PHILIPS

LABORATORY REPORT

ELECTRON TUBES
SEMICONDUCTORS
COMPONENTS
MATERIALS

Group : Electronic Application Laboratory
F.A.P.E.S.A.,
Buenos Aires.
Date : August 25th 1961.
Author : L. Garlatti.
Title : Single-ended transformerless amplifier.
Ref.no.: IL/6127 EL.
Rep.no.: AR 6107.

PHILIPS ELECTRON TUBE DIVISION
INDUSTRIAL COMPONENTS AND MATERIALS DIVISION

AR 6107

ELECTRONIC APPLICATIONS LABORATORY
F.A.P.E.S.A. BUENOS AIRES

GROUP: Radio
AUTHOR: L. Garlatti
TITLE: Single-ended transformerless amplifier
DATE: August 25th. 1961
REF: IL/6127 E1

SUMMARY

This report describes a transformerless amplifier for a gramophone using two OC74 in Class B. The power output is 300 mW.

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Published in English and Spanish

GENERAL CONSIDERATIONS:

The use of output transistors connected as [illegible] push-pull or asymetric push-pull amplifiers i[illegible] makes possible its direct coupling to low impedance speakers.

Symetrical P.P. $Zo = 4\ V_B/Ic$

Asymetrical P.P. $Zo = \frac{V_B}{2}/Io$

On the other hand, not being the optimum load v[illegible] critical referred to the energy transference, it is possible to use speakers [illegible] impedance differs of the estimated optimum value (logically, if we reduce the value of Zo the efficiency of the stage will be lower on account of the greater consumption). In our case, we have followed the previous judgement using conventional speakers with a 5ohms impedance and a battery voltage of 9 V.

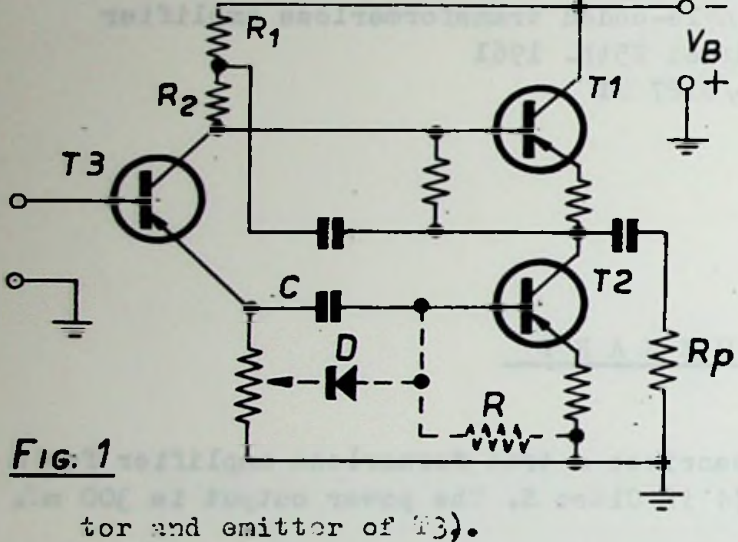

FIG. 1

In Fig. 1 is shown the output stage wiring. Transistor T3 drives transistor T1 using direct coupling between collector and base. The inyected signal is taken from the ends of resistor R2. It must be remembered that under this conditions the speaker impedance will be in parallel with resistor R1. to avoid an excessive loss of signal it must be complied that R1 >> Rp. (On the other hand, an excesive value of R1 will limit the maximum signal swing between collector and emitter of T3).

The driving signal for transistor T2 is taken from the emitter of transistor T3. As the output stage operates in Class B, when the transistor T2 is not conducting, capacitor C must discharge quickly during that half cycle. For this reason a divider has been introduced, formed by diode D and resistor R that also makes possible to fix the operating point of T2.

In the final circuit two preamplifier stages have been incorporated using transistors OC75 and a feedback loop has been included (capacitor C5) from collector to base of transistor T3.

Herewith are presented the measurements carried out on a prototype.

Static measurements:

Transistor	OC75	OC75	OC7[illegible]	2-OC74
I. Collector	1.[illegible]	2,[illegible]mA.	11mA.	10mA.
V. Collector and ground	0,[illegible]%	1,15V.	[illegible],7V.	0V.

Dynamic measurements:

Power output: 300 mW. with 5% harmonic distortion
Sensivity at maximum output: 180mV.
Frequency response: 50-4000 c/s (for -3dB)
Total no-signal consumption: 27mA.
Total maximum signal consumption: 115mA.

Conclusion:

The circuit employed provides a compromise solution in the case of not using transformers. However, it presents the disadvantage of the higher consumption and of using components that must have stricter tolerances due to the direct coupling.

References:

1) Single Ended Amplifier for Class B operation. H.C. Lin and B. White (Electronics May 2[illegible], 1,5[illegible]).

Report N°2/55 (N5502A.).
Handbook of Semiconductos Electronics, Lloyd P. Hunter.

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LIST OF MATERIALS

RESISTORS

R_1	: 200 K	½W ± 10%	
R_2	: 50K Potenciometer. Logar. Variat.		
R_3	: 27K	½W ± 10%	
R_4	: 10 Ω	"	"
R_5	: 3K3	"	"
R_6	: 27K	"	"
R_7	: 2K7	"	"
R_8	: 10 Ω	"	"
R_9	: 220 Ω	"	"
R_{10}	: 10K	"	"
R_{11}	: 10K	"	"
R_{12}	: 180 Ω	"	5%
R_{13}	: 150 Ω	"	"
R_{14}	: 100 Ω	"	"
R_{15}	: 68 Ω	"	"
R_{16}	: 100 Ω	"	10%
R_{17}	: 100 Ω	"	"
R_{18}	: 0,5 Copper wire		
R_{19}	: 0,5 "	"	

CAPACITORS

C_1 : 100 /uF x 16V.
C_2 : 3,2 /uF x 16V.
C_3 : 3,2 /uF x 16V.
C_4 : 3,2 /uF x 16V.
C_5 : 10K x 125V. (Poliester)
C_6 : 100 /uF x 16V.
C_7 : 100 /uF x 16V.
C_8 : 1000 /uF x 16V

MISCELLANEOUS

1 - 2-OC74 transistor with heat sink.
1 - OC79 transistor with heat sink Code 56.200
2 - OC75 Transistor
1 - OA81 Diode
1 - 5 Ω Loudspeaker

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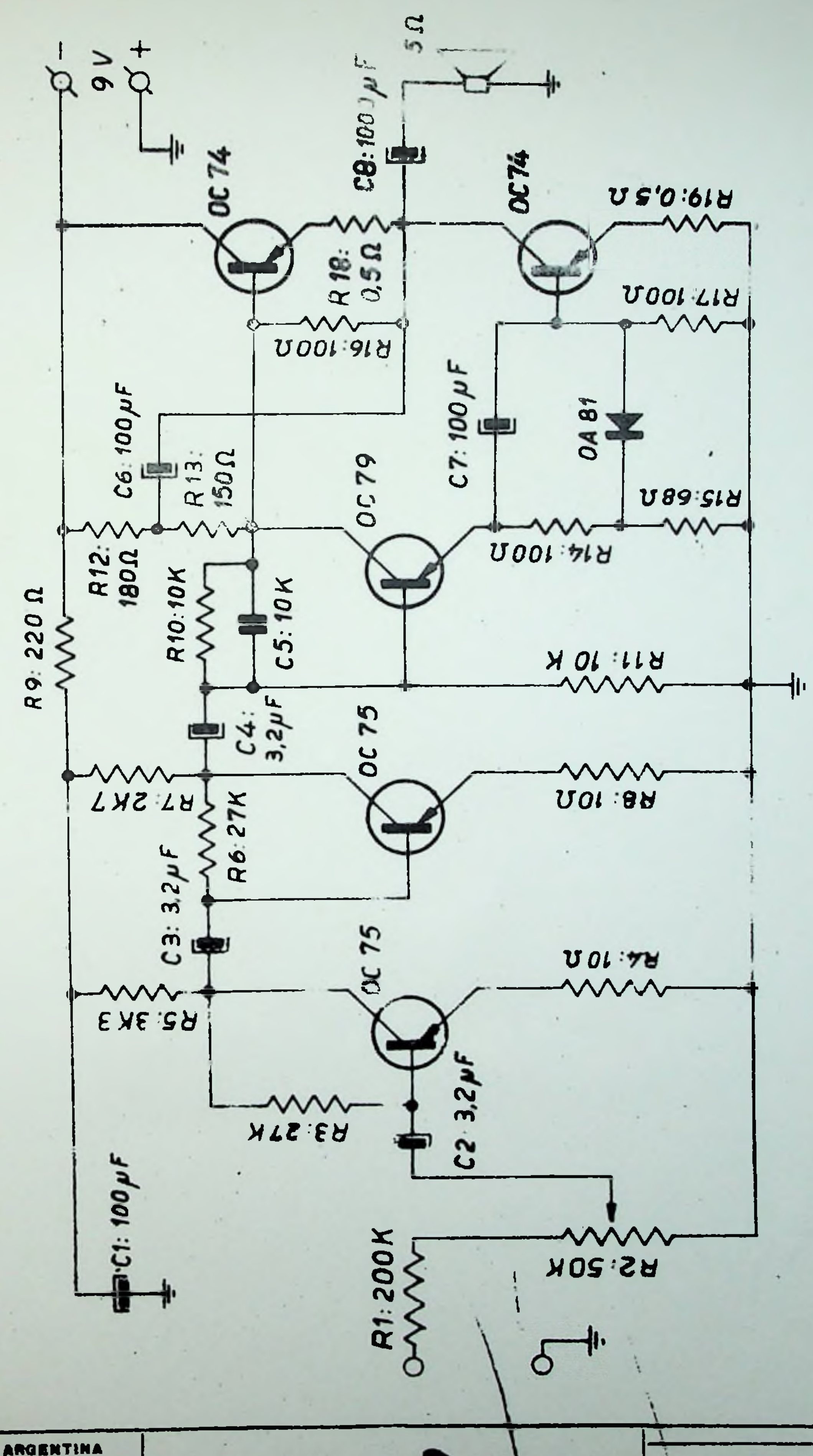
A B C D E F G H I J K L M N P Q R S T U V W X Y Z



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