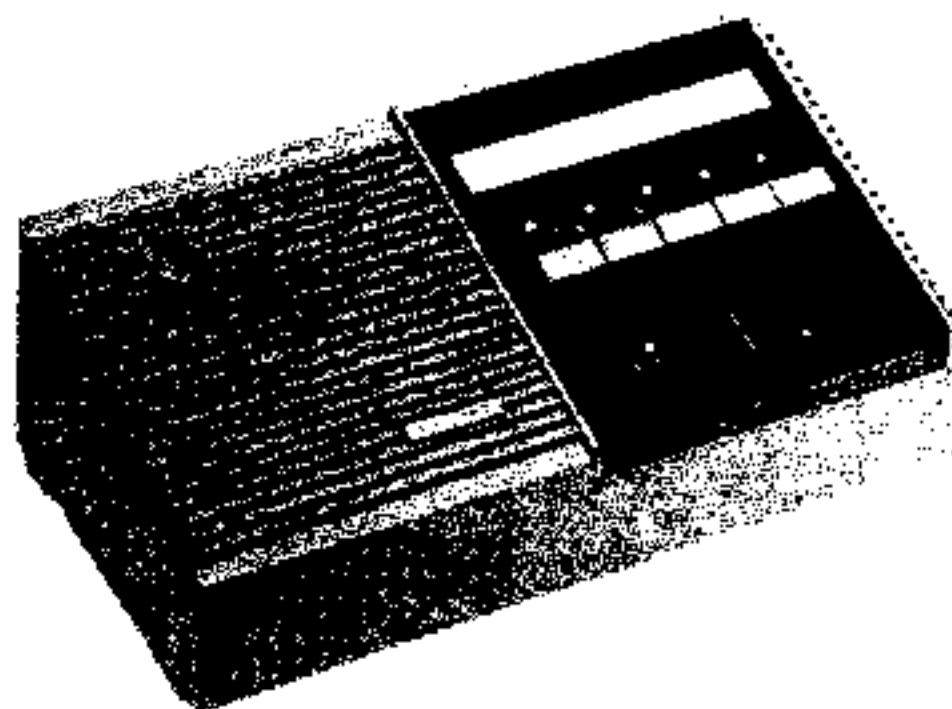


**PHILIPS**

*Service*

Met dank aan Hans van der Marel

**ELA  
AMPLIFIERS**



**EL 7322/02**



GENERAL

Specification

The main station EL 7322/02 has been designed to form a speech connection with 3 sub-stations EL 7324/00 and 2 other main stations EL 7322/02 via 2 and 4 wires respectively. The main station EL 7322/02 can be extended with the extension box EL 7329/00 for 5 additional sub-stations or with the extension box EL 7330/00 for 15 additional sub-stations.

The mains supply unit EL 7328/00 can be used instead of the battery supply in the battery space.

The maximum distances which can be bridged depend on the diameter of the wires. The maximum admissible resistance (there and back) of the lead may be 10 Ω.

If one allows the pilot lamps not to work, the maximum admissible resistance in the lead can be increased to 40 Ω.

Figures

- Fig. 1      Diagram of amplifier unit  
"    2      Circuit diagram  
"    3      Printed circuit plate amplifier (2 types, A and B)  
"    4      Top view  
"    5      Bottom view (opened)

Technical data

- Dimensions                   : 10" x 5 $\frac{3}{4}$ " x 3 $\frac{3}{4}$ " (250x135x90 mm)  
Weight                       : 2 lbs 13 oz (1.25 kg)  
Supply                         : Dry cells 3x 1.5 V 34x60 mm (1 2/8 x 2 2/8")  
                                      280 - 450 mA  
Power output                 : 200 mW at maximum 10 % distortion  
Impedance                     : Input and output 5 Ω

SERVICE INFORMATION														
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- Noise level : better than -50 dB
- Transistors : TS1, 2 OC75  
TS3 OC72  
TS4 OC26
- Lamps : Indication lamps LA1...6, 2 V, 60 mA  
D 115 03/60 mA, 2 V
- Connections : 3 sub-stations EL 7324/00 and 2 main stations EL 7322/02. The "K" connections in Fig. 1 serve to connect the extension boxes EL 7330 or EL 7329. EL 7328/00 fits in the battery space.

Operation of sub-stations

- I. By depressing the selector push-buttons (Fig. 5, SK1, 3...5), the main station brings about a connection with one of the 3 sub-stations.
- II. After the speech/listening button (SK2, Fig. 4) has been depressed, the main station can speak with the chosen sub-station.
- III. If the listening sub-station wishes to interrupt the main station, the sub-station may depress its push-button whereby the pilot lamp (LA6, Fig. 4) on the main station starts burning without the sub-station missing anything of the conversation.
- IV. If, during this conversation, another sub-station calls, the corresponding lamp on the main station (LA3...5, Fig. 4) starts burning, as well as pilot lamp LA6.
- V. If, in the rest position, a sub-station calls the main station, the amplifiers works as an oscillator and the main station is warned by a whistling tone and by one of the pilot lamps LA3...5. The sub-stations can be connected independently of each other to the main station "private" (P) or "non-private" (N.P.).
- VI. If the sub-station is connected "non-private", the sub-station can be overheard by the main station; but at the same time, the sub-station need not depress its push-button to reply to the main station.
- VII. If the sub-station has been connected "private" the sub-station cannot be overheard, but the sub-station should depress its push-button in order to be able to reply.

Operation of main-stations

- VIII. When calling up, depress the key for the desired main set. The call-up signal then sounds in this set and a lamp lights up.
- IX. For answering the call, depress the key below the lamp that is alight and next the speech/listening key.
- X. For talking depress the speech/listening key.  
For listening release the speech/listening key.
- XI. At the end of the conversation pull the red reset key on both sets forward for a short time and next release it. The depressed key then jumps back and the sets are ready again for the next call.
- XII. If an engaged main set is called up, on this set only the lamp

above the key of the caller lights up; there is no signal.

Description of diagram (see also "Operation of sub-stations")

- sub. I One of the five selector push-buttons is depressed (for instance, SK1-1).  
 In Fig. 1 contacts A1, B1, C1, D1 and E1 belong to the same push-button SK1-1. A2, B2, C2, D2 and E2 to SK1-2 and so on.
- A. The amplifier can only work when Rb is connected to earth. The "+" connection of the amplifier is taken as earth. If Rb is not connected to earth, TS1 cannot carry current and therefore not amplify either.  
 The "non-private" connected sub-station is connected to earth via the A switch.  
 With the "private" connected sub-station, R6 is connected to Vi.  
 As soon as Vi is connected to earth, TS1 is able to operated.
- B. SK1-B connects one connection of the chosen station to earth and disconnects all other stations from earth.
- C. SK1-C disconnects the other connection of the chosen station from the common line which is connected to earth and connects the other stations to R18 (battery negative).
- D. Vu is disconnected from Vi so that calling stations do not cause oscillation (no whistling tone).
- E. The positive side of the supply is connected to earth, so that the amplifier is switched on.
- sub. VI The "non-private" connected sub-station is now connected between Vi, SK2-listening D3, sub-station loudspeaker, C1, C2 (in sub-station) via B3 to earth. Each signal of the sub-station is therefore applied to the amplifier input. Rb is connected to earth via A3. The amplifier has been switched on by E3. Vu is connected to the loudspeaker on the main station via SK2-L. The main station can therefore overhear the sub-station.
- sub. VII If the sub-station is connected "private", Rb is not connected via A3 to earth, but to Vi. Vi is connected via SK2-L, D3 and sub-station loudspeaker but further, no connection exists until the sub-station depresses its push-button and Vi is further connected to earth via B3. Vi is now connected to earth via various electrical parts and therefore, Rb as well. TS1 can now operate and the main station can hear the sub-station.
- sub. II With the selector push-button depressed, the speech/listen knob SK2 is pressed down. SK2 is now in the speech position (Fig. 1). LS1 is now connected to Vi. Vu is connected to earth via SK2-S, D3, sub-station, B3.  
 So the sub-station hears the conversation.

- sub. III Sub-station 3 wishes to interrupt the main station and presses the push-button. Earth is now connected to VU via B3, sub-station push-button, sub-station loudspeaker. D3, SK2-S. LA6 now burns.
- sub. IV If sub-station 5 depresses its push-button whilst the main station speaks with sub-station 3, the positive supply is connected to the negative supply via R20, LA5, sub-station 5, C5, contact C3, LA5 starts burning.

Interconnection of the main sets

Main station I	Main station II	Main station III	
1A	_____	1A	
1B	_____	1B	
1C	_____	1D (!)	
1D	_____	1C (!)	
<hr/>			
2A	_____	2A	
2B	_____	2B	
2C	_____	2D (!)	
2D	_____	2C (!)	
<hr/>			
	2A	_____	1A
	2B	_____	1B
	2C	_____	1D (!)
	2D	_____	1C (!)

Checking measurements

Remove the bottom plate.  
 Undo the solder-connections at -, +, Vi, Vu, Rb.  
 Connected Rb to +.  
 Load the output by connecting a 5 Ω resistor between Vu and +.  
 Connect the supply between - and + (4.7 V).  
 Set volume control R1 to maximum.  
 Connect a voltmeter, range 1 V, to the output.  
 Apply a signal of 1000 c/s, about 3 mV, to the input, so that 1 V is indicated on the voltmeter.  
 Collector-emitter d.c. voltages are given in Fig. 1. The signal voltage is measured with respect to earth, tolerance ± 20 %.

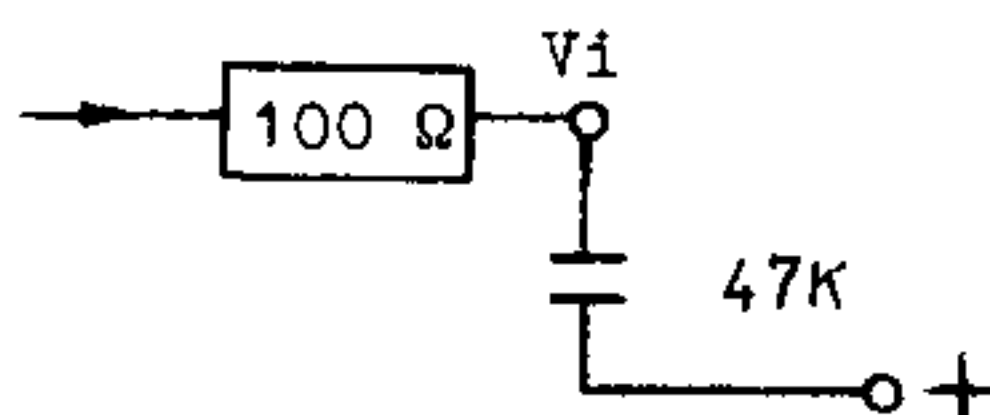
### Replacement of parts

If one of the lamps must be replaced, the transparent plastic covering plate should be removed. Remove the 4 screws so that the lamps can be unscrewed.

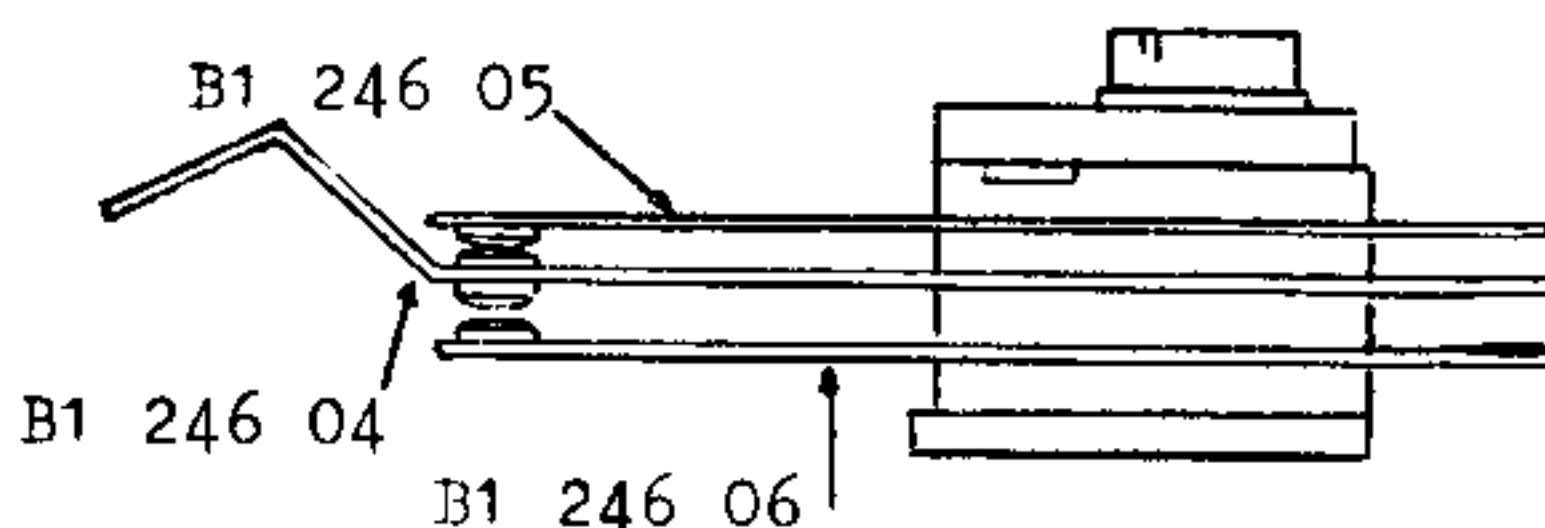
The print-plate can be pulled out of the casing for possible repairs or measurements.

The volume control can be adjusted through a hole in the rear cover. See Fig. 5 for "privat/non-private" connection of the sub-stations. Wire a3 can be soldered to line P or NP so that sub-station 3 is connected "private" or "non-private". In the same way wire a4 for sub-station 4 and so on. When the EL 7322 is delivered, all sub-stations are connected "private". The printed unit of the EL 7322 can be distinguished from the printed unit of the EL 7320 because a white dot is marks the print of the EL 7322. (EL 7320 has a red dot.)

In the neighbourhood of Powerful transmitters it may happen that interference is experienced from the transmitter signal. To pre-vent this it is recommended to mount the RC filter on the amplifier terminals.



Spring assembly SK2:



### List of mechanical parts

#### Code number

#### Description

V3 114 55	Casing
V3 137 75	Switch knob SK2
V3 578 84	Switch unit SK1
V3 131 45	Cover battery space
V3 486 94	Covering plate
967/24	Connection strip
2x V3 285 66	Slide in rails (in new casing)
4822 202 01064	Connection plate

LS1	940/AD3514X					
L1	V3 591 71					
C1	909/W2.5	2 $\mu$ F	10	V		
C2	909/C25	25 $\mu$ F	25	V		
C3	909/X4	4 $\mu$ F	4	V		
C4	4822 069 00547	25 $\mu$ F	4	V		
C5	909/C25	25 $\mu$ F	25	V		
C6	909/W80	80 $\mu$ F	6.4	V		
C7	909/W2.5	2 $\mu$ F	10	V		
C8	909/C25	25 $\mu$ F	25	V		
C9	909/C25	25 $\mu$ F	25	V		
C10	909/U400	400 $\mu$ F	6.4	V		
C11	4822 069 00934	2500 $\mu$ F	6.4	V		
C12	909/X4	4 $\mu$ F	4	V		
C13	909/T640	640 $\mu$ F	2.5	V		
R1	E 097 AC/5K	5000 $\Omega$				
R2	902/P5K6	5600 $\Omega$	10	%	0.25	W
R3	902/P1K5	1500 $\Omega$				
R4	902/P1K	1000 $\Omega$				
R5	902/P330E	330 $\Omega$				
R6	902/P470E	470 $\Omega$				
R7	902/P1K	1000 $\Omega$				
R8	902/P56K	56000 $\Omega$				
R9	902/P1K	1000 $\Omega$				
R10	902/P330E	330 $\Omega$				
R11	902/P3K3	3300 $\Omega$				
R12	902/P1K2	1200 $\Omega$				
R13	902/P220E	220 $\Omega$				
R14	902/P150E	150 $\Omega$				
R15	902/P47E	47 $\Omega$				
R16	902/P150E	150 $\Omega$				
R17	902/P39E	39 $\Omega$				
R18	902/P15E	15 $\Omega$				
R20	902/P10E	10 $\Omega$				
R21 +	902/P22E	22 $\Omega$				
R25						
R26	902/P82E	82 $\Omega$				
R27	901/W3E	3 $\Omega$	5	%	0.6	W

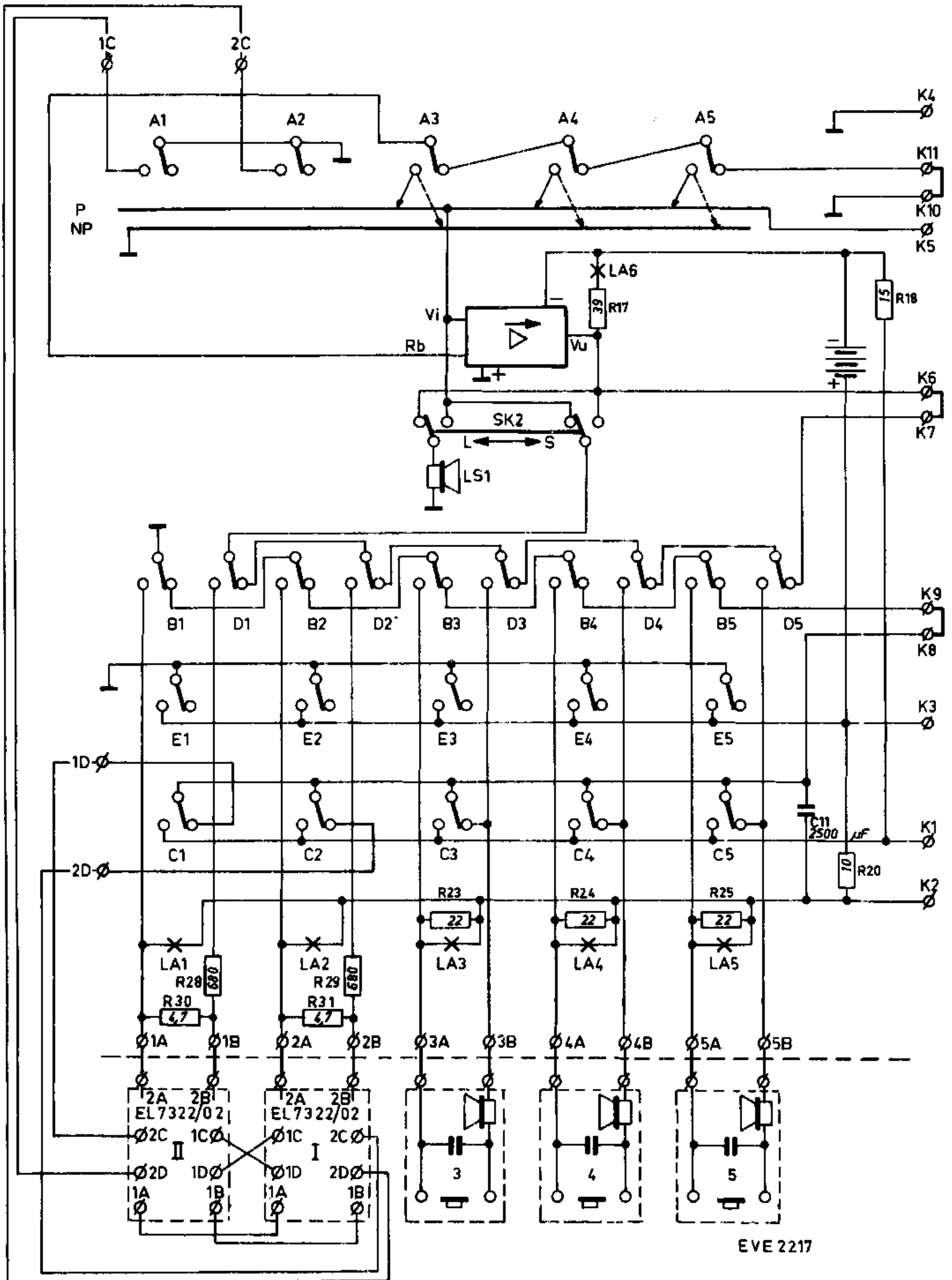
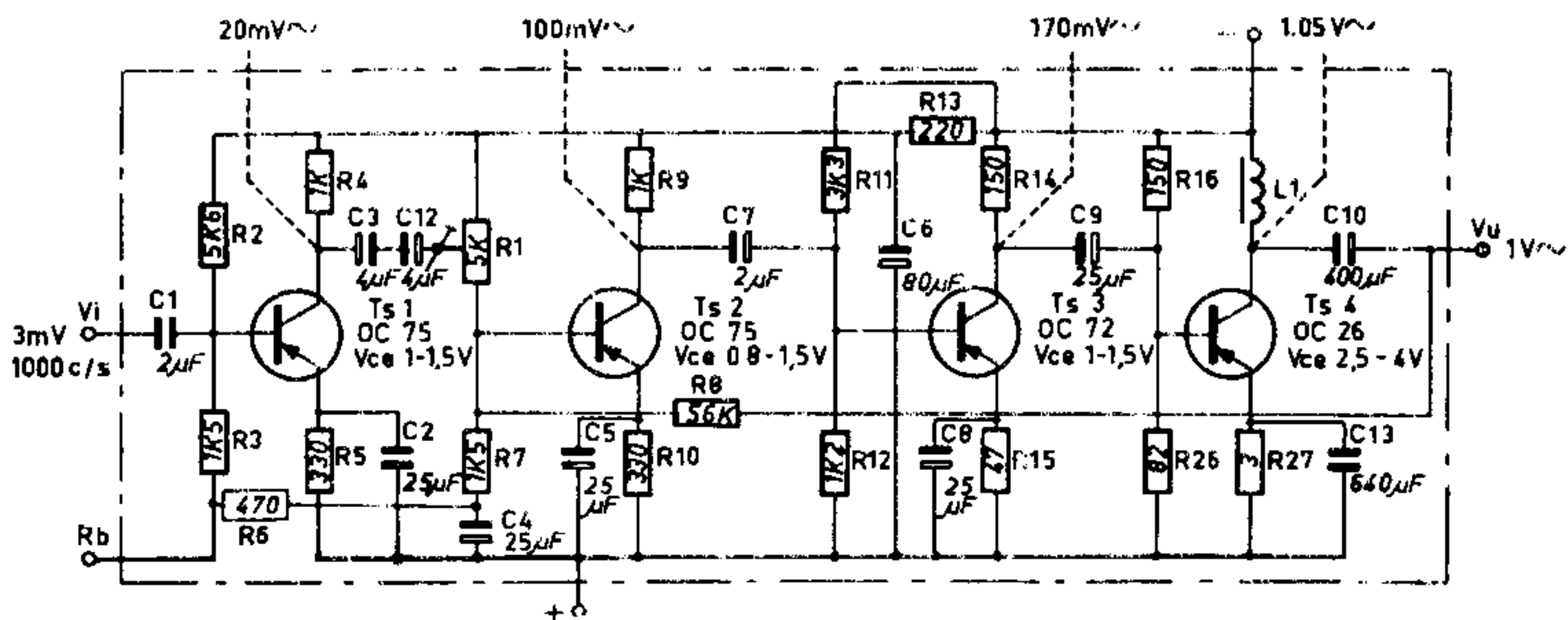


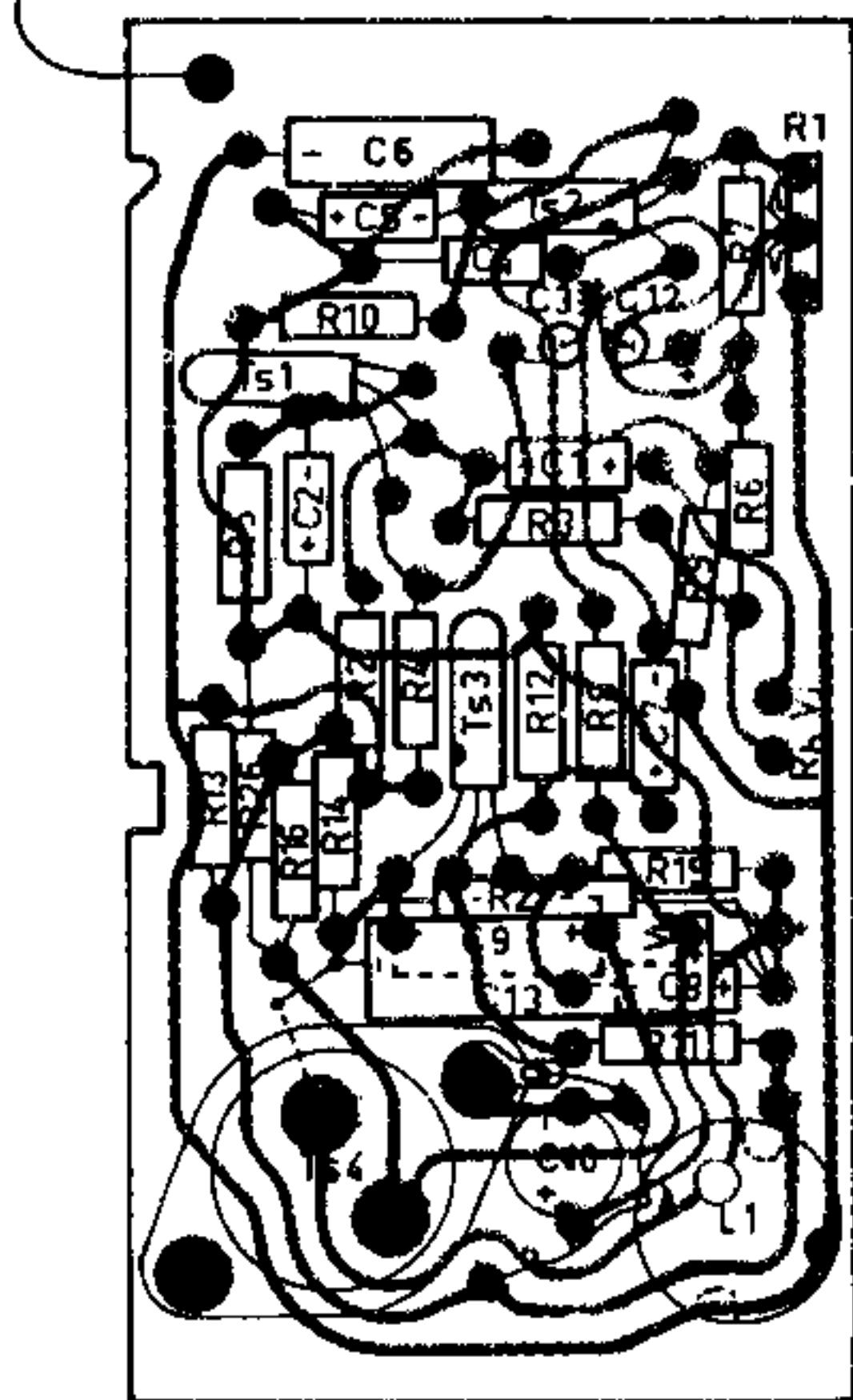
Fig. 1



C33980 A

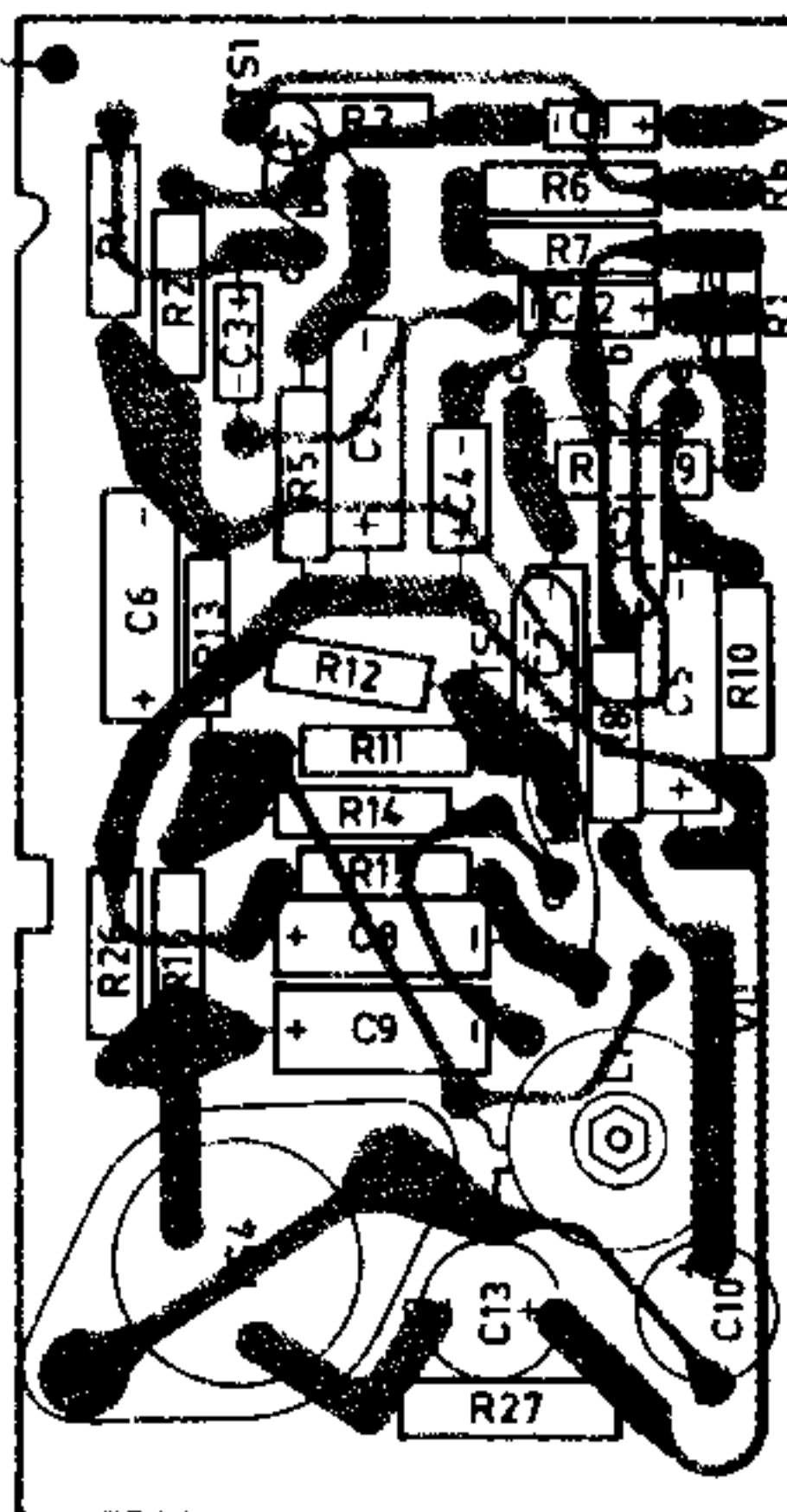
Fig2

WHITE DOT  
 WITTE STIP  
 POINT BLANC  
 WEISSER PUNKT  
 PUNTO BLANCO



C33981

A

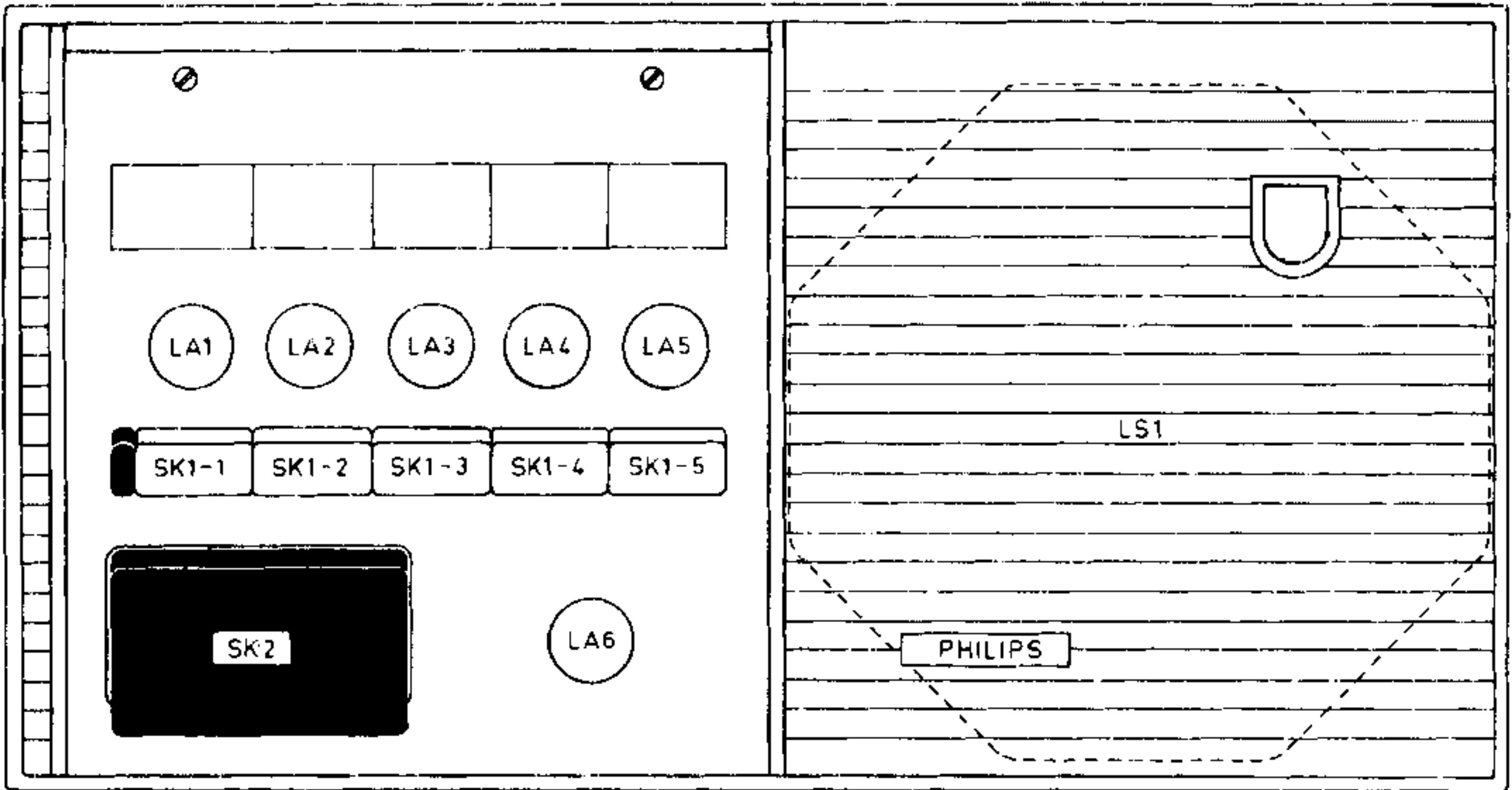


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B

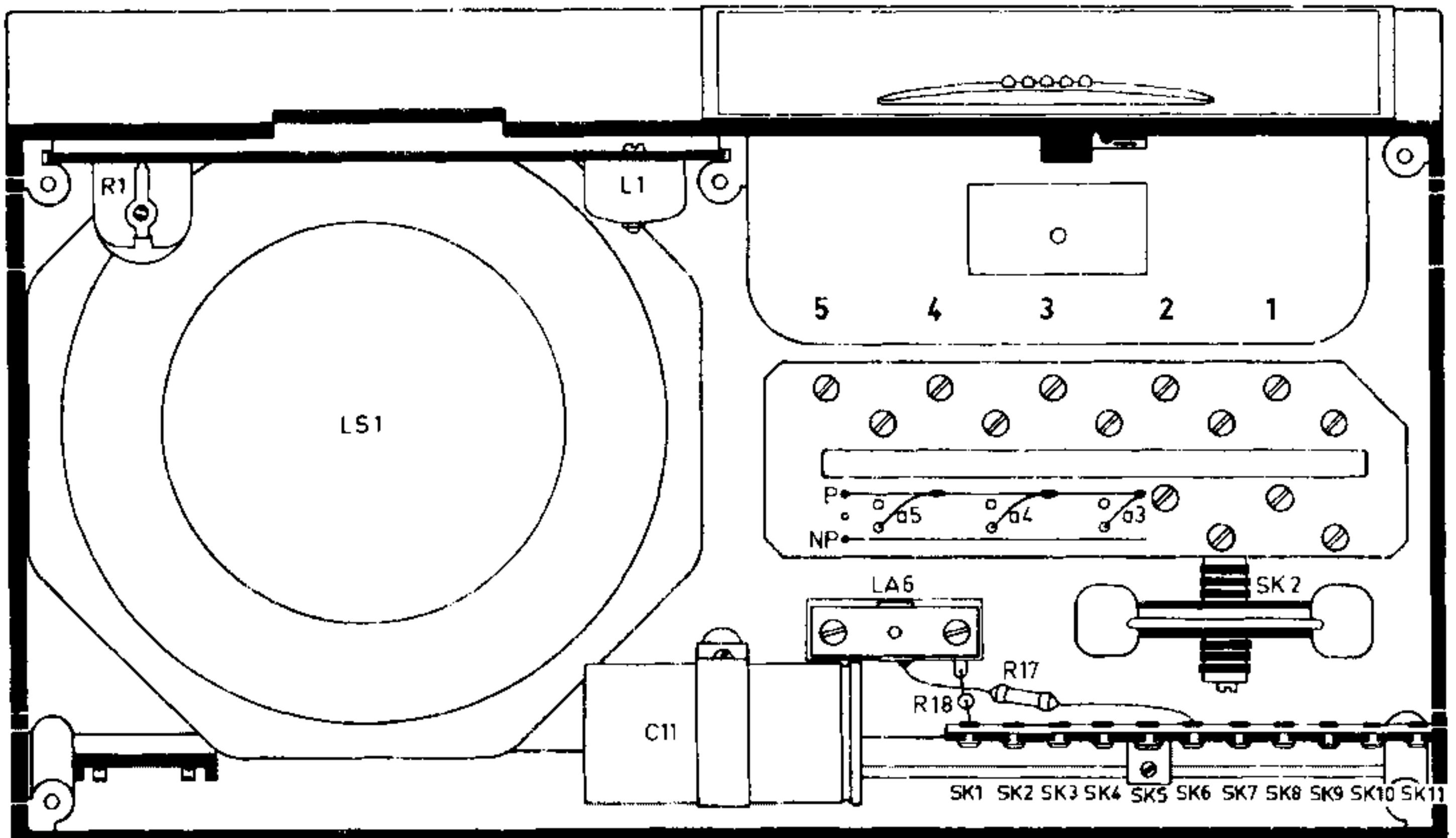
Fig3





C34238

Fig. 4



EVE2268

Fig. 5