

R.F. POWER AMPLIFIER AM14/3

Introduction

The AM14/3 operates at a fixed frequency in Band II and produces a maximum output of about 15 watts from an input of 500 mW (nominal). The input and output impedances are 50 ohms. The unit consumes about 1.6 amperes from an external power supplier¹ with an output adjustable from 32 to 34 volts.

Because of the heat generated internally, the construction of the unit is based on a CH1/28 chassis specially made in heavy-gauge copper with extra surface area provided by cooling fins projecting from the front. The index peg positions are 2 and 4.

The AM14/5 is a partly-equipped version of the AM14/3 and comprises the first two stages with the addition of an output coupling arrangement to produce an output of about 5 watts.

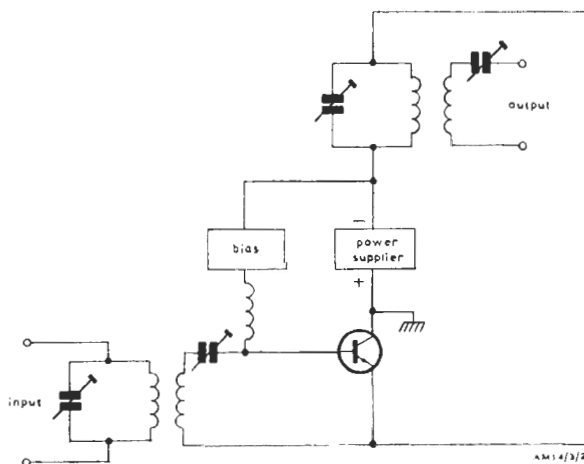


Fig. 1 Common-emitter Stage with Collector Earthed

Circuit Description

All the transistors are used in common-emitter stages which incorporate an unusual method of connecting the power supply so that the cases of the transistors, which form the collector terminals, can be solidly bonded to the earthy chassis. This arrangement, shown in the simplified circuit diagram Fig. 1, gives an efficient means of heat dissipation while eliminating the requirement for

electrical isolation of the collector heat sinks.

The full circuit diagram of the AM14/3 is given in Fig. 2. The input, output and interstage coupling arrangements all use double-tuned transformers with their primaries parallel-tuned and their secondaries series-tuned. For the output stage, which uses two transistors in parallel, the input tuning capacitor is divided to allow the possibility of offsetting differences in transistor parameters and wiring arrangements in order to ensure equal power sharing.

The emitter circuit of each stage includes a low-value resistor across a test socket for feed-current monitoring.

Test Procedure

Note: The unit must only be powered when a suitably rated 50-ohms load is connected to the output, as otherwise the output transistors will be destroyed. Such damage can also result from mistuning; variation of the tuning components from the previously-aligned positions must therefore be undertaken with great care and should be necessary only for those stages associated with the replacement of a faulty component.

Because the amplifier is usually set up within a complete equipment^{1,2} to suit the requirements of a particular installation, the following procedures should be undertaken preferably with the amplifier in either its normal working position or, when necessary, connected via a chassis extender CH1A/5. Additionally, the feed-current test-sockets are intended for use with a Portable Test Meter PTM/6 which has a resistance of 10 kilohms and an f.s.d. of 1 volt on a scale with 100 divisions.

1. Terminate the amplifier with a 50-ohms load.
2. Connect an input from a 50-ohms source capable of delivering 1 watt at the appropriate Band-II frequency.

Note: This input is best obtained from a previously-aligned associated unit such as the UN1/40. In this instance the UN1/40 needs a 10.7-MHz input at 10 mV.

3. Switch on the power supplier and, using a PTM/6 or equivalent instrument, measure the feed currents. The following table gives readings taken on installed equipment.

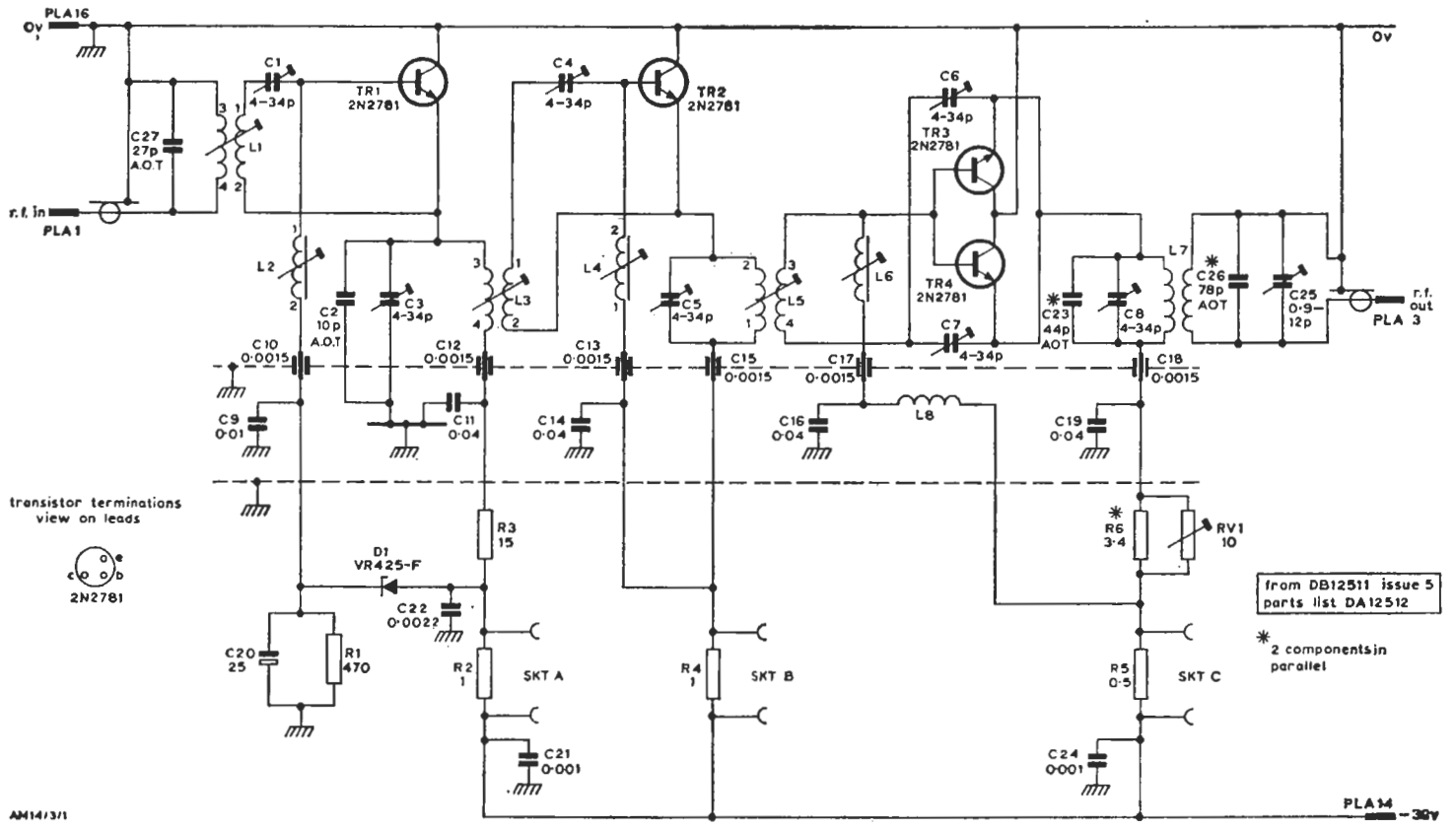


Fig. 2 Circuit of the AM14/3

PTM/6 Indications

<i>Position</i>	<i>R.F. Input zero</i>	<i>R.F. Input about 1 watt</i>
SKT A	26 ± 5	26 ± 5
SKT B	0	30 ± 5
SKT C	0	34 ± 10

4. Connect a v.h.f. oscilloscope, through a low-value capacitor (0.5 pF max.), across the load and examine the output waveform for spurious effects.
5. Set the output power to the required value by adjustment of RV1.
6. If the output power is low and either a replacement component has been fitted or the test-3 figures are non-typical, careful trimming of the tuning capacitors in the relevant stage is permissible.

Note: Output transistors may need to be selected to produce sufficient output, especially at the top end of the frequency range.

Final adjustment should be made after the amplifier has been on power for at least one hour. All the tuning capacitors are set for maximum output power; additionally, the correct position for C8 is indicated by a dip in the feed current of the final stage (SKT C).

Note: The couplings of the input, output and interstage transformers are set up on initial alignment by Equipment Department. The windings are then fixed in position *and must not subsequently be disturbed*.

7. Modulate the input at 1 kHz to a deviation of ± 75 kHz. Examine the output waveform for amplitude modulation. The a.m. content should be less than 2 per cent.

References to Typical Associated Equipment

1. Band-II F.M. Translator EP7/5
2. Band-II F.M. Drive Equipments EP7/4, 4A and EP7/7, 7A.

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