

POWER AND SUBCARRIER-PROCESSING UNIT UN1/549, UN1/549B

Introduction

This unit accepts inputs of mixed sync and colour-burst gating pulses, colour subcarrier and a.c. mains, and delivers outputs of positive-going clamp pulses, gating pulses, two feeds of colour subcarrier in phase quadrature and a d.c. supply at +12 volts. The UN1/549 forms part of the PAL Colour Coder GE1/526, and the UN1/549B forms part of the NTSC Colour Coder GE1/521B. The circuits, however, are the same (Fig. 1).

The unit is constructed on three printed-wiring boards on a Chassis Type CH1/12B (index-peg position nos. 13, 17). It has a *Burst Amp* control for adjusting the amplitude of the gating pulses and two other controls, *Coder Phase* and 90° , which enable the phases of the two colour subcarrier feeds to be varied.

General Specification

<i>Power Supply</i>	a.c. mains
<i>Input-signal Amplitudes</i>	
Mixed sync pulses	2 V p-p
Colour-burst gating pulses	2 V p-p
Colour subcarrier	1 V p-p
<i>Input-Impedances</i>	3.3 kilohms
<i>Output-signal Amplitudes</i>	
Clamp pulses	5.9 V p-p
Colour-burst gating pulses (variable)	1.6—2.5 V p-p
Colour subcarriers	0.5 V p-p

Circuit Description

The circuit of the unit is given in Fig. 1. The power supplier is of conventional design and, in addition to the circuits of the UN1/549, supplies other associated units via external connections. Its maximum load is approximately 1 amp.

In the clamp-pulse generator the low-Q resonant circuit L1, C7 is shock-excited by the differentiated leading edges of the mixed sync pulses. The first half-cycle of each damped oscillation is amplified and clipped by TR5 and TR6 to form a positive-going pulse of 5.9 volts amplitude. The adjustable core of L1 forms a pre-set control for the adjustment of the frequency of oscillation and hence the duration of the clamp pulses; this is normally 1.6 μ s.

The gating-pulse amplifier clips the incoming pulses to render the outgoing amplitude, set by RV2, independent of any variations in incoming amplitude.

The subcarrier processor contains two phasing networks L2, C18, RV3 and L3, C26, R52, RV4 of a type which, when tuned to 1/2 of the working frequency, do not cause a change of amplitude of the output signal when adjusted. The networks are fed at low impedance by emitter followers TR9, TR13, and further emitter followers TR11, TR14 provide low-impedance outputs from the unit. RV4 is the 90° control and has a range of 10° ; it enables the phase relationship between the two output signals to be set accurately to quadrature. The *Coder Phase* control RV3 enables the phase of both output signals together to be varied over a range of approximately 100° .

Associated Units

The UN1/549 is used in conjunction with Chrominance Unit UN18/503 and Luminance Unit UN19/502 in the PAL Colour Coder GE1M/526. The UN1/549B is used in conjunction with Chrominance Unit UN18/502B and Luminance Unit UN19/502B in the NTSC Colour Coder GE1/521B.

Maintenance

Because this is one of a group of interdependent units it is not replaceable by other examples of the same unit type; it must always be aligned as described below in association with the other units of the parent equipment preferably on their permanent panel. The following alignment procedure assumes that the other units are already aligned.

Apparatus Required

Cathode-ray oscilloscope with 50 mV/cm Y-plate sensitivity, 10 MHz bandwidth, time-base scale adjustable to 1 μ s/cm and fitted with high-impedance probe.

Avo testmeter, Model 8.

The parent panel of the unit (GE1M/526 for UN1/549, GE1/521B for UN1/549B) with complement of other units already aligned.

Feeds of 100% colour-bar RGB components.

Feeds of mixed sync and colour-burst gating pulses of 2-volt p-p, both loaded with 75 ohms externally to the panel.

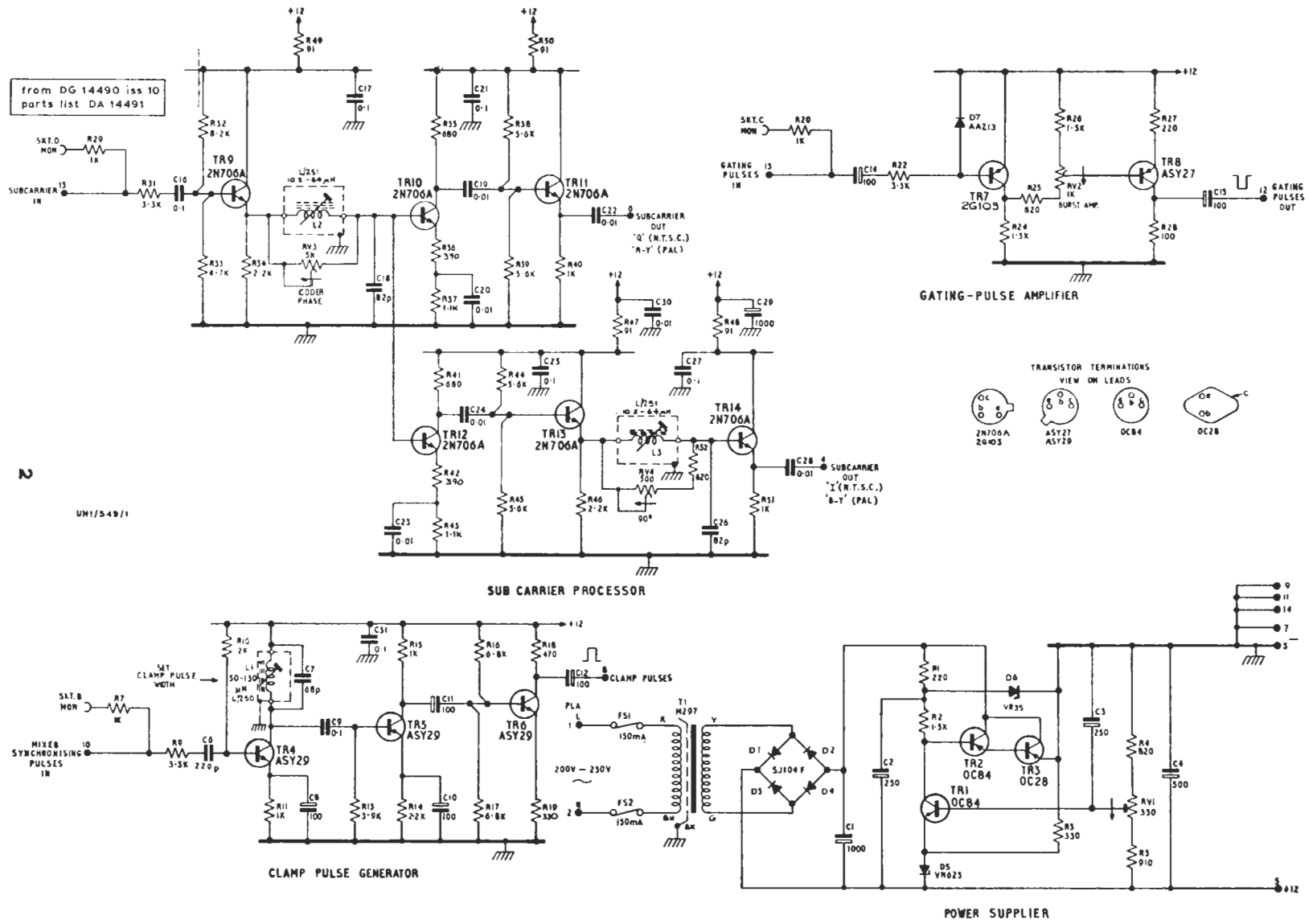


Fig 1 Circuit of the Power and Subcarrier Processing Unit UNI/549

Feed of PAL square-wave signal 1-volt p-p loaded with 75 ohms externally to the panel.

Feed of colour subcarrier of the appropriate frequency and 1-volt p-p (4.43361875 MHz for UN1/549; 3.579545 MHz for UN1/549B).

A.C. mains supply.

Test Procedure

1. If the alignment follows a change of transistor TR3, connect the positive lead of the test-meter to the chassis of the unit and measure the resistance between chassis and the envelope of the transistor; this resistance should be of the order of 580 ohms.
2. Set all the controls of the unit to mid-range and plug it into the parent panel; connect the signal feeds detailed above, plugging the colour-bar signals to the top three *Picture* input connectors to avoid the need for a relay-operating supply.
3. Using the oscilloscope probe, check that all the incoming signals appear with the correct amplitudes at the appropriate monitoring points on the units of the panel.
4. Connect the mains supply to the panel. Measure the potential with respect to chassis at the positive side of C4 and adjust it to +12 volts by means of RV1.
5. Using the oscilloscope probe, examine the signal at the collector of TR6 and check that it consists of positive-going pulses of 5.5–6.5 volt p-p amplitude.
Adjust the core of L1 to set the duration of these pulses (measured at the half-amplitude points) to $1.6 \mu\text{s} \pm 30\%$. (Increasing the inductance of L1 lengthens the pulse-duration.)
6. Using the oscilloscope probe, examine the signal at the collector of TR8 and check that it consists of negative-going pulses varying in

amplitude between 1.6 volts and 2.5 volts p-p as the *Burst Amp* control RV2 is rotated throughout its range.

7. Using the oscilloscope probe, examine the signal at the emitter of TR11; it should be an unmodulated colour subcarrier.
Adjust the core of L2 slowly, while rotating the *Coder Phase* control RV3 back and forth throughout its range, until a setting of L2 is found for which the variation of RV3 causes minimum variation of signal amplitude and equal slight increases of amplitude when RV3 is turned to its two extreme settings.
Check that the subcarrier amplitude is between 0.45 volt and 0.6 volt p-p.
8. Trigger the oscilloscope from mixed syncs (not line-trigger pulses).
Using a co-axial lead loaded with 75 ohms at the input to the oscilloscope examine the signal at the output connector of the GE1M/526 panel containing the unit. Adjust the oscilloscope trigger so as to superimpose two successive lines. The display may show two envelopes of different sizes for the bars or may 'twitter' along bar edges; this is due to the field-frequency superimposition of oscillograms of lines having different chrominance amplitudes.
9. Set RV4 to mid-range. Adjust L3 to minimise the effect described in 8.
10. Perform the routine alignment of the parent unit before returning it to service.

References

1. Designs Department Technical Memorandum No. 8.167(64).
2. Designs Department Specification No. 8.184(64).

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