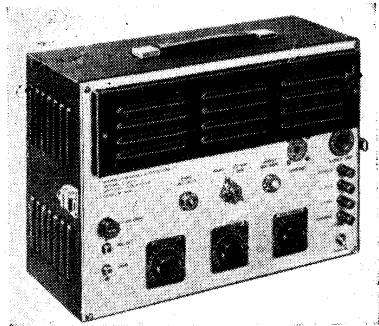


# BSR PA 20B



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.

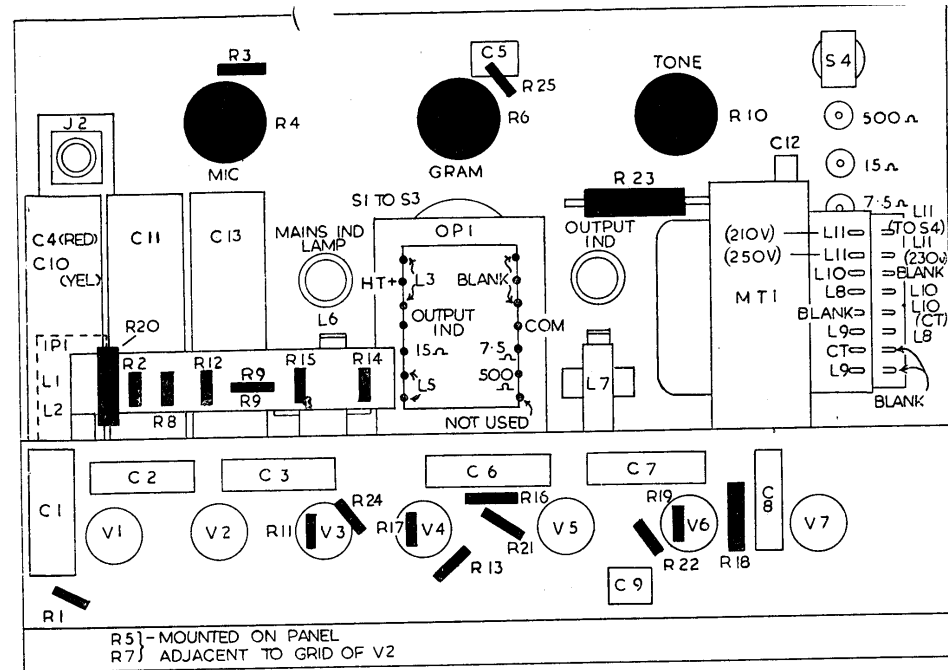
Radio unit input is fed, through special plug and socket, to gramophone volume control, R6, via R25. HT and LT for the radio unit are provided at the socket.

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.

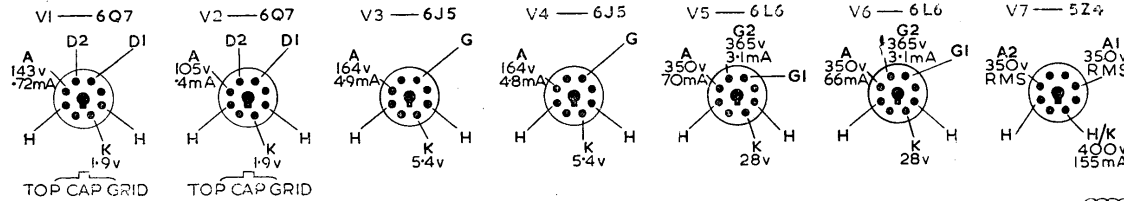
C3 feeds grid of V3, the driver valve for V5, one of the push-pull output valves. R9 is a grid stopper and R11 grid leak. R10, C5 provide variable top cut.

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



R5]- MOUNTED ON PANEL  
R7] ADJACENT TO GRID OF V2



### CAPACITORS

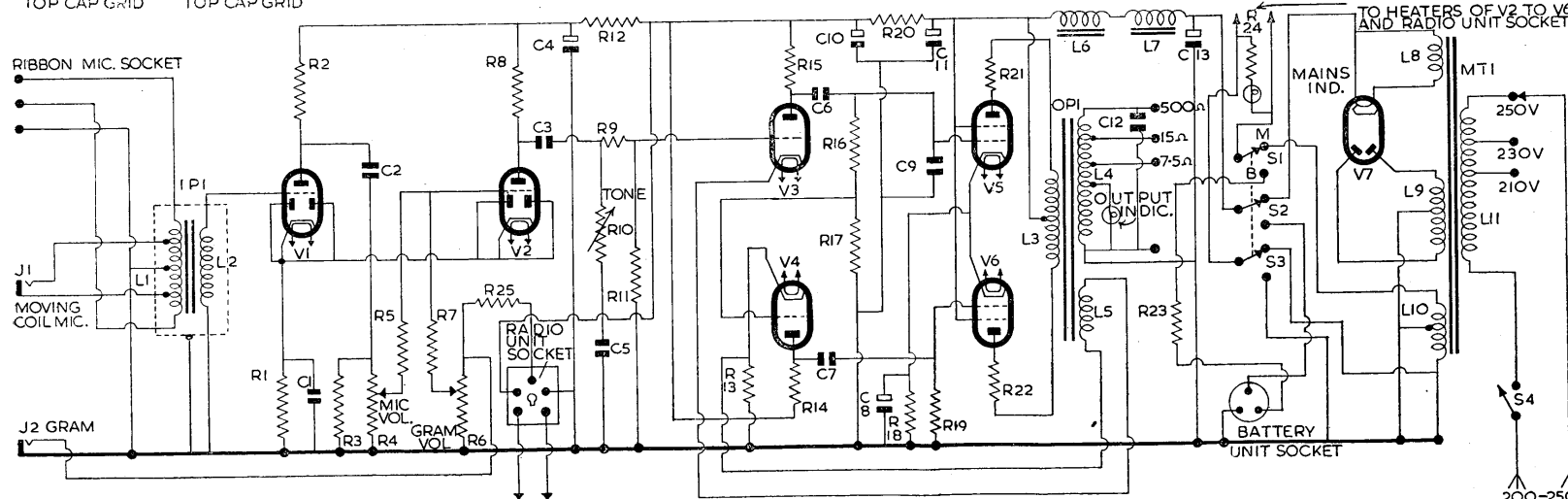
C	Capacity	Type	C	Capacity	Type
1	.25	Electrolytic 25V	8	.25	Electrolytic 50V
2	.01	Tubular 1000V	9	.001	Mica
3	.1	Tubular 500V	10	.8	Electrolytic 500V
4	.8	Electrolytic 500V	11	.16	Electrolytic 1000V
5	.001	Mica	12	.01	Tubular 1000V
6	.1	Tubular 500V	13	.16	Electrolytic 500V
7	.1	Tubular 500V			

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



## 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.

**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.

no other

## Valve Tester

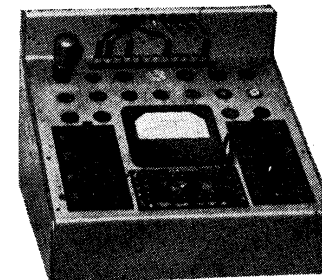
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