# SECTION 6
## D AMPLIFIERS

### D/9, D/9A, D 9B

The amplifiers D/9 and D/9A are designed as general purpose level raisers and operate between 600-ohm source and load impedances. The D/9B is of similar design but has an input impedance of 300 ohms and a much greater gain. Each of the amplifiers in this series comprises two stages, resistance-capacitance coupled and employing pentodes, Type AC SP3, feedback being applied to both stages.

### D/9. Circuit Description (Fig. 17)

The input transformer secondary winding is shunted by four resistors in series, R28 to R31, which are tapped so that the gain of the amplifier may be set to close limits on installation.

Current feedback of 13 dB is applied to the first stage and is obtained from the resistors R3, R4, R19, which are included in the cathode return circuit. The volume control, PF/4A1, and blocking capacitor, C3, are shunted across R3 and R19. Volume control is therefore effected by varying the amount of feedback in this stage, the control being limited to 10 dB in steps of 1 dB. A small amount of high-frequency correction is introduced by shunting C4 across R4.

Voltage feedback of 19 dB is applied to the second stage by means of a feedback winding on the output transformer, the cathode return circuit being completed through this winding and the bias resistor, R18. This enables maximum undistorted output to be obtained and compensates for the distortion due to the output transformer.

In order to minimise mains hum when using a.c. filament supply, bias is applied to the heaters from the potential divider, R26, R27, connected across the h.t.. supply, the bias being applied via R24, R25, thereby maintaining the two ends of the heater at the same potential with respect to the cathode. Under these conditions, terminals 14, 17 and 18 must be strapped to complete the circuit.

Where two amplifiers are supplied from a single mains unit, the strapping should only be done on one amplifier.

### Valve Data

| *Valve* | *Anode Current mA* | *Screen Current mA* | *Fil. Volts* | *Fil. Amps.* |
|---|---|---|---|---|
| Stage 1, AC/SP3A RH | 1·2 | 0·4 | 4 | 1 |
| Stage 2, AC/SP3B RH | 4·6 | 1·5 | 4 | 1 |

Total feed, 7·7 mA.
H.T. Supply, 300 or 250 V.
L.T. Supply, 4 V a.c. or 6 V d.c.

### General Data

*Volume Control*

| *Type* | *Resistance* | *No. of Studs* | *Loss per Stud* |
|---|---|---|---|
| PF/4A1 | 6,119 Ω | 10 | 1 dB. |

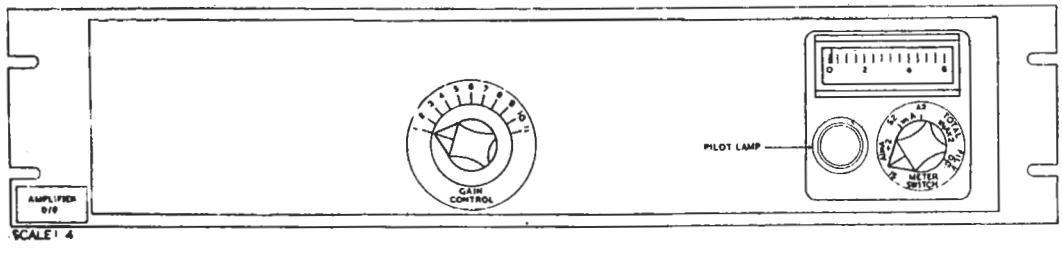



*Fig. 6.1. Face Panel D/9*

*Meter*, Miniature Edgewise No. 1456.

*Meter Switch*, Yaxley Type B, No. 2123.

*Impedances*

| | |
|---|---|
| Input | Z = 600 Ω. |
| Output | Z = 600 ,, |
| Normal Load | Z = 600 ,, |

*Normal Working Levels*

| | |
|---|---|
| Input | − 50 dB. |
| Output | 0 or + 4 dB. |

### Test Data

600-*ohm Test Gain*

Test Conditions :
Volume control set at maximum gain.
Tone Source Sending Level, − 46 dB.
Gain at 1,000 c/s, G = 50 dB.
Gain at 50-10,000 c/s, ± 0·1 dB relative to gain at 1,000 c/s.

*Maximum Working Voltage Gain*

Test Conditions :

Output loaded with 600 Ω and output level at + 4 dB.

Gain at 1,000 c/s, G = 50 dB.

*Total Percentage Harmonic Content*

| | *Normal level* | 8 *dB above normal level* |
|---|---|---|
| 100 c/s | < ·1 | < ·5 |
| 1,000 c/s | < ·1 | < ·2 |

## D/9A. Circuit Description (Fig. 18)

The input transformer feeds the grid of the first stage via a continuously-variable volume control, R32.

Current feedback of 13 dB is applied to the first stage from the combination of resistors R3, R4, R19, R33 and is applied through the blocking capacitor, C2. The amount of feedback is predetermined by shunting R33 across R3, R19. Correction at the higher frequencies is obtained by shunting C4 across R4.

## General Data

*Volume Control*

*Type*, Morganite Stackpole MNAP 20350.-

*Resistance*, 20,000 Ω.

*Meter*, Miniature Edgewise No. 1456.

*Meter Switch*, Yaxley Type B, No. 2123.

*Impedances*

| | |
|---|---|
| Input | Z = 600 Ω. |
| Output | Z = 600 ,, |
| Normal Load | Z = 600 ,, |

*Normal Working Levels*

| | |
|---|---|
| Input | − 50 dB. |
| Output | 0 or + 4 dB. |

## Test Data

*600-ohm Test Gain*

Test Conditions :

Volume control set at maximum gain.

Tone Source Sending Level, − 49 dB.

Gain at 1,000 c/s, G = 53 dB

Gain at 50-10,000 c/s, ± 0·1 db relative to gain at 1,000 c/s.

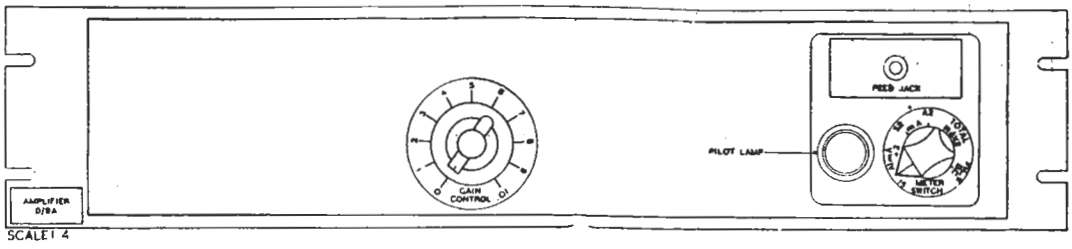



*Fig. 6.2 Face Panel D/9A*

Voltage feedback of 19 dB is applied to the second stage by means of a feedback winding on the output transformers, the cathode return circuit being completed through this winding and the bias resistor R18.

Similar arrangements for minimising mains hum are provided as those previously described under the heading D/9.

## Valve Data

| *Valve* | *Anode Current mA* | *Screen Current mA* | *Fil. Volts* | *Fil. Amps.* |
|---|---|---|---|---|
| Stage 1, AC/SP3A RH | 1·2 | 0·4 | 4 | 1 |
| Stage 2, AC/SP3B RH | 4·6 | 1·5 | 4 | 1 |

Total feed, 7·7 mA.

H.T. Supply, 300 or 250 V.

L.T. Supply, 4 V a.c. or 6 V d.c.

*Maximum Working Voltage Gain*

Test Conditions :

Output loaded with 600 Ω and output level at + 4 dB.

Gain at 1,000 c/s, G = 53 dB.

*Total Percentage Harmonic Content*

| | *Normal level* | 8 *dB above normal level* |
|---|---|---|
| 100 c/s | < 0·1 | < 0·5 |
| 1,000 c/s | < 0·1 | < 0·2 |

## D/9B. Circuit Description (Fig. 18)

The circuit of the D/9B is similar to that of the D/9A but employs a high step-up ratio input transformer which increases the overall gain to 71 dB and reduces the input impedance to 300 ohms. The D/9B can therefore be used as an "A" amplifier when required.

**Valve Data**

| Valve | *Anode Current mA* | *Screen Current mA* | *Fil. Volts* | *Fil. Amps.* |
|---|---|---|---|---|
| Stage 1, AC/SP3A RH | 1·2 | 0·4 | 4 | 1 |
| Stage 2, AC/SP3B RH | 4·6 | 1·5 | 4 | 1 |

Total feed, 7·7 mA.
H.T. Supply, 300 or 250 V.
L.T. Supply, 4 V a.c. or 6 V d.c.

**General Data**

*Volume Control*
*Type*, Morganite Stackpole MNAP 20450.
*Resistance*, 200,000 Ω.
*Meter*, Miniature Edgewise No. 1456.
*Meter Switch*, Yaxley Type B, No. 2123.

*Total Percentage Harmonic Content*

| | *Normal level* | *8 dB above normal level* |
|---|---|---|
| 100 c/s | < 0·1 | < 0·5 |
| 1,000 c/s | < 0·1 | < 0·2 |

**D/10, D/10A, D/10B**

The amplifiers D/10, D/10A and D/10B are single-stage medium-gain units designed as general purpose level raisers. Except for minor details, the same circuit is used in each of these amplifiers.

**Circuit Description (Figs. 19, 20, 21)**

The input transformer, the secondary of which is shunted by a volume control, feeds into a pentode, Type AC/SP3B. H.T. is fed to the anode of the valve through the primary winding of the output transformer, the secondary of the transformer being built out to an impedance of 600 ohms by the resistors R6, R7.

The cathode-return circuit is taken through a third winding on the output transformer, which provides 19 dB voltage feedback, the effect of which is to assist in obtaining correct output impedance and to reduce distortion due both to the valve and to the transformer.

Power supplies are normally taken from a mains unit of the MU/16 type, but provision is made for 6-V. d.c. l.t. . supply.

Metering facilities are available for the measurements of anode and screen currents.

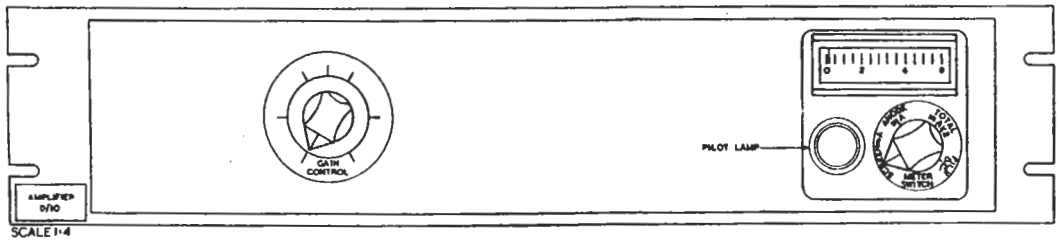



*Fig. 6.3 Face Panel D/10*

*Impedances*
Input Z = 300 Ω.
Output Z = 600 ,,
Normal Load Z = 600 ,,

*Normal Working Levels*
Input − 70 dB.
Output 0 or + 4 dB.

**Test Data**

*600-ohm Test Gain*

Test Conditions :
Volume control set at maximum gain.
Tone Source Sending Level, − 64 dB.
Gain at 1,000 c/s, G = 67·5 dB.
Gain at 50-10,000 c/s, ± 0·1 dB relative to gain at 1,000 c/s.

*Maximum Working Voltage Gain*
Test Conditions :
Output loaded with 600 Ω and output level at + 4 dB.
Gain at 1,000 c/s, G = 71 dB.

**D/10 (Fig. 19)**

**Valve Data**

| Valve | *Anode Current mA* | *Screen Current mA* | *Fil. Volts* | *Fil. Amps.* |
|---|---|---|---|---|
| Stage 1, AC/SP3A RH | 4·6 | 1·5 | 4 | 1 |

Total feed, 6·1 mA.
H.T. Supply, 300 or 250 V.
L.T. Supply, 4 V a.c. or 6 V d.c.

**General Data**
*Volume Control*
*Type*, Morganite Stackpole MNAP 25450.

*Resistance*, 250,000 Ω.

*Meter*, Miniature Edgewise No. ED 1456.

*Meter Switch*, Yaxley Type B ; 2-bank, 9-position.

*Impedances*
Input Z = 600 Ω.
Output Z = 600 ,,
Normal Load Z = 600 ,,

*Normal Working Levels*
Input — 40 dB.
Output — 10 dB.

**Test Data**
600-*ohm Test Gain*
Test Conditions :
Volume control set at maximum gain.
Tone Source Sending Level, — 29 dB.
Gain at 1,000 c/s, G = 33 dB.
Gain at 50-10,000 c/s, ± 0·1 dB relative to gain at 1,000 c/s.

*Maximum Working Voltage Gain*
Test Conditions :
Output loaded with 600 Ω and output level at — 10 dB.
Gain at 1,000 c/s, G = 33 dB.

*Total Percentage Harmonic Content*

| | *Normal level* | *8 dB above normal level* |
|---|---|---|
| 100 c/s | < 0·1 | < 1·0 |
| 1,000 c/s | < 0·1 | < 1·0 |

**D/10A (Fig. 20)**
**Valve Data**

| *Valve* | *Anode Current mA* | *Screen Current mA* | *Fil. Volts* | *Fil. Amps.* |
|---|---|---|---|---|
| Stage 1, AC/SP3A RH | 4·6 | 1·5 | 4 | 1 |

Total feed, 6·1 mA.
H.T. Supply, 300 or 250 V.
L.T. Supply, 4 V a.c. or 6 V d.c.

**General Data**
*Volume Control*

| *Type* | *Resistance* | *No. of Studs* | *Loss per Stud* |
|---|---|---|---|
| PN/5A1 | 8,900 Ω | 19 | 2 dB. |

*Meter*, Miniature Edgewise No. ED 1456.

*Meter Switch*, Yaxley Type B, 2-bank, 9-position.

*Impedances*
Input Z = 600 Ω.
Output Z = 600 ,,
Normal Load Z = 600 ,,
*Normal Working Levels*
Input — 39 dB.
Output — 10 dB.

**Test Data**
600-*ohm Test Gain*
Test Conditions :
Volume control set at maximum gain.
Tone Source Sending Level, — 25 dB.
Gain at 1,000 c/s, G = 29 dB.
Gain at 50-10,000 c/s, ± 0·1 dB relative to gain at 1,000 c/s.
*Maximum Working Voltage Gain*
Test Conditions :
Output loaded with 600 Ω and output level at — 10 dB.
Gain at 1,000 c/s, G = 29 dB.
*Total Percentage Harmonic Content*

| | *Normal level* | *8 dB above normal level* |
|---|---|---|
| 100 c/s | < 0·1 | < 0·5 |
| 1,000 c/s | < 0·1 | < 0·2 |

**D/10B (Fig. 21)**
**Valve Data**

| *Valve* | *Anode Current mA* | *Screen Current mA* | *Fil. Volts* | *Fil. Amps.* |
|---|---|---|---|---|
| Stage 1, AC/SP3A RH | 4·6 | 1·5 | 4 | 1 |

Total feed, 6·1 mA.
H.T. Supply, 300 or 250 V.
L.T. Supply, 4 V a.c. or 6 V d.c.

**General Data**
*Volume Control*

*Type*, Morganite Stackpole MNAP 25450.
*Resistance*, 250,000 Ω.

*Meter*, Miniature Edgewise No. ED 1456.

*Meter Switch*, Yaxley Type B, 2-bank, 9-position.

*Impedances*

| | |
|---|---|
| Input | Z = 600 Ω. |
| Output | Z = 150 ,, |
| Normal Load | Z = 150 ,, |

*Normal Working Levels*

| | |
|---|---|
| Input | − 30 db. |
| Output | − 6 dB. |

**Test Data**

*600-ohm Test Gain*

Test Conditions :

Volume control set at maximum gain.

Tone Source Sending Level, -- 37 dB.

Gain at 1,000 c/s, G = 31 dB.

Gain at 50-10,000 c/s, ± 0·1 dB relative to gain at 1,000 c/s.

*Maximum Working Voltage Gain*

Test Conditions :

Output loaded with 150 Ω and output level at − 6 dB.

Gain at 1,000 c/s, G = 27 dB.

*Total Percentage Harmonic Content*

| | *Normal level* | *8 dB above normal level* |
|---|---|---|
| 100 c/s | < 0·1 | < 0·5 |
| 1,000 c/s | < 0·1 | < 0·2 |

**AMPLIFIER D/11**

Considerable attention was paid to the design of the D/11 Amplifier, and it was produced on a large scale as a high-grade general purpose amplifier. It comprises two stages, resistance-capacitance coupled, with transformer input and output. The amplifier can be used under three conditions of maximum gain, 70 dB, 50 dB or 30 dB.

**Circuit Description (Fig. 22)**

The input transformer is connected to the grid of the first stage via a continuously-variable volume control.

Current feedback is applied to the first valve via C1 by means of the resistors R5, R6, R7 in series with the cathode return. Control over the maximum gain is obtained by local arrangement of these resistors.

For maximum gain of 30 dB, the whole of the feedback chain is in circuit, the feedback being applied through C1. For maximum gain of 50 dB, R7 is short-circuited, thus reducing the effective feedback.

For maximum gain of 70 dB, no feedback is applied, since R6 and R7 are short-circuited and the grid return path is direct to cathode via C1.

In the second stage, both voltage and current feedback are employed, balanced to obtain an output impedance of 600 ohms.

Voltage feedback is obtained from the potentiometer comprising R16, R17 and current feedback from the resistor R13 in conjunction with R22.

The grid circuit of V2 is returned, via the high-value resistor R11, to the junction of R13 and R22, so that the grid bias potential is obtained from R13 only.

**Output Impedance Considerations**

The output stage of this amplifier has been designed to give an output impedance of 600 ohms, which is obtained by use of negative feedback. For the amplifier to give the required output power with low harmonic content, considerable feedback is necessary. This can take the form of voltage or current feedback or both. As voltage feedback decreases and current feedback increases the effective generator impedance of a valve, considerable control of this impedance is possible by varying the ratio of voltage to current feedback, whilst keeping the total feedback factor the same. As the generator impedance of V2 without feedback is too high, some voltage feedback is necessary. The rather unusual arrangement of the feedback circuits in the output stage can best be explained by means of a theoretical circuit.

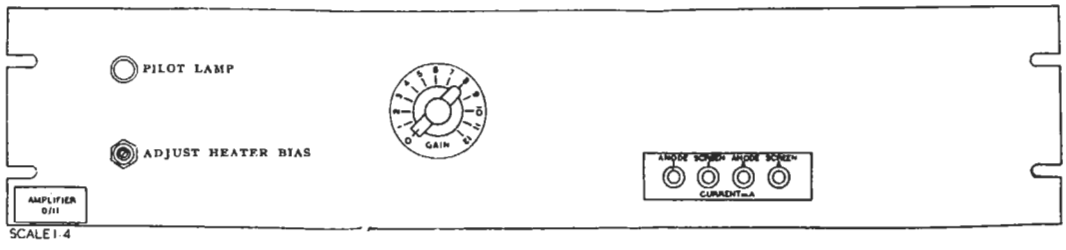



*Fig. 6.4 Face Panel D/11*

From Fig. F.5, it will be seen that the two resistors R16 a d R17 together form a potential divider connected across the output circuit of V2, and in parallel with the primary winding of the output transformer The decoupling capacitor C6 has such a large capacitance (16 $\mu$ F) that its reactance at audio frequencies is negligible compared with the values of the resistors R16 and R17 ; it therefore plays no part in the feedback circuit.

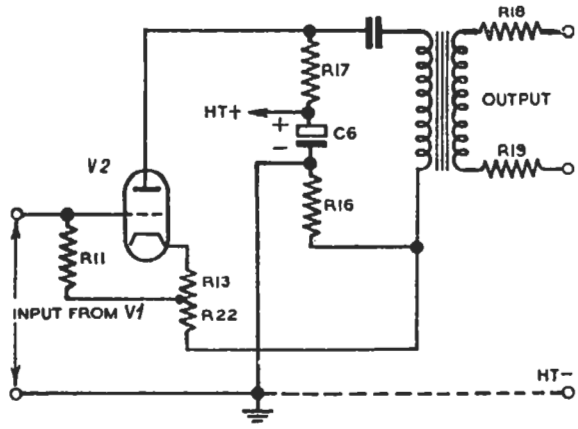



*Fig. 6.5 Feedback Circuit D/11 (Theoretical)*

The resistors R13, R22 and R16 are connected in series between the cathode of V2 and negative h.t. ; neglecting R13 and R22 for the moment, it will be seen that any alternating potentials developed across R16 will cause the cathode potential to fluctuate. The input voltage to V2 (the potential between grid and cathode), is the algebraic sum of the output voltage of V1 (between the grid of V2 and h.t. negative) and that across R16 (between cathode of V2 and h.t. negative), the latter being in phase opposition to the output voltage of V1.

If all the feedback required had been made proportional to output voltage, then the effective generator impedance of V2 would have been too low. It was therefore necessary to introduce some current feedback. This is applied by means of resistors R13 and R22, and their v lues together with those of R16 and R17, are chosen to give the required degree of total feedback.

It is customary in negative voltage feedback circuits to make the values o the resistors forming the potential divider very large compared with that of the anode load so th t they take negligible share of the output current In th D/11 it should be noted that R17 carries the d.c. anode current and R16 the total d.c. cathode current of V2. In order to give the valve a suitable anode-to-cathode potential the permissible drop across R16 and R17 is limited, that is to say, the values of R16 and R17 must be kept reasonably low. In fact the total resistance of the potential divider is approximately equal to the resistance reflected across the primary winding of the output transformer so that approximately half of the a.c. anode current of V2 passes through the potential divider. Thus the output impedance of the amplifier depends not only on the effective generator impedance of V2, as modified by the voltage and current feedback, but also on the value of R16 + R17 which is effectively in parallel with it. In addition the step-down ratio of the output transformer has to be taken into account, and an output impedance of 600 ohms is obtained by inserting the padding resistors R18, R19 in series with the secondary winding (Fig. 22).

**Valve Data**

| *Valve* | *Anode Current mA* | *Screen Current mA* | *Fil. Volts* | *Fil. Amps.* |
|---|---|---|---|---|
| Stage 1, AC/SP3A RH | 1·2 | 0·4 | 4 | 1 |
| Stage 2, AC/SP3B RH | 10 | 3·5 | 4 | 1 |

Total feed 15 mA.
H.T. Supply, 320 V.
L T. Supply, 4 V a.c. or 6 V d.c.

**General Data**

*Volume Control*
*T pe*, Morganite Stackpole MNAP 10450 (linear) or 10410 (logarithmic). 10410 preferred
*Resistance*, 100,000 Ω.

*Impedances*
Input Z = 600 Ω.
Output Z = 600 ,,
Normal Load Z = 600 ,,

*Normal Working Levels*
Input − 70 dB.
Output 0 or + 4 dB.

**Test Data**

600-*ohm Test Gain*
Test Conditions :
Volume control set at maximum gain.
Tone Source Sending Level, − 66, − 46 or − 26 dB.
Gain at 1,000 c/s, G = 70, 50 or 30 dB.
Gain at 50-10,000 c/s, ± 0·1 dB relative to gain at 1,000 c/s.

*Maximum Working Voltage Gain*

Test Conditions :

Output loaded with 600 Ω and output level at + 4 dB.

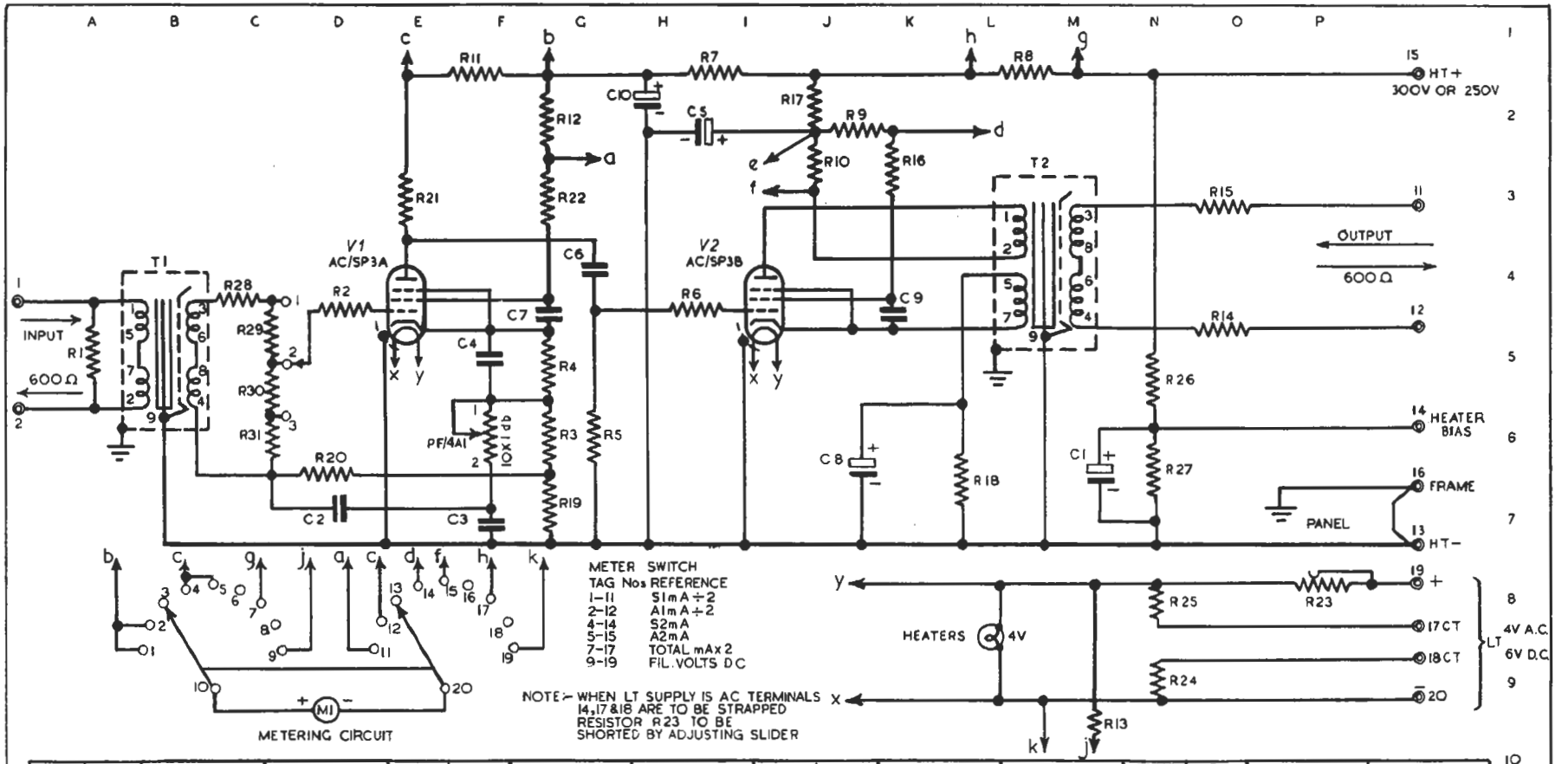
Gain at 1,000 c/s, G = 70, 50 or 30 dB.

*Total Percentage Harmonic Content*

| | *Normal level* | 8 *dB above normal level* |
|---|---|---|
| 100 c/s | < 0·5 | < 1·0 |
| 1,000 c/s | < 0·5 | < 1·0 |

**D/11A**

This amplifier is similar to D/11, the only modification being to the volume control, R2. On the D/11, this is a continuously variable resistor ; on the D/11A it is a 10-stud potentiometer.

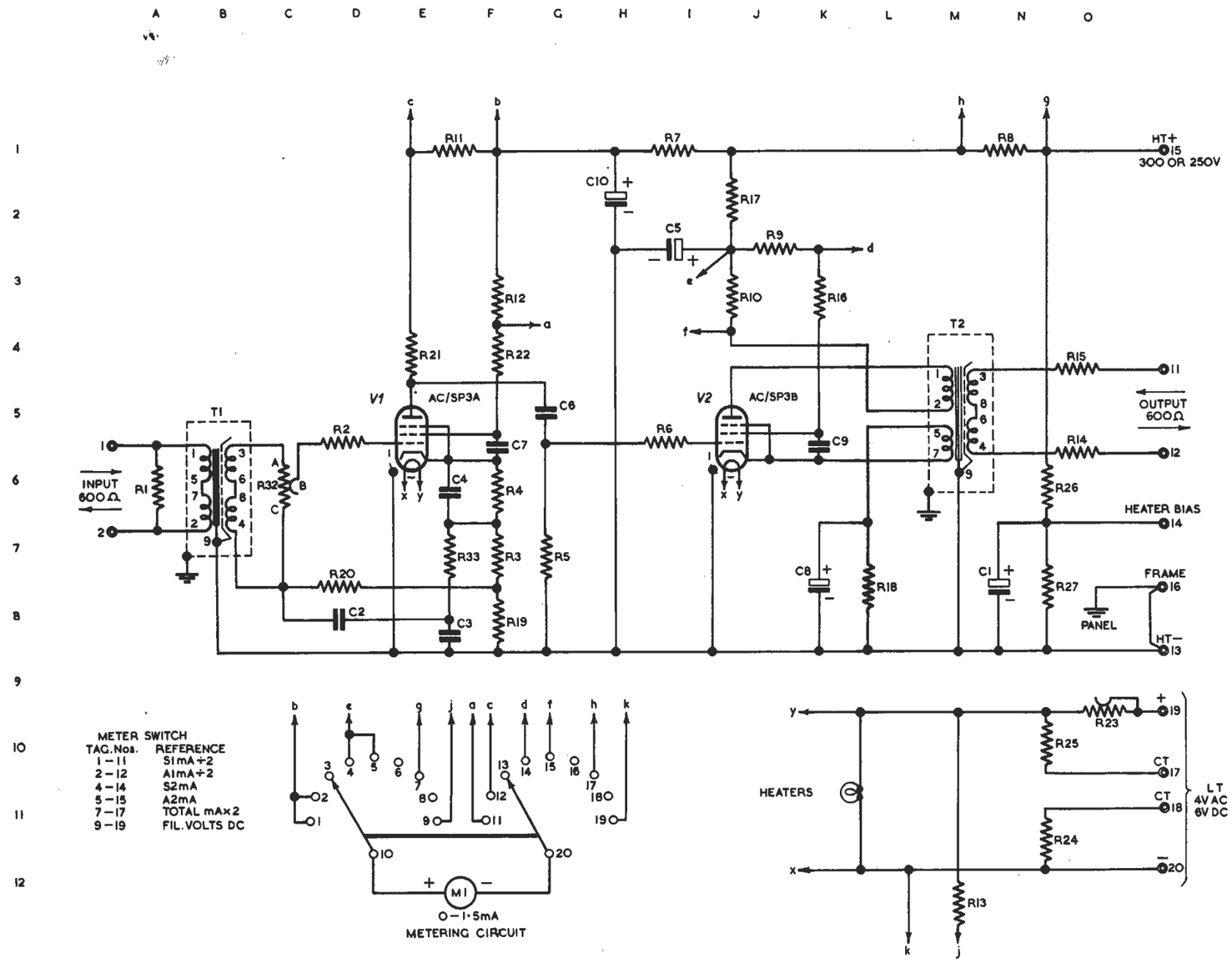



| COMP | LOC. | VALUE | TYPE | COMP. | LOC. | VALUE | TYPE | COMP. | LOC | VALUE | TYPE | COMP. | LOC | VALUE | TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | M6 | 2 µF | F W | M1 | D9 | | 0–1·5mA | R12 | C2 | 100 Ω | | R26 | N5 | 150 000 Ω | 1·0 W |
| C2 | D7 | 0·1 " | 431 | | | | | R13 | M10 | 3900 " | | R27 | N6 | 50 000 " | 1·0 " |
| C3 | F7 | 2 " | 65 | R1 | A5 | 900 Ω | 0·25 W | R14,15 | O3,O5 | 200 " | 0·25 W | R28 | C4 | 5 000 " | 0·25 " |
| C4 | F5 | 0·02 " | 431 | R2 | D4 | 5000 " | 0·25 " | R16 | K3 | 100000 " | 0·5 " | R29 | C5 | 1 000 " | 0·25 " |
| C5 | H2 | 16 " | 500VWKG | R3 | C6 | 650 " | 0·25 " | R17 | J2 | 10000 " | 0·5 " | R30 | C5 | 1 000 " | 0·25 " |
| C6 | G4 | 0·1 " | 431 | R4 | C5 | 350 " | 0·25 " | R18 | L7 | 250 " | 0·5 " | R31 | C6 | 13000 " | 0·25 " |
| C7 | G5 | 2 " | 87 | R5 | C6 | 300000 " | 0·25 " | R19 | G7 | 18000 " | 0·25 " | | | | |
| C8 | J6 | 250 " | 20VWKG | R6 | H4 | 5000 " | 0·25 " | R20 | D6 | 250 000 " | 0·25 " | | | | |
| C9 | K4 | 2 " | 87 | R7 | I,1 | 20000 " | 0·5 " | R21 | E3 | 150 000 " | 1·0 " | | | | |
| C10 | H2 | 16 " | 500VWKG | R8 | L1 | 14·3 " | | R22 | C3 | 500 000 " | 0·25 " | T1 | B5 | 1:3·16 | LG/18RB |
| | | | | R9 | J2 | 33·3 " | | R23 | P8 | 2 " | | T2 | M4 | 8·05:1 | AL/6 RA |
| | | | | R10 | J3 | 33·3 " | | R24 | N9 | 10 " | | | | | |
| | | | | R11 | F1 | 100 " | | R25 | N8 | 10 " | | | | | |

FIG.17 S3

# D AMPLIFIER D/9

FIG 18




| COMP. | LOC. | VALUE | TYPE |
|---|---|---|---|
| C1 | N7 | 2 µF | FW |
| C2 | D8 | 0·1 " | 431 |
| C3 | E8 | 2 " | 65 |
| C4 | E6 | 0·02 " | 431 |
| C5 | I3 | 16 " | 500V WKG |
| C6 | G5 | 0·1 " | 431 |
| C7 | F6 | 2 " | 87 |
| C8 | K7 | 250 " | 20V WKG |
| C9 | K5 | 2 " | 87 |
| C10 | H2 | 16 " | 500V WKG |
| | | | |
| | | | |
| R1 | A6 | 900 Ω | 0·25W |
| R2 | D5 | 5000 " | " |
| R3 | F7 | 650 " | " |
| R4 | F6 | 350 " | " |
| R5 | C7 | 300 000 " | " |
| R6 | I 5 | 5000 " | " |
| R7 | I 1 | 20 000 " | 0·5W |
| R8 | M1 | 14·3 " | |
| R9,10 | J2, J3 | 33·3 " | |
| R11,12 | E1 F3 | 100 " | |
| R13 | M12 | 3900 " | |
| R14,15 | O6 O4 | 200 " | 0·25W |
| R16 | K3 | 100 000 " | 0·5W |
| R17 | J2 | 10 000 " | " |
| R18 | L8 | 250 " | " |
| R19 | F8 | 18 000 " | 0·25W |
| R20 | D8 | 250 000 " | " |
| R21 | E4 | 150 000 " | 1·0W |
| R22 | F4 | 500 000 " | 0·25W |
| R23 | O9 | 2 " | |
| R24,25 | N11,N10 | 10 " | |
| R26 | N6 | 150 000 " | 1·0W |
| R27 | N8 | 50 000 " | 1·0W |
| R32 | D6 | 20 000 " | |
| R33 | E7 | 1000 " | |
| | | | |
| | | | |
| T1 | B6 | 1 : 3·16 | LC/18RB |
| T2 | M5 | 8·05 : 1 | AL/6RA |

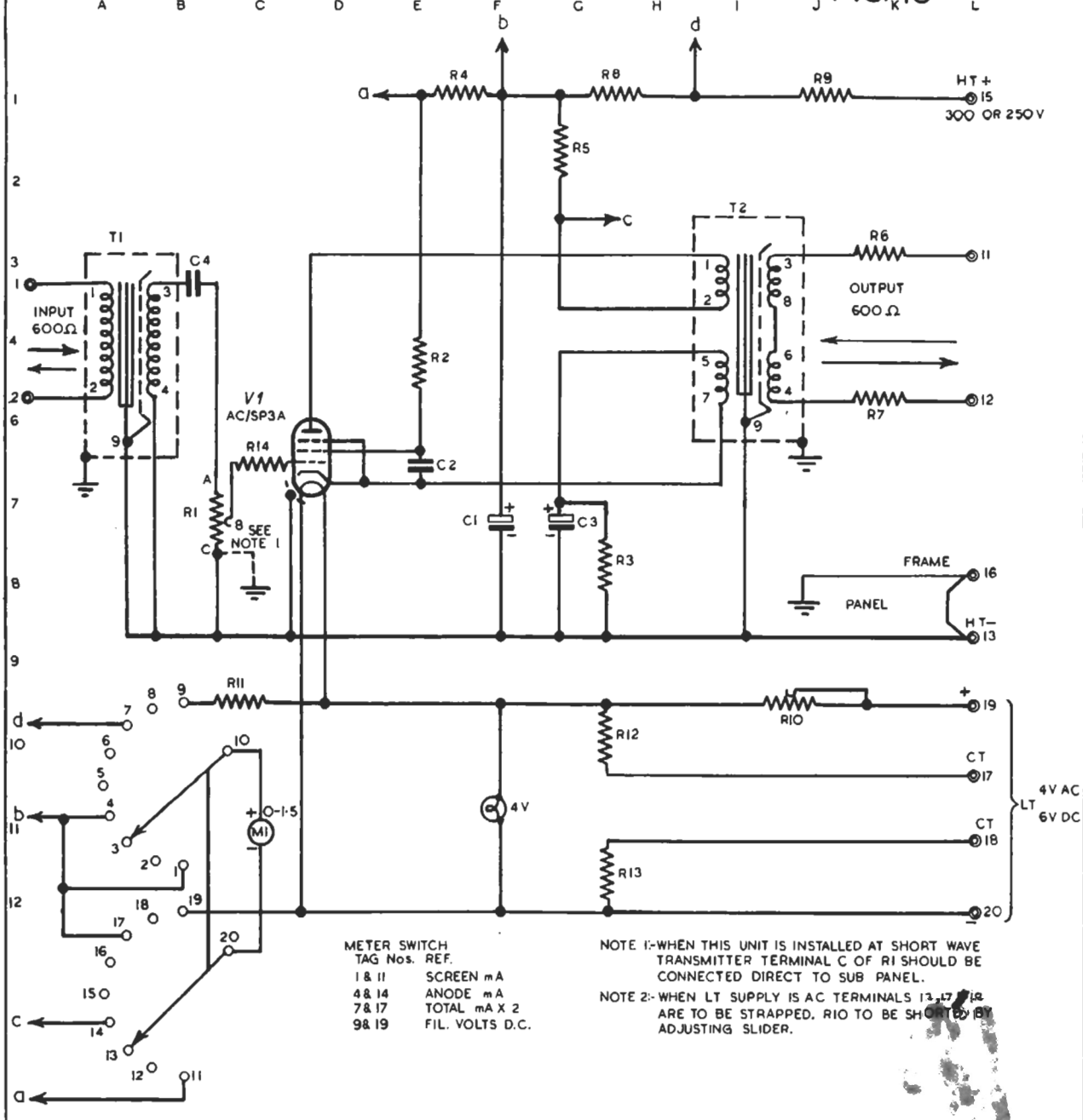
NOTE. 1 WHEN LT SUPPLY IS AC TERMINALS 14, 17 & 18 ARE TO BE STRAPPED, R23 TO BE SHORTED BY ADJUSTING SLIDER. THIS IS TO BE DONE ON ONE ONLY OF A PAIR OF AMPLIFIERS IF THEY ARE RUN FROM A SINGLE MAINS UNIT.

2 ON CERTAIN UNITS THE METER IS REPLACED BY A JACK, TAG 10 OF METER SWITCH BEING TAKEN TO THE "TIP" OF JACK AND TAG 20 TO THE "RING".

3 IN D/9B T1 = LG/13RB 1:25·8

# D AMPLIFIER D/9A. & 9B

FIG. 19 S3




METER SWITCH TAG Nos. REF.

| | |
|---|---|
| 1 & 11 | SCREEN mA |
| 4 & 14 | ANODE mA |
| 7 & 17 | TOTAL mA X 2 |
| 9 & 19 | FIL. VOLTS D.C. |

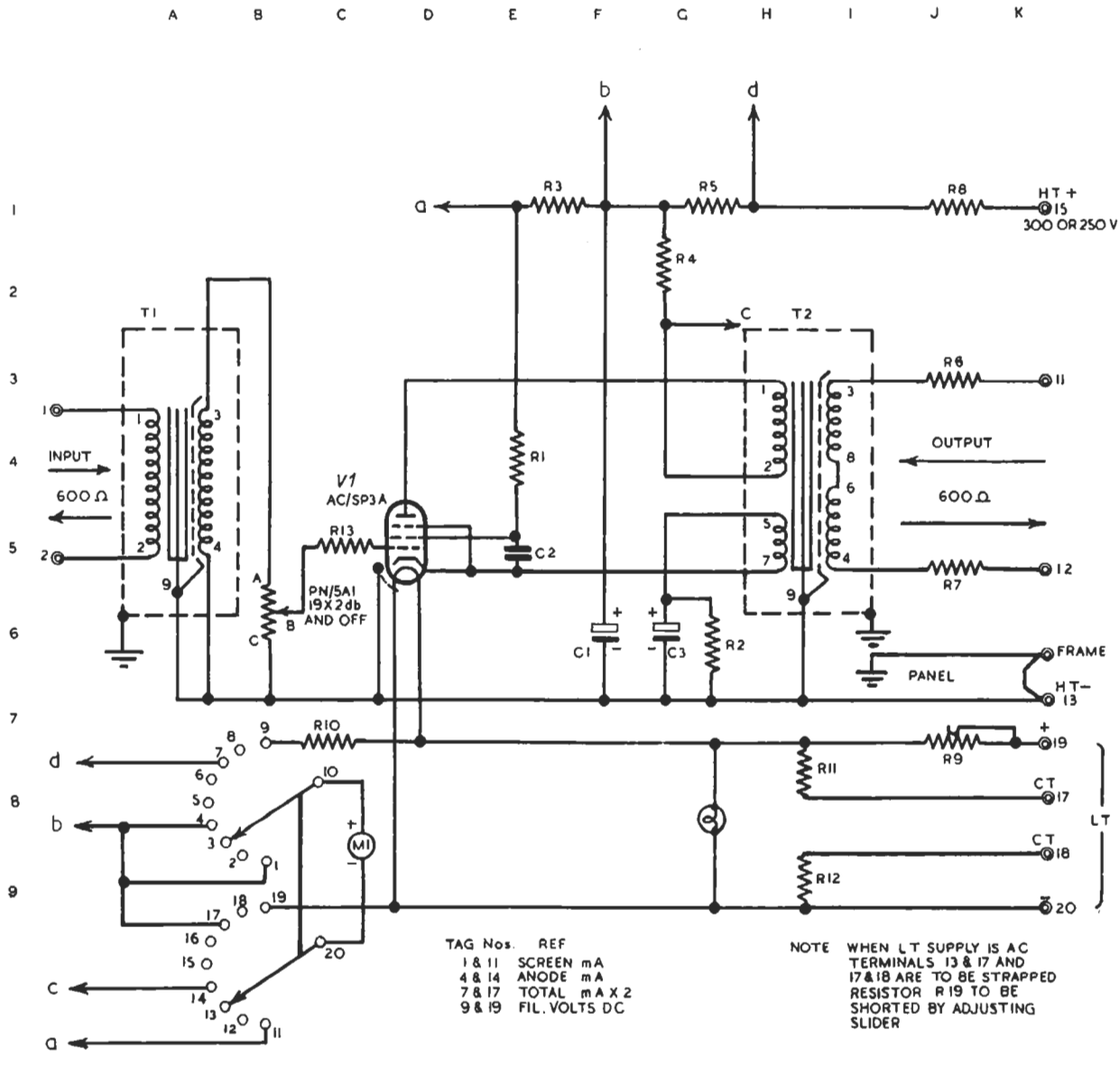
NOTE 1:- WHEN THIS UNIT IS INSTALLED AT SHORT WAVE TRANSMITTER TERMINAL C OF R1 SHOULD BE CONNECTED DIRECT TO SUB PANEL.

NOTE 2:- WHEN LT SUPPLY IS AC TERMINALS 13, 17 & 18 ARE TO BE STRAPPED. R10 TO BE SHORTED BY ADJUSTING SLIDER.

| COMP. | LOC. | VALUE | TYPE | COMP. | LOC. | VALUE | TYPE |
|---|---|---|---|---|---|---|---|
| C1 | F7 | 16 µF | BEC MA 14556 | R7 | K6 | 200 Ω | 0·25 W |
| C2 | E7 | 2·0 " | TCC TYPE 87 | R8 | G1 | 14·3 " | |
| C3 | G7 | 250 " | BEC MA 14580 | R9 | J1 | 10 000 " | 0·5 " |
| C4 | B3 | 0·03 " | TCC TYPE 431 | R10 | J9 | 0–6 " | |
| | | | | R11 | C10 | 3900 " | |
| | | | | R12, 13 | C10, G12 | 10 " | |
| R1 | C7 | 250 000 Ω | | R14 | C6 | 5000 " | 0·25 " |
| R2 | E4 | 100 000 " | 0·5W | | | | |
| R3 | G8 | 250 " | 0·5 " | | | | |
| R4,5 | E1, G2 | 33·3 " | | T1 | A4 | 1:20·4 | LG/14 RB |
| R6 | K3 | 200 " | 0·25 " | T2 | 14 | 8·05:1 | AL/6 RA |

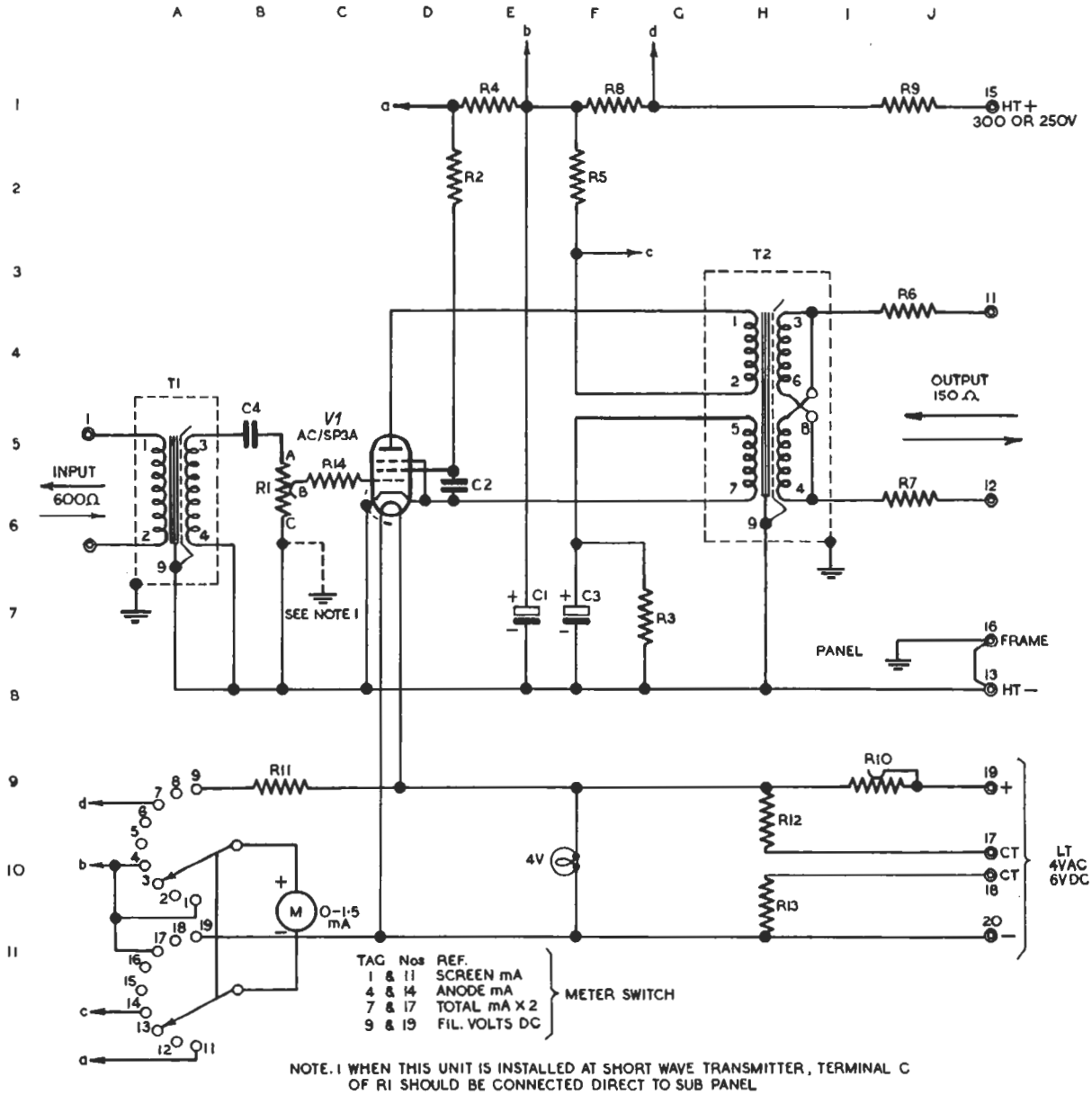
# D AMPLIFIER D/10

FIG. 20 S3




| COMP. | LOC. | VALUE | TYPE | COMP. | LOC. | VALUE | TYPE |
|---|---|---|---|---|---|---|---|
| C1 | F6 | 16 µF | BEC MA14556 | R8 | J1 | 10 000Ω | 0·5 W |
| C2 | E5 | 2 " | TCC TYPE B7 | R9 | J7 | 0–6 " | |
| C3 | C6 | 250 " | BEC MA14580, 20V WKG | R10 | C7 | 3900 " | |
| | | | | R11,R12 | H8, H9 | 10 " | |
| | | | | R13 | C5 | 5000 " | 0·25 " |
| R1 | E4 | 100 000Ω | 0·5 W | | | | |
| R2 | C6 | 250 " | 0·5 " | | | | |
| R3,R4 | E1, C2 | 33·3 " | | T1 | A4 | 1:12·9 | LG/20R8 |
| R5 | G1 | 14·3 " | | T2 | H4 | 8·05:1 | AL/6RA |
| R6,R7 | J3, J5 | 200 " | 0·25 " | | | | |

# D AMPLIFIER D/10A




NOTE. 1 WHEN THIS UNIT IS INSTALLED AT SHORT WAVE TRANSMITTER, TERMINAL C OF R1 SHOULD BE CONNECTED DIRECT TO SUB PANEL

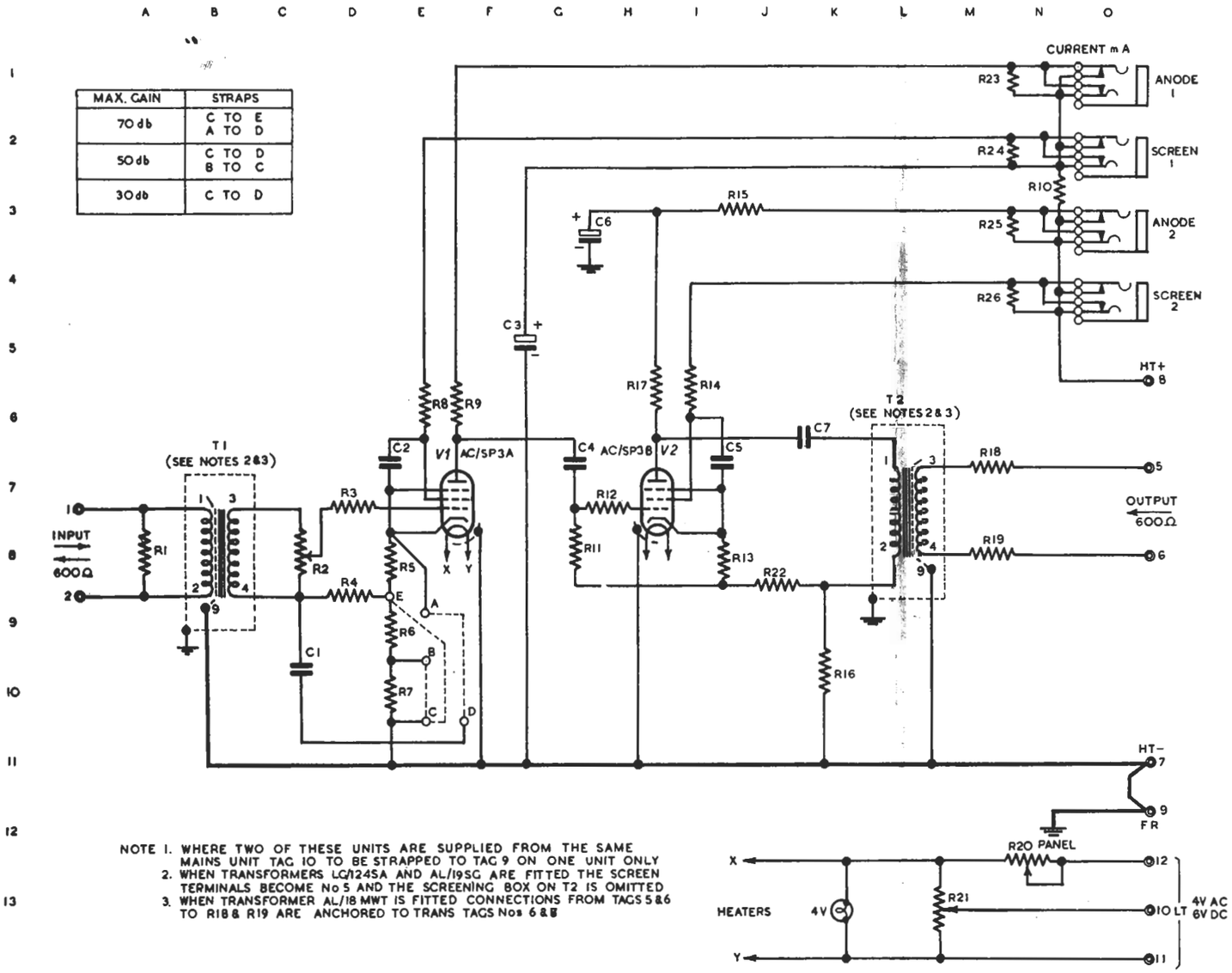
2 WHEN LT SUPPLY IS AC TERMINALS 13, 17 & 18 ARE TO BE STRAPPED, R10 TO BE SHORTED BY ADJUSTING SLIDER

| COMP. | LOC. | VALUE | TYPE | COMP. | LOC. | VALUE | TYPE |
|---|---|---|---|---|---|---|---|
| C1 | E7 | 16 µF | BECMA 14556 | R8 | F1 | 14·3 Ω | |
| C2 | D6 | 2 " | TCC TYPE 87 | R9 | J1 | 10 000 " | 0·5W |
| C3 | F7 | 250 " | BEC MA14580 | R10 | J9 | 0 — 6 " | PAINTON TYPE 381 |
| C4 | B5 | 0·03 " | TCC TYPE 431 | R11 | B9 | 3900 " | " " " |
| | | | | R12 13 | H9 H11 | 10 " | |
| | | | | R14 | C5 | 5000 " | 0·5W |
| R1 | B6 | 250 000Ω | MNAP 25450 | | | | |
| R2 | D2 | 100000 " | 0·5W | | | | |
| R3 | G7 | 250 " | " | T1 | A5 | 1 : 20·4 | LG/14 RB |
| R4, 5 | E1, F2 | 33·3 " | | T2 | H5 | 8·05 : 1 | AL/6 RA |
| R6, 7 | J3, J6 | 50 " | 0·25W | | | | |

# D AMPLIFIER D/10B

FIG 22






NOTE 1. WHERE TWO OF THESE UNITS ARE SUPPLIED FROM THE SAME MAINS UNIT TAG 10 TO BE STRAPPED TO TAG 9 ON ONE UNIT ONLY
2. WHEN TRANSFORMERS LG/124SA AND AL/19SG ARE FITTED THE SCREEN TERMINALS BECOME No 5 AND THE SCREENING BOX ON T2 IS OMITTED
3. WHEN TRANSFORMER AL/18 MWT IS FITTED CONNECTIONS FROM TAGS 5&6 TO R18& R19 ARE ANCHORED TO TRANS TAGS Nos 6&8

| COMP. | LOC. | VALUE | TYPE |
|---|---|---|---|
| C1 | C10 | 2μF | 87 |
| C2 | E7 | 2 „ | „ |
| C3 | G5 | 16 „ | MA15129 |
| C4 | G7 | 0·1 „ | 431 |
| C5 | I7 | 2 „ | 87 |
| C6 | G3 | 16 „ | MA15129 |
| C7 | K6 | 1·0 „ | 87 |
| | | | |
| | | | |
| R1 | A8 | 2000Ω | 0·25W |
| R2 | C8 | 100 000 „ | MNAP |
| R3 | D7 | 5000 „ | 0·25W |
| R4 | D9 | 250 000 „ | „ |
| R5 | E8 | 1000 „ | 0·5W |
| R6 | E9 | 2400 „ | „ |
| R7 | E10 | 34000 „ | 1·0W |
| R8 | E6 | 500000 „ | 0·5W |
| R9 | F6 | 150000 „ | 1·0W |
| R10 | N3 | 20000 „ | „ |
| R11 | G8 | 500000 „ | 0·5W |
| R12 | H7 | 5000 „ | 0·25W |
| R13 | I8 | 180 „ | 0·5W |
| R14 | I6 | 30000 „ | 1·0W |
| R15 | J3 | 2000 „ | 0·5W |
| R16 | K10 | 1500 „ | „ |
| R17 | I6 | 18700 „ | 1·0W |
| R18 | M7 | 150 „ | 0·25W |
| R19 | M8 | 150 „ | „ |
| R20 | N12 | 2 „ | PAINTON |
| R21 | M13 | 25 „ | „ |
| R22 | J9 | 50 „ | 0·5W |
| R23 | M1 | 2000 „ | 0·25W |
| R24 | M2 | 2000 „ | „ |
| R25 | M3 | 2000 „ | „ |
| R26 | M4 | 2000 „ | „ |
| | | | |
| | | | |
| T1 | B8 | 1:11·5 | LG/122MWT ORLG/124SA |
| T | L8 | 4·44:1 | AL/18MWT OR AL/19SG |

# AMPLIFIER D/11