S	1.4.5.3.2
C	1. 2. 16. 5. 4. 3.17. 12. 5a.11.13. 11a.13a. 18.19.6 9 18a.19a. 7.8. 20. 14.
R	1. 2. 3. 24.4.5.43.38.44.7. 26. 6.8.41.39.10.37.9. 12. 11.14.15.13.17.16. 18.20.19. 22. 23.25.40.27.28.33.34. 42.21. 29.35. 31.2. 30.36.

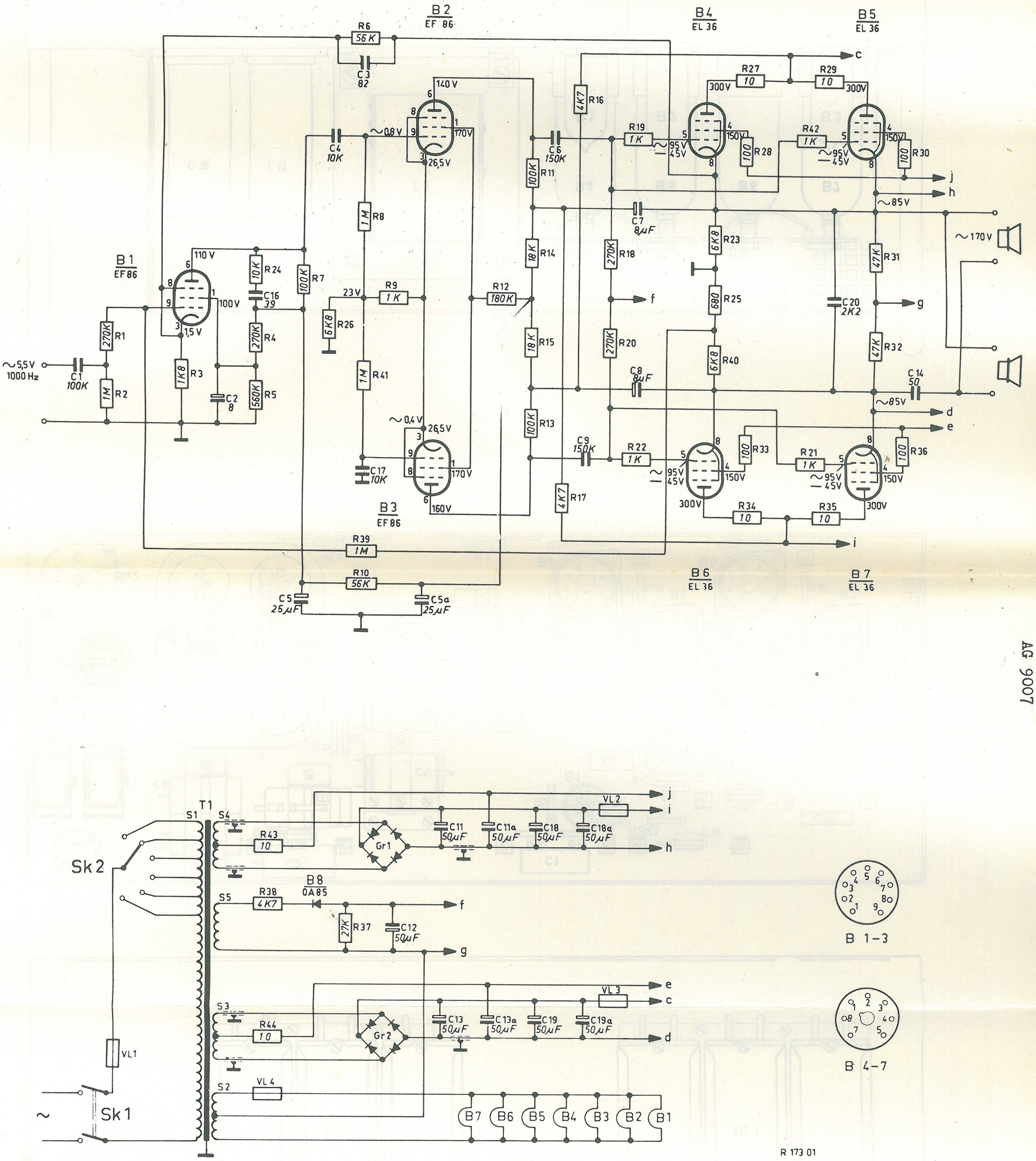
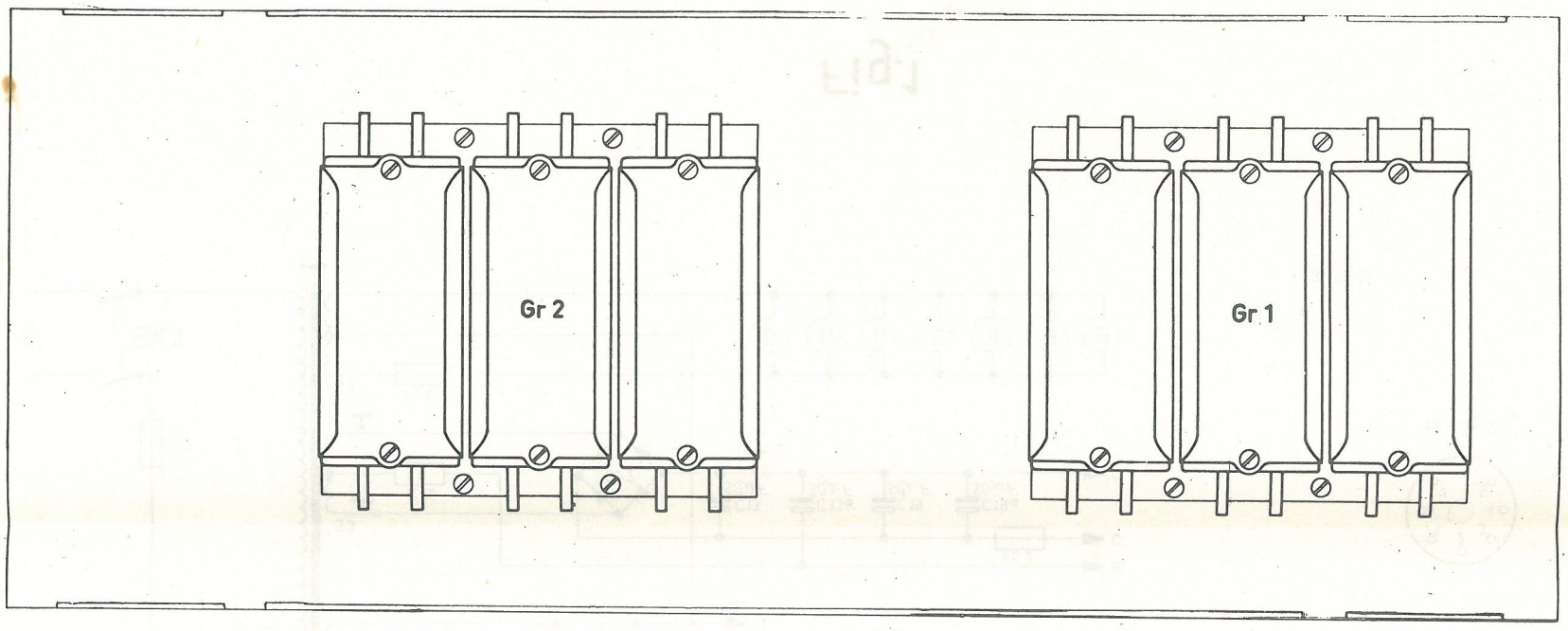
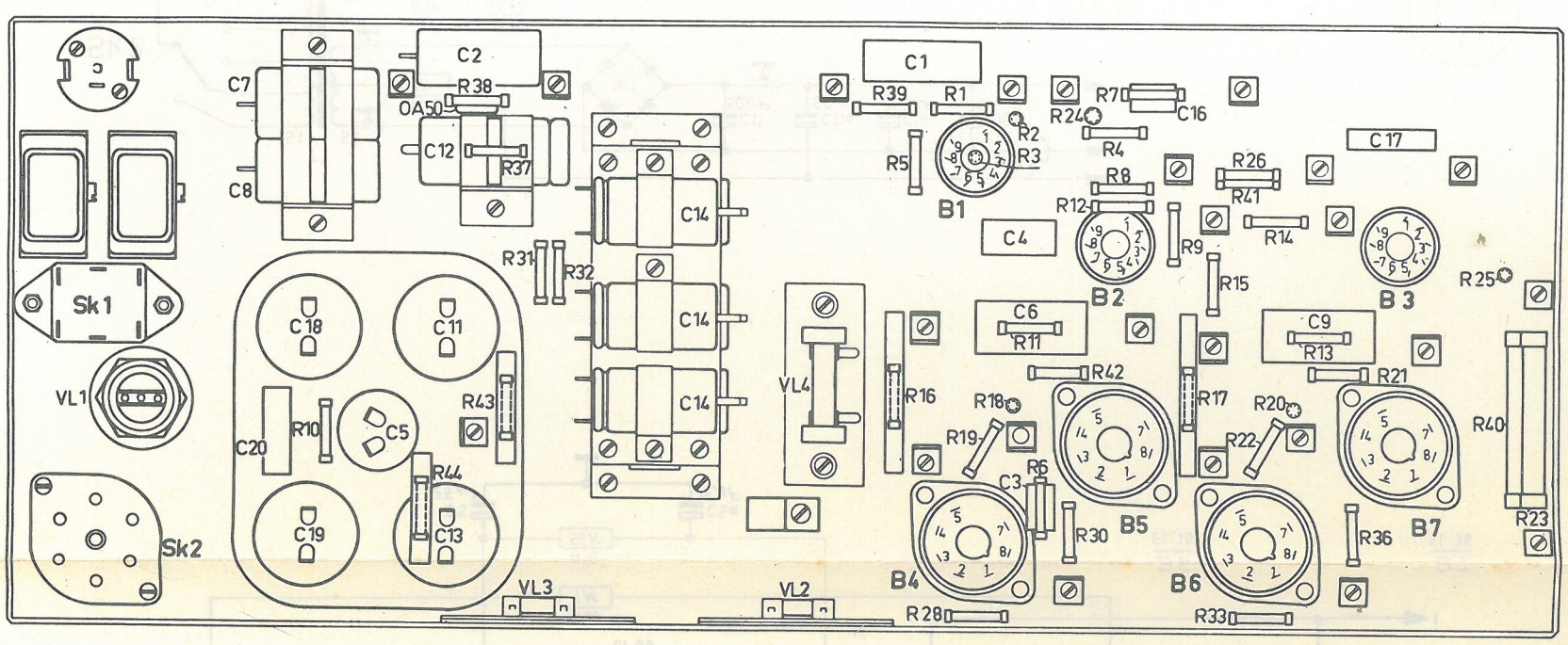


Fig.1

AG 9007

I


Gr 2
Gr 1


C1
C2
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C16
C17
C18
C19
C20
R1
R2
R3
R4
R5
R6
R7
R8
R9
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R30
R31
R32
R33
R34
R35
R36
R37
R38
R39
R40
R41
R42
R43
R44
OA50
B1
B2
B3
B4
B5
B6
B7
Sk1
Sk2
VL1
VL2
VL3
VL4

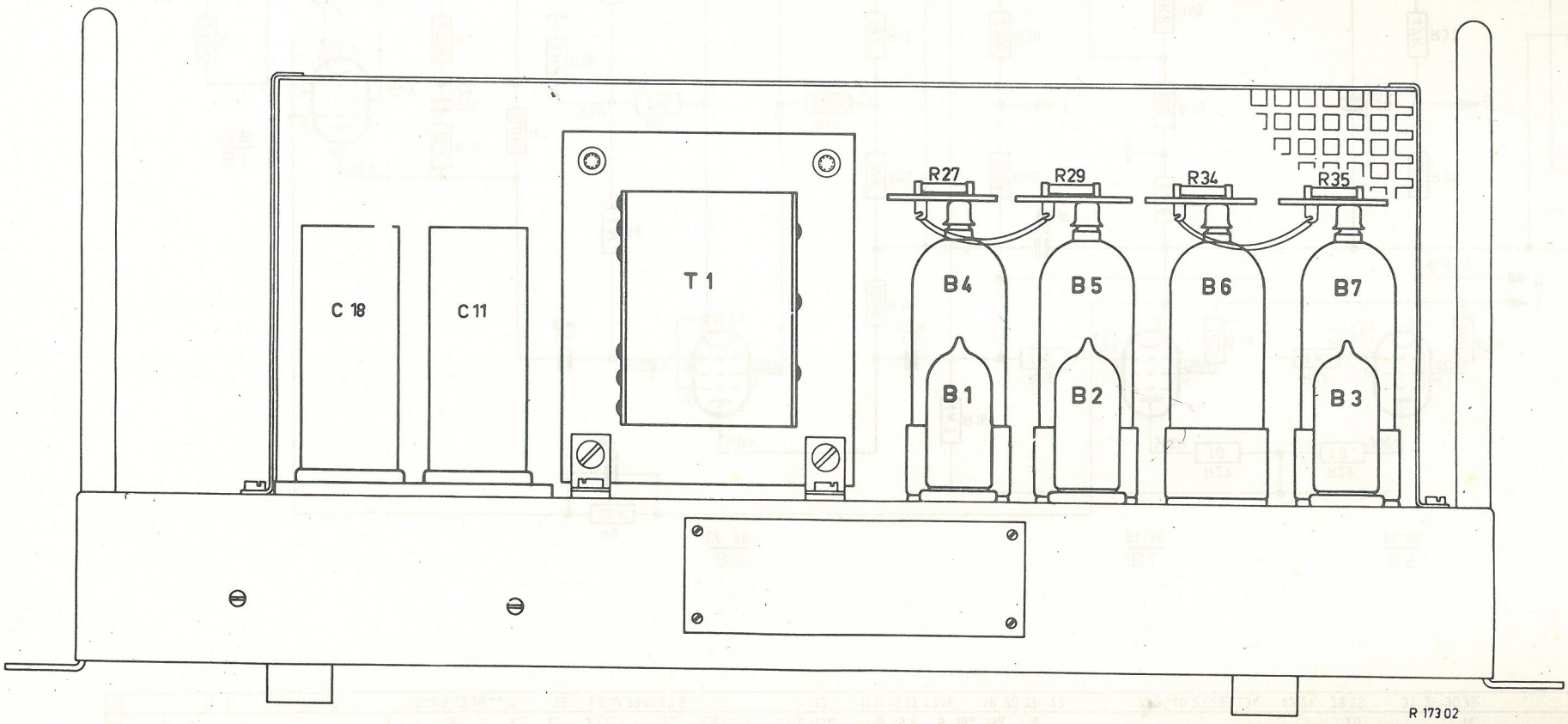
C 18
C 11
T 1
R27
R29
R34
R35
B4
B5
B6
B7
B1
B2
B3
R 173 02

Fig.2

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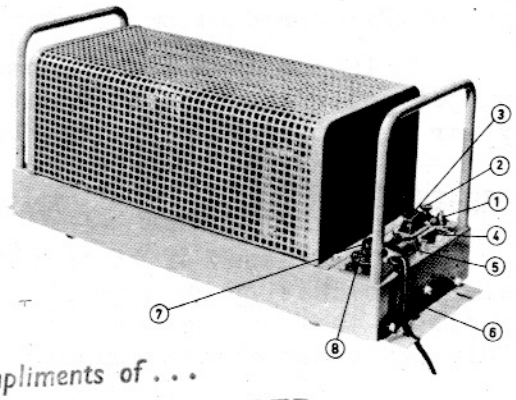
PHILIPS

SERVICE NOTES

for the Hi-Fi power amplifier



AG 9007

1958. For A.C. mains supply

Operation

1. Input socket
2. Earth screw
3. Loudspeaker connection
4. Loudspeaker connection
5. Mains switch
6. Mains flex + plug
7. Fuse holder
8. Voltage adaptor

Mains voltages

117-127-145-200-220-245 V
50 - 100 c/s

Power consumption

Unloaded: 85 Watts (220V)
With 39-W output: 136 W
With 60-W output: 177 W

Output power and distortion

When loaded with 400Ω: Wo = 60W
When loaded with 800Ω: Wo = 39W

With full output, the intermodulation distortion is smaller than 2%, and the harmonic distortion smaller than 0.3%.

Frequency characteristic

This is straight from 25 c/s to 30.000 c/s.

Sensitivity

When loaded with 800Ω, the sensitivity amounts to 5.7V with an output capacity of 39 Watts.
When loaded with 400Ω, the sensitivity amounts to 5V with an output capacity of 60 Watts.

Hum and Noise Level

Measured with open input:
-95 dB with respect to 60 Watts output.

Dimensions

440 x 215 x 173 mm.

Valves

B1, B2, B3	: EF86
B4, B5, B6, B7	: EL36
B8	: 0A85
GR1	: 3x SR300B120
GR2	: 3x SR300B120
VL1	: 974/1000 for 220V
VL2	: 974/250
VL3	: 974/250
VL4	: 08 143 02.

93 992 14.1.05

Printed in Holland

Purpose

This Hi-Fi power amplifier can be used together with the pre-amplifier AG 9004 and one or two loudspeaker combinations AD 5034, for the Hi-Fi reproduction of records, tapes, radio, etc.

If one loudspeaker combination AD 5034 is used, the maximum output power amounts to 39 Watts. With two combinations AD 5034, a power output of 60 Watts can be achieved.

Remark

The output of the amplifier is symmetrical with respect to earth, so that on no account one of the output terminals may be earthed, as in this case half of the output signal is short-circuited. This may cause serious damages of the amplifier.

Measuring of voltages

For this, two resistors of 390Ω 25W are required (code no. B8 300 34B/390E).

These resistors are connected in series to the loudspeaker-sockets, while the junction of the resistors is connected to earth.

All the voltages are measured with respect to earth. For measuring the sensitivity and the step amplification, use can be made of a tone generator, e.g. the GM 2317 or the GM 2315; the measuring frequency chosen is 1000 c/s.

Measuring of the frequency characteristic

The frequency characteristic has to be straight from 20 c/s to 30.000 c/s. Deviation ± 1 dB.

For this, a tone generator GM 2317 plus a valve voltmeter, e.g. GM 6015 or GM 6017, are needed. The valve voltmeter is connected across one of the load resistors of 390Ω. After this the same measurement can be carried out across the other load resistor.

Description of the circuit diagram

The signal is fed to g1 of B1 via C1 and R1. C1 has been provided to block any leak current of the cathode follower of the pre-amplifier. R2 functions as a leak resistor.

After having been amplified by B1, the signal is fed to the phase-shifting system, consisting of B2 and B3. Let us explain the working of this system:

Suppose that at a certain moment a positive voltage pulse appears on the grid of B2. In this case, the anode current of B2 will increase, consequently the cathode current increases, which causes an increased voltage across R9. As the grid of B3 for alternating current is connected to earth (via C17), and the cathode receives a positive voltage pulse, the anode current of B3 will temporarily decrease. So we see that the anode currents of B2 and B3 are in opposite phase.

After having been amplified by B2 and B3, the signal is fed to the output valves B4, B5, B6 and B7. B4 and B5 are connected in parellel, and B6 and B7 as well.

The output valves are connected as cathode followers, so that they slightly attenuate the voltage fed, but amplify the energy. The advantage of this circuit is the low output impedance, so that high-

impedance loudspeakers can be direct connected, and the loudspeaker transformer becomes superfluous.

Another and not less advantage is that a cathode follower practically does not give any distortion. When, moreover, a strong negative feedback is applied for the whole amplifier, the distortion will be negligibly small, which is also the case with the amplifier under discussion.

A disadvantage of the above mentioned circuit is the high grid voltage, which is needed to attain sufficient power. Therefore, the distortion would be shifted from the output valves to the preamplifier. However, this disadvantage has been completely removed in the following way: the relevant output signals have been brought, via C7 and C8, under in the anode circuits of B2 and B3, so that the preamplifier only need give a small voltage, and consequently gives little distortion. The negative grid voltage of the output valves is fixed, and is fed via the point f and g (see circuit diagram).

The output valves are fed by two H.T. units. + High tension from B4 and B5 is fed to point C. - high tension to d. Consequently, the output signal of B4 and B5 appears across R31+R32.

In the same way can be shown that the output signal of B6 and B7 appears across R32+R31. Via R6 and C3, a negative feedback voltage is applied to the cathode of B1. C3 has been provided to suppress any oscillating tendencies. Moreover, part of the output signal is fed via R39 to the grid of B1, which causes a strong negative feedback.

All this helps to keep the amplifier free of distortion.

S1)			
S2)			
S3)			V3 617 49
S4)			
S5)			
C1	0,1	µF	906/100K
C2	8	µF	911/P8
C3	82	pF	905/82E
C4	10.000	pF	906/V10K
C5)	25	µF	913/N25x25
C5a)	25	µF	
C6	0,15	µF	906/150K
C7	8	µF	911/P8
C8	8	µF	911/P8
C9	0,15	µF	906/150K
C11)	50	µF	913/P50+50
C11a)	50	µF	
C12	50	µF	910/D50
C13)	50	µF	913/P50+50
C13a)	50	µF	
C14	50	µF	AC 5951/50
C16	39	pF	905/39E
C17	10.000	pF	906/10K
C18)	50	µF	913/P50+50
C18a)	50	µF	
C19)	50	µF	913/P50+50
C19a)	50	µF	
C20	2200		906/V2K2
R1	0,27	MΩ	900/270K
R2	1	MΩ	900/1M
R3	1800	Ω	900/1K8
R4	0,27	MΩ	900/270K
R5	0,56	MΩ	900/560K
R6	56000	Ω	901/56K
R7	0,1	MΩ	900/100K
R8	1	MΩ	900/1M
R9	1000	Ω	901/1K
R10	56000	Ω	900/56K
R11	0,1	MΩ	900/100K
R12	0,18	MΩ	901/180K
R13	0,1	MΩ	901/100K
R14	18000	Ω	901/18K

R15	18000	Ω	901/18K
R16	4700	Ω	901/4K7
R17	4700	Ω	901/4K7
R18	0,27	MΩ	901/270K
R19	1000	Ω	900/1K
R20	0,27	MΩ	900/270K
R21	1000	Ω	900/1K
R22	1000	Ω	900/1K
R23	6800	Ω	2x900/15K *
R24	10000	Ω	900/10K
R25	680	Ω	901/680E
R26	6800	Ω	901/6K8
R27	10	Ω	901/10E
R28	100	Ω	900/100E
R29	10	Ω	900/10E
R30	100	Ω	900/100E
R31	47000	Ω	900/47K
R32	47000	Ω	900/47K
R33	100	Ω	900/100E
R34	10	Ω	900/10E
R35	10	Ω	900/10E
R36	100	Ω	900/100E
R37	27000	Ω	900/27K
R38	4700	Ω	900/4K7
R39	1	MΩ	901/1M
R40	6800	Ω	2x900/15K *
R42	1000	Ω	900/1K
R43	10	Ω	900/10E
R44	10	Ω	900/10E
V11	2A (117-145V)		974/2000
V11'	1A (200-245V)		974/1000
V12	250	mA	974/250
V13	250	mA	974/250
V14	20	A	08 143 02
Gr1	390	mA	3x SR300B130
Gr2	390	mA	3x SR300B130

DJ/GH