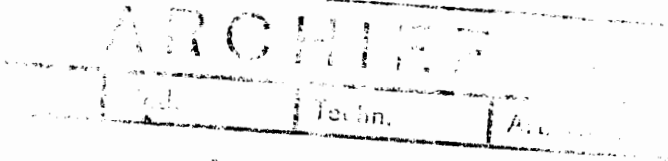


PHILIPS

Service

**ELA
AMPLIFIERS**



9 000,000

EL 6466 / 00



Pre-amplifier to be mounted in a 19" rack and to be used in combinations with the final amplifier EL 6416 (35 W) or EL 6426 (70 W)

General

Fuses

VI.4 R 152 JB/DO,14

Valves

B¹ 2, 2 EF86
B4 EM84

Lamps

LA1 dial light 6 V 3 W 6843
LA2 limiter 12 V 3 W 129 10

Dimensions

Width : 19" (482 mm)
Height : 7" (178 mm)
Depth : 6" (150 mm)

Weight

With valves and plugs EL 6820 8 lbs 6 onz. (3.75 kg.)

Figures

- Fig. 1 Schematic diagram
- Fig. 2 Top view
- Fig. 3 Front view
- Fig. 4 Frequency characteristic
- Fig. 5 Frequency characteristic tone controls
- Fig. 6 Unit B
- Fig. 7 Unit C

| | | | | | | | | | | |
|---------------------|--|--|--|--|--|--|--|--|--|--|
| SERVICE INFORMATION | | | | | | | | | | |
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Technical data

Power supply

The supply must be taken from the final amplifier. The connections are shown in fig. 1.

| | | | |
|--------|-----|-------|-------|
| e - f | ~ | 6.3 V | .6 A |
| e - d | ~ | 6.3 V | .71 A |
| o - + | --- | 180 V | 4 mA |
| o - ++ | --- | 250 V | 1 mA |

Input sensitivity (for nominal output voltage)

| | |
|------------------|-------------------|
| channels 1 and 2 | 6.5 mV \pm 20 % |
| channels 3 and 4 | 170 mV \pm 20 % |

Remark: on channels 1 and 2 signal of $36\frac{1}{2}$ mV is tolerable with volume controls turned down. Distortion is then doubled.

Input impedance

| | | |
|------------------|--------------------------|----------------------|
| channels 1 and 2 | between 30 and 15000 c/s | 1 to .2 M Ω |
| channels 3 and 4 | between 30 and 15000 c/s | .22 to .1 M Ω |

On channels 3 and 4 input impedance $>$.25 M Ω when the volume controls are half way up.

Distortion

Between 60 and 15000 c/s $\frac{1}{2}$ %.
(measured with $R_u = 100$ k Ω and $V_u = 250$ mV).

Output internal resistance

| | |
|---------------------------|---------------------|
| Between 500 and 15000 c/s | 67 - 36 k Ω |
| Between 30 and 15000 c/s | 300 - 36 k Ω |

Hum and noise

Ref. 250 mV on 100 k Ω (EIA standard)
 channels 1 and 2 shorted, 3 and 4 open
 channels 1 and 2 - 56 dB
 channels 3 and 4 - 68 dB

Limiter

(in combination with final amplifier EL 6416 or EL 6426)
 commences at about -5 dB at 1000 c/s.
 Protects the amplifier up to an increase of input signal of 37 dB above normal input.

Operation

The power supplies are switched on at the final amplifier, indicated by a red lamp on the front panel.
 All controls are brought out to the front panel.

From left to right: (see fig. 3)

1. Pre-set volume controls for channels 1 and 2, covered by plastic plugs.
2. Speech/music characteristic switch
With switch up - straight characteristic (curve A, fig. 4)
With switch down - low notes are decreased (about 22 dB at 30 c/s) (curve B, fig. 4)
3. Volume control channel 1
4. Volume control channel 2
5. Volume control channel 3
6. Volume control channel 4
7. Low note tone control at position 0 straight characteristic
8. High note tone control at position 0 straight characteristic
9. Indicator for output level, when the green columns close, maximum level.
10. On/off switch limiter.

If the apparatus is to be used irregularly in a moist place, the amplifier should be switched on half an hour before use to dry out. Hum and noise level will be smaller.

Parts issued with pre-amplifier

- 5 shorting plugs EL 6820
- 6 plastic protection caps P5 648 44/931

Parts which can be ordered extra

| | | |
|---|--------------------------|------------|
| Plug in transformer | 50 to 25000 Ω | EL 6805/01 |
| Cable transformer | 50 to 25000 Ω | EL 6806/00 |
| Plug in transformer | 500 to 500 Ω | EL 6807/00 |
| Plug in transformer | 4000 to 4000 Ω | EL 6808/00 |
| Plug in pre-amplifier | straight characteristic | EL 6825/00 |
| Plug in pre-amplifier | with low notes reduced | EL 6825/01 |
| Plug in pre-amplifier | with RIAA characteristic | EL 6827/00 |
| Plug in kathode follower in output socket | ⑤ | EL 6828/00 |

Remark: Indications underneath the potentiometers can be replaced by a blank piece of paper by removing the spring underneath the chassis.

Use of plug-in nuts

If no plug-in units are used, the shorting plugs EL 6820/00 or /01 must be used in the 4 input sockets.

Channels 1 and 2

Plug in transformers EL 6805 for low impedance microphones. Pins 1 and 2 are then free from earth.

Channels 3 and 4

- plug-in separation transformer EL 6807
 - plug-in separation transformer EL 6808
- pins 1 and 2 are then free from earth

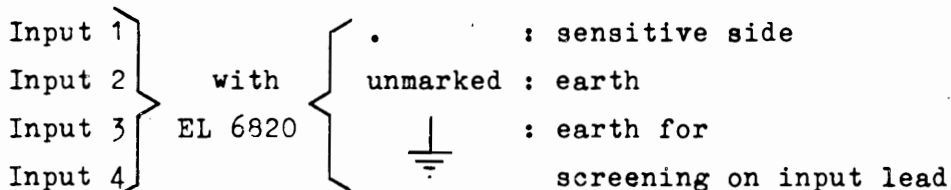
- plug-in pre-amplifier with straight characteristic EL 6825/00
with low notes cut EL 6825/01
- if with EL 6825/00 or 0/1 a low impedance microphone is to be used, use cable transformer EL 6806/00 close to the input plug.
- plug a pre-amplifier EL 6827/00 for use with low impedance dynamic pick-up. The EL 6827/00 has RIAA characteristic for minigrove records input impedance is approx. 50 kΩ.
- plug in transformer EL 6805/01
The input is now usable with a 50 Ω microphone to be spoken into very close.

In the output socket ⑤ can be used:

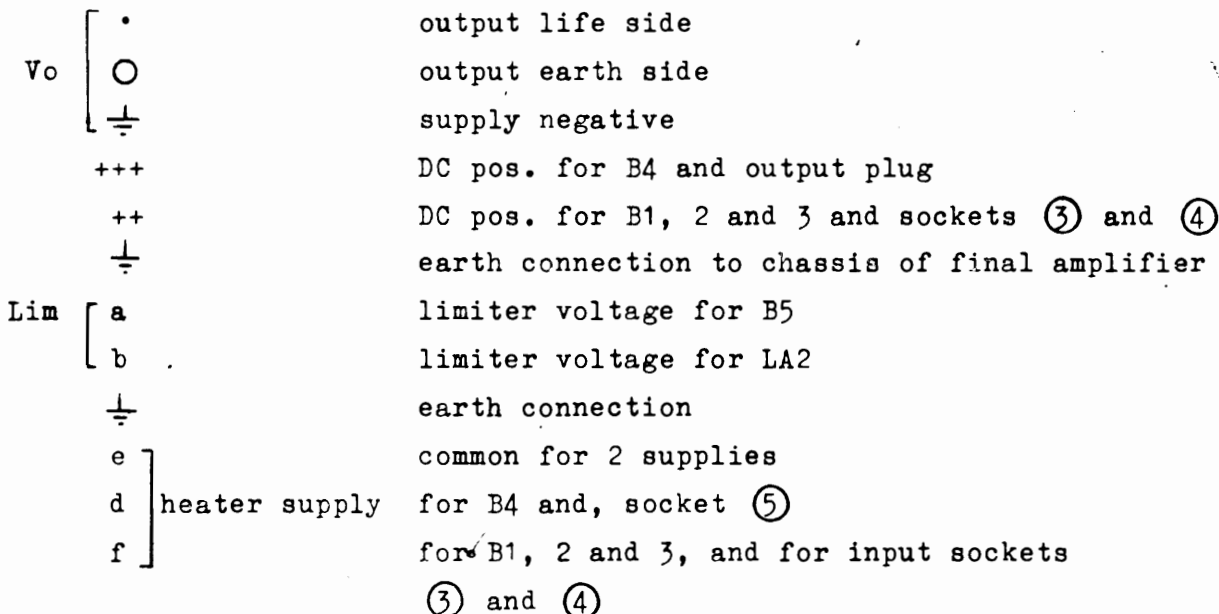
- shorting plug EL 6820 if no other unit is used.
- cathode follower EL 6828/00 in case a low impedance output is required, i.e. when a long cable is used to the input of the final amplifier.

Connections

On the left hand side of the pre-amplifier a screw-down connection strip with cover from left to right:



On the right-hand side of the pre-amplifier, a screw-down connection strip from left to right:



Circuit description

The inputs are connected to the sockets for the plug in units. On channel 1 (2) the signal from B1 (B2) is applied via switch SK1 (SK2) to R1 (R2) and to R3 (R4) to the input of B3 via C6. R1 is a screw-driver adjustment. With the sliding potentiometer R3 in the maximum position, turn R1 down until no acoustic feedback can be heard.

The same can be done with R2 and R4. SK1 and SK2 switch from music position (A) fig. 4 to speech (B fig. 4). The low notes are cut to make speech more intelligible. After amplification in B3, the signal is applied to the tone controls R8 and R7, and via socket (5) to the output terminals. The final amplifier supplies the filament and HT voltages. The final amplifier also supplies the voltage to operate the level indicator, and the limiter. For the limiter, a voltage is applied across LA2, R9, R56 and SK3, LA2 will light if the current is big enough. This light will fall on photo resistor R24. The resistance of R24 will drop, and part of the input voltage to B3 is shorted to earth. Another voltage is fed back from the anodes of the final amplifier via neon tube B5. B5 lights, if the output voltage is high enough, light from B5 will fall on R24.

Light output from B5 reacts much faster than from LA2. B5 takes care of sudden peaks of short duration, while LA2 reduces long term overloads. R9 is used to set the sensitivity of R24. This has been done in the factory, and unless R24 has been replaced, R9 should not be touched.

Replacement of parts

General: As printed wiring is used in this amplifier it is recommended:

- to use multicore solder 60-40.
- not to use a soldering iron with too small a bit to avoid local overheating.
- not to move the soldering iron to and fro to heat a bigger area, as scratching may damage the copper foil.
- to use a stiff brush to remove molten solder (hard toothbrush, no nylon)

when removing valve holders and screens, to heat the pins one by one whilst brushing away the molten solder.

While the pins are hot to bend them inwards with the aid of a small sharp screwdriver. Finally the part can be loosened carefully.

- when replacing resistors and condensers, to cut the wire close to the part body. Tin the remaining wires well, and solder the new part with the aid of soldering springs to the wires. The springs should rest against the plate.
- when replacing electrolytic capacitors, fastened with twist lugs - to remove the solder from these lugs, twist them back and cut as close to the body as possible.

Measurements

In fig. 1 all voltages and measuring points are indicated.

The letter indicates the measuring point, see also fig. 7 (unit C). The top value is the DC voltage, the bottom value is the AC voltage with an input of 1000 c/s.

For this measurement:

1. Let the pre-amplifier drive an EL 6426.
2. Put screwdriver potentiometer at maximum on channel 1, slide the volume control channel 1 to maximum.

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3. Put speech/music switch up.
 4. Switch off the limiter.
 5. Use shorting plugs EL 6820.
 6. Switch the output to 100 V.
 7. The output of the EL 6426 should be loaded with 143 Ω 70 W induction free.
 8. Put the tone controls at 0 (midway)
 9. Connect an AC voltmeter across the output load.
- DC 10. Now check all DC voltages.

- AC Follow points 1 through 9.
10. Insert a signal of approx. 4 mV 1000 c/s in the input. The voltmeter on the output should indicate approx. 100 V.
 11. Reduce the input signal, until the output voltage has dropped to 30 V.
 12. Now check the stage gain at the points indicated.

Check limiter

To adjust R9, after replacement of R24; set up as above and switch the limiter on. Insert a signal of 400 mV 1000 c/s in channel 1. Adjust R9 so that 100 V 1000 c/s is measured across the load.

| | | | |
|----|-------------------------|------------------------------|----|
| 2 | P5 648 49/HA | Closing plug | XX |
| 3 | P5 648 51/TC | Potentiometer cap red | XX |
| 4 | | Red/Brown | XX |
| 5 | P4 645 41/AA | Opening EM84 | XX |
| 6 | 976/9x12 | Valve base EM84 | X |
| 7 | V3 329 62 | Instruction plate | XX |
| 8 | P5 648 44/AB | Clear plastic protection cap | |
| 9 | V3 565 30 | Lamp holder | X |
| 10 | NF 792 22 | Red lens | XX |
| 11 | 967/T14 | Connections block | X |
| 12 | 976/PW9x12 | Valve base | X |
| 13 | EL 6820/01 | Shorting plug | XX |
| 14 | V3 130 81 81 | Protecting cover | XX |

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| | | | | | |
|-----------|----------------|----------|------|--|-------|
| GR1 | 0A85 | | | | |
| GR2 | 0A85 | | | | |
| SK1 | 970/29 | | | | |
| SK2 | 970/29 | | | | |
| SK3 | 970/29 | | | | |
| C2, C3 | 906/L15K | 15000 pF | | | 125 V |
| C4, C5 | 904/18K | 18000 pF | | | |
| C6 | 906/L15K | 15000 pF | | | 125 V |
| C7 | 909/W100 | 100 μF | | | 3 V |
| C8 | 911/R8 | 8 μF | | | 350 V |
| C9 | 906/27K | 27000 pF | | | 400 V |
| C10 | 904/100E | 100 pF | 20 % | | |
| C11 | 904/1K5 | 1500 pF | | | |
| C12 | 904/12E | 12 pF | 10 % | | |
| C13 | 906/L22K | 22000 pF | | | 125 V |
| C14 | 904/1K2 | 1200 pF | | | |
| C15 | 906/L18K | 18000 pF | | | 125 V |
| C16 | C 426 AM/G12.5 | 2.5 μF | | | 25 V |
| C17 | 909/Z4 | 3.2 μF | | | 70 V |
| C30, 31 | 904/1K | 1000 pF | | | |
| R1, 2 | 916/GL50K+450K | 0.5 MΩ | | | |
| R3---R6 | V3 737 50 | 0.5 MΩ | | | |
| R7, R8 | V3 737 51 | 1 MΩ | | | |
| R9 | E3 133 29 | 50 Ω | | | |
| R10, R11 | 902/10M | 10 MΩ | 10 % | | 1/2 W |
| R12, R13 | 902/100K | 100 kΩ | 10 % | | 1/2 W |
| R14 | 902/1M | 1 MΩ | 10 % | | 1/2 W |
| R15 | 902/820E | 820 Ω | 10 % | | 1/2 W |
| R16 | 902/390K | 390 kΩ | 10 % | | 1/2 W |
| R17 | 902/100K | 100 kΩ | 10 % | | 1/2 W |
| R18, R19 | 902/2M2 | 2.2 MΩ | 10 % | | 1/2 W |
| R20---R23 | 902/330K | 330 kΩ | 10 % | | 1/2 W |
| R24 | B8 731 03 | photo | | | |
| R25 | 902/82K | 82 kΩ | 10 % | | 1/2 W |
| R26 | 902/470K | 470 kΩ | 10 % | | 1/2 W |
| R27 | 902/120K | 120 kΩ | 10 % | | 1/2 W |
| R28 | 902/82K | 82 kΩ | 10 % | | 1/2 W |
| R29 | 902/12K | 12 kΩ | 10 % | | 1/2 W |
| R30 | E 104 AA/A1E | 1 Ω | 10 % | | 2 W |
| R54 | 901/47K | 47 kΩ | 10 % | | 1/2 W |
| R55 | 902/47E | 47 Ω | 10 % | | 1/2 W |
| R56 | 900/56E | 56 Ω | 10 % | | 1 W |

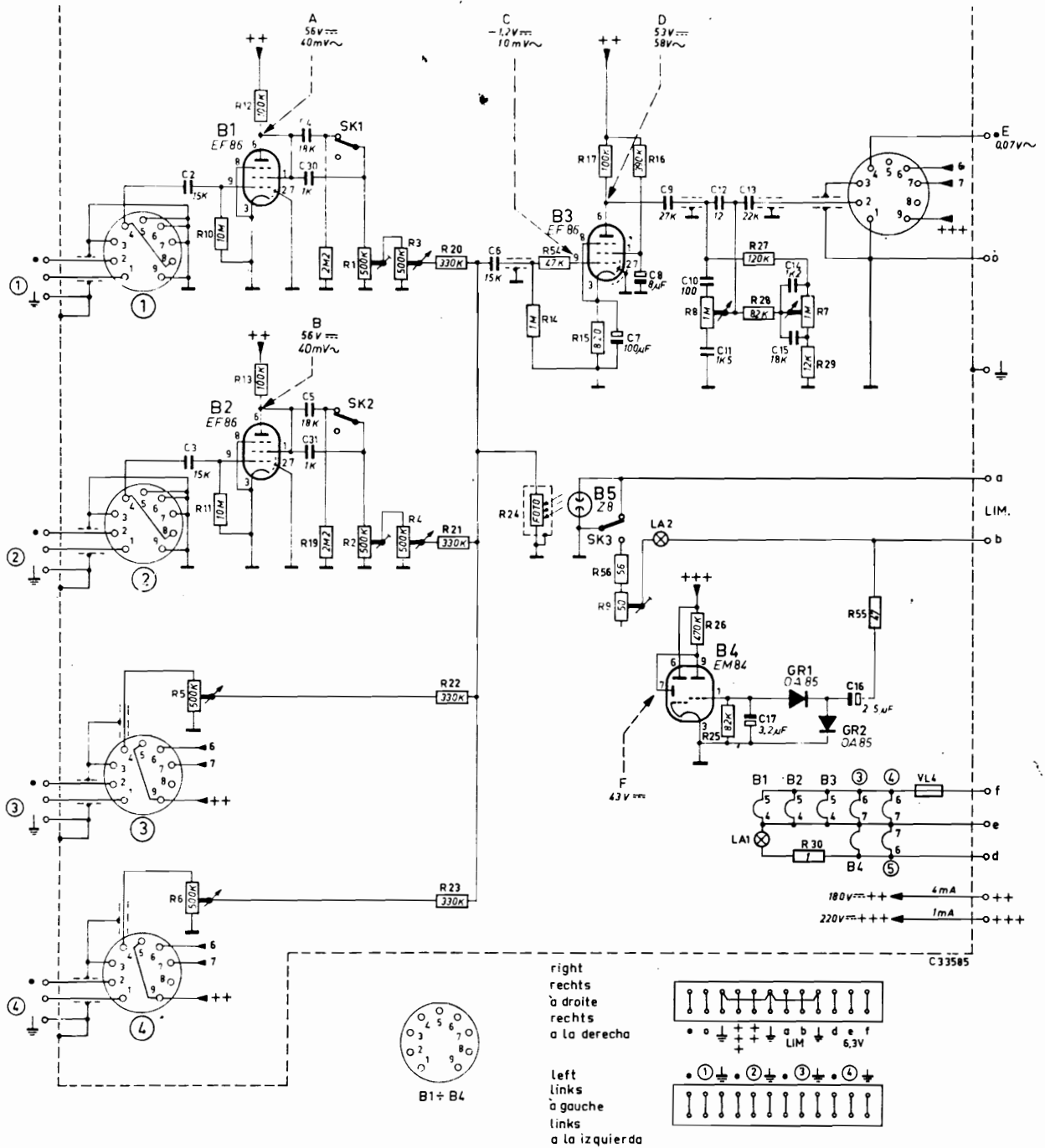


Fig.1

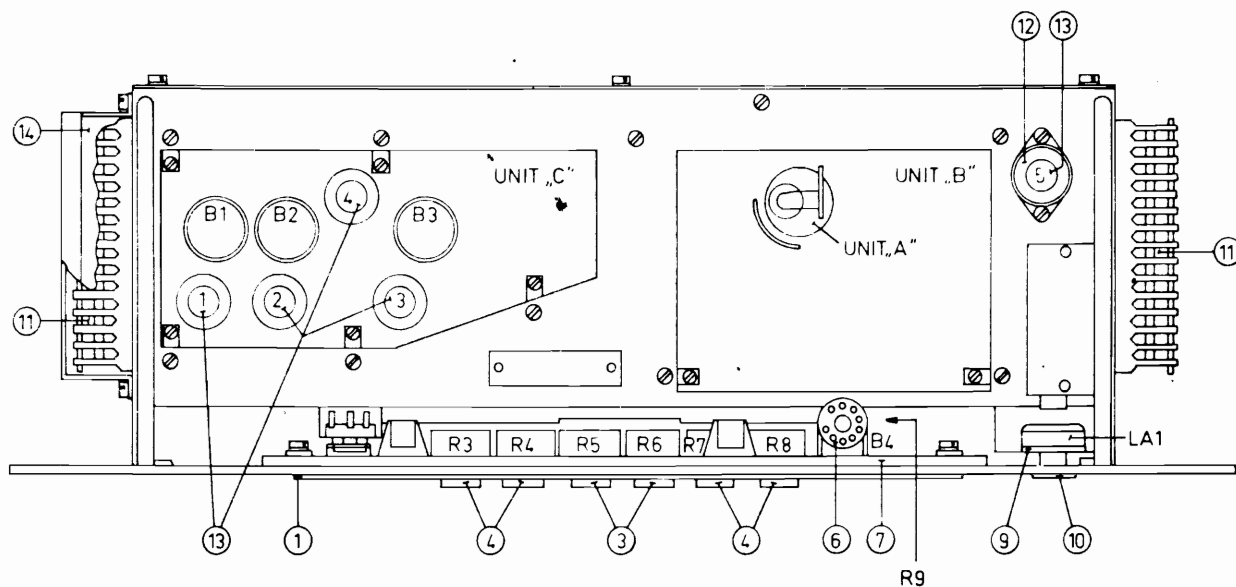


Fig.2

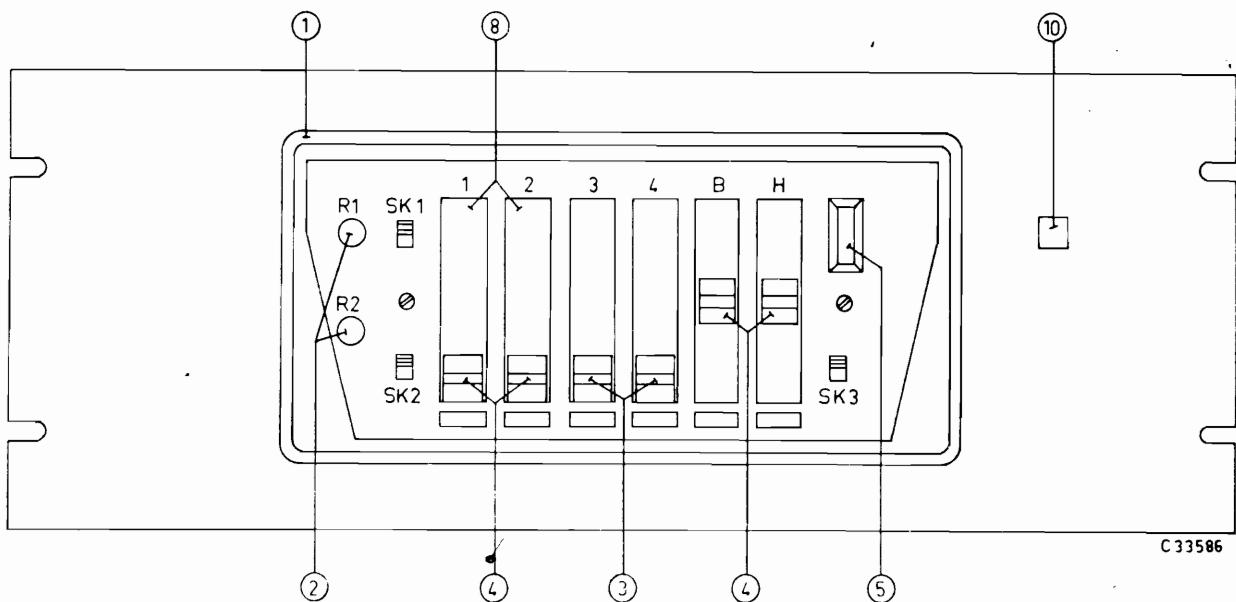


Fig.3

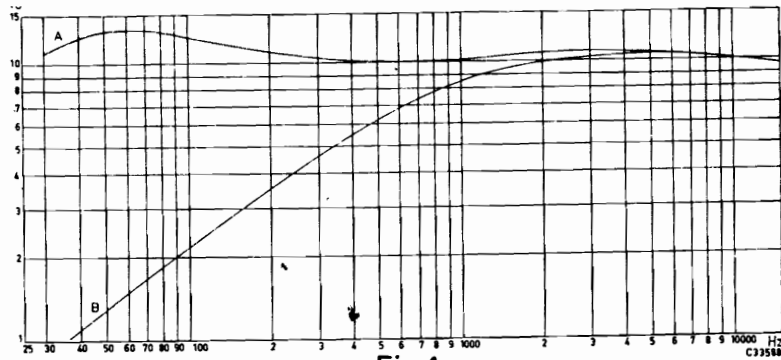


Fig.4

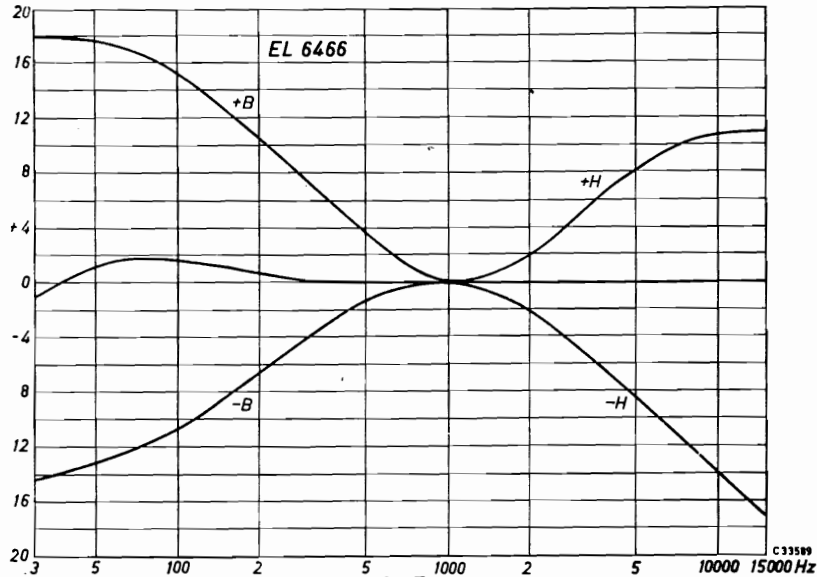


Fig.5

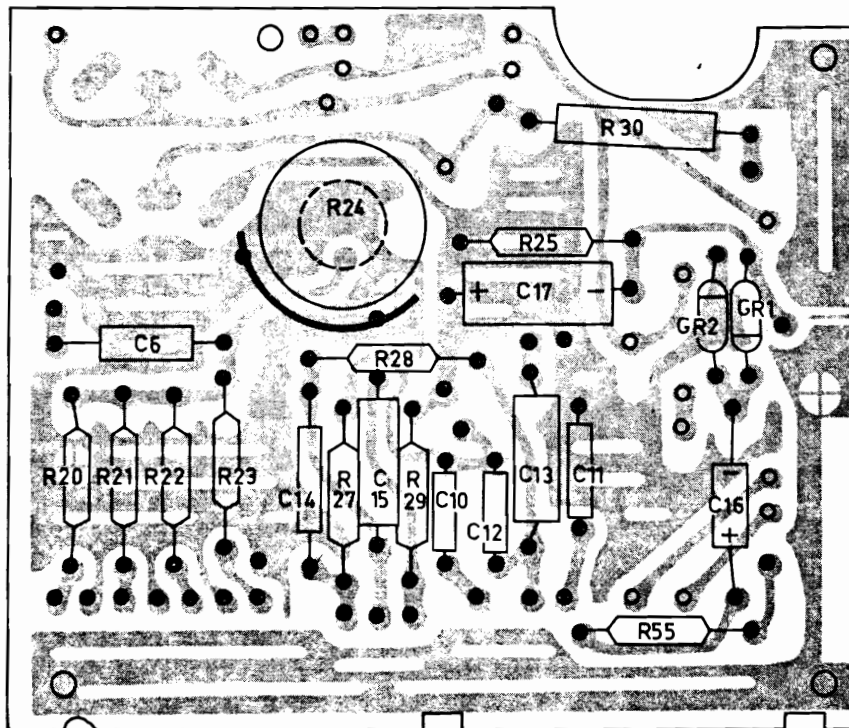


Fig.6

EL 6466/00

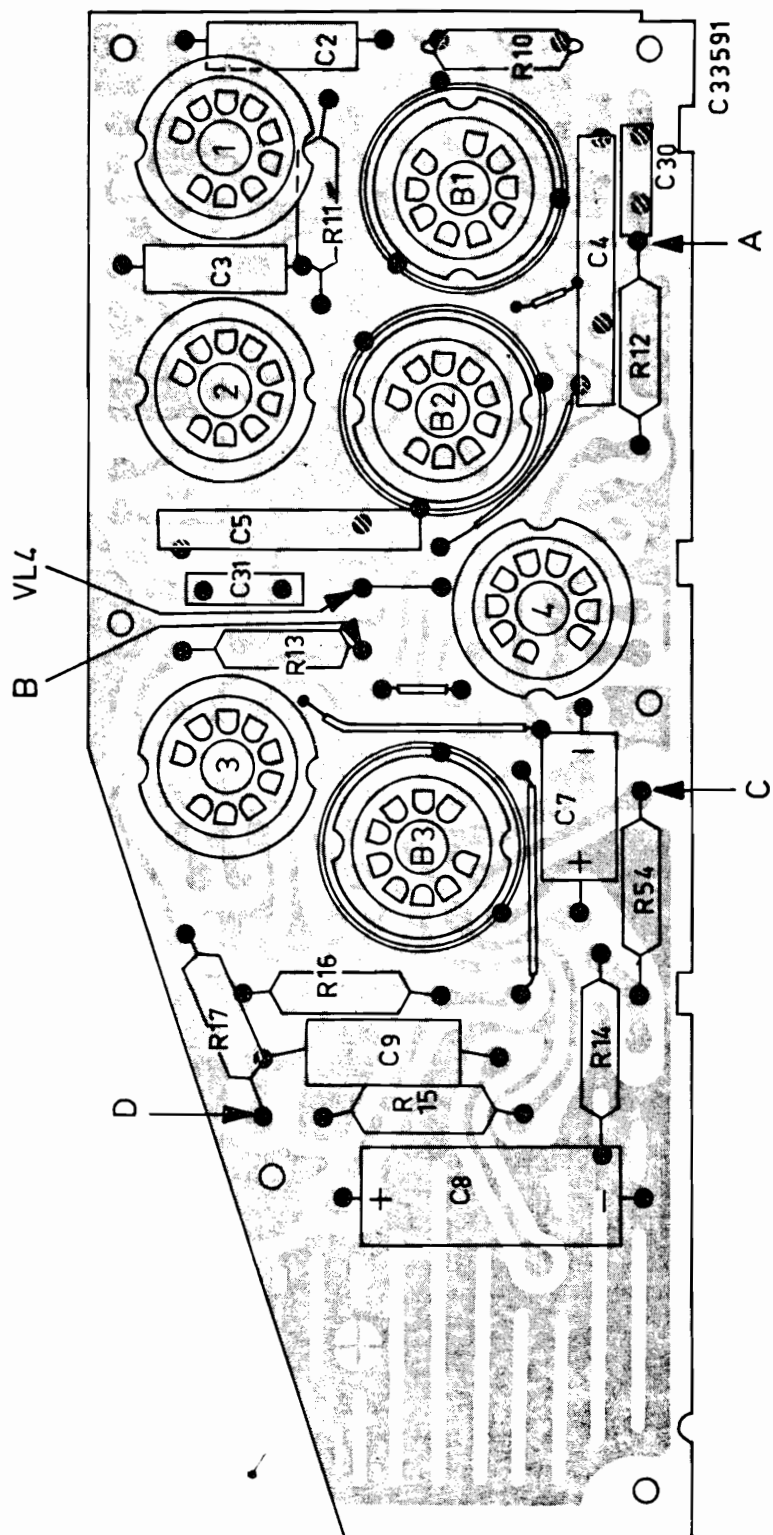


Fig.7