PAL COLOUR CODER GE1M/526

Introduction

This coder accepts the three RGB blanked-picture and colour-bar signals, the luminance signal (when available), the 4·43361875-MHz subcarrier and the colour-burst gating pulses of a 625-line colour television system, together with feeds of mixed syncs and a half line-frequency PAL square wave. It produces a PAL coded colour video signal. Supplies of a.c. mains and of d.c. at 50 volts for relay-operation are required.

The coder consists of a Panel PN3/23 containing:

Power and Subcarrier Processing Unit UN1/549
Chrominance Unit UN18/503
Luminance Unit UN19/502
Colour Coder Delay Network NE4/505A
Printed-wiring board interconnections for above units
Four relays

General Specification

Power Supplies	a.c. mains 50 V d.c.
Input-signal Amplitudes	
Picture signals	0·7 V p-p each
Subcarrier	1 V p-p
Gating pulses	2 V p-p
PAL square wave	1 V p-p
Mixed syncs	2 V p-p
Input Impedances	
Picture signals	75 ohms ±0·1 %
Subcarrier	3·3 kilohms
Gating pulses	3·3 kilohms
PAL square wave	2 kilohms
Mixed syncs	1·6 kilohms
Output-signal Amplitude	1 V p-p
Output Impedance	75 ohms
Propagation Delay	750 ±20 ns

Circuit Description

A block diagram of the coder is given in Fig. 1, and the interconnection diagram of the panel in Fig. 2. The relay RLD, operated via a circuit external to the panel, enables the colour-bar test signal inputs to be parallelled, so that a mono-chrome display is produced for checking the white balance of the equipment. The delay network, in the output connection of the coder, has a maximum insertion delay of 180 ns in steps of 30 ns, and enables the insertion delay of the coder to be adjusted to within 15 ns of a pre-determined value.

Fig. 3 shows the controls of the component units of the GE1/526.

Maintenance

The routine alignment procedure given below should be carried out at regular intervals but also after the repair of any of the units and on installation at a new site. This routine assumes that the units comprised by the panel are already individually aligned.

If any resistor in the groups R4 to R7 is changed, the new component must be selected so as to make the total resistance of the affected group 75 ohms ±0·1 per cent., measured with a Return-loss Measurement Set UN1/524.

Apparatus Required

Cathode-ray oscilloscope, with 50 mV/cm Y-plate sensitivity, 10-MHz bandwidth and time-base scale adjustable to 1 μs/cm; fitted with co-axial lead and Equaliser EQ1/510.
Coder Calibrator UN2M/505 or UN2L/505 (both of which comprise Colour Calibrator UN2/503A and Synchronous Detector and Amplifier AM1/549).
Feeds of 100% colour-bar RGB Components.
Feeds of mixed sync and colour-burst gating pulses, of 2-volt p-p amplitude, each loaded with 75 ohms externally to the panel.
Feed of PAL square-wave signal of 1-volt p-p amplitude, loaded with 75 ohms externally to the panel.
Feed of colour subcarrier (4·43361875 MHz).
50-volt d.c. supply, connected via Painton female connector Type 312010 and the circuit shown in Fig. 4.
A.C. Mains supply.

Test Procedure

1. Connect the output of the coder calibrator to the oscilloscope via the co-axial lead and equaliser.

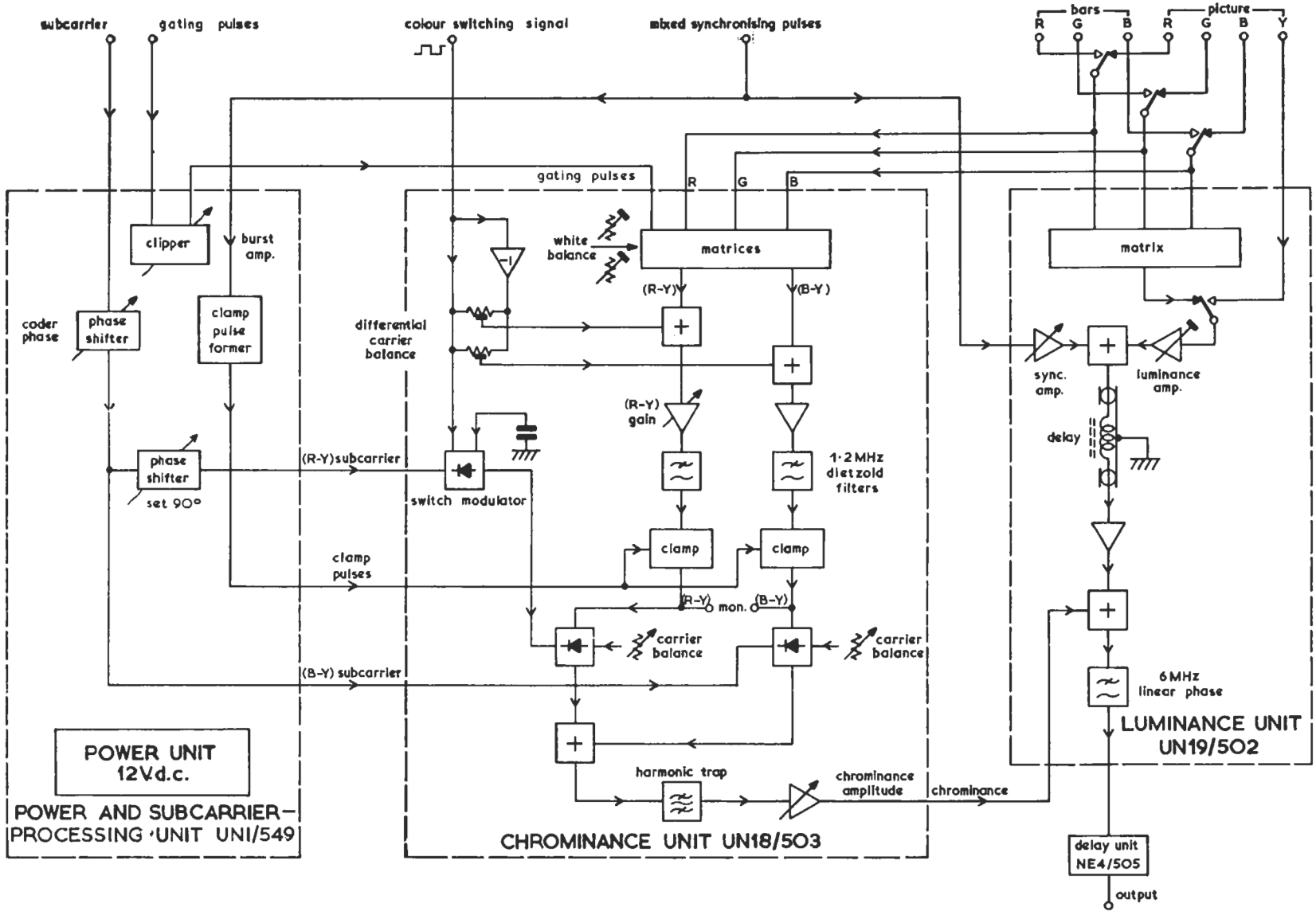

Fig 1 Block Diagram of the PAL Colour Coder GEI/526

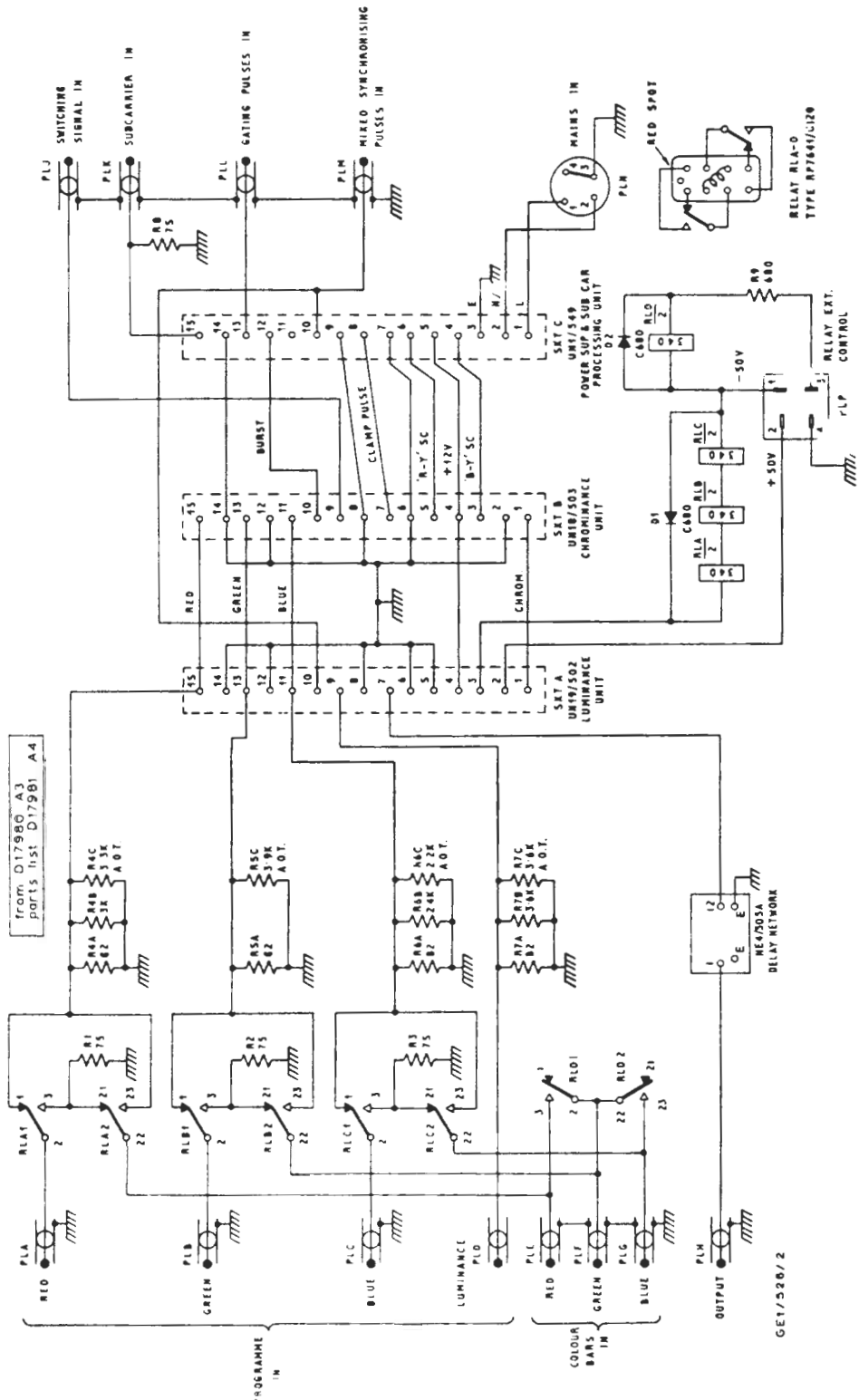

Fig 2 Interconnections of PAL Colour Coder GEI/526

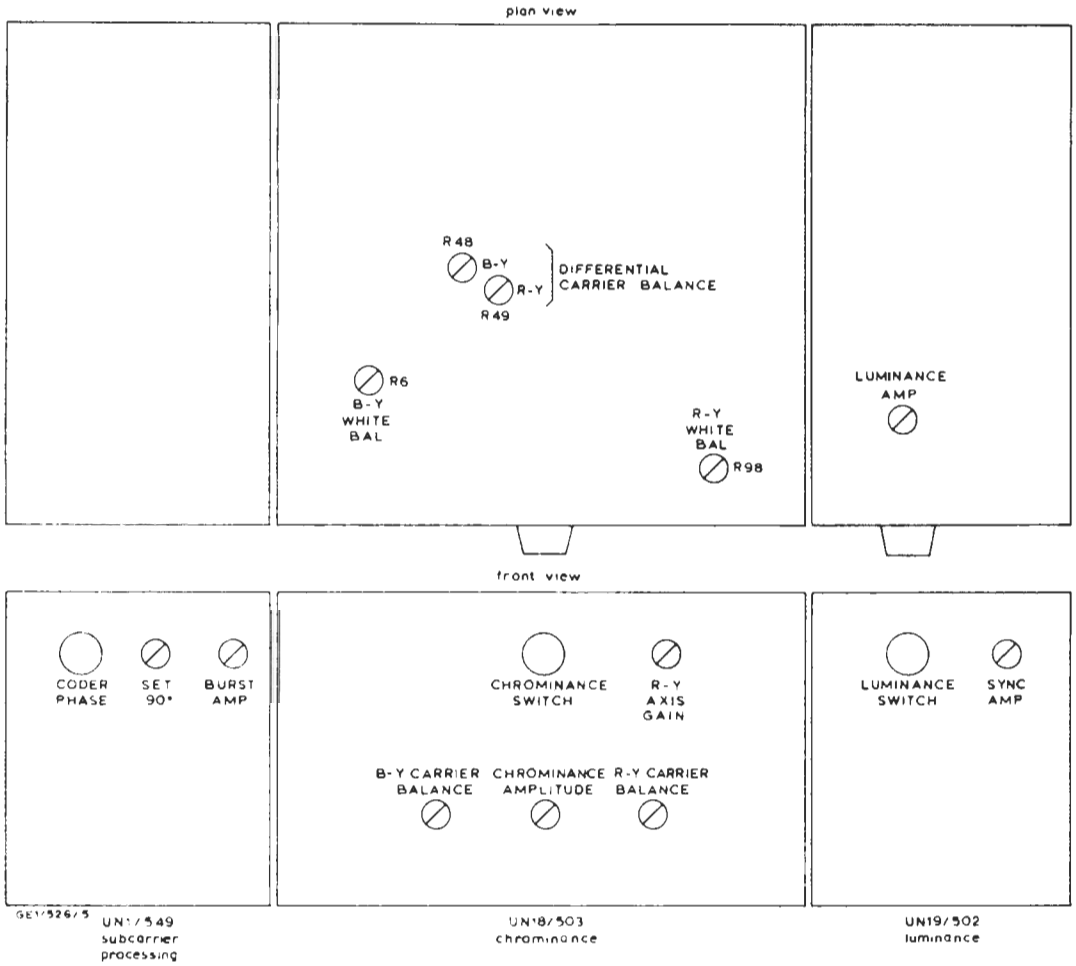

Fig. 3 Layout of Controls on the PAL Colour Coder GE1/526

Set the mode switch of the coder calibrator to *Lum. + Chrom.* and that of the synchronous detector and amplifier to *Cal.*

Set the oscilloscope sensitivity to 50 mV/cm and adjust the oscilloscope-equaliser control to obtain the display shown in Fig. 5(a), indicating that the response of the oscilloscope at 4·43 MHz is correct.

The same co-axial lead and equaliser must be used with the oscilloscope throughout the ensuing test procedure.

2. Connect the output of the colour coder under test to the oscilloscope via the lead and equaliser. Apply the appropriate input signals and power supplies, connecting the 50-volt supply via the test circuit shown in Fig. 4 and applying the colour-bar signals to the *Bars* input connectors of the panel.

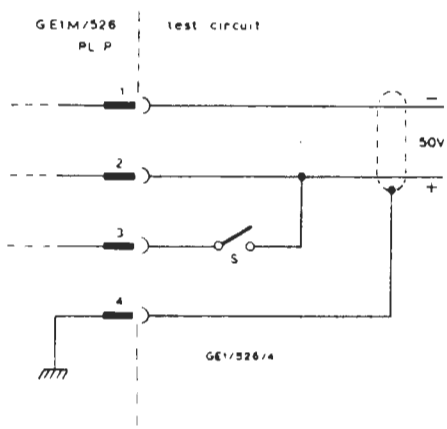

Fig. 4 Test Connector

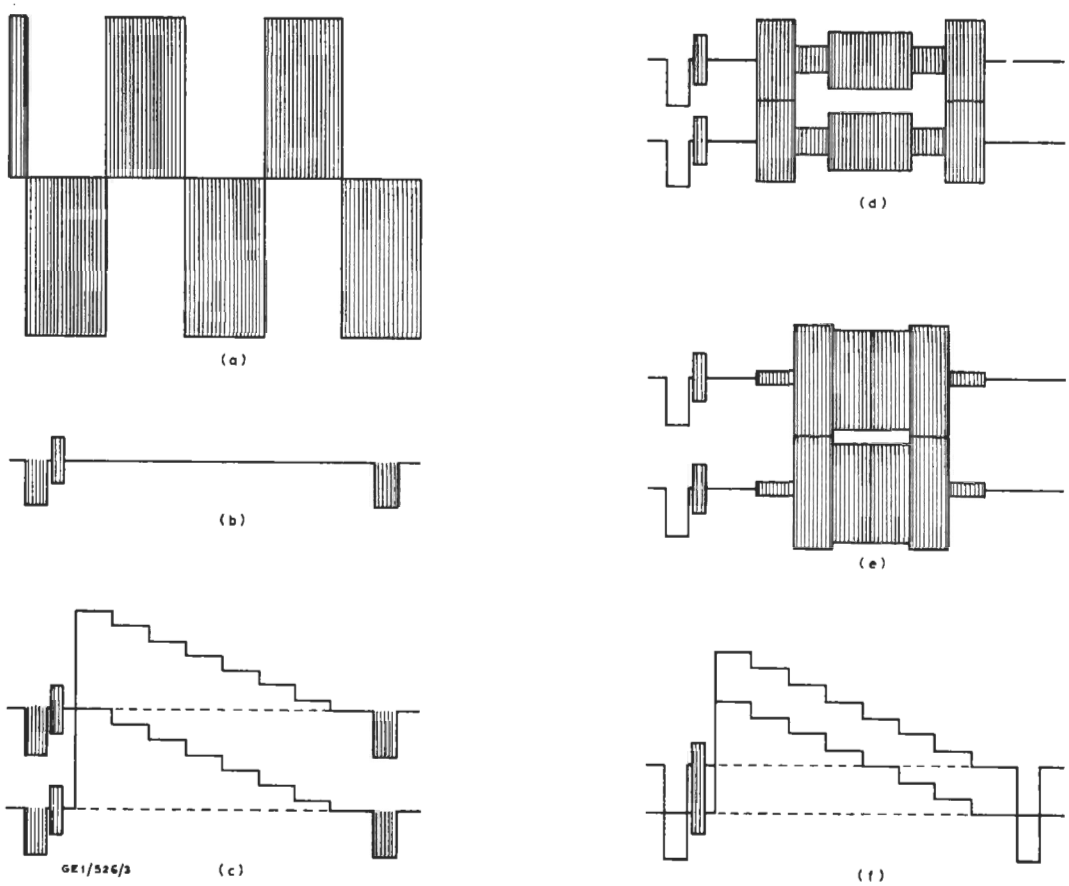

Fig. 5 Calibration Waveforms

Set the *Luminance* switch of the luminance unit to *Bars Off* and the *Chrominance* switch of the chrominance unit to *Off*. The display shown in Fig. 5(b) should be obtained.

Adjust R48 and R49 in the chrominance unit, if necessary, to obtain a residual-subcarrier amplitude which is constant during the active period of all lines and not greater than 5 mV p-p.

3. Close the switch S (Fig. 4), thereby operating relay RLD and parallelling the RGB signal circuits.

   Set the *Chrominance* switch of the chrominance unit to *B-Y* and check that the display of Fig. 5(b) is still obtained, with a residual subcarrier component of less that 5 mV p-p. If not, adjust the *B-Y white balance* control in the UN18/503.
4. Set the *Chrominance* switch to *R-Y* and check that the display of Fig. 5(b) is still obtained, with a residual subcarrier component of less that 5 mV p-p. If not, adjust the *R-Y white balance* control in the UN18/503.
5. Interpose the coder calibrator between the panel under test and the oscilloscope, using a short lead between the panel and the coder calibrator.

   Set the *Chrominance* switch to *Off* and the *Luminance* switch to *On*.

   Set the mode switch of the coder calibrator to *Lum.* and the *Measure Amp.* switch of the detector and amplifier to *Pic.*

   The display of Fig. 5(c) should be obtained. Check that the luminance amplitude is correct to within 10 mV. (This is represented by 5 mV on the display). If not, adjust *Luminance Amp* in the UN19/502.
6. Set the *Luminance* switch of the luminance unit to *Off*, and the *Chrominance* switch of the

chrominance unit to *B-Y*.
Adjust the *Chrominance Amplitude* control of the chrominance unit to obtain the display of Fig. 5(d) correct to within 5 mV.

7. Set the Chrominance switch of the chrominance unit and the *Measure Amp.* switch of the detector and amplifier both to *R-Y*.
Adjust the *R-Y Gain* control of the chrominance unit to obtain the display of Fig. 5(e) correct within 5 mV.
8. Set the *Chrominance* switch to *Off* and the *Luminance* switch to *Bars On*.
Set the *Measure Amp.* switch of the detector and amplifier to *Sync*.
Adjust the *Sync. Amp.* control of the luminance unit and the *Burst Amplitude* control of the power and subcarrier processing unit to obtain the display of Fig. 5(f).
9. Set the *Chrominance* switch to *On*, disconnect the coder calibrator and reconnect the oscilloscope lead to the output of the panel under test. 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. Adjust the *90°* control of the power and subcarrier processing unit to minimise the effect.
10. Set the *Luminance* switch to *Ext.* (*4T*) or *Int.* (*3T*) in accordance with operational requirement, and return the panel to service.

References

1. Designs Department Technical Memorandum No. 8.215(66).
2. Designs Department Specification No. 8.218(66).

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