SECTION 11

SWITCHING PULSE GENERATOR GE2/511

Introduction

The GE2/511 accepts an input of mixed-sync pulses and generates a picture-frequency switching pulse[1,2]. The output pulse consists of one line-sync pulse gated out of the input waveform and occurs, on even fields, after the broad pulses but within the field-blanking period. The unit will operate with a 405, 525 or 625 line input without adjustment.

The GE2/511 is constructed on a CH1/12A chassis with index peg positions 3 and 17. Input and output monitor sockets are provided on the front panel of the unit. A power supply at +12 volts is required[3].

General Specification

Mixed Sync Input	2 volts p-p ±2 dB
Output Signal	
Pulse Amplitude	+12 volts ±0·6 volts
Pulse Duration	one line-sync pulse
Rise Time	2 μs ± 1μs
Position	
405-line input	start of line 211
525-line input	start of line 272
625-line input	start of line 9
Pulse Current	0·2 A max.
Power Consumption	+12 volts ±4%, 80 mA
Weight	1 lb.

Circuit Description

A block diagram is shown in Fig. 11.1, a circuit diagram in Fig. 11.2 and the waveforms present at

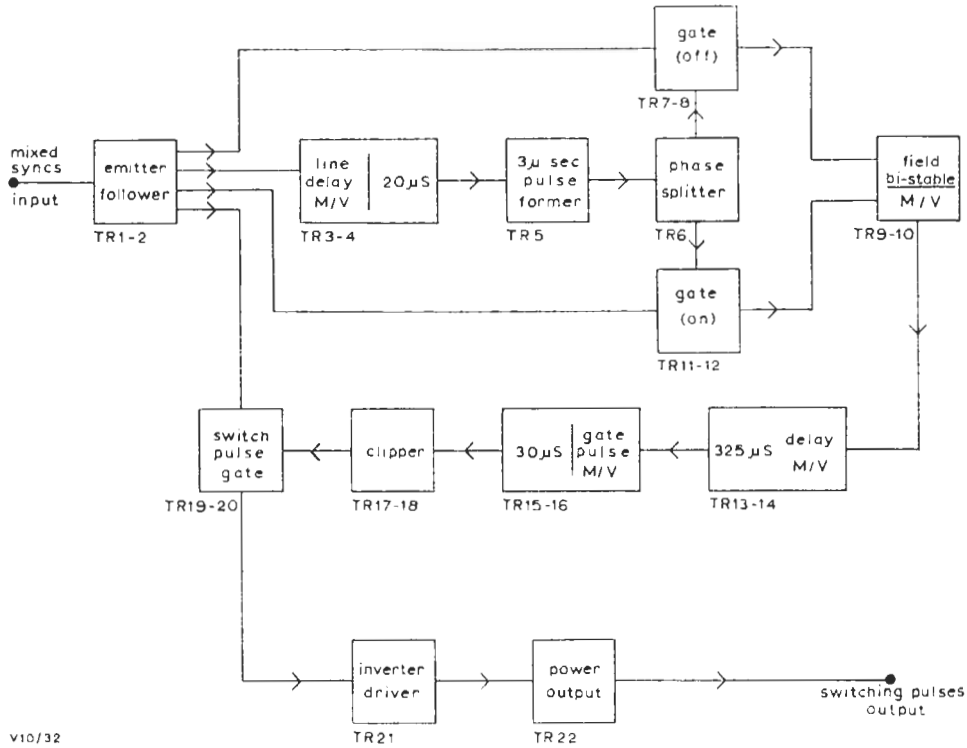

Fig. 11.1 Block Diagram of the GE2/511

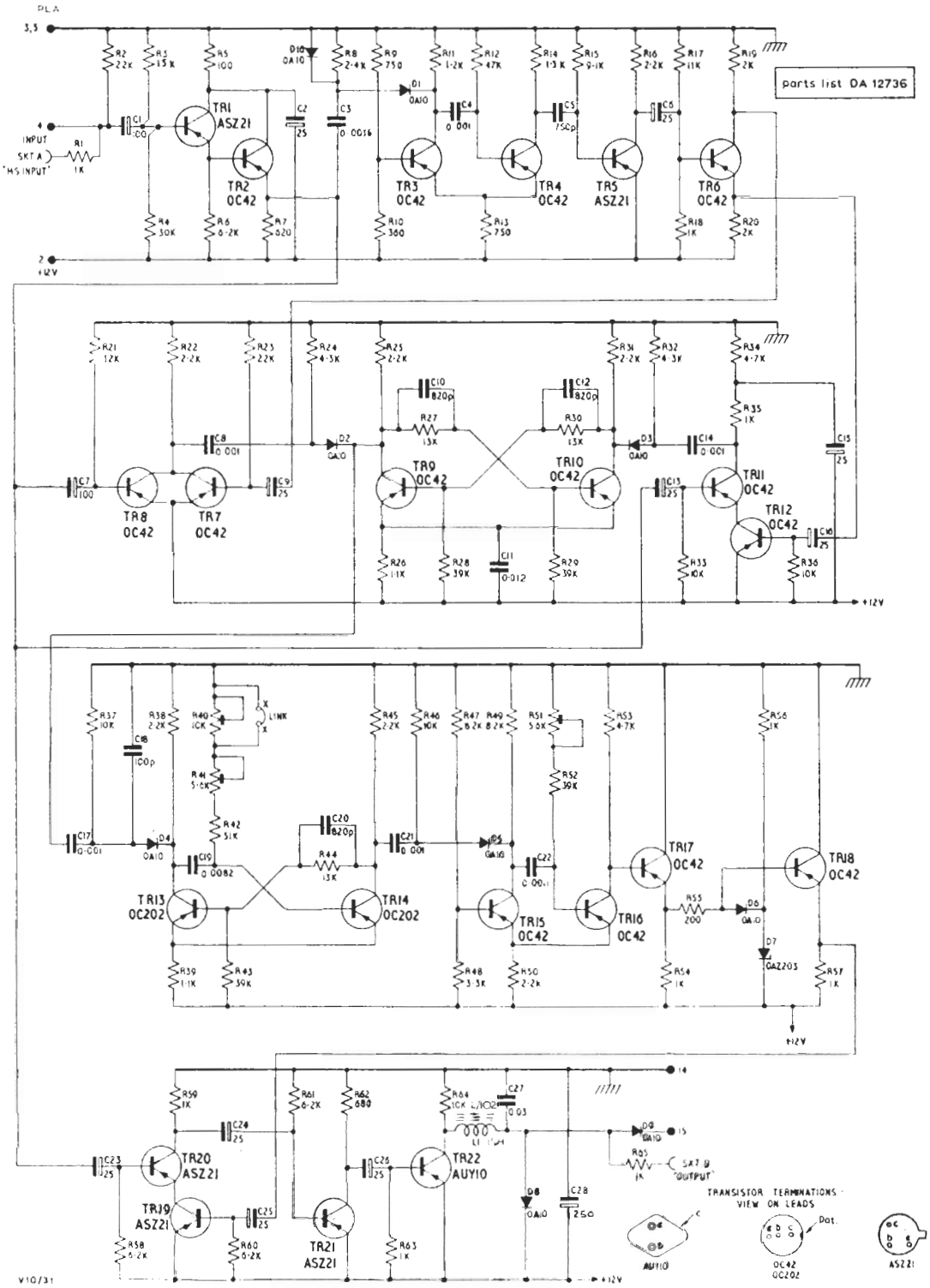

Fig. 11.2 Circuit of the GE2/511

various points in the circuit, together with their relative timings, are shown in Fig. 11.3.

The input signal is applied to a cascaded emitter-follower consisting of transistors TR1-TR2. Four feeds of sync pulses are taken from the emitter of TR2 and distributed to other parts of the generator. One of these outputs is differentiated, the negative-going spikes are suppressed by D10, and the positive-going spikes coincident with the trailing edge of each applied pulse are applied to the collector of TR3. Transistors TR3 and TR4 form an emitter-coupled monostable multivibrator (see Television Engineering, Volume 3) which reverts to its stable condition after about 20 μs. The output from this stage is applied from the collector of TR4 to the base of TR5 and the output from TR5, a 2-volt negative-going pulse 3 μs in duration, is applied to the phase-splitter TR6.

Transistor TR6 feeds a negative-going pulse to the coincidence-gate circuit formed by TR11 and TR12 (labelled *On* in Fig. 11.1) and a positive-going pulse to the coincidence-gate formed by TR7 and TR8 (labelled *Off* in Fig. 11.1). The *On* and *Off* gates are also fed with feeds of line-sync pulses from the emitter of TR2. The *On* gate produces an output only when both inputs to the gate are negative-going; i.e. during the second and subsequent broad pulses. The *Off* gate produces an output when one input is positive-going and the other is negative-going; i.e. for all inputs except those occurring during the field-sync period. The output of the *On* gate is taken from the collector of TR11 and applied to the collector of TR10; the output of the *Off* gate is taken from the commoned collectors of TR7 and TR8 and applied to the collector of TR9.

Transistors TR9 and TR10 form a bistable multivibrator which operates at field-frequency

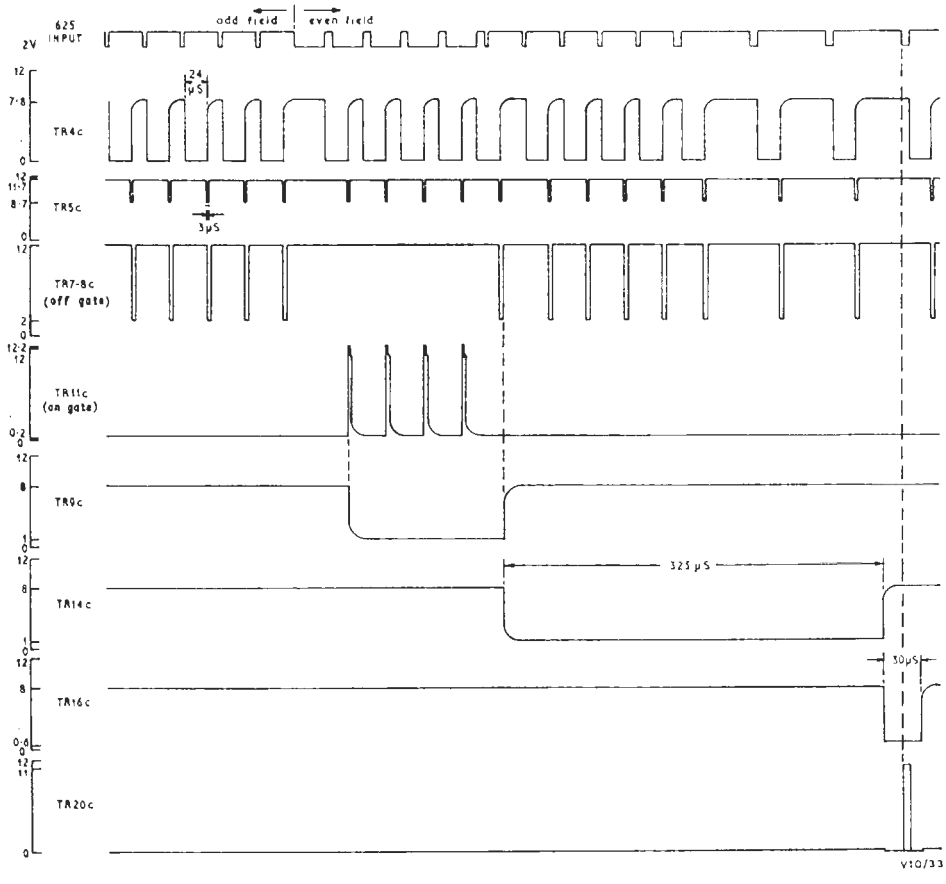

Fig. 11.3 Waveforms in the GE2/511

and is triggered by the outputs of the *On* and *Off* gates. TR9 is cut off by the leading edge of the first pulse from the *On* gate and TR10 is cut off (and TR9 turned on) by the trailing edge of the first subsequent pulse from the *Off* gate. The output of the stage is taken from the collector of TR9 and consists of a negative-going field-frequency pulse, with an amplitude of 8 volts, which starts during the second broad pulse and finishes about 24 μs after the trailing edge of the last broad pulse. This pulse is differentiated and applied to the collector of TR13.

Transistors TR13 and TR14 form a cross-coupled monostable multivibrator which provides a delay of between 310 and 340 μs; the duration of the delay can be varied by adjustment of R41. (R40, which was used to adjust the delay of the stage for alternate-field working, is no longer required and is short-circuited.) The output of the stage is taken from the collector of TR14, differentiated, and applied to the collector of TR15. Transistors TR15 and TR16 form an emitter-coupled monostable multivibrator and the stage generates gating-pulses with a duration of about 30 μs. The pulse duration can be varied by adjustment of R51. The gating-pulses are taken from the collector of TR16 and coupled, via emitter-follower TR17, to the base of emitter-follower TR18. At this point diode D6, which is held at a positive potential of 6 volts by zener diode D7, clips the positive portion of the waveform.

Transistors TR19 and TR20 form a gate circuit similar to that formed by TR11 and TR12. Negative-going line-sync pulses are applied to the base of TR20 and the negative-going gating pulses developed at the emitter of TR18 are applied to the base of TR19. The relative timing of these two signals is such that they only coincide during alternate field-blanking intervals. When this happens a positive-going pulse is developed at the collector of TR20 and this is applied, via inverter-driver stage TR21, to the output transistor TR22. The output signal, a 12-volt positive-going pulse one line-sync pulse in duration, is taken from the collector of TR22.

The output coupling network, L1 and C27, minimises the effect of the external load on the output current and provides the leading edge of the output waveform with a controlled rise-time. Overshoot is prevented by D8. Diode D9, by permitting a current to flow out of the generator but not into it, provides isolation between the generator and its external load.

Maintenance

The unit is maintained as part of its parent unit[1].

References to Typical Associated Equipment

1. Sync Switch Panels PA18/508 and PA18/509, Instruction V.13.
2. Studio Video Mixing Equipment EP5/502 and EP5/503, Instruction V.15.
3. Stabilised Power Supplier PS2/20, Instruction G.2.

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