

VISION IF AMPLIFIER AM1/543

Introduction

The AM1/543 is a vision i.f. amplifier for signals in the 30MHz to 40MHz band. It is intended primarily for use in television rebroadcast receivers¹.

The amplifier is built on to a printed board mounted in a screened CH1/39A chassis. The input and output connections are made via BNC sockets on the front panel.

General Specification

<i>Amplitude/frequency Response at 25°C</i>	less than 0.2 dB variation from 30MHz to 40MHz
<i>Maximum Gain</i>	greater than 46 dB
<i>Minimum Gain</i>	less than 6 dB
<i>Normal Output Level into 75 ohms</i>	between 60mV and 80 mV r.m.s.
<i>Variation of Amplitude/frequency Characteristic with Gain</i>	
6 to 36 dB gain	less than 0.2 dB
36 to 46 dB gain	less than 0.5 dB
<i>A.G.C. Characteristic</i>	
Change in output for input change from 350 μ V to 70 mV	less than 0.5 dB
<i>Control Voltage</i>	10V to 15V with negative earth
<i>D.C. Power Requirements</i>	60 mA at 20V with negative earth
<i>Index Pegs</i>	17 and 24
<i>Weight</i>	2 lb.

Circuit Description

The circuit diagram is given in Fig. 1 on page 3. The amplifier consists of 3 gain-controlled cascade stages^{2,3} in cascade, with buffer amplifiers at the input and output. The gain-control potential, which is fed to the input of each cascade pair, is developed externally in an a.g.c. unit⁴.

The input buffer amplifier TR1, is an emitter follower with a high input impedance. R1 provides the necessary 75-ohms input impedance for matching preceding units.

The time constant R5C4 holds the potential of TR2 base constant in the presence of high-level input signals which might otherwise vary the gain of TR2 in sympathy with the modulation. L8 provides the necessary isolation at i.f.

R5, R14 and R23 feed the a.g.c. potential to TR2, TR4 and TR6. Forward a.g.c. is used because of its better signal-handling capabilities.

The emitter resistors, R7, R16 and R25 provide feedback and minimise tilting of the characteristic as the gain varies with varying control potential. The resistance used, 22 ohms, provides a compromise between high gain and low tilt.

RV1, RV2 and RV3 are each set to give a 1-dB reduction of gain (at a given control potential setting). This adjustment enables the gain/bias characteristics of the three controlled transistors to be matched.

The Silistors R8, R17 and R26 provide compensation of gain with temperature.

The capacitors C32, C33 and C34, have a negative temperature coefficient and provide compensation to offset tilting of the amplifier characteristic with temperature changes. This compensation is intended to cover variations occurring in the complete receiver of which the AM1/543 forms a part¹.

The tuned couplings between the cascade stages L1L2, L3L4 and L5L6, each form a damped T equivalent of a transformer, where one arm of the T is negligibly small.

Maintenance

Routine maintenance is not required.

The response of the amplifier is set to be symmetrical and flat to within 0.2 dB, in the 30MHz to 40MHz band and the adjustments should not be disturbed. Realignment cannot be done without the proper specialised equipment.

The preset resistors, RV1, RV2 and RV3, are each set to give a 1-dB reduction of gain at a control potential of 11 volts. The adjustment is made for each preset resistor by first adjusting for maximum gain and then reducing the resistance value until the gain has fallen by 1 dB. The overall

gain of the amplifier should be from 46 dB to 6 dB at least, as the a.g.c. potential is varied from 10V to 15V.

The effect of temperature should be such that at 45°C, the response at 30MHz is about 1 dB below that at 40MHz assuming the amplifier to be flat at 20-25°C.

References

1. Television U.H.F. Receiver RC5M/501.
2. *Junction Transistor Circuit Analysis* by S. S. Hakim; Iliffe.
3. Wireless World, March 1965.
4. Vision A.G.C. Unit UN1/564
5. Designs Department Specification No. 6.113(66)
AIB 10/68

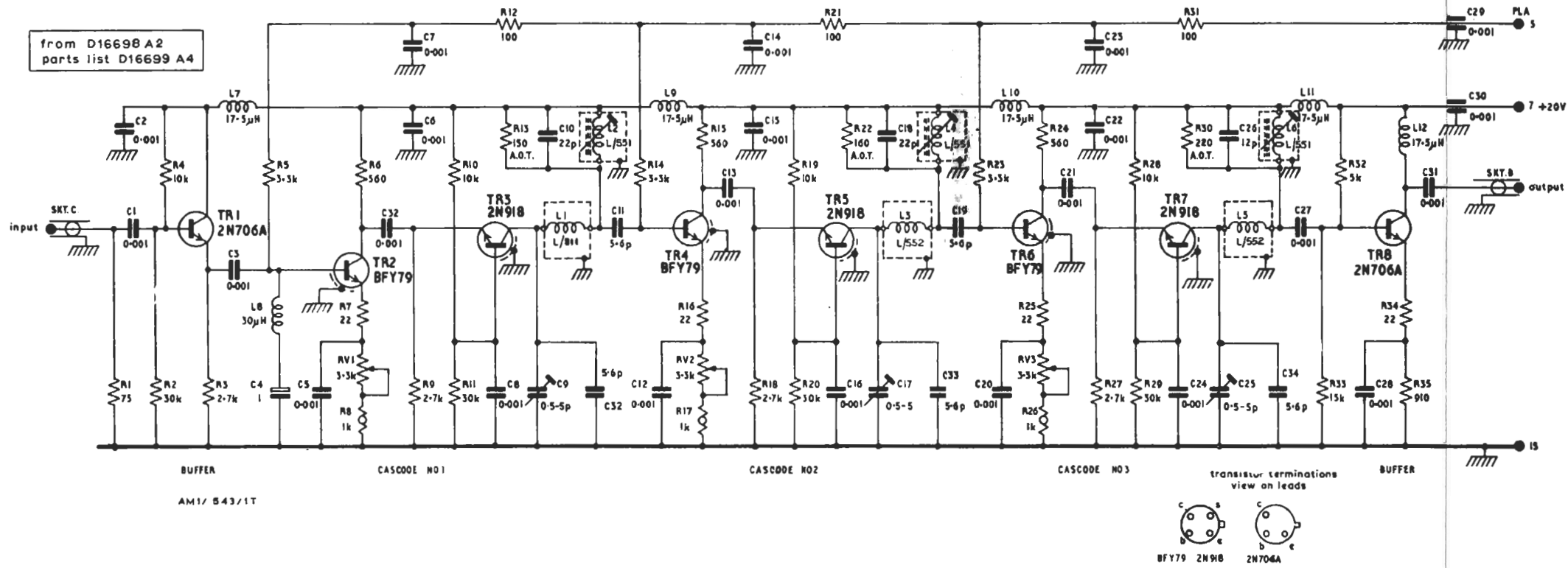


Fig. 1 Circuit of the AM1/543