

STUDER

PROFESSIONAL AUDIO EQUIPMENT

Service Information

STUDER A800 - TAPE DECK AND AUDIO
ADJUSTMENTS

Service Information SI 66/81 E

Replaces SI 54/80 E and SI 60/81 E

This service information is an enhanced and revised version of the SI's 54/80 E and 60/81 E.

The information contains the tape deck and audio adjustments instructions for machines of the series A800 MK I as well as MK II and reflects the technical level as of October 1981.

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1. SAFETY RECOMMENDATIONS

1.1

Repairs and corresponding adjustments may only be performed by qualified personnel.

1.2

CAUTION WHEN PERFORMING WORK ON THE MACHINE WHICH REQUIRES REMOVAL OF THE PROTECTIVE HOOD AND COVERS!

The machine must be disconnected from the mains when specified.

1.3

Under no circumstances the machine may be lifted with the side handles of the console!

1.4

The machine may only be lifted from the rear with a forklift.

1.5

The spooling motors should not be decelerated or stopped by hand.

1.6

After the reels have been mounted, the adapters must be properly tightened. If the preceding step is omitted and either the play, fast forward or rewind key is depressed, the spooling motors run without turning the reel and consequently can only be stopped by switching the machine off.

1.7

In the interest of safety, the remote control must be switched off when the machine is being serviced. Tape deck key released!

1.8

The machine can be operated up to 40⁰ C ambient temperature if good air circulation is guaranteed.

1.9

When installing the machine make sure adequate space for air circulation and heat evacuation is provided.

1.10

The machine may not be placed directly against a wall. (Do not remove rubber buffers!)

2.

GENERAL REFERENCES

2.1

Change of main voltage

The primary winding of the mains transformer can be matched to the local mains voltage by setting the voltage carousel to the appropriate position. (see Fig. 1).

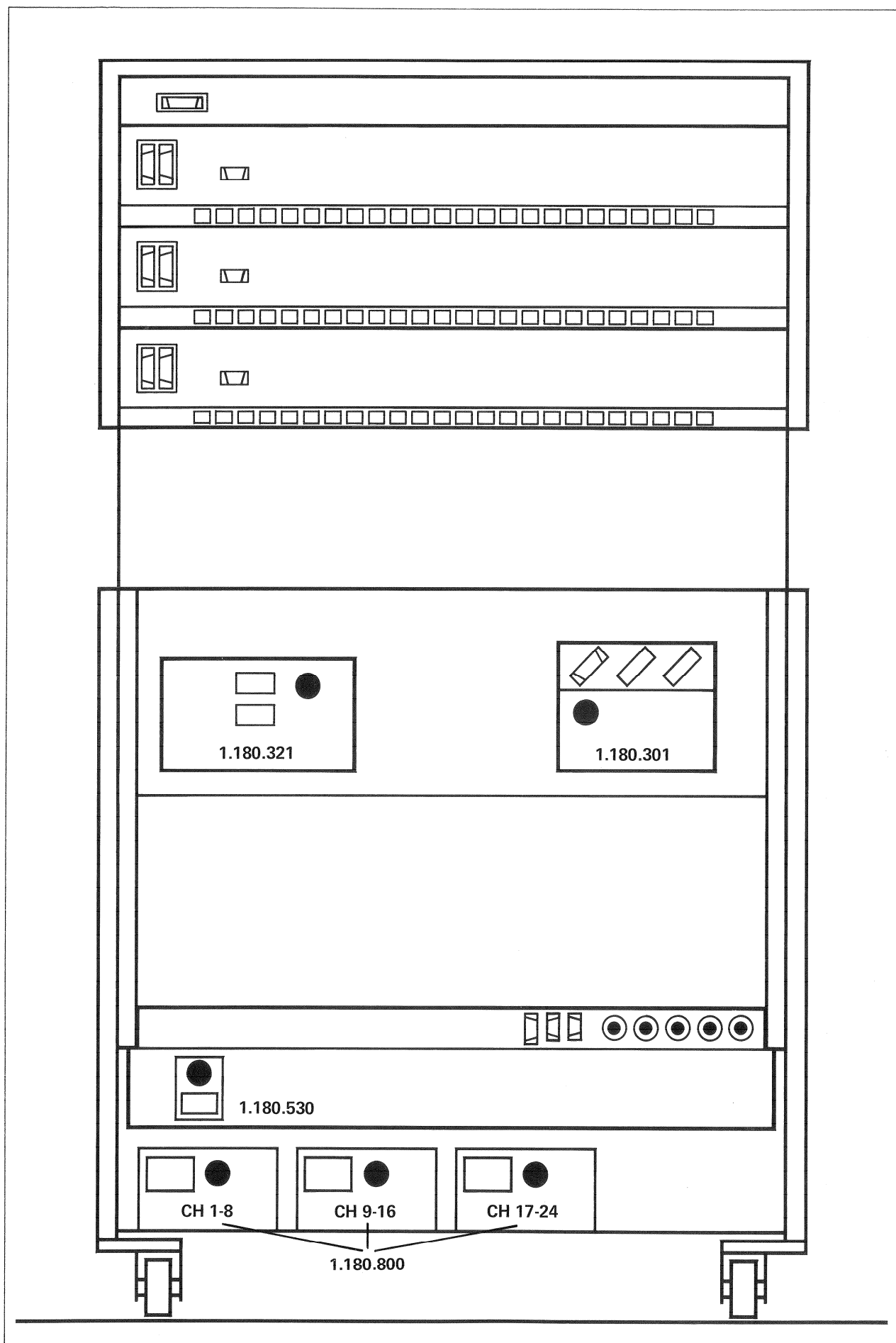


Figure 1

- 8 - channel - machines : 4 voltage selectors
- 16 - channel - machines : 5 voltage selectors
- 24 - channel - machines : 6 voltage selectors

- When connecting to line voltages of 100 V, 120 V or 140 V, the primary fuses of the power transformer must be replaced.

		100/120/140 V	200/220/240 V
Power supply electronics	1.180.301	5 AT	2,5 AT
Power supply spooling motors	1.180.321	8 AT	4 AT
Power supply expansion rack	1.180.530	4 AT	2 AT
Power supply audio	1.180.800	4 AT	2,5 AT

2.2

Change of line frequency 50-60 Hz

- The phase converter capacitor for the capstan motor is adapted in the following manner:

7,5/15 ips version, 50 Hz : 6.5 μ F (59.99.0460)
 60 Hz : 4.3 μ F (59.99.0452)

15/ 30 ips version, 50 Hz : 10 μ F (59.14.1100)
 60 Hz : 8 μ F (59.14.3809)

- The MP capacitor is located in the tape deck basket GR 30 EL 16, where it is easily accessible when the tape deck is tilted upwards.

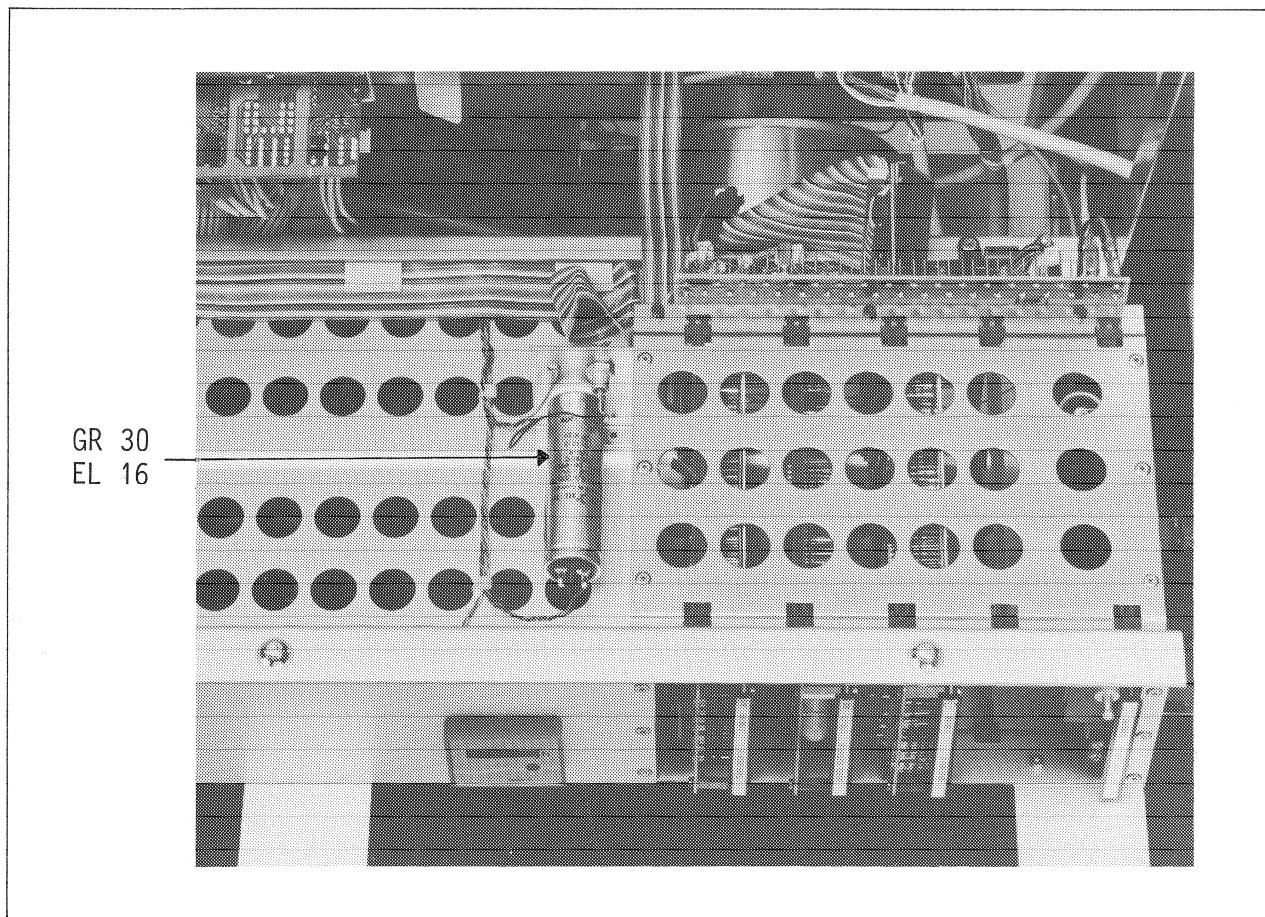


Figure 2

2.3

Recheck that all printed circuit boards are correctly positioned after the machine has been transported and prior to connecting it to the mains.

2.4

The switch "CODE CH ACTIVE" on the master panel may not be operated while the audio or code channel is in record or reproduce mode.

It is recommended that this setting is changed in the stop mode only.

2.5

The following protective foils are available for the reproduce and record heads:

Part number 1" = 1.216.060.02

Part number 2" = 1.216.080.02

2.6

Make sure that the machine is disconnected from the mains before boards are pulled out or reinserted.

2.7

Handling of MOS-packages

MOS packages are highly sensitive towards static loads. Please observe the following precautions:

- Do not touch pins of circuit package or only if your wrist is connected to ground.
- Use a grounded, conducting pad as work surface.
- For shipping, insert packages into an antistatic tube or mount them on a conducting pad. Styrofoam is NOT suitable for this purpose.
- Do not pull out or reinsert boards while the machine is switched on.

2.8

The ball bearings of move- and tape tension sensors may not alone be replaced. For reason of mechanical tolerances these assemblies have to be replaced as a whole.

3.

MAINTENANCE AND SERVICE WORK (List of maintenance aids, see part 23)

3.1

Cleaning of capstan shaft

- Please make sure that the cleaning agent used does not drip along the capstan shaft into the upper bearing.
- For this reason, only a damp piece of cloth should be used for cleaning.
- As cleaning agent we recommend alcohol or benzene.

3.2

Cleaning of pinch roller

- High-grade synthetic rubber is used in the manufacture of pinch rollers. However, this material is not resistant against all types of chemicals. Only the recommended cleaning agents may be used for cleaning.
- The recommended cleaning agents are: methylated spirits, water and soap solution ($\leq 70\%$).

3.3

If necessary, all other parts making contact with the tape must be cleaned with a soft piece of cloth moistened with alcohol.

- Note: Plastic parts should not come in contact with alcohol.

3.4

Highly contaminated anodized parts may be cleaned with aluminite cleanser.

3.5

To avoid damage, the magnetic heads should not come in contact with hard objects.

3.6

- Please ensure that the magnetic heads and tapes are not brought into close proximity of magnetic fields.
- The audio boards and the headblock assembly may not be removed while the machine is switched on.
- The magnetic heads should be periodically demagnetized (100 - 200 operating hours).

3.7

Cleaning of the dash pots

- If the dash pots are noisy or not smooth in operation, they should be cleaned.
- Piston and cylinder of the dash pots are to be cleaned with methylated spirits or aluminite cleanser.
- Apply a small amount of grease (Klüber Q-Paste NB 50, No. 99.01.0502) to piston and cylinder of the dash pot.
- Subsequently wipe off both parts with a clean rag in order to remove excessive grease. (Sufficient grease remains in the pores).

4.

VOLTAGE CHECKS

Switch the machine on.

4.1

- Check and adjust supply voltage before making electrical adjustments to the tape deck.
- An accurate multimeter 40 kOhm/V or preferably a digital voltmeter will be required.

Stabilizer board 1.180.465 or 1.180.466:

The adjustments must be performed in the following sequence due to the interdependence of certain voltages:

Test point 1	0 V	
Test point 6	+24 V \pm 0,1 V	adjustable with R28
Test point 5	+12 V \pm 0,1 V	adjustable with R29
Test point 2	-12 V \pm 0,1 V	adjustable with R30
Test point 3	- 5 V	
Test point 4	+5,2 V \pm 50 mV	adjustable with R9 at SW regulator 1.180.491

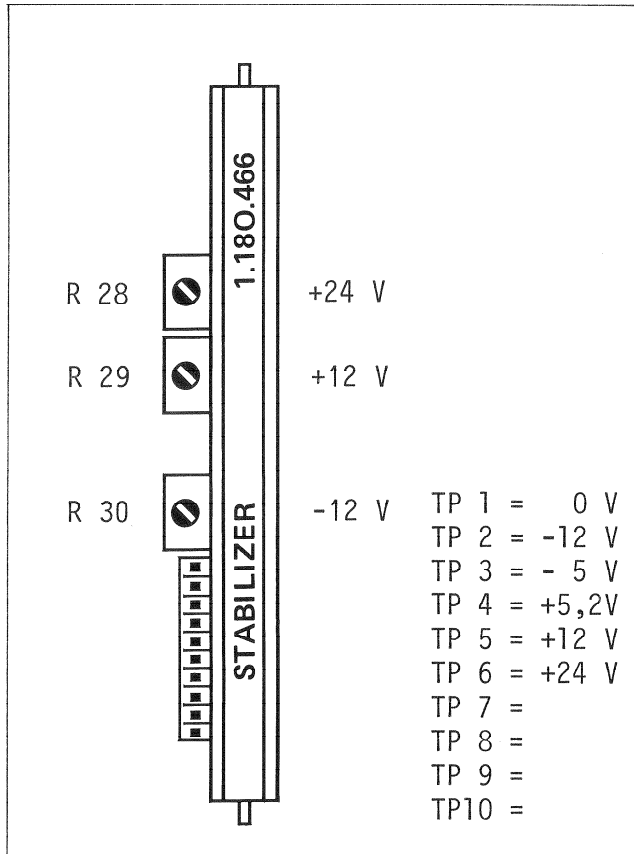


Figure 3

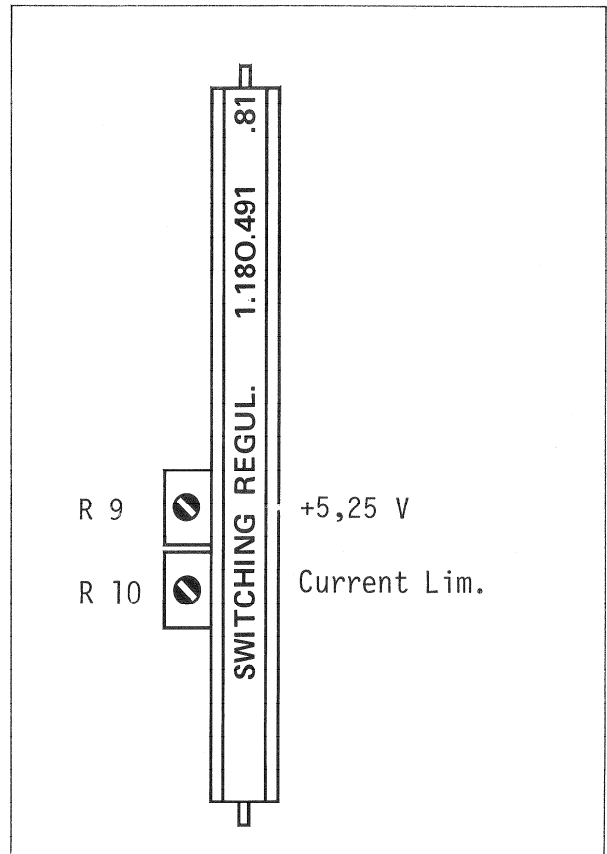


Figure 4

CAUTION: A voltage change of 100 mV at the \pm 12 V supply voltages causes a change in tape tension of approx. 100 μ . This must be taken into consideration especially when changing boards.

4.2

Current limit adjustment of the switching regulator 1.180.491 for tape deck A800

- This adjustment has been made at the factory and should only be repeated if the setting is suspect.
- After the voltage $5.2 \text{ V} \pm 50 \text{ mV}$ has been checked and if necessary adjusted, all boards of GR30 and GR35 must be removed. Only board 1.180.491 may still be plugged into GR35, EL1!
- Connect a ballast resistance of 0.86 Ohm/30 W (current 6 A) to the busbar GR35, EL11. See figure 5.

Black stranded connecting wire = 0 V / Green stranded connecting wire = 5.2 V

- Connect a voltmeter to the previously mentioned busbar.
- Turn potentiometer R10 (see figure 4) until the reading at the voltmeter begins to drop. Turn back potentiometer until the voltage has regained its original value. Whistling of the switching regulator should stop.

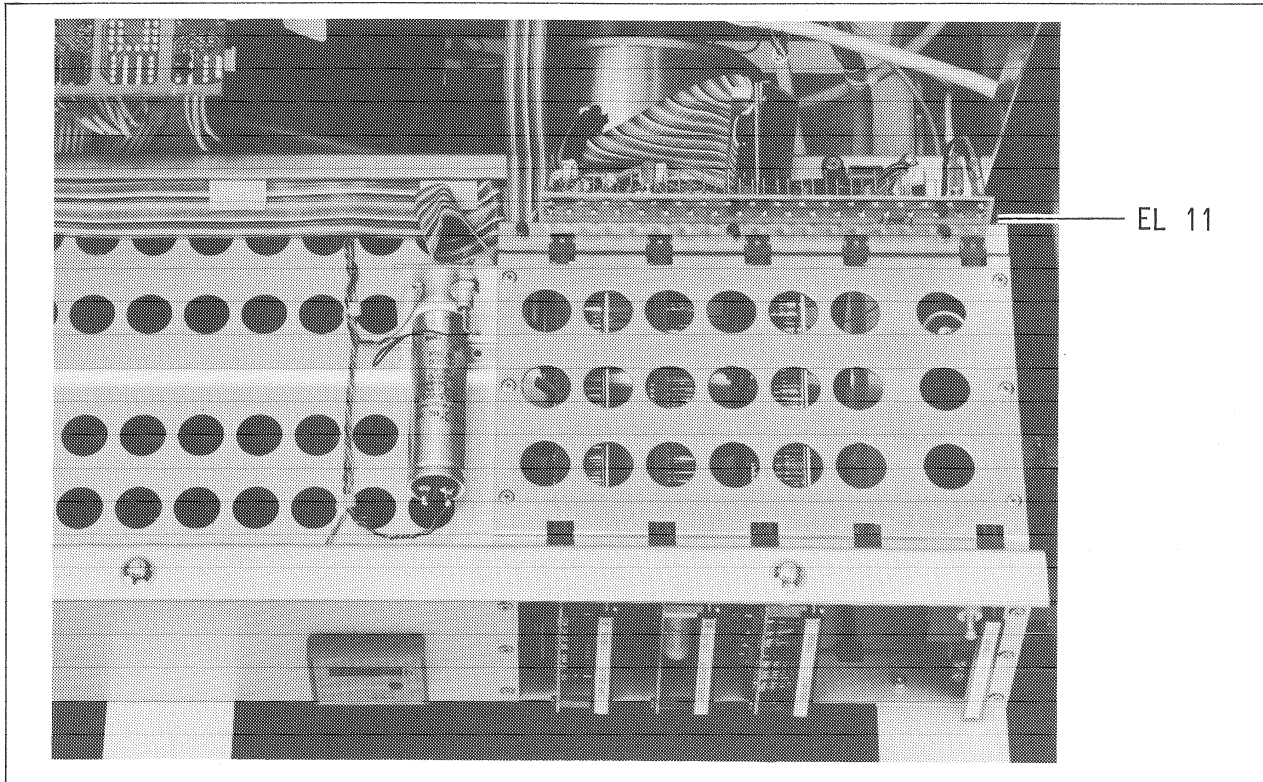


Figure 5

5.
BASIC ADJUSTMENT OF THE TAPE DECK

5.1
Make sure that all boards of the tape deck are plugged in all the way.

5.2
The jumpers on the print "Command Receiver 1.180.436" must be set according to specifications.

Unless specified to the contrary, Jumpers S1, S4 + S5 will be plugged into their standard positions.

Please make sure that C18 at TP3 is soldered correctly to correspond with the move sensor.

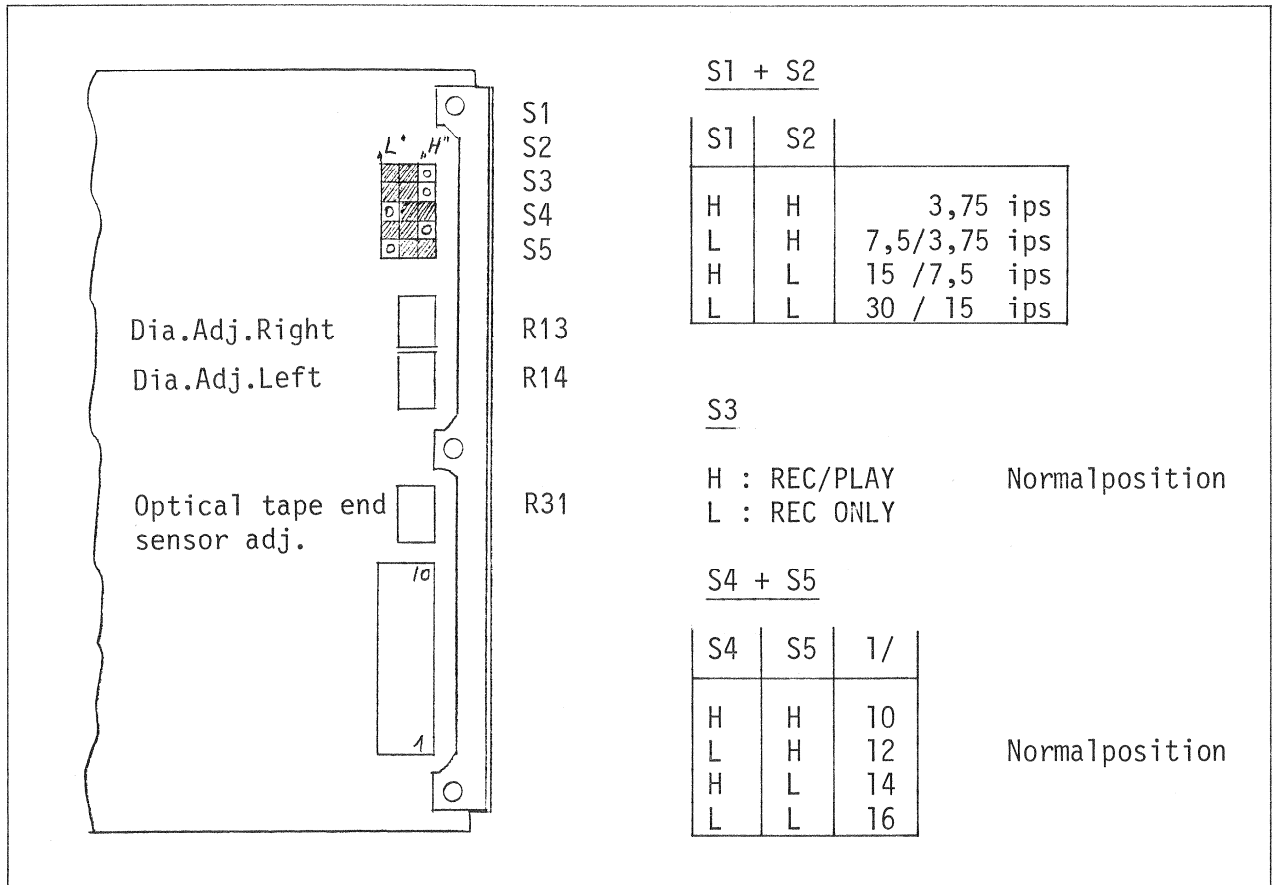


Figure 6

Command receiver 1.180.436 GR 30 EL 2

5.3

If the mechanical settings of the tape deck need to be readjusted, both covers of the tape deck must be removed.

Loosen oval-head screw (hexagon-socket-head 2.5 mm).

- Front cover 5 ea. M 4 x 8 mm
- Front/rear covers 2 ea. M 4 x 14 mm
- Rear cover 11 ea. M 4 x 8 mm

5.4

After the covers have been removed, the opto coupler limit switches of the tape tension sensors may be triggered by high ambient light levels.

Protect the limit switches from incident light with a metal shield or similar material. Otherwise the machine may not stop when reaching the tape end.

6.
ADJUSTMENT OF MECHANICAL BRAKES (Figure 7)

6.1

In the neutral position, the play between brake lever (3) and detent (5) should measure 0.5 - 1 mm. To adjust this setting, remove carrier plate (8). The carrier plate (8) can be adjusted by loosening screws (11) (Allen head 3 mm) and (12) (Allen head 5 mm).

6.2

The clearance between brake lever (3) and detent (5) should measure 4-5 mm when the plunger is pushed back manually.

6.3

The braking action can easily be checked by alternatingly rotating the reel adapter forward and backward with rapid motion (clicking noise). If no braking action can be detected (no clicking noise), the brakes should be allowed to run in as described on page 52 sections 21.18 through 21.22.

6.4

Adjustment of brake tension in the take-up direction (low brake tension). Mount empty reel with a tape section of approx. 2 - 3 m on hub of rewind direction.

Attach tentelometer (0 - 500 p) to the leading tape end and gradually pull forward to take the measurement. The specified brake tension of 110 p \pm 10 p is obtained by adjusting screw (1) (SW7).

6.5

Adjustment of brake tension in the feed direction (strong braking). Mount empty reel with a tape section of approx. 2 - 3 m on hub in play direction.

Attach tentelometer (0.5 - 3 kp) to leading tape end and gradually pull forward to take the measurement. The specified brake tension of 1.5 kp \pm 0.1 kp is obtained by adjusting screw (2) (SW7).

6.6
Mechanical brakes

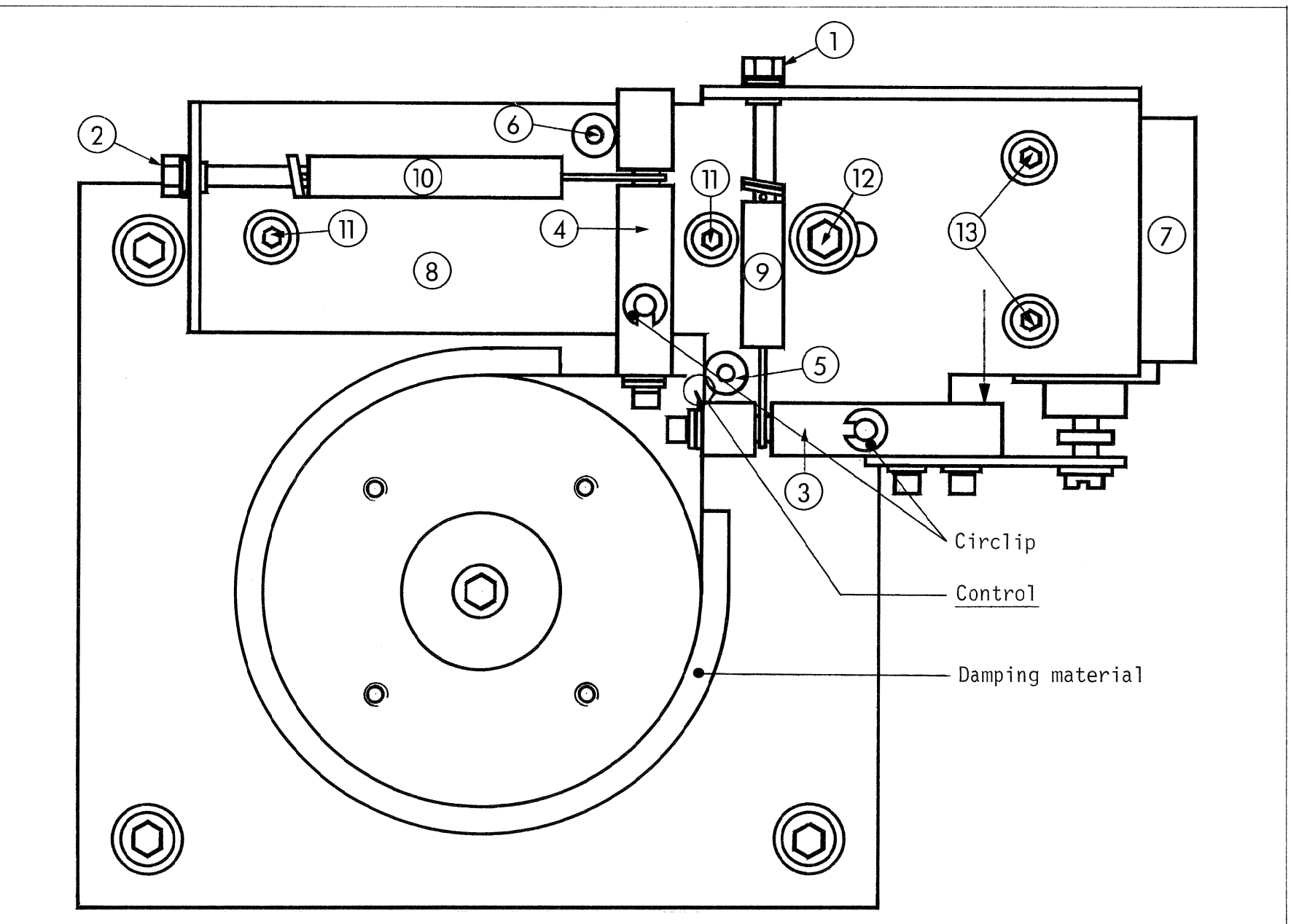


Figure 7

7. ADJUSTMENT OF LIGHT BARRIER

7.1 Thread magnetic tape.

7.2 By rotating the light emitter align the illuminating cone appearing on the magnetic tape in a horizontal direction.

7.3 Adjust potentiometer R31 (on 1.180.436) so that the tape counter still functions in play mode.

The counter must also function properly without interruptions when the rewind or locate mode is selected.

7.4 When the magnetic tape is lifted off the light barrier, the counter must stop, even though the move sense roller still rotates.

7.5 Mount Command Receiver board 1.180.436 on a 96 connector extension board (1.228.325).
Now, the voltage (0 Volt of TP 1) can be measured at the multipoint connector 24 C (Y-TRSP).
Without tape, the voltage should measure <0.4 VDC. After the tape is reinserted and the PLAY key is depressed, the voltage should measure >3 VDC. Both specifications must be safely met.

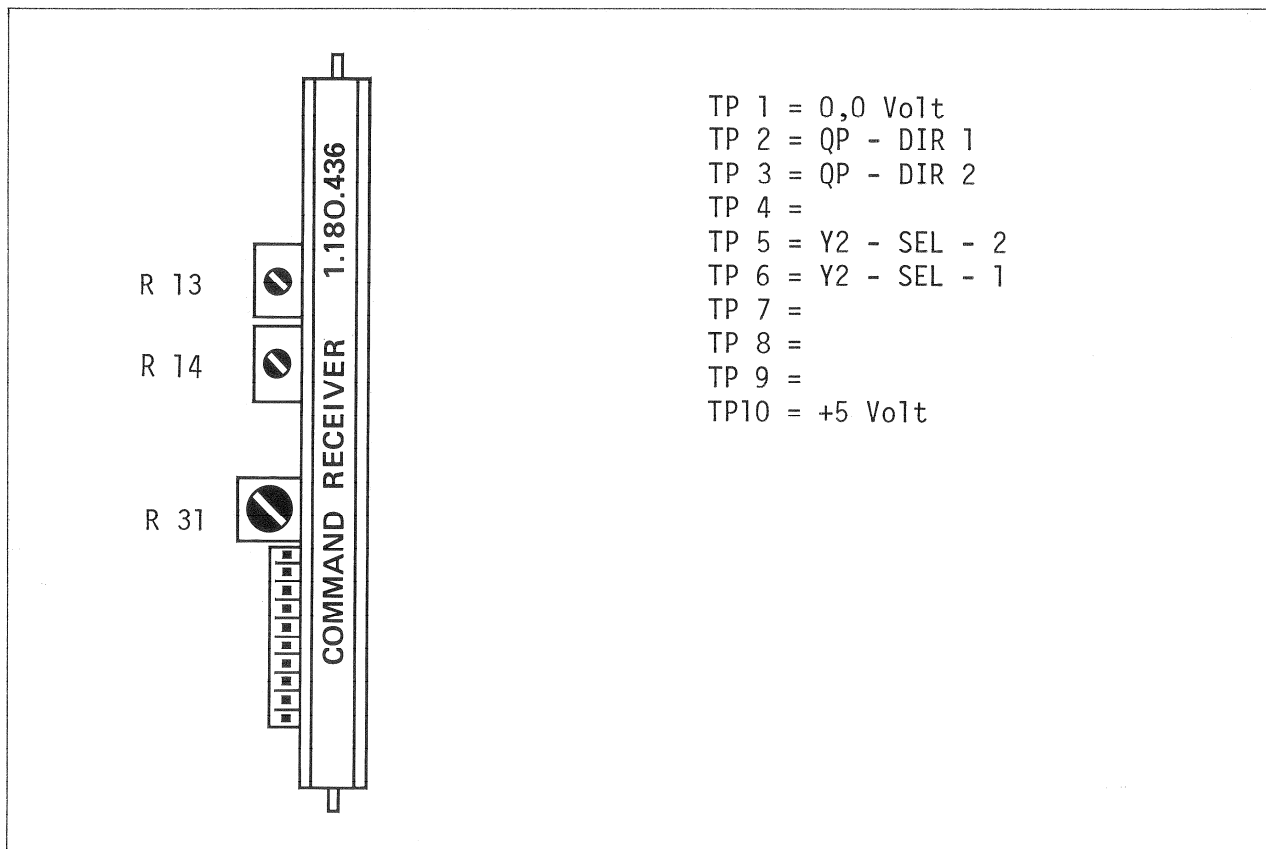


Figure 8

8. ADJUST OF PINCH UNIT

8.1
Remove headblock assembly and magnetic tape.

8.2
Check: The clearance between nut (1) (SW 14) and Allen screw (2) (SW 14) must measure $3 \text{ mm} \pm 0.5 \text{ mm}$.

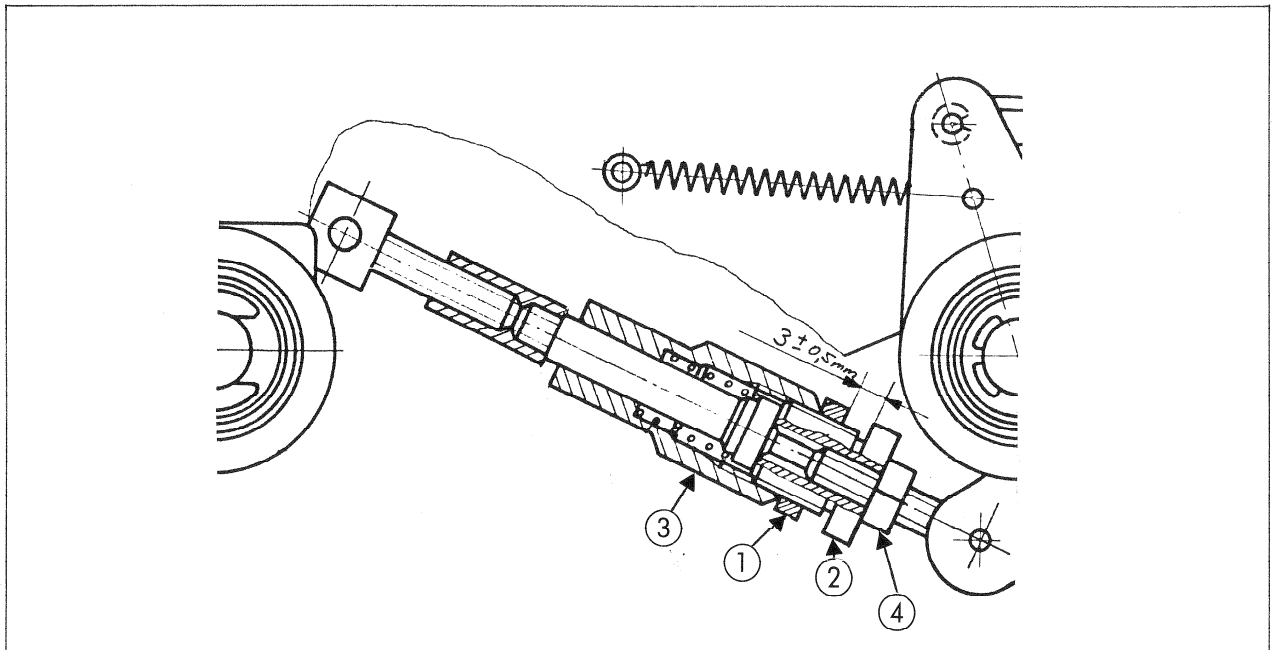


Figure 9

8.3
Drop the pinch unit into cutter position by depressing the EDIT key. The play position of the prestabilizer roller is adjusted by shifting the cutter magnet (SW 7). The clearance of 7.5 mm between the bearing trunnion of the prestabilizer arm and the external diameter of the prestabilizer roller is adjusted with the aid of a gauge (see Fig. 12).

8.4
The cutter position of the pinch roller is adjusted by shifting the linkage (3) (SW 14). Adjust the clearance between pinch roller and capstan shaft to 3 mm and secure setting with nut (4) (SW8).

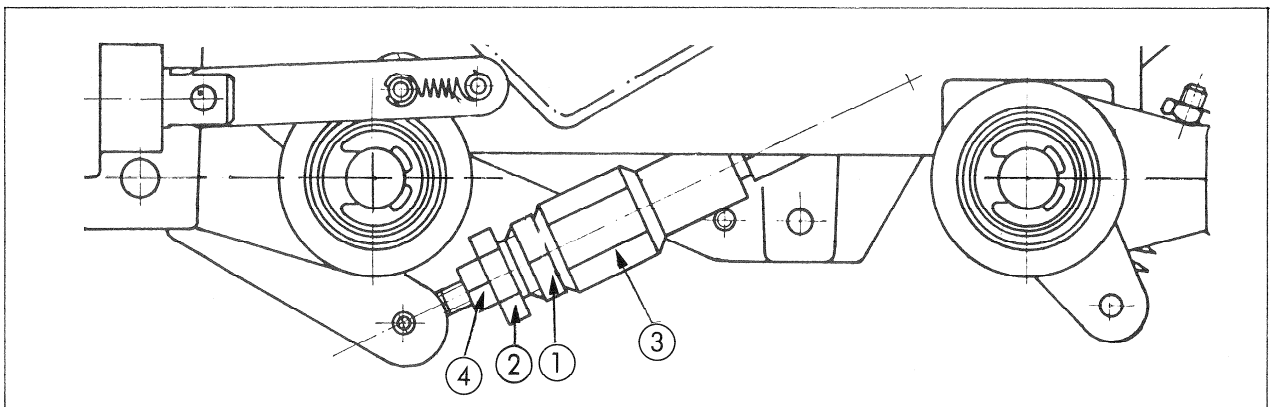


Figure 10

8.5

Install headblock assembly.

8.6

Depress PLAY key.

Measure the pinching force of the pinch rollers with the aid of a spring balance (0 - 2.5 kp). At the precise moment when they lift off the capstan shaft, the force should measure $1.6 \text{ kp} \pm 0.1 \text{ kp}$. The adjustment is made at the hexagon nut (5) (SW 7) located at the pressure arm.

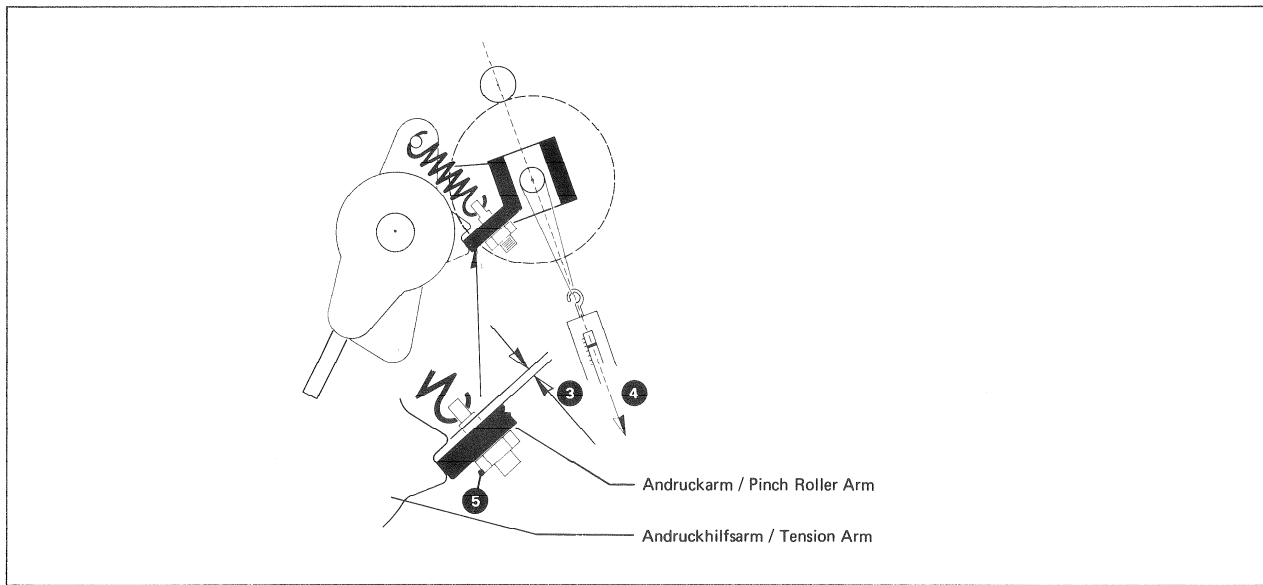


Figure 11

8.7

Mount magnetic tape.

The play between pressure arm and auxiliary pressure arm can be adjusted to 0.3 - 0.5 mm by shifting the pinch magnet (SW 7) (see figure 12)

This play can be verified by lightly pressing the pinch roller by hand towards the capstan shaft and by alternately depressing the PLAY and STOP keys.

Recheck settings of Sec.8 and, if necessary, readjust.

8.8

The damping unit can be adjusted by rotating the damping cylinder. The damping unit should be adjusted in such a fashion that the pinch roller does not overshoot, thus briefly touching the capstan shaft when the magnetic tape is rewound and the EDIT key is depressed.

Conversely, the pinching unit should move gradually and without jerking into its working or neutral position.

8.9

The switch point of the microswitches can be adjusted by loosening the hexagon nut (SW 5). The switch point should occur 0.2 - 0.4 mm before the armature reaches its detent.

When the armatures have reached their end position, the actuator pins of the microswitch must not touch the microswitch housing!

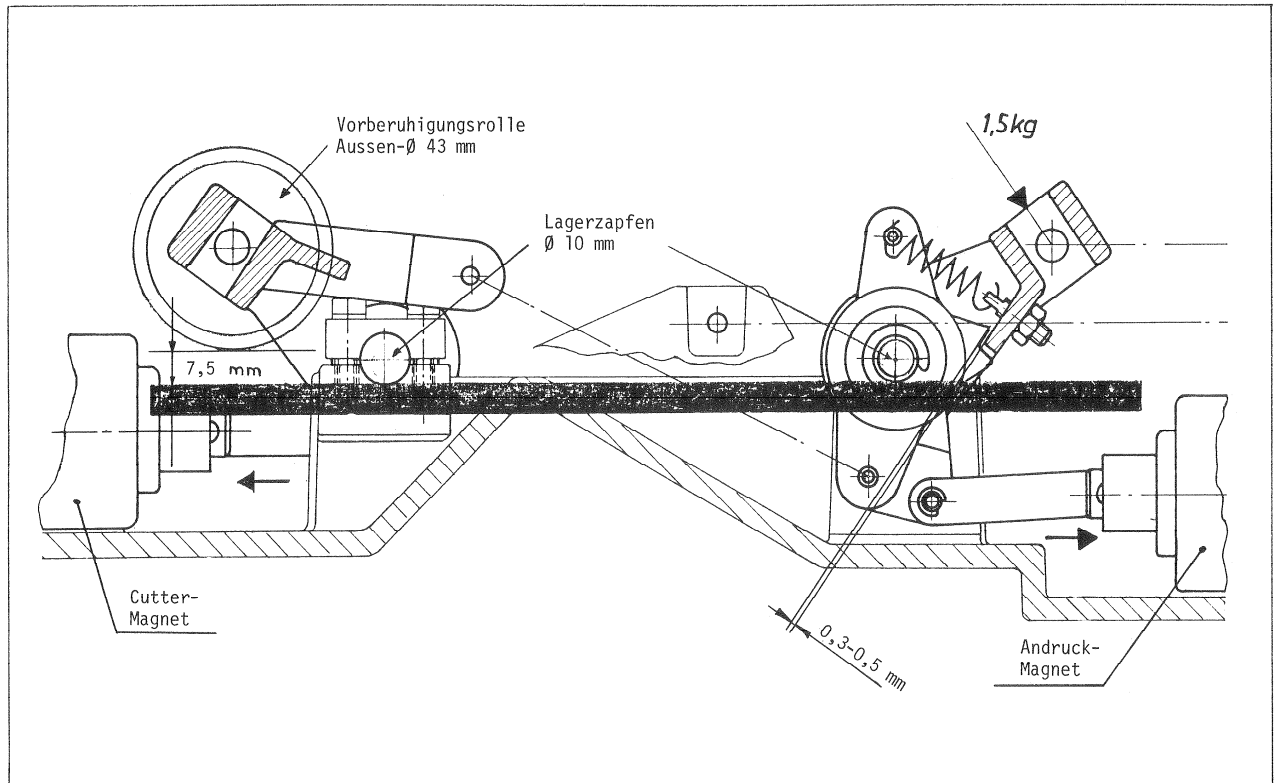


Figure 12 / Pinch unit STUDER A800

Important:

In the PLAY or EDIT position the pinch unit may not stay dropped in for too long while the microswitches are out of adjustment. The auxiliary winding of the cutter magnets is only designed for short-duration intermittent operation.

8.10

At this point, check that the pinch unit functions properly when alternately selecting various tape deck functions. In the cutter position, the magnetic tape must not touch the capstan shaft.

8.11

After the pinch unit has been properly adjusted and functions correctly, apply a small amount of glyptal (alkyd resin) to the end of the dash pot cylinder to prevent it from twisting.

9.**ADJUSTMENT OF THE TAPE TENSION SENSOR LIMIT SWITCHES (Figure 13)****9.1**

The limit switches of the tape tension sensors inhibit all tape deck functions when no tape is present.

The adjustments described below are made without threading a tape.

Caution: No incident light must reach the limit switches!

9.2

When the tape tension sensors are in their neutral position, the switch lug must be lined up with the switch panel of the light barrier. Adjustments can be made with the two screws.

With the tape tension sensor in its neutral position, use a soft pencil to transfer the zero point of the engraved cover of the tape tension sensor.

9.3

Rotate the tape tension sensor out of its neutral position (approx. 30°) and electronically deblock the tape deck.

Slowly return tape tension sensor to its neutral position. With a movement of approx. 3-4 mm (angle of rotation approx. 5°), measured from the neutral position of the tape tension sensor, the lamp in the stop key must change from continuous illumination to the blinking state.

Adjust the switch lug by loosening the two mounting screws so that the above conditions are met.

9.4

Visual check: the switch lug must be able to move through the slot of the light barrier without touching it.

9.5

These adjustments must be made for both limit switches of the tape tension sensors.

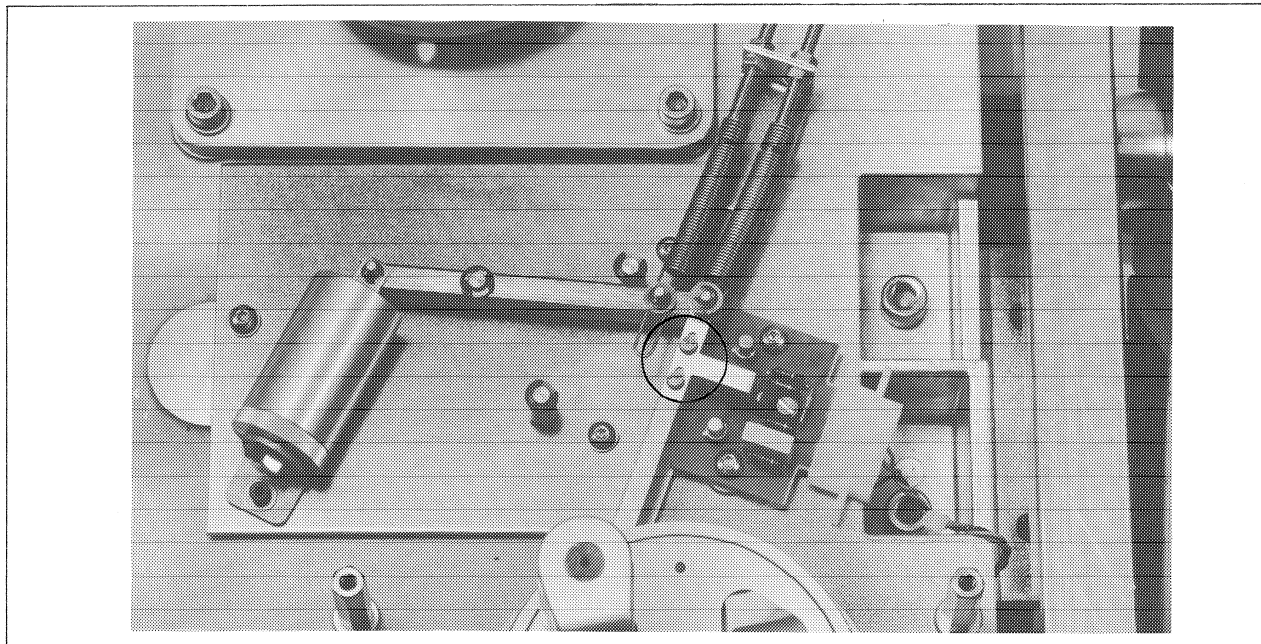


Figure 13

Valid for all machines with spooling motor control 1.180.455

10.
ADJUSTMENT OF ELECTRICAL BRAKES

The brakes are applied to the corresponding take-up reel as soon as the tape end is reached. The cut-off timing of the braking action is adjustable.

10.1

The two mechanical brakes can be manually disengaged by inserting a plastic block between tape deck chassis and armature lever (see figure 14).

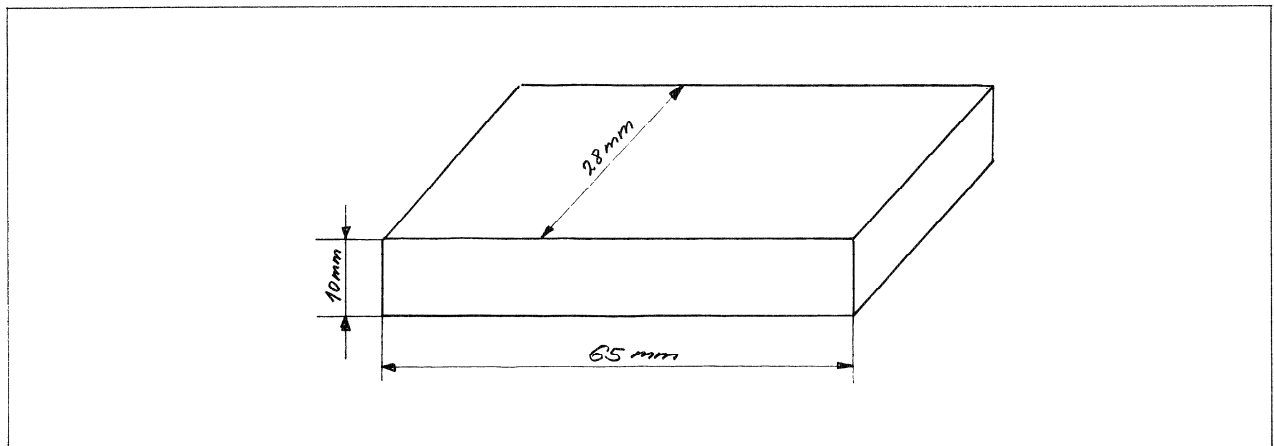


Figure 14

10.2

The adjustable potentiometers R24 and R25 located on the board "Spooling Motor Control 1.180.455" must be turned in a clock-wise direction until their limit position is reached.

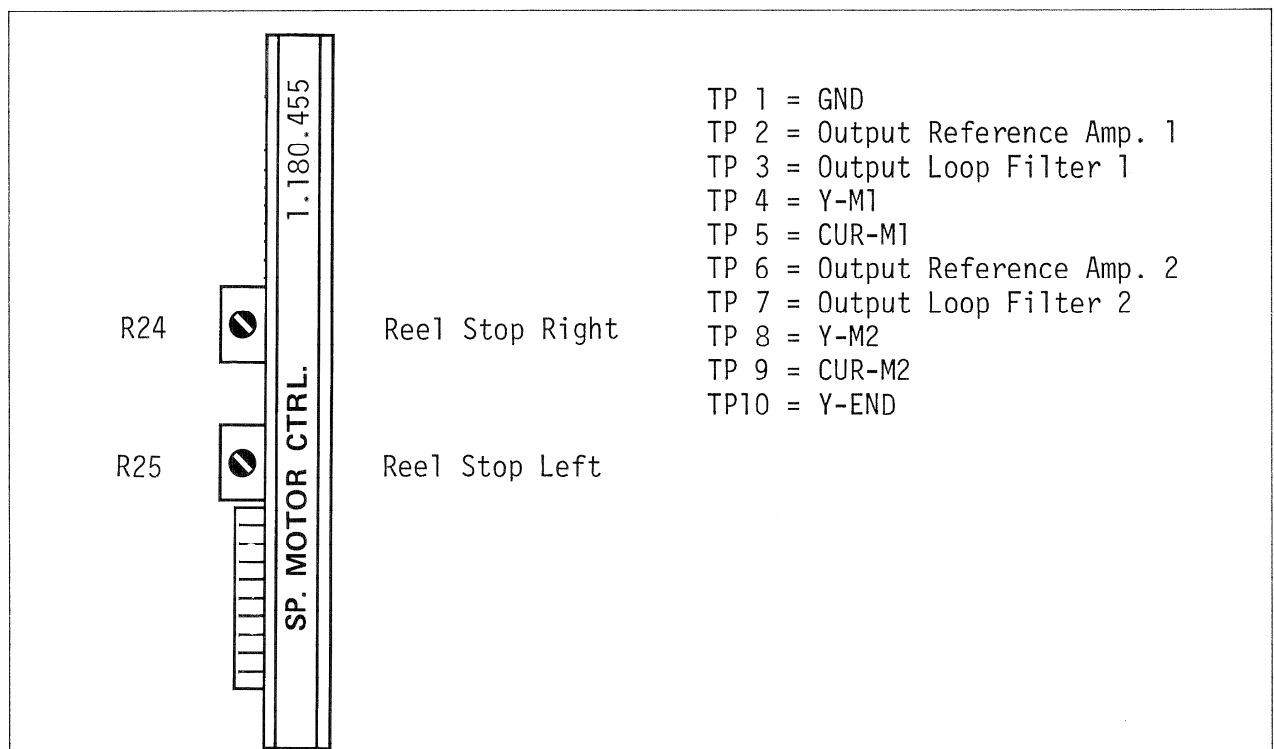


Figure 15

10.3

Mount empty 14" reel on the right-hand reel flange and tighten adapter.

Electronically deblock tape deck and depress one of the fast wind keys.

Electronic deblocking: lift flap of headblock assembly and shift one tape tension sensor out of its neutral position.

10.4

Adjust spooling motors to their maximum speed by rotating the tape tension sensor. After the motors have reached maximum speed, release the tape tension sensor, allowing it to return to its end stop.

The empty reel will be decelerated rapidly, however without slowing to a stand still. The cut-off timing can be set with the adjustable potentiometer R24 (located on 1.180.455) in such a manner, that braking remains effective until the reel stops.

By turning the adjustable potentiometer R24 further to the left, the empty reel will be braked too long, causing a reversal of its spooling direction.

10.5

Mount empty reel on the left-hand reel flange and adjust braking action with R25 (located on 1.180.455) using the method described in section 8.4.

10.6

Remove both inserted plastic blocks and remove empty reel.

11. ADJUSTMENT OF TAPE TENSION SENSORS

11.1

Loosen countersunk screw (1) and remove cover of tape tension sensor.

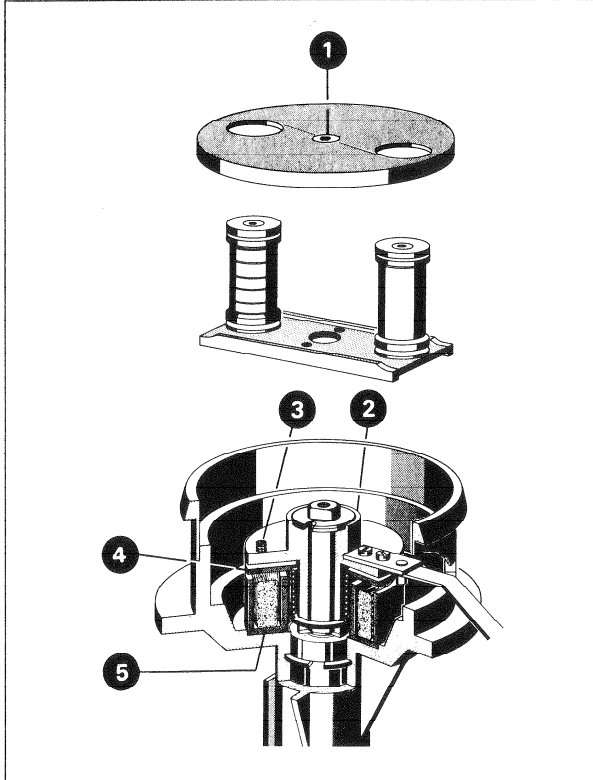


Figure 16

11.2

Depress lever flange (2) and adjust studs (3) until an air gap of 0.15 - 0.2 mm is obtained between anchor disk (4) and bell-shaped electro magnet.

11.3

Alternately depress STOP and EDIT key to check the correct blocking and lifting of the clutch plate against the electromagnets.

11.4

For checking purposes, turn the tape tension sensor to its limit position and subsequently depress the EDIT key. The tape tension sensor should lock in this position if the edit clutch is operating correctly.

11.5

Apply a small amount of glyptal to secure the studs (3).

11.6

Mount engraved cover of tape tension sensor.

11.7

With the tape tension sensor in neutral position, use a multimeter (40 kOhm/V) or a digital volt meter to establish a reading of $1.95 \text{ V} \pm 25 \text{ mV}$. (40 kOhm/V)
 $2.00 \text{ V} \pm 25 \text{ mV}$. (Digitalmeter)

11.8

Connect voltmeter to wiper terminal of the corresponding tape tension potentiometer and to ground.

Connect stranded wires of the potentiometer wiper terminals as follows:

left-hand (GR 12) brown

right-hand (GR 13) red

This adjustment is to be made for both tape tension sensors.

11.9

When the tape tension sensors leave their neutral position, the set voltage should drop.

11.10

Make sure that only a thin film of grease (Klüber Nr. 99.01.0502) adheres to the guide tube (4). The springs should be free of grease.

Remove the small, strong peak spring (1.180.170-09) if it is still in place.

Check that the ends of the outer large spring (1.180.172-03) are slightly turned so that they will not scratch the guide tube.

11.11

Loosen Allen screw (1.5 mm) of the spring adjusting ring (1). Shift edge of the adjusting ring (1) to line up with sleeve end (3) of spring (see figure 17).

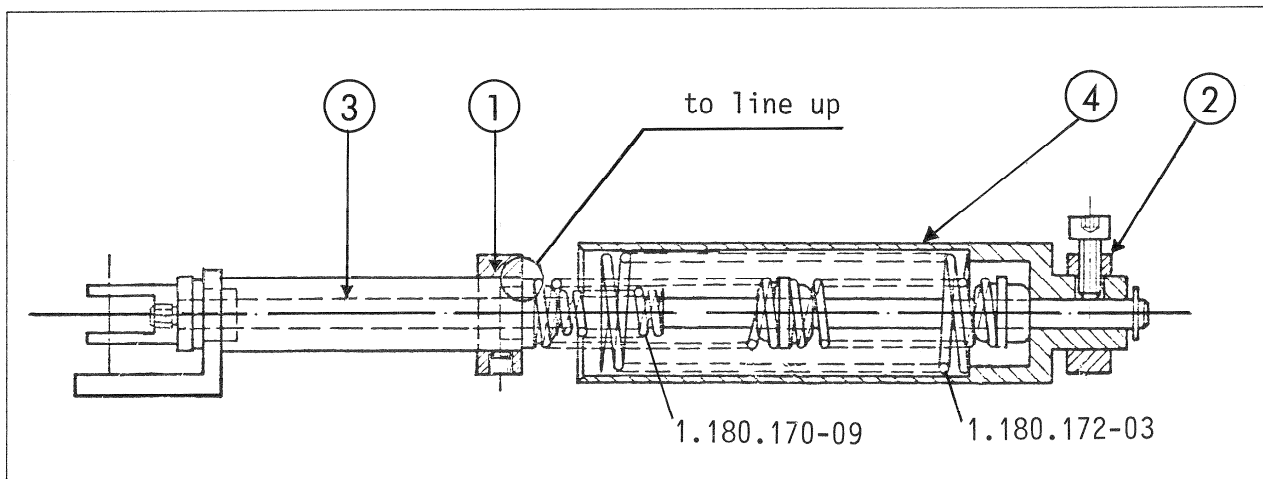


Figure 17

11.12

Mount empty reel with approx. 2-3 m of tape and thread tape into tape tension sensor.

With the tape tension sensor in neutral position, use a soft pencil to transfer the zero point of the engraved tape tension sensor cover to the flange ring.

Attach tentelometer 0-500 p to leading tape end and pull forward until the angle of rotation reaches 25° . The tape tension should measure 400 p. It can be adjusted by moving the guide tube (4) (allen head 2.5 mm).

The hysteresis of the tape tension sensor can be checked by pulling open the sensor until the angle of rotation measures approx. 50° . Now, slowly relax the spring tension until the angle of rotation reaches 25° . The deviation should not exceed 90 p (400 - 90 p). When the damping cylinders are removed the hysteresis should measure max. 30 p.

Remove tape.

11.13

Check that the angle of rotation at the tape tension sensor is at least 60° measured from stop to stop.

11.14

Checking the spooling direction reversal of the spooling motors

For electronic deblocking of the tape deck, one tape tension sensor must leave its neutral position and the microswitch of the shielding flap of the headblock assembly must be actuated.

After the tape deck has been electronically deblocked, depress the FORWARD key. The left-hand spooling motor must reverse its direction when the angle of rotation measures approx. $20-25^{\circ}$. For the right-hand spooling motor the reversal point should be reached when the angle of rotation measures approx. $55-65^{\circ}$.

Depress REWIND key. The left-hand spooling motor should reverse its direction at $55-65^{\circ}$. For the right-hand motor, reversal of the spooling direction should occur at approx. $20-25^{\circ}$.

11.15
Adjustment of the tape tension sensor equipped with air dumping

The latest STUDER A800 machines with spooling motor control 1.180.455 are equipped with air damping.

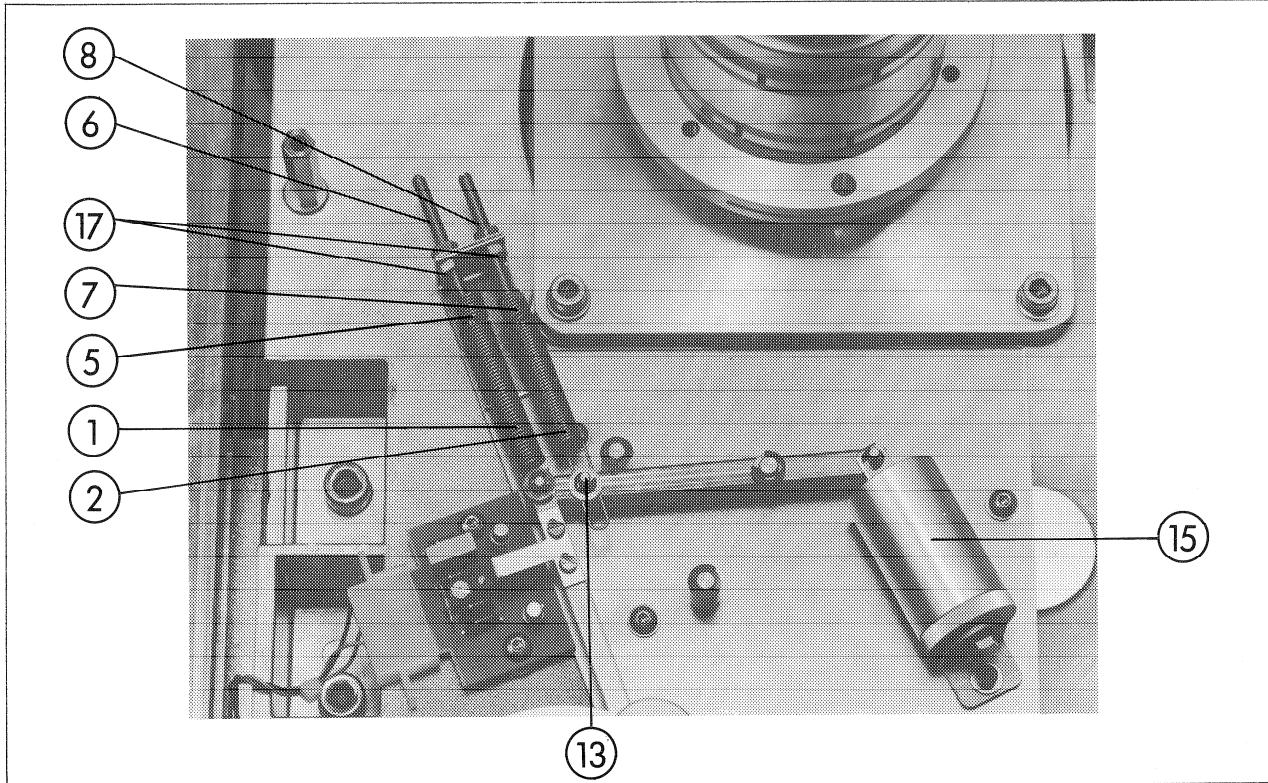


Figure 18

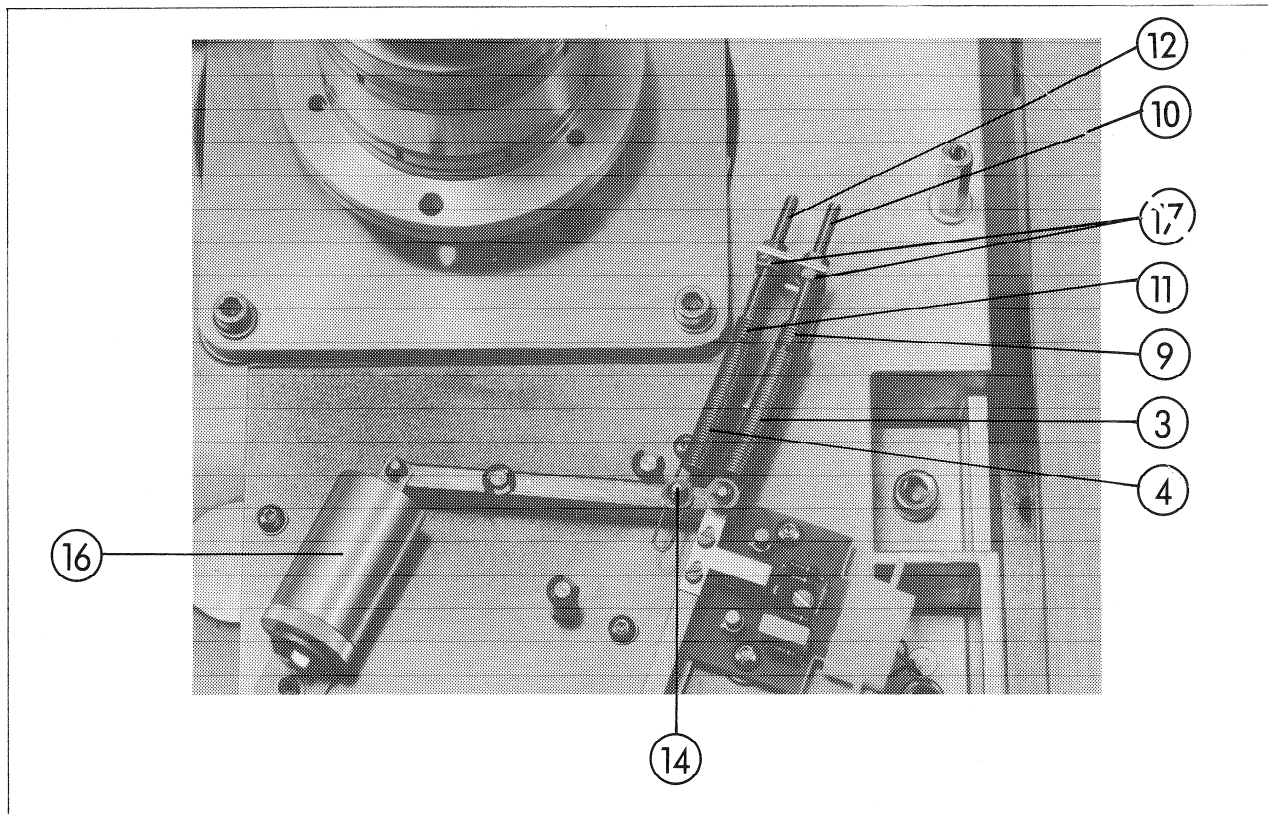


Figure 19

Adjust spring system only when necessary.

Tolerance of the spring system:
with angle of rotation up to 35° ± 15 p
with angle of rotation greater than 35° ± 50 p

11.15.1

With the tape tension sensors in neutral position, use a soft pencil to transfer the zero point engraved on the cover of the tape tension sensors to the flange ring.

11.15.2

Adjust springs (2) and (4) in such a fashion (or unhook) so that they do not engage with an angle of rotation of less than 40° (Figure 18/19).

11.15.3

Presetting of spring (1). See figure 20.

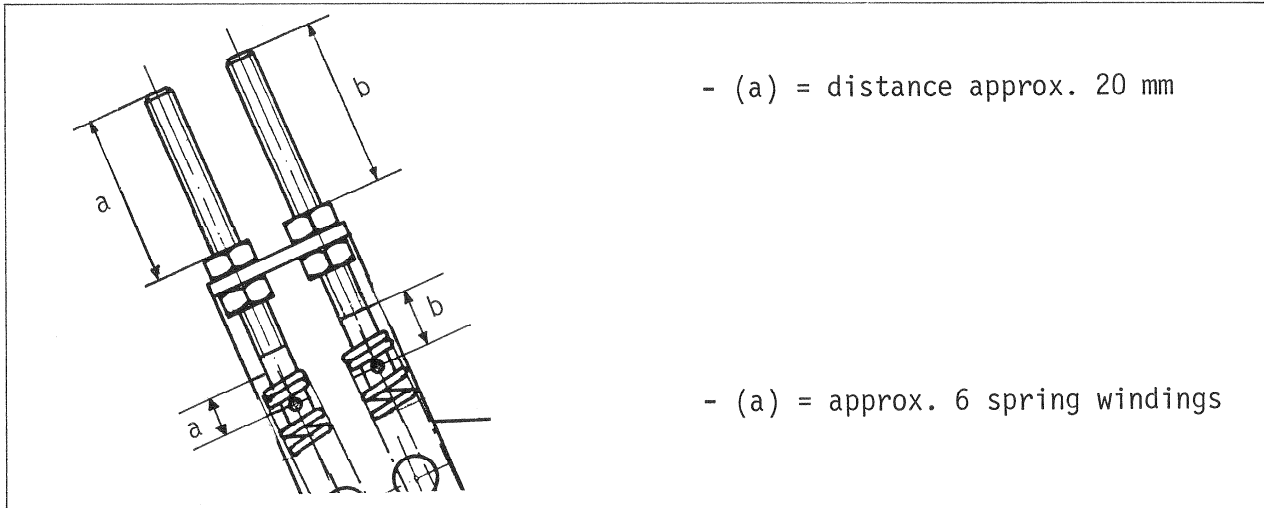


Figure 20

11.15.4

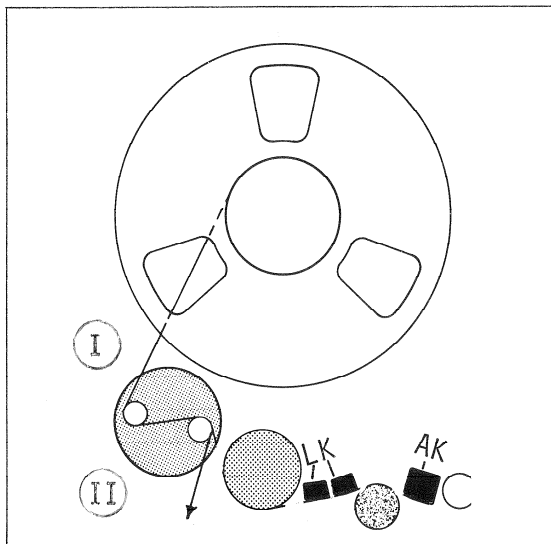
Measuring of spring characteristics (see figure 21).

Mount a blank reel containing about 2 - 3 m of tape on the reel adapter.

Thread tape in play direction (see figure 10) and connect the corresponding tentelometer to the leading end of the tape and pull evenly.

Required tentelometers:

0-500 p, 0-2,5 kp



Make sure that I and II are positioned in parallel when measuring the spring characteristics!

Figure 21

When readjustments are made, dash pots (15) and (16) should be set in such a manner that they do not produce a damping action.

11.15.5

Adjust spring (1) so that the spring tension measures 380 p at an angle of rotation of 25°.

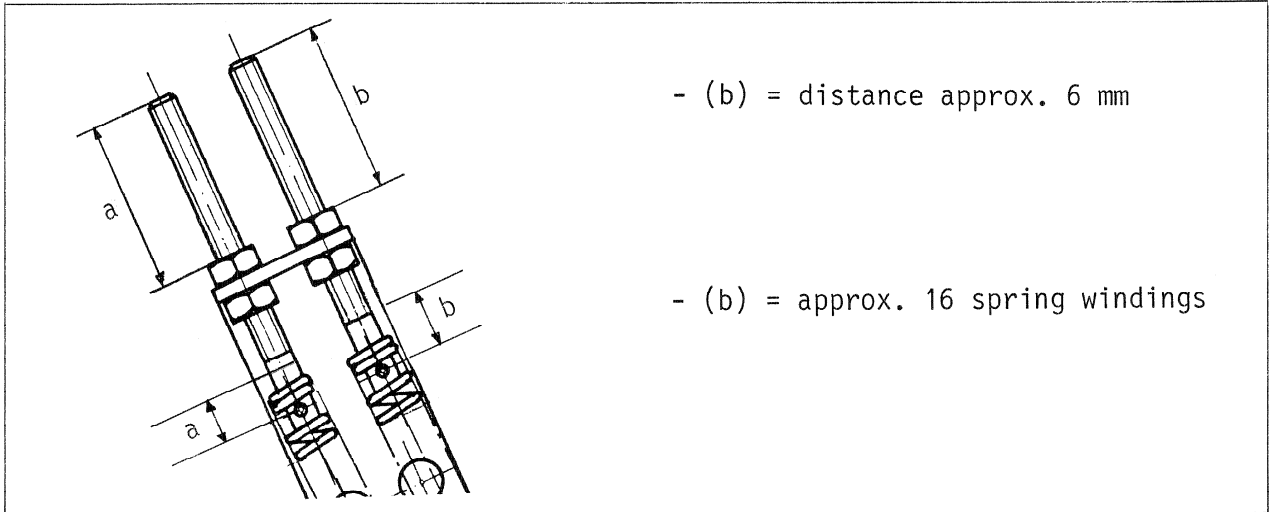
Check spring (1), and if necessary, readjust with (5) and (6) with the following angles of rotation:

10° = 220 p / 20° = 320 p / 25° = 380 p

11.15.6

Adjust spring (2) so that it engages with pin (13) when the angle of rotation reaches 35° .

Presetting of spring (2):



- (b) = distance approx. 6 mm

- (b) = approx. 16 spring windings

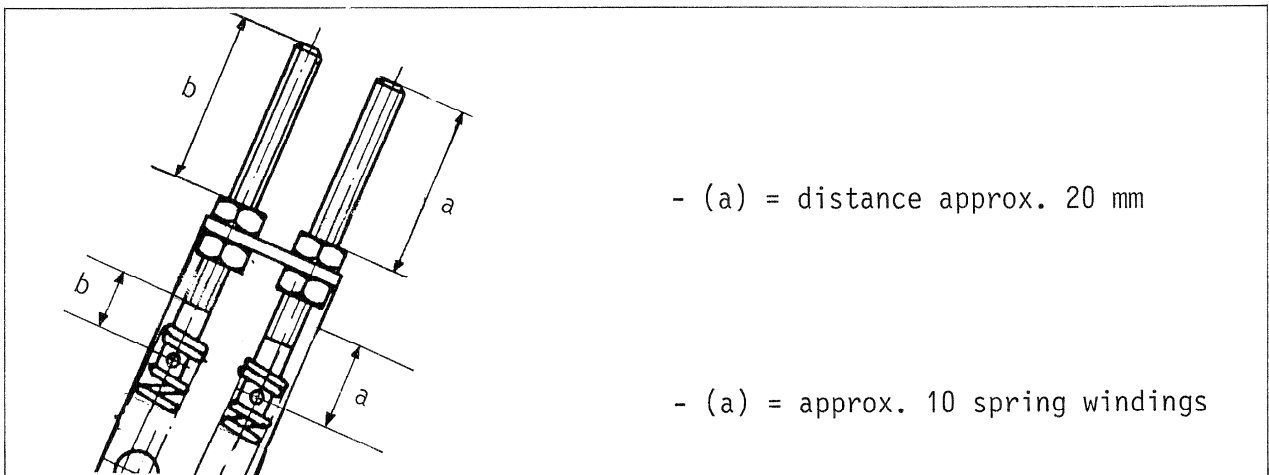
Figure 22

11.15.7

Adjust spring (2) with (7) and (8) in such a manner that the following spring characteristic (see Fig.25) is obtained for the complete left-hand spring system.

11.15.8

Presetting of spring (3):



- (a) = distance approx. 20 mm

- (a) = approx. 10 spring windings

Figure 23

11.15.9

Adjust spring (3) so that the spring tension measures 400 p when the angle of rotation reaches 25° .

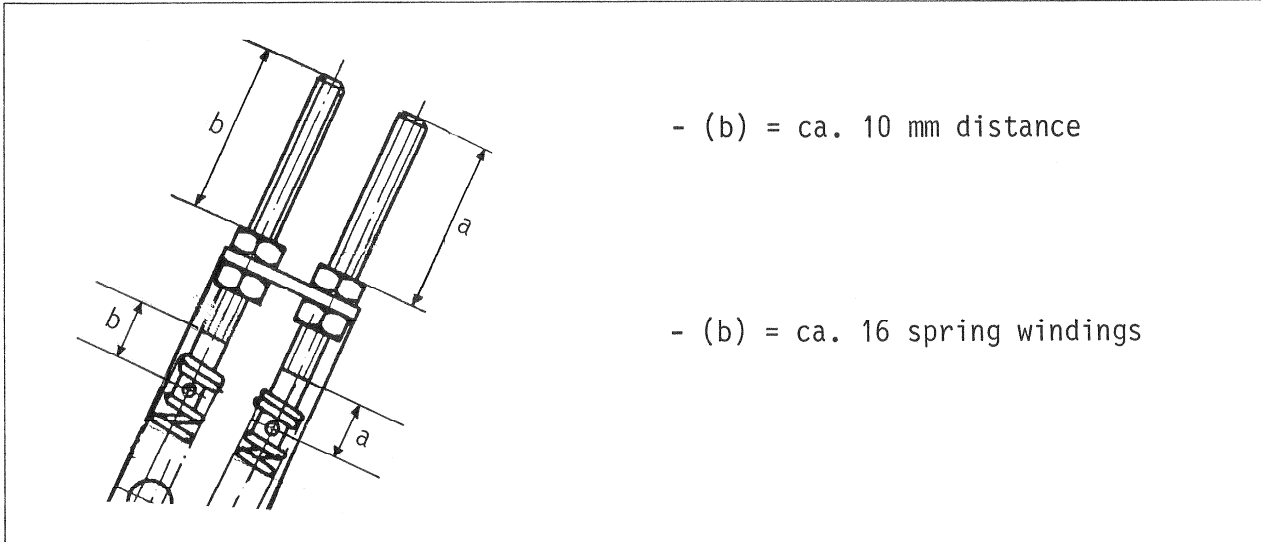
Check spring (3), and if necessary, readjust with (9) and (10) with the following angles of rotation:

- 10⁰ = 220 p
- 20⁰ = 340 p
- 25⁰ = 400 p

11.15.10

Adjust spring (4) so that it engages with pin (14) when the angle of rotation reaches 35°.

Presetting of spring (4):



- (b) = ca. 10 mm distance

- (b) = ca. 16 spring windings

Figure 24

11.15.11

Adjust spring (4) with (11) and (12) in such a manner that the following spring characteristic (see Fig. 25) is obtained for the complete right-hand spring system.

11.15.12

Tighten check nut (17) (SW 7).

11.15.13

The dash pots (15) and (16) can now be adjusted as follows:

- Manually pull open tape tension sensors until the angle of rotation reaches half of its maximum, i.e. approx 40°, then release. The tape tension sensors should gradually return to their neutral position without bouncing against the limit stop. The damping action can be adjusted by rotating the damping cylinder.

11.15.14

Tape tension spring characteristic for 1.180.455 / STUDER A800 - 2"

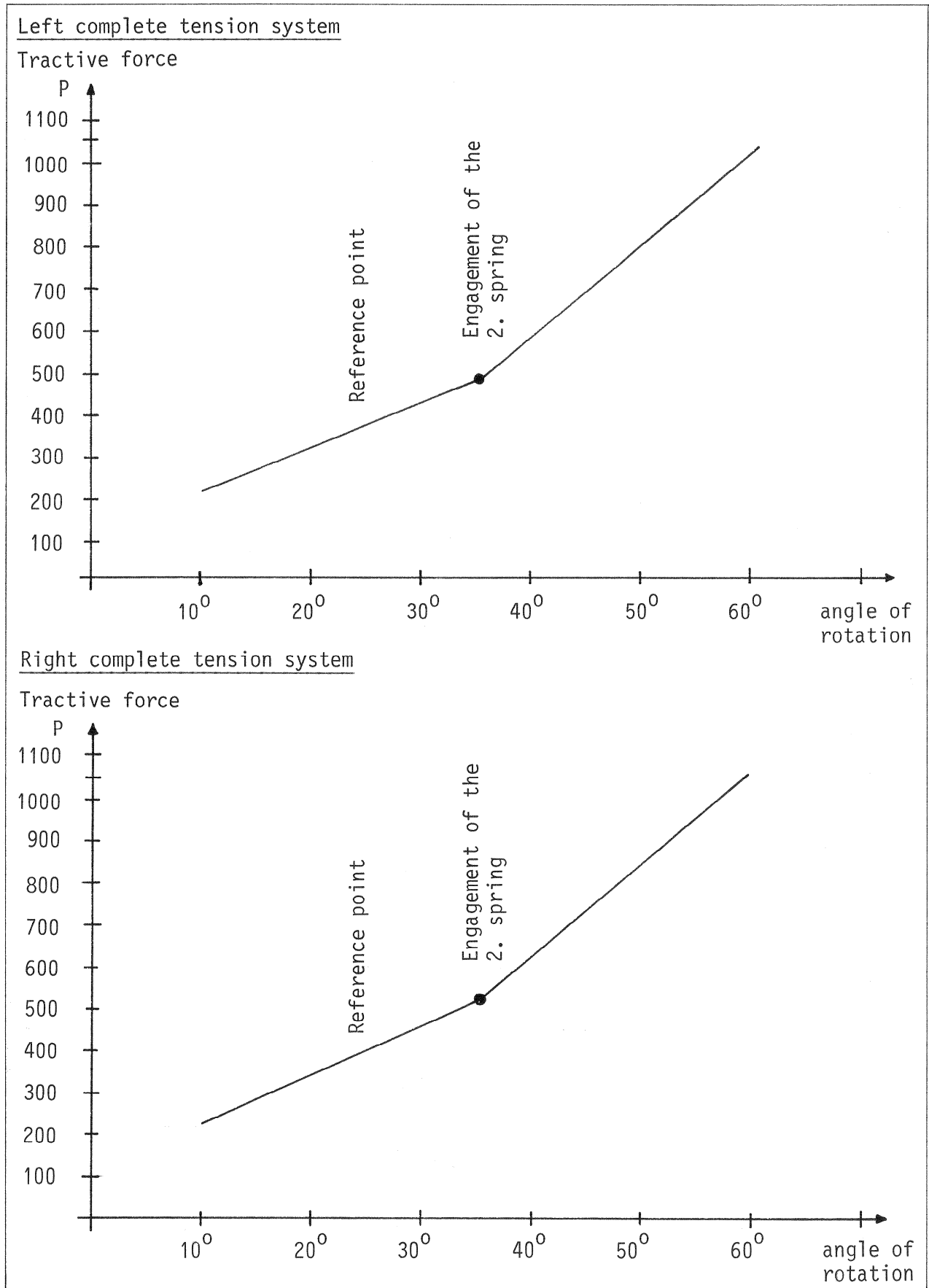


Figure 25

11.16
Adjustment of the spring characteristic

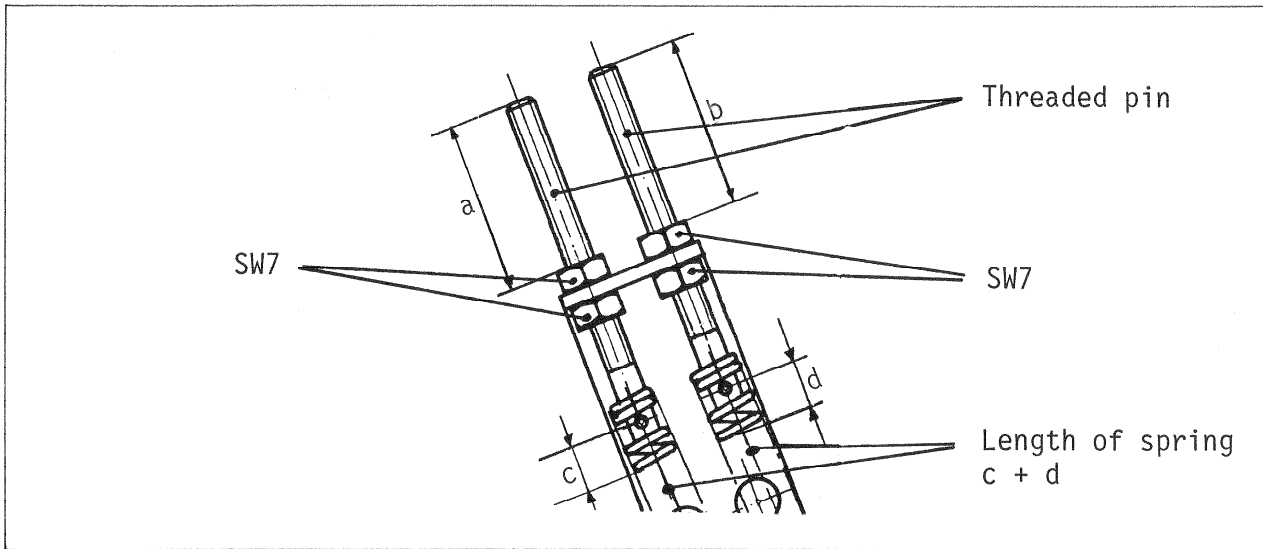


Figure 26

A parallel displacement of the spring tension characteristic is obtained by adjusting the threaded pin.

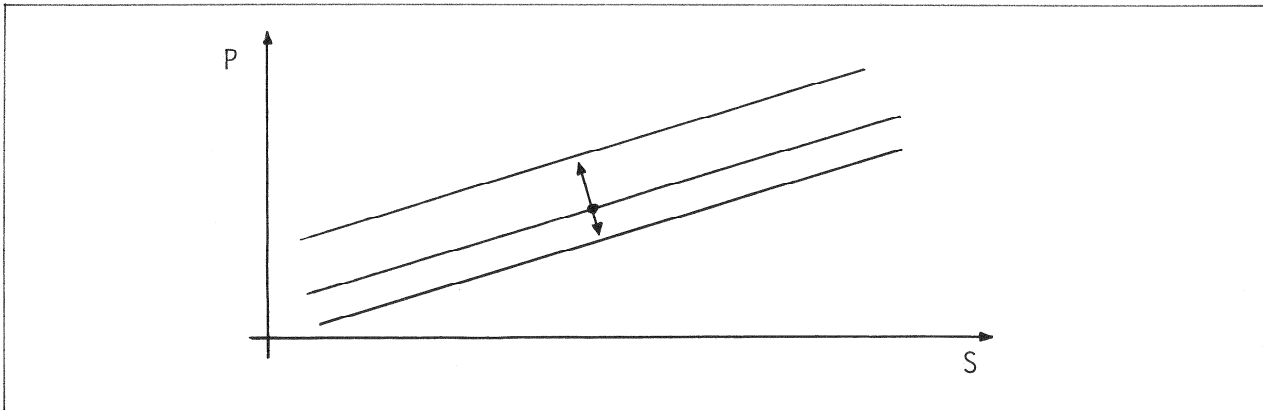


Figure 27

The slope of the spring characteristic is adjusted by shortening or lengthening the spring:
longer spring = flatter characteristic / shorter spring = steeper characteristic

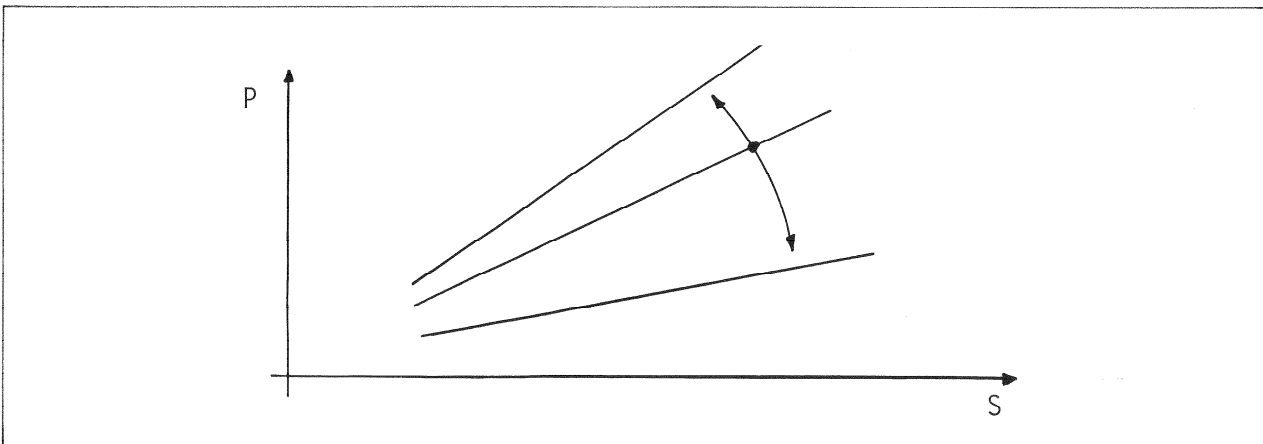


Figure 28

12. ADJUSTMENT OF TAPE TENSION

12.1

Mount magnetic tape (14"-reels) and wind forward until feed and take-up reel contain an equal length of tape.

12.2

Depress PLAY key and measure the tape tension between feed reel and left-hand tape tension sensor with the aid of a tentelometer.

The tape tension can be adjusted by shifting the spring adjusting ring (2) Allen head 2.5 mm near the left-hand tape tension sensor.

Tape tension with:	inline erase head	320 p	± 10 p
	two erase heads	350 p	± 10 p

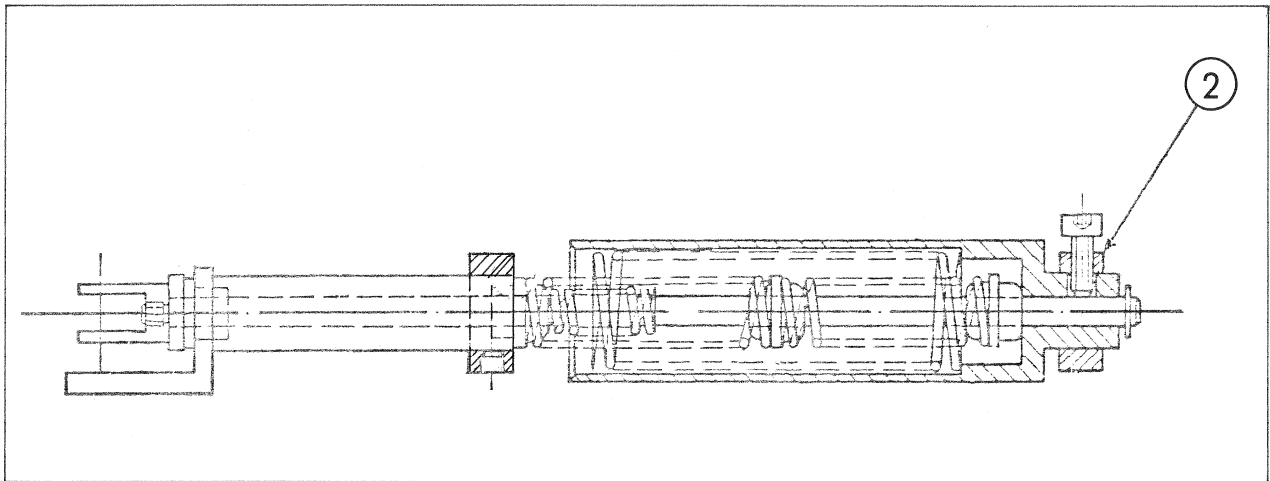


Figure 29

12.3

Measure tape tension between take-up reel and right-hand tape tension sensor.

The tape tension can be adjusted by shifting the spring adjusting ring (2) Allen head 2.5 mm near the right-hand tape tension sensor.

Tape tension with:	inline erase head	420 p	± 10 p
	two erase heads	400 p	± 10 p

12.4

When measuring the tape tension always initiate PLAY from the STOP mode.

Make sure that the difference in tape tension between the left and right side always gives the following values:

inline erase head	100 p
two erase heads	50 p

12.5

For checking the tape tension, the pinch roller must be lifted away from the capstan by approx. 1 mm with the aid of an Allen key 3 mm after which the tape should gradually slow down to a standstill.

The correctness of the adjustments is to be verified by repeating the check.

Check: The angle of rotation of the tape tension sensor, measured in the play position, must be approx. 25° for the left-hand side and approx. 27° for the right hand side when the take-up and feed reel contain an equal length of tape. With dashpot and new software, the angles should be 20° or 25° respectively.

12.7

The tape tensions increase by approx. 10 p when 12" reels are used for measuring the tape tension.

12.8

Adjustment of tape tension for air-dampened sensors

For tape tension sensors equipped with air damping, the tension is adjusted by shifting springs 1 and 3 (see section 6).

The tape tension specifications remain unchanged:

Tape tension left	Inline erase head $320 \text{ p} \pm 10 \text{ p}$	2 erase heads $350 \text{ p} \pm 10 \text{ p}$
Tape tension right	Inline erase head $420 \text{ p} \pm 10 \text{ p}$	2 erase heads $400 \text{ p} \pm 10 \text{ p}$

Valid for all machines with spooling motor control 1.180.457.00

13.
ADJUSTMENT OF TAPE TENSION SENSORS

13.1
Loosen countersunk screw (1) and remove cover of tape tension sensor.

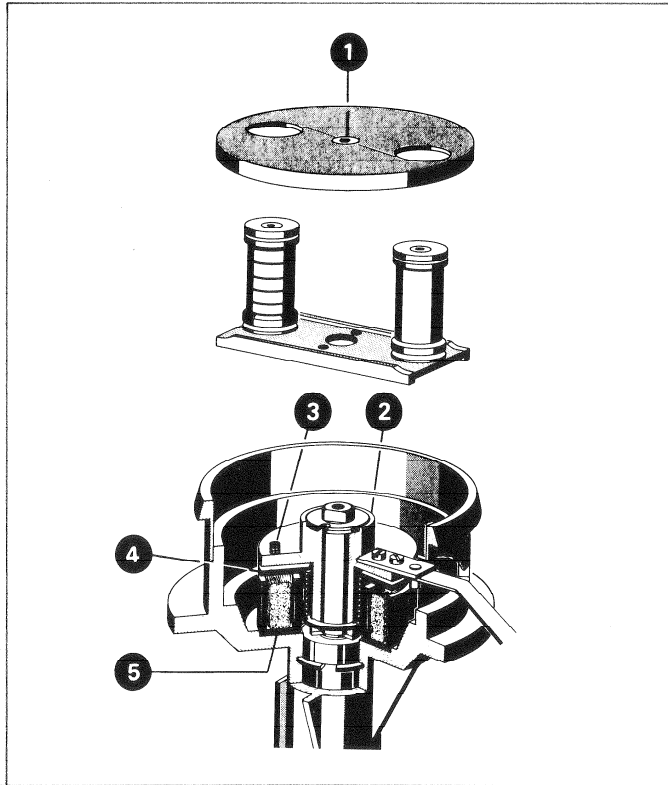


Figure 30

13.2
Depress lever flange (2) and adjust studs (3) until an air gap of 0.15 - 0.2 mm is obtained between anchor disk (4) and bell-shaped electro magnet.

13.3
Alternately depress STOP and EDIT key to check the correct blocking and lifting of the clutch plate against the electromagnets.

13.4
For checking purposes, turn the tape tension sensor to its limit position and subsequently depress the EDIT key. The tape tension sensor should lock in this position if the edit clutch is operating correctly.

13.5
Apply a small amount of glyptal to secure the studs (3).

13.6
Mount engraved cover of tape tension sensor.

13.7

Use a multimeter (40 kOhm / V) or a digital voltmeter: Connect one pole of voltmeter to wiper terminal of the corresponding tape tension potentiometer and the other pole to ground (e.g.: testpoint 1 on stabilizer 1.180.466). The stranded wires of the potentiometer wiper terminal have the following colours:

Left hand side (GR 12) brown

Right hand side (GR 13) red

Mechanical preadjustment of the potentiometer:

Tape tension sensor in neutral position gives a reading of 2 V.

Optimal working position:

Set the tape tension sensor to 30° deviation and turn the potentiometer slightly until the voltmeter shows $0 \text{ V} \pm 25 \text{ mV}$.

14a)

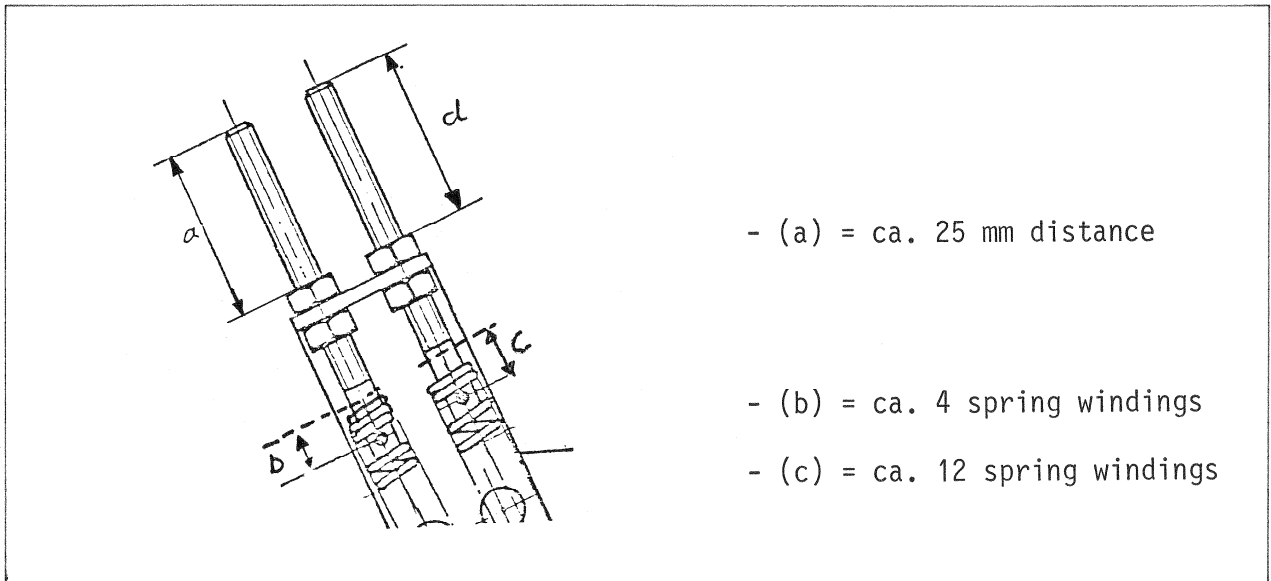
Spooling Motor Control Card 1.180.457.00 GR 30 EL 6 2 inch version

This card is inserted in all A800 1 and 2 inch with serial number higher than 20'200.

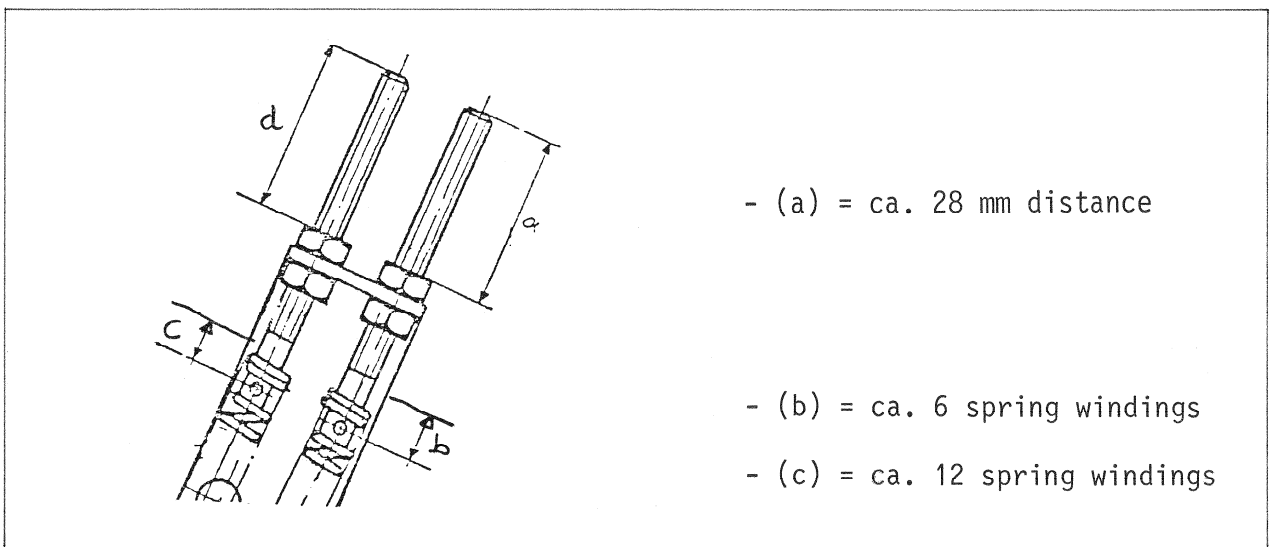
1.) Adjustment of tape tension sensors (valid for 2 inch machines)

a) Presetting of the springs: (usually factory adjusted)

left hand side:



right hand side



The peak spring has to be adjusted, that it hooks at about 35° by lengthening or shortening (d).

b) After the presetting of the springs, adjust them to the following values:

lefthand side tractive force in p	angle of rotation in °	righthand side tractive force in p
290	20	320
340	25	370
390	30	420
550	40	600
750	50	800
1000	60	1000

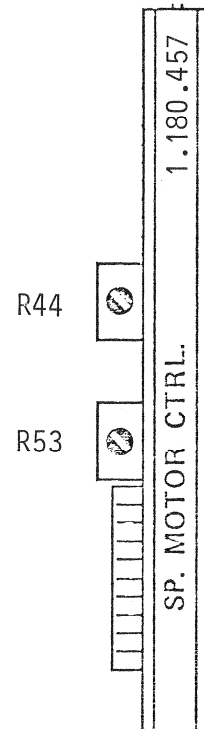
c) Adjustment of potentiometer:

at 0° angle of rotation 2.0 V preadjustment correction of the adjustment at 30° angle of rotation: 0 V ± 25 mV.

d) Adjustment of the correct tape tension:

If the spring system has been adjusted as mentioned above the correct tape tension can be adjusted as follows:

- 1.) Start the machine in play in the middle of the tape
- 2.) Switch a few times stop-play-stop-play
- 3.) Measure tape tension left handside and adjust with potentiometer R53 (lower potmeter on 1.180.457) to the required value.
- 4.) Measure tape tension right hand side and adjust with potentiometer R44 (upper potentiometer on 1.180.457) to the required value.
- 5.) Should the required values be out of the potentiometer range, the spring system might have to be slightly corrected.



recommended values	left	right
2 erase heads	320	380
in line erase head	320	400
narrow headblock	320	400

6.) Check the correct tape tension:

- a) Machine in play
- b) Remove the pinch roller a few millimeter from the capstan shaft
- c) The tape must slowly stop: 1/2 to 1 turn after removing the pinch roller

e) Adjustment of command receiver 1.180.436 for slow down at tape end:

The first speed reduction should occur about 3 minutes before tape end and the second about 1 minute before the end of tape.

upper potentiometer: right side

middle potentiometer: left side

f) Check correct operating of the spooling motors:

- 1.) Wind until middle of tape
- 2.) Press stop
- 3.) Hold the guide roller left together with the tape by hand
- 4.) Press fast forward: left hand balance shows ca. 30°
right hand balance shows ca. 60°
- 5.) Press fast rewind: right hand balance shows ca. 30°
left hand balance shows ca. 60°

14b)
Adjustment instruction A800 - 1 inch

SPOOLING MOTOR CONTROL CARD 1.180.457.00 GR 30 EL 6 1 inch version

This card is inserted in all A800 1 and 2 inch with serial numbers higher than 20'200.

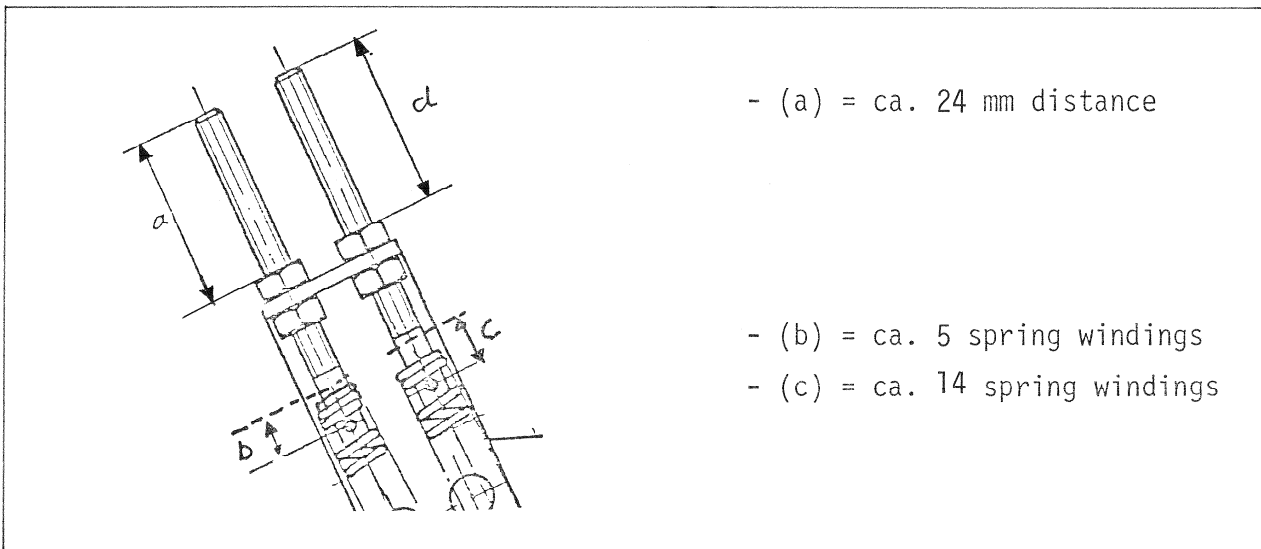
This instruction is valid for 1 inch machines with serial numbers higher than 20'200.

1.) Adjustment of tape tension sensors (valid for 1 inch machines)

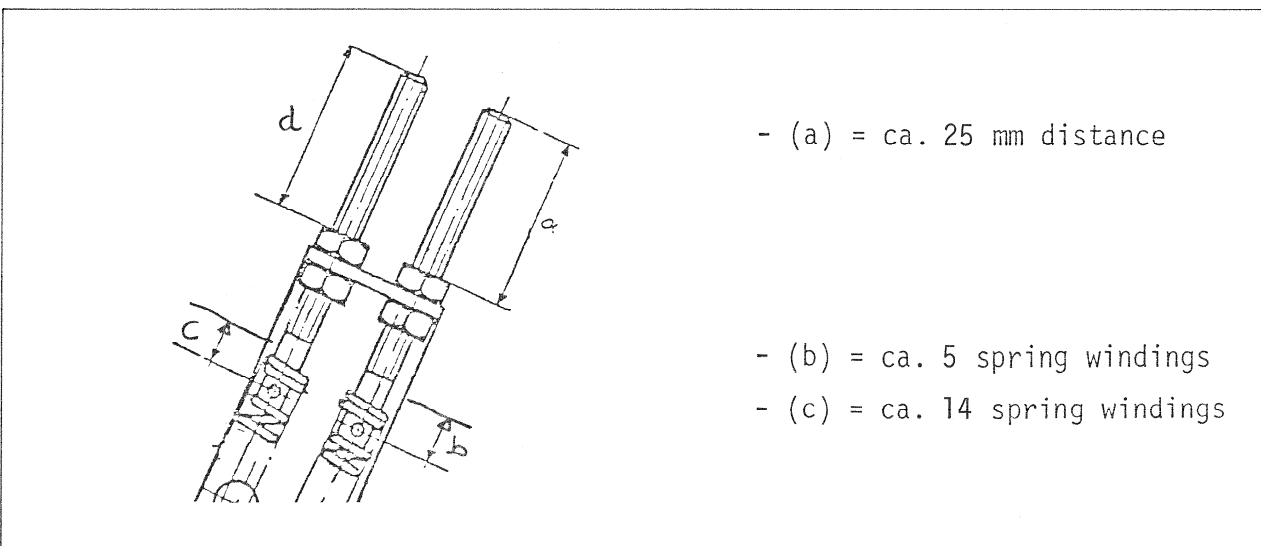
- operating spring: one inch type: 1.180.210-06
- peak spring : two inch type: 1.180.220-02

a) Presetting of the springs: (usually factory adjusted)

left hand side



right hand side



The peak spring has to be adjusted, that it hooks at about 35° by lengthening or shortening (d).

b) After the presetting of the springs, adjust them to the following values:

lefthand side tractive force in p	angle of rotation in °	righthand side tractive force in p
160	20	165
185	25	190
210	30	215
380	40	380
500	50	500
675	60	700

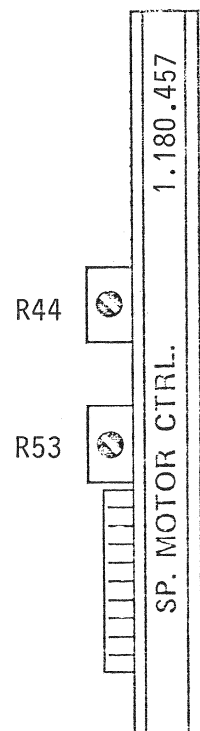
c) Adjustment of potentiometer:

at 0° angle of rotation 2.0 V preadjustment correction
of the adjustment at 30° angle of rotation: 0 V ± 25 mV.

d) Adjustment of the correct tape tension:

If the spring system has been adjusted as mentioned above the correct tape tension can be adjust as follows:

- 1.) Start the machine in play in the middle of the tape
- 2.) Switch a few times stop-play-stop-play
- 3.) Measure tape tension left handside and adjust with potentiometer R53 (lower potmeter on 1.180.457) to the required value.
- 4.) Measure tape tension right hand side and adjust with potentiometer R44 (upper potentiometer on 1.180.457) to the required value.
- 5.) Should the required values be out of the potentiometer range, the spring system might have to be slightly corrected.



recommended values	left	right
2 erase heads	230	270
in line erase head	210	270
narrow headblock	210	270

6.) Check the correct tape tension:

- a) Machine in play
- b) Remove the pinch roller a few millimeter from the capstan shaft
- c) The tape must slowly stop: 1/2 to 1 turn after removing the pinch roller

e) Adjustment of command receiver 1.180.436 for slow down at tape end:

The first speed reduction should occur about 3 minutes before tape end and the second about 1 minute before the end of tape.

upper potentiometer: right side

middle potentiometer: left side

f) Check correct operating of the spooling motors:

- 1.) Wind until middle of tape
- 2.) Press stop
- 3.) Hold the guide roller left together with the tape by hand
- 4.) Press fast forward: left hand balance shows ca. 30°
right hand balance shows ca. 60°
- 5.) Press fast rewind: right hand balance shows ca. 30°
left hand balance shows ca. 60°

15. ADJUSTMENT OF TAPE-END DECELERATION

The timing of the tape-end deceleration which reduces the tape speed when approaching the end of tape can be adjusted at R13 and R14.

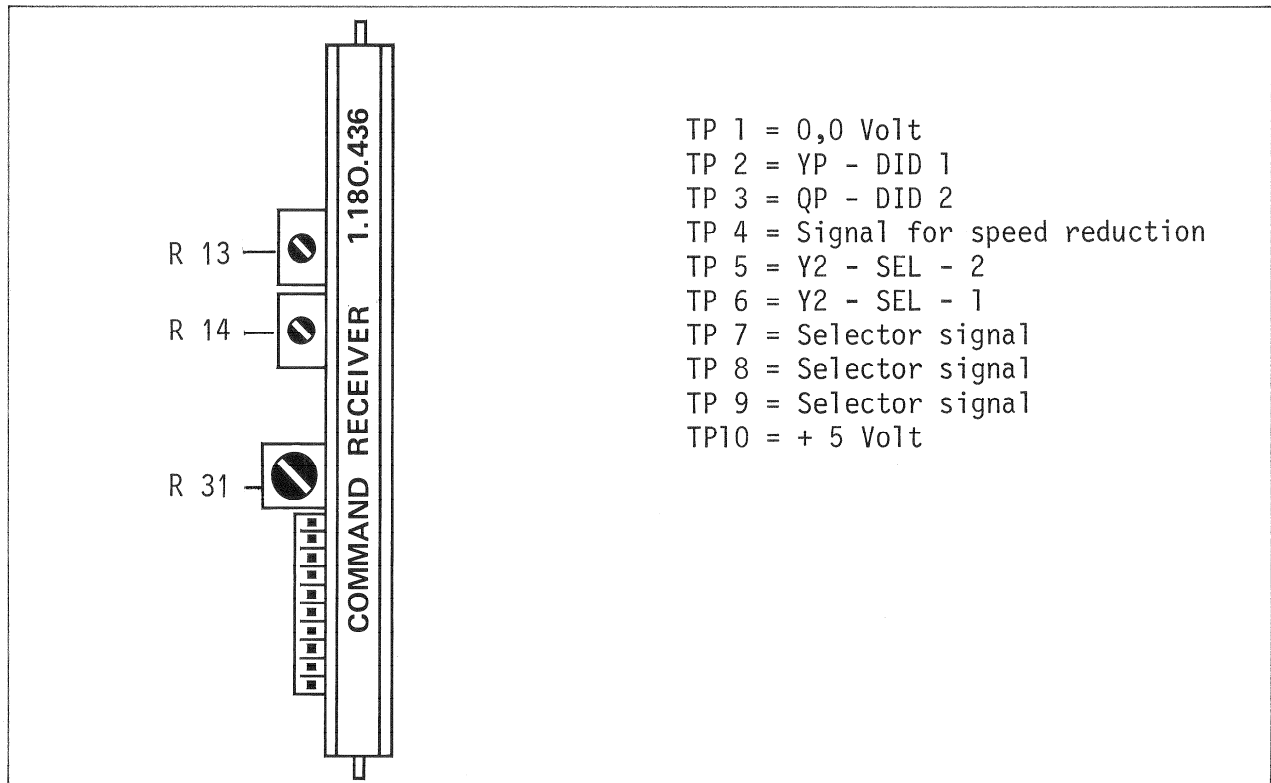


Figure 31

15.1
Tape deceleration for the rewind mode can be adjusted at potentiometer R13.

The tape deceleration governing the forward wind can be adjusted at potentiometer R14.

15.2
The following universal setting adequately satisfies all possibilities:

- Reel diameter 14"
- Speed 15 ips
- Timing adjustment for decelerating the left- and right-hand sides 1 min before tape end*

15.3
If only one reel size is used, the adjustments can be optimized for the corresponding diameter.

*All machines equipped with spooling motor control board 1.180.457 perform a first slight slow down three to four minutes before tape end.

16.

ADJUSTMENT OF TAPE TRANSPORT

No readjustments should be made if the tape transport does not deviate significantly from the ideal setting because the tape transport mechanism is very delicate to adjust!

As a prerequisite to adjusting the tape transport, the tape deck must be correctly adjusted.

16.1

With the corresponding gauges (No. 10.010.001-01 and 10.010.001-05) check the recess height of the tape tension sensors, move sensors and left-hand guide roller.

The distance from the polished casting to the underside of the magnetic tape should measure $41 \text{ mm} \pm 0.075 \text{ mm}$.

16.2

If the height of the recessed tape tension roller does not match, the roller may be shifted in the axial direction by loosening the threaded stud (Allen head 2 mm) located at the upper support section.

The move sense roller should not be removed in order to adjust the roller height! The height of this assembly is factory-adjusted and the bearings are pre-stressed with the specified value.

The left-hand guide roller should only be replaced as a complete assembly because it is subject to the same criteria.

16.3

The height and angularity of the headblock assembly should be measured with the corresponding gauges by placing it on a leveling block.

16.4

To check the tape transport, only new quality tape should be used. The tape transport should be adjusted with the same type of tape which is used most frequently on the machine to be adjusted.

16.5

The magnetic tape must run correctly through all the guiding surfaces regardless of tape speed and tape deck function selected.

The tape should run between the reel flanges without touching.

16.6

The following measures may be taken to correct the tape transport with a correctly adjusted tape deck.

The height of the reel flanges can be changed with shim rings 0.1 mm (No. 1.062.353-03). The adapter must be removed for this purpose.

Make sure that the reel flange does not rotate out of true. The reel adapters should be adjusted as high as possible to avoid stretching of the tape.

The height of the rubber pinch roller and the prestabilizer roller can be changed with the following shim rings:

0,1 mm	—————→	1.080.530-08
0,12 mm	—————→	1.080.530-10
0,15 mm	—————→	1.080.530-09
1,2 mm	—————→	1.080.530-06
0,5 mm	—————→	1.080.530-07

Because the rubber pinch roller consists of 4 elements, it may be possible to optimize the tape transport by interchanging the individual rubber rollers.

17.
CHECK OF SPOOLING MOTOR CONTROL

17a) (valid for spooling motor card 1.180.455 only)

17.1
Start tape deck with threaded tape in PLAY mode.

17.2
With the aid of a jumper cable establish a short circuit between emitter and collector of the output transistor (see figure 32A).

At this point the tape transport should come to a standstill and the stop light on the tape deck command keys should blink.

17.3
The supply power to the spooling motors, which was interrupted by the guard circuit, can be reestablished by turning the main power switch of the tape deck to the OFF position. The switch must remain in the OFF position for approx. 500 ms before moving it to the ON position.

After the short circuit has been removed, the machine can be switched back on and the tape deck functions should again operate in a normal manner.

17.4
The test of the guard circuit described above must be performed twice for each spooling motor (positive and negative side). Therefore, 4 short circuit connections will be necessary to check the guard circuit.

The negative side is connected to the emitters with blue cables.

The positive side is connected to the emitters with green cables (in modified versions, the additional emitter connections feature purple cables).

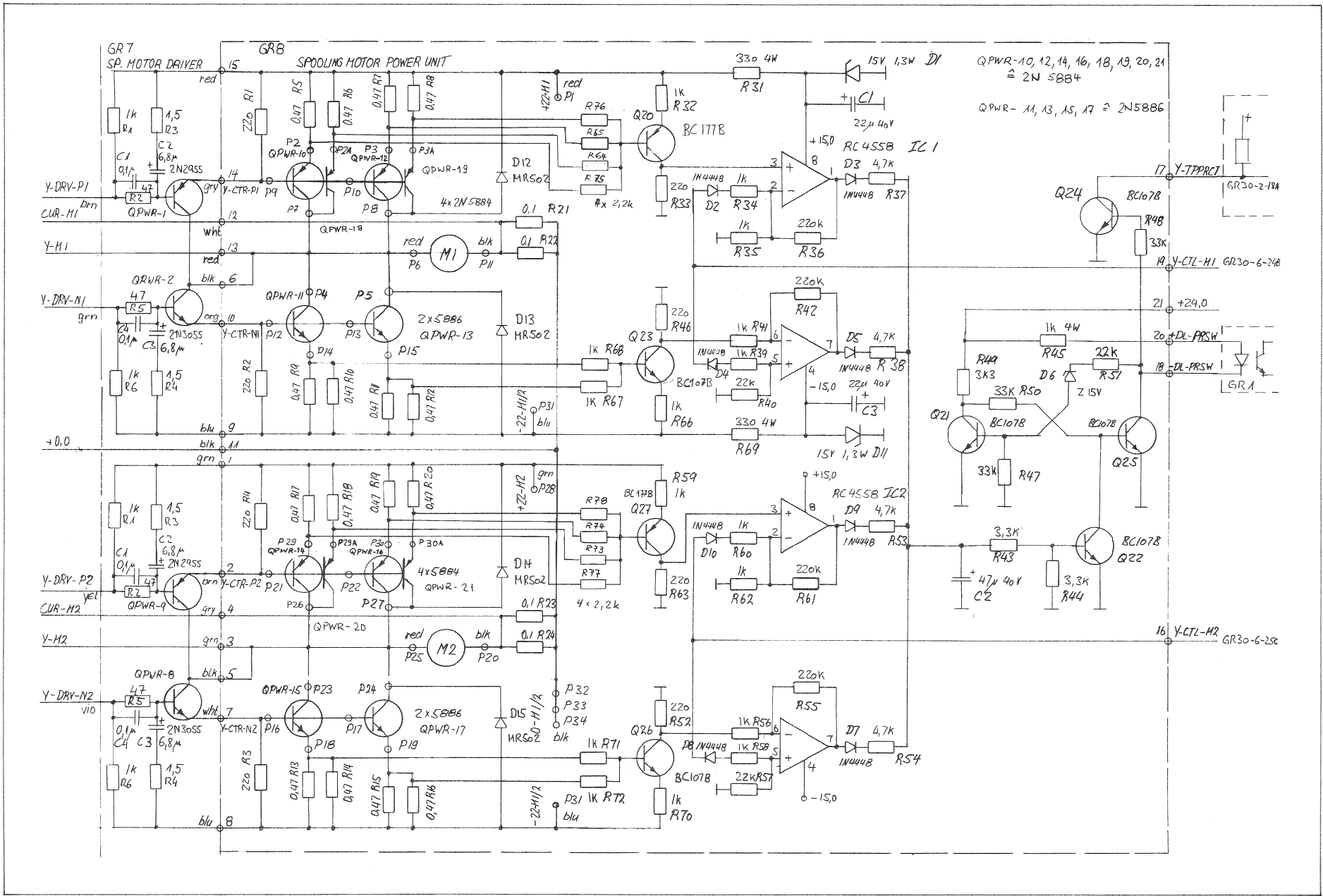
17.5
Due to a technical change, the final stage 1.180.500 may feature 4 parallel connected NPN power transistors in the positive spooling motor control (3 power transistors per heatsink) as well as an extension board 1.180.515.

17.6
Machines with power supply type 1.180.321-81 or 82

This power supply is equipped with a thermoswitch which cuts out the primary side in case of overheating.

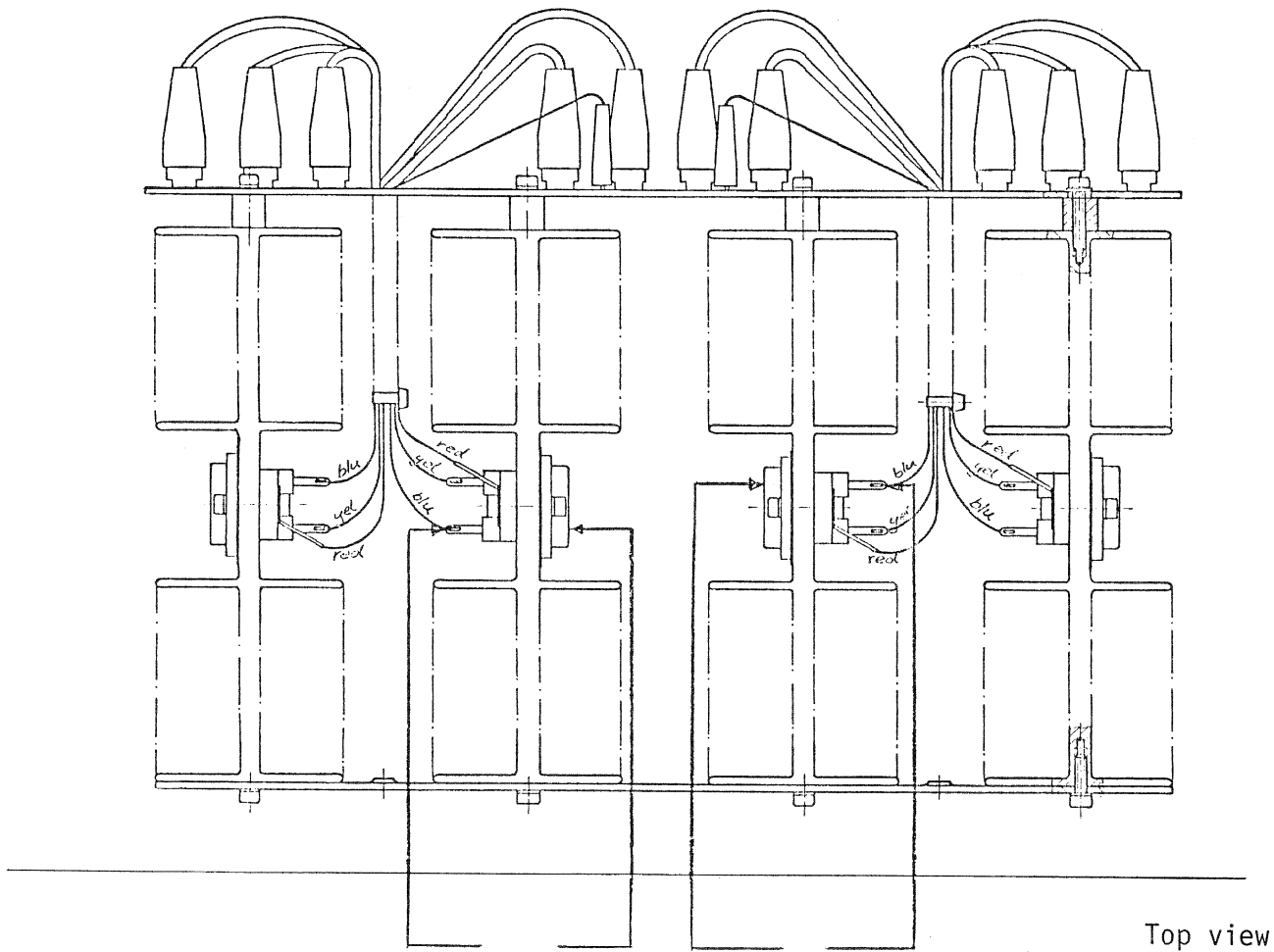
Consequence:

The spooling motors stop, however, the stop key does not always blink. Switch off machine for a brief period of time.



QPWR-10, 12, 14, 16, 18, 19, 20, 21
 ≅ 2N 5884
 QPWR- 11, 13, 15, 17 ≅ 2N5886

Figure 32 Spooling motor power unit 1.180.500 / A800 Tape deck control



upper transistor	→	Ist short circuit	2nd short circuit
lower transistor	→	3rd short circuit	4th short circuit

Figure 32A Spooting motor power unit 1.180.500 / A800 Tape deck control

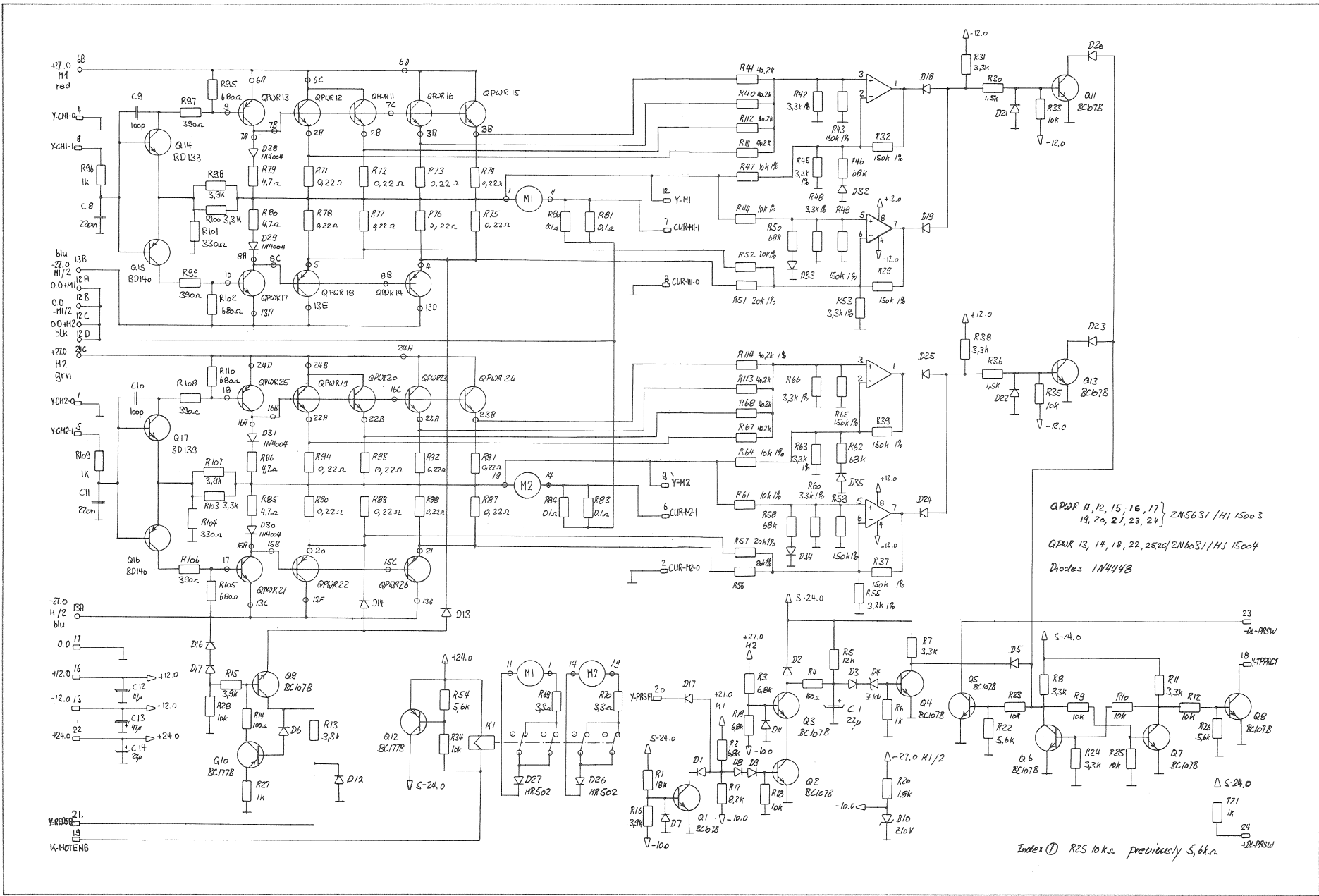


Figure 33 Spooling motor power unit 1.180.501 / A800 Tape deck control

17b) valid for spooling motor control 1.180.457

- 1) Start tape deck with threaded tape in play mode
- 2) Remove fuse + 22 V for motor 1 on power supply 1.180.321
- 3) Machine goes to stop, stop light flashes
- 4) Switch off, insert fuse, start again in play
- 5) Remove fuse + 22 V for motor 2
- 6) Machine goes to stop, stop light flashes

Remark:

This check can also be performed on machines with spooling motor control 1.180.455 provided, they have been updated with the "conversion kit new software" No. 20.020.301.19.

18.

OPERATIONAL TEST

18.1

Check whether the capstan synchronizes at both tape speeds. The LED "SYNC" and the red LED on the Capstan Servo print 1.180.460 must light up.

18.2

Testing of the tape deck interlock

After the tape deck is connected to the mains, the tape deck should be interlocked as long as a magnetic tape has not been mounted. The lamp in the STOP key should blink.

First, the protective flap of the headblock assembly must close and one of the tape tension sensors must shift out of its neutral position.

18.3

During fast winding of the tape, the counter should properly count forward or backward.

When the magnetic tape is lifted off the light barrier, the counter should stop immediately.

18.4

All tape deck functions should operate correctly.

18.5

With the aid of the Variospeed it is possible to vary the pitch by ± 7.5 semi-notes from the nominal speed.

18.6

Check the right-hand operating section for proper operation of all possible functions.

18.7

If the Autolocator and Variospeed are installed, also check that all functions associated with these features perform correctly.

18.8

In addition to the autolocator also the MPU board 1.180.482 resp. 1.189 484 (with Index 81, 82, 83) is installed, please check whether the varispeed and counter reading have been properly stored.

19.

WOW AND FLUTTER ADJUSTMENTS

19.1

Connect wow-and-flutter meter (e.g. EMT 420) to one of the audio channels of the machine and apply the pilot frequency.

The wow and flutter is measured while tape is present at slow tape speed and adjusted with potentiometer R47 on print 1.180.460 (Capstan Servo) to the minimum of the weighted reading.

19.2

Because the minimum of the weighted reading may be quite broad for fast tape machines, it can be fine-adjusted with the aid of a cathode-ray oscilloscope (CRO). Connect the CRO to PT10 (ground TP 1) of the Capstan Servos. The signal in the form of a sinus half-wave is fine-adjusted for minimum amplitude with potentiometer R47 located on the Capstan Servo print 1.180.460.

When making this adjustment, please ensure that the weighted reading remains within the minimum.

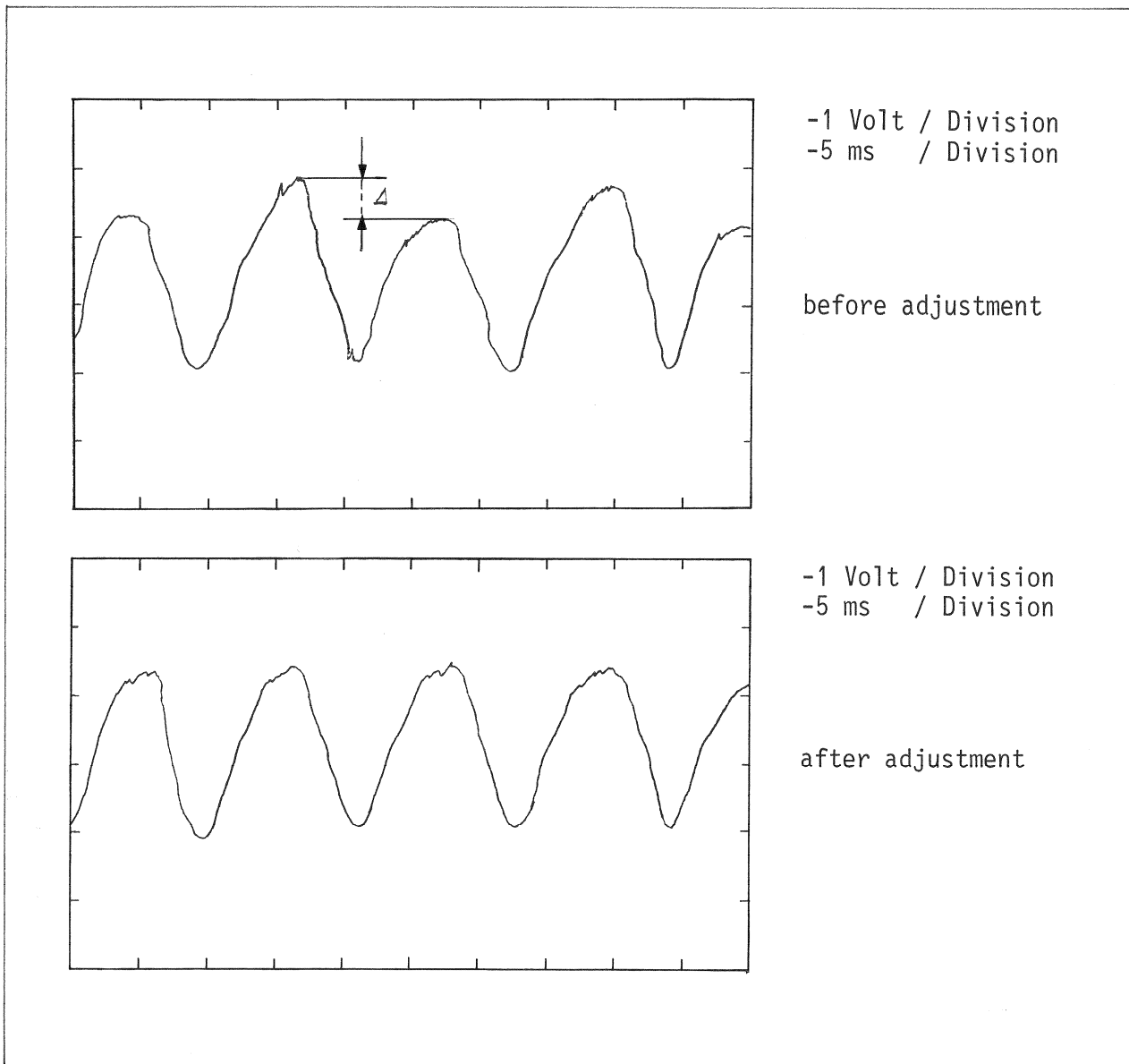


Figure 34

- Wobble values, peak wighted:
(according to DIN 45507, IEC 368)
- 7,5 ips max. 0.06 %
- 15 ips max. 0.04 %
- 30 ips max. 0.04 %

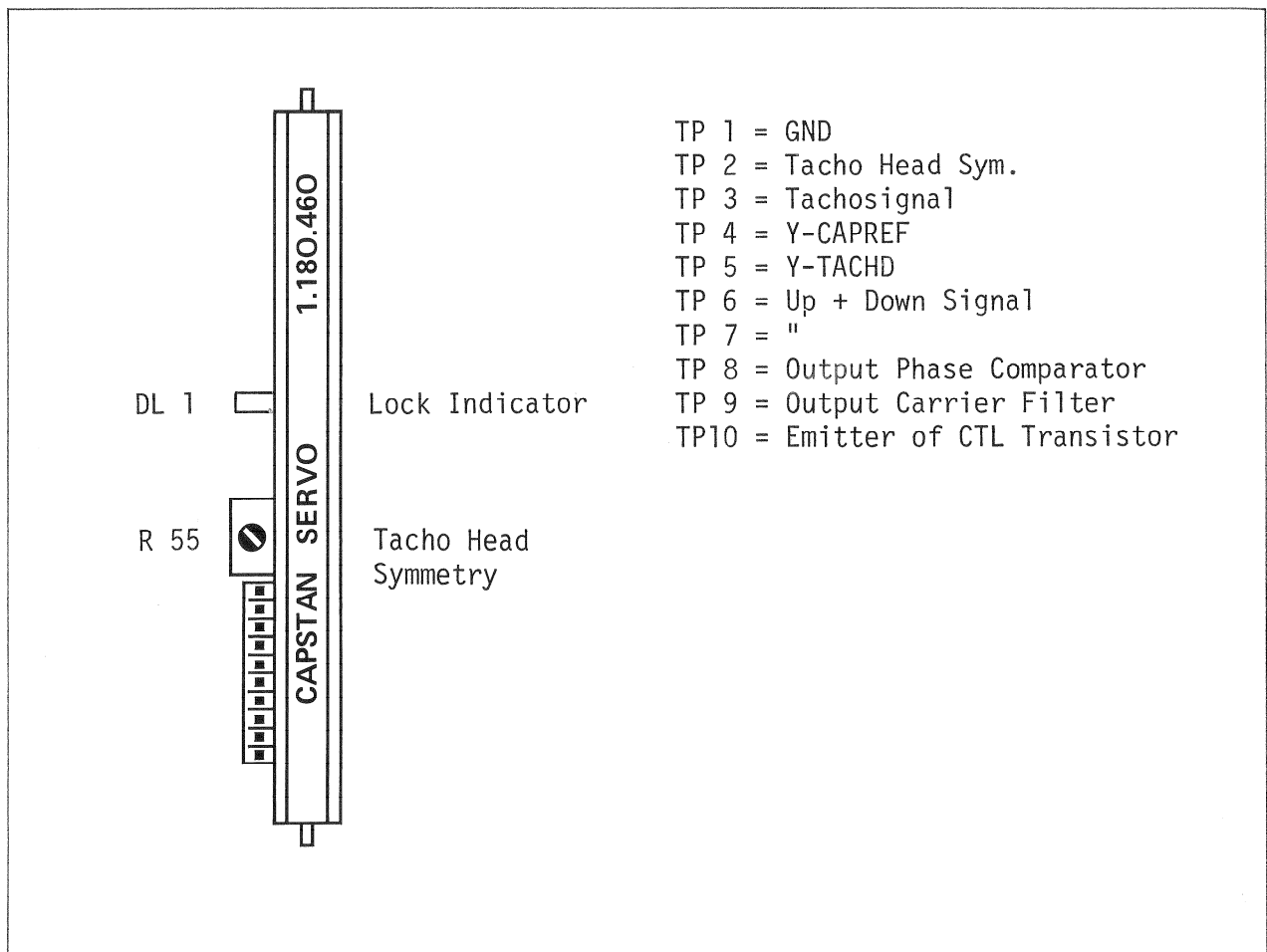


Figure 35

20.
FINAL CHECK

20.1
Check that all screws are properly tightened.

20.2
Check that the short circuit at the power stage of the spooling motors has been removed.

20.3
Now conduct a visual check to verify that no foreign objects remain on the tape deck chassis.

20.4
Reinstall all covers which have been removed.

21.

REPLACEMENT OF MECHANICAL BRAKES

- The mechanical brakes should only be replaced if they can no longer be adjusted to meet the specifications given in Chapt. 7. (Brake tension too low).
- The machine should be disconnected from the mains while the brakes are being replaced.

21.1

Remove reels and magnetic tape.

Remove top covers of the tape deck.

21.2

Turn screw grip (1) of the reel adaptor until the 4 Allen screws M 4 x 14 mm (2) become visible through the 4 holes.(see figure 38)

21.3

Loosen the Allen screws (2) (socket size 3 mm) through the screw grip (1) and remove upper section of reel adaptor.

For this purpose, alternately loosen the 4 Allen screws.

21.4

The seven external parts of the reel adaptor should be pulled off towards the top.

21.5

For original reel adaptor version only:

Loosen Allen head screw M4x14 mm (3) (socket size 3 mm) and remove carrier (6).

21.6

New version:

Loosen the Allen head screws M4x22 mm (4) (socket size 3 mm) and remove carrier (8) together with screws.

21.7

Subsequently loosen the Allen screw M 6x18 mm (5) (socket size 5 mm) of the brake drum.(see figure 37)

Remove Allen screw (5) and thrust washer (7).

21.8

Carefully remove the 3 tightening disks 24.99.0119 (9).

21.9

To remove the brake band 1.180.107, unhook springs (9) and (10). Remove both circlips of levers (3) and (4) and carefully lift out brake band including the two levers towards the top. (see diagram, Chapt. 7).

21.10

Remove brake roller 1.180.250 (10) from the motor shaft.

If the brake roller is to be reused, its friction surface may not be touched!

The brake drum should be replaced if it shows signs of strong wear or if it is contaminated.

21.11

If the brake bands need replacement they must be disconnected from the levers (3) and (4) at the Allen screws M 3x5 mm (socket size 2.5 mm) (see diagram in Chapt. 7).

21.12

Before installing the brake bands, they should be cleaned with a cotton rag dipped in methylated spirits (chloroethene is not suitable).

The brake bands must be cleaned on a flat surface by applying strong pressure until it "sings". At this point it should have a shiny surface; potential residues would be visible.

21.13

Attach the two levers (3) and (4) in geometrically correct position to the new brake band (see diagram Chapt.6).

One end of the brake band should be slightly curved (see diagram section6).

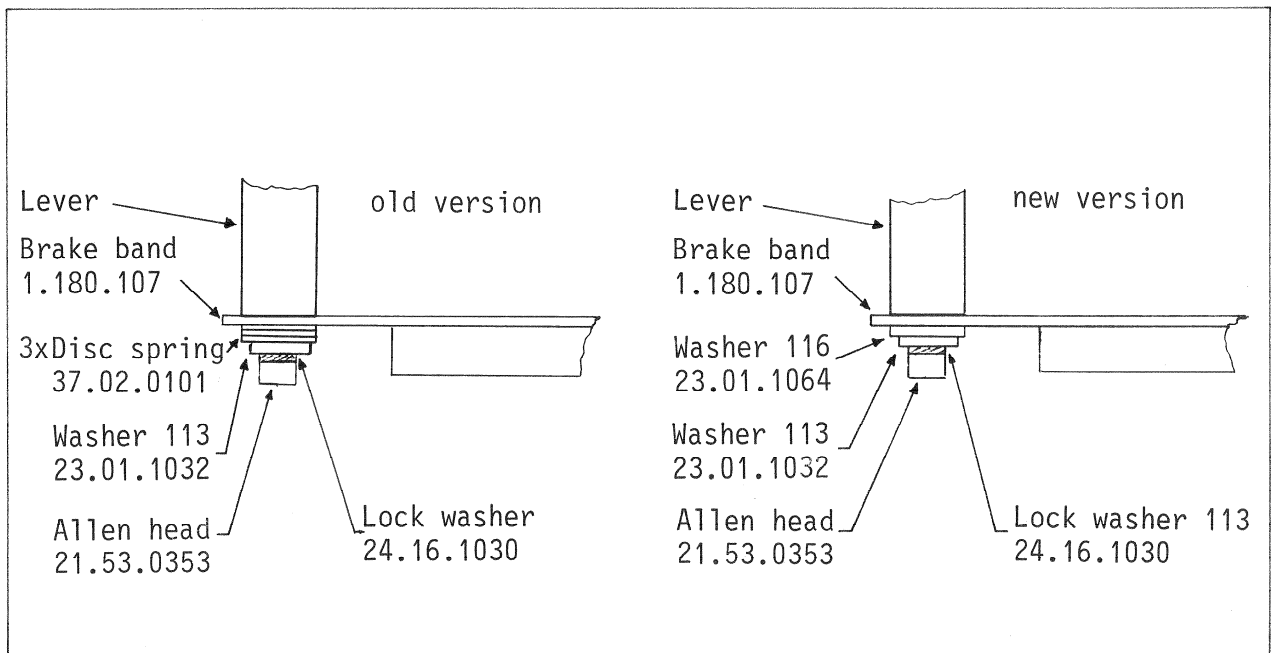


Figure 36

21.14

Install new brake roller.

Clean friction surface of the brake drum with methylated spirits.

Carefully reinstall the 3 tightening disks. All 3 disks must be installed in the same manner and the bend must point downward inside the bore.

Install thrust washer (7) and Allen screw (5) and tighten manually.

21.15

Carefully fix brake band with its two levers to the brake chassis and secure with the respective shaft retainers.

Hook both springs (9) and (10) to the levers (3) and (4) respectively (see diagram Chapt. 6).

21.16

Mount carrier element (8) and tighten with Allen screws (4).

21.17

Tighten Allen screw (5) of the brake band roller with a torque of 1 mkg.

21.18

Unplug both Molex connectors of the brake magnets (GR 22 and 23).

21.19

The mechanical brakes require a run-in period before delivering optimum braking performance.

Reconnect the machine to the mains.

Allow spooling motor to turn forward and backward by rotating the tape tension sensor. The run-in period can be shortened by applying light finger pressure on lever (3) (stronger braking action).

The correct functioning of the brake can be checked by manually rotating the reel adaptor forward and backward in short intervals.

The mechanical brakes should not be allowed to heat up on account of an excessively long run run-in.

21.20

When the braking action obtained in Sect. 21.19 is correct, replugin both Molex connectors of the brake magnets while the machine is disconnected from the mains.

21.21

Reassemble the reel adaptor in the correct sequence.

21.22

Adjust the mechanical brakes when they are cold according to specifications in section 6.

Reel adaptor, old version

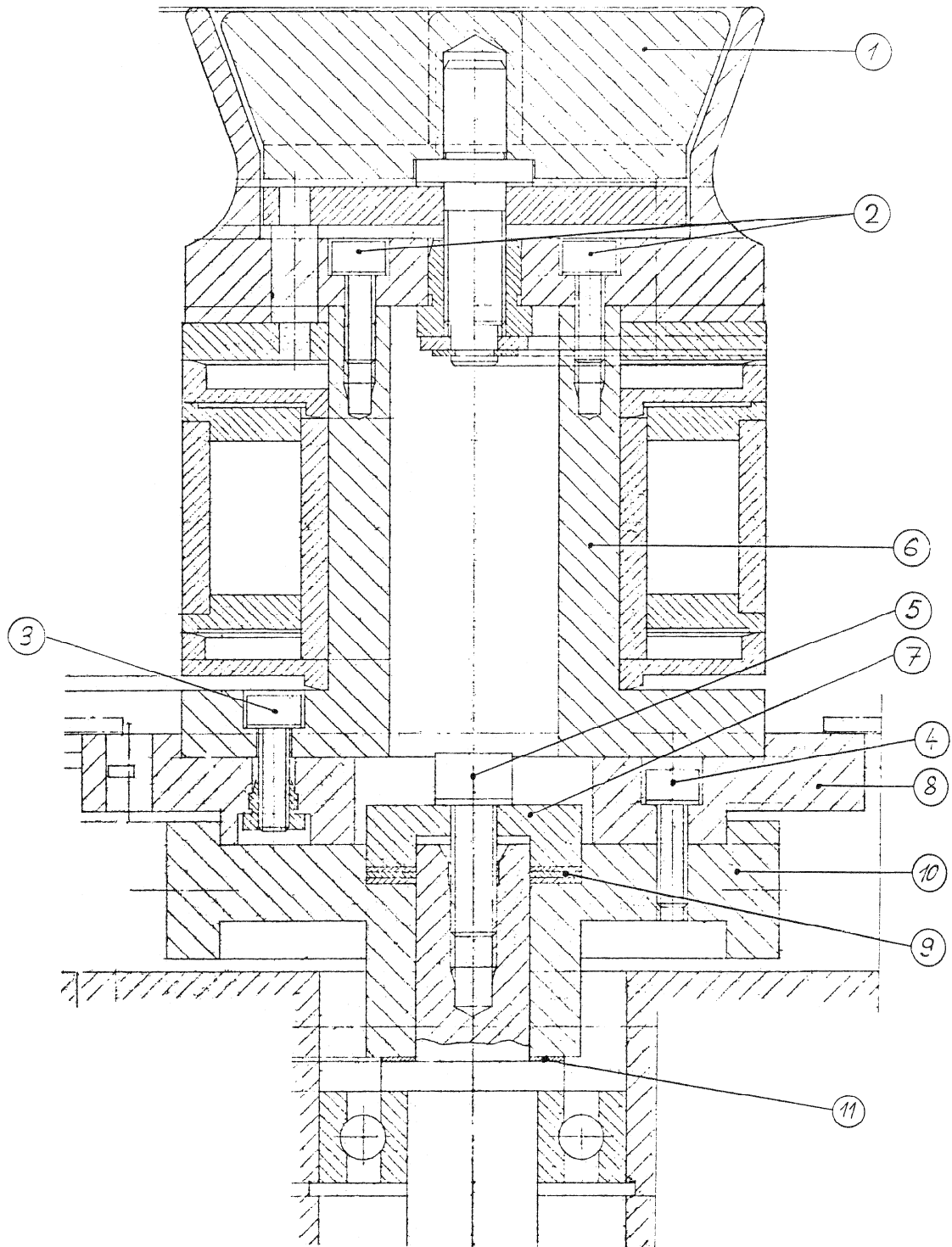


Figure 37

New version, reel adaptor

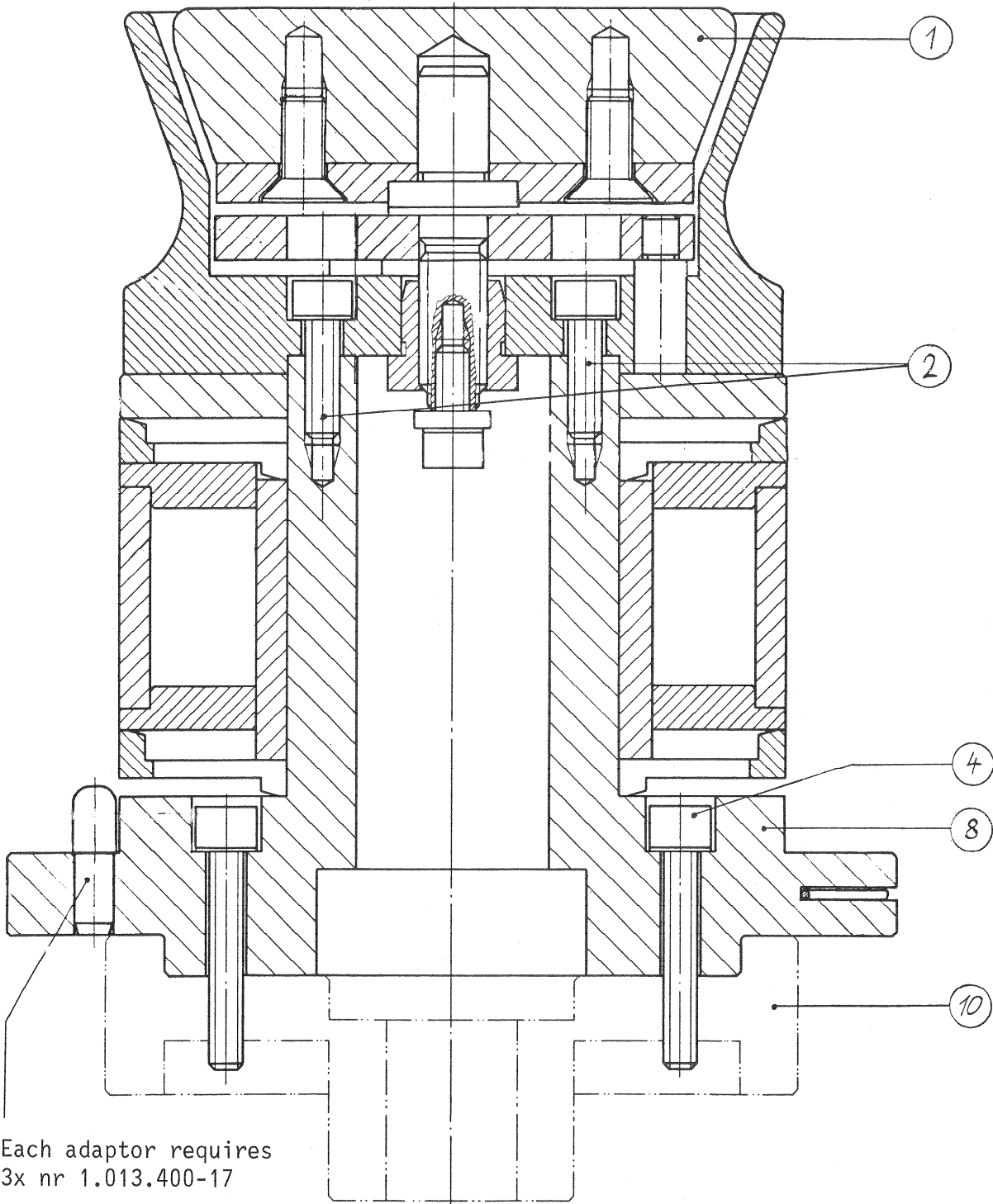


Figure 38

22.

CHORD LENGTHS OF ANGLES OF ROTATION

Because engraved headblock assembly covers with calibration are not universally available, the chord lengths may also be used as an auxiliary means.

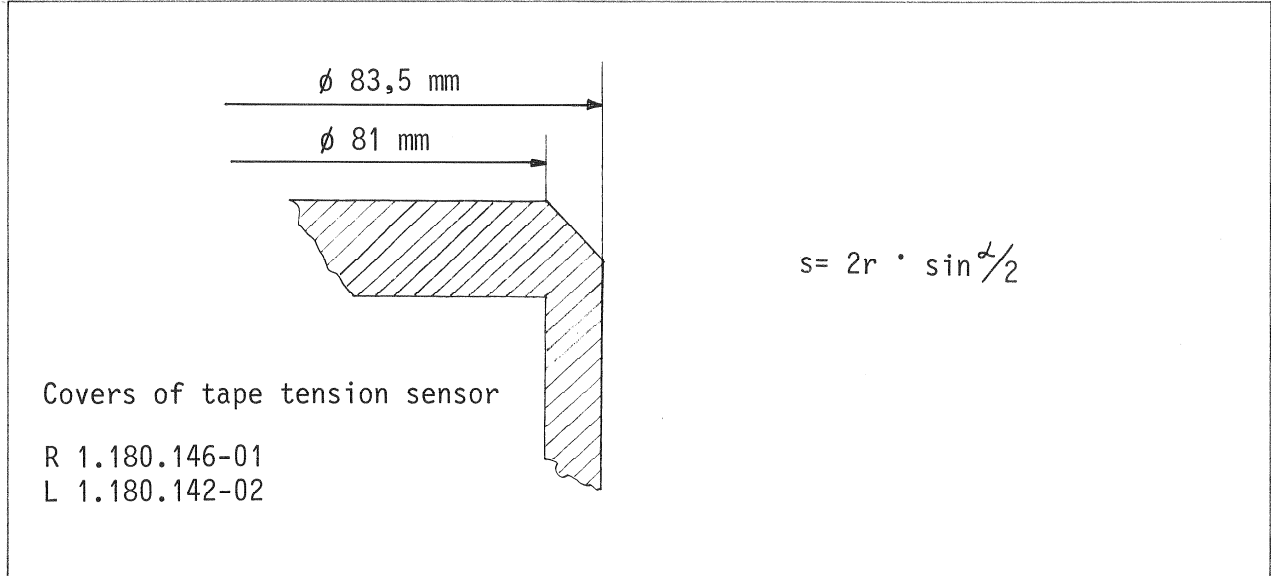


Figure 39

Angle of rotation	Diameter 83,5 mm	Diameter 81 mm
0°	-	-
5°	3,6 mm	3,5 mm
10°	7,3 mm	7,1 mm
15°	10,9 mm	10,6 mm
20°	14,5 mm	14,1 mm
25°	18,1 mm	17,5 mm
30°	21,6 mm	22,0 mm
35°	25,1 mm	24,4 mm
40°	28,6 mm	27,7 mm
45°	31,9 mm	31,0 mm
50°	35,3 mm	34,2 mm
55°	38,6	37,4 mm
60°	41,8 mm	40,5 mm
65°	44,9 mm	43,5 mm
70°	47,9 mm	46,5 mm

Figure 40

23.

Service and maintenance aids:

Klüber Q-Paste NB 50	99.01.0502
Oil for capstan motor	20.020.401.04
Extension board for tape deck electronic	1.228.325.00
Extension board for audio electronic	1.228.324.00
Extension board for 10 testpoints	10.023.001.01
Gauge for tape height adjustment 2 inch	10.010.001.05
Gauge for tape height adjustment 1 inch	10.010.001.04
Reference block, necessary for above mentioned gauges	10.010.001.01
Gauge for pinch roller assembly	10.010.002.06
Engraved covers for tape tension sensors (two inch version)	10.010.002.07
Engraved covers for tape tension sensors (one inch version)	10.010.002.05
Spring scale 300 g	10.249.001.02
Spring scale 500 g	10.249.001.01
Spring scale 2.0 kg	10.249.001.03
Tool case complete A800 (soldering iron 220 V)	20.020.001.05
Tool case complete A80/A800 (soldering iron 220 V)	20.020.001.09
Tool case complete A800 (soldering iron 110 V)	20.020.001.55
Tool case complete A80/A800 (soldering iron 110 V)	20.020.001.59
Tentelometer 2 inch	10.300.001.02
Tentelometer 1 inch	10.300.001.01
Bus analyzer 6800	10.023.002.00

24.
Standard accessories (parts)

Standard accessory No. 20.020.302-18 for A800 transport:

1	Allen key	1.5 mm	26.06.1015
1	Allen key	2.0 mm	26.06.1020
1	Allen key	2.5 mm	26.06.1025
1	Allen key	3.0 mm	26.06.1030
1	Allen key	4.0 mm	26.06.1040
1	Allen key	5.0 mm	26.06.1050
1	Allen key	6.0 mm	26.06.1060
1	Allen key	2.5 mm with handle	26.06.2025
1	Allen key	3.0 mm with handle	26.06.2030
10	Fuses	0.5 A	51.01.0114
10	Fuses	1 A	51.01.0117
10	Fuses	2 A	51.01.0120
10	Fuses	2.5 A	51.01.0121
10	Fuses	3.15 A	51.01.0122
10	Fuses	4 A	51.01.0123
10	Fuses	5 A	51.01.0124
10	Fuses	8 A	51.01.0127
10	Fuses	20 A	51.01.0265
6	Lamps	24 Volts	51.02.0145
1	Stereo Plug		54.02.0601
1	Sub Miniatur Jack		54.02.0107
1	Lamp Remover		89.01.0253
1	Power supply	3 m	10.223.001-03
1	Service/Operating Instructions		

Amplifier Hardware 20.020.302-19

A800-8 (7.020.302-19)

4	Lamps	12 Volts	51.02.0126
1	Connector Set	Noise reduction	20.020.303-03

Note: Amplifier hardware 7.020.302-19
 1 for 8 channel recorder
 2 for 16 channel recorder
 3 for 24 channel recorder

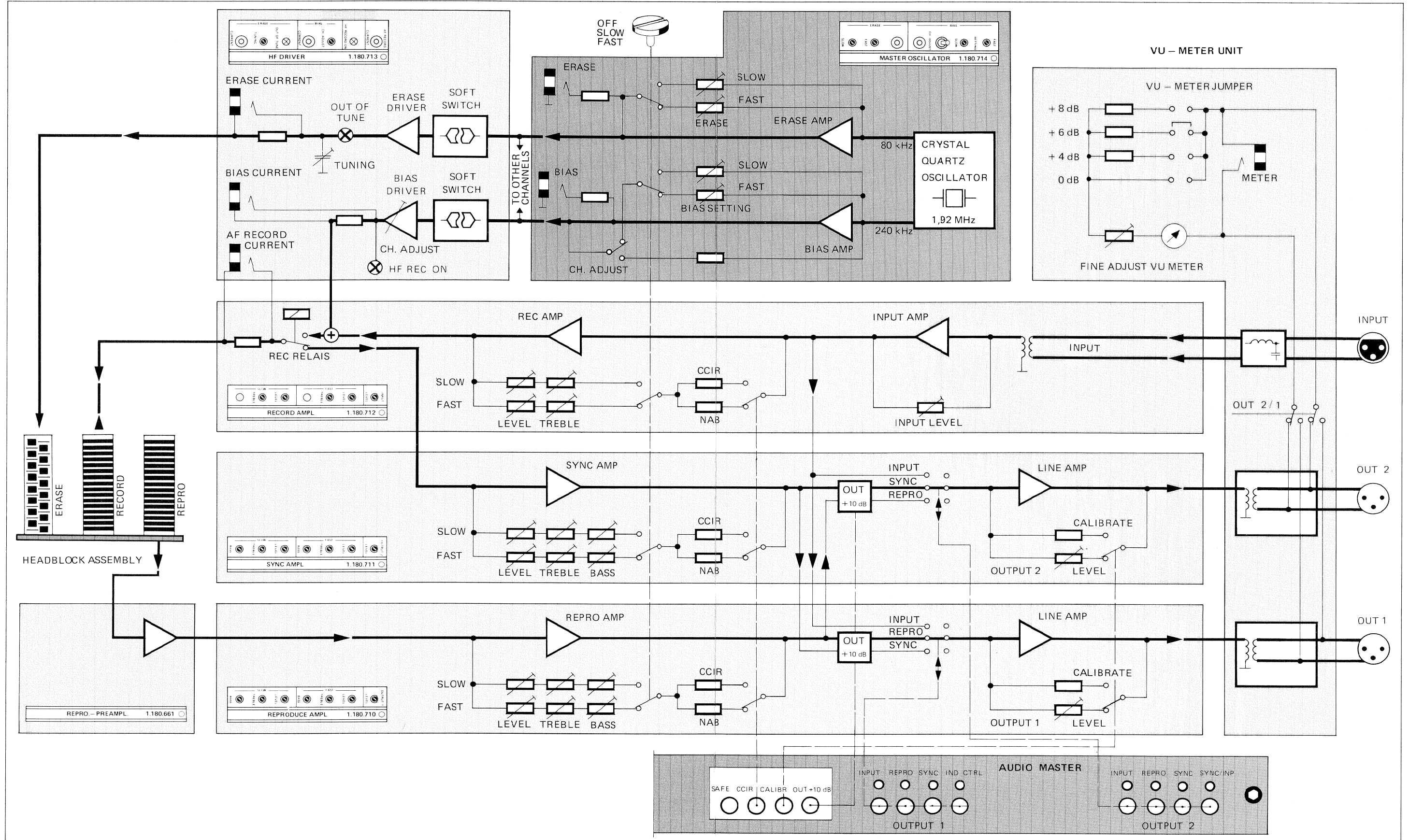
This service information is an revised of the SI 60/81 E.

A800 AUDIO ADJUSTMENTS

Service Information 66/81 E

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1.2 Recommended CCIR calibration	2
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AUDIO BLOCKDIAGRAM (ONE CHANNEL)



1. PRELIMINARY ADJUSTMENTS

1.1) Recommended NAB calibration:

- Equalization selector in NAB position
- VU-meter jumper in + 4 dBu position (see page 5)

<u>VU-meter reading</u>	<u>Line level</u>	<u>Tape flux</u>	<u>Definition</u>
+ 6 VU	= + 10 dBu	= 640 nWb/m	= Peak level
0 VU	= + 4 dBu	= 320 nWb/m	= Operating level

- Reproduce reference level = operating level

1.2) Recommended CCIR calibration:

- Equalization selector in CCIR position
- VU-meter jumper in 0 dBu position (see page 5)

<u>VU-meter reading</u>	<u>Line level</u>	<u>Tape flux</u>	<u>Definition</u>
+ 6 VU	= + 6 dBu	= 640 nWb/m	= Peak level

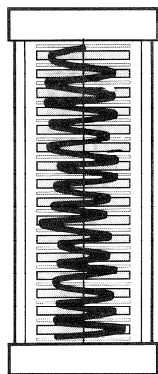
Recommended for calibration:

0 VU = 0 dBu = 320 nWb/m*

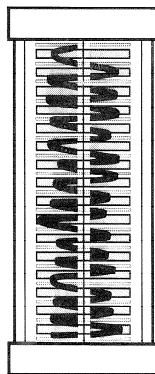
* This reduced level is recommended so that the audio adjustments of the machine can be made with the aid of the VU meters.

1.3) Mechanical checks prior to audio adjustments:

- A)
- Check tape tension in play mode with the aid of the tentelometer
or
A rough check without any instrument can also be performed the following way:
 - Remove cover of pinch roller.
 - Start the machine in play (middle of tape).
 - Lift the pinch roller slightly off the capstan shaft eg. by using a 3 mm allen-screw driver which is put into the slot on the upper End of the pinch roller.
 - The tape must come to standstill about half a turn after lift off.
- B) Check of the head wrap:
- Mark the Record head and the Reproduce head with a red marker (e.g. Order No: 10.416.001.01) with horizontal lines as shown in figure ①.
 - Mount tape and start machine in "play" mode.
 - Stop machine after a few minutes. If the head wrap is properly adjusted, the marking will be wiped off in a symmetrical pattern on either side of the gap. (figure2).
 - If this is not the case, try to turn the heads slightly by hand to the correct position.
 - In case the heads are tightly fixed (what they should) remove the headblock and loosen the 3 mm allen screw on the bottom so far that the heads can just be moved. Do not touch the small slotted screws, they fix the azimuth plate to the correct height.
 - Fix the heads and recheck the head wrap

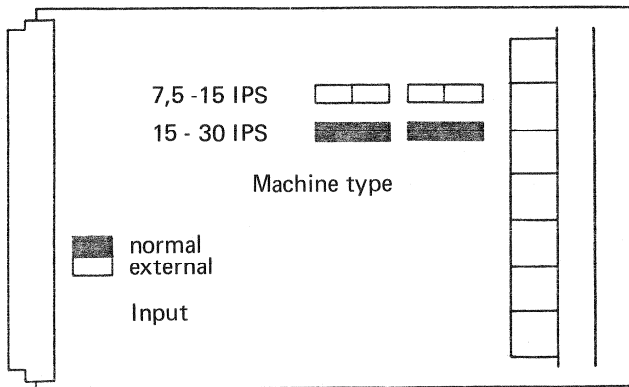


Picture ①

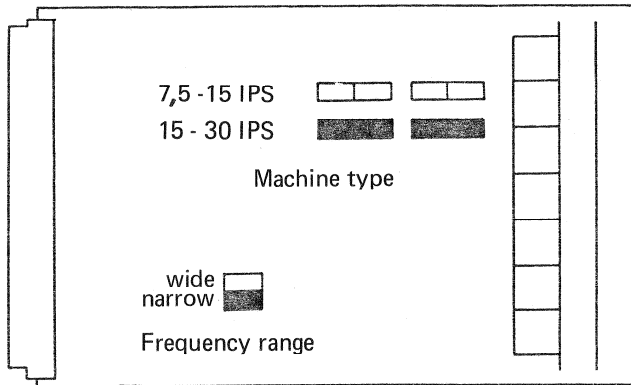


Picture ②

1.4) Jumper positions of audio P.C. boards

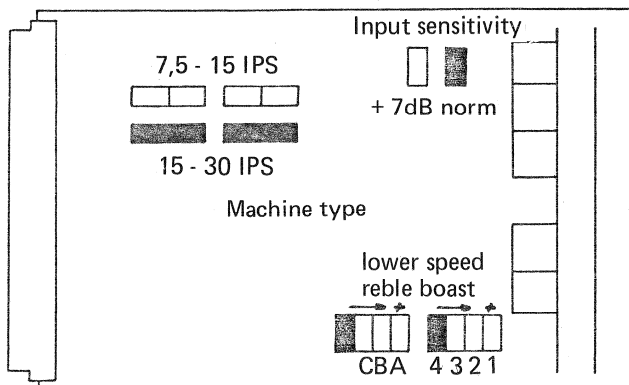


1.180.710(81) Reproduce Amp.



PC-Board 1.180.711.00 is not provided with frequency range jumper.

1.180.711(81) Sync Amp.



0 C B A



Time constant increasing

0 = flat response

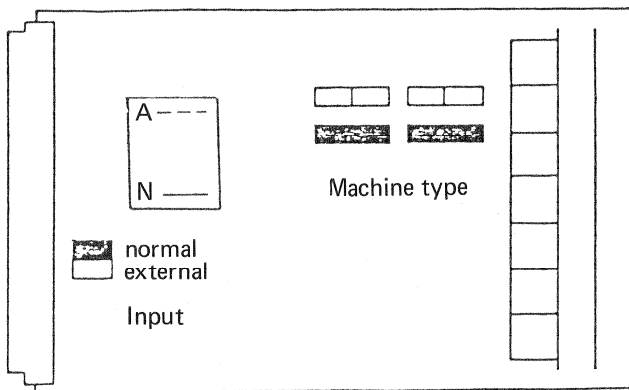


4 3 2 1



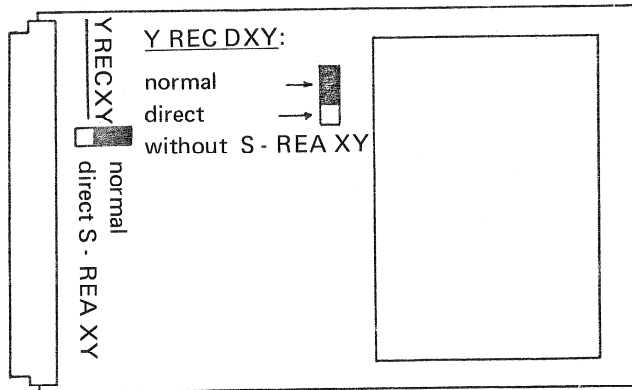
Boost increasing

1.180.712(81) Record Amp.

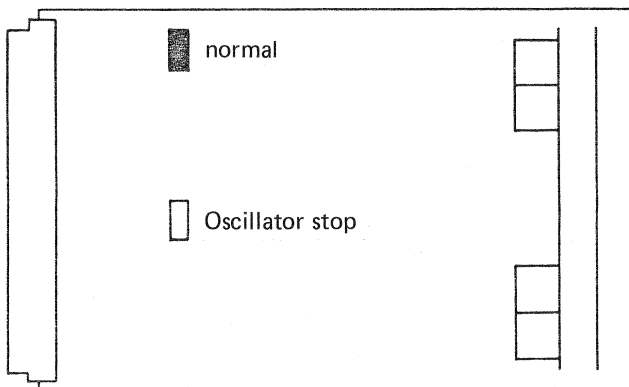


Jumper in Position N:
Print works as Index - 81
Jumper in Position A:
If machine is provided with
"mute in wind mode only"
and "auto input dependent
upon ready": (channels in
sync, autoinput)
Ready channels will stay in
input during wind mode and
mute will not be active on
those channels.

1.180.710(82) Reproduce Amp.



1.180.713(81) HF-DRIVER

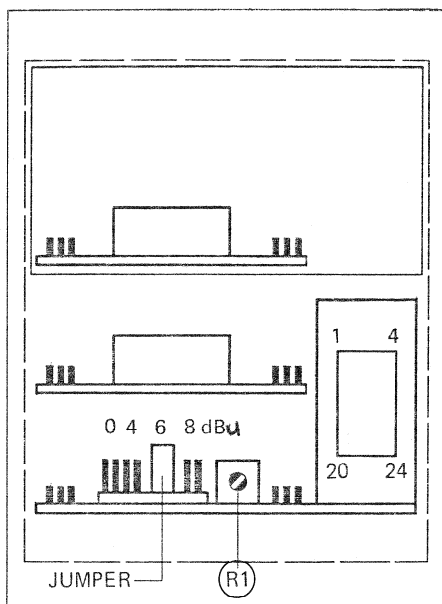


1.180.714(81) Master Oscillator

1.5) Adjustment of VU-meter unit

- Open back of VU-meter rack
- Check setting of jumpers for the corresponding operating level. The following line levels can be selected:
∅, 4, 6 and 8 dBu.

VU-meter viewed from back.

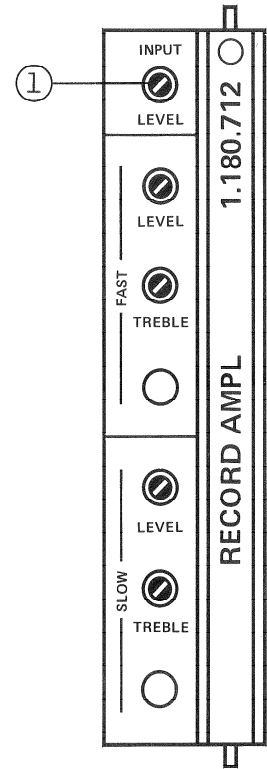


The illustration shows the jumper in the 6 dB position. The VU meter, therefore, indicates 0 VU if a line level of 6 dBu is applied.

- Switch machine off
- Remove all external audio cables
- Apply 1 kHz operating level at "METER" socket (Front of VU-Panel)
- If the VU-meter does not indicate exactly 0 VU, the reading can be adjusted by rotating (R1) .

1.6) Calibration of input level

- Audio master, Output 1 at "INPUT"
- Audio Master, Output 2 at "INPUT"
- Depress "CALIBRATE" key
- Generator at operating level
0, 4, 6 or 8 dBu / 1 kHz (700 Hz)
- Calibrate output 1 with "INPUT LEVEL"
① for - 3 dBu on connector output 1.
- Check the VU-Meter reading according to the line Level (see table)
- Check wheter the level available at output 2 is the same as at output 1, \pm 0.5 dB



The following table shows the VU-meter indication for the corresponding jumper positions and line levels.

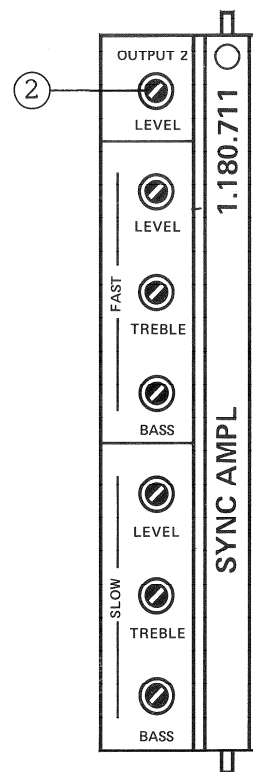
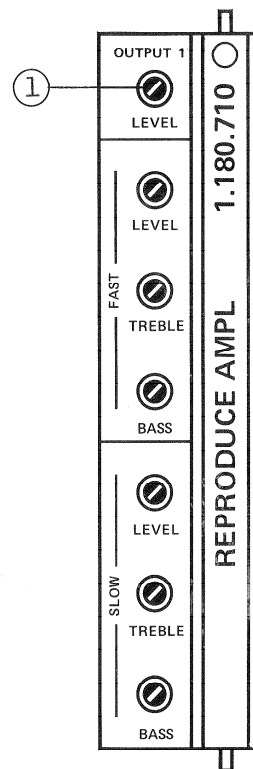
VU-METER JUMPER POSITION	OPERATE POSITION		CALIBRATE POSITION	
	INPUT LEVEL	VU-METER INDICATION	Output * LEVEL	VU-METER INDICATION
0 dBu	0 dBu	0 VU	- 3 dBu	- 3 VU
4 dBu	4 dBu	0 VU	- 3 dBu	- 7 VU
6 dBu	6 dBu	0 VU	- 3 dBu	- 9 VU
8 dBu	8 dBu	0 VU	- 3 dBu	- 11 VU

- Release "CALIBRATE" key

* The internal level is equal to the output-Level in Position calibrate.

1.7) Calibration of output level

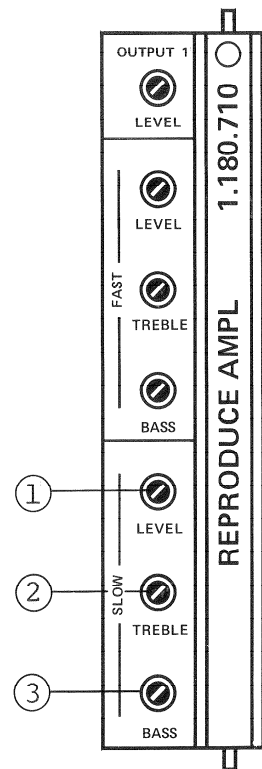
- Audio Master output 1 at "INPUT"
- Audio Master output 2 at "INPUT"
- Generator at operating level
0, 4, 6 or 8 dBu 1 kHz (700 Hz)
- With "OUTPUT 1 LEVEL" ① , adjust
output 1 to operating level
(peak level for CCIR)
- With "OUTPUT 2 LEVEL" ② ,
adjust output 2 to operating level
(peak level for CCIR)



2.) ADJUSTMENT OF REPRODUCE AMPLIFIER

DEPRESS MASTERSAFE

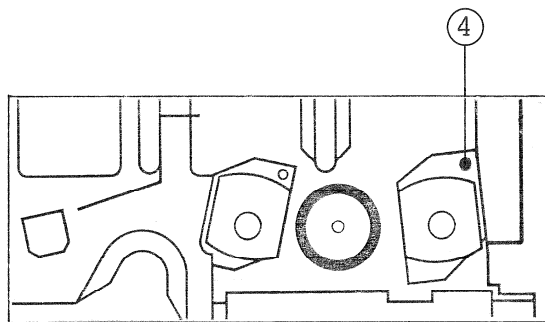
- Audio master output 1 at "REPRO"
- Audio master output 2 at "REPRO"
- Select desired equalization (CCIR or NAB)
- Select desired tape speed
- Switch machine to "PLAY" mode
- The following adjustments are to be performed in the sequence provided by the reference tape.
- With LEVEL ①, adjust output 1 to the proper level (see page 1)
- Adjust head azimuth with ④ (phase optimum)
- Adjust TREBLE ② and Bass ③ (see table)



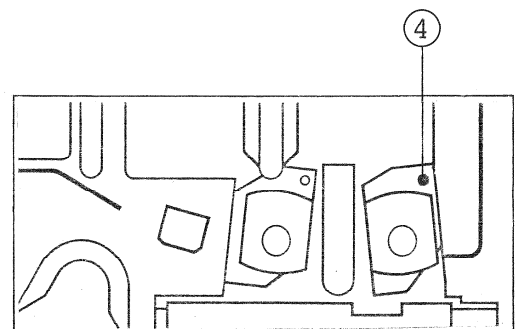
Preadjust frequency response with the following frequencies:

SPEED	7,5 / 15 / 30 ips
LEVEL	1 kHz (700 Hz)
TREBLE	10 kHz
BASS	50 Hz

- Check frequency response against technical specifications.



Wide headblock assembly

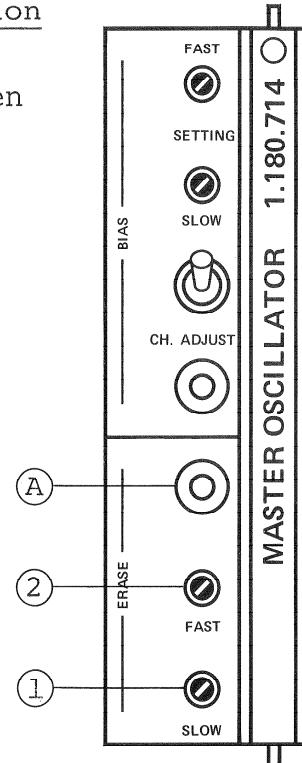


Narrow headblock assembly

2.1) Adjustment of master oscillator, erase section

Note: The measurements can be simplified when recalibrating for a different type of tape. If applicable, please consult instructions on page 14.

- Switch machine to "SLOW SPEED"
- Adjust voltage available at mini jack (A) with "ERASE SLOW" (1) according to table 1 below
- Switch machine to "HIGH SPEED"
- Adjust voltage available at mini jack (A) with "ERASE FAST" (2) according to table 1 below



Adjustments with RMS-Voltmeter:

MACHINE TYPE	2 ERASE HEADS	INLINE ERASE HEAD
8 / 16 CHANNEL	1.5 V RMS	1.2 V RMS
24 CHANNEL	1.2 V RMS	1.0 V RMS

IMPORTANT: For the preceding measurement, a high-quality RMS wide-band voltmeter with an upper limit frequency of 100 kHz should be available. A high-quality oscilloscope can also be used in which case the following table applies:

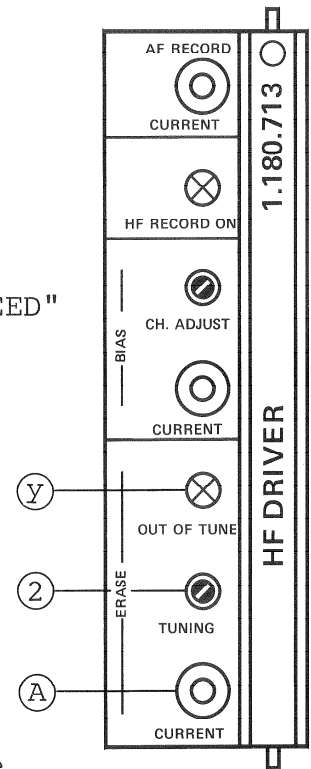
Adjustments with oscilloscope:

MACHINE TYPE	2 ERASE HEADS	INLINE ERASE HEAD
8 / 16 CHANNEL	4.2 V _{pp}	3.4 V _{pp}
24 CHANNEL	3.4 V _{pp}	2.8 V _{pp}

2.2) Calibration of HF driver, erase section

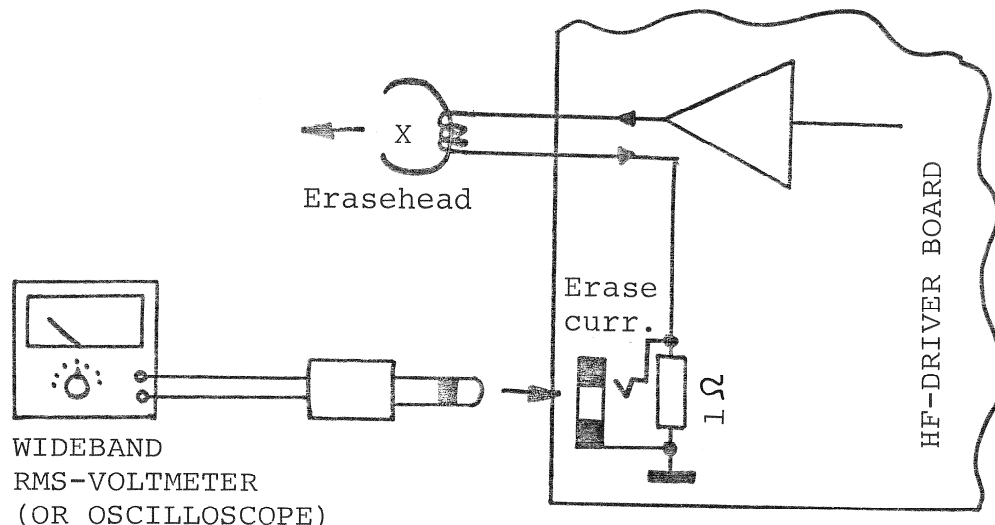
Note: The measurements can be simplified when recalibrating for a different type of tape. If applicable, please consult the instructions on page 14.

- Switch machine to either "SLOW" or "HIGH SPEED"
- Mount matching recording tape
- Switch all channels to "RECORD"
- With "TUNING" (2) , adjust LED "OUT OF TUNE" (Y) to minimum brightness
- After adjusting the last channel, recheck the erase voltage at the master oscillator (page 10) and readjust if necessary.
- With a good RMS wide-band voltmeter (upper limit frequency min. 100 kHz), measure erase current at mini jack (A) .



IMPORTANT:

The 120 mV measured across a 1 Ohm resistor correspond to the maximum permissible erase current. Typical 50 - 100 mV. If an oscilloscope is used, the crest voltage should not exceed 340 mV peak-to-peak. Typical: 180 - 280 mV_{pp}.

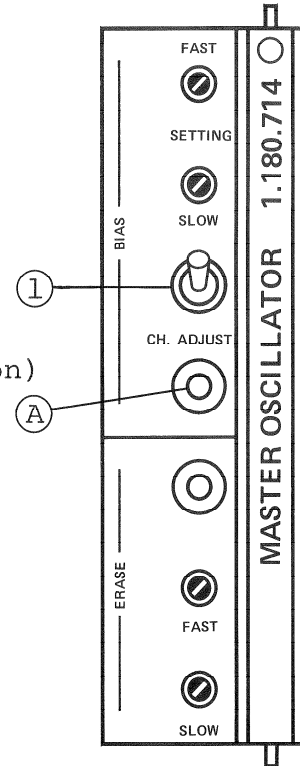


PRINCIPLE OF ERASE-CURRENT MEASUREMENT

2.3) Master oscillator bias preadjustment

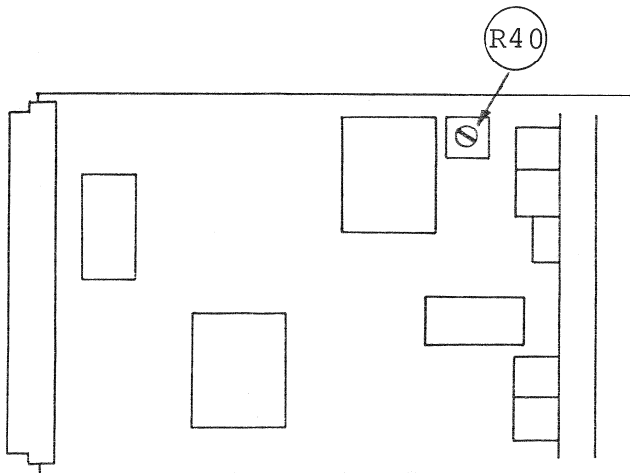
Note: The measurements can be simplified when recalibrating for a different type of tape. If applicable, please consult instructions on page 14.

- Switch machine to "SLOW" or "HIGH SPEED"
- Set switch ① to "CH.ADJUST" (lower position)
- With good RMS wide-band voltmeter (upper limit frequency at least 300 kHz), check whether 2 V RMS (\pm 100 mV) are available a mini jack ② . An oscilloscope can be used as a substitute. The value indicated on the CRO screen should be 5.6 V_{pp} (\pm 280 mV). In case of deviations, correct voltage as follows:
- Plug master oscillator into extension board.



CAUTION: NEVER CONNECT OR DISCONNECT EXTENSION BOARD WHILE MACHINE IS UNDER POWER.

- Adjust for 2 V (\pm 100 mV) with potentiometer ③

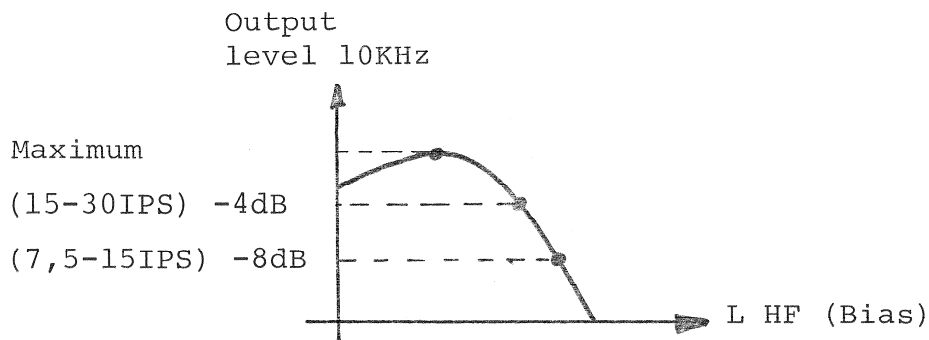
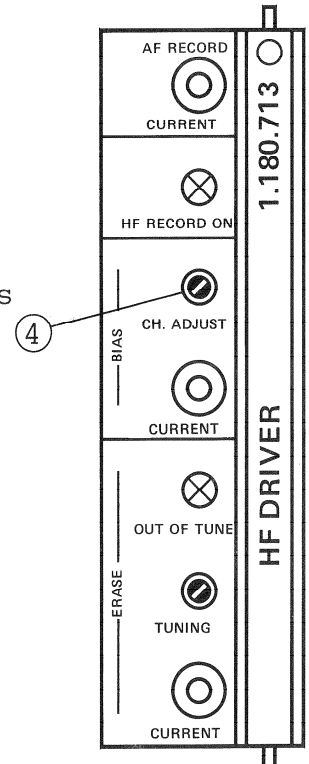
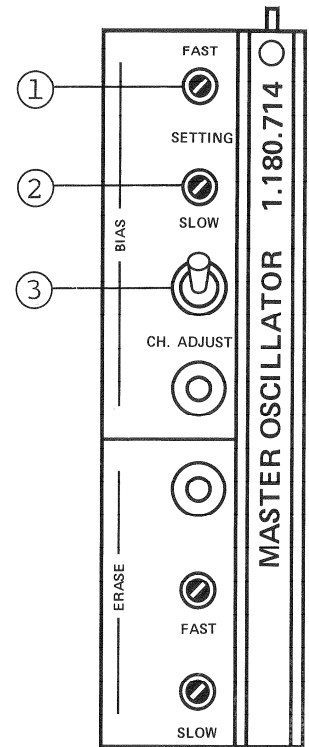


1.180.714(81) Master Oscillator

2.4) HF driver bias preadjustment

Note: The measurements can be simplified when recalibrating for a different type of tape. If applicable, please consult instructions on page 14.

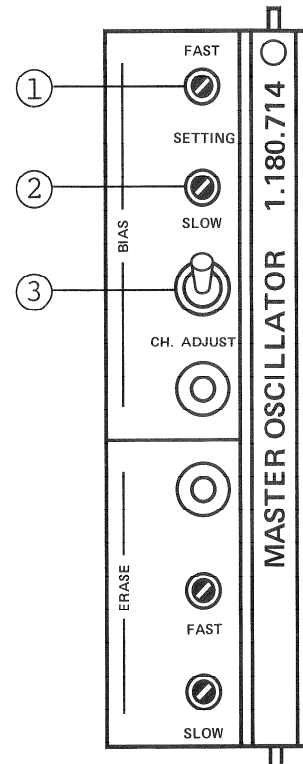
- Audio master output 1, at "REPRO"
- Switch machine to SLOW SPEED"
- Mount matching recording tape
- To be shure that the bias headroom on the master oscillator is big enough for all brands of tape, we recommend to use 3M 250 for this adjustment.
- All channels switched to "RECORD"
- Generator at 10 kHz, 10 or 20 dB below operating level (- 10 dB applies only for 15-30 ips machines, for 7,5-15 ips machines use 20 dB!
- Switch 3 to "CH.ADJUST" (lower position)
- Rotate "BIAS FAST + SLOW" potentiometers ① ② to counter-clockwise stop position
- Search maximum level at output 1 by rotating "BIAS CH.ADJUST" 4, then rotate clockwise until output 1 drops 4 dB below maximum. This 4 dB point only applies to 15-30 ips machines. For 7.5-15 ips machines this adjustment must be made for - 8 dB



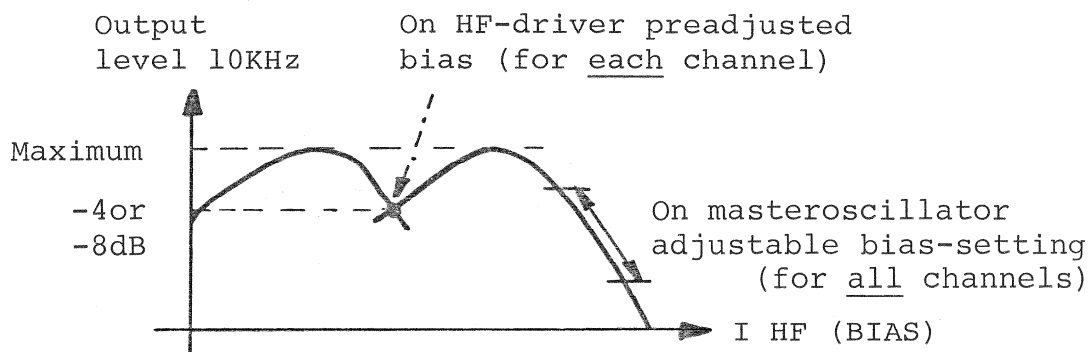
Switch master oscillator "CH.ADJUST" ③ back to normal setting.

2.5) Master oscillator bias adjustment

Note: When recalibrating for a different type of tape, the bias adjustment can be performed centrally for all channels. However, the level and treble controls need to be readjusted individually for each channel.



- Audio master output 1, at "REPRO"
- Switch machine to "SLOW SPEED"
- Mount matching recording tape
- Set "CH.ADJUST" switch (3) to normal (upper) position
- Switch all channels to "RECORD"
- Generator at 10 kHz, 10 or 20 dB below operating level (- 10 dB applies only to 15-30 ips machines, for 7.5-15 ips machines use - 20 dB!)
- Search maximum level at output 1 by rotating "BIAS SETTING SLOW" (2), then rotate clockwise until output 1 is "x" dB below the previously reached maximum. "x" represents the BIAS point in dB and depends on the type of tape. See bias table on next page.
- Switch machine to "HIGH SPEED"
- Repeat foregoing procedure, however this time with "BIAS SETTING FAST" (1).



MASTER OSCILLATOR BIAS ADJUSTMENT

BIAS TABLE on following page. (adjustment clockwise)

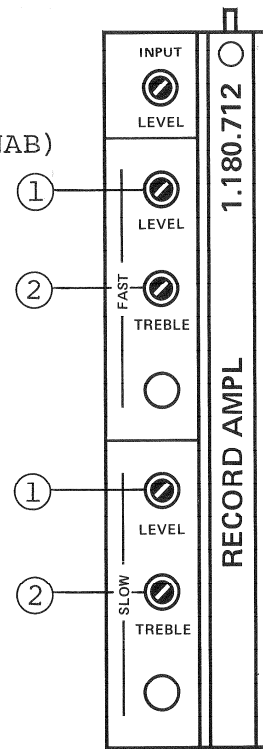
2.6) Table of bias settings in dB

The following BIAS settings are recommended (ΔE 10 kHz)

BANDSORTE	3,75 ips	7,5 ips	15 ips	30 ips
SCOTCH 3M 226	6	6	3,5	1,5
SCOTCH 3M 206	5,5	5,5	3	1,5
SCOTCH 3M 263	6	6	3	1
SCOTCH 3M 250	5	6	3,5	1
SCOTCH 3M 256	6	6,5	3,5	1
AGFA PEM 468	6	6	3,5	1,5
AGFA PER 525	6	6	3	1
AMPEX 406	6	5	3	1,5
AMPEX 456	5	6,5	3,5	1,5
BASF LGR 30 P	6	6	4	1,5
BASF SPR 50 LH	6	5,5	3,5	1,5
BASF SPR 50 LH	6	5,5	3,5	1,5
EMI 816/817	6	6,5	4	1,5
PYRAL CJ 90	6	6,5	3,5	1,5
AGFA PER 528	6	6	3,5	1,5
BASF LGR 50	6	6	4	1,5

2.7) Adjustment of record amplifier

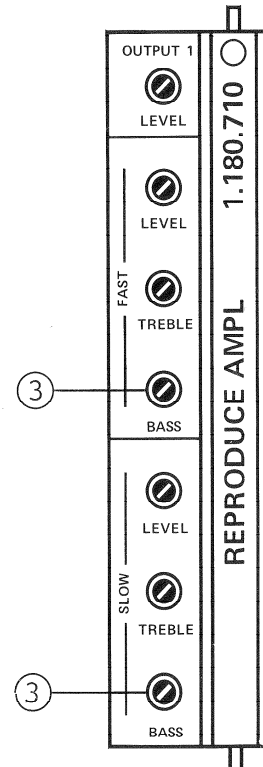
- Audio master output 1, at "REPRO"
- Select applicable equalization mode (CCIR or NAB)
- Mount matching recording tape
- Switch all channels to "REPRO"
- Generator at 10 kHz, operating level
- Adjust head azimuth with ④
- Generator at 1 kHz or 700 Hz, operating level
- Adjust level with LEVEL ①
- Adjust frequency response at 20 dB below line level (potentiometers ② ③).



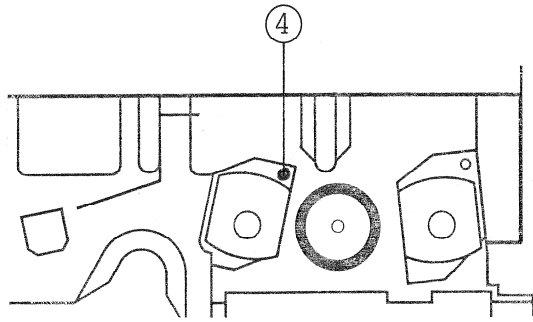
Adjust frequency response with the following frequencies:

SPEED	7,5/15/30 ips
LEVEL	1 kHz (700 Hz)
TREBLE	12 kHz
BASS	50 Hz

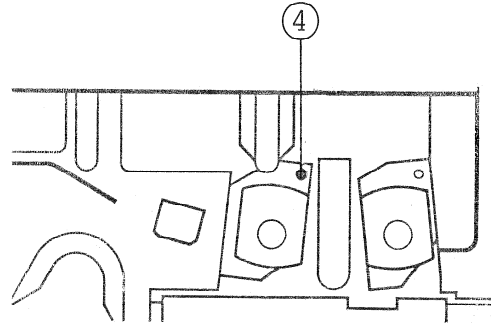
- Check frequency response against technical specifications:



7,5 ips	15 ips	30 ips
30Hz - 15kHz \pm 2 dB 3 dB	30Hz - 20kHz \pm 2 dB	50Hz - 20kHz \pm 2 dB
60Hz - 12kHz \pm 1 dB	60Hz - 18kHz \pm 1 dB	60Hz - 20kHz \pm 1 dB



Wide headblock assembly

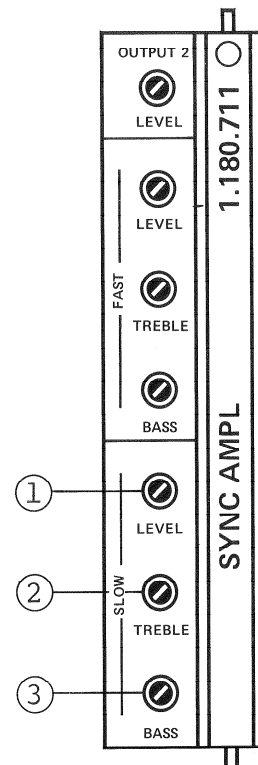


Narrow headblock assembly

2.8) Adjustment of sync amplifier

Note: Check narrow/wide strapping, page 4

- Audio master output 1, at "SYNC"
- Audio master output 2, at "SYNC"
- Select applicable equalization mode (CCIR or NAB)
- Switch machine to "SLOW SPEED"
- Mount matching recording tape
- Switch all channels to "RECORD"
- Reset tape counter to zero
- Record the following test sequence at 20 dB below operating level:
 - 3 min, 1 kHz (700 Hz for NAB)
 - 3 min, 10 kHz
 - 3 min, 50 Hz
- Depress "ZERO LOC", followed by "PLAY"
- Adjust level with LEVEL ①
- Check whether level at output 2 is the same \pm 0.5 dB
- Adjust high frequencies with TREBLE ②
- Adjust low frequencies with BASS ③



Note: The preceding sync calibrations can also be performed with the aid of a reference tape.

Preadjust frequency response with the following frequencies:

SPEED	7,5/15/30 ips
LEVEL	1 kHz (700 Hz)
TREBLE	10 kHz *
BASS	50 Hz

* 8 kHz on 7,5 ips if jumper in position narrow.

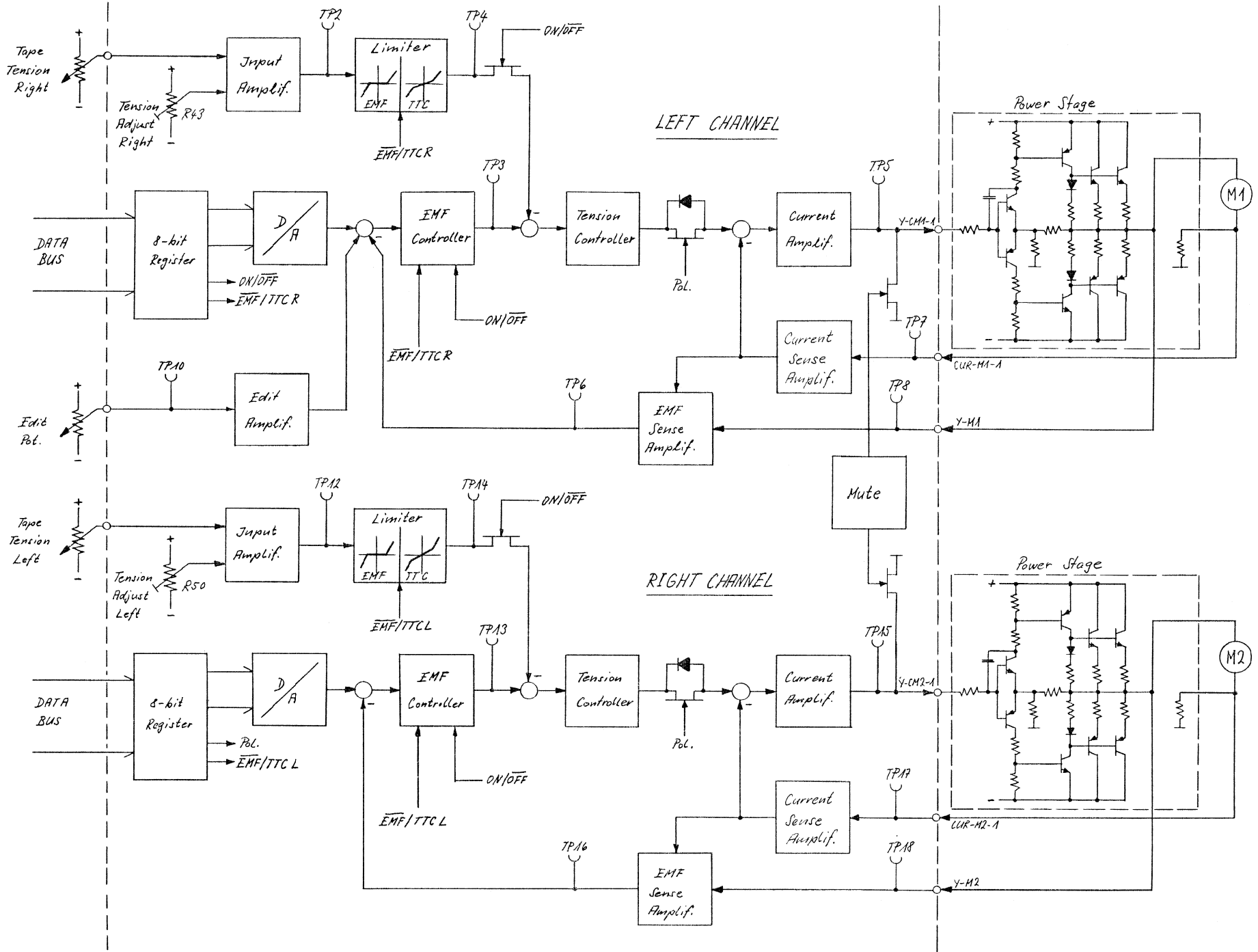
- Check frequency response against technical specifications:

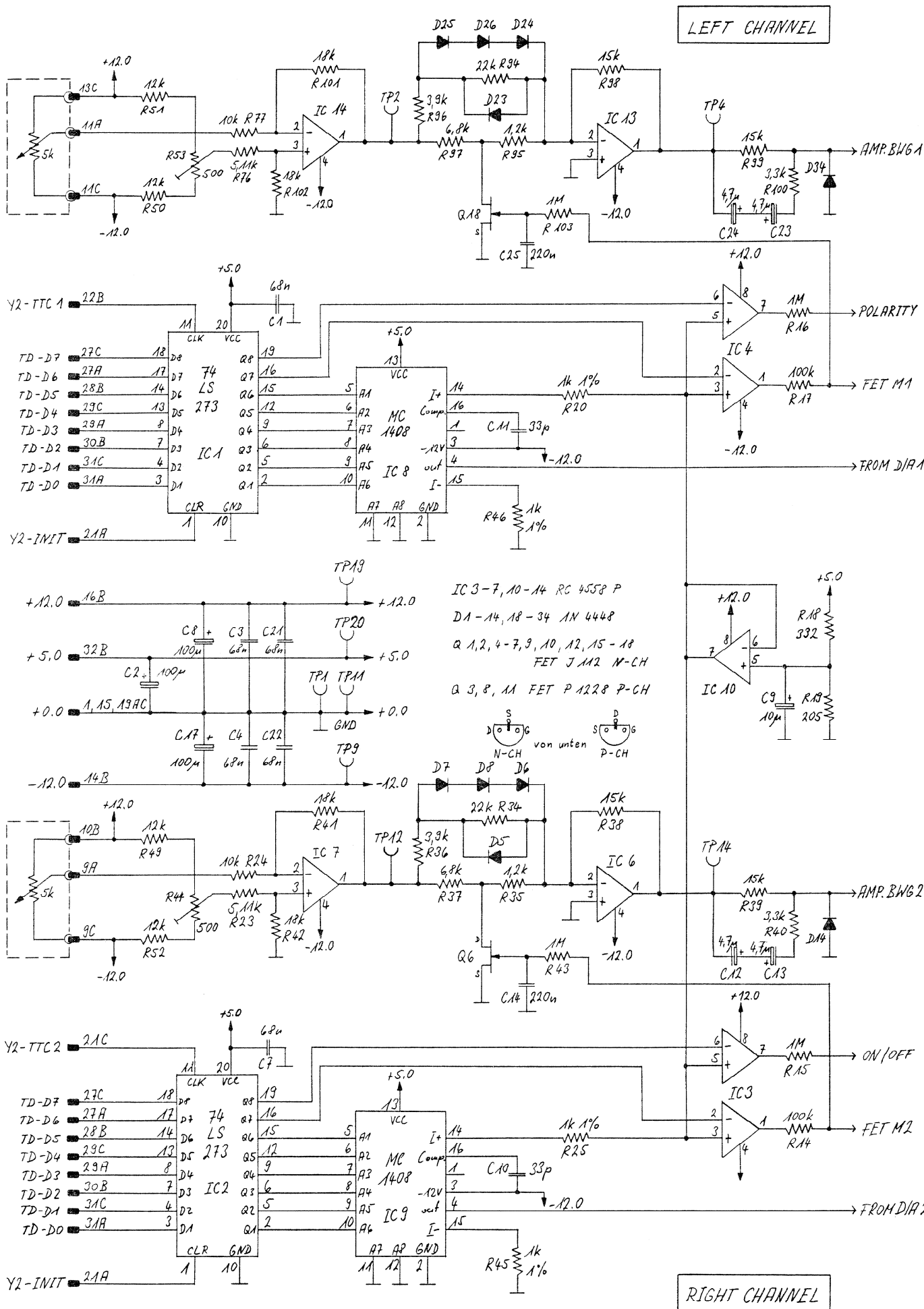
	7,5 ips	15 ips	30 ips
narrow	30Hz - 8kHz \pm 2 dB	30Hz - 12kHz \pm 2 dB	50Hz - 12kHz \pm 2 dB
wide	30Hz - 10kHz \pm 2 dB	30Hz - 18kHz \pm 2 dB	50Hz - 20kHz \pm 2 dB

STUDER A800 MK II
Appendix to SI 66/81

This appendix contains all additional drawings
required for the A800 MK II version.

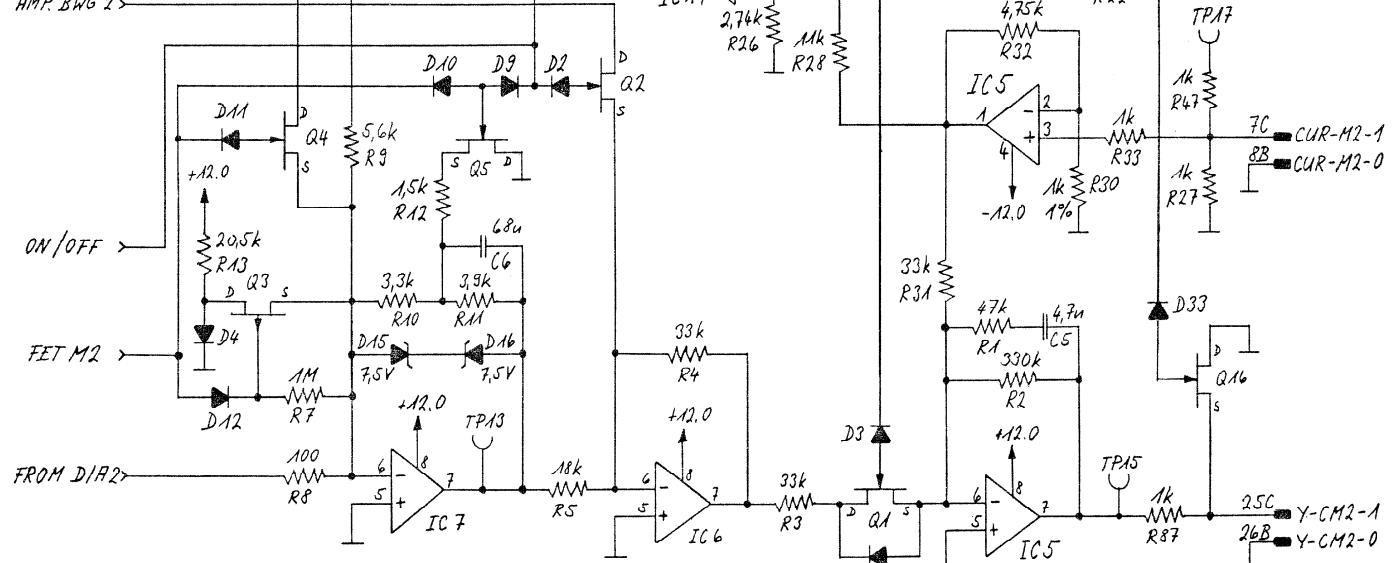
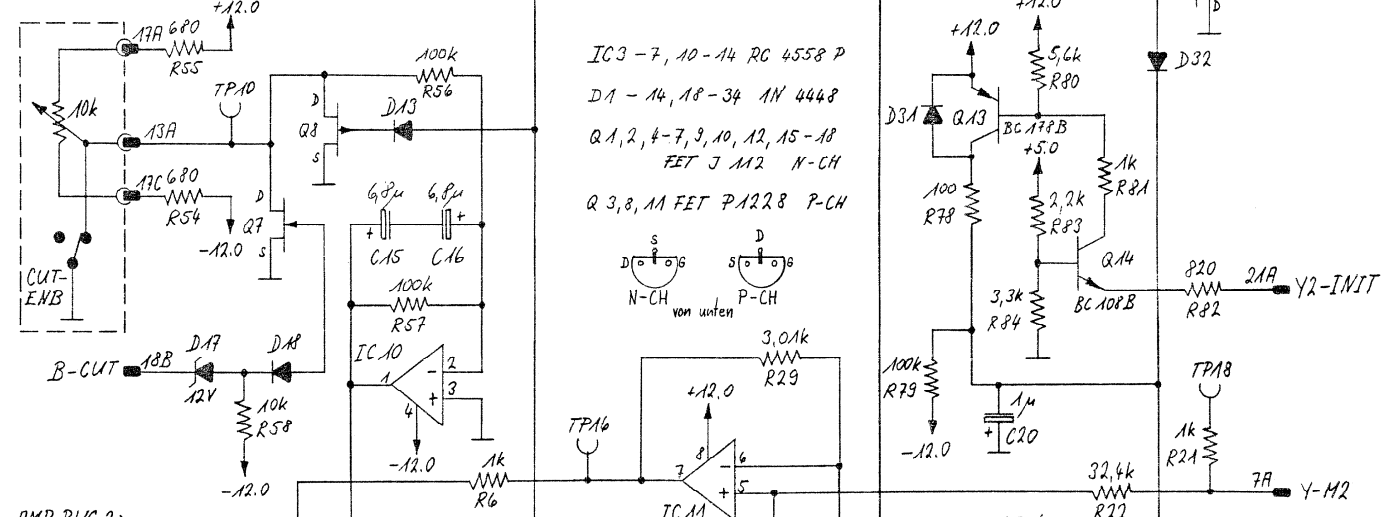
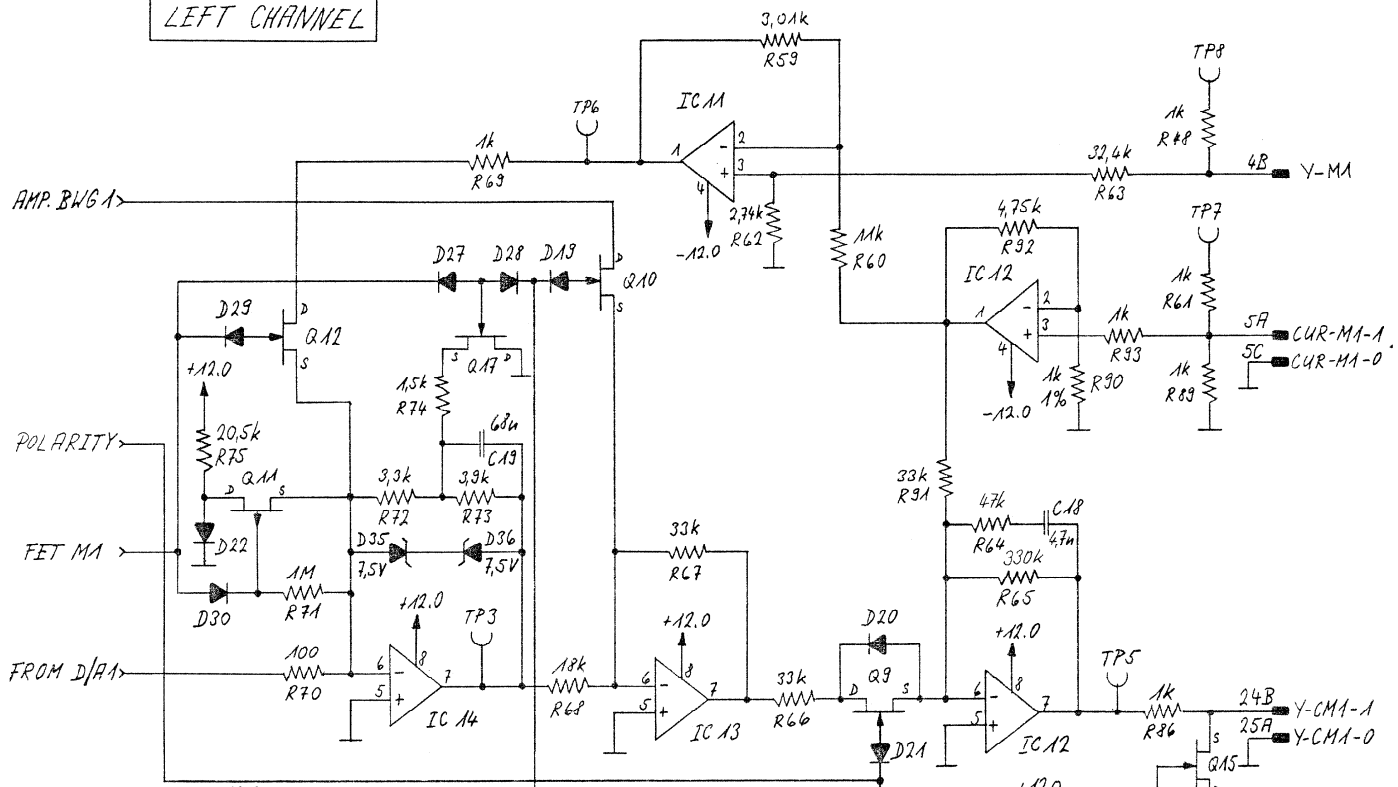
- | | |
|---------------------------------|-----------------------|
| 1. Spooling motor control | 1.180.457.00 |
| 2. Spooling motor power unit | 1.180.501.00 |
| 3. Spooling motor intercon. PC | 1.180.512.00 |
| 4. Tape tension spring assembly | 1.180.210/211/220/221 |
| 5. Remote control facilities | |





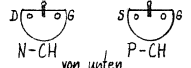
22.02.80	M.Kurz L3 A800 Tape Deck	GR30 EL6
STUDER	Spooling Motor Control Card	1.180.457-00
		PAGE 1 OF 2

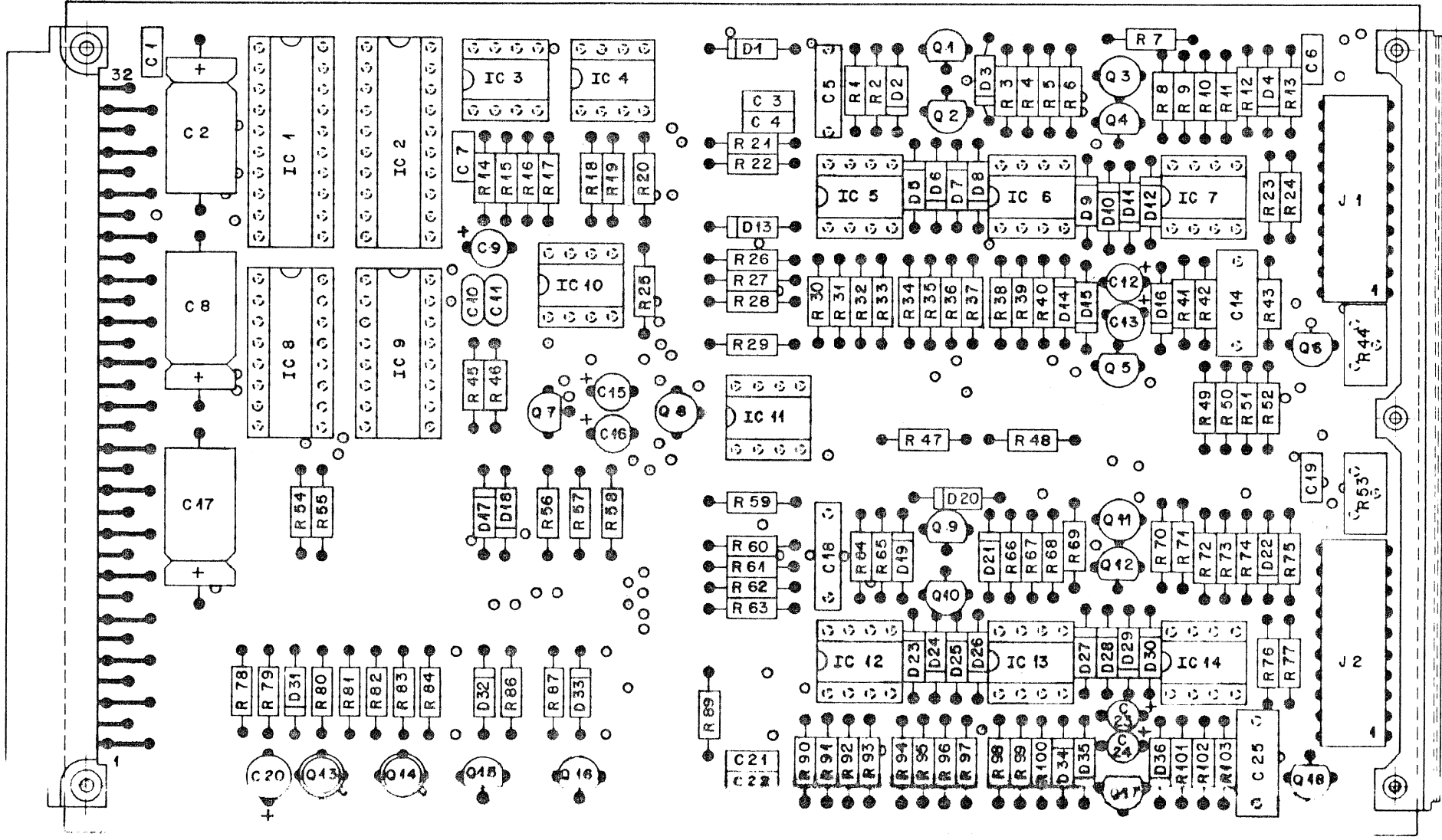
LEFT CHANNEL



RIGHT CHANNEL

IC3 - 7, 10-14 RC 4558 P
 D1 - 14, 18-34 1N 4448
 Q1, 2, 4-7, 9, 10, 12, 15-18
 FET J M12 N-CH
 Q3, 8, 11 FET P1228 P-CH





Spooling Motor Control 1.180.457-00

IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT	MFR
C	1	59.99.0205	68 nF	63V -20% CER	
C	2	59.25.3101	100 μF	16V -10% EL	
C	3	59.99.0205	68 nF	63V -20% CER	
C	4	"	68 nF	" "	
C	5	59.31.9472	4,7 nF	" ±10% MPETP	
C	6	59.99.0205	68 nF	" -20% CER	
C	7	"	68 nF	" "	
C	8	59.25.3101	100 μF	16V -10% EL	
C	9	59.36.3100	10 μF	" ±20% TA	
C	10	59.34.2330	33 pF	63V ±5% CER	
C	11	59.34.2330	33 pF	63V ±5% CER	
C	12	59.36.4479	4,7 μF	25V ±20% TA	
C	13	"	4,7 μF	" "	
C	14	59.31.1224	220 nF	63V " MPETP	
C	15	59.36.4689	6,8 nF	25V " TA	
C	16	"	6,8 nF	" "	
C	17	59.25.3101	100 μF	16V -10% EL	
C	18	59.31.9472	4,7 nF	63V ±10% MPETP	
C	19	59.99.0205	68 nF	" -20% CER	
C	20	59.36.6109	1 μF	25V ±20% TA	
C	21	59.99.0205	68 nF	63V -20% CER	
C	22	"	68 nF	" "	
C	23	59.36.4479	4,7 μF	25V ±20% TA	
C	24	"	4,7 μF	" "	
C	25	59.31.1224	220 nF	63V " MPETP	

IND	DATE	NAME
④		
③		
②		
①		
○	22.02.80	H. Kurz
STUDER		SPOOLING MOTOR CONTROL 1.180.457.00
		PAGE 1 OF 8

IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT	MFR
D	1	50.04.0125	1N 4448	75V	Si
D	2	"	"	"	"
D	3	"	"	"	"
D	4	"	"	"	"
D	5	"	"	"	"
D	6	"	"	"	"
D	7	"	"	"	"
D	8	"	"	"	"
D	9	"	"	"	"
D	10	"	"	"	"
D	11	50.04.0125	1N 4448	75V	Si
D	12	"	"	"	"
D	13	"	"	"	"
D	14	"	"	"	"
D	15	50.04.1103	Z 7,5V	U _Z 7,5V ±5% 0,4W	"
D	16	"	"	"	"
D	17	50.04.1117	Z 12V	U _Z 12V	"
D	18	50.04.0125	1N 4448	75V	"
D	19	"	"	"	"
D	20	"	"	"	"
D	21	50.04.0125	1N 4448	75V	Si
D	22	"	"	"	"
D	23	"	"	"	"
D	24	"	"	"	"
D	25	"	"	"	"
D	26	"	"	"	"
D	27	"	"	"	"

IND	DATE	NAME
④		
③		
②		
①		
○	22.02.80	M. Kurz

IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT	MFR
	D 28	50.04.0125	1N 4448	75V Si	
	D 29	"	"	"	
	D 30	"	"	"	
	D 31	"	"	"	
	D 32	"	"	"	
	D 33	"	"	"	
	D 34	"	"	"	
	D 35	50.04.1103	Z 7,5V	U _Z 7,5V ±5% 0,4W "	
	D 36	"	"	" " " "	
	IC 1	50.06.0273	SN74LS 273	Octal buffer/driver 3-State TTL	M/TI
	IC 2	"	SN74LS 273	" "	"
	IC 3	50.05.0245	RC 4558	Dual OP	TI
	IC 4	"	RC 4558	"	"
	IC 5	"	RC 4558	"	"
	IC 6	"	RC 4558	"	"
	IC 7	"	RC 4558	"	"
	IC 8	50.99.0123	MC 1408	8-Bit DAC C-MOS	M
	IC 9	"	MC 1408	"	"
	IC 10	50.05.0245	RC 4558	Dual OP	TI
	IC 11	50.05.0245	RC 4558	Dual OP	TI
	IC 12	"	RC 4558	"	"
	IC 13	"	RC 4558	"	"
	IC 14	"	RC 4558	"	"

IND	DATE	NAME	
④			M ≙ Motorola TI ≙ Texas-Instruments
③			
②			
①			
○	22.02.80	H. Kurz	
STUDER		SPoolING MOTOR CONTROL	1:180.457.00 PAGE 3 OF 8

IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT	MFR
	J 1	54.01.0307	10 Pol	parallel	Cis
	J 2	"	10 Pol	"	"
	P 1	54.01.0368	EUROPA	3x16 Pin	
	Q 1	50.03.0350	J 112	J-FET N-CH	SC/N
	Q 2	"	J 112	" "	"
	Q 3	50.03.0329	P 1228	" P-CH	Td/M
	Q 4	50.03.0350	J 112	" N-CH	SC/N
	Q 5	"	J 112	" "	"
	Q 6	"	J 112	" "	"
	Q 7	"	J 112	" "	"
	Q 8	50.03.0329	P 1228	" P-CH	Td/M
	Q 9	50.03.0350	J 112	" N-CH	SC/N
	Q 10	"	J 112	" "	"
	Q 11	50.03.0329	P 1228	J-FET P-CH	Td/M
	Q 12	50.03.0350	J 112	" N-CH	SC/N
	Q 13	50.03.0306	BC 178 B	UcB 30V PNP	aug
	Q 14	50.03.0409	BC 108 B	UcB 30V NPN	aug
	Q 15	50.03.0350	J 112	J-FET N-CH	SC/N
	Q 16	"	J 112	" "	"
	Q 17	"	J 112	" "	"
	Q 18	"	J 112	" "	"

IND	DATE	NAME		
④			SC ≙ Silec N ≙ National Semiconductors Td ≙ Teledyne M ≙ Motorola	
③				
②				
①				
○	22.02.80	M. Kurz		
STUDER		SPOOLING MOTOR CONTROL	1.180.657.00	PAGE 4 OF 8

IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT			MFR
	R 1	57. 11. 4473	47k	5%	0,25W	CSCH	
	R 2	" 4334	330k	"	"	"	
	R 3	" 4333	33k	"	"	"	
	R 4	" 4333	33k	"	"	"	
	R 5	" 4183	18k	"	"	"	
	R 6	" 4102	1k	"	"	"	
	R 7	" 4105	1M	"	"	"	
	R 8	" 4101	100	"	"	"	
	R 9	" 4562	5,6k	"	"	"	
	R 10	" 4332	3,3k	"	"	"	
	R 11	57. 11. 4392	3,9k	5%	0,25W	CSCH	
	R 12	" 4152	1,5k	"	"	"	
	R 13	57. 39. 2052	20,5k	1%	"	MF	
	R 14	57. 11. 4104	100k	5%	"	CSCH	
	R 15	" 4105	1M	"	"	"	
	R 16	" 4105	1M	"	"	"	
	R 17	" 4104	100k	"	"	"	
	R 18	57. 39. 3320	332	1%	"	MF	
	R 19	57. 39. 2050	205	"	"	"	
	R 20	57. 39. 1001	1k	"	"	"	
	R 21	57. 11. 4102	1k	5%	0,25W	CSCH	
	R 22	57. 39. 3242	32,4k	1%	"	MF	
	R 23	57. 39. 5111	5,11k	"	"	"	
	R 24	57. 11. 4103	10k	5%	"	CSCH	
	R 25	57. 39. 1001	1k	1%	"	MF	
	R 26	57. 39. 2741	2,74k	"	"	"	
	R 27	57. 11. 4102	1k	5%	"	CSCH	

IND	DATE	NAME
④		
③		
②		
①		
○	22. 02. 80	M. Kurz
STUDER		SPOOLING MOTOR CONTROL 1. 120. 457. 00
		PAGE 5 OF 8

IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT			MFR
	R 28	57.39.1102	11k	1%	0,25W	MF	
	R 29	57.39.3011	3,01k	"	"	"	
	R 30	57.39.1001	1k	"	"	"	
	R 31	57.11.4333	33k	5%	0,25W	C5CH	
	R 32	57.39.4751	4,75k	1%	"	MF	
	R 33	57.11.4102	1k	5%	"	C5CH	
	R 34	" 4223	22k	"	"	"	
	R 35	" 4122	1,2k	"	"	"	
	R 36	" 4392	3,9k	"	"	"	
	R 37	" 4682	6,8k	"	"	"	
	R 38	" 4153	15k	"	"	"	
	R 39	" 4153	15k	"	"	"	
	R 40	" 4332	3,3k	"	"	"	
	R 41	57.11.4183	18k	5%	0,25W	C5CH	
	R 42	" 4183	18k	"	"	"	
	R 43	" 4105	1M	"	"	"	
	R 44	58.01.7501	500	10%	"	PM6	Cermet
	R 45	57.39.1001	1k	1%	"	MF	
	R 46	57.39.1001	1k	"	"	"	
	R 47	57.11.4102	1k	5%	"	C5CH	
	R 48	" 4102	1k	"	"	"	
	R 49	" 4123	12k	"	"	"	
	R 50	" 4123	12k	"	"	"	
	R 51	57.11.4123	12k	5%	0,25W	C5CH	
	R 52	" 4123	12k	"	"	"	
	R 53	58.01.7501	500	10%	"	PM6	Cermet

IND	DATE	NAME
④		
③		
②		
①		
○	22.02.80	M. Kurz
STUDER		SPOOLING MOTOR CONTROL 1.180.457.00
		PAGE 6 OF 8

IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT			MFR
	R 54	57.11.4681	680	5%	0,25W	CSCH	
	R 55	" 4681	680	"	"	"	
	R 56	" 4104	100k	"	"	"	
	R 57	" 4104	100k	"	"	"	
	R 58	" 4103	10k	"	"	"	
	R 59	57.39.3011	3,01k	10%	"	MF	
	R 60	57.39.1102	11k	"	"	"	
	R 61	57.11.4102	1k	5%	0,25W	CSCH	
	R 62	57.39.2741	2,74k	10%	"	MF	
	R 63	57.39.3242	32,4k	"	"	"	
	R 64	57.11.4473	47k	5%	"	CSCH	
	R 65	" 4334	330k	"	"	"	
	R 66	" 4333	33k	"	"	"	
	R 67	" 4333	33k	"	"	"	
	R 68	" 4183	18k	"	"	"	
	R 69	" 4102	1k	"	"	"	
	R 70	" 4101	100	"	"	"	
	R 71	57.11.4105	1M	5%	0,25W	CSCH	
	R 72	" 4332	3,3k	"	"	"	
	R 73	" 4392	3,9k	"	"	"	
	R 74	" 4152	1,5k	"	"	"	
	R 75	57.39.2052	20,5k	10%	"	MF	
	R 76	57.39.5111	5,11k	"	"	"	
	R 77	57.11.4103	10k	5%	"	CSCH	
	R 78	" 4101	100	"	"	"	
	R 79	" 4104	100k	"	"	"	
	R 80	" 4562	5,6k	"	"	"	

IND	DATE	NAME	
④			
③			
②			
①			
○	12.02.80	Y Kurz	
STUDER		SPOOLING MOTOR CONTROL	1.180.457.00 PAGE 7 OF 8

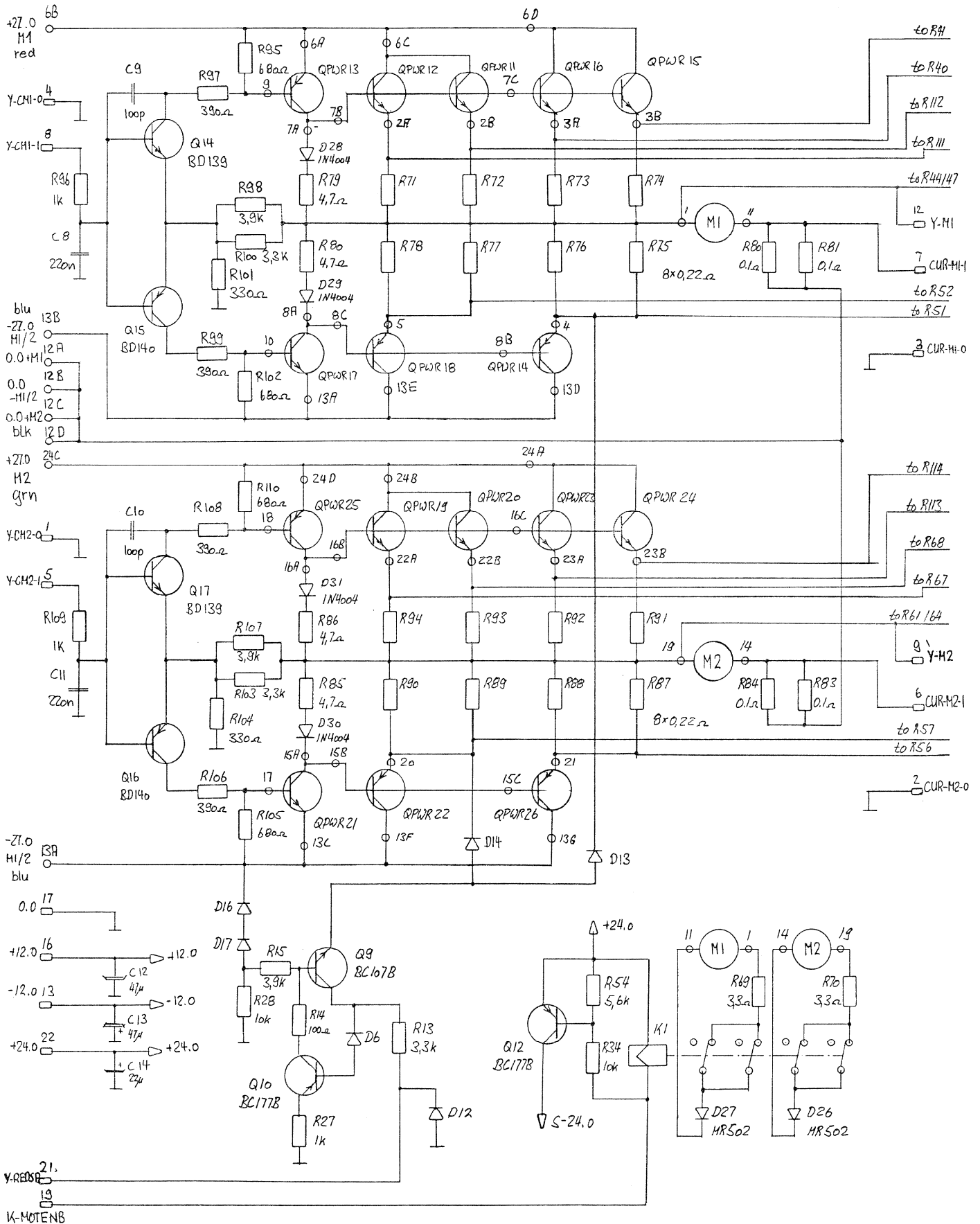
IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT			MFR
	R 81	57.11.4102	1 k	5%	0,25W	CSCH	
	R 82	" 4221	820	"	"	"	
	R 83	" 4222	2,2 k	"	"	"	
	R 84	" 4332	3,3 k	"	"	"	
	R 86	" 4102	1 k	"	"	"	
	R 87	" 4102	1 k	"	"	"	
	R 89	" 4102	1 k	"	"	"	
	R 90	57.39.1001	1 k	1%	"	MF	
	R 91	57.11.4333	33 k	5%	0,25W	CSCH	
	R 92	57.39.4751	4,75 k	1%	"	MF	
	R 93	57.11.4102	1 k	5%	"	CSCH	
	R 94	" 4223	22 k	"	"	"	
	R 95	" 4122	1,2 k	"	"	"	
	R 96	" 4392	3,9 k	"	"	"	
	R 97	" 4682	6,8 k	"	"	"	
	R 98	" 4153	15 k	"	"	"	
	R 99	" 4153	15 k	"	"	"	
	R 100	" 4332	3,3 k	"	"	"	
	R 101	57.11.4183	18 k	5%	0,25W	CSCH	
	R 102	" 4183	18 k	"	"	"	
	R 103	" 4105	1 M	"	"	"	

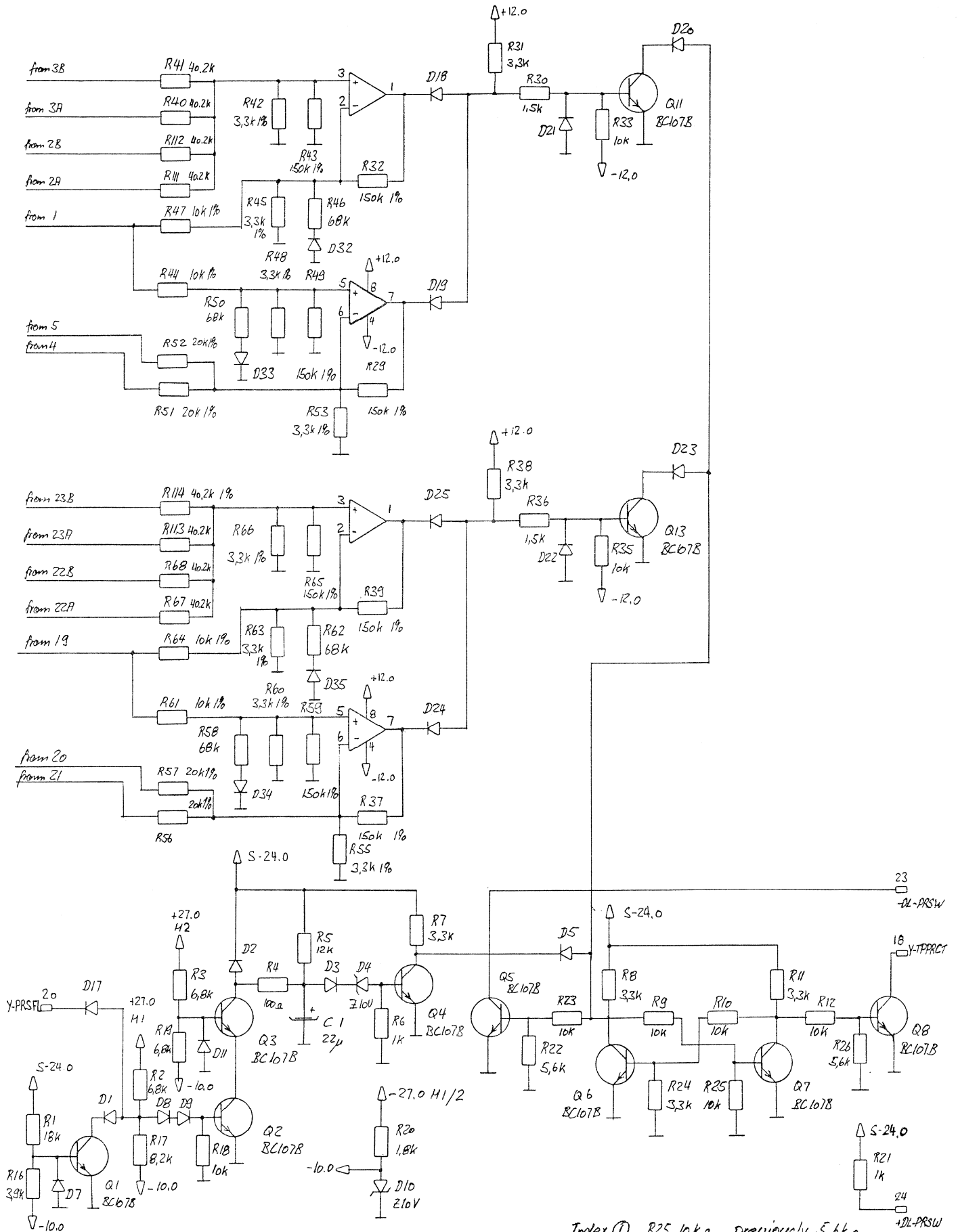
IND	DATE	NAME
④		
③		
②		
①		
○	22.02.20	U. Kutz
STUDER		SPOOLING MOTOR CONTROL
		1.180.457.00
		PAGE 8 OF 8

QPW 12, 11, 16, 15, 17 } ZNS631 / HJ 15003
 19, 20, 23, 24, 21

QPW 13, 18, 14, 25, 22, 26 / ZN6031 / HJ 15004

Diodes 1N4448

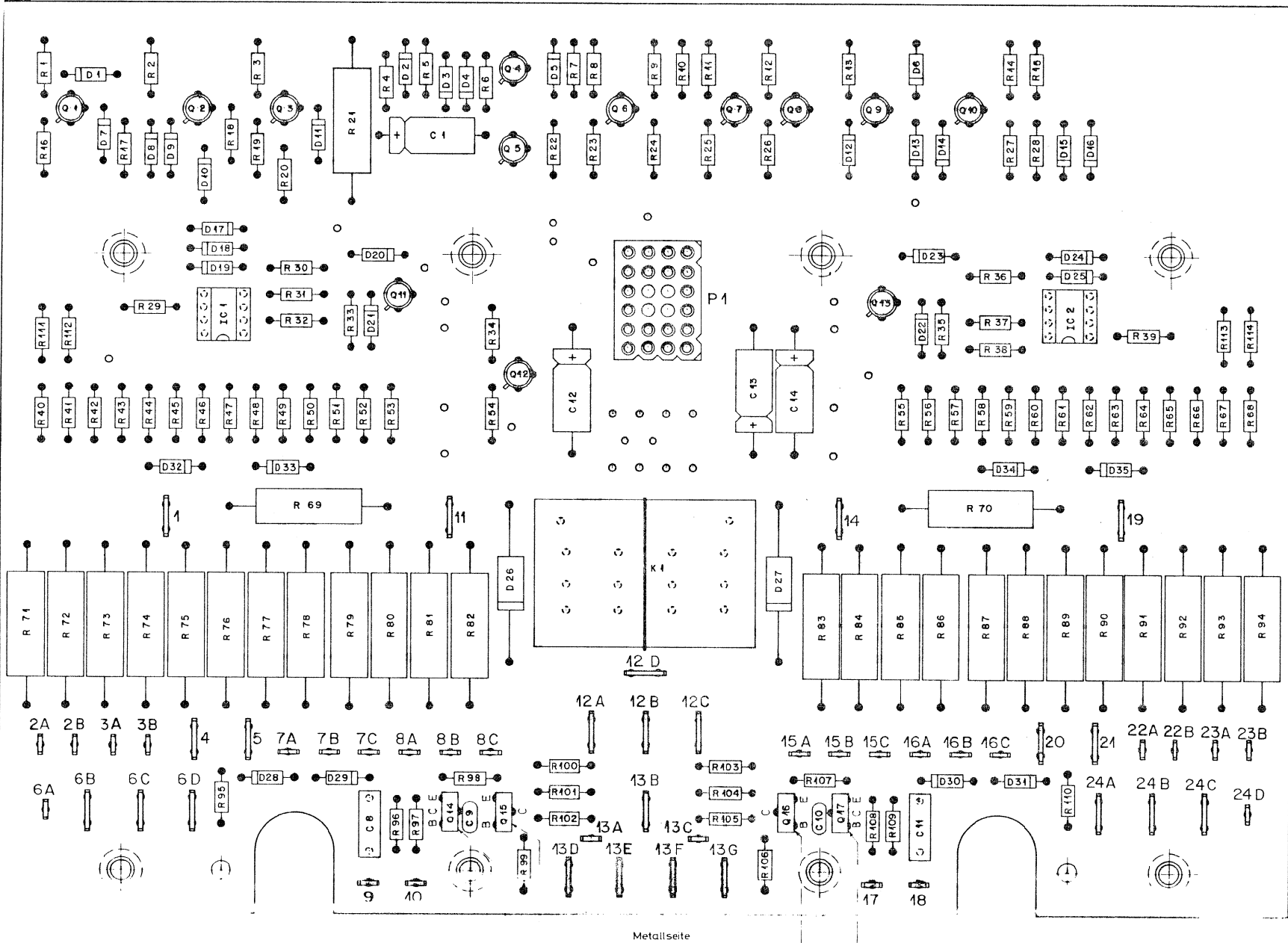




Index ① R25 10kΩ previously 5,6kΩ

28.5.80	A. Schindler L3	A 800 Tape deck control	Gr. 8
STUDER	Spooling motor power unit		1.180.501
			PAGE 2 OF 2

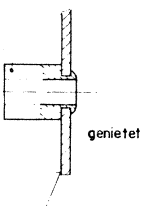
Spooling Motor Intercon. P.C. Card 1.180.512-00



Flachstecker auf Besüchtungsseite gerade aufliegend einpressen und auf Lötseite verstemmen.
Flachstecker dürfen nur Handgelötet werden

Transistoren gesieckt oder mit Unterlagen montiert

1.180.510-01



1.180.512-12

53.03.0166

54.02.0335
verstemmt

54.02.0320

INDI	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT	MFR
	QPWR11	50030342	2N5631	NPN Power	M
	QPWR12	50030343	2N6031	PNP Power	H
	QPWR13	50030343	2N6031		
	QPWR14	50030342	2N5631		
	QPWR15	50030342	2N5631		
	QPWR16	50030343	2N6031		
	QPWR17	50030342	2N5631		
	QPWR18	50030342	2N5631		
	QPWR19	50030343	2N6031		
	QPWR20	50030342	2N5631		
	QPWR21	50030343	2N6031		
	QPWR22	50030343	2N6031		

INDI	DATE	NAME	
④			M Motorola
③			
②			
①			
○	5.03.80	Keller	
STUDER		SPOOLING MOTOR POWER UNIT	1.180.501-00
			PAGE 1 OF 1

IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT	MFR
	C1	59.25.5220	22 μ	40V -10% +50% EL	
	C2				
	C3				
	C4				
	C5				
	C6				
	C7				
	C8	59.31.6224	220n	100V \pm 10% MPETP	
	C9	59.34.1101	100pf	63V \pm 40% CER	
	C10	59.34.1101	100pf	63V \pm 40% CER	
	C11	59.31.6224	220n	100V \pm 10% MPETP	
	C12,13	59.25.3470	47 μ F	16V -10%, +50% EL	
	C14	59.25.5220	22 μ F	40V -10%, +50% EL	
	D1	50.04.0125	1N4448	75V 1V/100mA	P Tr
	D2	"	"		
	D3	"	"		
	D4	50041114	D10	10V	
	D5	50040125	1N4448	75V 1V/100mA	P Tr
	D6	"	"		
	D7	"	"		
	D8	"	"		
	D9	"	"		
	D10	50041114	D10	10V	
	D11	50040125	1N4448	75V 1V/100mA	P Tr
	D12	"	"		
	D13	"	"		
	D14	"	"		
	D15	"	"		
	D16	"	"		
	D17	50.04.0125	1N4448	75V 1V/100mA	

IND	DATE	NAME	
④			P Philips EL ELECTROLYTIC
③			Tr Transiron CER CERAMIC
②			MPETP Metallized Polyester
①	5.03.60	Keller	
○	28.02.60	Keller	
STUDER		SPooling MOTOR INTERCON. PRINT	1.180.512-00 PAGE 1 OF 7

IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT	MFR
	D18	50.04.0125	1N4448	75V 1V/100mA	P Tr
	D19	"	"		
	D20	"	"		
	D21	"	"		
	D22	"	"		
	D23	"	"		
	D24	"	"		
	D25	50.04.0125	1N4448	75V 1V/100mA	P Tr
	D26	50.04.0507	MR502	200V 0,9/3A	M
	D27	50.04.0507	MR502	200V 0,9/3A	M
	D28	50.04.0105	1N4004	400V 10/1A	T1 M
	D29	"	"		
	D30	"	"		
	D31	50.04.0105	1N4004	400V 10/1A	T1 M
	D32,33	50.04.0125	1N4448	75V 1V/100mA	
	D34,35	50.04.0125	1N4448	75V 1V/100mA	
	IC1	50.05.0245	RC4558	Dual Op Amp	T1 M
	IC2	50.05.0245	RC4558	Dual Op Amp	T1 M
	K1	56.02.0108			
	P	54.02.0416			
	Q1	1.010.221.50	BC107B	NPN	P.S.M
	Q2	"	"		
	Q3	"	"		
	Q4	"	"		
	Q5	"	"		
	Q6	1.010.221.50	BC107B	NPN	P.S.M

IND	DATE	NAME	
④			T1 Texas Instruments
③			M Motorola
②			P Philips
①	5.09.80	Meller	S Siemens
○	28.02.80	Meller	
STUDER		SPOOLING MOTOR INTERCON. PRINT 1.180512-00	
			PAGE 2 OF 7

IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT	MFR
	Q7	1.010.221.50	BC107B	NPN	P, S, M
	Q8	"	BC107B	NPN	
	Q9	1.010.221.50	BC107B	NPN	
	Q10	1.010.208.50	BC177B	PNP	P, S, M
	Q11	1.010.221.50	BC107B	NPN	
	Q12	1.010.208.50	BC177B	PNP	P, S, M
	Q13	1.010.221.50	BC107B	NPN	
	Q14	50.03.0451	BD139-10	NPN Power	P, T, S
	Q15	50.03.0452	BD140-10	PNP Power	
	Q16	50.03.0452	BD140-10	PNP Power	
	Q17	50.03.0451	BD139-10	NPN Power	P, T, S

IND	DATE	NAME	
④			P Philips
③			S Siemens
②			M Motorola
①	5.03.80	Heller	T Telefunken
○	28.02.80	Heller	
STUDER		SPOOLING MOTOR INTERCON. PRINT	1.180.512-00 PAGE 3 OF 7

IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT	MFR
	R1	57.11.4183	18 k Ω	5% 0,25W CF	
	R2	57.11.4682	6,8k Ω		
	R3	57.11.4682	6,8k Ω		
	R4	57.11.4101	100 Ω		
	R5	57.11.4123	12k Ω		
	R6	57.11.4102	1k Ω		
	R7	57.11.4332	3,3k Ω		
	R8	57.11.4332	3,3k Ω		
	R9	57.11.4103	10k Ω		
	R10	57.11.4103	10k Ω		
	R11	57.11.4332	3,3k Ω		
	R12	57.11.4103	10k Ω		
	R13	57.11.4332	3,3k Ω		
	R14	57.11.4101	100 Ω		
	R15	57.11.4392	3,9k Ω		
	R16	57.11.4392	3,9k Ω		
	R17	57.11.4822	8,2k Ω		
	R18	57.11.4103	10k Ω		
	R19	57.11.4682	6,8k Ω		
	R20	57.11.4182	1,8k Ω		
	R21	57.11.4102	1k Ω		
	R22	57.11.4562	5,6k Ω		
	R23	57.11.4103	10k Ω		
	R24	57.11.4332	3,3k Ω		
①	R25	57.11.4103	10k Ω		
	R26	57.11.4562	5,6k Ω		
	R27	57.11.4102	1k Ω		
	R28	57.11.4103	10k Ω		
	R29	57.39.1503	150k Ω	1% 0,25W MF	
	R30	57.11.4152	1,5k Ω		

IND	DATE	NAME	
④			CF = Carbon Film MF Metal Film
③			
②			
①	5.09.80	Heller	
○	28.02.80	Heller	
STUDER		SPOOLING MOTOR INTERCON. PRINT	1.180.512-00
			PAGE 4 OF 7

IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT			MFR
	R31	57.11.4332	3,3k Ω	5%	0,25W	CF	
	R32	57.39.1503	150k Ω	1%	0,25W	MF	
	R33	57.11.4103	10k Ω	5%	0,25W	CF	
	R34	57.11.4103	10k Ω				
	R35	57.11.4103	10k Ω				
	R36	57.11.4152	1,5k Ω				
	R37	57.39.1503	150k Ω	1%	0,25W	MF	
	R38	57.11.4332	3,3k Ω	5%	0,25W	CF	
	R39	57.39.1503	150k Ω	1%	0,25W	MF	
	R40	57.39.4022	40.2 k Ω	1%			
	R41	57.39.4022	40.2 k Ω	1%			
	R42	57.39.3321	3,32k Ω	1%			
	R43	57.39.1503	150k Ω	1%			
	R44	57.39.1002	10k Ω	1%			
	R45	57.39.3321	3,32k Ω	1%			
	R46	57.11.4683	68 k Ω	5%	0.25W	CF	
	R47	57.39.1002	10 k Ω	1%			
	R48	57.39.3321	3,32k Ω	1%			
	R49	57.39.1503	150k Ω	1%			
	R50	57.11.4683	68 k Ω	5%	0.25W	CF	
	R51	57.39.2002	20k Ω	1%			
	R52	57.39.2002	20k Ω	1%			
	R53	57.39.3321	3,32k Ω	1%			
	R54	57.11.4562	5,6k Ω	5%	0,25W	CF	
	R55	57.39.3321	3,32k Ω	1%			
	R56	57.39.2002	20k Ω	1%			
	R57	57.39.2002	20k Ω	1%			
	R58	57.11.4683	68 k Ω	5%	0.25W	CF	
	R59	57.39.1503	150k Ω	1%			
	R60	57.39.3321	3,32k Ω	1%			

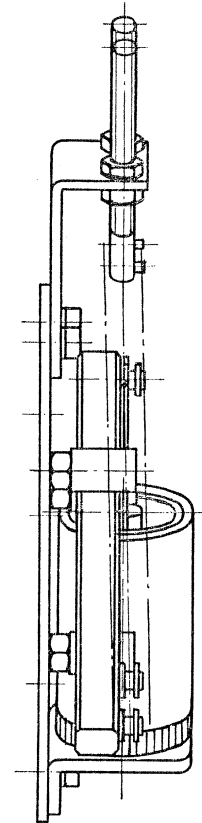
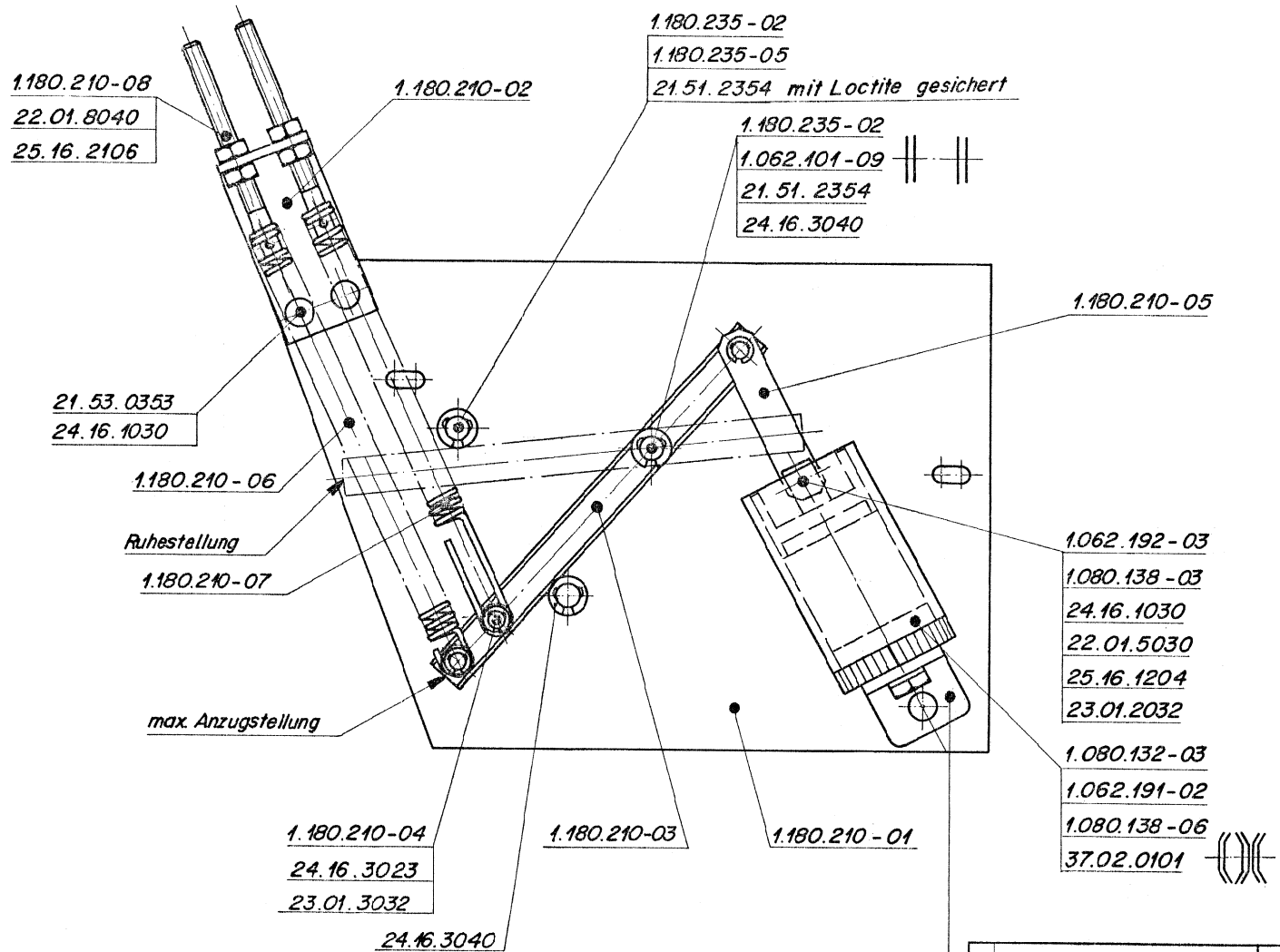
IND	DATE	NAME	
④			CF Carbon Film
③			MF Metal Film
②			
①	5.09.80	Meller	
○	28.02.80	Meller	
STUDER		SPOOLING MOTOR INTERCON. PRINT	1.180.512-00
			PAGE 5 OF 7

IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT			MFR
	R61	57.39.1002	10k Ω	1%	0.25W	MF	
	R62	57.11.4683	68k Ω	5%	0.25W	CF	
	R63	57.39.3321	3,32k Ω	1%			
	R64	57.39.1002	10k Ω	1%			
	R65	57.39.1503	150k Ω	1%			
	R66	57.39.3321	3,32k Ω	1%			
	R67	57.39.4022	40.2k Ω	1%			
	R68	57.39.4022	40.2k Ω	1%			
	R69	57.56.5339	3,3 Ω	10%	4W	WW	
	R70	57.56.5339	3,3 Ω	10%	4W		
	R71	57.56.5228	0,22 Ω	10%	4W		
	R72	57.56.5228	0,22 Ω	10%	4W		
	R73	57.56.5228	0,22 Ω	10%	4W		
	R74	57.56.5228	0,22 Ω	10%	4W		
	R75	57.56.5228	0,22 Ω	10%	4W		
	R76	57.56.5228	0,22 Ω	10%	4W		
	R77	57.56.5228	0,22 Ω	10%	4W		
	R78	57.56.5228	0,22 Ω	10%	4W		
	R79	57.56.5479	4,7 Ω	10%	4W		
	R80	57.56.5479	4,7 Ω	10%	4W		
	R81	57.56.5108	0,1 Ω	10%	4W		
	R82	57.56.5108	0,1 Ω	10%	4W		
	R83	57.56.5108	0,1 Ω	10%	4W		
	R84	57.56.5108	0,1 Ω	10%	4W		
	R85	57.56.5479	4,7 Ω	10%	4W		
	R86	57.56.5479	4,7 Ω	10%	4W		
	R87	57.56.5228	0,22 Ω	10%	4W		
	R88	57.56.5228	0,22 Ω	10%	4W		
	R89	57.56.5228	0,22 Ω	10%	4W		
	R90	57.56.5228	0,22 Ω	10%	4W		

IND	DATE	NAME			
④			MF	Metal Film	
③			WW	Wirewound	
②					
①	5.09.80	Keller			
○	23.02.80	Keller			
STUDER		SPOOLING MOTOR INTERCON PRINT		1.180.512-00	PAGE 6 OF 7

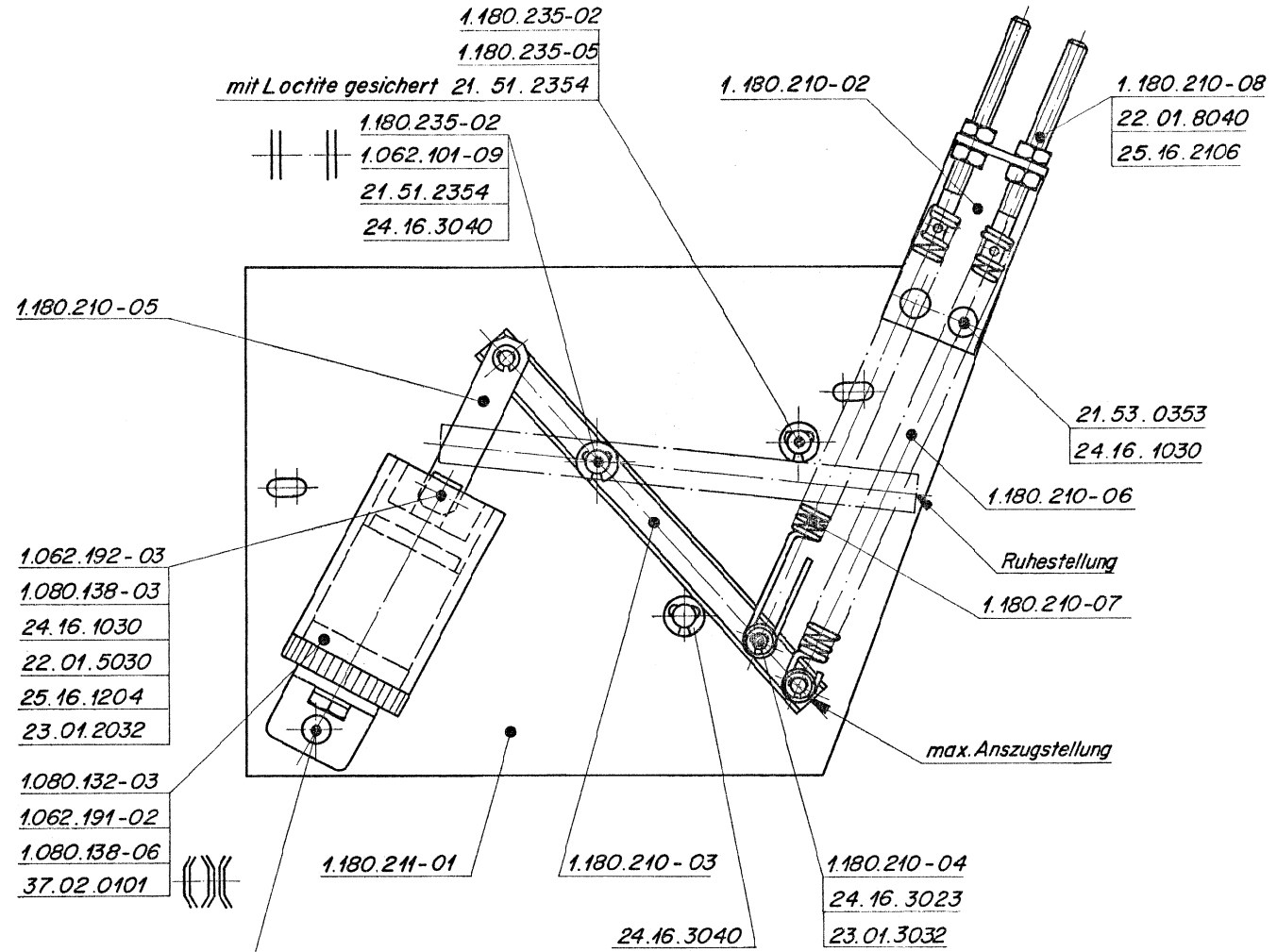
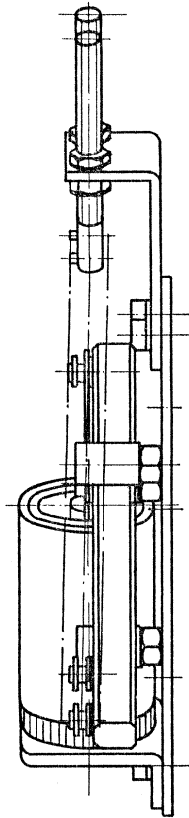
IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT	MFR
	R91	57.56.5226	0,22 Ω	10% 4W WW	
	R92	57.56.5226	0,22 Ω	10% 4W	
	R93	57.56.5228	0,22 Ω	10% 4W	
	R94	57.56.5228	0,22 Ω	10% 4W	
	R95	57.11.4661	680 Ω	5% 0,25W CF	
	R96	57.11.4102	1 k Ω		
	R97	57.11.4391	390 Ω		
	R98	57.11.4392	3,9k Ω		
	R99	57.11.4391	390 Ω		
	R100	57.11.4332	3,3k Ω		
	R101	57.11.4331	330 Ω		
	R102	57.11.4661	680 Ω		
	R103	57.11.4332	3,3k Ω		
	R104	57.11.4331	330 Ω		
	R105	57.11.4661	680 Ω		
	R106	57.11.4391	390 Ω		
	R107	57.11.4392	3,9k Ω		
	R108	57.11.4391	390 Ω		
	R109	57.11.4102	1 k Ω		
	R110	57.11.4661	680 Ω		
	R111	57.39.4022	40.2 k Ω	1%	
	R112	57.39.4022	40.2 k Ω	1%	
	R113	57.39.4022	40.2 k Ω	1%	
	R114	57.39.4022	40.2 k Ω	1%	

IND	DATE	NAME	
④			CF Carbon Film
③			WW Wirewound
②			
①	5.09.80	Heller	
○	28.02 80	Heller	
STUDER		SPooling MOTOR INTERCOV. PRINT	1.160.512-00
			PAGE 7 OF 7



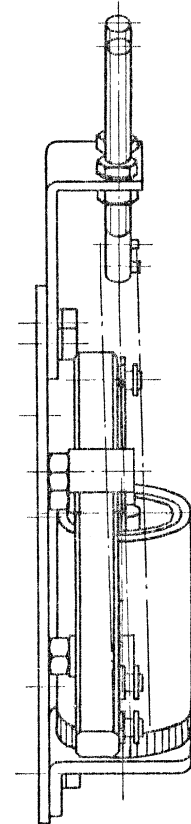
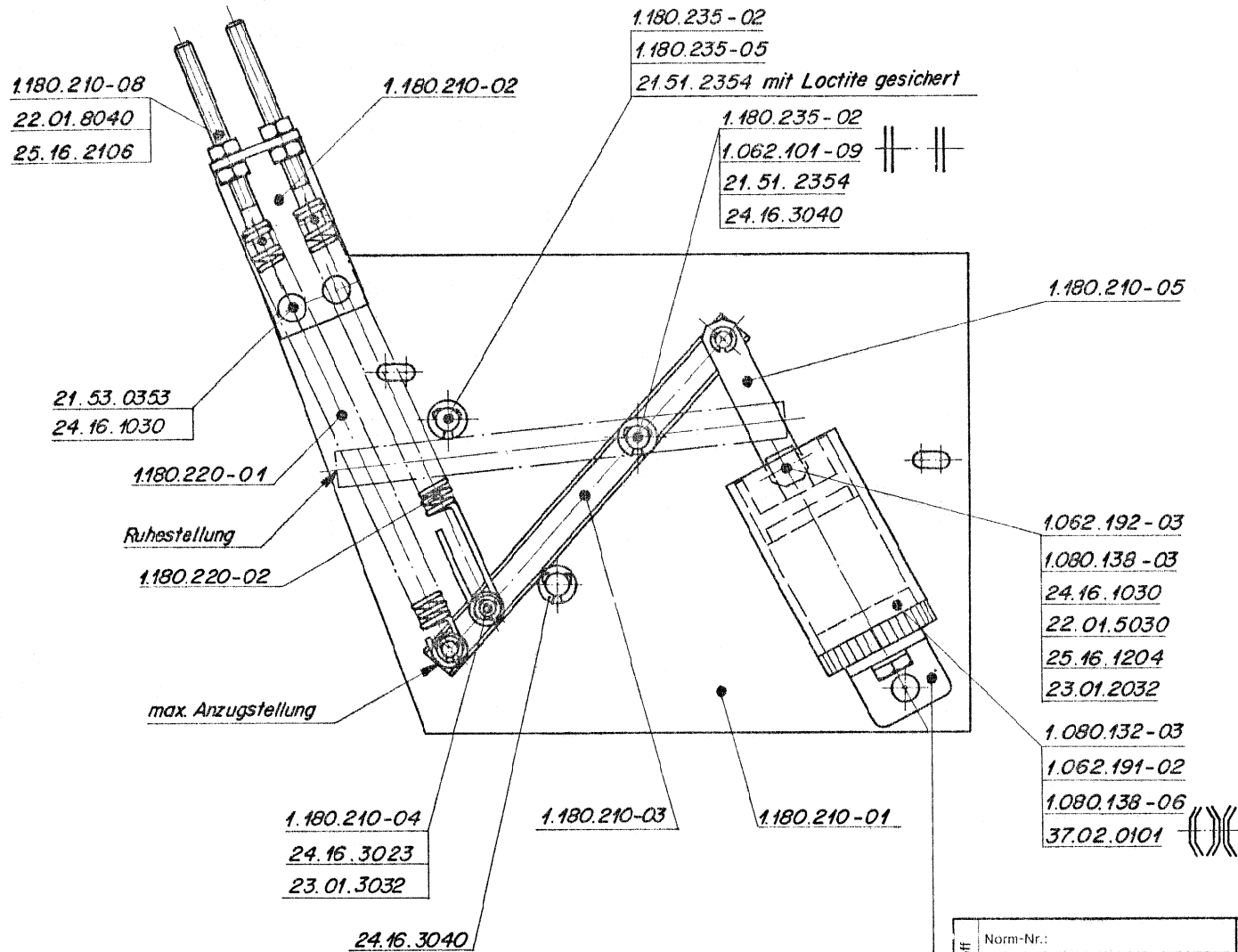
1.080.138-01
21.53.0353
24.16.1030

Werkstoff	Norm-Nr.:	Oberfläche	Güte:						③	
	DIN-Bez.:		Beh.:							②
	Abmessung:									①
Zugehörige Unterlagen:		Freimasstoleranz:	Maßstab:	Ausgabe		18.1.80	Be		①	
		±	1:1	Datum	Gez.	Gepr.	Ges.	Index		
Ersatz für:		Ersetzt durch:		Kopie für:						
STUDER REGENSDORF ZÜRICH		Benennung: Anzugfeder kompl. Links 1"		Nummer: 1.180.210						

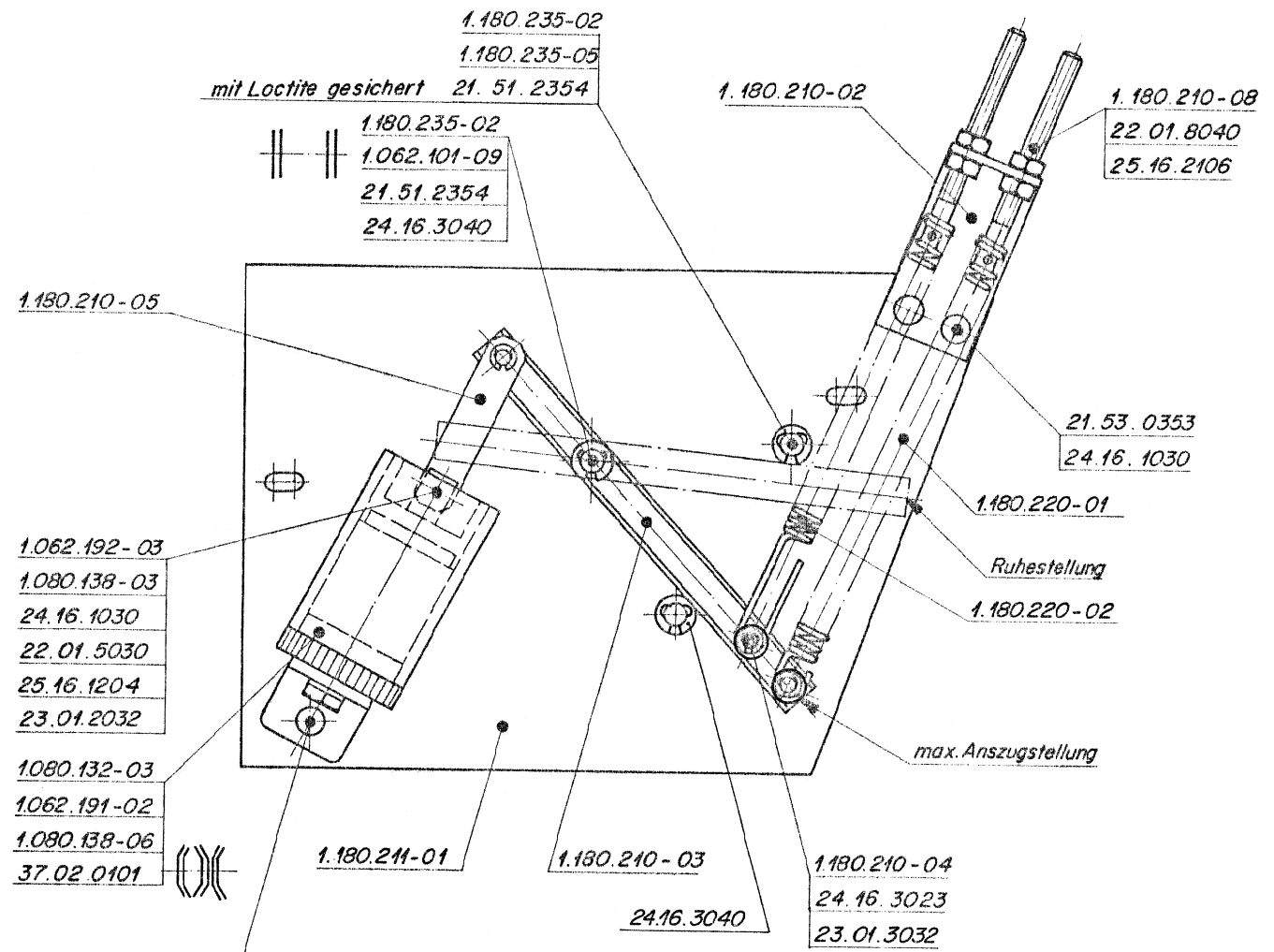
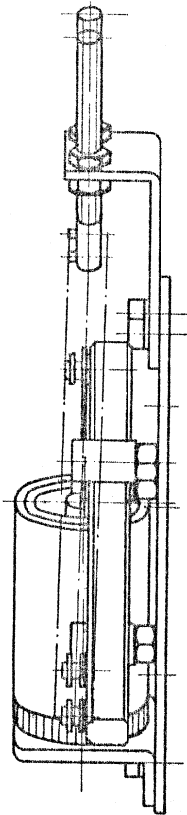


1.080.138-01
21.53.0353
24.16.1030

Werkstoff	Norm-Nr.:	Oberfläche	Güte:	Änderung					③	
	DIN-Bez.:		Beh.:							②
	Abmessung:									
Zugehörige Unterlagen:		Freimasstoleranz:	Maßstab:	Ausgabe	18.1.80	Be			④	
		±	1:1	Datum	Gez.	Gepr.	Ges.	Index		
Ersatz für:		Ersetzt durch:		Kopie für.						
STUDER REGENSDORF ZÜRICH		Benennung: <i>Prandzugfeder kompl. hochts 1"</i>		Nummer: 1.180.211						



Werkstoff	Norm-Nr.:	Oberfläche	Güte:	Änderung					3
	DIN-Bez.:		Beh.						
	Abmessung:								1
Zugehörige Unterlagen:		Freimasstoleranz:	Maßstab:	Ausgabe	18.1.80	Be			0
		±	1:1	Datum	Gez.	Gepr.	Ges.		
Ersatz für:		Ersetzt durch:		Kopie für:					
STUDER REGENSDORF ZÜRICH		Bemennung: Anzugfeder kompl. LIIIKS 2"		Nummer: 1.180.220					



1.080.138-01
 21.53.0353
 24.16.1030

Werkstoff	Norm-Nr.:	Gute:	Änderung							3
	DIN-Bez.:	Beh.:								
	Abmessung:									1
		Freimasstoleranz:	Maßstab:	Ausgabe	18.1.80	Be				0
		±	1:1	Datum	13. Mai 1980	Gez	Gepr.	Ges.	Index	
Ersatz für:	Ersetzt durch:		Kopie für:							
STUDER REGENSDORF ZÜRICH	Benennung: <i>Randzugfeder kompl.</i> <i>Rechts 2"</i>		Nummer: 1.180.221							

Remote facilities of A800 MK II

A.) Remote connector

Signals are active low. The commands FF resp FRW activate the following procedure:

On spooling motor control card 1.180.457 a reference value is loaded into IC 1 resp IC 2.

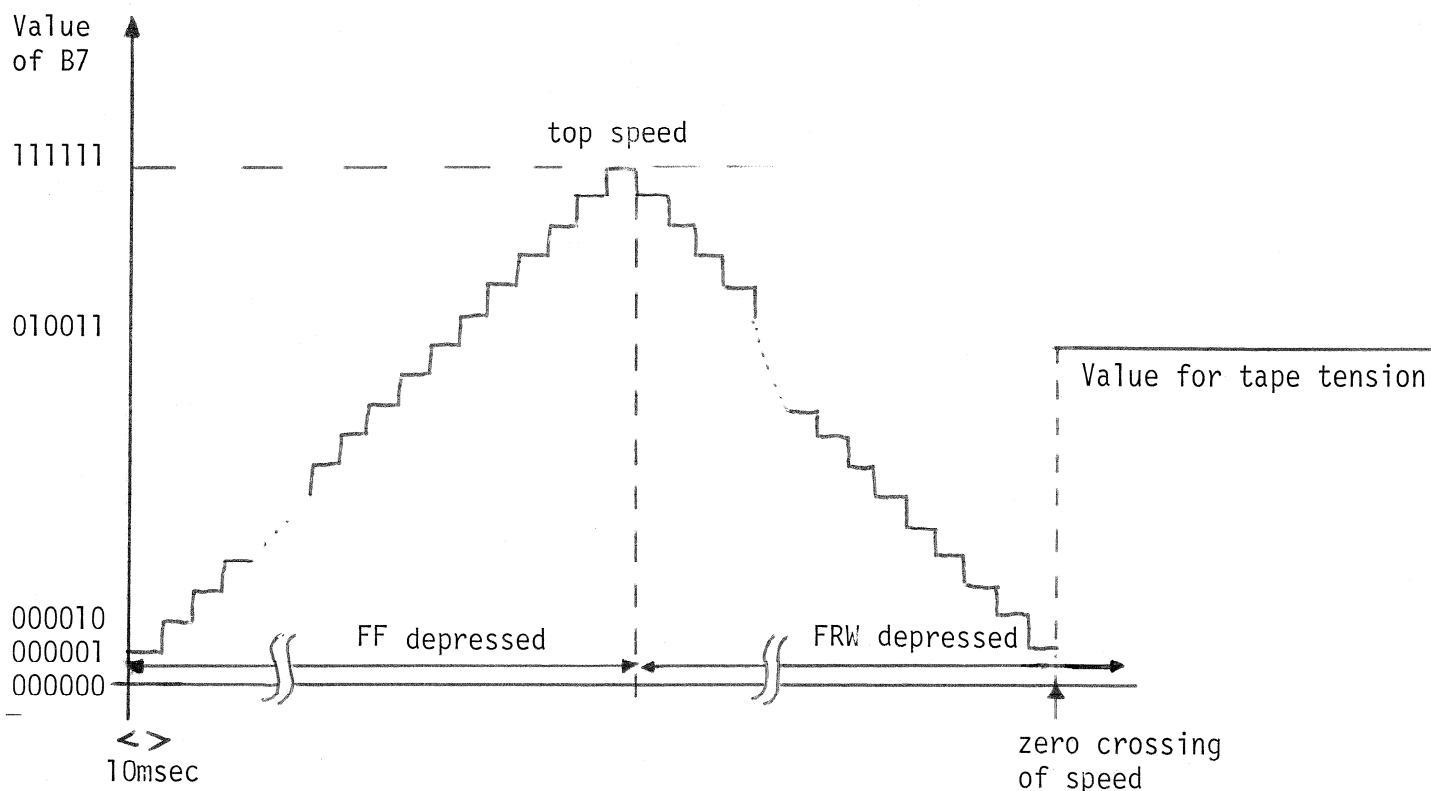
- TD-DATA 0....5 Bit pattern for speed resp. tape tension
- TD-DATA 6 if low, then EMK-control
- TD-DATA 7 M1 (IC 1) polarity switch
 M2 (IC 2) control on/off

The take up motor is always speed controlled, the supply motor tape-tension. The bit pattern is also available on the μ p-Bus

- EBUF 40 $\hat{=}$ address B6 $\hat{=}$ Ref. M1 (take up in fast rewind)
- EBUF 41 $\hat{=}$ address B7 $\hat{=}$ Ref. M2 (take up in FF/Play)

The digital/analog converter IC 8 resp. IC 9 produces a current which is proportional to the speed of the motor. Every ten msec. a new bit-pattern is loaded into d/A converter IC 8 / IC 9.

Bit-pattern in case of stop \longrightarrow FF \longrightarrow FRW



Prescription of tape speed would be possible by pressing FF for a certain time (e.g. 200 msec) and then toggling FF/FRW with 100 cycles ev. 25 or 50 cycles.

Complete bit pattern:

		D7	D6	D5	D4	D3	D2	D1	D0	
B6	Play	1	1	0	0	0	1	1	0	
	FF	0	1	0	1	0	0	1	1	
	FRW	0	0	1	1	1	1	1	1	at full speed
B7	Play	1	1	0	1	0	0	1	1	
	FF	1	0	1	1	1	1	1	1	at full speed
	FRW	1	1	0	1	0	0	1	1	

The access to the μ p Bus is given at the place between MPU-card and switching regulator.

B.) Aux connector at the back of the machine

The auxiliary connector is linked to the master interface 1.228.434.

All commands are active low according to the following list.

MCDAT2DR	MCDAT1DR	MCDAT0DR	FUNCTION
1	1	1	MControl off
1	1	0	Play
1	0	1	Pause
1	0	0	Rec
0	1	1	Stop
0	1	0	Rew
0	0	1	Loc to zero
0	0	0	fast forw.

MC REHDR Rehearse

MC RESDR 1 reserved

MC ZSETDR Set to zero

MC KCUTDR Go to edit position with pinch roller

MC DATRDY Is set when a push button on the programmer is depressed

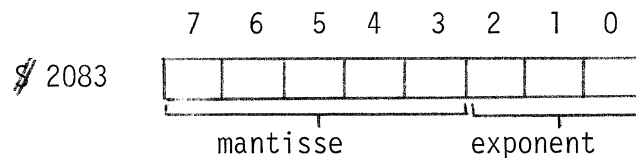
C.) Command line

The command line is linked to the TLS Interface 1.228.433.

Data transfer is done according to the following list.

The basic address of this interface is $\$$ 2080.

In the register $\$$ 2083 the reference for the required spooling speed is loaded by the TLS or an external device.



The required value corresponds to play speed multiplied with content of $\$$ 2083.

In FF/FRW mode, A800 accepts speed prescriptions if at the same time LOCSWDIS is actif. (actif = high). In Play/Rec/Locate the machine runs with internal values.

Prescription of winding speed:	TD-FORW / TD-REW	actif
	+ $\$$ 2083	
	+ LOCSWDIS	actif

In register $\$$ 2086 the direction of data transfer is defined:

Bit 7 = high $\hat{=}$ Data ready for A800

Bit 7 = low $\hat{=}$ Data ready for TLS