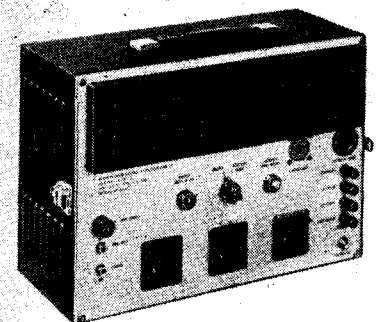


BSR PA 20B



Seven-valve portable 20 watt push-pull amplifier. Input sockets for ribbon and moving coil microphones, crystal or magnetic pickup and for radio tuner unit. Operating from 200 to 250V AC 50 c/s or 12V battery-operated vibrator unit. In black crackle-finished metal case with carrying handle. Manufactured by Birmingham Sound Reproducers, Old Hill, Staffs.

CIRCUIT. Input transformer IP1 is fitted for use with ribbon or moving-coil microphones. The centre tap on L1, its primary, is connected to chassis and balanced input for 10 to 30 ohm moving-coil and 600 ohm ribbon microphones is secured.

L2, secondary of the input transformer, applies the signal to the grid of V1, a microphone pre-amplifier. Cathode bias is by R1, decoupled by C1. Diodes, not used, are strapped to cathode. R2 is the anode load, C2 feeds R4, the microphone volume control which is shunted by R3. R5 passes signal to grid of V2.

Gramophone pickup is plugged into J2, which connects it to R6, the gramophone volume control, and thence through R7 to grid of V2.

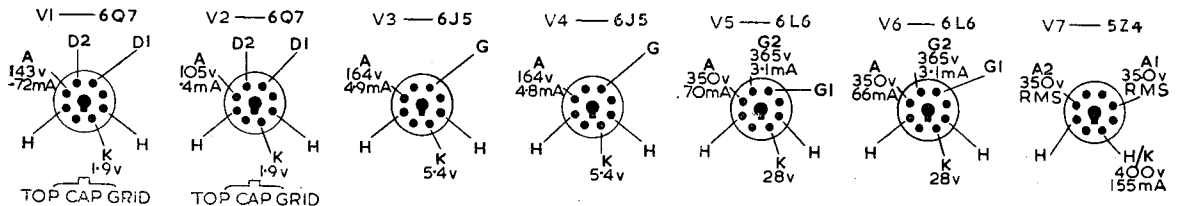
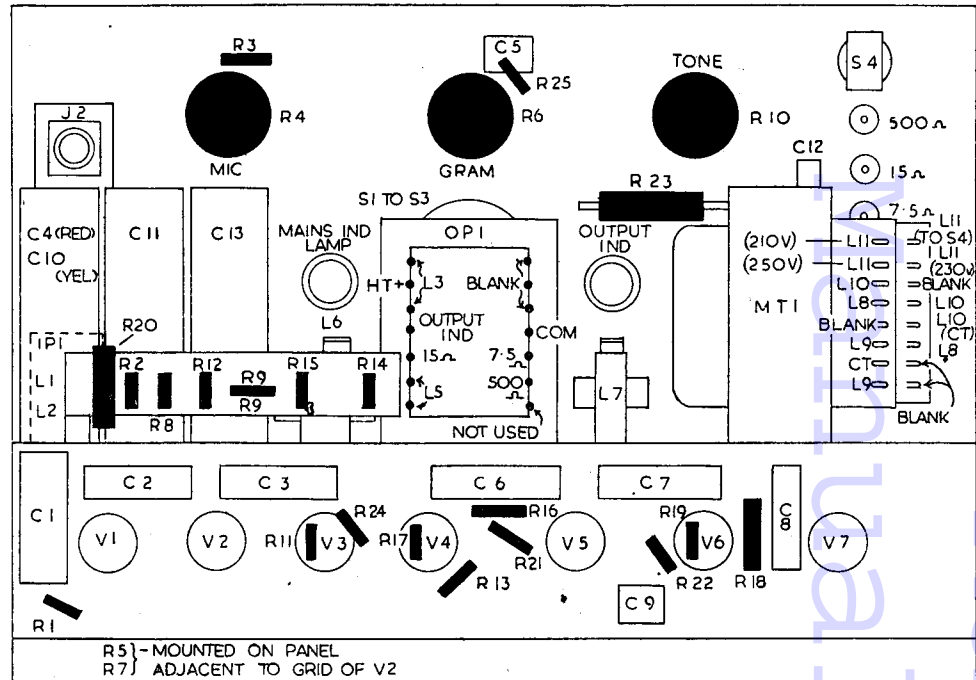
Radio unit input is fed, through special plug and socket, to gramophone volume control, R6, via R25. HT and LT for the radio unit are provided at the socket.

Signal on grid of V2 may, therefore, be from microphone, pickup or radio. Cathode bias is by R1, C1, also in the cathode circuit of V1. V2 diodes are not used, and are strapped to the cathode. R8 is anode load. HT to V1 and V2 is obtained through R12 and decoupled by C4.

C3 feeds grid of V3, the driver valve for V5, one of the push-pull output valves. R9 is a grid stopper and R11 grid leak. R10, C5 provide variable top cut.

Cathode bias for V3 and V4 is obtained from R13 in the cathode circuit. Negative feedback is introduced at this stage by connecting a

Continued on page iv



CAPACITORS

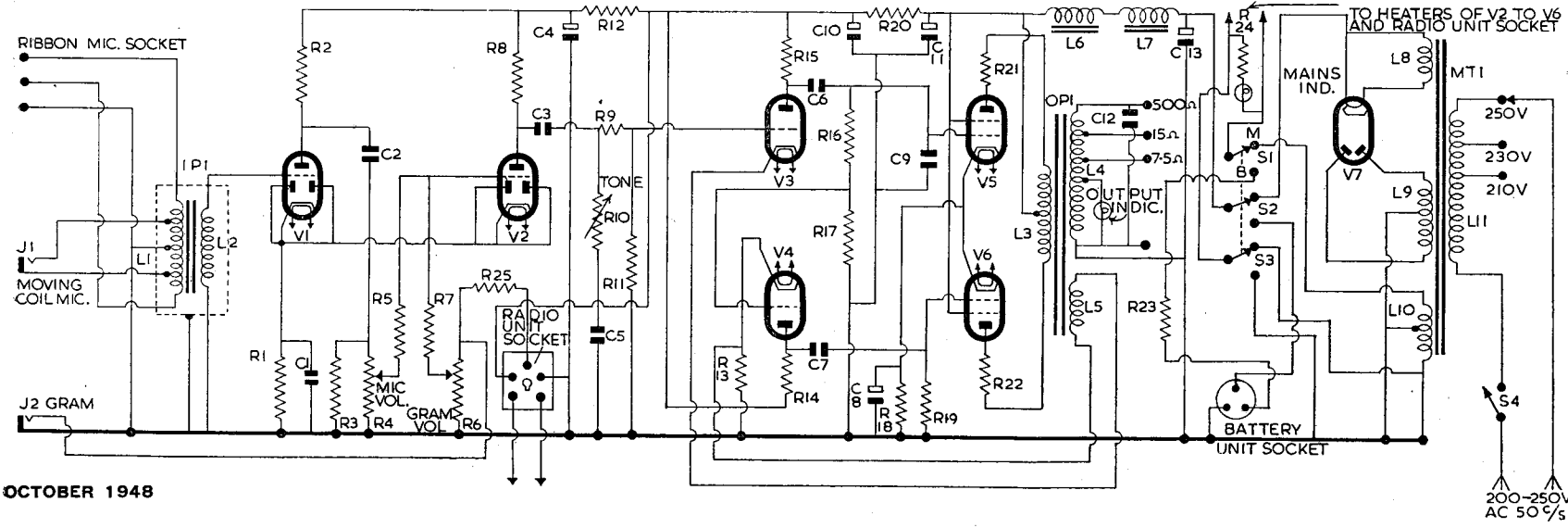
C	Capacity	Type	C	Capacity	Type
1	.25	Electrolytic 25V	8	.25	Electrolytic 50V
2	.01	Tubular 1000V	9	.001	Mica
3	.1	Tubular 500V	10	.8	Electrolytic 500V
4	.8	Electrolytic 500V	11	.16	Electrolytic 500V
5	.001	Mica	12	.01	Tubular 1000V
6	.1	Tubular 500V	13	.16	Electrolytic 500V
7	.1	Tubular 500V			

INDUCTORS

L	Ohms
1	12.5 (total)
2	1650
3	230
4	32 (total)
5	Very low
6	100
7	100
8	Very low
9	180
10	Very low
11	15.5 (total)

RESISTORS

R	Ohms	Watts
1	2.2 K	1/4W
2	100 K	1/4W
3	100 K	1/4W
4	250 K	Potr.
5	220 K	1/4W
6	250 K	Potr.
7	220 K	1/4W
8	220 K	1/4W
9	100 K	1/4W
10	500 K	Potr.
11	220 K	1/4W
12	10 K	1/4W
13	680	1/4W
14	22 K	1/4W
15	22 K	1/4W
16	220 K	1/4W
17	22 K	1/4W
18	200	1/4W
19	220 K	1/4W
20	10 K	1/4W
21	100	1/4W
22	100	1/4W
23	1.7	25W
24	10	1/4W
25	1 M	1/4W



BSR MODEL PA 20B—Contd.

special winding L5 on the output transformer in series with the cathode of V3.

R15 is anode load, C6 feeds signal to grid of V5, one of the push-pull beam tetrode output valves, and also to potential divider formed by R16, R17, and thence to grid of phase inverter V4. R14 is anode load of V4.

HT for V3 and V4 is obtained from R20, decoupled by C10. C7 applies signal at anode of V4 to grid of second push-pull beam tetrode output valve V6. R16, R17 form the grid resistor of V5 and R19 that of V6.

Output stage. Cathodes of V5 and V6 are strapped together and obtain bias by R18, C8. Grid signals are obtained from V3 and V4, through C6 and C7 respectively. Screen voltages are obtained direct from HT line with C11 for decoupling.

HT for anodes of V5 and V6 is fed to centre-tap of primary L3 of the output transformer. R21 and R22 are anode stoppers. Secondary L4 of the output matching transformer OP1 is tapped for output impedances 500, 15 and 7.5 ohms. A special tapping is provided for the output indicator lamp. C12 is shunted across the whole secondary.

PHILIPS MAS 292—Continued

Negative feedback. The feedback circuit is in the form of a bridge network with feedback voltages, applied from L24, via C28 across the two parallel circuits R28, R31 and R19, R23. V4 cathode is joined to the junction of R28, R31: the grid is connected in effect, to the junction of R19, R23. Relative to the cathode, the voltages from L24 via C28 are in phase with the grid signals, while the voltages from the other end of L24 are out of phase with the grid.

Component values are adjusted so that, with the volume control near to its maximum, the in-phase feedback voltage is equal to, and therefore neutralises, the out-of-phase voltage. Thus, there is no negative feedback when the volume control is full up for maximum sensitivity. As the volume control is moved away from maximum, the out-of-phase voltage exceeds the in-phase voltage and increasing negative feedback is obtained.

Tone control operates by varying the amount of out-of-phase voltage from L24 applied to the grid of V4. Frequency discrimination in favour of the upper register is determined by R20, C26. Thus, with the slider of R21 at the grid end of the track, maximum negative feedback is applied to the higher audio frequencies.

High tension is provided by directly heated full-wave rectifier V6. L27, the HT secondary of MT1, the mains input transformer, supplies its anode voltages and L26 its filament current. Smoothing is provided by C35, C36, R32 and part of L22, which is incorporated to give hum cancellation by virtue of currents of opposite phase in the two sections of the winding.

Heaters V1 to V5 and dial lights obtain filament current from L28.

Primary L29 of mains input transformer MT1 is tapped for 100-155 and 190-255V, 50-100 c/s AC. S5, ganged to the volume control spindle, is the ON-OFF switch.

Chassis removal. Take off four control knobs. Unsolder lead to tag on base foil. Remove four

High tension. Where AC mains are available the HT is provided by an indirectly heated rectifier V7. L9, the HT secondary of MT1, the mains input transformer, supplies its anode voltages, and L8 its heater current. HT is fed from the rectifier to a changeover switch S2.

When AC mains are not available, HT can be provided by a 12V battery-operated vibrator unit, type LT20, the output from which is plugged into the special socket fitted on front panel of amplifier. HT from this unit is also fed to S2.

Whichever HT supply is used, it is fed by S2 to choke-capacity smoothing circuit L6, L7, C11, C13.

Heaters of V1 to V6, mains indicator lamp and heaters of valves in radio unit obtain their current, on AC supplies, from secondary, L10 of MT1. On battery operation they obtain their current from the vibrator supply of 12V through a dropper resistor R23. S1 and S3, ganged to S2, disconnect the heaters of V1 to V6 from across secondary L10 and connect them to 12V DC.

Primary L11 of MT1 is tapped for input voltages of 200 to 250V 50-100 c/s. S4 is the mains ON-OFF switch only.

Chassis removal. Remove the four bolts (one at each corner) and lift out chassis.

screws holding scale assembly to cabinet, then two vertical screws (one at each end of chassis) which hold the chassis to the large side brackets. These brackets remain attached to the cabinet. Chassis is free to be withdrawn and can be stood on end using the transformer projecting lugs as feet. The speaker leads are long enough to permit this.

When replacing chassis, ensure that the two rubber-bushed holes in the front of chassis engage with the large projecting pins on cabinet support brackets. Leave the replacement of the scale assembly screws until last. Insertion of these screws is facilitated by sticking each screw to the driver by means of a small amount of wax or alternatively by magnetising the screwdriver.

Cord drive replacement. Make up the cord assembly as shown, p.vi. Fit as follows: Face the front of chassis and turn gang to maximum. Slip roller A into one loop of cord and one end of spring B through the hole in the roller. The other spring end fits over lug C on the drum. Pass the cord clockwise round pin D down to the righthand side of the vernier brass drum. Wind 2.5 turns clockwise and return to the left side of the smaller groove on the gang drum. Feed clockwise round the groove and pin D back to the roller A. Loop the free end of the cord on to the roller. The latter operation is facilitated by temporarily detaching the spring from the lug C. The cord should be under tension exerted by the spring.

Pointer cable replacement. Make up the cable as shown. Turn gang to minimum. Slip the small roller E into one loop of the cable and one end of the spring F through the hole in the roller. The free end of the spring loops on to the drum lug G. Pass the cable via the opening in the edge of the drum, into the outside groove, then up to and round the pulleys H, J and K back to the left side of the drum. Continue in the outside groove back to the roller E via the drum edge opening. Finally, loop the free end of the cable on to the roller. This last operation is more easily carried out if the spring is temporarily detached from the lug G. The cable should be under tension exerted by the spring. The pointer can now be secured to the cable.

no other

Valve Tester

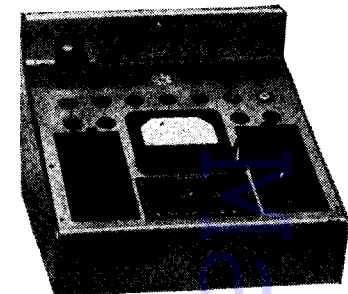
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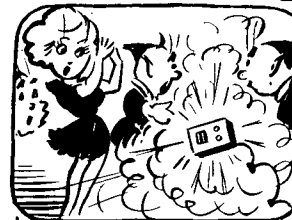
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