# SECTION 49

## SYNCHRONOUS DETECTOR AND AMPLIFIER AM1/549

### Introduction

The AM1/549 forms part of a coder calibrator[1] and is used in conjunction with a colour calibrator[2] and a high-grade oscilloscope when aligning NTSC and PAL coders to check the following parameters:

Luminance signal amplitudes.
PAL and NTSC chrominance signal amplitudes.
Relative phase of NTSC subcarrier components.

Input signals to the AM1/549 are:

A reference signal of colour sub-carrier.
The output of the coder to be aligned.
The output of the colour calibrator.

The phase of the reference signal (at NTSC sub-carrier frequency) can be varied with respect to that of the coder signal in a variable phase-shift network; a fixed 90-degree phase-shift network is also provided. These phase-shift networks are used, in conjunction with a synchronous detector[3], to adjust the I and Q axes of an NTSC chrominance signal to exact quadrature. The unit is not suitable for adjusting the quadrature of PAL chrominance signals.

The AM1/549 is constructed on two printed-circuit boards which are mounted on a CH1/12A plug-in chassis with index peg positions 18 and 40. A four-position selector switch, a calibrated attenuator and various phase-shift controls are mounted on the front panel of the unit. A *Test/Normal* switch, which can be used to check the accuracy of the phase-shift networks, is mounted on the back-plate of the unit. A stabilised power supply at −18 volts is required[4].

### Circuit Description

A circuit diagram is shown in Fig. 49.1 on page 49.3. The circuit is described below for the various positions of the selection switch SA.

*Calibrate*

With the switch in this position the input signal from the associated colour calibrator passes through the AM1/549, via contact 1 on switches SA1 and SA3, to the output.

*Measure Amp*

The input signal from the colour calibrator (a square waveform for this application) is applied, via SA1 contact 2 and the calibrated attenuator SB, to a mixing pad which is fed also, via SA2 contact 2, with the output to the coder. By setting the attenuator to the required position, the amplitudes of the component parts of the coder output can be measured.

*Set On Q*

The coder output is applied, via contact 3 of SA3 and the colour-signal amplifier TR1, to synchronous detector MD2/504. The reference feed of colour sub-carrier is applied, via the *Normal* position of the *Test/Normal* switch, emitter-follower TR2, contact 3 of SA1 and contact 6 on SA2, to the base of TR3. The phase-shift network consisting of L2, C6 and C7 is short-circuited by the action of the switches.

Transistor TR3 is a common-emitter amplifier and feeds the signal to phase-shift stage TR4. Fine and course phase-shift controls are provided in the collector circuit of this stage. The sub-carrier signal is then applied, via emitter-follower TR5, phase-shifter TR6 and amplifier stage TR7—TR8, to pin 8 of the MD2/504 synchronous detector.

The output from the detector is applied, via a low-pass filter which removes unwanted h.f. components from the signal, to the output amplifier TR9—TR11. The output of the amplifier is taken from the emitter of TR11 and fed, via a further low-pass filter and contact 3 of SA3, to the output of the unit.

*Adjust I*

With the selection switch in this position the signal paths through the AM1/549 are similar to those for the *Set On Q* position. The only differences is that phase-shift section A is brought into circuit by contact 4 of SA1 and so the reference feed of sub-carrier is phase-shifted by 90° before being applied to the variable phase-shift network.

**Operation**

Operating instructions for this unit are given under Coder Calibrator UN2M/505, Instruction V.14.

**Maintenance and Alignment**

The unit is maintained and aligned as part of the parent unit[1].

**References to Typical Associated Equipment**

1. Coder Calibrator UN2M/505, Instruction V.14.
2. Colour Calibrator UN2/503, Instruction V.14.
3. Carrier Amplitude Modulator MD2/504, Instruction V.9.
4. Power Supplier PS2/22C, Instruction G.2.

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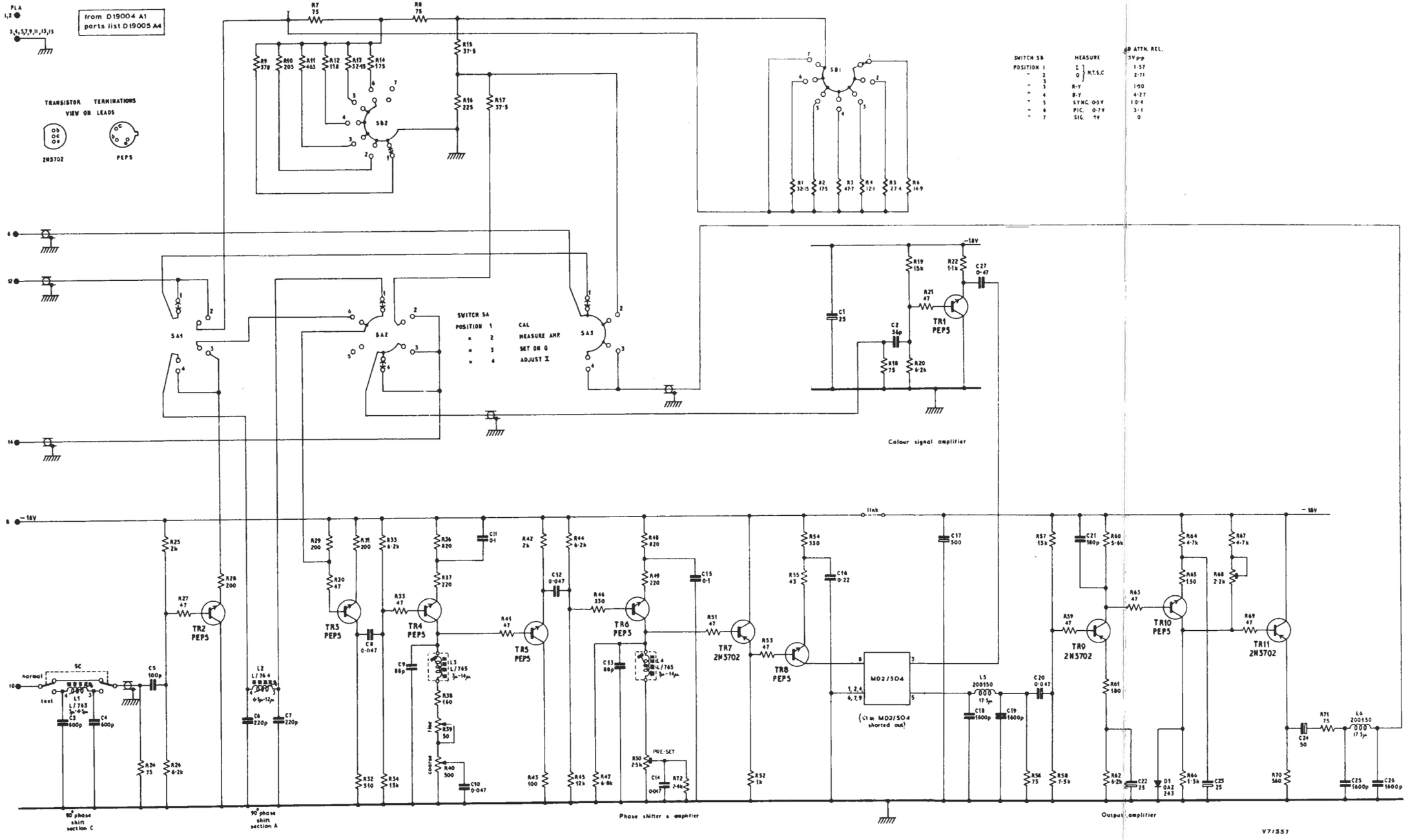


*Fig. 49.1 Circuit of the AM1/549*