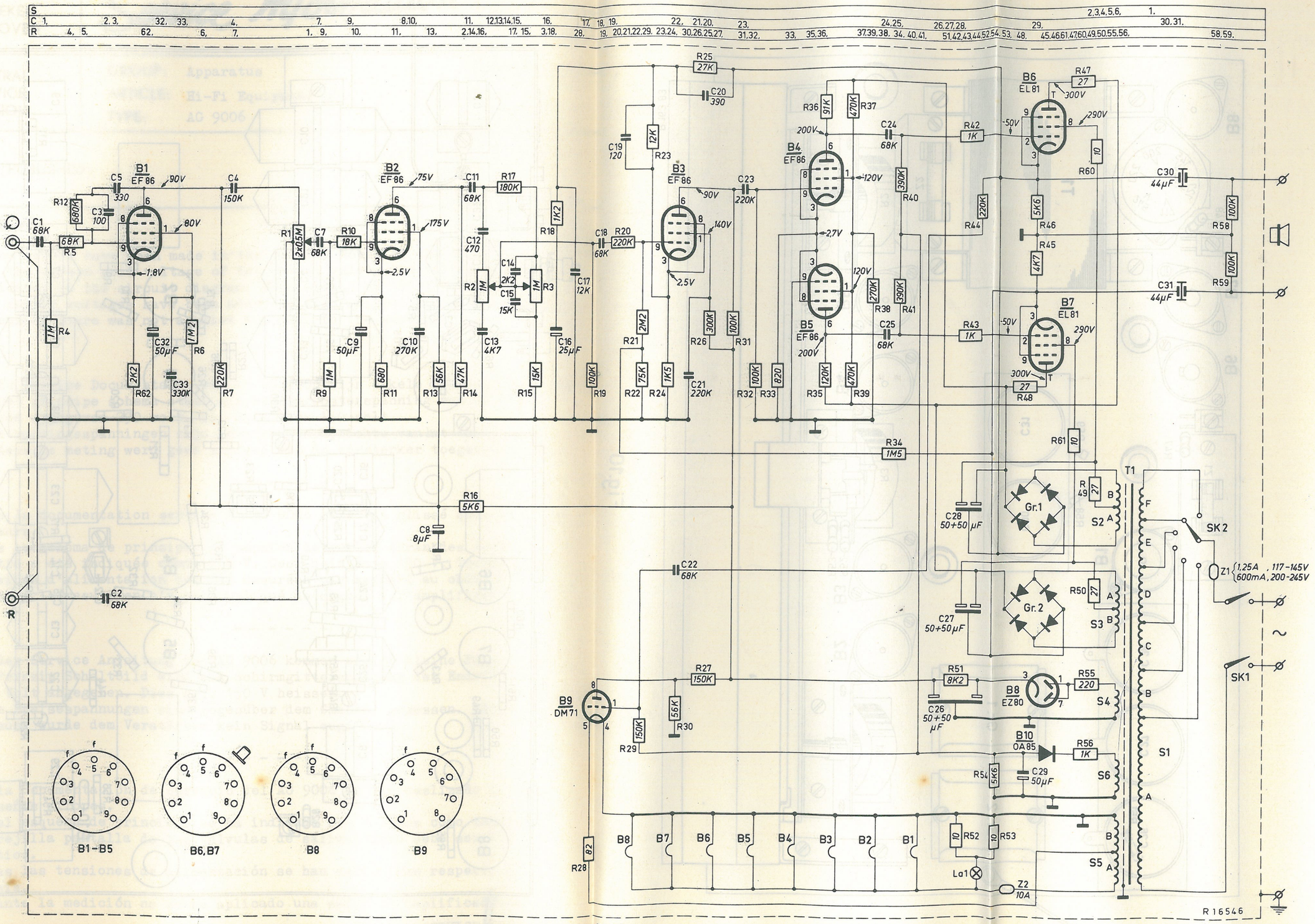

S
C 1, 2.3, 32, 33, 4, 7, 9, 8.10, 11, 12.13.14.15, 16, 17, 18, 19, 22, 21.20, 23, 24.25, 26.27.28, 2.3.4.5.6, 1, 29, 30.31.
R 4, 5, 62, 6, 7, 1, 9, 10, 11, 13, 2.14.16, 17, 15, 3.18, 28, 19, 20.21.22.29, 23.24, 30.26.25.27, 31.32, 33, 35.36, 37.39.38, 34, 40.41, 51.42.43.44.52.54.53, 48, 45.46.61.47.60.49.50.55.56, 58.59.
B1 EF 86 90V
B2 EF 86 75V
B3 EF 86 90V
B4 EF 86 200V 120V
B5 EF 86 200V 120V
B6 EL 81 300V 290V
B7 EL 81 300V 290V
B8 EZ 80
B9 DM 71
B10 OA 85
C1 68K
C2 68K
C3 100
C4 150K
C5 330
C7 68K
C8 8µF
C9 50µF
C10 270K
C11 68K
C12 470
C13 4K7
C14 2K2
C15 15K
C16 25µF
C17 12K
C18 68K
C19 120
C20 390
C21 220K
C22 68K
C23 220K
C24 68K
C25 68K
C26 50+50 µF
C27 50+50µF
C28 50+50 µF
C29 50µF
C30 44µF
C31 44µF
R1 2x0,5M
R2 1M
R3 1M
R4 1M
R5 68K
R6 1M2
R7 220K
R9 1M
R10 18K
R11 680
R12 680K
R13 56K
R14 47K
R15 15K
R16 5K6
R17 180K
R18 1K2
R19 100K
R20 220K
R21 2M2
R22 75K
R23 12K
R24 1K5
R25 27K
R26 300K
R27 150K
R28 82
R29 150K
R30 56K
R31 100K
R32 100K
R33 820
R34 1M5
R35 120K
R36 91K
R37 470K
R38 270K
R39 470K
R40 390K
R41 390K
R42 1K
R43 1K
R44 220K
R45 4K7
R46 5K6
R47 27
R48 27
R49 27
R50 27
R51 8K2
R52 10
R53 10
R54 5K6
R55 220
R56 1K
R58 100K
R59 100K
R60 10
R61 10
T1
Gr.1
Gr.2
S1
S2
S3
S4
S5
S6
SK1
SK2
Z1 1,25A , 117-145V 600mA, 200-245V
Z2 10A
La1
B1 B2 B3 B4 B5 B6 B7 B8
R
R16546

B1-B5
B6, B7
B8
B9

Fig.9

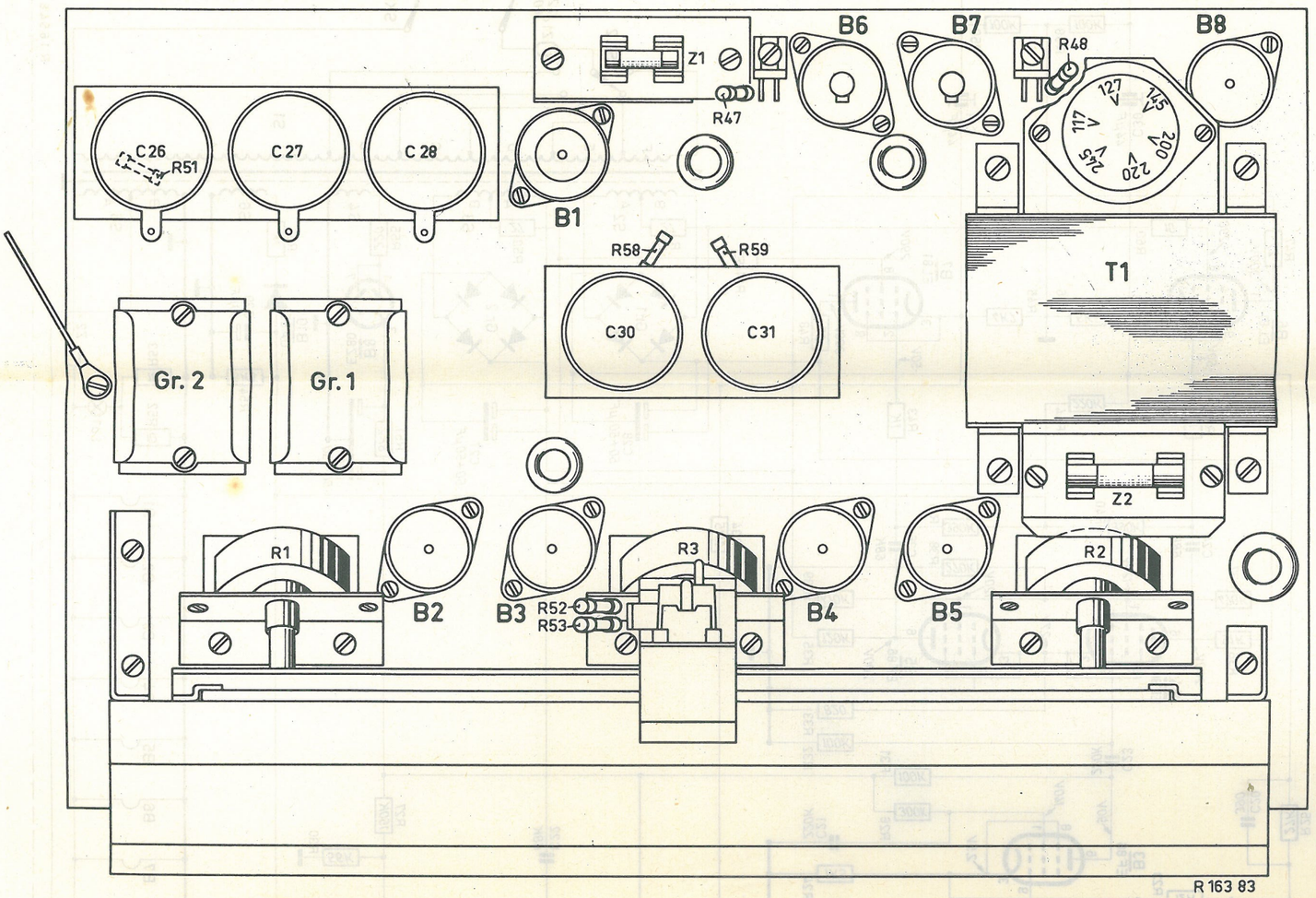

B6
B7
B8
Z1
R47
R48
C26
R51
C 27
C 28
B1
R58
R59
C30
C31
T1
Gr. 2
Gr. 1
Z2
R1
B2
B3
R52
R53
R3
B4
B5
R2
R 163 83

Fig.10

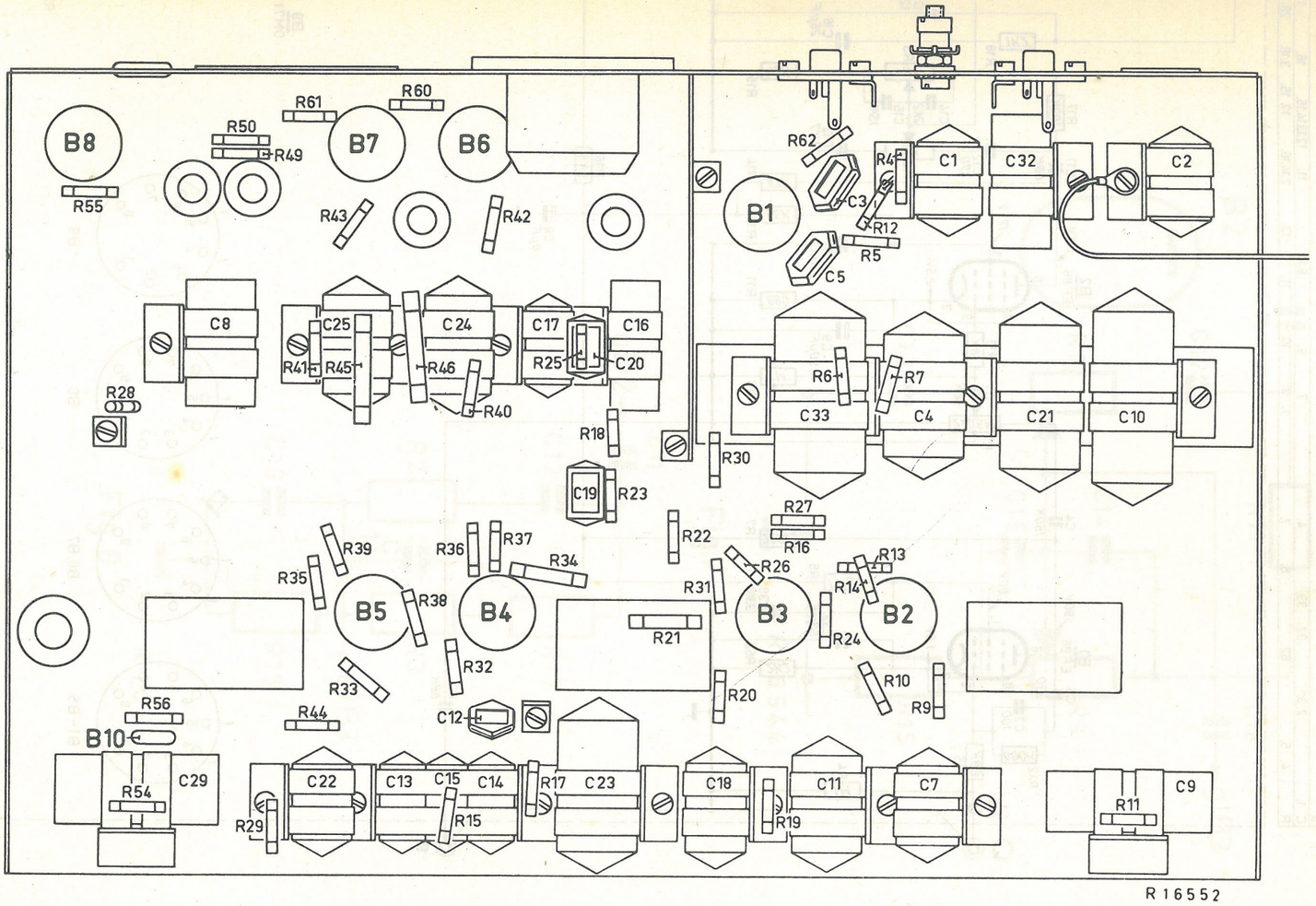

R61
R60
B8
B7
B6
R50
R49
R55
R43
R42
B1
R62
R4
C1
C32
C2
C3
R12
R5
C5
C8
C25
C 24
C17
C16
R41
R45
R46
R25
C20
R40
R28
R18
C19
R23
R6
R7
C33
C4
C21
C10
R30
R27
R16
R22
R39
R36
R37
R34
R35
B5
R38
B4
R26
R31
B3
R13
R14
B2
R21
R24
R32
R33
R10
R9
R20
R56
R44
C12
B10
R54
C29
C22
C13
C15
C14
R17
C23
C18
C11
C7
C9
R29
R15
R19
R11
R 16552

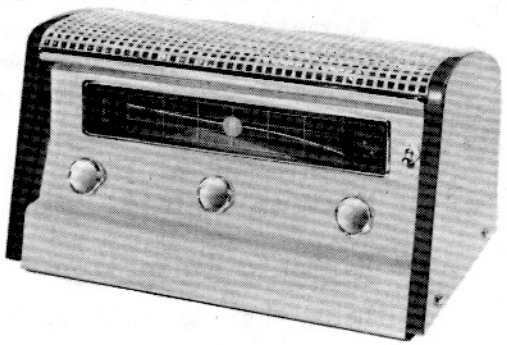
Fig.11

Published by
THE CENTRAL SERVICE DIVISION
N.V. Philips' Gloeilampenfabrieken
Eindhoven

PHILIPS

SERVICE NOTES

for the Hi-Fi amplifier



1224 89

AG9006

1956 For A.G. mains supply.

Controls

From left to right:
1. Volume control with zero position in the middle (to the left : Radio (to the right:: P.U.
2. Bass control
3. Treble control
4. Mains switch

Connections

At the rear of the chasis are from left to right the following connections:

1. Mains cord + plug
2. Loudspeaker connection (1200 Ω)
3. Gramophone input
4. Earth terminal
5. Radio input

Dimensions

Length : 335 mm.
Depth : 248 mm.
Height : 186 mm.

Mains voltages

117-127-145-200-220-245 V
(50 - 100 Hz)

Consumption

No load : 50 Watt
Full load : 73 Watt

Valves

B1 : EF86
B2 : EF86
B3 : EF86
B4 : EF86
B5 : EF86
B6 : EL81
B7 : EL81
B8 : EZ80
B9 : DM71
B10 : OA50
X1 : SR 250 B85
X2 : SR 250 B85
L1 : 8008N

Fuses

Z1 : 1,25 A (117 V),
0,6 A (220 V).
Z2 : 10 A

Tone control

Above the knobs of the tone control a dial has been mounted, behind it are two pointers which turn along with the tone control potentiometers.
So it can be easily seen how much the high and/or low notes are amplified or attenuated.

Output power

Maximum 20 Watt.

Harmonic distortion

Less than 5% with 20 Watt power output

Intermodulation distortion

With 10 Watt power output 2%
With 20 Watt power output 5%
This distortion is measured with an input signal of 40 and 12 500 c/s. (amplitude ratio 4 : 1)

Hum and noise (Radio channel : -67 dB
(Gramophone channel : -51 dB

Input impedance

Radio : $\geqq$ 100.000 Ω
Gramophone : $\approx$ 50.000 Ω

Damping factor

The damping factor of this amplifier is 30.
By damping factor is understood the quotient of matching impedance and output resistance.
The matching impedance is 1200 Ω. The output resistance is 40 Ω, which makes a damping factor of 30.

Matching

A loudspeaker combination with an impedance of 1200 Ω should be connected to this amplifier (e.g. AD 5032)
The output voltage is symmetrical with respect to the chassis.

The Gramophone record correction

The modern long play records are not recorded with a straight frequency response curve, the low notes are attenuated, the high ones amplified.
In the amplifier the low and high notes should therefore be amplified and attenuated in the same way, in order to obtain again a straight reproduction characteristic.
The newest Philips long-play records are recorded according to the R.I.A.A. curve, just as the newest Capitol, D.G.G., Decca, R.C.A., Columbia and Westminster long play records. (see fig. 1)
For that reason the R.I.I.A. correction curve is applied in this amplifier (see fig. 2)
Older long-play records are recorded according to various characteristics, which in general, however, differ very little from the R.I.A.A. characteristic.
An exception is the old H.M.V. curve which does not give an amplification of the high notes, but only an attenuation of the low notes.

If this characteristic is corrected according to R.I.A.A., the high notes are reproduced too weak. Therefore, if these records are played with the AG 9006, the treble control should be put to maximum treble, and the bass control in the middle position.
With all other long play records, the tone controls can remain in the middle position. Possible small differences between various record brands can then be corrected with the aid of the tone controls

Pointer drive

The length and the course of the driving cords are given in fig. 3.

Some details about the circuit diagram

A. Pick-up preamplifier unit

The signal from the magneto dynamic pick-up arrives at the control grid of B1 via C1 and R5. B1 amplifies the signal. Part of the anode volta- of B1 is fed back to the control grid, so that negative feed back arises.
Through the R.C. network R12-C3-C5 the negative feedback becomes frequency dependent and this in such a way that, when an input signal with a constant voltage - the frequency of which varies however from for instance 30 - 15000 c/s- is applied to the input of the amplifier, a signal appears between anode and earth, the amplitude of which has the same trend as the R.I.A.A. characteristic. (fig. 2)
By this the desired correction for long play records is obtained.

B. Tone control

With R2 and R3 the low and high notes can be adjusted at choice independent from each other (see fig. 4)
In fig, 5 both tone controls have been drawn with the slide contact in the upper position. Fig. 6 gives a simplified diagram of this.
The low and high notes are now amplified more than the notes in the middle range (around 1000 c/s)
We shall explain this with the aid of fig. 6. The amplification of the low notes will be discussed first. For that purpose we will examine the voltage divider C11 - R17, R3 - C15 - R15.
For notes of the middle range and for high notes, C15 forms a very small impedance with respect to R3.
From this it follows that the low notes are therefore favoured above the remainder of the frequency spectrum.
The amplification of the high notes is done in the following way. For that purpose we examine the voltage divider C11 - C12, R2 - C13.
R2 and C13 form together a much greater impedance for high notes than for notes in the middle range and low notes. From this follows that the high notes are favoured above the remainder of the frequency spectrum.
Fig. 7 represents the tone controls with the slide contacts in the lower position.
Fig. 8 is the simplified diagram. In this position the low and high notes are attenuated. We shall discuss the bass control first. For that purpose we examine the voltage divider C11 - R17 - R3 - C14, R15. C14 forms a small impedance for notes in the middle and treble range with respect to R3.
For these frequencies we can therefore neglect R3, but for the low frequencies the impedance of C14 is very great, so that R3 is of importance here.
We see that the impedance of C11 - R17 - R3 - C14 decreases when the frequency increases. From this it follows that the low notes are attenuated with respect to the remainder of the frequency range.

For the treble control we examine the voltage divider C11 - C12 - R2 C13. The impedance of C13 decreases as the frequency increases. The high notes are therefore attenuated with respect to the low notes and those in the middle range.
So we have now examined the two extreme positions of the tone control. The low and high notes can therefore be amplified or attenuated with respect to the tones in the middlerange (± 1000 c/s.) When the slide contacts of R2 and R3 move from the top downwards, we therefore get first an amplification of the high and low notes, and after that they are attenuated. It therefore goes without saying that both tone controls have a position in which the high and low notes are not amplified with respect to the remainder. This tone control circuit is dimensioned in such a way that the frequency response curve is straight in the middle position of the slide contacts of R2 and R3.

C. Phase shifter

B4 and B5 work as phase shifter.
The signal amplified by B3 is applied to the control grid of B4. The cathode resistance of B4 has not been bypassed. The grid of B5 has been earthed. B5 is therefore a so-called grounded grid amplifier.
If we suppose that at a certain moment a positive voltage pulse comes on the control grid of B4, the anode current of B4 will increase. Therefore also the cathode voltage increases. As the grid of B5 is connected to earth, the voltage of the grid with respect to the cathode becomes more negative. From this it follows that the anode current of B5 decreases.
With an increase of the anode current of B4 therefore goes a decrease of the anode current of B5.
The signals on the anodes of B4 and B5 are 180° out of phase with each other. The circuit has been dimensioned in such a way that the signals for both output valves have equal amplitudes.
Also through the current feed back - which is obtained by an unbypassed cathode resistor (R33) - the distortion of this circuit is small and an unequal trend of the slope of both valves has little influence onthe equality of the anode A.C. voltages.

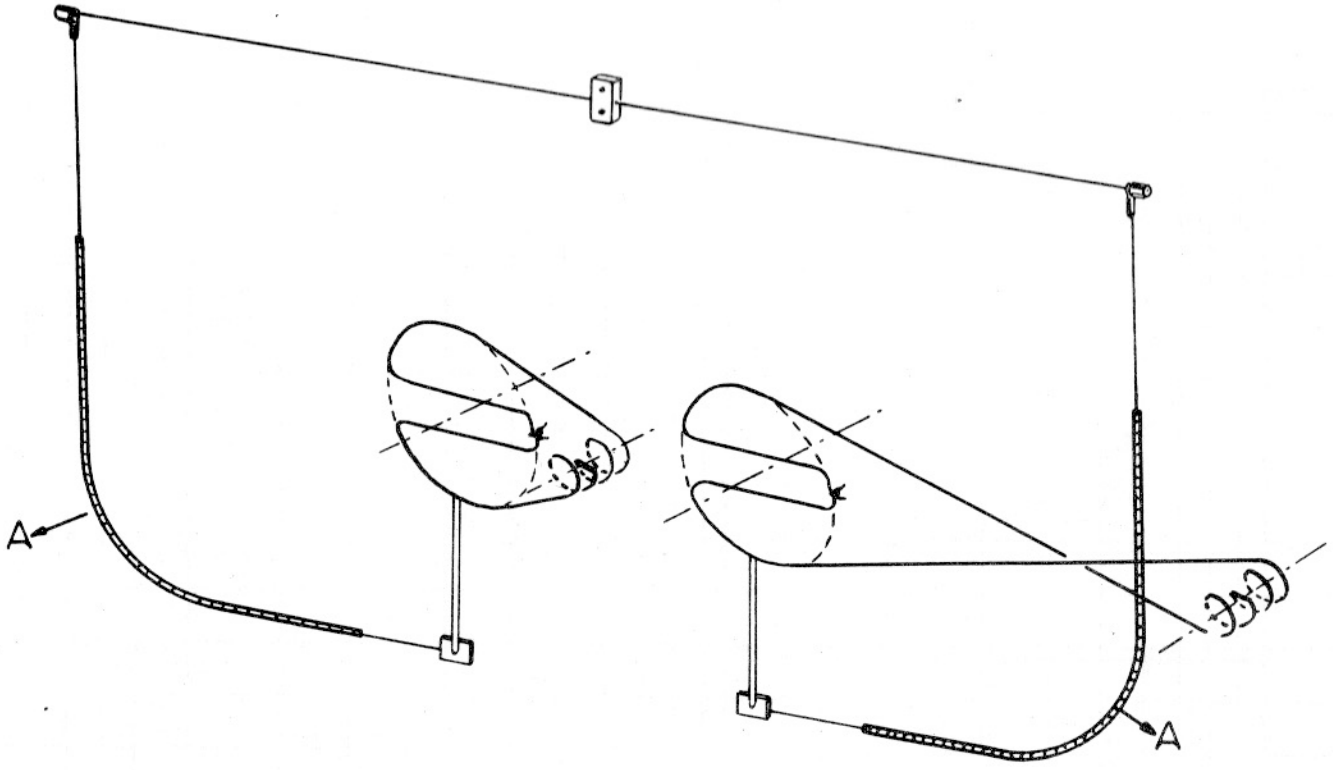
The push-pull output stage

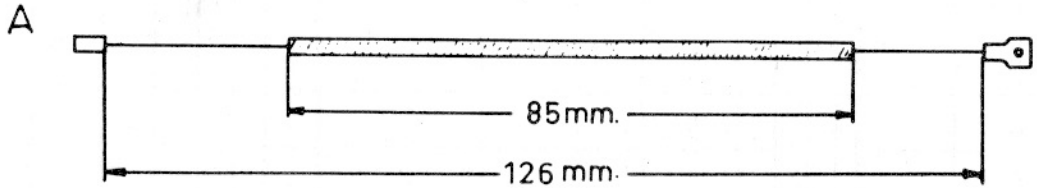
This is formed by the valves B6 and B7.
The output signal is taken from the cathodes via 2 electrolytic capacitors C30 and C31.
These are intended for preventing the direct current from flowing through the loudspeaker.
The advantage of this semi-cathode follower output stage is that one obtains a very low output impedance 1200 Ω, as a result of which the loudspeaker transformer can be omitted.
The positive voltage of C28 is between the anode of B7 and the cathode of B6.
The output signal of B7 therefore appears across R45-R46.
The output signal of B6 appears across R46 - R45.
Each output valve has its own high tension supply unit. The supply unit of B7 supplies at the same time the driver valve B4. The supply unit for B6 supplies at the same time the driver B5.
A negative feedback signal is derived from R45 and applied to the cathode of B3. At the same time a negative feedback signal is derived from R46 and applied via R25 - C20, R23 - C19 to the cathode of B3.

S1)				
S2)				V3 617 25.0
S3)				
S4)				
C1	68000	pF		A9 999 06/68K
C2	68000	pF		A9 999 06/68K
C3	100	pF		A9 999 05/100E
C4	0,15	µF		A9 999 06/150K
C5	330	pF		A9 999 05/330E
C7	68000	pF		A9 999 06/68K
C8	8	µF		A9 999 11/P8
C9	50	µF		A9 999 09/B50
C10	0,27	µF		A9 999 06/270K
C11	68000	pF		A9 999 06/68K
C12	470	pF		A9 999 05/470E
C13	4700	pF		A9 999 06/4K7
C14	2200	pF		A9 999 06/2K2
C15	15000	pF		A9 999 06/15K
C16	25	µF		A9 999 09/B50
C17	12000	pF		A9 999 06/12K
C18	68000	pF		A9 999 06/68K
C19	120	pF		A9 999 05/120E
C20	390	pF		A9 999 05/390E
C21	0,22	µF		A9 999 06/220K
C22	68000	pF		A9 999 06/68K
C23	0,22	µF		A9 999 06/220K
C24	68000	pF		A9 999 06/68K
C25	68000	pF		A9 999 06/68K
C26	50+50	µF		A9 999 12/P50+50
C27	50+50	µF		A9 999 12/P50+50
C28	50+50	µF		A9 999 12/P50+50
C29	50	µF		A9 999 10/D50
C30	44	µF		49 020 62.0
C31	44	µF		49 020 62.0
C32	50	µF		A9 999 09/B50
C33	0,33	µF		A9 999 06/330K
R1	0,5+0,5	MΩ	(LOG)	49 501 43.0
R2	1	MΩ	(LIN)	A9 999 15/E1M
R3	1	MΩ	(LIN)	A9 999 15/E1M
R4	1	MΩ		A9 999 00/1M
R5	68000	Ω	(5%)*	A9 999 00/68K
R6	1,2	MΩ		A9 999 00/1M2
R7	0,22	MΩ		A9 999 00/220K
R9	1	MΩ		A9 999 00/1M
R10	18000	Ω		A9 999 00/18K
R11	680	Ω		A9 999 00/680E
R12	0,68	MΩ	(5%)*	A9 999 00/680K
R13	0,12	MΩ	(5%)*	A9 999 00/120K
R14	47000	Ω		A9 999 00/47K
R15	15000	Ω		A9 999 00/15K
R16	5600	Ω		A9 999 00/5K6
R17	0,18	MΩ		A9 999 00/180K
R18	1200	Ω	(5%)*	A9 999 00/1K2
R19	0,1	MΩ		A9 999 00/100K

R20	0,22	MΩ		A9 999 00/220K
R21	2,2	MΩ	(5%)*	A9 999 00/2M2
R22	75000	Ω	2x	A9 999 01/150K (parallel)
R23	12000	Ω	(5%)*	A9 999 00/12K
R24	1500	Ω	(5%)*	A9 999 00/1K5
R25	27000	Ω	(5%)*	A9 999 00/27K
R26	0,3	MΩ	(5%)*2x	A9 999 01/150K (serie)
R27	0,15	MΩ		A9 999 00/150K
R28	82	Ω		A9 999 00/82E
R29	0,15	MΩ		A9 999 00/150K
R30	56000	Ω		A9 999 00/56K
R31	0,1	MΩ		A9 999 00/100K
R32	0,1	MΩ		A9 999 00/100K
R33	1500	Ω		A9 999 00/1K5
R34	1,5	MΩ	(5%)*	A9 999 00/1M5
R35	0,12	MΩ		A9 999 00/120K
R36	91000	Ω	(5%)*	A9 999 00/100K
R37	0,47	MΩ		A9 999 00/470K
R38	0,27	MΩ		A9 999 00/270K
R39	0,47	MΩ		A9 999 00/470K
R40	0,39	MΩ		A9 999 00/390K
R41	0,39	MΩ		A9 999 00/390K
R42	1000	Ω		A9 999 00/1K
R43	1000	Ω		A9 999 00/1K
R44	0,22	MΩ		A9 999 00/220K
R45	4700	Ω		A9 999 00/4K7
R46	5600	Ω		A9 999 00/5K6
R47	27	Ω	(5%)*	A9 999 00/27E
R48	27	Ω	(5%)*	A9 999 00/27E
R49	27	Ω		A9 999 00/27E
R50	27	Ω		A9 999 00/27E
R51	8200	Ω		A9 999 00/8K2
R52	10	Ω		A9 999 00/10E
R53	10	Ω		A9 999 00/10E
R54	5600	Ω	(2%)*	A9 999 00/56K
R55	220	Ω		A9 999 00/220E
R56	1000	Ω	(2%)	A9 999 01/1K
R58	0,1	MΩ		A9 999 00/100K
R59	0,1	MΩ		A9 999 00/100K
R60	10	Ω		A9 999 00/10E
R61	10	Ω		A9 999 00/10E
R62	2200	Ω		A9 999 00/2K2
L1				8008N
GR1	250 V 100 mA			SR 250/B100
GR2	250 V 100 mA			SR 250/B100
Z1	1,25 A(117-145V) 600mA(200-245V)			08 142 45 08 142 44
Z2	10 A			08 143 00

DJ/RT





I 224 53

Fig.3

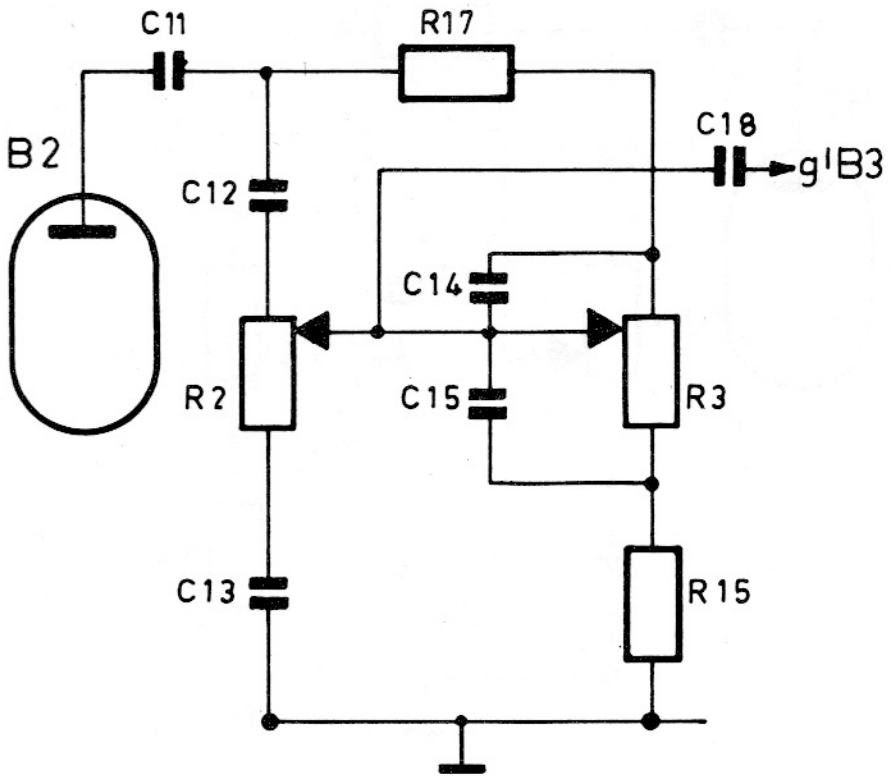


Fig.5

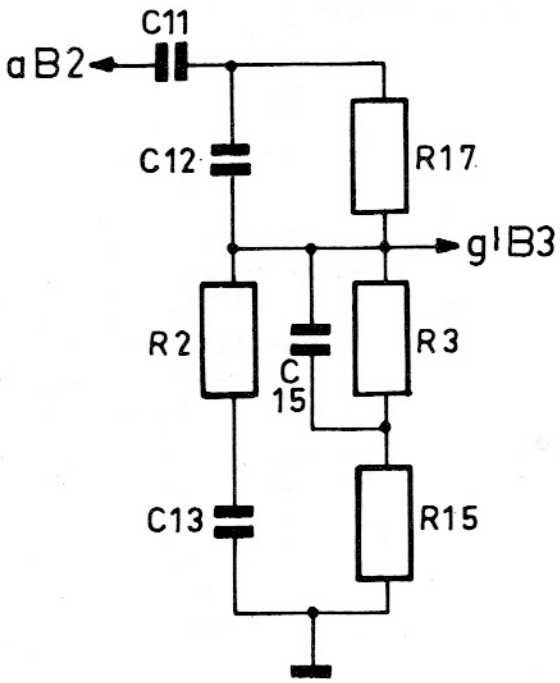


Fig.6

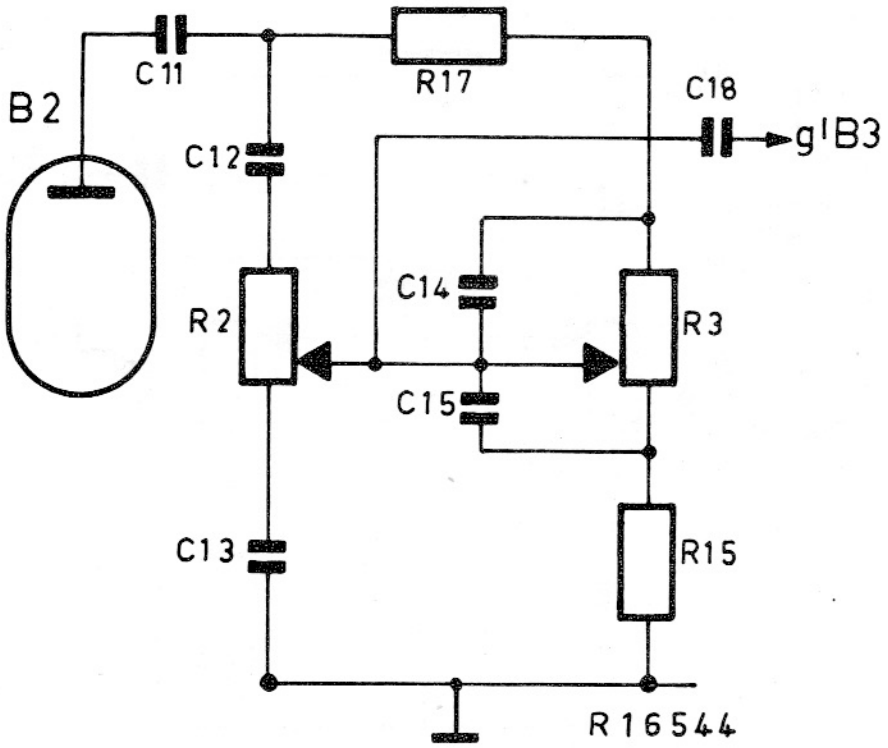

B2
C11
R17
C18
g¹B3
C12
C14
R2
R3
C15
C13
R15
R16544

Fig.7

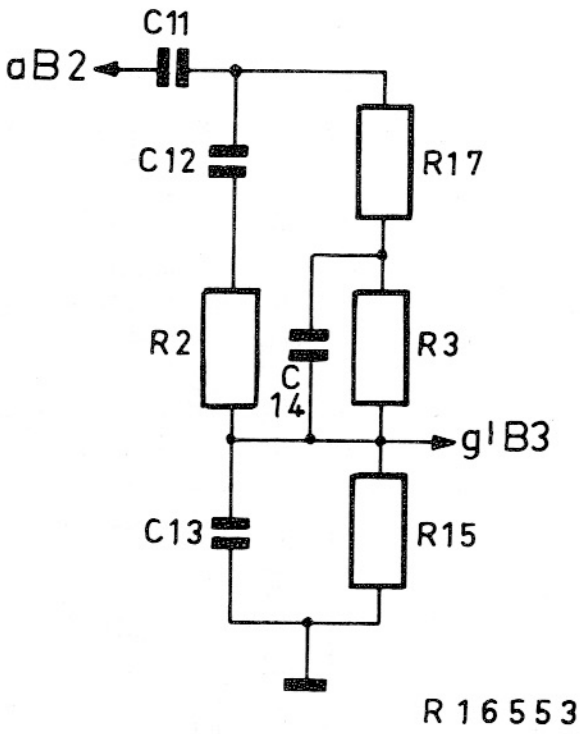

C11
aB2
C12
R17
R2
C 14
R3
g¹B3
C13
R15
R16553

Fig.8

N.V. PHILIPS GLOEILAMPEN-FABRIEKEN EINDHOVEN	**Service Information**	No. BH 1
		10-10-1957
CENTRAL SERVICE DIVISION	GROUP: Apparatus ARTICLE: Hi-Fi Equipment TYPE: AG 9006	DJ/JG

ALREADY PUBLISHED:

RE: Errata.

A few errors have been made in the Service Notes of the AG 9006.
For the screen grid voltage of the output valves 290 Volt has been indicated in the circuit diagram. This should be 150 Volt.
All supply voltages have been measured with respect to chassis. During measuring there was not applied a signal to the amplifier.

- - - - - -

In de Service Documentatie van de AG 9006 zijn enkele foutjes geslopen.
In het principe schema staat als schermroosterspanning van de eindbuizen opgegeven 290 volt. Dit moet zijn 150 volt.
Alle voedingsspanningen zijn gemeten ten opzichte van het chassis.
Tijdens de meting werd geen signaal aan de versterker toegevoerd.

- - - - - -

Dans la documentation service du AG 9006 il s'est glissé quelques erreurs.
Dans le schéma de principe la tension de grille-écran des tubes de sortie a été indiquée comme 290 V. Ceci doit être 150 V. Toutes les tensions d'alimentation ont été mesurées par rapport au châssis.
Pendant la mesure on n'a pas appliqué de signal à l'amplificateur.

- - - - - -

In der Service Anleitung des AG 9006 kommen einige kleine Fehler vor.
Im Prinzip Schaltbild wird als Schirmgitterspannung der Endröhren 290 Volt angegeben. Dies soll 150 V heissen.
Alle Speisespannungen sind gegenüber dem Chassis gemessen. Während der Messung wurde dem Verstärker kein Signal zugeführt.

- - - - - - -

En la documentación de servicio del AG 9006 se han deslizado algunos pequeños errores.
En el esquema de principio se ha indicado 290 voltios como tensión de rejilla pantalla de las válvulas de salida. Esto debe ser 150 voltios.
Todas las tensiones de alimentación se han medido con respecto al chasís.
Durante la medición no se ha aplicado una señal al amplificador.

CENTRAL SERVICE DIVISION
A. van Heu[illegible]