PULSE GENERATOR GE2/553

Introduction

The GE2/553 accepts an input of mixed sync pulses and produces seven output signals which are used in generating a line-up waveform for colour decoders. These output signals are:

(a) Field blanking pulses
(b) Mixed sync pulses
(c) PAL square-wave
(d) Inverted PAL square-wave
(e) White-bar waveform
(f) Drive pulses
(g) Burst-gate pulses

The GE2/553 is constructed on a CH1/12A chassis with index-peg positions 7 and 42.

General Description

A block diagram of the GE2/553 is shown in Fig. 1. Mixed sync pulses are fed to the field-pulses generator which produces a pulse at the end of each equalising pulse. These trains of pulses are fed via a gate to a burst-gate blanking pulse generator with an output pulse duration of nine line-periods (9H) and to a field blanking pulse generator with an output pulse duration of 25 line-periods (25H). The output of the burst-gate blanking pulse generator is fed back to the gate so that only the first of the train of pulses in each field interval is fed to the two blanking-pulse generators.

The output of the line-frequency pulse generator

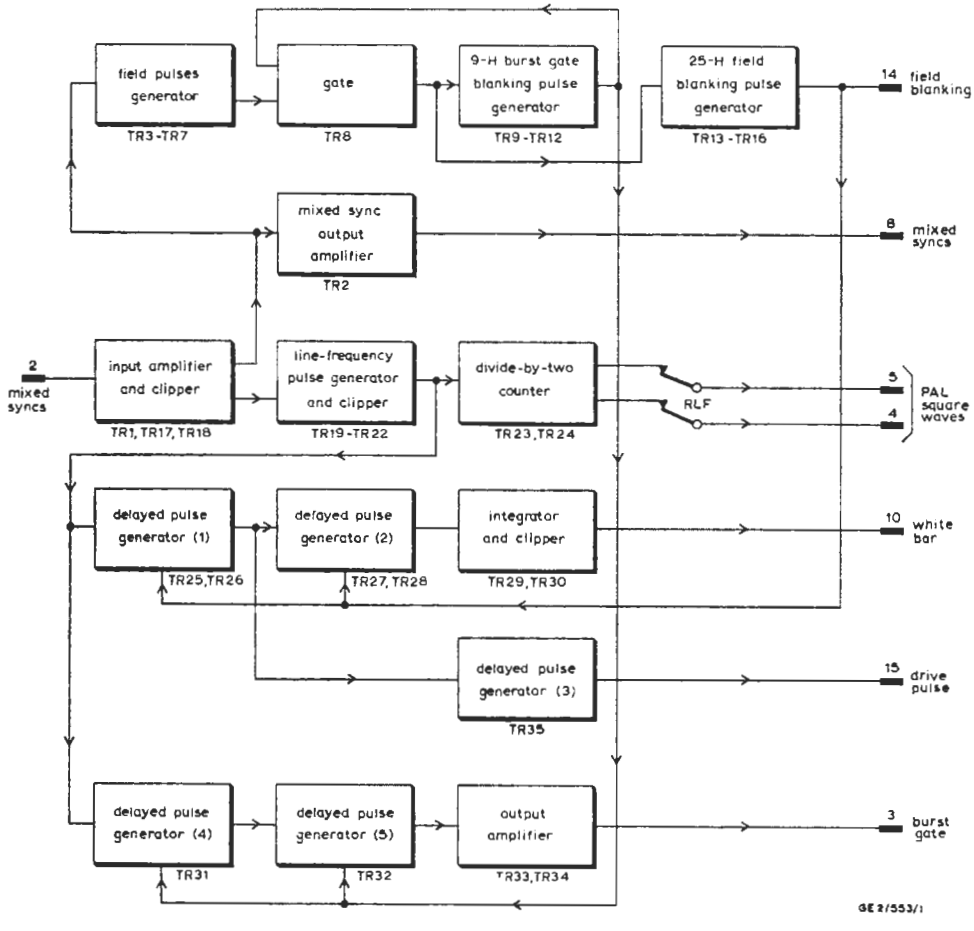

Fig. 1 Block Diagram of the GE2/553

and clipper, shown in Fig. 2(b), is fed to a bistable counter circuit and to two delayed-pulse generators. The bistable circuit produces normal and inverted PAL square-waves.

The delayed-pulse generators control the timing and duration of the white-bar waveform and the drive pulses, both shown in Fig. 2(d), and the burst-gate pulses shown in Fig. 2(f). These generators are blanked with either the field blanking pulses or the burst-gate blanking pulses.

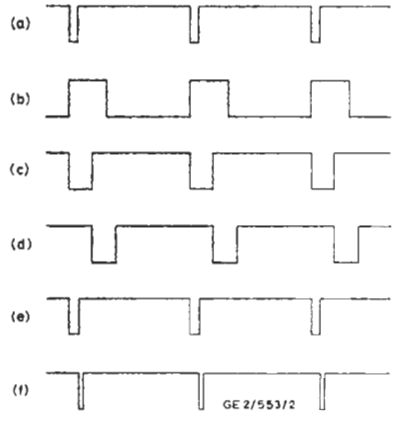

Fig. 2 Delayed Pulse Generator Waveforms

Circuit Description

The circuit diagram of the GE2/553 is given in Fig. 3 on page 3.

Transistor TR2 in the mixed-sync output stage feeds a preset resistor R10 via its slider. This configuration gives a constant output impedance equal to the sum of the values of resistors R9 and R10.

Transistor TR3 shares its collector load resistor R21 with transistor TR6 in the 3-μs monostable multivibrator thus gating the mixed sync pulses and the 3-μs pulses as shown in Fig. 4.

Transistor TR8 conducts if the 9H monostable multivibrator is in its stable state. With no field pulses from transistor TR7, the collector current of TR8 flows through resistor R28. A positive-going field pulse from the emitter of transistor TR7 reverse biases diode D5 thereby diverting the collector current of TR8 through diode D6. This causes a positive-going pulse at the bases of transistors TR9 and TR13. With the 9H monostable multivibrator in its unstable state transistor TR8 is cut off and one or other of the diodes D5 or D6 is always reversed biased, thus preventing the

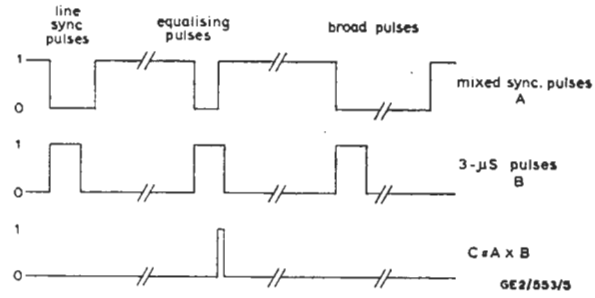

Fig. 4 Generation of Field Pulses
(a) sync-pulse component
(b) 3-μs pulse component
(c) output waveform

field pulses being applied to transistors TR9 and TR13.

The 9H and 25H multivibrators are each followed by a two-stage amplifier.

The negative-going leading edges of the sync pulses applied to capacitor C13 reverse bias diode D7. This puts resistor R62 in parallel with resistor R63 via diode D8. At the end of the exponential decay of the negative-going pulse which charges capacitor C13, diode D7 conducts and the voltage drop across resistor R62 reverse biases diode D8. Thus a negative-going pulse at each of the negative-going transitions in the mixed sync waveform is fed to the base of transistor TR19.

Transistors TR19 and TR20 are in an astable multivibrator with a natural period of about 90-μs and a mark-to-space ratio of a little under 1:3. This multivibrator is synchronised by the differentiated and clipped sync pulses to give a 20-μs positive-going pulse at the start of each line. The output level of the clipper transistor TR22 is set at about 2·5 volts by the base resistor chain (diode D19 and resistors R71, R127 and R72).

The bistable multivibrator containing transistors TR23 and TR24 is a conventional circuit the outputs of which are switched off by means of relay contacts RLF1 and RLF2. These contacts also provide alternative output voltages corresponding to one of the output states of the bistable multivibrator.

Transistors TR25, TR27, TR31, TR32 and TR35 are all in timing-element circuits similar to that shown in Fig. 5. A negative-going pulse applied to the circuit (waveform 1) is differentiated (waveform 2). The time constant for the negative-going edge is shorter than that for the positive-going edge because the transistor is conducting, thereby

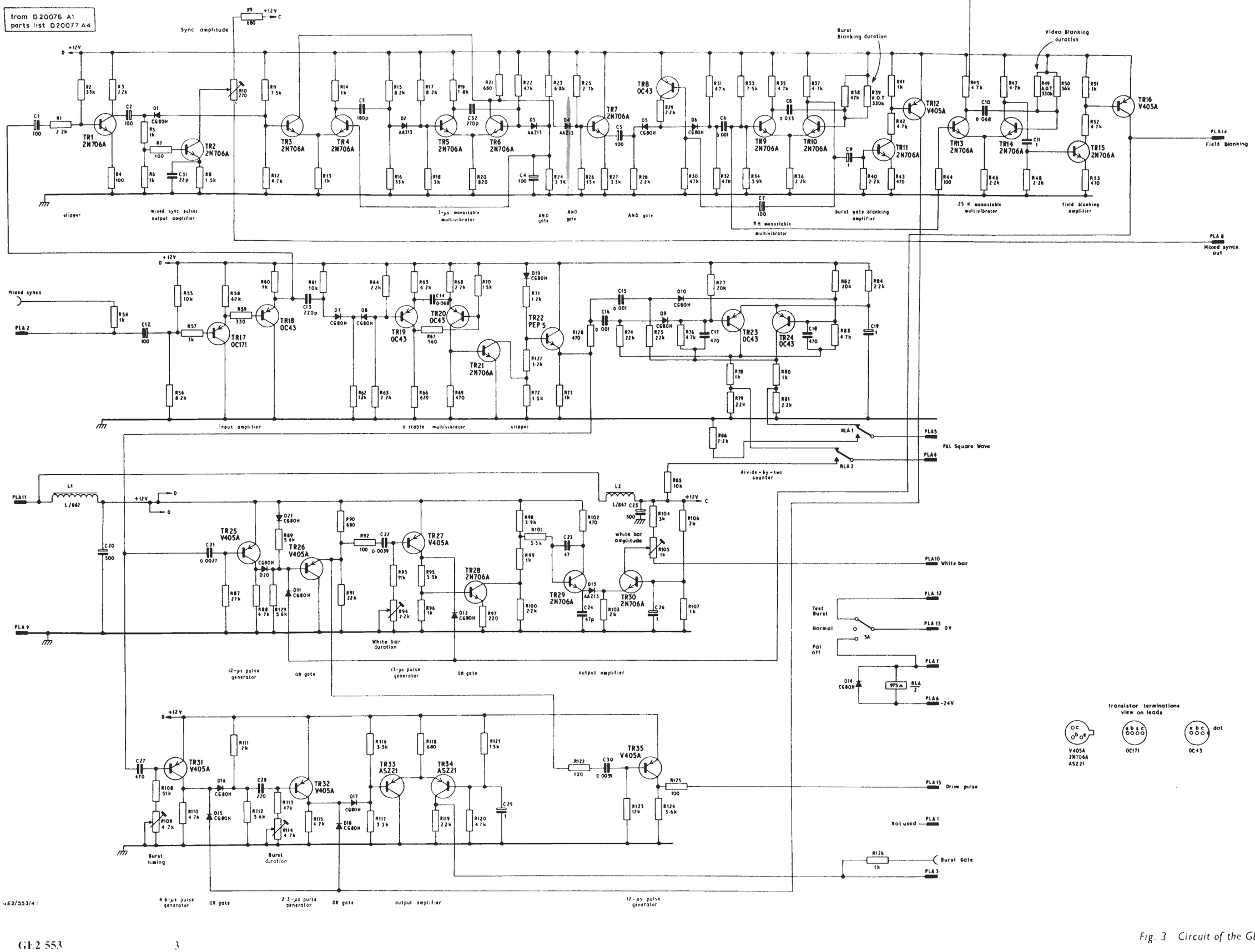

Fig. 3 Circuit of the GE2i553

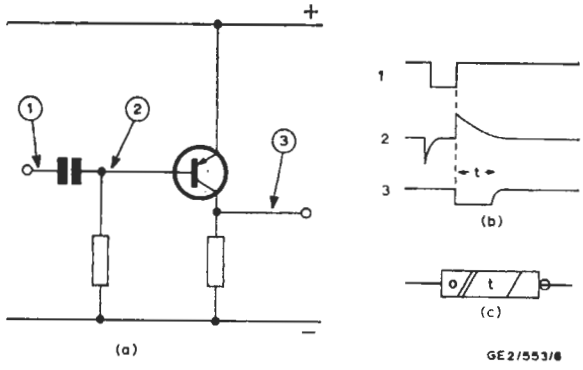

Fig. 5 Delayed Pulse Generator Timing Element
(a) circuit
(b) waveforms
(c) block diagram symbol (positive logic)

shunting the base resistor. The positive-going pulse cuts off the transistor giving a negative-going pulse at the collector (waveform 3). Fig. 5(c) shows the logic diagram symbol for this timing element circuit using positive logic (see Instruction G.1).

Blanking is applied to these timing elements via diodes. Long-tailed pair output circuits are used for the white-bar and burst-gate outputs. The white-bar output amplifier uses the same constant-resistance configuration as the mixed sync output amplifier.

Test Procedure

The GE2/553 is tested as part of its parent unit.

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