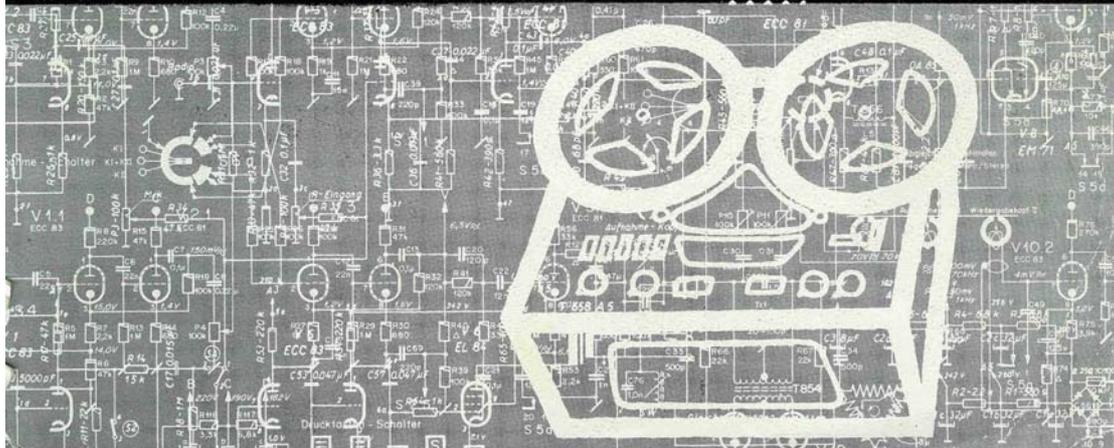




# REVOX G36

## Service Manual



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## 1 General

The REVOX Series 36 has been constantly improved and kept up to date, since it was first introduced in 1956. However, the present G still bears the same basic layout and conception as did the original A recorder.

Compared with the preceding models, the following major innovations have been incorporated in the REVOX G 36 recorder : Hysteresis-Synchronous Capstan motor, VU-meters for record level control and a tape-tension switch to permit the use of all reels from 7 inch up to 10 1/2 inch diameter.

The G 36 model is available in both 2 and 4 track versions. Identification is made by the appropriate number being stamped on the head mounting plate, and on the upper side of the lower chassis.

The recorder consists of an upper and lower chassis. These are joined at the rear by means of the back panel which carries the input and output sockets, mains voltage adjuster and fuse-holder, and at the front by means of the loudspeaker panel mountings. The upper chassis carries the tape transport mechanism and the lower chassis bears the power supply unit and the electronics.

All Audio Connections are led to standard phono sockets. To interconnect the REVOX recorder with other Audio Equipment, a selection of adapter cables is available.

## 2 Mechanical Description

The machine employs three motors. Two are identical and perform the wind and tension functions. The third motor is large and drives the capstan. It is of the pole switching variety and speed change is therefore effected electrically.

The wind motors are designed to provide pulse free torque. Back tension is applied by electrical counter torque during the record and playback functions as well as during wind.

The Capstan Motor is of the Hysteresis-Synchronous type, incorporating a special design feature to prevent hunting. By switching to either the 6 or 12 pole stator winding, the tape speed of 7 1/2 or 3 3/4 ips may be selected. The capstan drive, the pinch roller assembly and the headblock with the tape guides are carried on one die-cast frame. This ensures accurately parallel and permanent alignment of all major transport elements. The coupling between motor and flywheel consists of special silicone-rubber strips, with the whole assembly acting as a mechanical filter. A direct slip free drive is thus achieved whilst maintaining negligible wow and flutter.

The pinch roller is held against the capstan during record and replay functions with considerable pressure. This necessitates the use of a capstan bearing designed specifically to withstand considerable side pressure for long periods. The pinch roller

arm carries the shield for the playback-head and the tape-lift mechanism for the rewind function.

The brakes are mechanical in nature but are electrically operated. This is achieved by the action of the brake solenoid which pulls the brakes off during all operating functions. When the stop button is pressed however, or when the current fails for any reason, the solenoid is de-energized, and the brakes automatically come on, with the higher braking force always on the trailing spindle.

All functions are controlled by the push buttons. Arcing damage and noise is prevented by the use of diodes and RC networks. A sensing lever on the RH tape guide (3 in fig. 1 and 8) operates a switch (SE on schematic) which, in series with the stop button, provides a current path to a solenoid incorporated in the push button unit. This has the effect of clearing any selected function either by depressing the stop button or operation of the end of tape switch. On recorders up to serial No. 36 500, the function of the end of tape switch is delayed by about two seconds to avoid tripping during the start mode. On machines with higher serial numbers (recognizable by the end-of-tape switch being made of gold-plated wire with NC contact configuration) this time delay (relais) has been utilized to supply increased operating voltage to the wind motors, thus providing the required starting torque. (Inset schematic B and diagram 7.736.001-002:6 refer.)

The tape guide pins to the left and right hand side of the loading slot assist in achieving uniform tape tension due to the change in friction with varying wrap-around from large to small spooling diameters.

A three digit tape counter is driven from the take-up turntable by a rubber belt. The translucent resetting knob of the counter is lit by a small pilot bulb which acts as a mains indicator.

A remote control facility is provided

Removal of the shorting link from the socket on the rear panel and the insertion of the correct accessory plug, lead and switch, enables the recorder to be started or stopped in either the record or playback function as selected. Operation of the remote control switch has the effect of de-energizing both the capstan and brake solenoids.

ATTENTION If no remote control is used, the dummy plug must be inserted into the socket, otherwise the recorder will not start.

## ***2.1 Mechanical checks and adjustments***

It is advisable to use a full and an empty 10 1/2 inch spool when carrying out adjustments. For the majority of tape transport checks, it is essential to keep the plastic top cover in position. For other mechanical adjustments the top and head covers should be removed. To remove the plastic top plate, pull off the grey control knobs, the transparent selector discs and the plastic cover over the pinch-roller arm. Further undo the mounting screws (1 in fig. 2) of both turntables, of the head cover and the mounting lugs (2 in fig. 1) of the pinch-roller cover. When reassembling, take

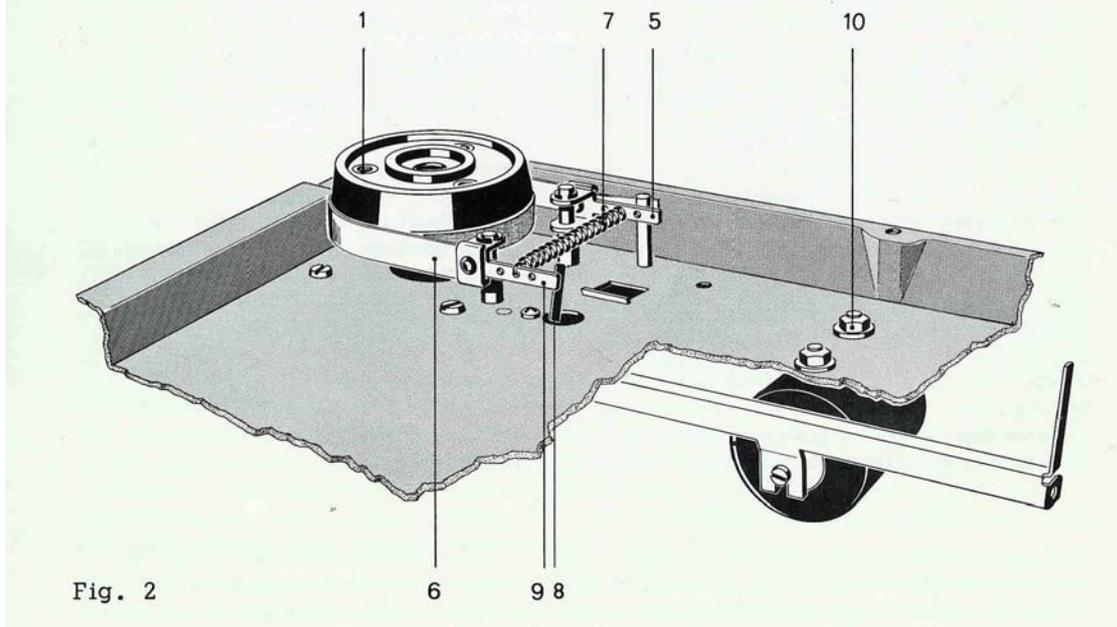
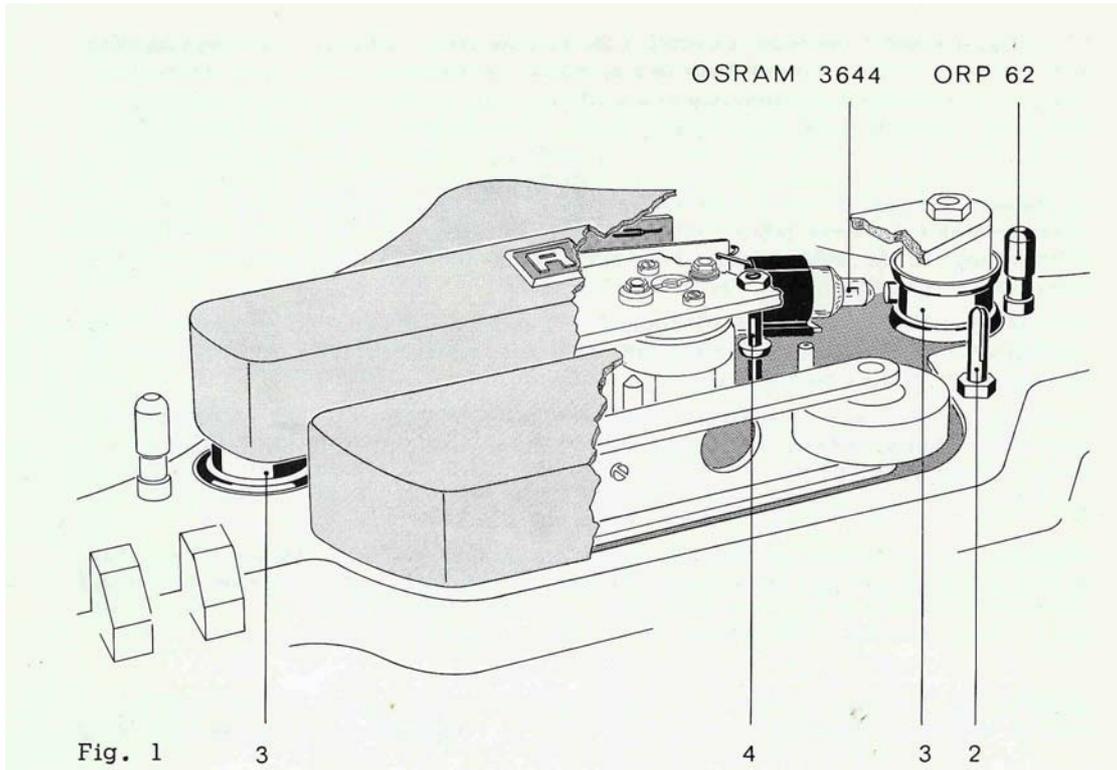
great care in tightening the turntable screws uniformly to prevent them from wobbling. For best results, they may have to be rotated by 120°.

### **2.1.1 Tape path**

The tape path level is determined by the left and right hand tape guides (3 in fig. 1) and by a small guide (4) positioned between the playback head and the capstan. We do not recommend that these guides should be interfered with in any way. Adjustment to the spool carrier height can of course be made to enable the tape to be wound centrally between the spool flanges. This is brought about by sliding shim-washers of varying thickness onto the spooling motor shafts after removal of the bakelite brake drums. To pull a brake drum off the shaft, screws should be inserted into the three tapped holes (1 in fig. 2) so as to serve as “handles”. Care should be taken to prevent damage of the brake bands at this stage. Where a brake drum has to be removed it is recommended that the brake band be removed first.

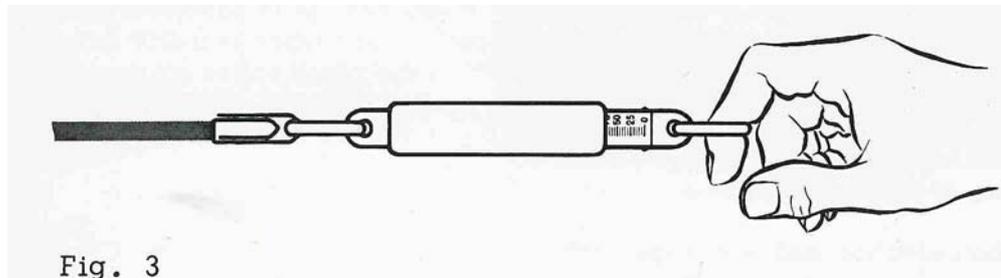
### **2.1.2 Brakes**

The layout of the brake system is shown in fig. 2. The mounting bracket (5 in fig. 2) on the rear end (stationary) of the brake band must be held tight against the vertical pin on the chassis by sufficient tension of the leaf-spring on the bracket.



It is important to check that the brake band (6) is running flat on the brake lining and not biting on the upper or lower edge. Adjust alignment of brake band by slightly pivoting it in the rivets if required.

Correct tension for spring 7 is obtained when 160-220 grams applied as a tangent force to a 10 cm diam (spool and tape) causes the spool to move. See fig. 3.



Brake tension may be altered by resetting the brake return spring (7) into any of the three holes on the end-brackets (5 and 9). The brake release solenoid must cause sufficient movement (approx. 3 mm) of the front-end bracket (9) to fully free the brake band from the lining.

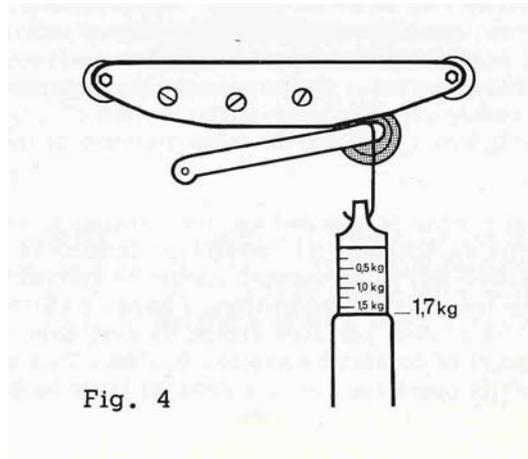
Depress the “stop” and “play” buttons simultaneously to energize the brake release solenoid. If the movement is incorrect, loosen the nuts (10) and re-position the solenoid. The front-end brackets of the brake bands may be bent to achieve simultaneous release of both brakes.

The brakes should be kept clean and dry. Do not use any oil or grease on the linings.

### 2.1.3 Tape tension

Back tension is applied by the combination of reverse direction torque from the feed motor and the degree of wrap around on the LH guide pin. Wear on the mechanical parts of the recorder will not alter the amount of tape tension. Any effects that could be attributed to inaccurate tape tension may be caused by:

- a. Faulty adjustment of the brake band
- b. Electrical fault in feed motor
- c. Electrical fault in phase shift-condenser  
(C 72 pos. 22 in fig. 5 and 6).



### 2.1.4 Pinch roller

The pressure of the pinch roller can be measured by a gauge fixed to the pinch roller arm as close as possible to the spindle of the pinch roller (fig. 4). A constant tone tape should be played and the pinch roller withdrawn by the gauge until the note is heard to change. A reading in the region of 1.7 kg should be obtained. Adjustment to this value can usually be obtained by turning nut no 13 in fig. 5. Should this not provide the necessary amount of correction it is advisable to check the position of the solenoid no 11 in fig. 5 which will be correct when there is approx. 0.5 mm clearance at point A (fig. 5) with the solenoid energized. It is essential that the solenoid's slug fully bottoms in the energized position and when properly adjusted, there should be no movement of the slug when lifting the pinch roller off the capstan. Correct setting can be obtained by loosening the nuts (12 in fig. 6) and moving the solenoid in the required direction.

### 2.1.5 End of tape switch

#### A. Photoelectric end-of-tape-switch

Recorders with serial numbers from 58 000 onwards are equipped with a light sensitive auto shut-off device. It consists of a light source (Osram 3644), the photoresistor ORP 62 and a printed circuit section containing two transistors (see fig. 1).

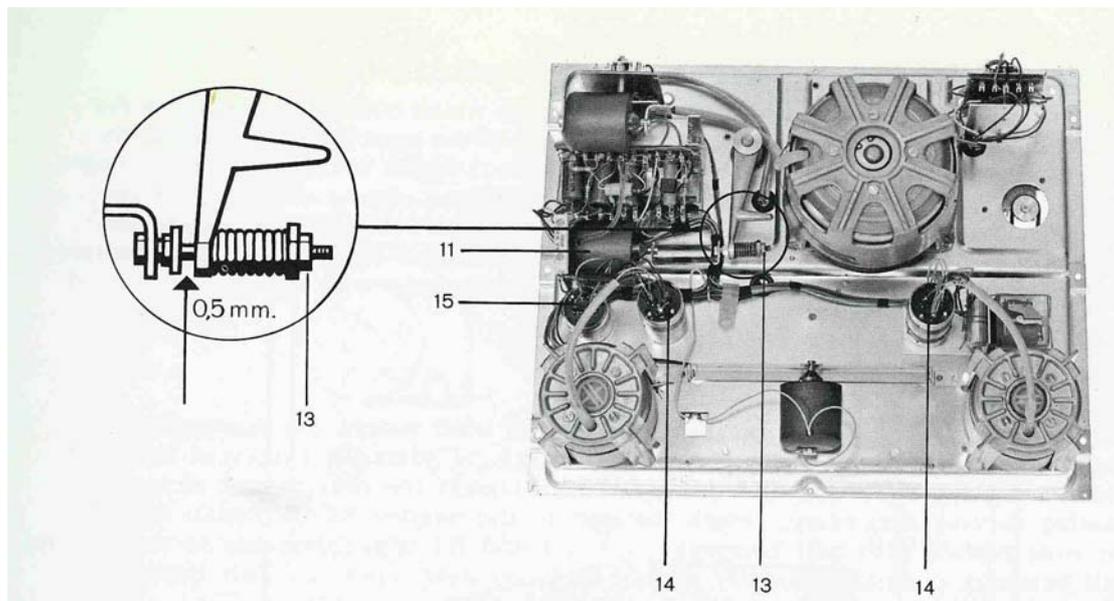
The photoconductive cell is housed in the tape guide pin on the right hand side of the recorder. It has a dark resistance of greater than 100 k $\Omega$  and this value drops to below 3300  $\Omega$  under illumination. The associated current amplifier energizes the push button release solenoid when light reaches the photoconductor. For normal operation of the recorder the sensing element is at its high dark resistance and both transistors are biased into cut-off. Illumination of the photo-resistor changes the bias condition on T1 thereby raising its collector current. A voltage drop develops across the solenoid winding and T2 begins to conduct. Since T2 opens a current path parallel to the photoconductor, positive feed back action sets in which causes the collector current of T1 to rise quickly into saturation.

To de-energize the solenoid and to restore the nonconducting condition, the supply voltage has to be interrupted.

#### B. Mechanical end-of-tape switch.

This switch and its associate operating levers must be thoroughly clean to function correctly. On G-36 recorders up to serial number 36 500, the tape sensing lever operates a snap-action switch (SE schematic A) which is closed with tape tension applied. The right position of the switch assembly is essential for correct operation to be obtained. This adjustment is carried out by slackening the fixing screws and moving the switch bodily until the snap-action switch closes when the sensing lever still protrudes by 0.5 to 1 mm from the outer diameter of the tape guide.

On recorders with serial number 36 500 and up, the sensing lever operates a gold-plated wire contact. This switch opens when tape tension is applied (see BE in schematic Band 7.736.001-002). Adjustment should be carried out analogue to the above specifications for the snap-action switch by bending the long wire loop. In the resting position sufficient contact pressure should be available to make the short wire loop move beyond the point of contact by approx. 0.5 mm. This is achieved by bending the contact wires while operating the tape sensing lever by hand.



The end-of-tape switch and its operating lever are then properly adjusted when the switch remains open (or closed on older models) for any movement of the sensing lever inside the tape-guide post. Accidental tripping due to sticky splices etc. will thus be avoided.

### 2.1.6 Wow and flutter

Accurate and useful measurement of wow and flutter can only be made with an appropriate instrument. The recorder is calibrated using the EMT Model 420. Possible causes of flutter may well lie with the capstan, capstan motor. Wow can usually be seen as associated with the pinch roller speed and in some cases a faulty pinch roller may be the cause, and in others too much back tension or insufficient pinch roller pressure. For all wow and flutter investigations the transport mechanism must be completely clean.

### **2.1.7 Tape speed**

Tape speeds can be checked by running a marked, measured length of tape through the recorder. For a 100 sec. run 950cm would be required at 3 3/4 ips and 1905 cm at 7 1/2 ips. The difference in running time in seconds will be the speed variance as a percentage. Some variance can be expected with temperature increase but this should lie within the quoted tolerance. In very cold weather it may be noted that the recorder runs accurately at 3 3/4 ips but slows down when switched to 7 1/2 ips. This is due to drag from the cold grease in the capstan bearing, especially when new. After a short time of operation at 3 3/4 the machine should be capable of running at 7 1/2 ips.

When detecting any deviations from the figures quoted, an accurate reading of the mains frequency should be taken first before investigating pinch-roller pressure, brakes etc. On a 50 cycle power line, a drop to 49.5 cycles will make the recorder run slow by 1% and this should be borne in mind when checking equipment with a specified accuracy of  $\pm 0.3$  percent.

## **2.2 Routine maintenance**

### **2.2.1 Cleaning**

From time to time the working parts of the recorder which come in contact with the tape should be thoroughly cleaned. Cleaning of the head faces is particularly important, especially in the case of four track heads where seemingly invisible particles can often have an adverse effect on performance. On no account must any deposits be scraped off with metallic tools. Loose tape dust, may be brushed off. For cleaning of the heads and capstan shaft, use a cotton-swab soaked with methylated spirits. (Avoid any solvents from coming into contact with the plastic parts of the recorder).

### **2.2.2 Lubrication**

The capstan motor, the capstan bearing and the wind motors are equipped with bearings of sintered material. Each bearing has an adequate supply of lubricant which should last for the life of the bearing. Should the replacement of a motor bearing become necessary, return the unit to the nearest REVOX Repair Station. On wind motors with ball bearings (Series I and II) it is advisable to replace the ball bearings

once their supply of lubricant has been used up. Felt linings are to be saturated with Teresso 43 (Esso).

If signs of wear become visible on the capstan shaft, the whole bearing plate complete with shaft should be replaced (see sect 2.3). Lubrication of the capstan bearings is not anticipated. However, where this can not be avoided, Teresso 43 (Esso) only must be used.

### **2.2.3 Servicing of solenoids**

When it appears that a solenoid is tending to stick or function erratically, it should be dismantled and the slug and housing thoroughly cleaned with methylated spirits. When both parts are properly clean and dry, molybdenum grease may be rubbed into the working surfaces, which must finally be wiped dry before re-assembly.

### **2.2.4 Servicing of push button assembly**

Conventional switch cleaners are not recommended for the high current spring contacts used in the REVOX, and where cleaning is necessary, the contacts should be polished clean. The interlocking bars and push-button shafts may require occasional greasing with molybdenum grease. Where a part of the assembly needs replacement, unscrew the four fixing screws, bend the pushbuttons to the right and ease the unit to a better working position. For better access to the switch assembly, the housing of the pinch roller solenoid should be removed by undoing the M 4 nuts (pos. 12 in fig. 6).

## **2.3 Removal of capstan assembly**

This may become necessary where the recorder is to be used on a mains frequency which differs from that for which the recorder was manufactured, or when replacing the capstan assembly becomes necessary.

Having removed the chassis, as described in sect. 2.1. from the cabinet and the loudspeaker and panel, separate upper and lower chassis sections by undoing screws no 16 shown in fig. 6. Lift upper chassis without exerting excessive force, if necessary loosen the fixing screws of the selector switches (18 in fig. 6) to gain more freedom of movement.

Unscrew the capstan mounting nuts (19 in fig. 6) and remove the assembly downwards and forwards out of the chassis. The fixing screws 20 in fig. 7 on the flexible coupling are to be removed through the large holes in the capstan bearing plate. The motor mounting screws (21 fig. 7) should now be removed using REVOX's special 8 mm nut driver, after which the flywheel assembly can be separated from the motor.

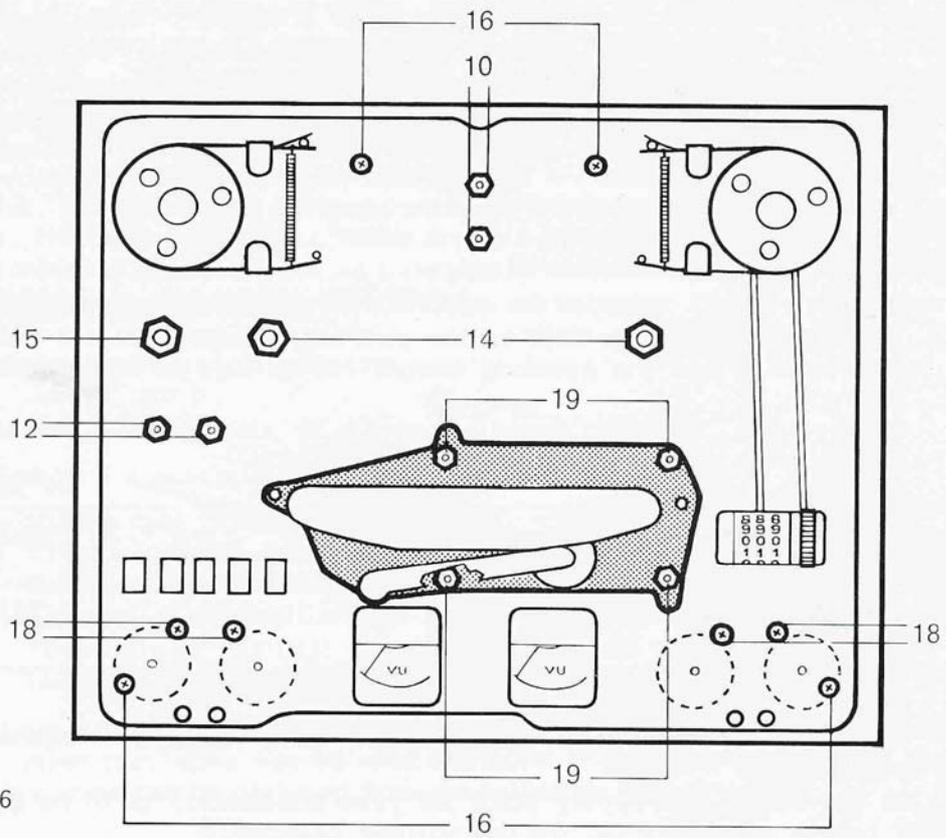


Fig. 6

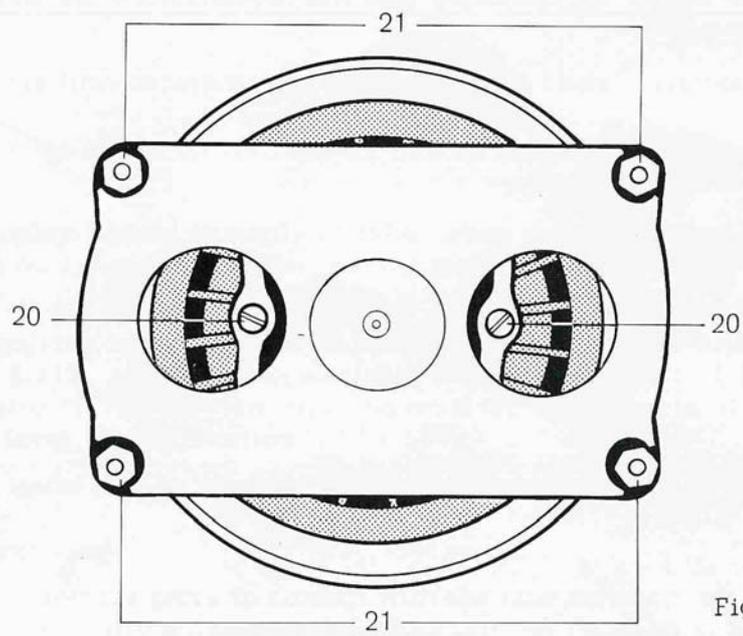


Fig. 7

### 3 Electronic Description

Access to the majority of the electronics of the recorder can be obtained by removing the base of the recorder. The REVOX G-36 has two identical record- and replay-channels. The common bias and erase Oscillator can be switched onto either one or both channels, thus allowing stereophonic recordings, two-track sound with sound and monophonic recordings. Each channel is equipped with pre-amplifier stages to accept low-level signals from linear high-impedance sources. (Step-up transformers are required where low-impedance dynamic microphones are being used.) For monitoring the signal level, the recorder is equipped with two VU-meters and associated matching amplifiers. The built in power amplifier drives a 21 cm Ø loudspeaker and an appropriate switching arrangement permits listening to either one - or both channels, before and after tape.

#### 3.1 Circuit checks and adjustments

##### 3.1.1 Measuring instruments

The following items are essential:

- a) 10 000 Ω/V DC Multi range meter
- b) VTVM with min. sensitivity of 3 mV full scale
- c) Low distortion audio generator
- d) Appropriate calibration tape (use "REVOX Bezugsband" or "Bezugsband" 19 DIN 45513" both of which have a frequency response corresponding to the G-36 equalization characteristic)

Where a test tape with response characteristics of the recorder under examination is not available, other test tapes may be used and a set of correction figures for the individual frequencies can be obtained from the following equation:

$$\Delta A = 10 \lg \frac{1 + \omega^2 \tau_2^2}{1 + \omega^2 \tau_1^2} \quad (\text{db})$$

valid when  $\tau_2 > \tau_1$

$\tau_1$  and  $\tau_2$  designate the time constants of the equalization characteristics.

Other desirable but not essential instruments include a Distortion Factor Meter and an Oscilloscope.

Direct record and replay figures can only be taken when a suitable bias filter is connected between the output of the recorder and the measuring instrument.

An external filter will not be necessary for those REVOX G-36 Recorders which are already equipped with the bias-suppression circuit (printed circuit with L3, L4, C 48, C76, C77, C78, R112 and R113 on amplifier chassis to the left of P1, see fig. 14 and

schematic G-36) provided that the residual RF-signal is at least 35 db below peak record level (3 % distortion).

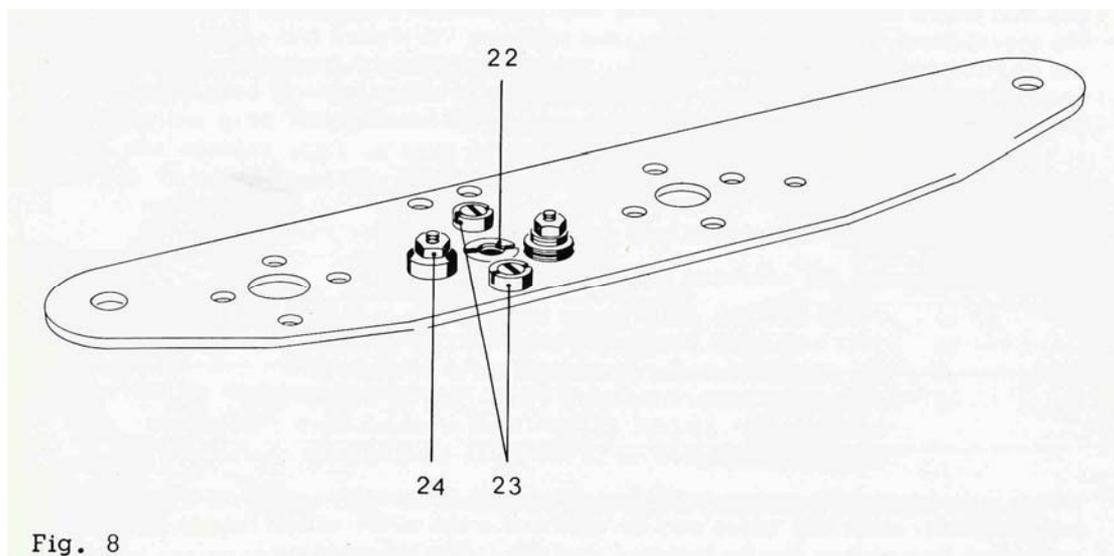
A wow- and flutter meter may be required in rare instances only.

### 3.1.2 De-magnetising

From time to time the ferrous parts in contact with the tape may become magnetised. When this occurs, especially with head magnetisation, an increase in background noise will be evident and in serious instances, partial erasure of the tape may come about. De-magnetisation should be carried out with the appropriate instrument at frequent intervals and care should be taken at all times to ensure that magnetised tools do not come in contact with the head assembly. Permanent damage may be caused to a calibration tape by magnetised sound heads, as they will tend to partially erase the high frequencies on the tape. They may also have some adverse effects on the overall performance of the recorder.

### 3.1.3 Head alignment

Head adjustment should only be necessary when a head requires replacement or where the setting has been interfered with.



Five adjustment screws are provided I their functions are as follows:

The centre screw no 22 must be undone to remove the head or to adjust the head around the vertical axis. Adjust screw no 23 at the rear of the head for height, which will be correct when the upper brass spacer of the heads is divided by the upper tape edge. Front screw no 23 should then be adjusted to bring the head face vertical with the tape. Azimuth adjustment must be carried out by turning nut no 24.

Azimuth adjustment of playback head

Good high frequency response is possible only when the gaps of the record- and playback heads are parallel to each other. Where recordings are to be exchanged for replaying on other machines, it is furthermore essential that the head gaps are accurately aligned to an angle of  $90^\circ$  against the direction of tape travel.

Correct adjustment is achieved by proceeding as follows:

- connect VTVM to the output of one channel
- run alignment tape and adjust nut 24 until a maximum reading is obtained from the VTVM (observe the instructions included with the tape)

When correctly aligned, a sharp maximum will be indicated and the signal level must drop when turning nut 24 in either direction.

#### Azimuth adjustment of record head

It is essential that the playback head has been aligned as outlined above.

- record 12 kc/s on good quality blank tape
- with the output coupled to a VTVM nut 24 of the record head should be adjusted to give maximum output from the tape.

It is of little significance which of the two channels is used for carrying out the azimuth adjustment, however, it is advisable to check the performance of the other channel also.

#### Head adjustment by the phase check method

The azimuth position of the head gap on stereo tape recorders influences not only the signal level at high frequencies, it also effects the phase relation between channels. The criterion of minimum phase deviation provides a more accurate indication of correct gap angle than the adjustment for maximum output level.

To avoid a phase angle error of  $90^\circ$ , the azimuth should first get aligned by adjusting for level maximum.

A simple method for adjusting phase can be seen from the diagram fig. 9. Both channels are connected in parallel and azimuth adjustment is carried out at a test frequency of 10 kc/s to give maximum output from the tape. Where a double beam oscilloscope is available this should be employed so that traces from both channels can be observed simultaneously. Accurate azimuth alignment will permit phase to be maintained between channels at all frequencies, when correctly aligned a change of frequency will not affect the locking of phase between channels.

To adjust the record head ensure that playback head is correct. Using the playback channel as a measuring reference, a signal of 10 kc/s should be recorded and the record head adjusted to give maximum playback output. Again the phase check method may be employed and this will have the effect of phasing the machine from input to output via tape at all frequencies.

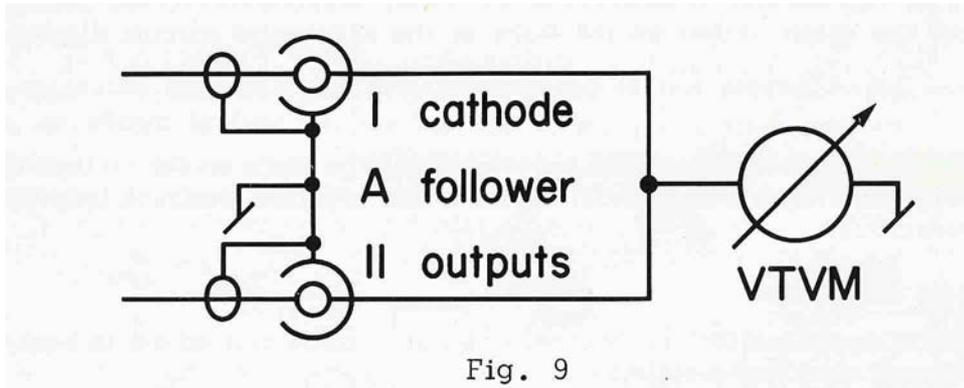


Fig. 9

### Adjustment of four track heads

This is a highly delicate operation as with a track separation of only 3/16", slight inaccuracies in head alignment cause a track overlap and lead to the very annoying "dead channel" cross-talk.

Where a four track recorder is under examination, it is advisable to obtain the REVOX four track alignment tape.

Relevant instructions are included with the tape.

### **3.1.4 Playback amplifier**

Before any tests are made on the playback section of the recorder, it is essential to ensure that the sound heads are scrupulously clean; minute particles may cause false readings by partially lifting the tape off the heads.

Connect a VTVM to the cathode follower output of each channel in turn. A reference signal recorded at 32 millimaxwell per 1 mm of tape width should give an output of approximately 3 db below that specified in the technical data (refer to 5.). The frequency response section of the calibration tape is normally recorded 20 db below this level for measuring the performance characteristics of the playback channels.

A response of + 2/-3 db referred to the level at 1 kc/s is acceptable. Where unsatisfactory figures are obtained it is advisable to replace the playback head as outlined in 3.1.3. and take new readings. Should this not bring about the desired improvement, the playback pre-amplifier should be examined. Remove the earth connection of the playback head and insert a 10Ω resistor in series (fig.10.)

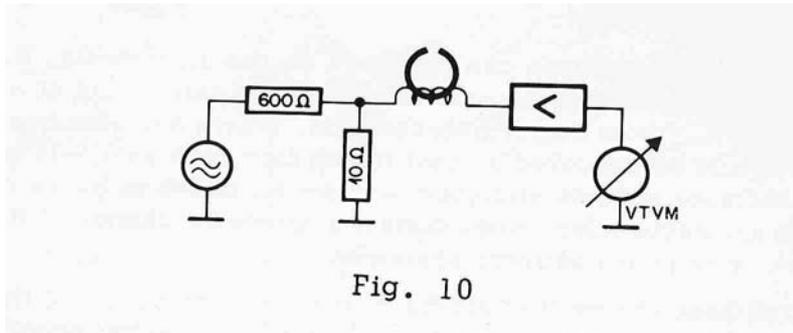


Fig. 10

Connect an audio generator across the resistor and adjust output at 1 kc/s to give 70 mV at the cathode follower. The frequency response obtained should coincide with the graph shown on the back of the respective circuit diagram.

Where a considerable deviance exists, checks should be made on the voltage values obtained within the circuit with special regard to the negative feedback loop which is frequency conscious.

### 3.1.5 Bias adjustment

The procedure is described for one channel only. It is to be carried out in both channels for achieving identical performance.

Connect a VTVM with a bias filter (described in 3.1.1.) in circuit to the output of the playback amplifier. Press the record button, leaving the record level control closed, and tune the filter for minimum indication on the VTVM. This external filter will not be required on REVOX G-36 recorders already equipped with bias-traps. It must be observed, however, that the residual bias remains below the level specified under 3.1.1.

Where a filter is not available, the overall performance can not be tested while recording, as bias leakage masks the audio signal. It will be necessary to take all readings after first recording, rewinding and then playing the tape again.

Any alteration of the bias current changes the remanent tape flux and consequently effects output level, frequency response and distortion. As no two heads can be made to perform exactly alike, there is little value in measuring the bias current alone and directly. In adjusting the bias current, all of these variables are taken into consideration and the near optimum value has to be found first before the frequency response tests can be commenced with.

The recommended procedure is to employ a long playing tape of compatible quality and record a 1 kc/s signal approx. 3 db below full modulation at the 3 3/4 ips tape speed. The bias should be adjusted with P 10 and P 11 (fig. 14) for channels I and II respectively, for maximum audio output.

The generator signal level should then be reduced by 20 db and the output level noted. After changing the frequency to 10 kc/s, bias should be adjusted to an output identical to that at 1 kc/s.

### 3.1.6 Measurement of overall frequency response

Before any attempt is made to verify the overall response, it is advisable to see that all tests described in the preceding paragraphs have been properly observed and that the settings arrived at have been left undisturbed.

A 1 kc/s signal should be recorded via the radio input socket at reference level, viz: the same output voltage should appear on the cathode follower as from the reference level of the calibration tape. The level of the signal should then be attenuated by 20 db and the "overall" response curve taken. It is essential for this test that the signal level is some 25 db below peak record level (3 % dist) otherwise the record pre-emphasis may lead to tape saturation at high frequencies thus producing false test results.

Where the frequency response deviates from the specified tolerance of  $+2 / -3$  db, a slight re-adjustment of the bias current may be necessary. Any variation in bias has a pronounced effect on the frequency response.

If a fault is suspected to lie in the record section of the recorder, the record head should first be changed. If this does not prove to be the cause of the trouble the response curves of the amplifier should be checked with the bias oscillator valve removed.

To measure the response characteristic of the record pre-emphasis use a test circuit as shown in fig. 12.

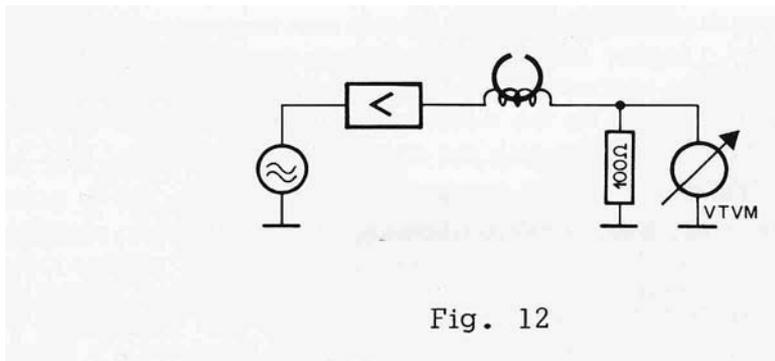
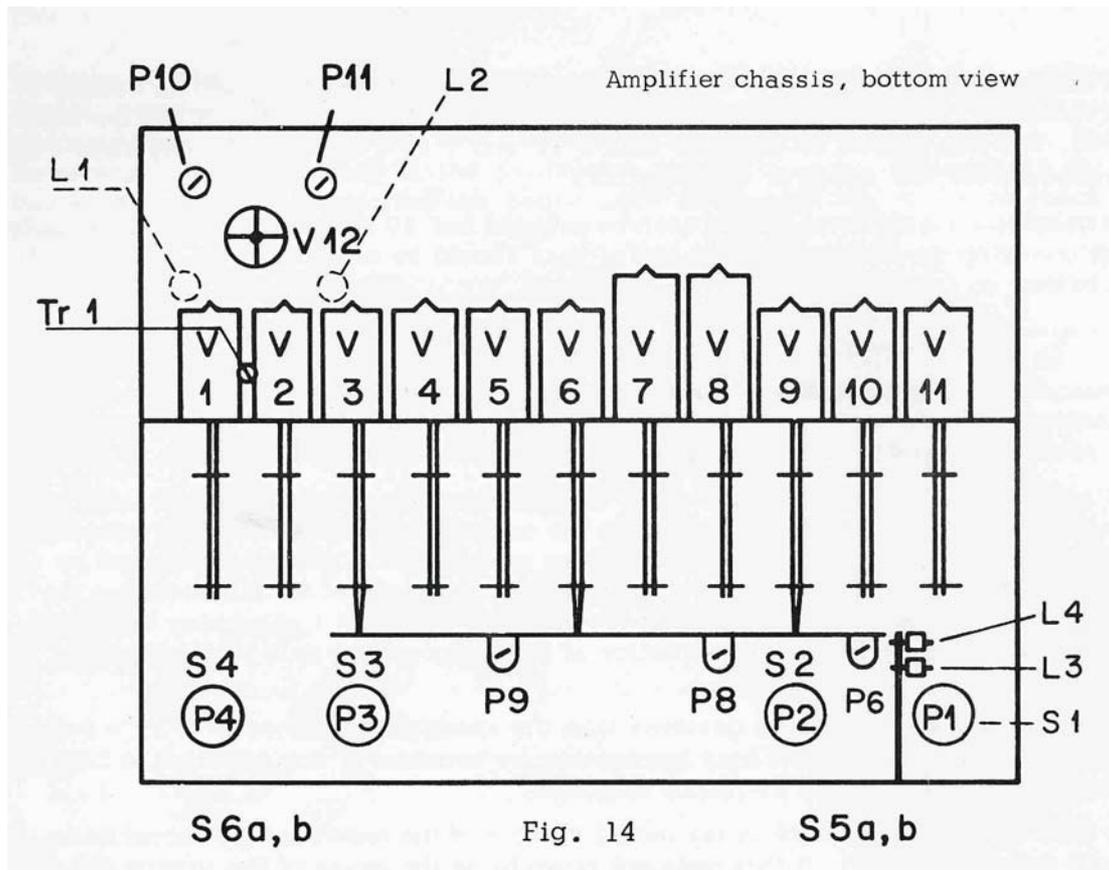


Fig. 12

The frequency response obtained should coincide with the graph shown on the back of the respective circuit diagram. Considerable deviations would indicate valve aging, or faulty components in the frequency conscious networks of the record amplifier.



### 3.1.7 VU-Meter adjustment

Peak record level is defined as the level at which the signal contains 3 % of third harmonic due to tape distortion. This should correspond to an output level approx. 3 db above the reference level of the calibration tape.

Where a distortion analyser is available, the alignment procedure is as follows:

Record a 1 kc/s signal via the radio input with the record level control wide open and adjust generator level until a distortion factor of 3 % can be measured on the cathode follower output. A "lead" (higher sensitivity) of 7 db is required on the VU-Meter to compensate for its ballistic characteristic. The generator level should now be attenuated by 7 db and the trimpot on the meter amplifier adjusted for 0 VU-indication on the meter. Adjustment is made with the trimpots P 8 and P 9 (fig. 14) for channel I and II respectively.

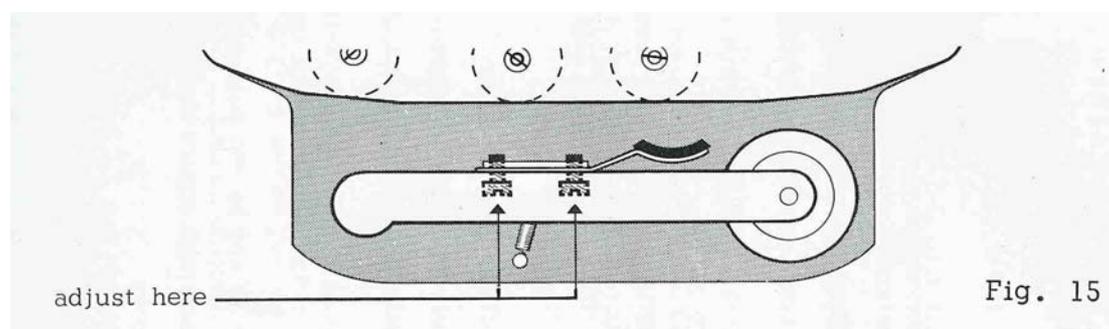
Lacking a distortion analyser, a reasonably accurate alignment is possible by the following method:

Note the output level produced from the reference section of the calibration tape. Record a signal of identical frequency, adjusting the input level until a level 4 db below reference level appears on the cathode follower output. Now set the trimpots of the meter-amplifiers to obtain a 0 VU reading on the meters.

### 3.1.8 Adjustment of head shielding

This may sometimes be necessary in order to keep the operating hum levels at a minimum. It should be noted also that since hum can be picked up by the electronics on the underside of the recorder, care must be taken to screen the base when the chassis is removed from its case, whether on the service bench for attention, or when built into a cabinet.

To adjust the playback head shield, place two spools on the recorder with a half reel of tape wound on each and without threading the tape depress the play and stop buttons. The tape should remain stationary and the head shield may be adjusted to give the lowest reading on a milli voltmeter connected to the cathode follower output. If two meters are available it is advisable to check both channels simultaneously since an improvement in one may bring about a deterioration in the other.



### 3.1.9 Channel to channel crosstalk

Certain physical limitation prevent one from achieving infinite crosstalk rejection. A crosstalk figure of 50 db can be reached in practice and is generally considered acceptable.

It may however still be irritating in such cases where extreme level differences exist in the recordings of adjacent tracks.

When checking crosstalk, one should never listen to the “dead channel” with a wide open monitor gain. Depending on the reserve gain available in the monitor system, the slightest amount of crosstalk will thus become audible. Crosstalk behaviour can be judged by exact measurement only.

To adjust the recorder for minimum crosstalk a reference recording at full modulation (preferably music) is required on one track only. While making this test recording it is important that the bias and audio signals are inoperative on the other channel. (Channel-selector in position I or II respectively, level control of the unused channel closed). After re-winding, the recorded section is to be replayed while monitoring the unrecorded track. By adjusting trimpot P6 (fig.14) reduce any audible crosstalk until a minimum is reached. The optimum setting for P6 is found by repeating the above procedure with a recording on the other track.

### **3.2 Tuning the bias traps**

The following procedure is suggested for tuning the filters L 1/T 855 and L 2/T 855 (see schematic G 36, 6) on the output of the stages V 5. 1 and V 5.2 :

The record circuits of both channels should be switched on by depressing the buttons "record" and channels I + II (stereo), causing the oscillator (V 12) to generate 70 kc/s. The record level controls P 3 and P 4 remain closed. A VTVM or oscilloscope with a sensitivity that assures useful deflection at 1 mV 100 kc/s should be connected to pin 1 on the socket of V 5 (Plate, Channel I) and the slug of L 1 (Fig. 14) is to be tuned for a minimum reading. After connecting the VTVM or oscilloscope to pin 6 of the same socket (Plate, Channel II) the slug of L 2 should get tuned analogue to the above.

Tuning of the bias filters on the cathode follower outputs V 9 and V 11 (not obtained in the early version of the G-36) :

The record circuits should be turned on as described above. With the VTVM or oscilloscope connected to the cathode follower outputs A - K I and A - K II the slugs of L 3 and L 4 (Fig. 14) respectively should get tuned for minimum indication on the test equipment.

## 4 Troubleshooting

### 4.1 Mechanical troubleshooting

Trouble	Cause	How to repair
Capstan motor does not run at either speed	Speed switch in mid-position Speed switch defective Jamming motor Jamming capstan bearing	Switch to 3 3/4 or 7 1/2 speed Replace wafer Clean and lubricate bearings (2.2.2.) Replace capstan assembly
Noisy capstan	Felt of the lower bearing damaged Loose flywheel Damaged capstan-bearing Damaged motor bearing	Replace felt and lubricate with SAE 20 oil Tighten fastening nut Replace capstan assembly Replace motor
Tape speed too low	Open-circuit motor-winding Faulty motor condenser Jamming capstan	Replace capstan motor Replace motor condenser Replace capstan assembly
Capstan runs at 3 3/4 but not at 7 1/2 ips	Recorder too cold and drag from new bearing or grease too great	Run at 3 3/4 for a few minutes. Recorder will then pick up to 7 1/2 ips
Pinch roller arm does not operate	Dirty solenoid Dirty contacts in the push-button assembly Dummy-plug of remote control removed	Clean and adjust solenoid (2.2.3.) Clean and adjust solenoid (2.2.4.) Connect pin 1, 2 and 3 of the remote control socket
Brakes do not release	Dirty brake-solenoid Dirty contacts in the push-button assembly Dummy plug removed	Clean and adjust solenoid (2.2.3.) Clean and adjust contacts (2.2.4.) Connect pin 1, 2 and 3 of the remote control socket
Push-button will not remain in pressed position	End of tape switch does not operate Incorrectly threaded tape	Adjust (2.1.5.) Thread the tape as explained in the instruction manual
End of tape switch does not operate	Dirty solenoid End of tape switch contacts maladjusted Light bulb defective. Light-port in the right-hand guide pin blocked with tape dust.	Clean and adjust (2.2.3.) Adjust (2.1.5.) Replace light bulb Osram 3644 Carefully clean the opening.

Wow and flutter	Damaged or dirty pinch roller, pinch roller pressure insufficient, left side brake maladjusted, jammed turntable motor.	Replace pinch roller. Clean capstan and pinch roller, adjust pinch roller arm (2.1.4.) adjust brake (2.1.2.) clean and lubricate motor-bearings
Fast rewind or forward too slow	Brake maladjusted Dirty brake solenoid Open-circuit winding in the Turn-table-motor Defective motor-condenser	Adjust brakes (2.1.2.) Clean solenoid (2.2.3.) Replace turntable-motor  Replace motor-condenser

## 4.2 Electronic troubleshooting

Trouble	Cause	How to repair
Playback hum	Disconnection in the playback head Front shielding of the playback head out of adjustment	Replace playback head Adjust front shielding (3.1.8.)
Playback hiss	Faulty tube in the playback amplifier Magnetised playback head	Replace tube De-magnetising the head (3.1.2.)
Bad treble response	Dirty head Heads out of alignment Worn out heads Tape wrongly threaded	Clean the heads (2.2.1.) Adjust the heads (3.1.3.) Replace heads Thread tape as explained in the instruction manual
Absence of recording or insufficient recording	Bias incorrect Dirty recording-head Defective recording-head Dirty contact of recording push-button Incorrect bias adjustment Defective bias-oscillator	Adjust bias (3.1.6.) Clean the head Replace the head Clean and adjust contact  Adjust bias (3.1.6.) Check bias-oscillator tube, coil and erase head
Insufficient erasure	Erase head soiled Erase head defective Bias-oscillator defective	Clean heads (2.2.1.) Replace erase head Check bias-oscillator tube, coil and erase head
No indication on the VU-meter	VU- meter defective Indicator amplifier valve defective Maladjusted potentiometer	Replace VU-meter Replace valve  Adjust level control (3.1.7.)
Short circuit in the power supply	Speed switch of capstan-motor burned out	Replace wafer

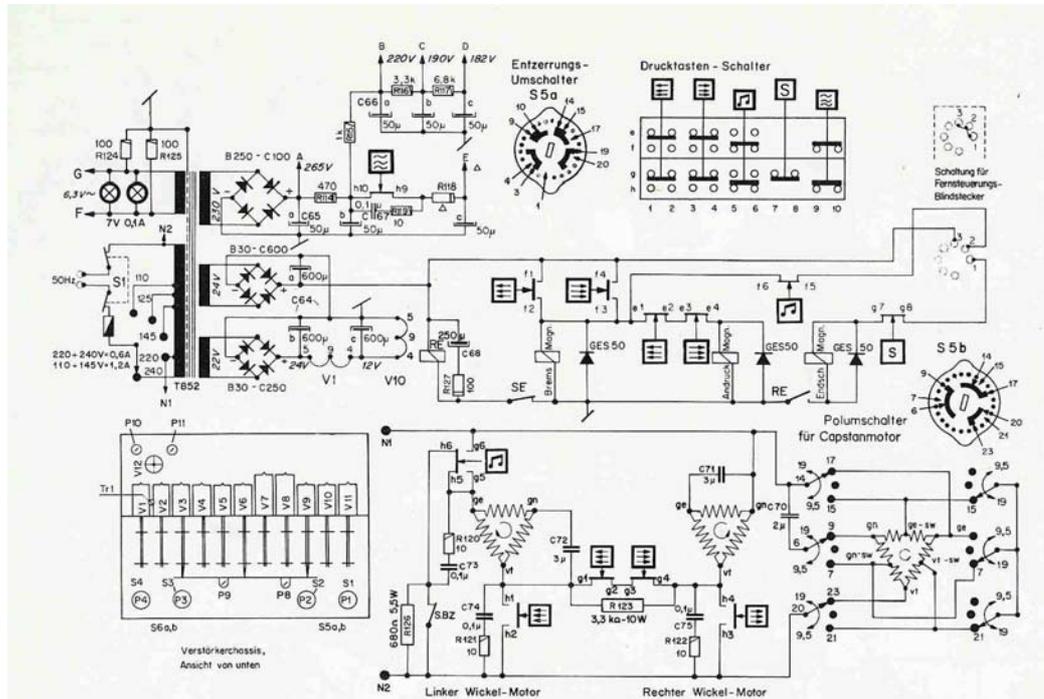
## 5 Technical Data

Tape Speed:	3 ¾ and 7 ½ ips 6/12 pole Hysteresis Synchronous capstan motor, direct drive
Wow and flutter:	≤ ± 0.1%, at 7 ½ ips peak reading ≤ ± 0.15%, at 3 ¾ ips weighted (DIN 45507)
Tape speed deviation:	≤ 0.3%, from nominal
Max. spool size:	10 ½" (265mm)
Rewind – time:	120s for 3300ft of tape (10 ½" reels)
Frequency Response:	40 – 18 000 c/s at 7 ½ ips +2/-3 db 40 – 12 000 c/s at 3 ¾ ips +2/-3 db
Equalization:	In accordance with IEC standards 70 µs/3180 µs at 7 ½ ips 140 µs/3180 µs at 3 ¾ ips
USA / 60 cps:	In accordance with NAB standards 50 µs/3180 µs at 7 ½ ips 940 µs/3180 µs at 3 ¾ ips
Harmonic distortion: (overall)	≤ 3% at peak recording level
Signal to noise ration unweighted:	2-track recorder 55db peak recording level at 4-track recorder 52 db 3% harmonic distortion
Dynamic range:	2-track recorder: 55db at 7 ½ ips 53db at 3 ¾ ips 4-track recorder: 52db at 7 ½ ips 50db at 3 ¾ ips
Crosstalk:	Mono 60db Stereo 40db
Oscillator-bias frequency:	70 kc/s, push-pull oscillator
Inputs per channel:	1. Microphone 3mV, Ri = 0.5 MΩ max. 600mV 2. Radio / <u>Tuner</u> 50mV, Ri = 1 MΩ max. 10V 3. Diode / <u>Aux.</u> 3-50mV, Ri = 47 kΩ adjustable
Outputs:	2 High Impedance outputs, Eout ≥ 0.7V (2-track) Load resistance not less Eout ≥ 0.5V (4-track) than 0.1 MΩ 1 loudspeaker output 5Ω, 6W rms. Push-pull power amplifier, internal speaker may be switched off.
Tube complement:	4xECC81, 1xECC82, 5xECC83, 2xECL86, 2 Transistors, 5 silicon diodes, 3 selenium rectifiers
Power line voltage:	110, 125, 145, <u>220</u> and 240 V, 50 cps
USA	117 V / 60 cps
Power Requirements:	Approx. 120W
Fuses:	for 220-240 V : 0.6 A 5 x 20 mm for 110-145 V : 1.2 A slow blow
USA	117 V : 1.2 A slow blow type 3 AG
Weight:	Approx 45 lbs

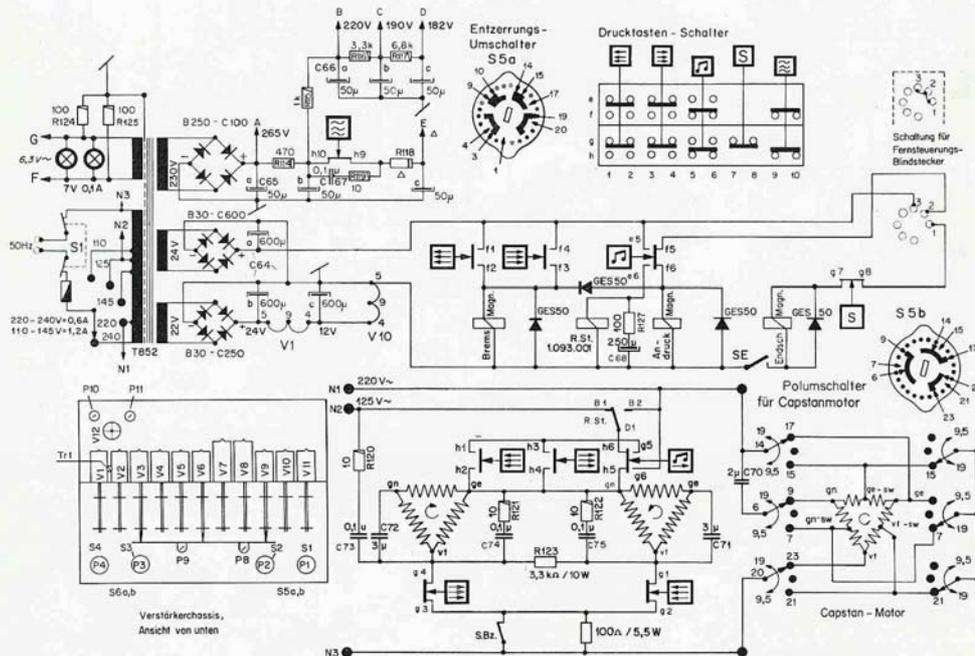
Case dimensions: 19 x 13 ½ x 12”  
Chassis dimensions: 21 ¾ x 15 ½ x 10 ¾”  
(with 10 ½” reels)  
Colour: grey

All data are valid for the 2-track as well as for the 4-track recorder unless specified otherwise.

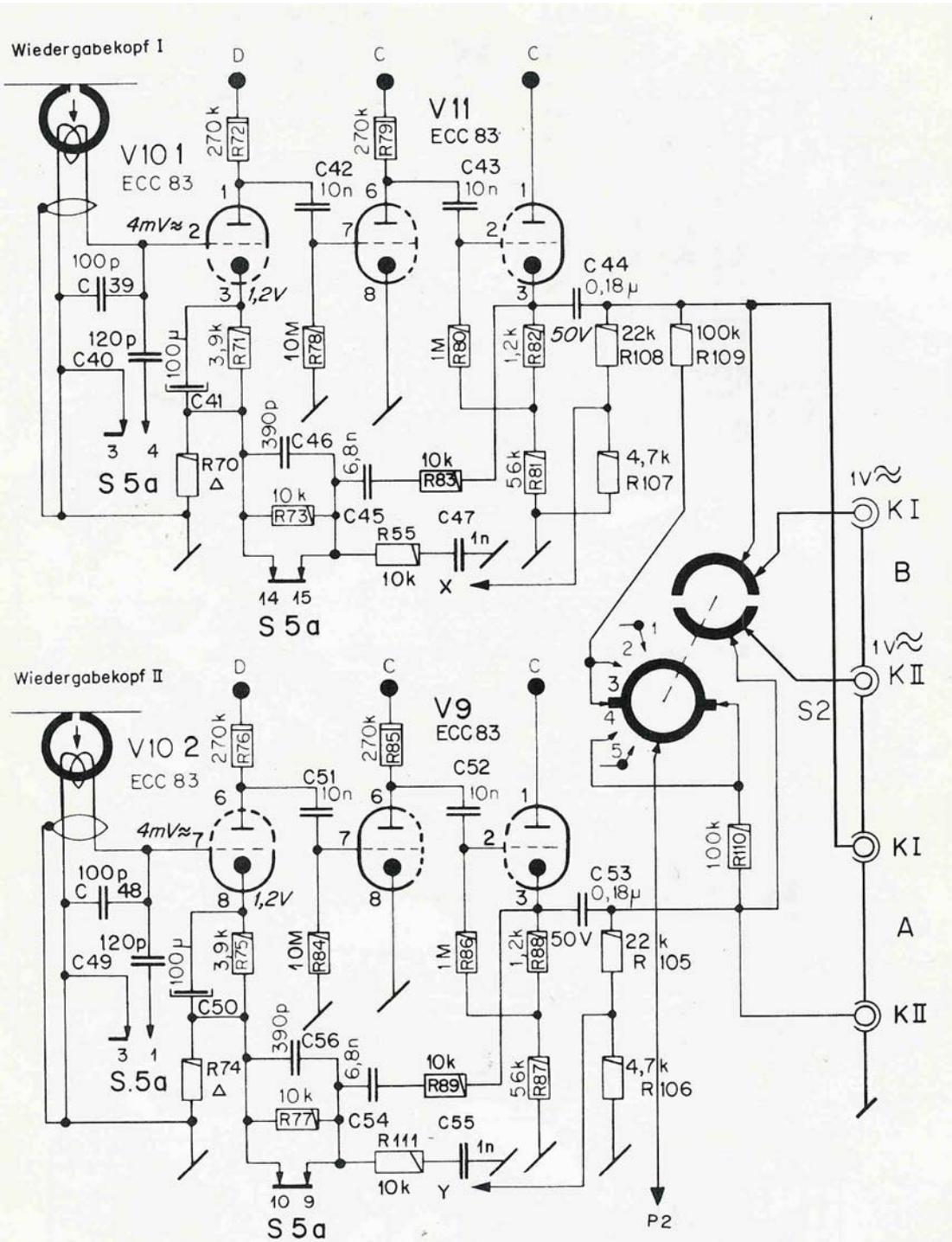
## 6 Circuit Diagram



Circuit Diagram A  
 REVOX G 36 no 35 001 - 36 500  
 Motor- and controlcircuit with power supply



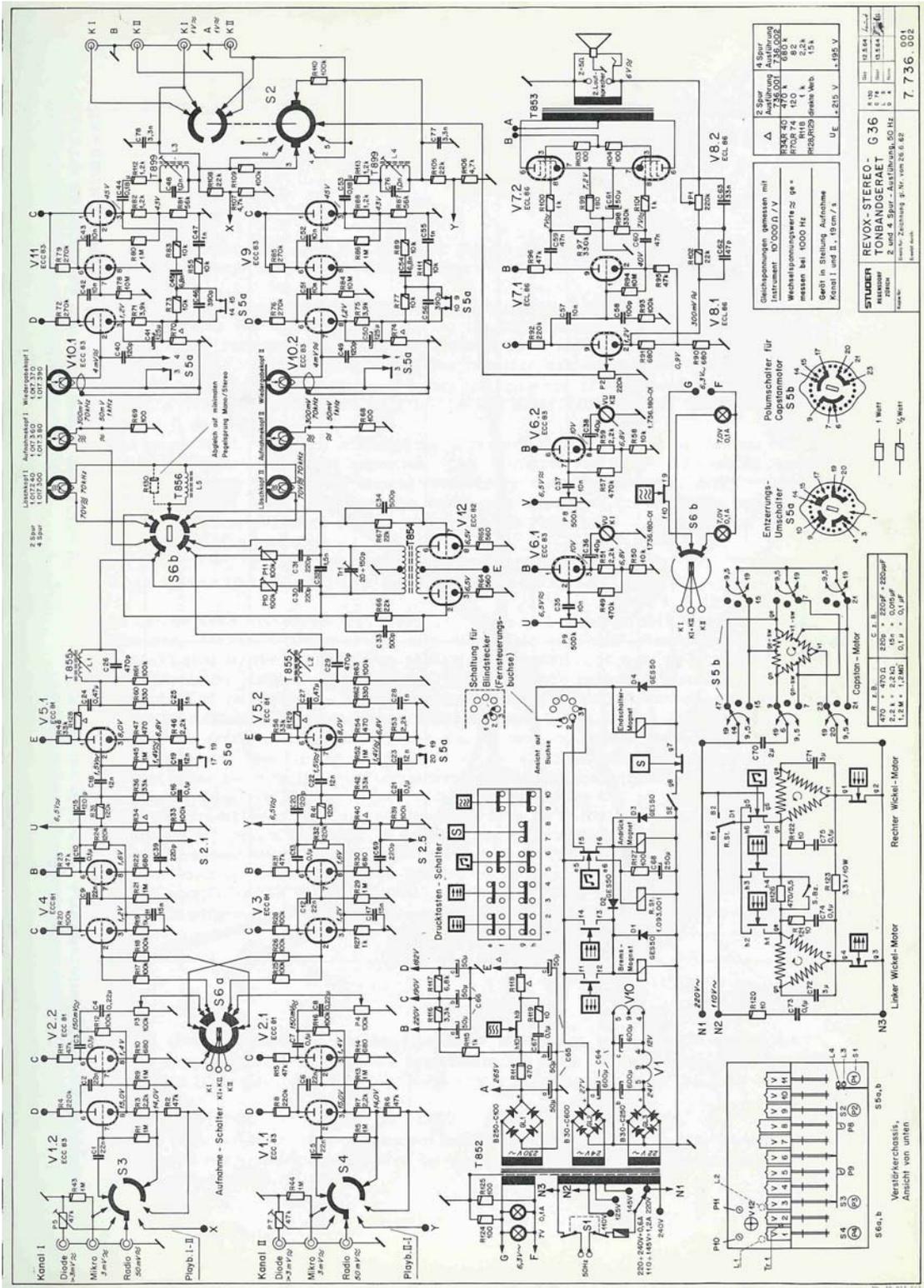
Circuit Diagram B  
 REVOX G 36 no 36 501 - 37 400  
 Motor- and controlcircuit with power supply



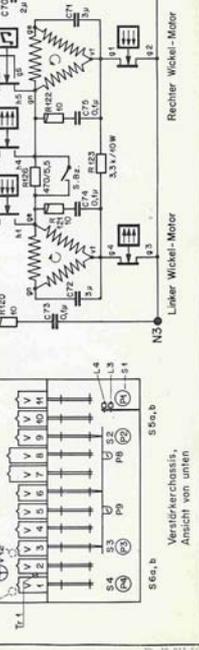
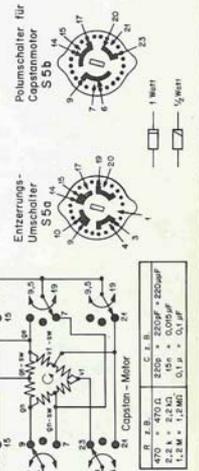
Circuit Diagram C

REVOX G 36 no 35 001 - 37 000

Circuit of the playback amplifiers, cathode-follower outputs without bias traps.



<b>STUOER</b> REVOX G36 Stereo-Verstärker	<b>REVOX-STEREO</b> <b>TONBANDGERÄTE</b> G36 Stereo-Verstärker Kanal I und II, 19cm / s Ue - 215 V, ±195 V	8 100 10 100 12 100 14 100 16 100 18 100 20 100 22 100 24 100 26 100 28 100 30 100 32 100 34 100 36 100 38 100 40 100 42 100 44 100 46 100 48 100 50 100 52 100 54 100 56 100 58 100 60 100 62 100 64 100 66 100 68 100 70 100 72 100 74 100 76 100 78 100 80 100 82 100 84 100 86 100 88 100 90 100 92 100 94 100 96 100 98 100 100 100	19.5.54 7.36.002
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<b>STUOER</b> REVOX G36 Stereo-Verstärker	<b>REVOX-STEREO</b> <b>TONBANDGERÄTE</b> G36 Stereo-Verstärker Kanal I und II, 19cm / s Ue - 215 V, ±195 V	8 100 10 100 12 100 14 100 16 100 18 100 20 100 22 100 24 100 26 100 28 100 30 100 32 100 34 100 36 100 38 100 40 100 42 100 44 100 46 100 48 100 50 100 52 100 54 100 56 100 58 100 60 100 62 100 64 100 66 100 68 100 70 100 72 100 74 100 76 100 78 100 80 100 82 100 84 100 86 100 88 100 90 100 92 100 94 100 96 100 98 100 100 100	19.5.54 7.36.002
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Frequenzgang Wiedergabeverstärker  
 Courbe de réponse Amplificateur de lecture  
 Playback Equalization

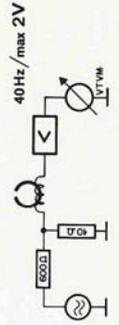
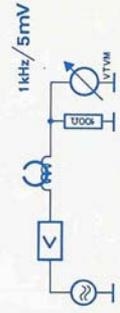
Frequenzgang Aufnahmeverstärker  
 Courbe de réponse Amplificateur d'enregistrement  
 Recording Pre-emphasis



db  
 db

Frequency

9.5 cm/s IEC  
 19 cm/s IEC  
 9.5 cm/s IEC  
 19 cm/s IEC



Modifications effective from serial number:  
48401 (Motor-control circuit) onwards  
48701 (Transmission response of record amplifier)

#### Motor - control circuit

Changes in the circuit of the spooling motors were effected in order to improve the performance during the start-mode under extreme ratios of the supply and feed loads. The relay R. St. mentioned on page 3 which operates with a delayed release time, now supplies the higher voltage during the start-mode to the right hand spooling motor only. Perfect starts are thus assured even with small tape roll diameters on both sides. In situations where the recorder has to be started with large tape roll diameters on the right hand side, performance is improved by the fact that the tension remains -constant on the left hand motor during the operating time of the R.St. relay.

The relay R.St. is being actuated by a current pulse. It remains de-energised during all other stages of operation. The condenser C 68 (250 mF) which receives its charge from the 24 Volt supply, discharges through the R.St. relay when depressing the play-button and the relay gets energised for 0,3 sec. approx., thereby feeding a higher supply voltage to the right hand spooling motor for that period of time.

#### Transmission response of record amplifier

As can be seen from figure 13, page 14, there is a considerable rise in the high frequency response of the record amplifier. This response characteristic is necessitated by the standardised replay equalisation, as well as by the type of tape emulsion utilised for recording. The frequency response displays a peak around 30 kc on machines up to the above mentioned serial number. In conjunction with the extremely wide response characteristic of the record and replay amplifiers, this could cause interferences due to overmodulation when recording programs derived from carrier distribution systems with too high a residual RF component after de-modulation. Furthermore, it was difficult to obtain precise readings with wow and flutter meters employing square wave test signals.

With the insertion of an inverse feedback loop (V3 - C80, V4 - C79, respectively 10 mmf each) plus a reduction in value of the cathode by-pass capacitor (V3 - C17, V4-C11 respectively, reduced from 0,015 to 0,012mf) The response peak could now be lowered to 23 kc approx. The frequency response curve remains unaltered in the portion of the audio band which is required for sound recording. The following values of attenuation are thus obtained:

	7 1/2 ips	3 3/4 ips
30kc	- 8 db	-11 db
38 kc	-12 db	- 13 db

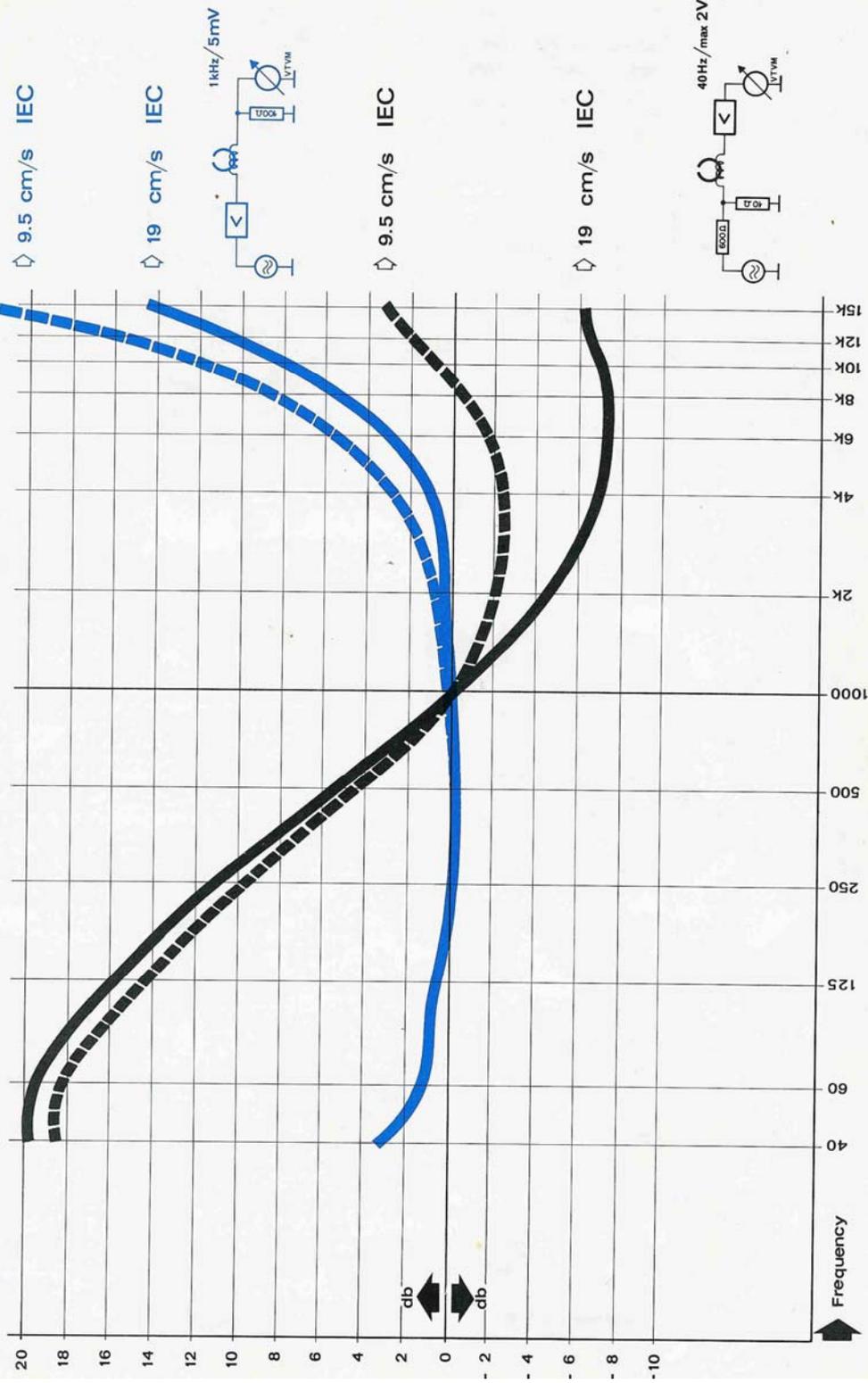
which greatly eliminates the possibility of generating beat signals from ultra sonic frequencies. Where stereo broadcasts are to be recorded, use of the REVOX-multiplex filter will be essential, particularly when operating at the tape speed of 3 3/4 ips.

REVOX G 36 recorders not containing these modifications can easily be adapted to the new response characteristic by replacing and/or adding the above mentioned components.



Frequenzgang Wiedergabeverstärker  
 Courbe de réponse Amplificateur de lecture  
 Playback Equalization

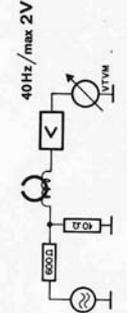
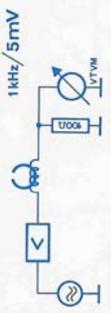
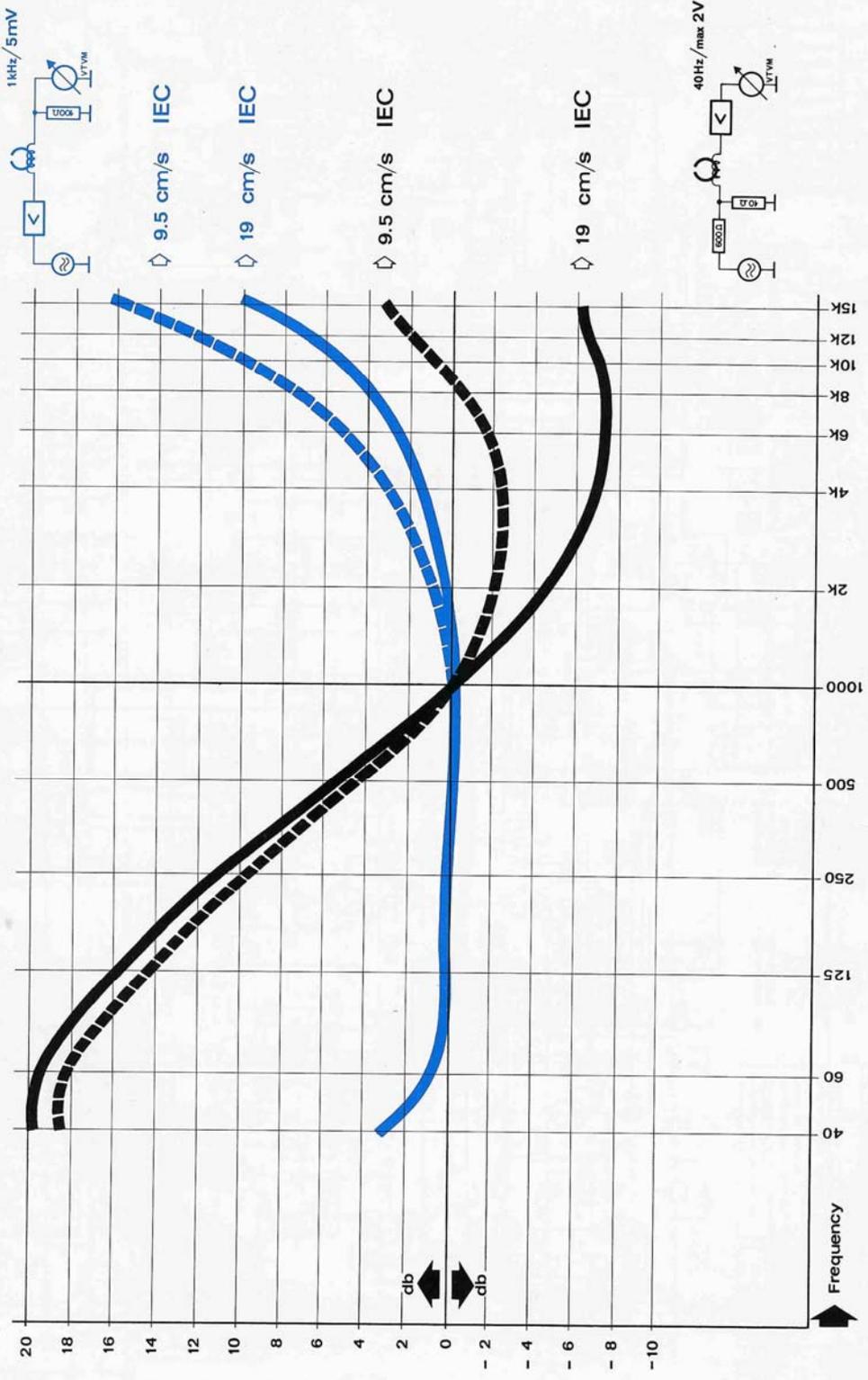
Frequenzgang Aufnahmeverstärker  
 Courbe de réponse Amplificateur d'enregistrement  
 Recording Pre-emphasis





Frequenzgang Wiedergabeverstärker  
 Courbe de réponse Amplificateur de lecture  
 Playback Equalization

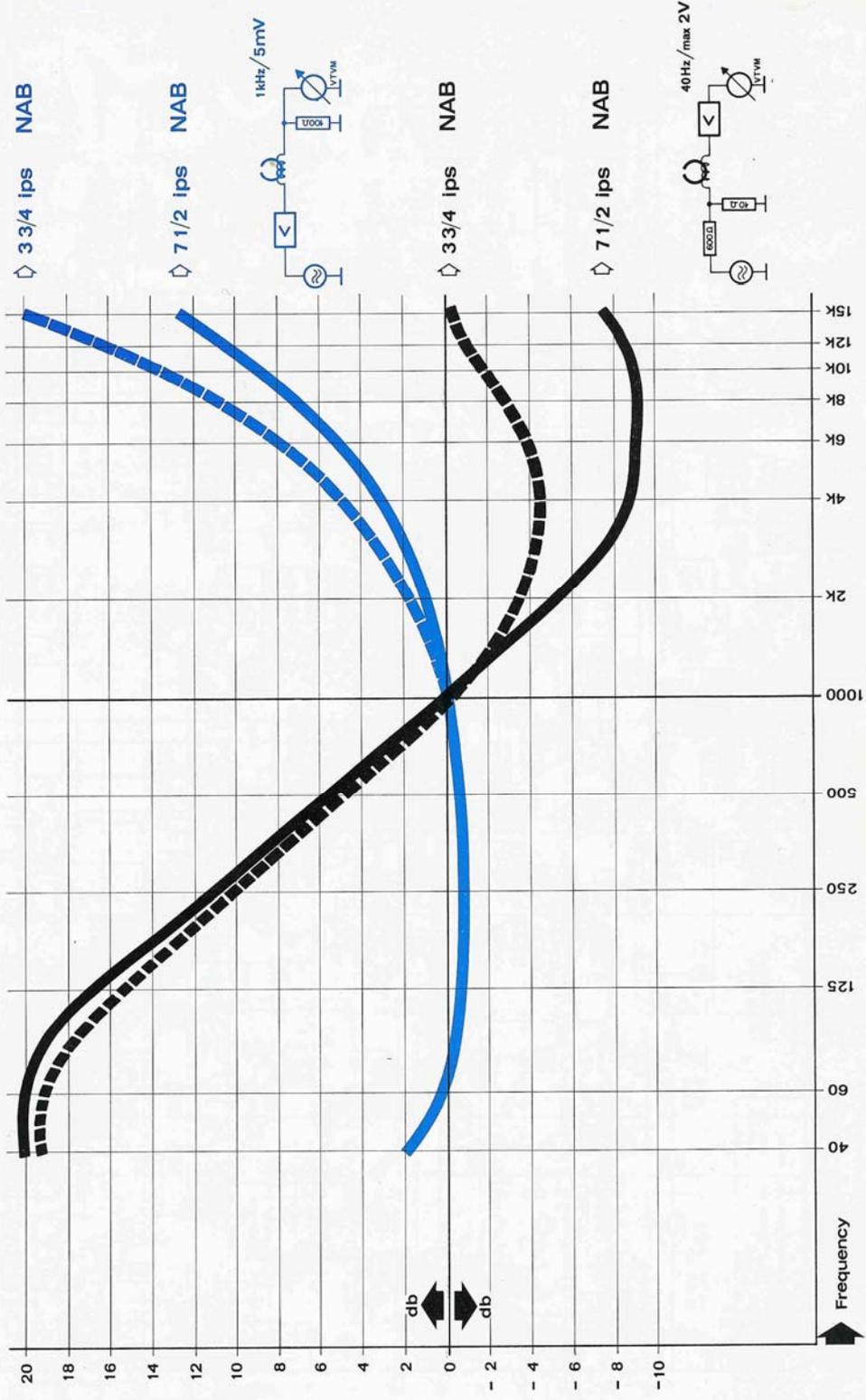
Frequenzgang Aufnahmeverstärker  
 Courbe de réponse Amplificateur d'enregistrement  
 Recording Pre-emphasis





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 Playback Equalization

Frequenzgang Aufnahmeverstärker  
 Courbe de réponse Amplificateur d'enregistrement  
 Recording Pre-emphasis





## 7 SPARE PARTS LIST - ISSUE IV

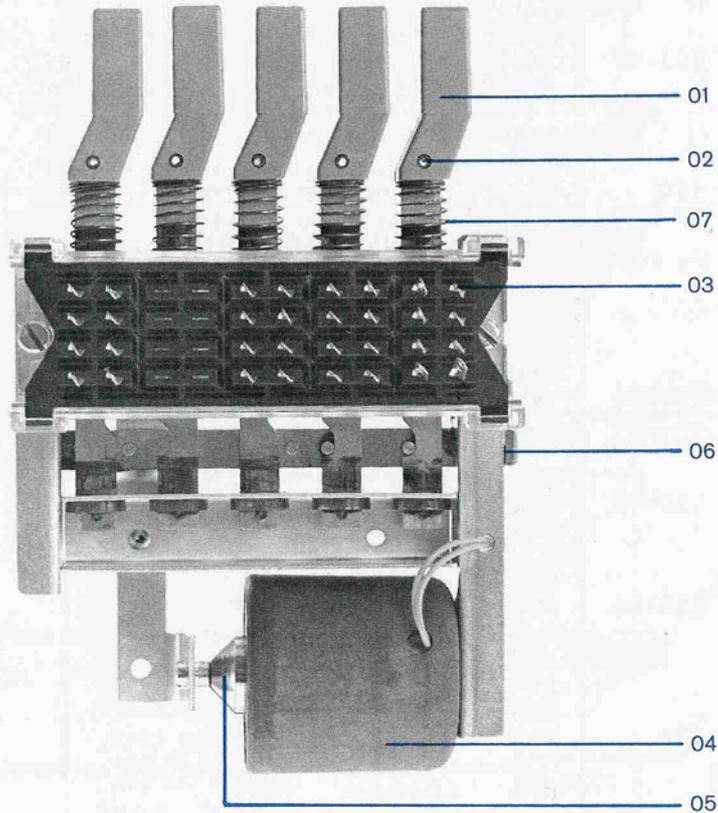
This Issue of the Spare Parts List has been augmented in all sections and exploded views are included for the more complicated sub-assemblies. The tabulations are divided into the following columns:

INDEX	Index numbers are identical with the tracer numbers shown in the drawings and photographs.
ORDER NUMBER	This number must be used when ordering spare parts.
PART DESCRIPTION	In case of inexact part description due to translation errors the german version shall be the determinant. When ordering plastic parts with the same order number, but of slightly differing colour, add colour code number.
SERIES	The three columns indicate in which series a particular part is used. Parts which are not directly interchangeable between Series are marked by the letter (x) in parentheses. They have to be replaced by complete sub-assemblies.
QUANTITY	Indicates the number of identical parts within the assembly.
INDEX III	Cross index with Parts List Issue III which is now <u>cancelled</u> . <u>Index III must not be used any more when ordering parts.</u>

ALL ORDERS SHOULD STATE ORDER NUMBER AND SHORT PART DESCRIPTION.

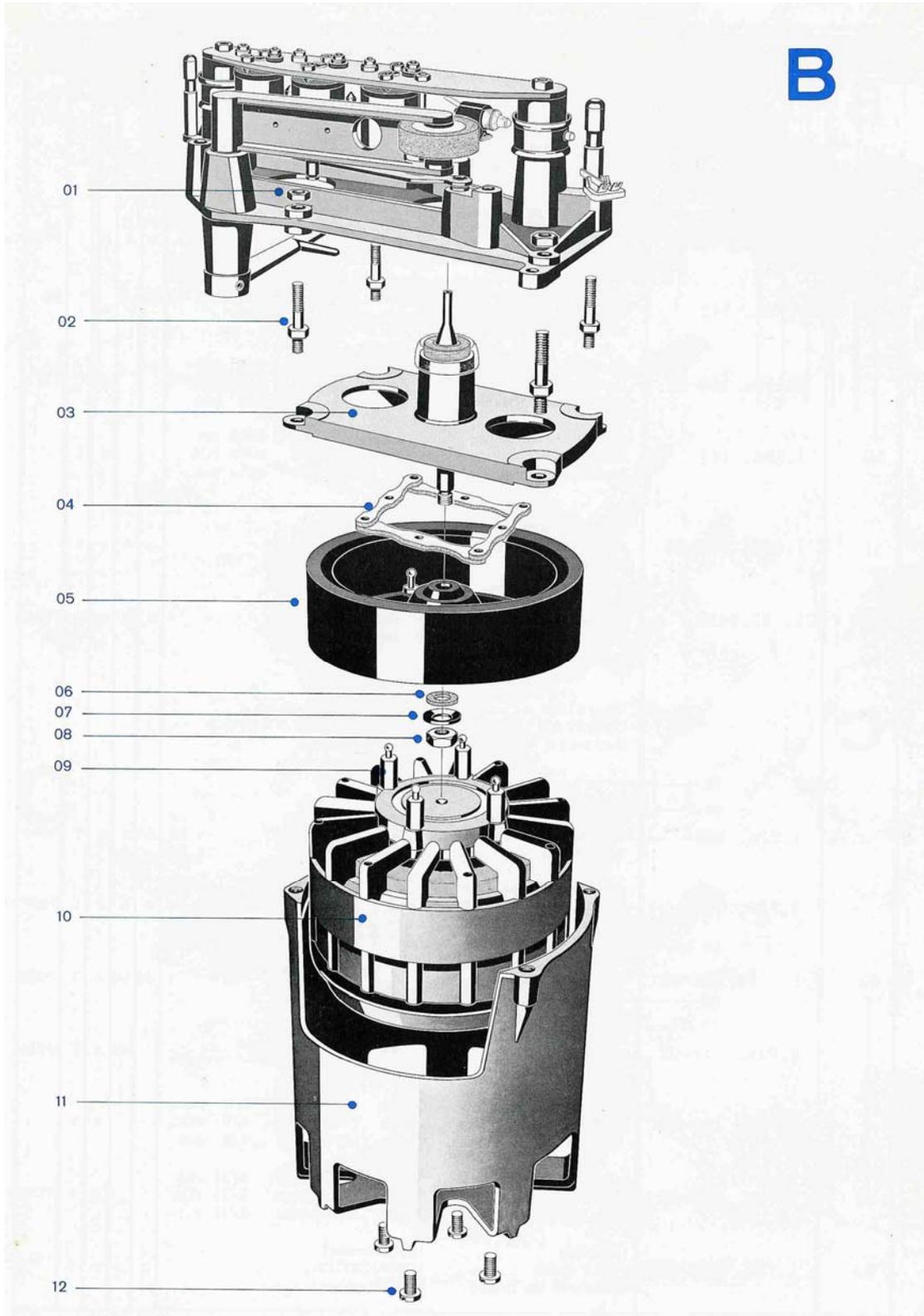
INDEX	ORDER N°	PART DESCRIPTION	SERIES			Qu	Ind III
			I	II	III		
		Carrying Case					
	1.736.825	Case Bottom Complete	x	x	x	1	
	1.736.828-01	Case Bottom	x	x	x	1	7001
	1.736.828-03	Rubber Washer (Case Bottom Mount)	x	x	x	4	7008
	21.01.0458	Machine Screw (Case Bottom Mount)	x	x	x	4	7009
	23.01.1043	Washer for Case Bottom Mount	x	x	x	4	7010
	1.736.830	Case top Complete	x	x	x	1	7002
	1.736.850-02	Latch Case Top	x	x	x	2	7003
	1.736.832	Case Middle Section Complete	x	x	x	1	7004
	1.736.836	Rear Panel Cover Snap-fit	x			1	7005
	1.736.837	Rear Panel Cover, Hinged, including Frame		x	x	1	7006
	1.736.832-05	Case Feet	x	x	x	4	7007
	1.736.834	Chassis Mounting Bracket	x	x	x	2	7011
	20.22.7306	Mounting Bracket Screw	x	x	x	16	7012
	1.736.832-04	Loudspeaker Lattice (Trapezoid)	x			1	7013
	1.736.832-08	Loudspeaker Lattice (Rectangular)		x	x	1	7014
	33.03.0101	Carrying Handle Mounting Bracket	x	x	x	1	7015
	28.99.0106	Rivet, Tubular	x	x	x	2	7016
	1.736.501-04	Washer	x	x	x	2	7017
	33.03.0102	Carrying Handle	x	x	x	1	7018
	21.01.0455	Machine Screw M 4x8 (Chassis to Bracket)	x	x	x	6	7019
		Top Plate					
	1.736.851	Top Plate Complete		x	x		7021
		Top Plate of Series I to be replaced with Top Plate 1.736.851 and Counter 1.736.502-15	x				7020
	21.02.3375	Machine Screw M 3x12, Oval Head, for Mounting of Top Plate	x	x	x	6	7022
	1.736.853	Plastic Cover for Pressure Roller	x	x		1	7024
	1.736.500-15	Plastic Cover for Pressure Roller			x	1	7025
	1.736.500-13	Plastic Head Cover (without Name Plate)	x	x		1	7026
	21.02.3356	Machine Screw M 3x10, Oval Head	x	x		2	7028
	43.02.0101	Revox Name Plate	x	x	x	2	7029
	1.736.855	Plastic Head Cover (with Name Plate)			x	1	7027
	1.736.500-04	Grey Plastic Knob (transparent)	x	x	x	4	7030
	1.736.500-10	Felt Washer	x	x	x	4	7031
	1.736.861	Grey Plastic Knob Colour 1035	x	x		4	7032
	1.736.861	Grey Plastic Knob Colour 6760			x	4	7033
	1.736.791-01	Push Button Red	x	x	x	2	7034
	1.736.790-02	Push Button Black	x	x		2	7035
	1.736.790-02	Push Button Grey			x	2	7036
	1.736.851-02	Escutcheon Plate	x	x	x	1	7041
	1.736.851-03	Escutcheon Plate, Push Buttons	x	x	x	1	7042
	1.736.180-01	VU – Meter	x	x	x	2	7128
	1.736.181	VU – Meter Mounting Board (Paxolin)	x	x	x	1	
	1.736.180-03	Cover, VU – Meter	x	x	x	2	7129
	1.736.180-02	Tubular Spacer	x	x	x	8	7130
	51.02.0101	Pilot Lamp 7V / 0.1 A	x	x	x	4	7131
	1.736.255	Lampsocket Complete (without lamp)	x	x	x	2	7132

# A

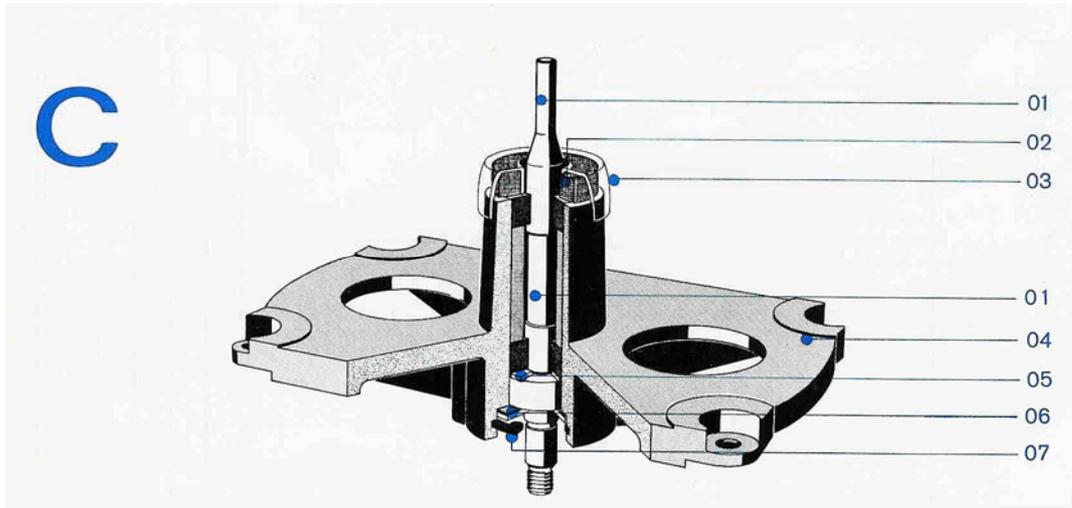


INDEX	ORDER N°	PART DESCRIPTION	SERIES			Qu	Ind III
			I	II	III		
<b>A</b>		Push Button Assembly					
	1.736.550	Push Button Assembly Complete Colour 1035	x	x		1	7140
	1.736.550	Push Button Assembly Complete Colour 6760			x	1	7141
	20.21.7203	Self Tapping Screw (Push Button Mounting)	x	x	x	4	7142
01	1.736.578-02	Push Button Grey Colour 1035	x	x		5	7143
01	1.736.578-02	Push Button Grey Colour 6760			x	5	7144
02	25.16.1211	Push Button Retaining Pin	x	x	x	5	7145
	54.04.0118	Diode, Noise Suppression 50V / 100mA (Diode on Relay - socket Series III)	x	x	x	4	7146
	50.04.0128	Switching Diode 50V / 500mA			x	1	
03	1.736.587	Contact, Stationary	x			26	7147
03	1.736.592	Contact, Stationary		x	x	26	7148
	1.736.591	Paxolin Switch Lever	x	x	x	5	7149
	1.736.588	Moving H Contact	x	x	x	8	7150
04	1.014.300	Solenoid, Push Button Release	x	x	x	1	7151
05	1.014.910-01	Slug, For all Solenoid	x	x	x	3	7152
06	1.736.551-05	Leaf Spring, Locking Bar	x	x	x	3	7153
	1.736.551-11	Contact Spring	x	x	x	8	7154
07	1.736.551-07	Push Button Spring	x	x	x	5	7155
	1.736.150	Speed Selector Switch Complete	x	x	x	1	7156
	1.736.151	Speed Selector Switch Complete 7.5/15 ips			x	1	

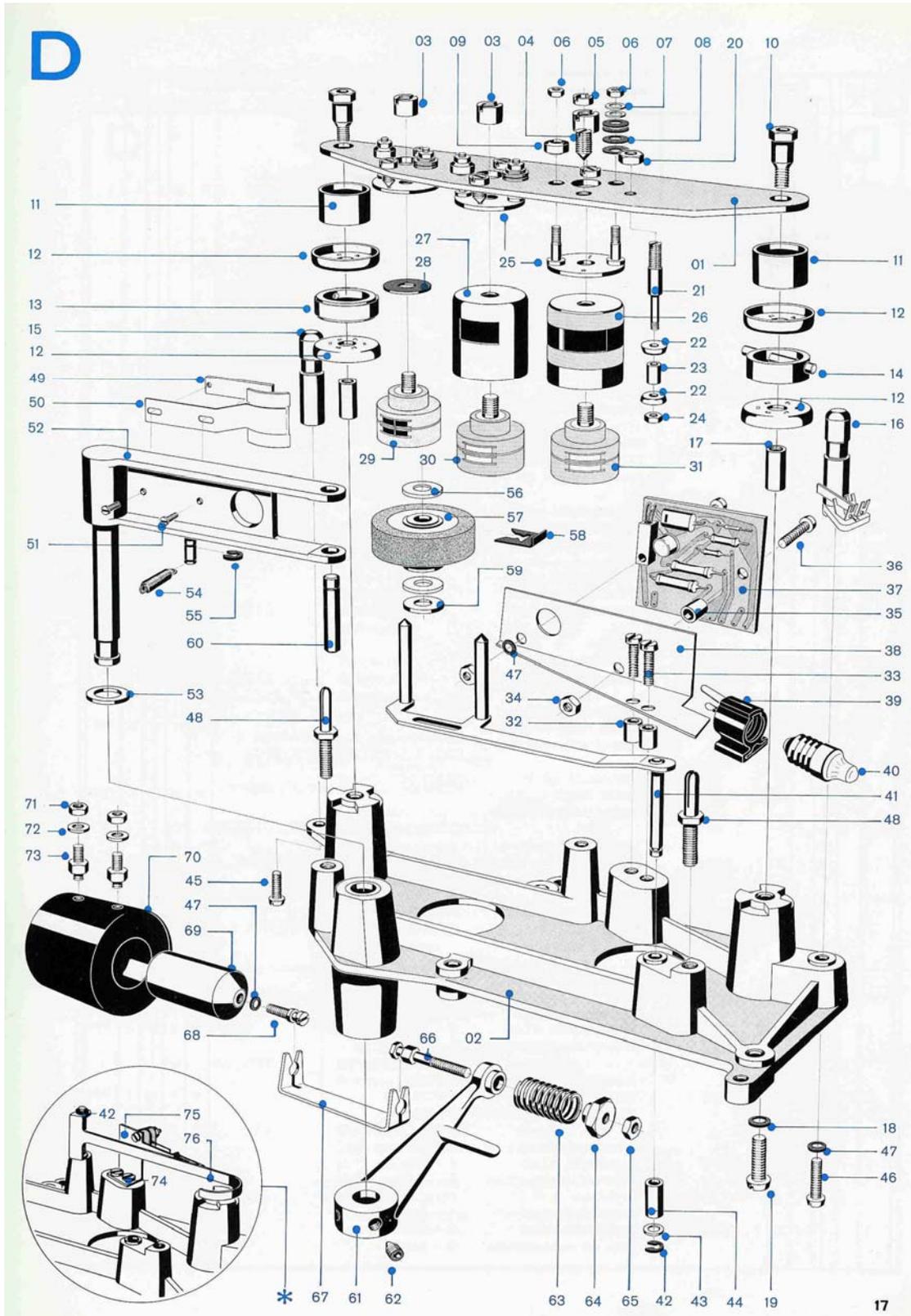
1.736.150-05	Motor Wafer	x	x		1	7157
1.736.150-10	Motor Wafer			x	1	7158
1.736.150-06	Equalization Wafer	x	x	x	1	7159
1.736.170	Recording Channel Selector Complete	x	x	x	1	7160
1.736.170-03	Oscillator Wafer	x	x	x	1	7161
1.736.170-02	Amplifier Wafer	x	x	x	1	7162



INDEX	ORDER N°	PART DESCRIPTION	SERIES			Qu	Ind III
			I	II	III		
<b>B</b>		Capstan Drive Assembly					
	1.736.125	Capstan Drive Assembly Without Head Support 50Hz	x	x	x	1	
	1.736.126	Capstan Drive Assembly Without Head Support 60Hz	x	x	x	1	
	1.736.120	Capstan Drive Assembly Without Head Support 7.5/15 ips 50 Hz 4/8 Pol			x	1	
	1.736.122	Capstan Drive Assembly Without Head Support 7.5/15 ips 50 Hz 6/12 Pol			x	1	
01	22.01.8040	Hexagon Nut M4	x	x	x	4	
02	1.736.125-01	Threaded Mounting Stud	x	x	x	4	7091
03		Capstan Bearing Plate (see section C)					
04	1.736.136	Coupling Strip for Screw Mounting (for motor with 2 coupling pins)	x	x	x	2	7090
	21.01.0355	Machine screw for above (M 3x8)	x	x	x	2	
04	1.736.125-02	Coupling Strip, Push-On type (for motor with 4 coupling pins)			x	4	
05	1.736.134	Flywheel Complete (for Motor with 2 Coupling Pins)	x	x	x		7085
05	1.736.135	Flywheel Complete (for Motor with 4 Coupling Pins)			x	1	
06	1.736.128-07	Washer	x	x	x	1	
07	37.01.0110	Spring Washer	x	x	x	1	
08	22.01.5060	Hexagon Nut	x	x	x	1	
09	1.736.138-02	Coupling Pin (for Motor with 2 Coupling Pins)	x	x	x	2	7089
09	1.736.140-02	Coupling Pin (for Motor with 4 Coupling Pins)			x	4	
		2 different types of capstan motors are used in the G36 Old version: 2 coupling pins and strips with screw mounting. New version: 4 coupling pins and strips with push-on mounting. The coupling pins have to be ordered separately.					
10	1.060.060-01	Capstan Motor 50 Hz OLD	x	x	x	1	7079
10	1.736.141	Capstan Motor 50 Hz NEW			x	1	
10	1.736.140-01	Capstan Motor 60 Hz OLD	x	x	x	1	7080
10	1.736.142	Capstan Motor 60 Hz NEW			x	1	
10	1.736.140-05	Capstan Motor 50 Hz 7.5/15 ips 4/8 pol			x	1	7081
10	1.736.141	Capstan Motor 50 Hz 7.5/15 ips 6/12 pol			x	1	
11	1.060.052-01	Motor Housing	x	x	x	1	
12	21.01.0455	Machine Screw M 4x8	x	x	x	4	7092



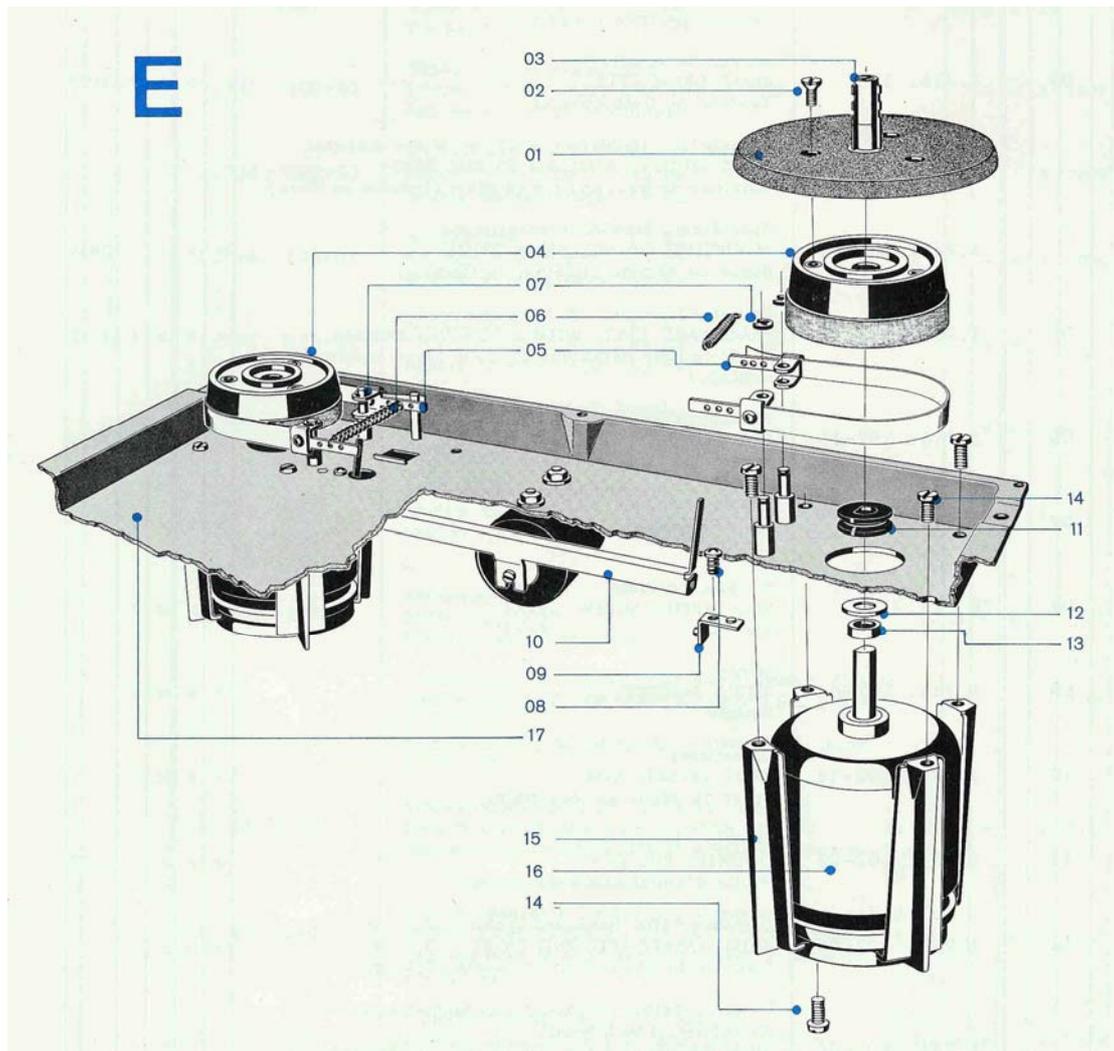
INDEX	ORDER N°	PART DESCRIPTION	SERIES			Qu	Ind III
			I	II	III		
<b>C</b>		Capstan Bearing Plate with Shaft					
	1.736.128	Capstan Bearing Plate Complete with Shaft 50 Hz	x	x	x	1	7082
	1.736.129	Capstan Bearing Plate Complete with Shaft 60 Hz	x	x	x	1	7087
01	1.736.128-02	Capstan Shaft 50 Hz	x	x	x	1	7083
01	1.736.129-02	Capstan Shaft 60 Hz		x	x	1	7088
01	1.736.120-02	Capstan Shaft 50 Hz 7.5 / 15 ips 4/8 pol			x	1	
01	1.736.122-02	Capstan Shaft 50 Hz 7.5 / 15 ips 6/12 pol			x	1	7084
02	1.736.128-08	Felt Ring (Lubrication)	x	x	x	1	
03	1.736.128-06	Grease Cup	x	x	x	1	7086
04	1.736.130	Capstan Bearing Plate without shaft	x	x	x	1	
05	1.062.351-03	Thrust Washer, Top	x	x	x	1	
06	1.736.128-04	Felt Washer	x	x		1	
06	1.736.125-03	Low friction Washer, Plastic Coated			x	1	
		when replacing felt washer (1.736.128-04) with low friction washer (1.736.125-03) the steel shim 1mm (1.736.128-03) has to be interchanged with the steel shim 1.736.125-04 of 0.5 mm thickness.					
	1.736.128-03	Steel Shim 1 mm	x	x		1	
	37.02.0107	Spring Washer EL9			x	1	
		Spring Washer	x	x		2	
07	24.16.4240	True – arc ring 24	x	x	x	1	



INDEX	ORDER N°	PART DESCRIPTION	SERIES			Qu	Ind III
			I	II	III		
<b>D</b>		Head Support Block					

	1.736.227	Head Support Block Complete with 2-track Heads without pinch-roller arm	x	x	x		
	1.736.228	Head Support Block Complete with 4-track Heads without pinch-roller arm	x	x	x		
	1.736.229	Head Support Block Complete with 2-track Heads 7.5/15 ips 6/12 pol					
01	1.736.226-01	Head Mounting Plate, bare	x	x	x	1	7076
	1.736.226	Head Mounting Plate, Complete, without Heads	x	x	x	1	
02	1.736.224	Head Support Block Bare (Including 7.5/15 ips 4/8 pol)	x	x	x	1	
02	1.736.225	Head Support Block Bare 7.5/15 ips 6/12 pol			x	1	
03	1.736.226-02	Slotted Nut (Head Mounting)	x	x	x	3	7052
04	1.736.226-05	Screw (Vertical Adjuster)	x	x	x	6	7054
05	1.736.226-04	Slotted Nut (Vertical Adjuster)	x	x	x	6	7053
06	22.01.8026	Hexagon Nut M 2.6	x	x	x	6	7057
07	23.01.1032	Washer	x	x	x	6	
08	37.01.0101	Spring Washer 3.2/8	x	x	x	12	7056
09	1.736.226-07	Spacer, Azimuth Adjuster	x	x	x	3	7055
10	1.736.222-01	Head Block Fixing Screw (Screw-On Head Cover)	x	x		2	7138
10	1.736.222-09	Head Block Fixing Screw (Plug-In Head Cover)			x	2	7139
11	1.736.222-07	Tubular Spacer	x	x	x	2	
12	1.736.222-04	Tape Guide Cup	x	x	x	4	7133
13	1.736.222-05	Tape Guide Centre Piece, Left	x	x		1	7136
13	1.736.221	Tape Guide Centre Piece, Left			x	1	7137
14	1.736.222-06	Tape Guide Centre Piece, Right (Mech. And Switch)	x	x		1	7134
14	1.027.114	Tape Guide Centre Piece, Right (Opt. And Switch)			x	1	7135
15	1.736.222-08	Tape Guide Post, Left (Ser I + II also right)	x	x	x	2	7037
16	1.736.250	Tape Guide Post, Right (Opt. And Switch)			x	1	7038
	57.99.0132	Photo resistor ORP 62			x	1	7039
17	1.736.222-03	Threaded bushing	x	x	x	2	
18	24.16.1040	Lock Washer M4	x	x	x	2	
19	21.01.0456	Machine Screw M 4x10	x	x	x	2	
20	22.01.8030	Hexagon Nut M 3	x	x	x	1	
21	1.736.232-01	Pin	x	x	x	1	
22	1.736.232-03	Guide Washer	x	x	x	2	
23	1.736.232-02	Spacer	x	x	x	1	
24	22.01.8020	Hexagon Nut M 2	x	x	x	1	
21-24	1.736.232	Tape Guide Pin Complete	x	x	x	1	7058
25	1.020.127	Head Mounting Disc Complete	x	x	x	3	7051
26 27	1.736.226-06	Shielding Can	x	x	x	2	7049
28	1.736.501-04	Washer	x	x	x	1	
29	1.017.240	Erase Head 2-Track (check serial n° of recorder)	x	x	x	1	7043
29	1.017.300	Erase Head 4-Track (check serial n° of recorder)	x	x	x	1	7044
29	1.017.241	Erase Head 2-Track (from n° 69701 up and for n° 60101 – 60700 & 65101 - 68500)			x	1	
29	1.017.301	Erase Head 4-Track (from n° 69701 up and for n° 60101 – 60700 & 65101 - 68500)			x	1	
30	1.017.360	Recording Head 2-track	x	x	x	1	7045
30	1.017.380	Recording Head 4-track	x	x	x	1	7046
31	1.017.370	Playback Head 2-track	x	x	x	1	7047
31	1.017.390	Playback Head 4-track	x	x	x	1	7048
32	1.736.237-02	Tubular Spacer			x	2	
33	21.01.0356	Machine Screw M 3x10			x	2	
34	22.01.8030	Hexagon Nut M 3			x	2	
35	1.736.237-02	Tubular Spacer			x	1	
36	21.01.0357	Machine Screw M 3x12			x	2	
37	1.736.239	Auto-stop Amplifier Complete			x	1	7063

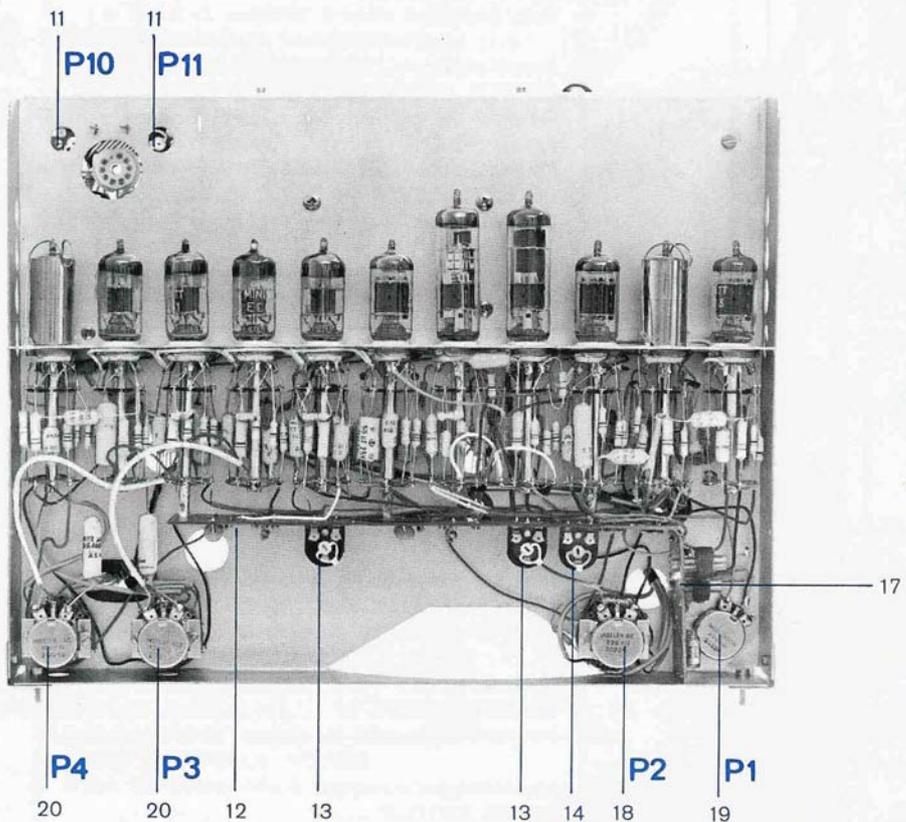
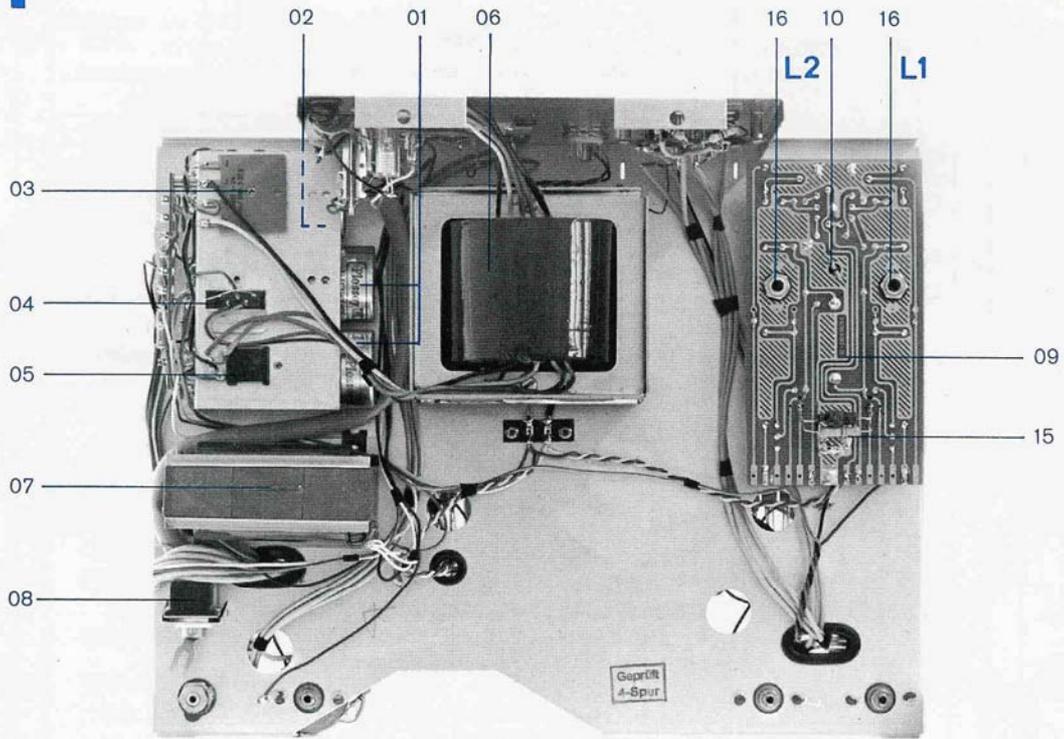
	50.03.0210	Transistor AC 124			x	1	7065
	50.03.0421	Transistor RT 9448			x	1	7066
38	1.736.237-01	Mounting Bracket			x	1	
39	53.99.0114	Lamp Socket E – 10			x	1	7068
40	51.99.0108	Minature Lamp Osram 10 – 3664 (3.7V / 0.3A with Lens)			x	1	7067
41	1.736.219	Tape Lift Lever OLD	x	x		1	7077
	24.16.3032	Retaining Ring for above	x	x		1	
41	1.736.220	Tape Lift Lever NEW			x	1	7078
42	24.16.3023	Retaining Ring	x	x	x	1	
43	23.01.1032	Washer			x	1	
44	1.736.150-08	Tubular Spacer			x	1	
45 46	21.01.0356	Machine Screw M 3x10	x	x	x	2	7040
47	24.16.1030	Lock Washer M 3	x	x	x	4	
48	1.736.500-05	Mounting Lug (Pinch Roller Cover)	x	x	x	2	7023
49	1.736.500-06	Threaded Plate	x	x	x	1	
50	1.736.793	Face Shield Complete	x	x	x	1	7050
51	21.01.0203	Machine Screw M 2x5	x	x	x	2	
52	1.736.201	Pinch Roller Arm	x	x	x	1	
53	1.736.502-12	Paxalin Washer	x	x	x	1	
54	1.736.502-09	Return Spring	x	x	x	1	7110
55	24.16.3032	Retaining Ring	x	x	x	1	
56	1.736.200-04	Teflon Spacer	x	x	x	2	
57	1.736.205	Pinch Roller	x	x	x	1	7109
58	1.736.200-03	Clip, Pinch Roller Complete	x	x	x	1	7112
59	1.736.501-06	Spacer	x	x	x	1	7113
60	1.736.200-02	Pinch Roller Spindle	x	x	x	1	7111
61	1.736.275-01	Lever	x	x	x	1	
62	21.59.6504	Allenscrew M 5x6	x	x	x	2	
63	1.736.275-05	Compression Ring	x	x	x	1	
64	1.736.275-03	Adjusting Nut	x	x	x	1	
65	22.01.8040	Hexagon Nut M 4	x	x	x	1	
66	1.736.275-02	Spindle	x	x	x	1	
67	1.736.275-04	Bracket	x	x	x	1	
68	1.014.910-02	Special Screw	x	x	x	1	
69	1.014.910-01	Slug, for all Solenoids	x	x	x	3	7114
70	1.736.375	Pinch Roller Solenoid	x	x	x	1	7115
	(1.014.300	Push Button Release Solenoid)	x	x	x	1	7151
	(1.736.378	Brake Solenoid)	x	x	x	1	7107
71	22.01.8040	Hexagon Nut M 4 For Pinch Roller and Brake Solenoid	x	x	x	4	
72	23.01.2043	Washer For Pinch Roller and Brake Solenoid	x	x	x	4	
73	1.736.375-01	Threaded Stud For Pinch Roller and Brake Solenoid	x	x	x	4	7116
*		Mechanical End of Tape Switch					
	1.736.234	End of Tape Switch Complete N° 35001 - 36500					
	1.736.234-02	Contact Spring N° 35001 - 36500					
		End of Tape Switch N° 36501-incl. Series II					
74	21.01.0354	Machine Screw M 3x6	x	x		2	
75	1.736.238	Tape Pressure Switch Complete with Mounting Bracket	x	x		1	7060
76	1.736.222-02	Lever, End of Tape Switch	x	x		1	7062



INDEX	ORDER N°	PART DESCRIPTION	SERIES			Qu	Ind III
			I	II	III		
<b>E</b>		Brakes – Spooling Motors					
01	1.736.794	Turntable with Shaft Section	x	x	x	2	7100
02	21.02.3355	Machine Screw Oval Head M 3x8	x	x	x	6	7104
03	1.736.794-01	Shaft Section, Upper	x	x	x	2	7101
	1.736.794-02	Shaft Screw	x	x	x	2	7102
	1.736.794-03	Reel Lock Spring	x	x	x	2	7103
04	1.736.360	Brake Drum Complete	x			2	7096
04	1.736.358	Brake Drum Complete		x	x	2	7097
		Brake Lining, Available by the Metre					
	1.736.360-01	Mounting Spring, Brake Drum	x	x	x		7098
05	1.736.351	Brake Band, Complete with Mounting Brackets	x	x	x	2	7105
06	1.736.502-10	Brake Tension Spring	x	x	x	2	7106
07	24.16.3032	Retaining Ring	x	x	x	4	
08	20.21.7153	Self-tapping Screw 4x1/4"	x	x	x	2	
09	1.736.502-07	Angle Bracket	x	x	x	2	
10	1.736.502-14	Brake Release Arm	x	x	x	1	
11	1.736.502-02	Counter Pulley	x	x	x	1	7127
12	1.736.502-05	Shim Washer Left & Right 0.5 mm	x	x	x	2	
	1.736.502-04	Shim Washer 0.2 mm for height Adjustment of					

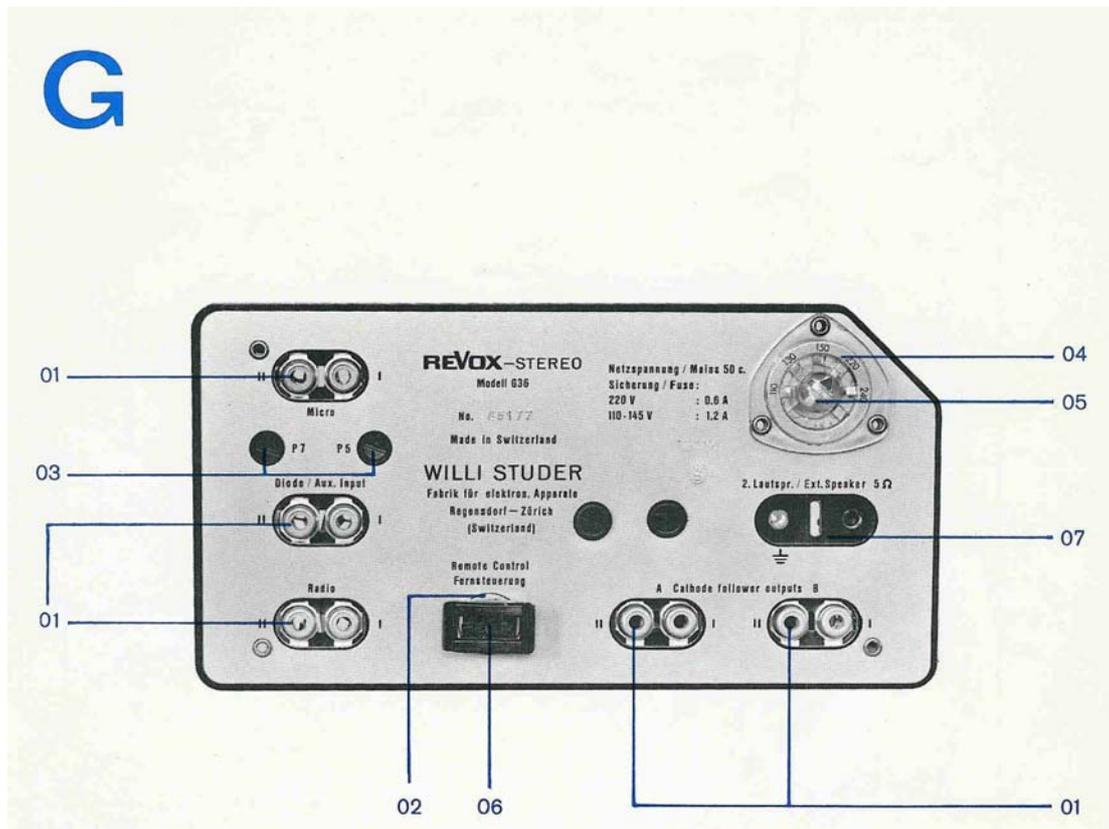
		Brake Drum					
13	1.736.502-17	Tubular Spacer Right	x	x	x	1	
	1.736.502-16	Tubular Spacer Left	x	x	x	1	
14	21.01.0455	Machine Screw M 4x8	x	x	x	16	
15	1.736.103-02	Mounting Bracket, Spooling Motor		x	x	2	7095
16	1.736.002-03	Spooling Motor 50 Hz	x			1	7093
16	1.736.103-01	Spooling Motor 50 Hz		x	x	1	7094
16	1.736.515-01	Spooling Motor 60 Hz		x	x	1	
17	1.736.520	Motor Deck Complete		x	x	1	
	1.736.521	Motor Deck Complete 7.5 / 15 ips			x	1	
	1.736.378	Brake Solenoid	x	x	x	1	7107
		Mounting Stud for Brake Solenoid see Index B 71 - 73					7108
	59.15.4209	Motor Condenser 2 $\mu$ F Capstan Motor 50 Hz	x	x		1	7117
	59.99.0154	Motor Condenser 2 + 0.5 $\mu$ F Capstan Motor 50 Hz			x	2	7118
	59.15.4309	Motor Condenser 3 $\mu$ F Spooling Motor 50 Hz	x	x		1	7119
	59.15.4359	Motor Condenser 3.5 $\mu$ F Spooling Motor 50 Hz			x	2	7120
	1.736.002-08	Turns Counter	x			1	7121
	1.736.502-15	Turns Counter Colour 1035		x		1	7122
	1.736.502-15	Turns Counter Colour 6760			x	1	7123
	1.736.851-07	Lens Counter		x	x	1	7124
	31.99.0101	Belt for Counter	x			1	7125
	31.99.0106	Belt for Counter		x	x	1	7126
	1.736.365	Tape Tension Switch	x	x	x	1	7069
	1.736.500-12	Tape Tension Switch Lever Colour 685	x	x		1	7070
	1.736.500-12	Tape Tension Switch Lever Colour 6760			x	1	7071
	1.094.001	Relay Serial N° 35001 - 36500				1	7072
	1.093.002	Relay Serial N° 36501 - 48400				1	7073
	1.093.004	Relay Serial N° 48401 – Incl Series II				1	7074
	56.04.0112	Relay Serial N° 58001 – and up			x	1	7075

**F**



INDEX	ORDER N°	PART DESCRIPTION	SERIES			Qu	Ind III
			I	II	III		
<b>F</b>		Amplifier - Chassis					
01	59.12.0103	Electrolyte Condensior 3 x 50 µF 350 V	x	x	x	2	7163
02	59.12.0106	Electrolyte Condensior 3 x 600 µF 35 V	x	x	x	1	7164
03	70.01.0131	Rectifier B 30 C 1000 / 600 Sealed	x	x	x	1	7165
04	70.01.0102	Rectifier B 250 C 100	x			1	7166
04	70.01.0161	Rectifier B 250 C 100 Sealed		x	x	1	7167
05	70.01.0121	Rectifier B 30 C 250	x	x	x	1	7168
06	1.736.648	Mains Transformer 50 Hz	x	x	x	1	7169
06	1.736.654	Mains Transformer 60 Hz		x	x	1	7170
06	1.736.650	Mains Transformer Semko	x	x	x	1	7171
07	1.736.660	Output Transformer	x	x	x	1	7172
09	1.736.680	Bias Oscillator Complete (less valve)	x	x	x	1	7173
10	1.736.682	Oscillator Coil T 854, Less Ferrite Housing	x	x	x	1	7174
		Check serial n° of recorder:					
	1.736.681	Bias Oscillator Complete 2-Track N° 69701 and above and for 60101 – 60700 & 63101 - 68500			x	1	
	1.736.689	Bias Oscillator Complete 4-Track N° 69701 and above and for 60101 – 60700 & 63101 - 68500			x	1	
	1.736.683	Bias Oscillator Complete T 854 N° 69701 and above and for 60101 – 60700 & 63101 - 68500			x	1	
	61.01.0163	Oscillator Coil Housing	x	x	x	2	7175
11	58.20.1104	Potentiometer 100k (P 10 + P 11) Bias Adjust	x	x	x	2	7176
	59.16.0122	Trimmer Condenser 20 – 150 pF, Bias Oscillator	x	x	x	1	7177
12	1.736.480	Equaliser Panel (Printed Circuit Complete) Incl. Trimm-pot meter and VU-meter amplifier 2-Track 50 Hz	x	x	x	1	7178
12	1.736.486	Equaliser Panel Complete 2-Track 60Hz NAB	x	x	x	1	
12	1.736.481	Equaliser Panel Complete 4-Track 50Hz	x	x	x	1	
12	1.736.487	Equaliser Panel Complete 4-Track 60Hz NAB	x	x	x	1	
12	1.736.491	Equaliser Panel Complete 2-Track 7.5/15 ips 50Hz	x	x	x	1	
13	58.20.0504	Trimm-Pot Meter 500K VU-Meter Amplifier	x	x	x	2	7180
14	58.20.0104	Trimm-Pot Meter 100K, Cross-talk Comp.			x	1	7181
15	1.736.686	Coil, Dummy Head Load T856	x	x	x	1	7182
15	1.736.687	Coil, Dummy Head Load T 856 2-Track N° 69701 and above and for 60101 – 60700 & 63101 - 68500			x	1	
15	1.736.688	Coil, Dummy Head Load T 856 4-Track N° 69701 and above and for 60101 – 60700 & 63101 - 68500			x	1	
16	1.736.684	Bias Rejection Filter, Record T 855	x	x	x	2	7183
17	1.736.720	Bias Rejection Filter, Playback T 899 Complete with Two Coils (L3 + L4)	x	x	x	1	7184
	1.736.595-03	Switch Wafer (S2) Monitor Selector	x	x	x	1	7185
18	1.736.400-09	Potentiometer (P2) 220 K Monitor Volume	x	x	x	1	7186
	1.736.695-04	Switch Positioner, Monitor Selector	x	x	x	1	7187
19	1.736.400-09	Potentiometer (P1) 220 K, Bass Control	x	x	x	1	7188
	1.736.700-01	Switch Wafer (S3, S4) Input Selector	x	x	x	2	7189
	1.736.700-02	Switch Positioner, Input Selector (S3, S4)	x	x	x	2	7190
20	1.736.400-12	Potentiometer (P3, P4) 100 K Record Level	x	x	x	2	7191
08	55.01.0101	Mains Switch	x	x	x	1	7192
	1.736.863	Outer Shaft Extension Complete for Mains Switch	x	x	x	1	7205
	1.736.870	Outer Shaft Extension Complete for Input Selector Ch I	x	x	x	1	7206
	1.736.875	Outer Shaft Extension Complete for Input Selector Ch II	x	x	x	1	7207

	1.736.880	Outer Shaft Extension Complete Monitor Selector	x	x	x	2	7208
	1.736.400-03	Inner Shaft Extension, Long	x	x	x	3	7209
	1.736.400-02	Inner Shaft Extension, Short	x	x	x	1	7211
	1.736.770-02	Loudspeaker AD 3800 M	x	x	x	1	7193
	1.736.770	Loudspeaker Complete with Baffle	x	x	x	1	
	1.736.501-04	Washer, Speaker Baffle	x	x	x	4	7194
	20.21.7206	Self Tapping Screw	x	x	x	2	7195
	22.01.8040	Hexagon Nut M 4	x	x	x	2	7196
	20.21.7305	Self Tapping Screw, Upper to Lower Chassis	x	x	x	4	7197



<b>G</b>	22.16.2001	Speed Nut for above	x	x	x	4	7198
<b>01</b>	54.02.0293	Double Phono Socket	x	x	x	5	7199
<b>02</b>	53.01.0111	Remote Control Socket	x	x	x	1	7200
<b>03</b>	58.11.6473	Potentiometer 47 K for Diode Input	x	x	x	2	7201
<b>04</b>	53.03.0121	Mains Voltage Selector	x	x	x	1	7202
<b>05</b>	53.03.0120	Voltage Selector Knob	x	x	x	1	7203
	51.01.0115	Fuse 0.63 A / 220 V	x	x	x	1	7204
	51.01.0118	Fuse 1.25 A / 110 V	x	x	x	1	
<b>06</b>	1.736.400-10	Remote Control, Dummy Plug	x	x	x	1	7211
<b>07</b>	54.01.0113	Loudspeaker Socket (with Switch)	x	x	x	1	
		Tools and Service Aids					
		Calibration Tape (Full Track Recording) per IEC Recommendation – with 4 track alignment section	x	x	x		
		Double Screw driver 337 – R	x	x	x		
		Spring Scale 0.5 kg	x	x	x		
		Spring Scale 5 kg	x	x	x		
		Nut Driver 8 mm spec for Capstan Assembly	x				
		Head Demagnetiser	x	x	x		