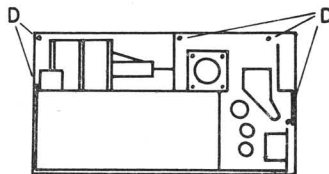
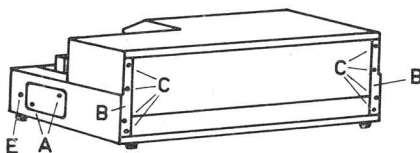


Consisting of:	Electronic Section	2305.1
	Mechanical Section	2305.2
	Position of Components	2305.3
	Parts List	2305.4
	Circuit Diagram	2305.5



#### Removal of the Metal Case

Place the instrument face downwards on a piece of soft material. Then remove bottom plate and back plate  
remove the two screws A and the cover  
remove the four screws C and the two metal plates B  
remove the five screws D  
remove 1:10 gear lever E  
The metal case can now be removed.

#### Trouble Shooting

If the reason for a fault is not an obvious one such as a dead tube, broken down resistor, blown or disconnected fuse etc., then first test the voltages of all the tubes and compare them with the voltages shown in the circuit diagram in order to localize the defect. Should this method of finding the fault prove unsuccessful, then check the instrument by adopting the method described in the adjustment procedure. When the trouble has been found and remedied, the voltages and adjustments which are influenced by the remedy must be rechecked.

The tolerances stated in the instructions can only be used as a guide for adjustment and control, but any deviations must not be corrected without being sure that the tolerances of the instruments used for making the adjustment are so small as to have no influence on the measurements.

The instructions in this Manual are given purely as a guide to the service of equipment. Some faults, as f. inst., small deviations in tolerances require for their correction special control equipment and extensive experience, and in these cases it is necessary to send the instrument to the factory.

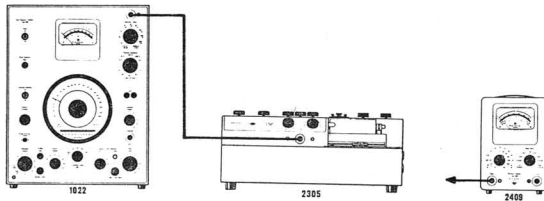
#### Spare Parts

Please state type and serial number of apparatus, when spare parts are ordered.

#### Instruments and accessories necessary for service and repair:

Multimeter (50  $\mu$ A)  
Beat Frequency Oscillator type 1022  
(Beat Frequency Oscillator type 1013)  
(Beat Frequency Oscillator type 1017)  
Pressure Gage (15-150 gr)  
Electronic Voltmeter type 2409





1.1. Balance of the Output Amplifier

POTENTIOMETER RANGE: "Stand by"  
WRITING SPEED: "1000 mm/s"

Measure the d.c. voltage across R1, measuring point B + B-: approx. 5 V.

Then measure the d.c. voltage across the drive coil, measuring point B- and ground: 0 - 10 V.

If unbalanced, connect g<sub>1</sub> of tube V6 to ground, measuring point H.

Measure the 5 kHz voltage across the primary of transformer T3 by means of type 2409 and adjust P13 "5 kc/s comp" to min. voltage.

Then adjust: P4 for approx. 5 V across B+ and B-  
P5 for approx. 0 V across B- and ground

Remove ground connection from measuring point H and adjust P7 "Chopper balance" to 0-6 V across the drive coil, measuring point B - and ground.

Possible reasons for zero drift: defective tubes V 1,6,7,8  
defective diodes Q14-17

1.2. Balance of the Input Amplifier

Measure the voltage across the anodes of V9 and V10, measuring point C -D: max. 10 V.

If necessary adjust P1 "D.C. balance".

Possible reason for unbalance: defective tubes V2 - 5, 9, 10

Whenever V2 and V3 are changed only use selected low microphonic tubes.

1.3. Mechanical Friction and Max. Driving Power.

INPUT ATTENUATOR: "0 dB"  
INPUT POTENTIOMETER: "10"  
WRITING SPEED: "2 mm/s" (large figure)  
LOWER LIM. FREQ.: "200 Hz"  
RECTIFIER RESPONSE: "RMS"  
POTENTIOMETER RANGE: "50 dB"  
MOTOR: "On"  
PAPER DRIVE: "Start-Forward"  
PAPER SPEED: "1 mm/s" (large figure)  
1:10 gear lever pushed in.  
PAPER: QP 0402 (QP 0423)

Input signal: 10 V 1000 Hz.

Measure the d.c. voltage across the drive coil, measuring point B- and ground.

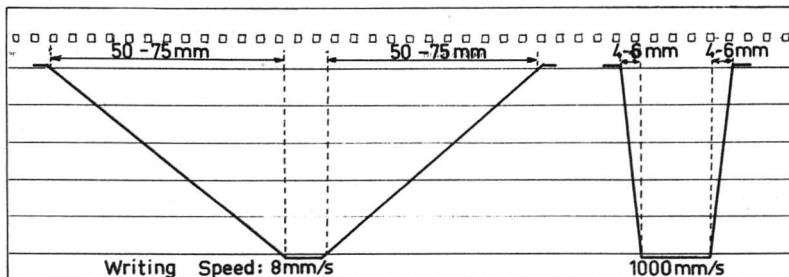
When the input signal is disconnected the voltage should be below 20 V during movement to 0 dB line. If the voltage is higher remove the driving arm from the boogie and repeat the measurement.

If the voltage is: below 10 V check writing system item 2.1.  
above 10 V check magnet system item 2.2.

When the sapphire stops at the 0 dB line the voltage should increase to approx. 150 V.

Connect again the input signal. As long as the sapphire is moving the voltage should be approx. -20 V and increase to approx. -150 V when the system is stopped.

Possible reasons for fault: defective tubes V1,6,7,8.



1.4. Writing Speed.

- a. INPUT ATTENUATOR:"0 dB"
- INPUT POTENTIOMETER:"10"
- WRITING SPEED:"8 mm/s (large figure)
- LOWER LIM.FREQ.:"200 Hz"
- RECTIFIER RESPONSE:"RMS"
- POTENTIOMETER RANGE:"50 dB"
- WRITING WIDTH:"50 mm"
- MOTOR:"On"
- PAPER DRIVE:"Stop-Forward"
- PAPER SPEED:"10 mm/s (large figure)
- 1:10 gear lever pushed in
- PAPER: QP 0102 (QP 0123)

Input signal: 4 V 1000 Hz.

Depress OSCILLATOR STOP on type 1022 while the paper is running ( PAPER DRIVE to "Start")and release it again when the sapphire has reached the 0 - dB line.

The paper length for a movement of the sapphire from 50 dB to 0 dB and back again should be equal (62 mm).

Tolerance:  $\pm 20\%$  Measured on the paper: 50 - 75 mm.

If necessary adjust P3 "Vel.adj."(anticlockwise for increased speed)

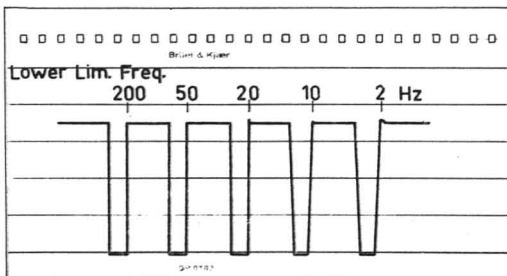
Possible reasons for faults: defective feed-back coil  
defective diodes Q 12, 13  
unbalanced amplifier check item 1.1 and 1.2.

- b. WRITING SPEED to 1000 mm/s (large figure)
- PAPER SPEED:"100 mm/s" (large figure)
- 1:10 gear lever pushed in

Check as under a

Tolerance:  $\pm 20\%$  Measured on the paper: 4 - 6 mm.

If necessary adjust P12 "Max.vel.adj." (clockwise for increased speed)



1.5. Overshoot

- a. INPUT ATTENUATOR:"0 dB"
- INPUT POTENTIOMETER:"10"
- WRITING SPEED:"800 mm/s" (large figure)
- LOWER LIM. FREQ.:"200 Hz"
- RECTIFIER RESPONSE:"RMS"
- POTENTIOMETER RANGE:"50 dB"
- MOTOR:"On"
- PAPER DRIVE:"Stop-Forward"
- PAPER SPEED:"11 mm/s (large figure)
- 1:10 gear lever pushed in
- WRITING WIDTH:"50 mm"
- PAPER: QP 0102 (QP 0123)

Input signal: 400 mV 1000 Hz.

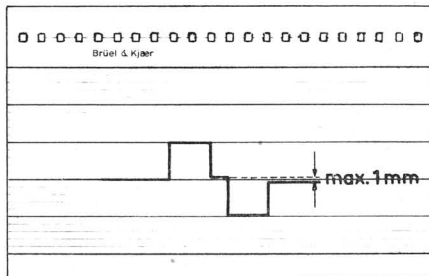
Depress and release OSCILLATOR STOP on type 1022 while the paper is running. PAPER DRIVE to "Start".

Overshoot: max. 1 mm.

If necessary adjust P10 "Resolution".Whenever P 10 is adjusted check item 1.6

Possible reason for faults: unbalanced amplifier check item 1.1 and 1.2.  
defective diodes Q1 - 4  
faulty contact in magnet system check item 2.2  
writing speed too high check item 1.4

b.	WRITING SPEED	LOWER LIM. FREQ.	OVERSHOOT
	mm/s	Hz	mm
	500	50	1
	250	20	1.5
	100	10	1
	25	2	1.5



1.6. Resolving Power

- a. INPUT ATTENUATOR: "10 dB"
- INPUT POTENTIOMETER: "10"
- WRITING SPEED: "16 mm/s" (large figure)
- LOWER LIM. FREQ.: "200 Hz"
- RECTIFIER RESPONSE: "RMS"
- POTENTIOMETER RANGE: "50 dB"
- MOTOR: "On"
- PAPER DRIVE: "Start-Forward"
- PAPER SPEED: "1 mm/s (large figure)
- 1:10 gear lever pushed in
- WRITING WIDTH: "50 mm"
- PAPER: QP 0102 (QP 0123)

Frequency: 1000 Hz.

Adjust the input voltage until the sapphire is on the 20 dB line.

Change INPUT ATTENUATOR to "0 dB" and back again to "10 dB". Thereafter to "20 dB" and back again to "10 dB".

Check that the sapphire comes back again to the 20 dB line.

Tolerance:  $\pm$  0,5 mm

Possible reason for faults: faulty adjusted P10 check item 1.5  
unbalanced amplifier check item 1.1 and 1.2  
mechanical friction check item 1.3

1.7. Frequency Response 2-1000 Hz

- a. INPUT ATTENUATOR: "0 dB"
- INPUT POTENTIOMETER: "10"
- WRITING SPEED: "8 mm/s" (large figure)
- LOWER LIM. FREQ. "200 Hz"
- RECTIFIER RESPONSE: "RMS"
- POTENTIOMETER RANGE: "50 dB"

The lower limit can only be checked by means of a low frequency oscillator f. inst. type 1017.

Frequency: 1000 Hz. Adjust the input voltage until the sapphire is on the 40 dB line.

- b. Check all positions of LOWER LIM. FREQ.

Change frequency from the oscillator according to position LOWER LIM. FREQ. Deflection of the sapphire: 40 dB .

Tolerance: 0.3 dB ( $\pm$  tolerance of type 1017: 0.5 dB)

1.8. Frequency Response 1 - 200 kHz

- a. INPUT ATTENUATOR: "0 dB"
- INPUT POTENTIOMETER: "10"
- WRITING SPEED: "500 mm/s" (large figure)
- LOWER LIM. FREQ. "200 Hz"
- RECTIFIER RESPONSE: "RMS"
- POTENTIOMETER RANGE: "50 dB"

The upper limit can only be checked by means of a high frequency oscillator f. inst. type 1013.

Frequency: 1000 Hz. Adjust the input voltage until the sapphire is on the 40 dB line.

Change frequency to 200 kHz. Deflection of the sapphire: 40 dB

Tolerance: -0,2 - 0,5 dB ( $\pm$  tolerance of type 1013: 0,5 dB)

- b. Check all positions of INPUT ATTENUATOR

Attenuator step: 10 dB  
Tolerance:  $\pm$  0.2 dB

### 1.9. Rectifier Response

- a. INPUT ATTENUATOR: "0 dB"  
WRITING SPEED: "100 mm/s" (large figure)  
LOWER LIM. FREQ.: "20 Hz"  
RECTIFIER RESPONSE: "RMS"  
POTENTIOMETER RANGE: "50 dB"  
PAPER: QP 0102 (QP 0123)
- b. RECTIFIER RESPONSE to "Average"
- c. RECTIFIER RESPONSE to "Peak"
- d. RECTIFIER RESPONSE to "DC"

Depress the "100 mV/Ref." button and adjust INPUT POTENTIOMETER until the sapphire is on the 20 dB line.

Release the push-button and adjust the input voltage (frequency: 1000 Hz) until the sapphire is on the 20 dB line.

Sapphire deflection: 19.1 dB

Sapphire deflection: 23 dB

Disconnect the oscillator and connect a d.c. voltage 1.5 V to INPUT socket

Sapphire deflection: 37.5 dB

### 1.10. Mains Frequency - 5 kHz Chopper Beat

- a. INPUT ATTENUATOR: "0 dB"  
INPUT POTENTIOMETER: "10"  
WRITING SPEED: "100 mm/s" (large figure)  
LOWER LIM. FREQ.: "10 Hz"  
RECTIFIER RESPONSE: "Peak"  
POTENTIOMETER RANGE: "10 dB"  
PAPER: QP 0102 (QP 0123)
- b. WRITING SPEED to "500 mm/s" (large figure)  
LOWER LIM. FREQ. to "200 Hz"

Input signal: 15 mV 1000 Hz.

Change the frequency slowly from 1 kHz to mains frequency and check the sapphire movement. At approx. 2 Hz from mains frequency: max. 0.5 mm beat

If necessary adjust P9 and P14 "hum"

Change frequency to around 5 kHz: max. 0.5 mm beat.

If necessary adjust P8 "5 kHz beat"

### 1.11. Sensitivity - Reference

- a. INPUT ATTENUATOR: "0 dB"  
INPUT POTENTIOMETER: "10"  
WRITING SPEED: "100 mm/s" (large figure)  
LOWER LIM. FREQ.: "20 Hz"  
RECTIFIER RESPONSE: "RMS"  
POTENTIOMETER RANGE: "50 dB"
- b.

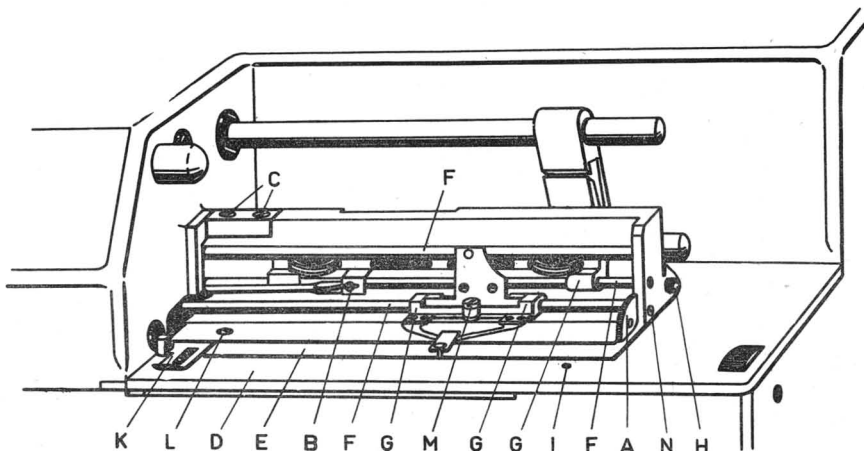
Frequency: 1000 Hz. Adjust the input voltage until the sapphire is on the 0 dB line.

Input voltage: 5 - 6 mV

Adjust the input voltage to exactly 100 mV and adjust INPUT POTENTIOMETER until the sapphire is on the 20 dB line.

Depress "100 mV Ref." button and check the deviation: max. 0.1 dB.

If necessary adjust P2 "100 mV Ref."



**2.1. Writing System**

**a. Cleaning**

Remove writing arm unit cover by pulling cover to the right. Lift stylus mechanically by moving grooved finger cam A clockwise. Remove the driving arm from the lug B. Unscrew the retaining screws C and carefully lift the complete unit off.

With a soft cloth and trichlorethylene remove any wax or waste matter from writing plate D and bottom plate E. Also clean the guide bars F and the guides G. After cleaning pull out pin H and place it in the hole I. Replace writing arm unit and set it so that the distance to pin H is 0.5 mm, thus ensuring that unit is accurately and squarely situated.

**b. Mechanical Friction**

Measure the force necessary to move the writing system only. (Remove the driving arm from the lug B) max.: 40 g. The sapphire should rest on the paper, if the sapphire is lifted mechanically by the finger cam A, the force will be higher.

**c. Paper guide clip.**

POWER: "On"  
MOTOR: "On"  
MOTOR DRIVE: "Start - Forward"  
PAPER SPEED: "30 mm/s" (large figure)  
1:10 gear lever pushed in

Lift stylus mechanically by moving grooved finger cam A clockwise.

Adjust the paper guide clip K by turning screw L to a position where the tension is suitable for a smooth pull-off of paper from roll.

Check that the paper can run at least 30 cm forward and backward several times without the paper tending to catch and thus tear at the perforations.

The screwdriver must be removed for each trial to avoid excess pressure on the clip.

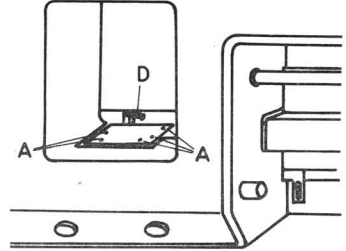
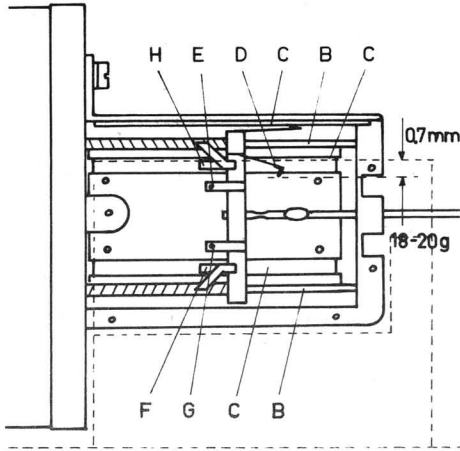
**d. Stylus pressure**

Check that the pressure is 18 - 21 g. If necessary adjust screw M

**e. Adjustment of dB scale**

Set stylus to the position 0 dB on the paper and adjust the screw N for a corresponding reading on the metallic scale.

**ATTENTION:** Under no circumstances should oil be applied to the writing system.



## 2.2. Magnet System

### a. Contact Tracks

When the measuring potentiometer is withdrawn the five screws A and the cover can be removed.

The dust from the teflon tubes B can be removed by means of a soft brush.

Clean the contact tracks C and the contact points with a soft cloth damped with petrol.

### b. Measuring Potentiometer

The silver lamellae on the potentiometer should also be cleaned with petrol and any metallic dust between the lamellae removed with a brush.

After considerable wear it may be desirable to re-grind the slider. D. This is done by placing a piece of the finest glass-paper obtainable between the lamellae and the slider.

The potentiometer has been inserted and the writing system moved to and fro several times.

Then carefully grind the edges of the slider, also by means of fine glass-paper and remove any grinding dust.

### c. Contact Pressure

If the slider has been bent, the contact pressure should be measured.

Place a piece of material, 0.7 mm thick, on the bottom plate and measure the slider pressure at this distance from the bottom plate: 18 - 20 g.

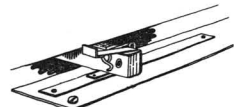
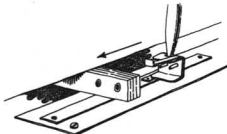
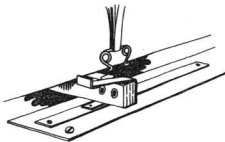
### d. Coil Resistance

Measure the resistance in the coils; Drive coil: (E - F): approx. 2 k $\Omega$   
Feed-back coil: (G-H): approx. 1 k $\Omega$

### e. Mechanical Friction

Measure the force necessary to move the magnet system only (remove the driving arm from the lug B): max. 60 g.

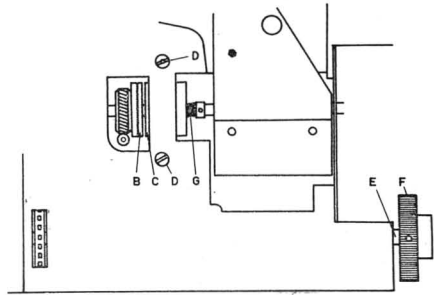
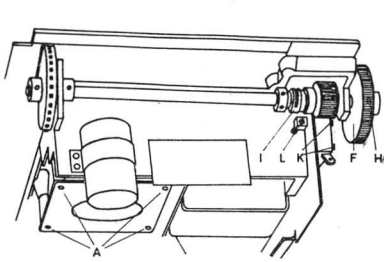
**ATTENTION:** Under no circumstances should oil be applied to the magnet system.



## 2.3. Replacement of the Slider.

Dismount locking spring by use of slim pliers and place the new contact by means of tweezers. Then the locking spring is put into position behind contacts. After replacement re-grind the slider as item 2.2 b.





2.3. Gear Box - Motor

a. Motor

If necessary, loosen the four screws A and fix the motor in a position where it runs smoothly forward and backward.

b. Magnetic Clutch

POWER: "Off"  
MOTOR: "On"  
PAPER DRIVE: "Start"  
PAPER SPEED: "100 mm/s" (large figure)  
1:10 gear lever pushed in

Check that the distance between the clutch disc B and the clutch magnet C is 0.8 - 1.0 mm.

If necessary loosen the screws D and move the clutch magnet to the correct distance.

Switch on the POWER and check that the axle E starts and stops immediately when switching MOTOR DRIVE from "Stop" to "Start" even if the grooved finger wheel F is blocked.

If necessary adjust the pressure of the clutch spring G.

c. Friction Clutch

POWER: "On"  
MOTOR: "On"  
PAPER DRIVE: "Start"  
PAPER SPEED: "100 mm/s" (large figure)  
1:10 gear lever pushed in

Place a pin in the hole H in the grooved finger wheel F and check that the friction clutch slips at a pressure of 150 g measured on the pin 10 cm from the center.

If necessary adjust the pressure of the clutch spring by means of the nut 1.

d. Automatic stop

POWER: "On"  
MOTOR: "On"  
POTENTIOMETER RANGE: "Stand by"  
WRITING SPEED: "1000 mm/s"  
PAPER DRIVE: "Start - forward"  
PAPER SPEED: "10 mm/s" (small figure)  
1:10 gear lever pulled out

When the paper drive has stopped automatically draw a line across the paper by moving the sapphire from 0 to 50 dB.

Depress SINGLE CHART for a short while and when the paper again stops automatically draw another line across the paper.

Switch PAPER DRIVE to "Reverse" and check that the paper drive stops at the first line on the paper.

Tolerance: 0.5 mm

If necessary loosen the two screws K and adjust the screw L until the paper drive stops at the same line for the motor running forward and backward.

e. Lubricating

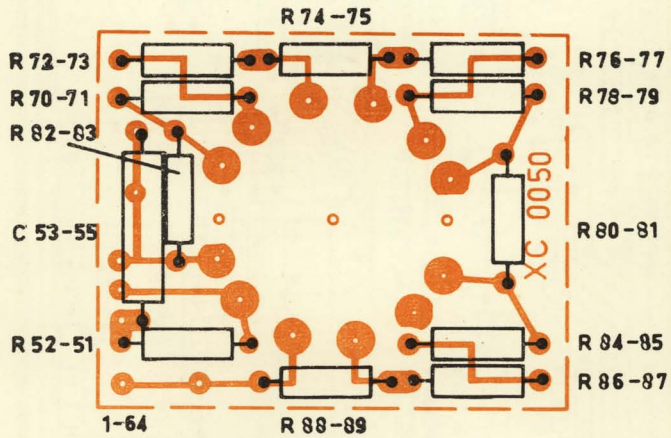
Clean with petrol and lubricate the following parts with a non-acidic machine oil (e.g. sewing machine oil):

Worm and worm drive  
All metal drive wheels  
Moving parts for 1:10 gear shift  
Friction clutch

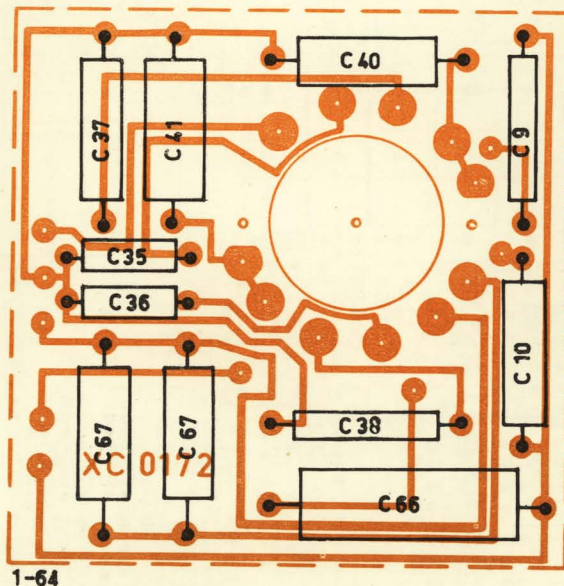
The following parts are not oiled:

Axle bearings (self-lubricating)  
Motor bearings ( " )  
Magnetic clutch  
Nylon wheels  
Pen lifting and marking relays

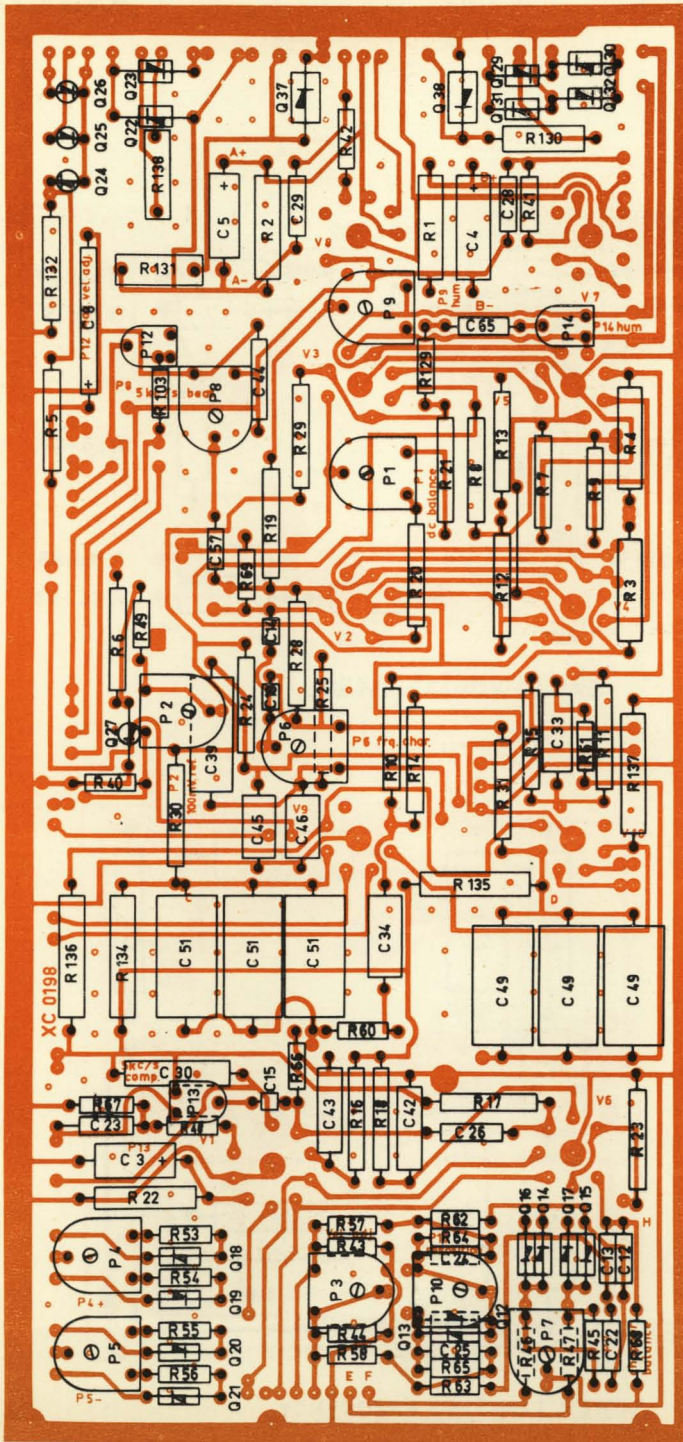


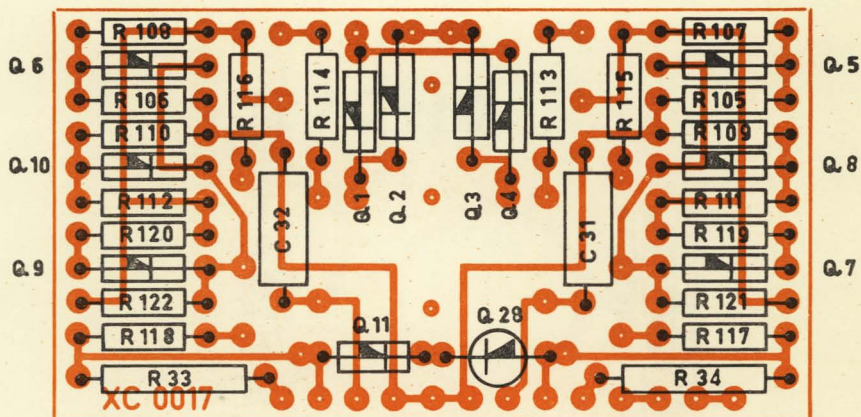


POTENTIOMETER RANGE



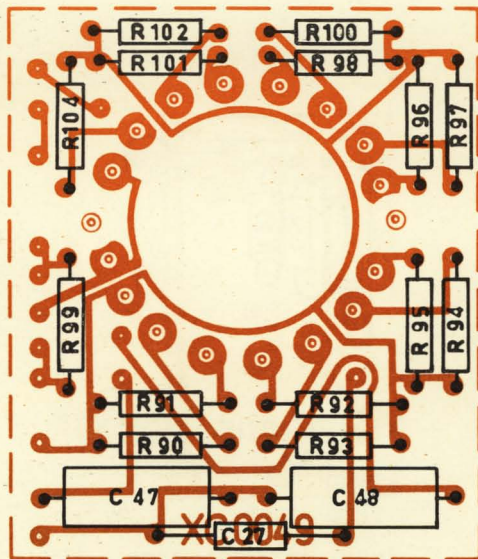
LOWER LIMITING FREQUENCY





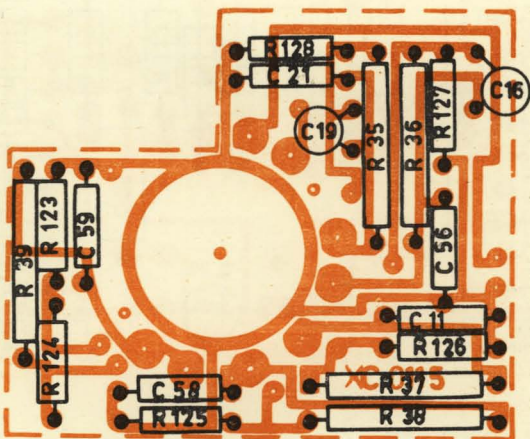
1-64

RECTIFIER RESPONSE

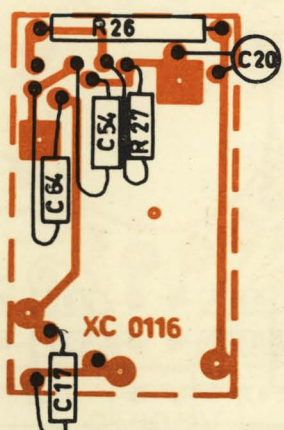


1-64

WRITING SPEED



INPUT ATTENUATOR



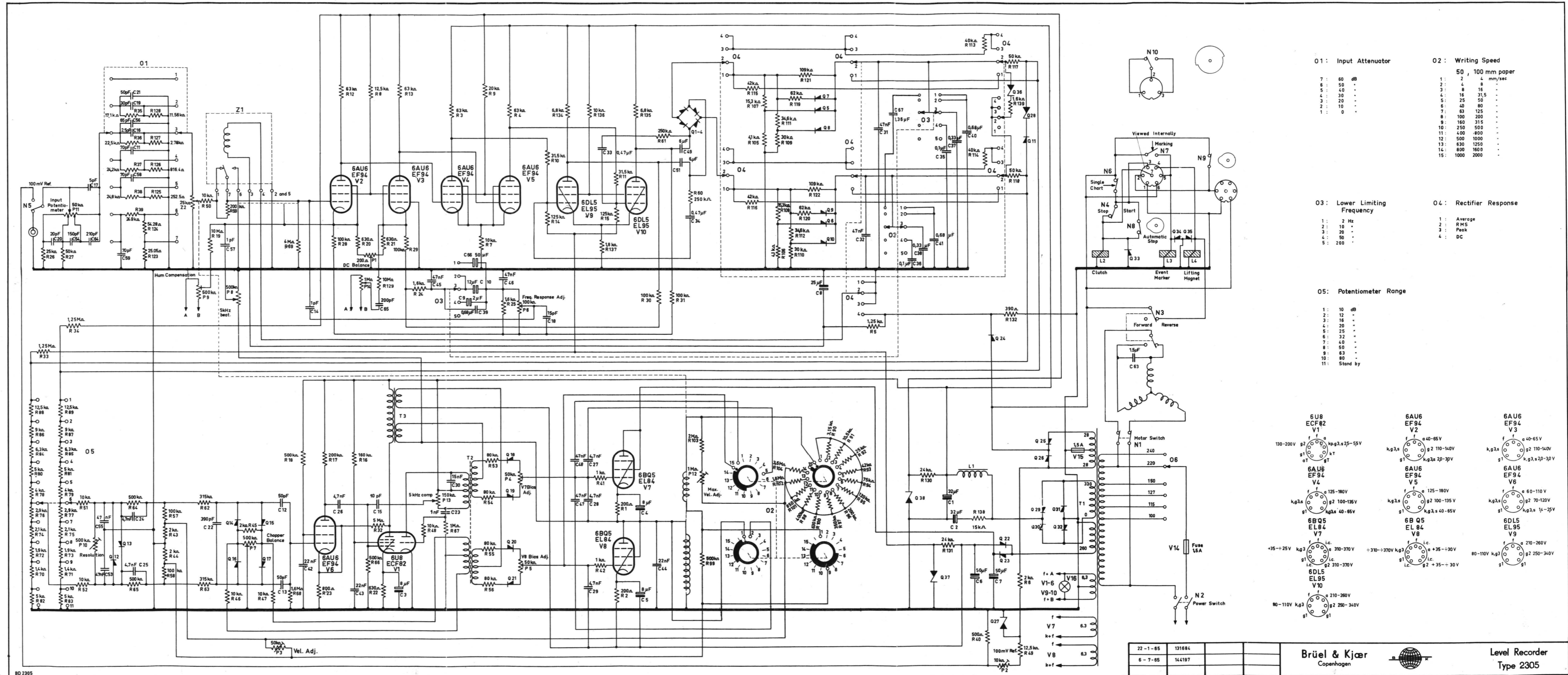
INPUT POTENTIOMETER

valid from serial no.209184

COMPONENT TYPE	STOCK REFERENCE	CIRCUIT DIAGRAM REF.	COMPONENT TYPE	STOCK REFERENCE	CIRCUIT DIAGRAM REF.
<b>CONDENSERS:</b>					
<b>Electrolytic</b>					
"	8 µF/ 25 V	CE 0414	C 3-5		
"	25 µF/ 50 V	CE 8948	C 8		
"	50 µF/450 V	CE 0907	C 6,7		
"	2 x 32 µF/500 V	CE 0908	C 1,2		
" non polarized	12 µF/ 50 V	CE 8959	C 10		
"	50 µF/ 50 V	CE 0505	C 66		
"	2 µF/100 V	CE 8927	C 9		
<b>Ceramic</b>					
" -20 + 50%	390 pF/500 V	CK 0084	C 22		
" " "	1 nF/500 V	CK 0085	C 23		
" " "	1 pF/500 V	CK 0031	C 14, 57		
" " +25%	4.7 nF/500 V	CK 0087	C 24-26		
" " +20%	5 pF/500 V	CK 0034	C 17		
" " +10%	10 pF/500 V	CK 0036	C 15		
" " "	15 pF/500 V	CK 0037	C 18		
" " "	20 pF/500 V	CK 0038	C 20		
" " "	50 pF/500 V	CK 0004	C 12, 13		
" " "	2.5 pF/500 V	CK 0104	C 16		
" " +5%	30 pF/500 V	CK 0105	C 19		
" " "	50 pF/500 V	CK 0058	C 21		
" " "	65 pF/500 V	CK 0106	C 56		
" " "	70 pF/500 V	CK 0025	C 11, 58, 59		
" paper +5%	1.5 µF/250 V	CP 8590	C 63		
" " "	15 nF/400 V	CP 5963	C 30		
" polyester	47 nF/250 V	CS 0009	C 31, 32, 45, 46, 53, 55		
" " "	0.1 µF/250 V	CS 0013	C 35, 36		
" " "	0.33 µF/250 V	CS 0019	C 37, 38		
" " "	0.47 µF/250 V	CS 0021	C 33, 34		
" " "	0.68 µF/250 V	CS 0023	C 39-41, 67		
" " "	3 x 2 µF/250 V	CS 0028	C 49, 51		
" " "	4.7 nF/400 V	CS 0122	C 27-29		
" " "	22 nF/400 V	CS 0105	C 42-44		
" " "	47 nF/400 V	CS 0109	C 47, 48		
" polystyrene +5%	150 pF/125 V	CT 0105	C 54		
" " "	200 pF/500 V	CT 0107	C 65		
" " +2.5%	210 pF/500 V	CT 0231	C 64		
<b>SWITCHES:</b>					
" On-Off		NN 0014	N 1,2		
" Forward-Reverse		NN 0015	N 3		
" Start-Stop		NN 0017	N 4		
" Microswitch for gearbox		NT 0004	N 8-10		
" Microswitch for Ref.		NT 0021	N 5		
" Single chart		NT 0022	N 6		
" Event marker		NT 0023	N 7		
" Input Attenuator		OX 2305	O 1		
" Writing speed		OS 2305	O 2		
" Lower lim. freq.		OT 2305	O 3		
" Rectifier Response		OU 2305	O 4		
" Potentiometer range		OV 2305	O 5		
" Lower voltage selector		JS 0001	O 6		
<b>POTENTIOMETERS:</b>					
" Input wire-wound	50 kΩ lin	PV 3507	P 11		
" Trimmer potm. carbon	200 Ω lin	PG 1201	P 1		
" " "	10 kΩ "	PG 3102	P 2		
" " "	50 kΩ "	PG 3501	P 3-5		
" " "	100 kΩ "	PG 4102	P 6		
" " "	150 kΩ "	PG 4151	P 13		
" " "	500 kΩ "	PG 4501	P 7-10		
" " "	1MΩ "	PG 5102	P 12, 14		
<b>RECTIFIERS:</b>					
<b>Silicon diode (low Cap.)</b>					
"	200 V/o.04A	QV 0022	Q 1-4, 14-17		
"	1000 V/o.15A	QV 0023	Q 11, 22, 23		
"	1200 V/o.15A	QV 0025	Q 25, 26, 29-32		
"	150 V/o.03A	QV 0202	Q 12, 13		
"	275 V/o.03A	QV 0209	Q 18-21		
"	400 V/o.4 A	QV 0300	Q 24		
" Germanium diode	45 V/o.1 A	QV 0078	Q 5, 6		
"	115 V/o.15A	QV 0085	Q 7-10		
<b>RECTIFIERS:</b>					
<b>Zener diode</b>					
"	6.8 V/30 mA	QV 1106	Q 27, 28		
"	150 V/ 5 mA	QV 1317	Q 37, 38		
"	24 V/10 mA	QV 1005	Q 36		
<b>PRECISION RESISTORS:</b>					
<b>Carbon film</b>					
"	1/3 W ±0.5%	RK 25.05 Ω	R 123		
"	"	RK 54.28 Ω	R 124		
"	"	RK 252.5 Ω	R 125		
"	"	RK 81.6 Ω	R 126		
"	"	RK 2.78kΩ	R 127		
"	"	RK 11.56kΩ	R 128		
"	±1%	RK 4.1kΩ	R 105, 106		
"	"	RK 15.3kΩ	R 107, 108		
"	"	RK 30.0kΩ	R 109, 110		
"	"	RK 34.6kΩ	R 111, 112		
"	"	RK 40.0kΩ	R 113, 114		
"	"	RK 42.0kΩ	R 115, 116		
"	"	RK 50.0kΩ	R 117, 118		
"	"	RK 62.0kΩ	R 119, 120		
"	"	RK 109.0kΩ	R 121, 122		
"	1/2 W ±0.5%	RK 17.09kΩ	R 35		
"	"	RK 22.5kΩ	R 36		
"	"	RK 24.21kΩ	R 37		
"	"	RK 24.75kΩ	R 38		
"	"	RK 24.92kΩ	R 39		
<b>RESISTORS:</b>					
<b>Carbon film</b>					
"	1/3 W ±10%	RK 500 Ω	R 40		
"	"	RK 1kΩ	R 41, 42		
"	"	RK 1.6 kΩ	R 139		
"	"	RK 2kΩ	R 43-45		
"	"	RK 10kΩ	R 46-48, 51, 52		
"	"	RK 12.5kΩ	R 49		
"	"	RK 80kΩ	R 53-56		
"	"	RK 100kΩ	R 57, 58		
"	"	RK 200kΩ	R 59		
"	"	RK 315kΩ	R 62, 63		
"	"	RK 500kΩ	R 64-66		
"	"	RK 1MΩ	R 67		
"	"	RK 1.6MΩ	R 68		
"	"	RK 4MΩ	R 69		
"	"	RK 10MΩ	R 129		
"	±5%	RK 2MΩ	R 103		
"	±2%	RK 1.4kΩ	R 70, 71		
"	"	RK 1.9kΩ	R 72, 73		
"	"	RK 2.1kΩ	R 74, 75		
"	"	RK 2.9kΩ	R 76, 77		
"	"	RK 3.15kΩ	R 90		
"	"	RK 4kΩ	R 78, 79		
"	"	RK 5kΩ	R 80-83		
"	"	RK 6.3kΩ	R 84, 85		
"	"	RK 9kΩ	R 86, 87		
"	"	RK 10.5kΩ	R 91		
"	"	RK 12.5kΩ	R 88, 89		
"	"	RK 25kΩ	R 92		
"	"	RK 42kΩ	R 93		
"	"	RK 50kΩ	R 27		
"	"	RK 75kΩ	R 94		
"	"	RK 120kΩ	R 95		
"	"	RK 200kΩ	R 96		
"	"	RK 250kΩ	R 60, 61		
"	"	RK 350kΩ	R 97		
"	"	RK 400kΩ	R 98		
"	"	RK 500kΩ	R 99		
"	"	RK 630kΩ	R 100		
"	"	RK 850kΩ	R 101		
"	"	RK 1.6MΩ	R 102		
"	"	RK 3.5MΩ	R 104		
"	1/2 W ±10%	RK 1.25kΩ	R 5		
"	"	RK 2kΩ	R 6		
"	"	RK 160kΩ	R 16		
"	"	RK 200kΩ	R 17		
"	"	RK 500kΩ	R 18		
"	"	RK 10MΩ	R 19		
"	±5%	RK 10kΩ	R 7		
"	"	RK 12.5kΩ	R 8		

COMPONENT TYPE	STOCK REFERENCE	CIRCUIT DIAGRAM REF.	COMPONENT TYPE	STOCK REFERENCE	CIRCUIT DIAGRAM REF.
<u>RESISTORS:</u>			<u>MISCELLANEOUS:</u>		
Carbon film	1/2 W ± 5%	RK 20kΩ R 9	Mahogany cabinet	KA 2305	
"	"	RK 31.5kΩ R 10,11	Mahogany case for potentiometer	KE 0005	
"	"	RK 63kΩ R 12,13	Dust cover 2305 A	KF 0036	
"	1 W	RK 125kΩ R 14,15	Steel cabinet	KQ 2305	
"	1/2 W ± 2%	RK 630 Ω R 20-22	Choke	LJ 0003	L 1
"	"	RK 800 Ω R 23	DC-AC signal chopper	OC 0269	Z 1
"	"	RK 1.6kΩ R 24,25	Cam disc 180°	OD 0059	
"	"	RK 25kΩ R 26	Cam disc, short pulse	OD 0060	
"	"	RK 100kΩ R 28-31	Cam disc 90°	OD 0061	
"	"	RK 1.25MΩ R 33,34	Bakelite knob	SN 0807	
"	"	RK 2 x 2.5MΩ R 32	Bakelite knob, gear shift	SN 0812	
"	1 W ± 10%	RK 200 Ω R 1,2	Power transformer	TN 9820	T 1
"	± 5%	RK 63kΩ R 3,4	Oscillator transformer	TO 8344	T 2
			Output transformer	TU 8209	T 3
			Writing system, complete	UA 2000	
			Paper guide and roll retainer	UA 2001	
			Gear box complete with motor	UG 0085	
			Motor	UM 0029	
			Pen lifing and event marker unit	UM 0500	
			Magnetic drive system	UM 2305	
			Replacement kit for potentiometer slider	UA 0162	
NTC	1.8 W 15 kΩ	RN 0003 R 138			
Wire-wound	5.5 W 390 Ω	RX 0301 R 132			
"	" 24 kΩ	RX 0404 R 130,131			
"	8 W 1.8 kΩ	RX 0400 R 137			
"	" 6.8 kΩ	RX 0401 R 134,135			
"	" 10 kΩ	RX 0403 R 136			
<u>TUBES etc.:</u>					
Triode, pentode	ECF82/6U8	VA 0014 V 1			
Pentode low micr.	EF 94/6AU6	VA 0070 V 2,3			
"	EF 94/6AU6	VA 0021 V 4-6			
"	EL 84/6BQ8	VA 0023 V 7,8			
"	EL 95/6DL5	VA 0026 V 9,10			
Fuse	1.6A/250 V	VF 0007 V 14,15			
Panel lamp	6.3V/o.3A	V5 8024 V 16			
<u>PRINTED CIRCUIT:</u>					
Rectifier Response		XC 0017			
Writing Speed		XC 0049			
Potentiometer range		XC 0050			
Input Attenuator		XC 0115			
Input Potentiometer		XC 0116			
Lower Lim. Freq.		XC 0172			
Amplifier		XC 0198			
XC 0017 with components		2305 bl. 801			
XC 0049		2305 bl. 807			
XC 0050		2305 bl. 804			
XC 0115		2305 bl. 803			
XC 0116		2305 bl. 808			
XC 0172		2305 bl. 806			
XC 0198		2305 bl. 800			
<u>MISCELLANEOUS:</u>					
Power cord, eur.		AN 0005			
Power cord USA		AN 0006			
Panel lamp housing		DB 0338			
Polar recording pin		DB 0340			
Bakelite foot for cabinet		DF 7000			
Nylon gear wheel 22-22 f. 50 Hz		DG 0233			
Nylon gear wheel 20 f. 60 Hz		DG 0232			
Nylon gear wheel 24 f. 60 Hz		DG 0234			
Event marker pen		DH 2000			
Recording pen		DH 2001			
Event marker stylus		DH 2002			
Recording stylus		DH 2003			
Paper cutters		GV 0183-0424			
Coaxial input socket		JJ 0116			
2-channel input socket		JJ 4700			
Remote control socket		JJ 4705			
Panel lamp socket		JO 0001			
Coaxial input plug		JP 0018			
2-channel input plug		JP 4701			
Remote control input plug 6-pin		JP 4705			
Remote control input plug 7-pin		JP 4707			
Fuse socket, 24 V system		JS 0007			





**O1: Input Attenuator**

7:	60 dB
6:	50 "
5:	40 "
4:	30 "
3:	20 "
2:	10 "
1:	0 "

**O2: Writing Speed**

1:	2	4	mm/sec
2:	4	8	"
3:	8	16	"
4:	16	31.5	"
5:	25	50	"
6:	40	80	"
7:	63	125	"
8:	100	200	"
9:	160	315	"
10:	250	500	"
11:	400	800	"
12:	500	1000	"
13:	630	1250	"
14:	800	1600	"
15:	1000	2000	"

**O3: Lower Limiting Frequency**

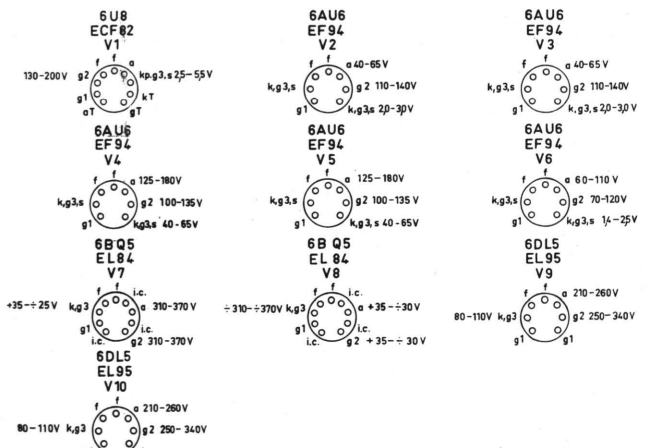
1:	2 Hz
2:	10 "
3:	20 "
4:	50 "
5:	200 "

**O4: Rectifier Response**

1:	Average
2:	RMS
3:	Peak
4:	DC

**O5: Potentiometer Range**

1:	10 dB
2:	12 "
3:	16 "
4:	20 "
5:	25 "
6:	32 "
7:	40 "
8:	50 "
9:	63 "
10:	80 "
11:	Stand by



22-1-85	131684
6-7-85	144197