COLOUR PICTURE PHASE PULSE GENERATOR GE2/563

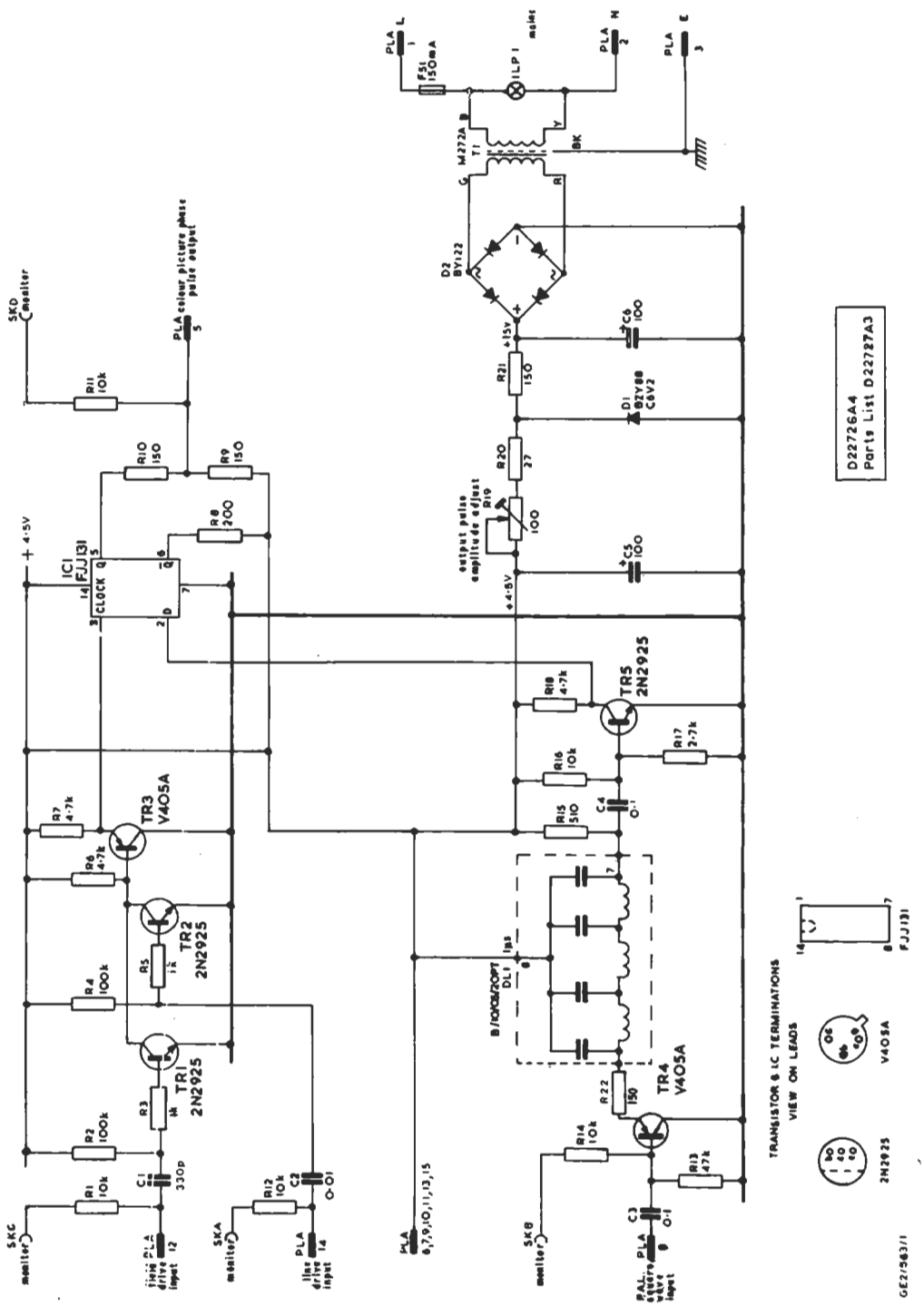

Fig. 1 Circuit of the Colour-picture Phase Pulse Generator GE2/563

Introduction

The GE2/563 accepts line-drive, field-drive and PAL squarewave signals, and produces a 12·5-Hz squarewave signal which is used for the approximate picture synchronisation of all 625-line PAL colour sources in a *common clock* area.

The unit is constructed on a CH1/12A chassis with index-peg positions 18 and 35. Monitor sockets for the three input signals and for the output signal are provided on the front panel of the unit, together with a mains-on indicator lamp. A variable power supply (adjustable between 3·5 volts and 5·3 volts) is derived from an integral mains-driven power supplier.

General Specification

Signal Inputs

Coincident Line-drive	2V p-p
Field-drive	2V p-p
PAL squarewave	1V p-p
Input Impedances	high w.r.t. 75 ohms
Signal Output	
12·5 Hz Squarewave	1V p-p
Output Impedance	75 ohms
Power Consumption	15 mA at 240V, 50 Hz

Circuit Description

A circuit diagram of the GE2/563 is shown in Fig. 1. Negative-going field-drive signals are differentiated and applied to amplifier-inverter stage TR1, and negative-going line-drive signals are applied to amplifier-inverter stage TR2. Transistors TR1 and TR2 form an AND gate at the input to emitter-follower TR3 which is cut off only when TR1 and TR2 are simultaneously cut off; i.e. once every two fields when the peak of the differentiated field-drive pulse coincides with a line-drive pulse. The resulting positive-going signal developed at the emitter of TR3 has a duration of 6·5 μs and a period of 40 ms; this signal is applied to the *Clock* input of integrated circuit IC1.

A PAL square-wave signal is applied, via emitter-follower TR4 and a 1-μs delay line, to amplifier-inverter stage TR5. From the collector of TR5 the delayed and amplified waveform is applied to the D input of IC1. The delay ensures that the square-wave transitions always reach IC1 later than the leading edges of the clock signal.

Integrated circuit IC1 is a D-type bistable device. Its output changes state each time the leading edge of a positive-going pulse is applied to the *Clock* input, the transition being in the same direction as the following PAL square-wave transition. Thus the signal developed at the Q output of IC1 is a square-wave with a frequency of 12·5 Hz; this waveform is fed to the output of the unit via a dividing and matching network. Resistor R8 is used as a load for the $\overline{Q}$ output and so balances the load on the power supply.

The mains-driven power supply uses a full-wave bridge rectifier circuit; the d.c. supply is stabilised at a nominal 6·2 volts by a Zener diode. Power is applied to the signal circuit via variable resistor R19 which functions as an output-pulse amplitude control.

Test Procedure

Apparatus required

Painton 15-way socket
Avometer model 8
Oscilloscope with double-beam facility; e.g. Tektronix 543 or 545 with CA plug-in unit.
Four 75-ohm resistors
Source of standard 625-line waveforms:
Line drive
Field-drive
PAL Square-wave

1. Insert the unit into the 15-way socket and connect the appropriate terminals of the socket to a supply of a.c. mains.
2. Check that the d.c. potential between the positive and negative terminals of diode bridge D2 is 15V.
   Measure the d.c. potential across C5 and check that it can be varied between 3·5V and 5·3V by adjustment of R19. Set R19 for a d.c. potential of 4·5V.
3. Connect to the appropriate terminals of the socket, line-drive, field-drive and PAL square-wave signals. Terminate these input signals in 75 ohms, and terminate the output of the unit in 75 ohms.
4. Apply a high-impedance probe to each of the input monitor sockets in turn. Check that the signal amplitudes are: line-drive 2V p-p, field-drive 2V p-p, PAL square-wave 1V p-p.
5. Trigger the oscilloscope from the PAL square-wave input. Use the double-beam facility of the oscilloscope to compare the PAL square-wave input with the waveform at the collector of TR5. Check that the TR5 waveform is an inverted PAL square-wave with an amplitude of

4V p-p which is delayed by 1 μs with respect to the input waveform.

6. Trigger the oscilloscope from the field-drive input and monitor the wave-form at the emitter of TR3. Check that this waveform consists of positive-going pulses with an amplitude of 3·5V p-p and a duration of 6·5 μs which occur at picture rate; i.e. every 40 ms.
7. Trigger the oscilloscope from the output of the unit and monitor the waveform at the monitor output socket. Check that this is a square-wave with a frequency of 12·5 Hz. Use the double beam facility to compare the output with the waveforms present at the emitter of TR3 and the collector of TR5. Check that the output waveform changes polarity whenever the leading edge of a positive-going pulse appears at the emitter of TR3 and check that the transition is in the same direction as the nearest PAL square-wave transition.
8. Adjust preset resistor R19 for an output amplitude of 1V p-p.

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