

INSTRUCTION S.3

Section 21

Page re-issued May 1960

Amplifiers GPA/4 and 4A

General

The GPA/4 and 4A are general-purpose voltage amplifiers with input and output impedances of 600 ohms. The gain of the GPA/4 is variable in 10-dB steps from 43 dB to 73 dB, and that of the GPA/4A effectively in 0.5-dB steps from 30 dB to 70 dB. The frequency response of both amplifiers is sensibly flat from 30 c/s to 15 kc/s, and non-linearity is negligible up to a peak output volume of at least

Circuit Description (Fig. 21.5)

The circuit employs two double-triode valves giving between them three stages of gain. The first and second stages use the two halves of a Type 6060 valve, while the output stage, which is push-pull operated, uses both halves of a CV 455. Input and output transformers are fitted, and the push-pull stage is made self-balancing with respect to its anode-current feeds in the same way as on the C/9.

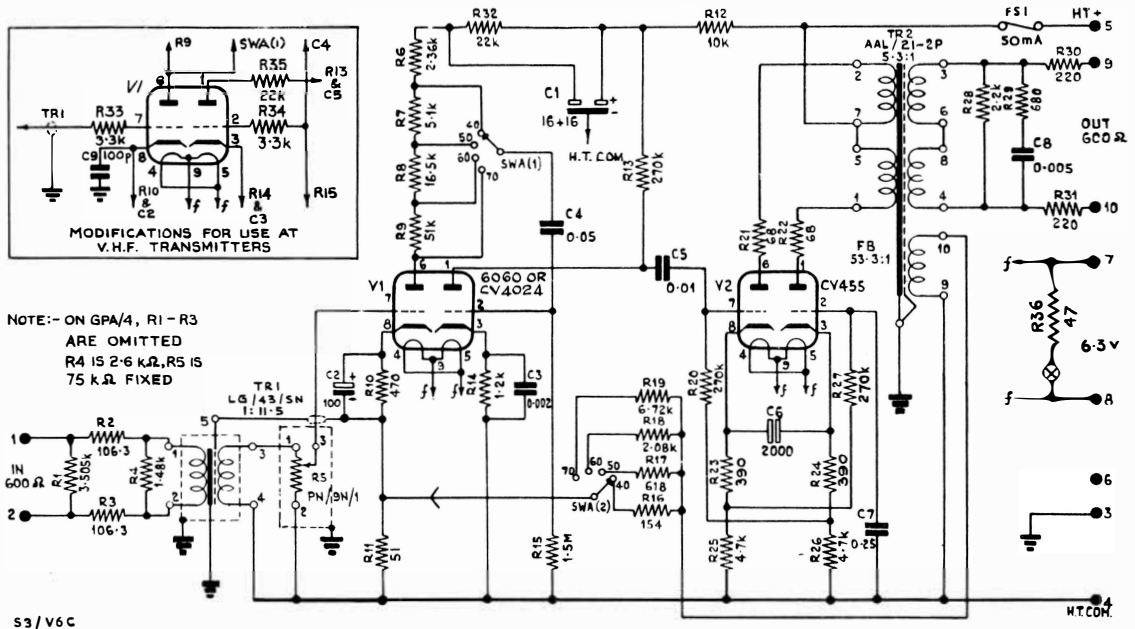


Fig. 21.5. Amplifiers GPA/4 and 4A: Circuit
Drawing No. EA 8566

+14 dB. The total noise output does not appreciably exceed that due to thermal-agitation currents in the input circuit.

The parent type, GPA/4, is intended for use where a coarse gain adjustment is sufficient and a highly accurate input impedance is not important, e.g., for a microphone amplifier, whereas the sub-type, GPA/4A, is suitable for positions where a close adjustment of gain and an accurate resistive input impedance are essential, e.g., with an incoming-line equaliser. These requirements for the GPA/4A are met by the provision at the input of an additional gain control with 21 steps of 0.5 dB and a 3-dB loss-pad which halves the effects of transformer reactance and resistance variation on the amplifier input impedance.

The 3-dB pad R1-R4 and potentiometer PN/9N/1 which precede and follow the input transformer TR 1 are fitted on the GPA/4A only, as explained under the previous sub-heading. On the GPA/4, R1-R3 are omitted, the value of R4 is increased from 1.48 to 2.6 kilohms and the PN/9N/1 is replaced by a fixed 75-kilohm resistor R5. In both amplifiers, however, the input transformer is loaded with two resistors (or their equivalent!) in parallel, the smaller resistance being across the primary and the larger across the secondary winding. By a suitable choice of values the transformer input impedance is made more nearly constant and free from reactance than would be possible with an undivided load.

Voltage negative feedback from a tertiary winding on the output transformer TR 2 is applied to the cathode circuit of V1A. Gain adjustment is made by means of switch SW A, one section of which varies the forward gain in 10-dB steps, while the other maintains the gain-reduction caused by feedback at the constant value of 16 dB. The forward gain is varied by switching the coupling capacitor C4 to tapping points on V1A anode resistance, since the alternative of