

INTRODUCTION

The AM5/20 and AM5/21 are intended for use as loudspeaker amplifiers in intercomm and talkback systems.

The amplifiers are designed to operate from -24 volt or -50 volt power supplies. Provision is made both for positive and balanced power supplies with centre-tap earth. This earth is the noise free reference for an unbalanced input signal.

The AM5/20 has a fixed gain and no operational controls.

The AM5/21 is supplied with a fixed gain and no operational controls, but facilities are provided to fit a balanced input transformer. In addition a volume control or fixed attenuator at the input may be fitted.

SPECIFICATION

OUTPUT POWER

AM5/20, 21 2 watts r.m.s. maximum into 8 ohms, 24 volt supply
 3 watts r.m.s. maximum into 15 ohms, 24 volt or 50 volt supply.

AM5/21 10 watts r.m.s. maximum into 15 ohms

AM5/20 Requires modification to give 10 watts output, see page 4

Load 15 ohms or 35 ohms

Minimum load 8 ohms using 24 volt power supply
 15 ohms using 50 volt power supply

Power supplies

Regulated +20 V to +24 V d.c.

Regulated and unregulated -20 V to -50 V d.c.

Regulated and unregulated-
 balanced, centre-tapped ±12 V to ± 24 V d.c.

Gain

AM5/20 40 dB fixed

AM5/21 40 dB, facilities exist for a volume control or fixed input attenuator to be fitted

Input impedance

AM5/20 Unbalanced, greater than 20 kΩ

AM5/21 Unbalanced, greater than 20 kΩ, with facility for balanced input transformer

Frequency Response

35 ohms load -3 dB w.r.t. 1 kHz at 50 Hz and 10 kHz

Distortion

Less than 0.5 per cent total harmonic distortion at 1 kHz

Connector

AM5/20 11 - pole ISEP plug

AM5/21 17 - pole Souriau plug, coding element A1

Construction

AM5/20 Printed wiring board 127 mm x 75 mm, with integral 30 mm high heat sink.

AM5/21 2U BMM card suitable for CH1/65A chassis

Coding pins BMM coding 1, 7 and 15.

ALIGNMENT

- Note 1. For fault location the amplifier should be powered from a -24 volt current limiting power supply.
- 2. Ensure test conditions meet the heat sink and amplifier current limiting requirements, see page 4.

Check a.c. operation The test conditions are

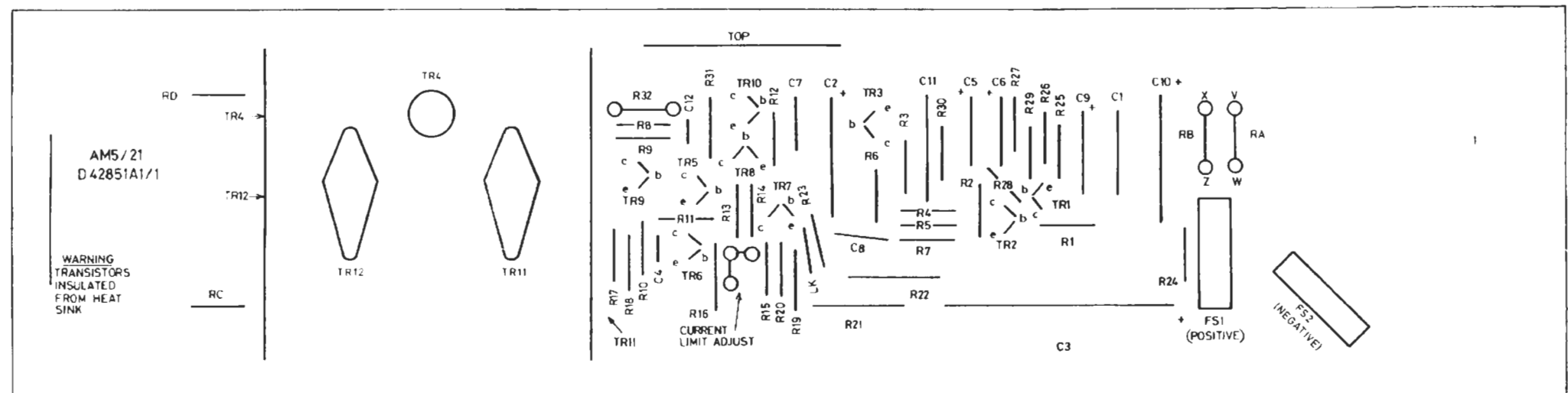
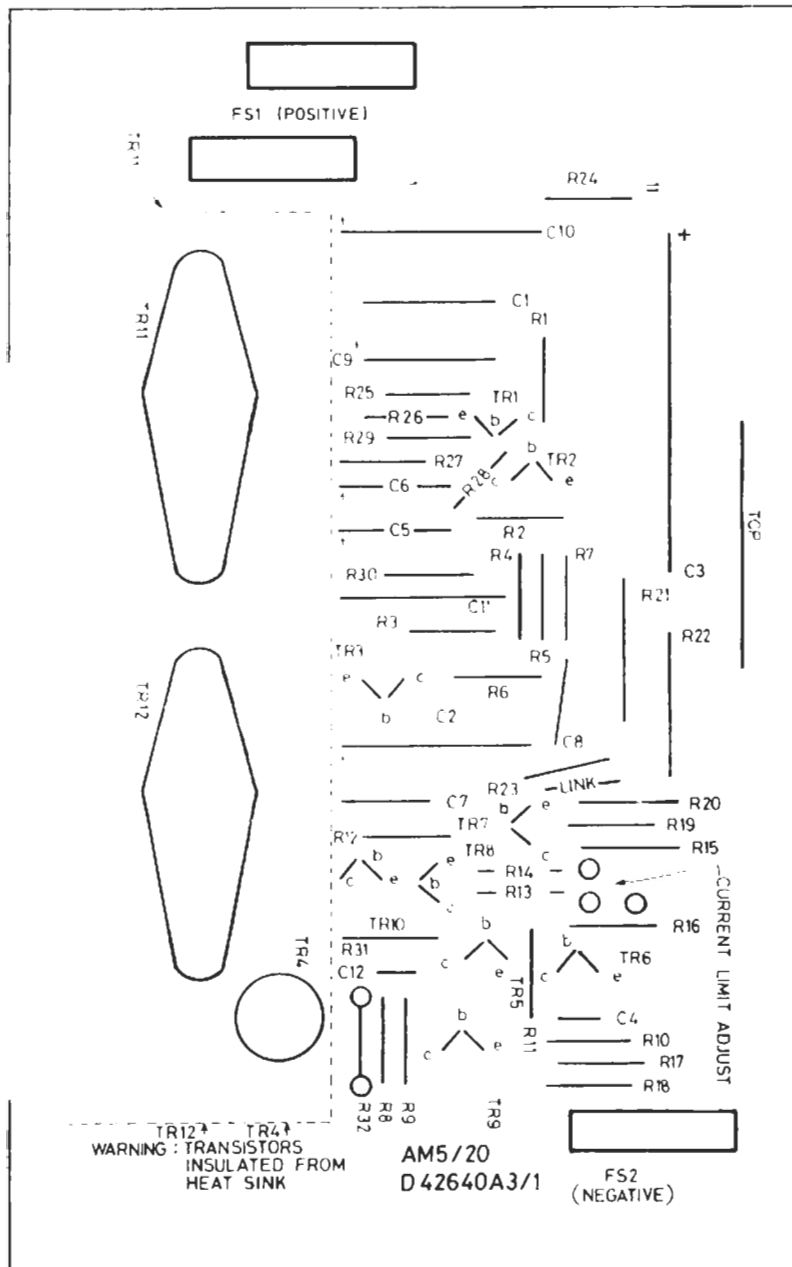
- a -24 volt power supply
- Load 35 Ω 2.5 watt
- Input -24 dB at 1 kHz unbalanced
- Current limit adjust terminals All three terminals linked
- Output +16 dB ± 2 dB

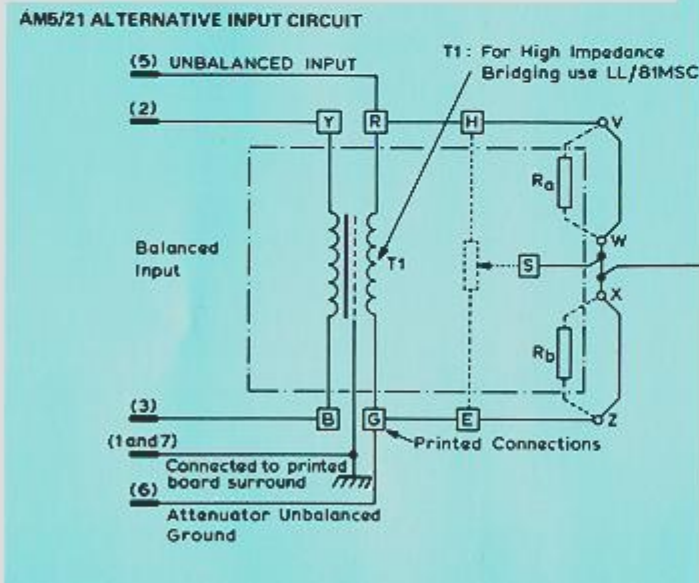
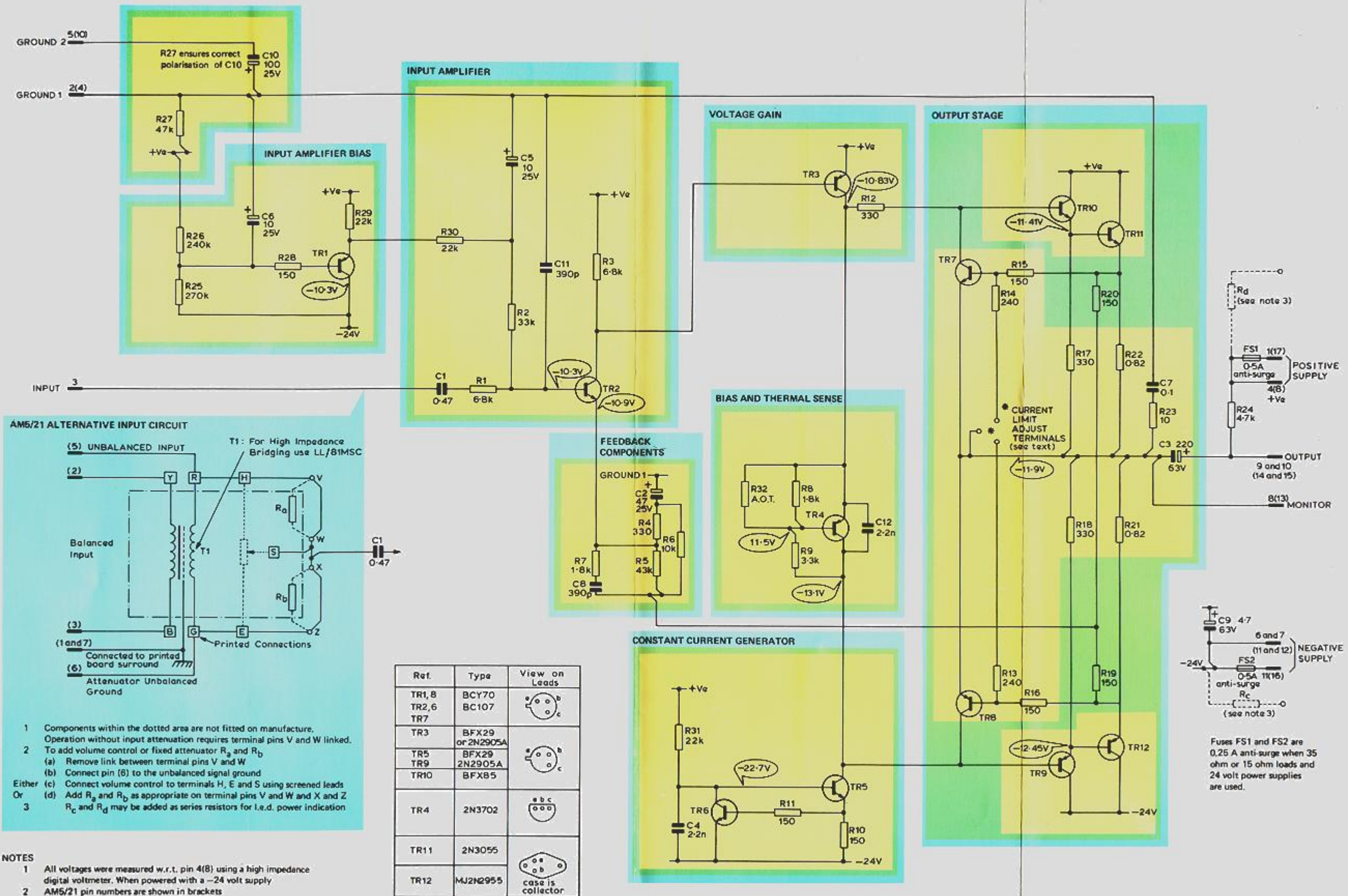
Note The load may become hot during the test.

Set Standing feed ; With the amplifier input and output terminals unterminated, measure the supply current.

| | Standing feed, mA | |
|----------------|-------------------|-----------------|
| | -24 volt supply | -50 volt supply |
| R32 removed | approx 7 | approx 7 |
| R32 in circuit | 9 to 13 | 12 to 18 |

Typical value of R32 is 7.5 kΩ. A value within the range 4.7 to 15 kΩ may be used.



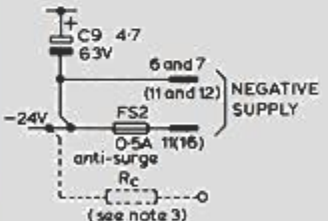


- Components within the dotted area are not fitted on manufacture. Operation without input attenuation requires terminal pins V and W linked.
- To add volume control or fixed attenuator R_a and R_b
 - Remove link between terminal pins V and W
 - Connect pin (6) to the unbalanced signal ground
- Either
 - Connect volume control to terminals H, E and S using screened leads
 - Add R_a and R_b as appropriate on terminal pins V and W and X and Z
 Or
 - R_c and R_d may be added as series resistors for i.e.d. power indication

NOTES

- All voltages were measured w.r.t. pin 4(8) using a high impedance digital voltmeter. When powered with a -24 volt supply
- AM5/21 pin numbers are shown in brackets

| Ref. | Type | View on Leads |
|-------|------------------|---------------|
| TR1,8 | BCY70 | |
| TR2,6 | BC107 | |
| TR3 | BFX29 or 2N2905A | |
| TR5 | BFX29 | |
| TR9 | 2N2905A | |
| TR10 | BFX85 | |
| TR4 | 2N3702 | |
| TR11 | 2N3055 | |
| TR12 | MJ2N2955 | |



Fuses FS1 and FS2 are 0.25 A anti-surge when 35 ohm or 15 ohm loads and 24 volt power supplies are used.

The amplifiers require no adjustment to operate from power supplies within the specified range. The necessary changes are made in the external wiring as shown on the interconnection diagrams.

When using unregulated supplies, the optimum rejection of supply ripple and noise is obtained by using the positive earth mode. To reduce crosstalk, where several amplifiers are fed from a common power supply, the output impedance of the supply must be low. Each amplifier must have separate supply wiring and be mounted close to the supply to ensure minimum wire resistance. Where cross talk is a problem a diode – capacitor de-coupling circuit is advised.

The amplifier has an output current limiting network, operating at a peak current of 0.73 A. Wiring together the current limit terminals, increases the peak current limit to 1.1 A, for high power working, see following table.

Note: The AM5/20, with the higher limit selected, requires a further 60 cm² of heat sink and unrestricted ventilation. The additional heat sink must be attached by means of the three M4 anchor nuts, using heat sink compound.

| Loudspeaker impedance, ohms | Power output, W | Total supply voltage | Peak current from supply, A |
|-----------------------------|-------------------------|----------------------|-----------------------------|
| 8 | 2 ¹ | 24 | 0.7 |
| 15 | 2 ¹ Note 1 | 24 | 0.5 ⁴ |
| 15 | 2 ¹ | 50 | 0.5 |
| 15 | 3.7 ¹ | 50 | 0.7 |
| 35 | 1.32 ² | 24 | 0.26 ⁴ |
| 35 | 7.3 ² Note 2 | 50 | 0.64 |
| 8 ³ | 4.8 ² | 24 | 0.95 |
| 15 ³ Note 3 | 10 | 50 | 1.1 |

Note 1 Current limited at 0.73 A.

2 Power limited by supply voltage and load impedance.

3 Current limit increased, note that 8 ohms/50 volts is not a permitted combination.

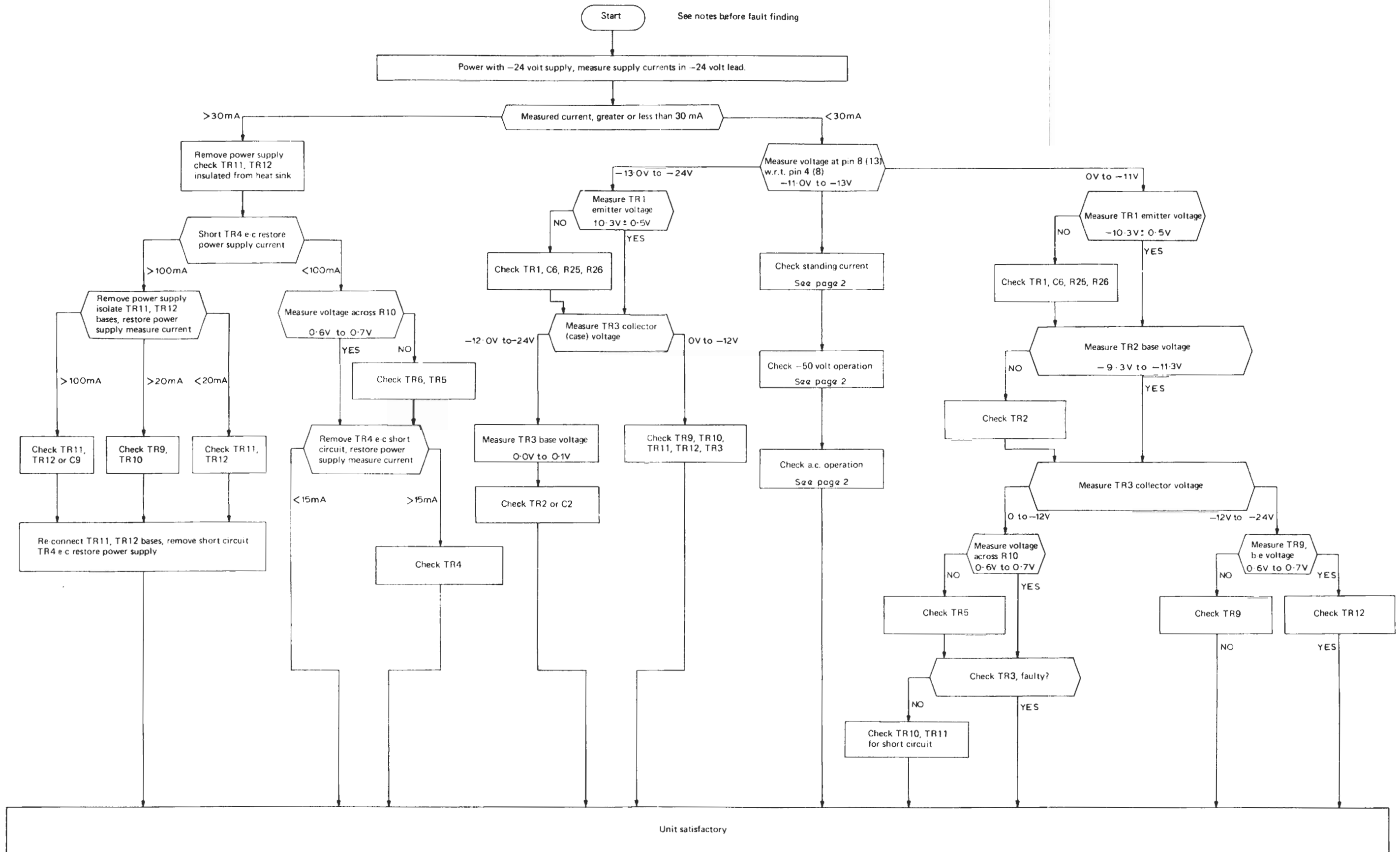
4 The standard fuse for FS1 and FS2 is 0.5 A anti-surge.

With 35 ohm or 15 ohm loads and 24 volts operation, a 0.25 A anti-surge type is fitted.

An integral loudspeaker coupling capacitor and other internal components gives a low frequency response as shown in the table.

| Output load ohms | -3 dB l.f. response Hz (w.r.t. to 1 kHz) |
|------------------|--|
| 35 | 50 |
| 15 | 70 |
| 8 | 85 |

The response at -3 dB may be extended to 50 Hz for 15 ohm and 8 ohm loads by the addition of a capacitor in parallel with C3. The value of this additional capacitor should be selected on test.



- NOTES
1. The amplifier must be powered from a -24 volt current limiting power supply
 2. Voltage measurements were taken with a high impedance digital voltmeter. These voltages are measured w.r.t. pin 4 (8)
 3. AM5/21 pin numbers are shown in brackets
 4. Should TR4, TR9, TR10, TR11, TR12, be replaced, then reset standing feed as in the alignment instructions.

