SECTION 1

30-MHz CARRIER AMPLIFIERS AM2/501A AND AM2/501B

Introduction

These units amplify a 30-MHz amplitude-modulated signal with a bandwidth of ±5 MHz; the nominal gain of the AM2/501A is 26 dB and of the AM2/501B is 30 dB. The units are intended for use as input and output amplifiers of a quartz delay line; see NE4M/501, Instruction V.9.

The amplifiers are similar and each is constructed on a printed-wiring board in a separate screening can. Normally they are assembled with other units on a CH1/12A chassis.

General Specification

Gain	
AM2/501A	26 dB ± 1 dB.
AM2/501B	30 dB maximum.
Output Level	2 V r.m.s. maximum.
Impedances	
Input	75 ohms (AM2/501A input is isolated from earth).
Load	75 ohms (AM2/501A only: load may be capacitive).
Frequency Response	
Centre frequency	30 MHz.
25 MHz and 35 MHz	+0·3 dB ±0·3 dB.
20 MHz and 40 MHz	−3 dB ±1 dB.
Gain Variation	
Ambient temperature	−0·01 dB/°C (approximately).
Supply potential	+0·1 dB/volt.
Delay	45 ns.
Power Requirement	+18 volts, 105 mA.

Circuit Description

The circuit of the AM2/501A is shown in Fig. 1.1 on page 1.3. The input is isolated by means of a transformer. The input stage comprises TR1 and TR2, connected as a cascode amplifier, and a band-pass coupled circuit of unusual form which is a development of the common-inductance circuit as shown in Fig. 1.2. Fig. 1.2(b) shows that, if the impedance of the second tuned circuit is reduced, the common inductance is the only inductance that is required; diagram (c) shows the actual component references from Fig. 1.1. Capacitor C10 is a d.c.-isolating capacitor. The damping in this coupled circuit consists of the parallel combination of R9 to R12 and the input impedance of TR3; R10 is adjusted on test to compensate for the variation of input impedance with different transistors.

The second stage is similar except that the design emphasis is on correct output impedance rather than on correct bandwidth. Capacitor C13 neutralises the input inductance of TR4.

Details in which the circuit of the AM2/501B differ are shown inset in Fig. 1.1. The extra gain is obtained by omitting resistor R21. Overall gain can be adjusted by means of the 75-ohm pad R18, R19 and R20. L9 is tuned by C20; early amplifiers type AM2/501A may have similar tuning arrangements.

Maintenance

Normally, adjustments are not needed after the initial setting-up of the sub-unit containing the amplifiers. If re-alignment becomes necessary, the Production Test Schedule in Designs Department Specification No. 7.66(65) should be consulted.

The noise performance of an amplifier is dependent mainly on TR1; re-alignment is not required if this transistor is renewed.

Typical transistor-electrode potentials, measured using the lowest usable range of an Avo Model-8 test meter, are given below:

Transistor	*Emitter*	*Collector*
TR1	+8·6 V	+14 V
TR2	+8·9 V	+17 V
TR3	+9·6 V	+16 V
TR4	+3·8 V	+16·3 V

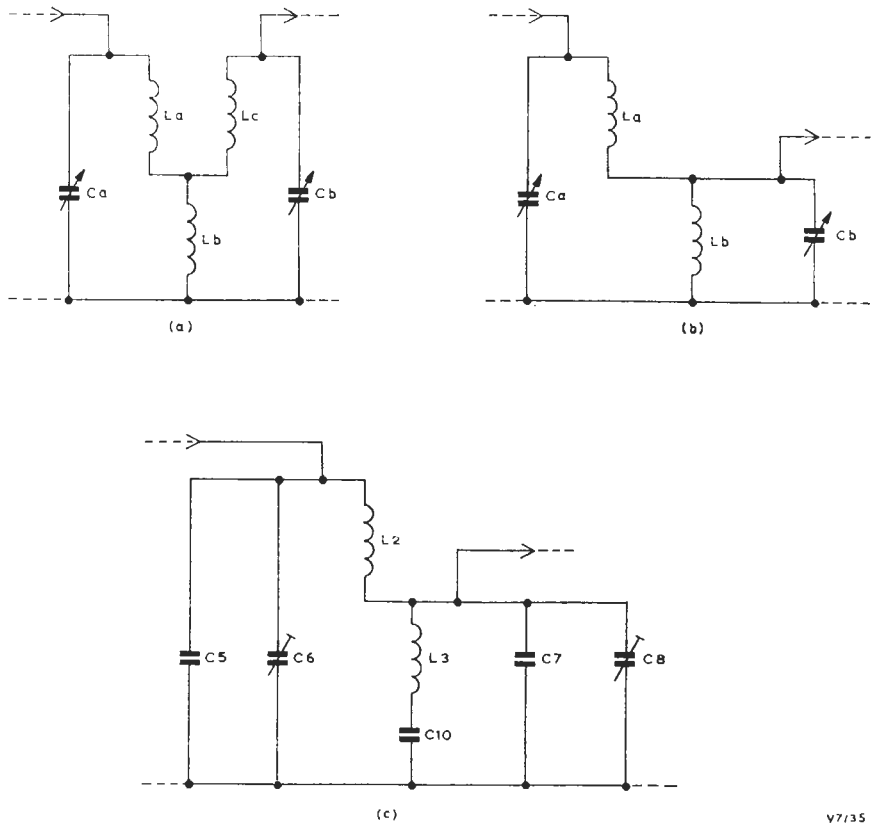


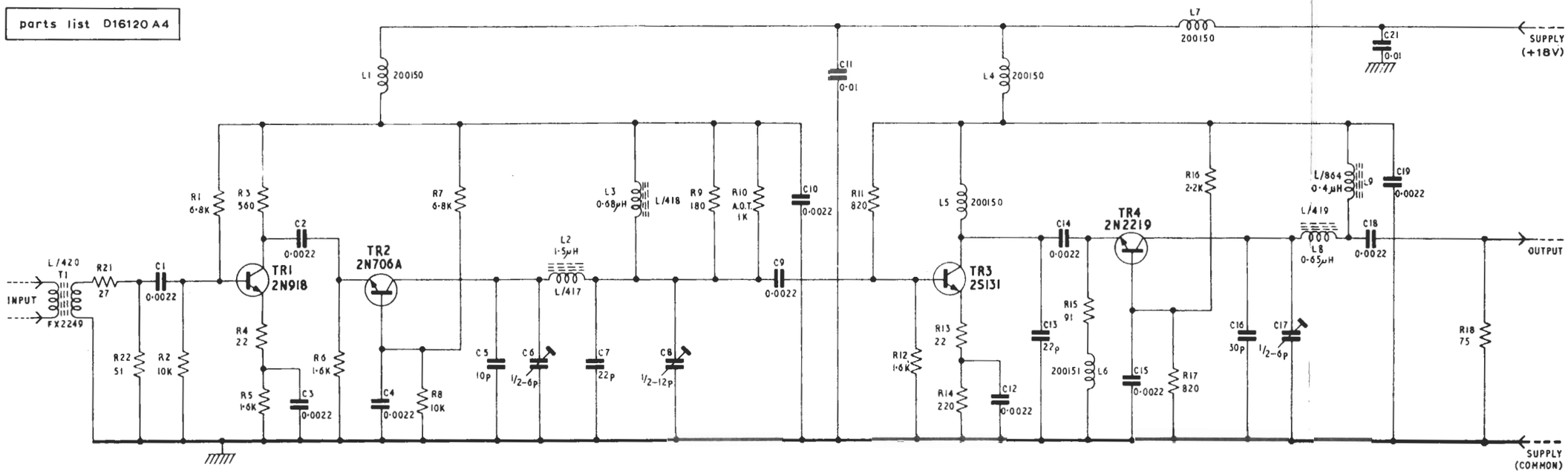
Fig. 1.2 Development of the Band-pass Circuit in the AM2/501A

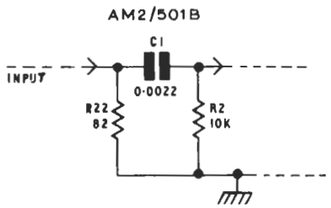
Reference

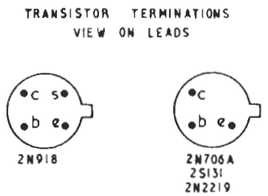
In addition to the Designs Department Specification mentioned above, Designs Department Technical Memorandum No. 7.110(65) refers to these amplifiers.

DEH 4/67

parts list D16120 A4







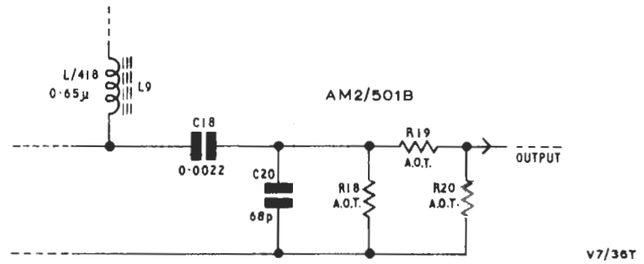


Fig. 1.1 Circuit of the AM2/501A