MIXED-BLANKING-PULSE GENERATOR GE2/557

Introduction

This generator accepts an input of mixed-synchronising pulses and delivers outputs of line-trigger, field-trigger and mixed-blanking pulses, all negative-going and of two-volts amplitude when fed into 75-ohm loads. It is suitable for use on 625-line or 525-line standards; wiring changes are necessary to convert from one of these standards to the other.

The output signals are derived from a free-running oscillator by a process of frequency-division and gating; control signals derived from the incoming mixed-synchronising pulses closely control the frequency of the oscillator and reset the frequency-dividing pulse-counter for each field period.

The unit consists of two printed-wiring boards accommodated in a Chassis Type CH1/26A (index-peg-position Nos. 14, 43). There are no operationally-variable controls. In addition to the supply of mixed-synchronising pulses, a power supply of approximately 280 mA at +12 volts is required.

Circuit Description

A block diagram is given in Fig. 1 on page 3, and the circuit diagram in Fig. 2 on page 5. The oscillator (TR24, TR25) runs at twice-line frequency (approximately 31 kHz). Three of the four gating circuits constituting IC1 serve to ensure that TR24 and TR25 oscillate when power is applied; if both transistors simultaneously become bottomed, their gains are insufficient for oscillation to occur. This condition entails near-zero potentials at both collectors and these potentials, applied to IC1, produce a zero output potential at the junction of R68, R69 which causes TR24, TR25 to be cut off. The conditions described are thus reversed, and another opportunity exists for oscillation to commence.

The fourth gating circuit in IC1 receives only one input, and acts as a clipper/amplifier driving the pulse-counter.

The bistable multivibrator TR7, TR8 provides two line-frequency square-wave signals. One of these is fed via TR9 to the base of TR11 where, by the action of C10 and the constant-current circuit-path formed by TR10, the fast negative-going transition of the square-wave is lost and replaced by a linear potential-fall of 4-microseconds duration. The resulting trapezoidal-waveform signal at the emitter of TR11 is sampled by TR12, which conducts for a half-microsecond from the initial transition of each incoming line-synchronising pulse; the derivation of the sampling pulses is described later. The samples of the trapezoidal-waveform signal are integrated to form at the base of TR13 a control potential which governs the base potentials of TR24, TR25 and thus the frequency of oscillation. The circuit is set up to be stable when sampling occurs at the mid-point of the sloping transition of the trapezoidal-waveform signal, and the action of the circuit is to restore this condition when the frequency (and therefore phase) of oscillation drifts with respect to that of the incoming mixed-synchronising pulses.

The second line-frequency square-wave signal from TR7, TR8 is fed via differentiating circuits and buffer stages to monostable multivibrators TR19, TR20 and TR28, TR29, which are triggered by the differentiated positive-going transitions of the signal. The signal at the collector of TR20 is amplified, clipped and inverted by TR21 to form the line-trigger output from the unit. The signal at the collector of TR29 is treated in a similar manner to give line-blanking pulses, but these are interrupted at field frequency by intervals of approximately 25-line duration when TR27 conducts, stopping the multivibrator action of TR28, TR29. Thus the output from TR32 is a mixed-blanking signal. The derivation of the input signal to TR27 is described later.

The integrated circuits IC2—IC11 form a pulse counter which progressively reduces the twice-line frequency of the IC2 input signal to 1/512 times line-frequency at the outputs from IC11. Because this lowest frequency produced by the counter is lower than that of field repetition, any pattern of potentials at the outputs of the integrated circuits occurs only once during a field period; also, all the integrated circuits are reset to an initial state (all output-signal potentials at tags 10 zero) regularly at the start of each field period by a pulse derived from the incoming mixed-synchronising pulses. Hence, each half-line period of a field is uniquely identified by a characteristic pattern of potentials, the occurrence of which can be recognised by suitable gating circuits and used to initiate further pulse-generation.

The field-blanking and field-trigger signals are timed in this manner. The signals are generated

by IC14 and IC15, respectively, which are bistable multivibrators. IC12 and IC13 contain gating circuits connected to the counter for either 625-line or 525-line operation as set out in the table given in Fig. 2. Pulses from IC12 are fed to both IC14 (tag 3) and IC15 (tag 6) to initiate the blanking and trigger pulses; after appropriate intervals IC13 produces other pulses which restore IC14 and IC15 to their original states, terminating the blanking and trigger pulses. A second output from IC15 (tag 10), fed to IC14 (tags 1 and 13), serves to inhibit the response of IC14 to any pulse arriving at its input during the period of the field trigger pulse; this is a safeguard against spurious operation of IC14 during that time. The field-blanking pulses are applied to TR27, as mentioned above; the field-trigger pulses, after inversion by TR33, are fed out of the unit.

The mixed-synchronising pulses with which the operation of the unit is synchronised are clipped at both potential-excursions by TR1 and TR2 and applied, after differentiation, to a monostable multivibrator TR4, TR5. This has a time-constant rather greater than half the line period and so does not respond to alternate twice-line-frequency equalising and broad pulses; the output from the circuit is a continuous, line-frequency, rectangular-waveform signal, which is differentiated by C4, R18. The resulting negative-going pulses, which coincide with the initial transitions of the incoming line-synchronising pulses, are shaped and inverted by TR6 to form the half-microsecond rectangular pulses applied to the sampling stage TR12 as mentioned above.

The clipped mixed-synchronising pulses at the collector of TR2 are also inverted and further clipped by TR3 before being applied to the integrating circuit R40, C12. The broad pulses cause a rise of potential at the base of TR15, which therefore ceases to conduct, producing a negative-going pulse at the base of TR16. This pulse passes via TR16, TR17 to become the field-frequency reset pulse applied to the counter.

Maintenance

Monitoring points for the mixed-synchronising-pulse input and the three outputs of the unit are provided on the front panel.

No adjustments are normally needed, and indeed it is necessary to remove the escutcheon plate of the chassis in order to gain access to the three pre-set controls. These are set up during the initial testing of the unit and if, exceptionally, it is required to repeat this process, the procedure will be found in Designs Department Specification No. 7.125(67).

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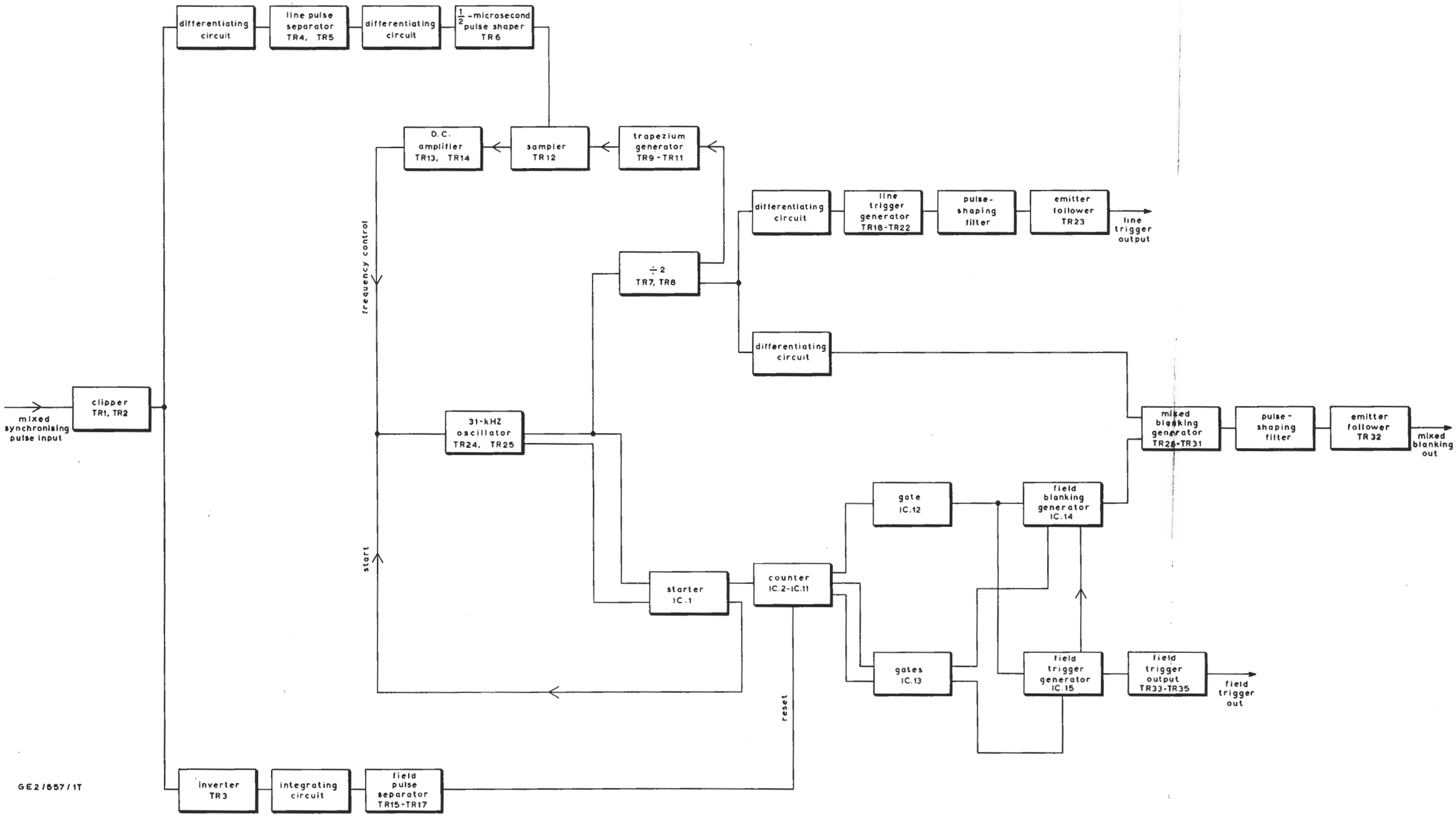

Fig. 1 Block Diagram of the GE2/557

from PID 21004 Iss 1
parts list D21005A4

GE2/557

clipper | inverter | line pulse seperator | ½ µs pulse shaper | − 2 | trapezium generator | sampler

field pulse seperator | line trigger generator | 31kHz oscillator | starter

counter

field trigger generator | field blanking generator | field trigger output

mixed blanking generator

Board No. 1
Board No. 2

translator terminations
view on leads

2N2925
2N2926

2N3702

2N706A
V405A
C111
2N1307
2N2484
2N2297

FCH111
FCH131
FCH191
FCJ101

Tags A-8 6 8-27 connected as follows	
For 625 line std	For 525 line std
A - 8	6 - 8
B - 10	8 - 26
C - 12	C -
D - 26	D -
E -	E -
F -	F -
G - 20	G -
H - 18	H -
J - 14	J - 12
K - 16	K - 14
L - 21	L - 16
M -	M -
N - 6	N - 10
P - 12	P - 12
Q - 27	Q - 27
R -	R -

GE2/557/2T

Fig. 2. Circuit of the GE2/557