LOCAL CSC PULSE UNIT GE2/549

Introduction

The GE2/549 comprises two separate circuits. One accepts a reference colour-subcarrier signal and produces the following outputs [1], [2]:

(a) *reference sinewave*, 6 volts p-p at a frequency approximately 7 kHz lower than that of the input subcarrier signal.

(b) *reference squarewave*, 5 volts p-p at an approximate frequency of 7 kHz.

(c) *delayed squarewave*, which is output (b) delayed by 0·6 µs.

The other circuit accepts an input of mixed sync pulses and from it produces the following outputs:

(d) *reset pulses* which are 5-volt p-p negative-going pulses 9 ms in duration starting at line no. 4.

(e) *sample pulses* which are 12-volt p-p negative-going pulses 0·5 µs in duration and occurring 500 µs after the reset pulses.

The circuits of the GE2/549 are constructed on separate printed wiring boards of a CH1/26A chassis with index-peg positions 4 and 33.

General Description

A block diagram of the GE2/549 is given in Fig. 1. The subcarrier input signal is fed, together with an output of an internal 4·426-MHz oscillator, to the inputs of a long-tailed pair frequency-changer. The output of the frequency-changer, filtered to give a 7-kHz difference frequency signal, is squared in a Schmitt trigger circuit to give the reference squarewave. This squarewave is delayed by 0·6 µs to give the delayed squarewave.

Mixed sync pulses, inverted by a sync separator stage, are fed to both a 45-µs monostable multivibrator and a field-sync separator circuit. The period of this multivibrator is chosen to avoid double-triggering during the field-sync period. The output of the field-sync separator triggers a 1-ms monostable multivibrator.

The differentiated outputs of these multivibrators are gated to trigger a 9-ms monostable multivibrator once in each picture period. The negative-going output of the 9-ms multivibrator (reset pulses) triggers a 350-µs monostable multivibrator the negative-going output of which is differentiated to produce the sample pulses.

Circuit Description

The circuit of the GE2/549, given in Fig. 3 on page 3, comprises conventional stages but the following points should be noted:

(a) In the sync-separator stage the base-emitter junction diode of transistor TR1 d.c.-restores the waveform at the base so that the transistor conducts only during the sync pulses.

(b) The four monostable multivibrators have 470-pF speed-up capacitors. Two of the multivibrators share their emitter-bias circuit because it is physically convenient to do so.
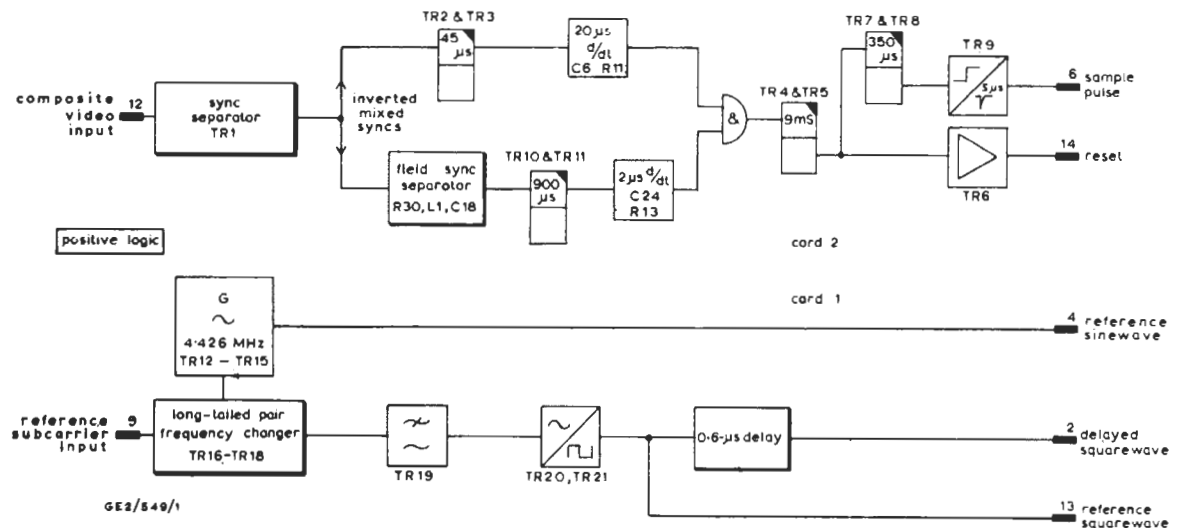

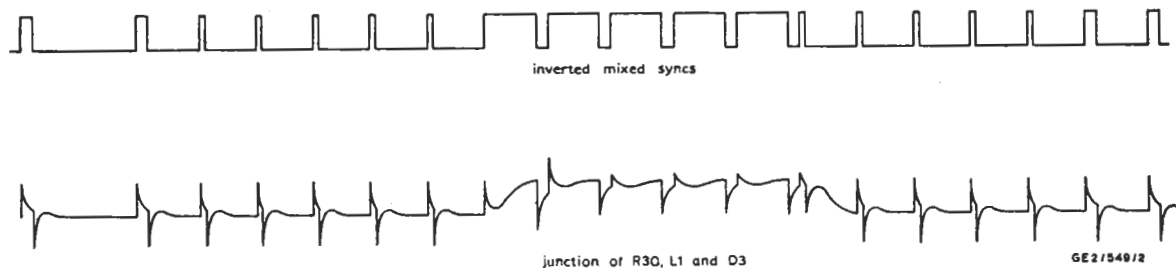Fig. 1   Block Diagram of the Local CSC Pulse Unit GE2/549

inverted mixed syncs

junction of R30, L1 and D3   GE2/549/2

Fig. 2   Waveforms In the GE2/549

(c)   Fig. 2 shows the input and output waveforms of the field-sync separator circuit.

(d)   The oscillator is of the Butler type and comprises a common-base stage and an emitter follower.

(e)   The frequency-changer circuit is an overdriven long-tailed pair. Overdriving the stage causes distortion of what would be an algebraic difference signal. This distortion produces modulation products and all signals bar the 7-kHz frequency-difference signal are removed by means of resistor-capacitor filtering.

Test Procedure

The GE2/549 is tested as part of its parent unit.

Modifications for Use with a Moving Source

Some units GE2/549 bear the label *Modified for Moving Source.* In this case the error-sampling rate has been doubled to field frequency (50 Hz) and the size of the dead-space has also been doubled to 5 degrees.

This is achieved by removing diode D1 and increasing the beat frequency by 6 kHz (because the delay lines are set at maximum).

The modified crystal frequency is 4.420 MHz and consequent changes (to reduce attenuation of the new beat frequency are shown only on the circuit diagram in Fig. 3.
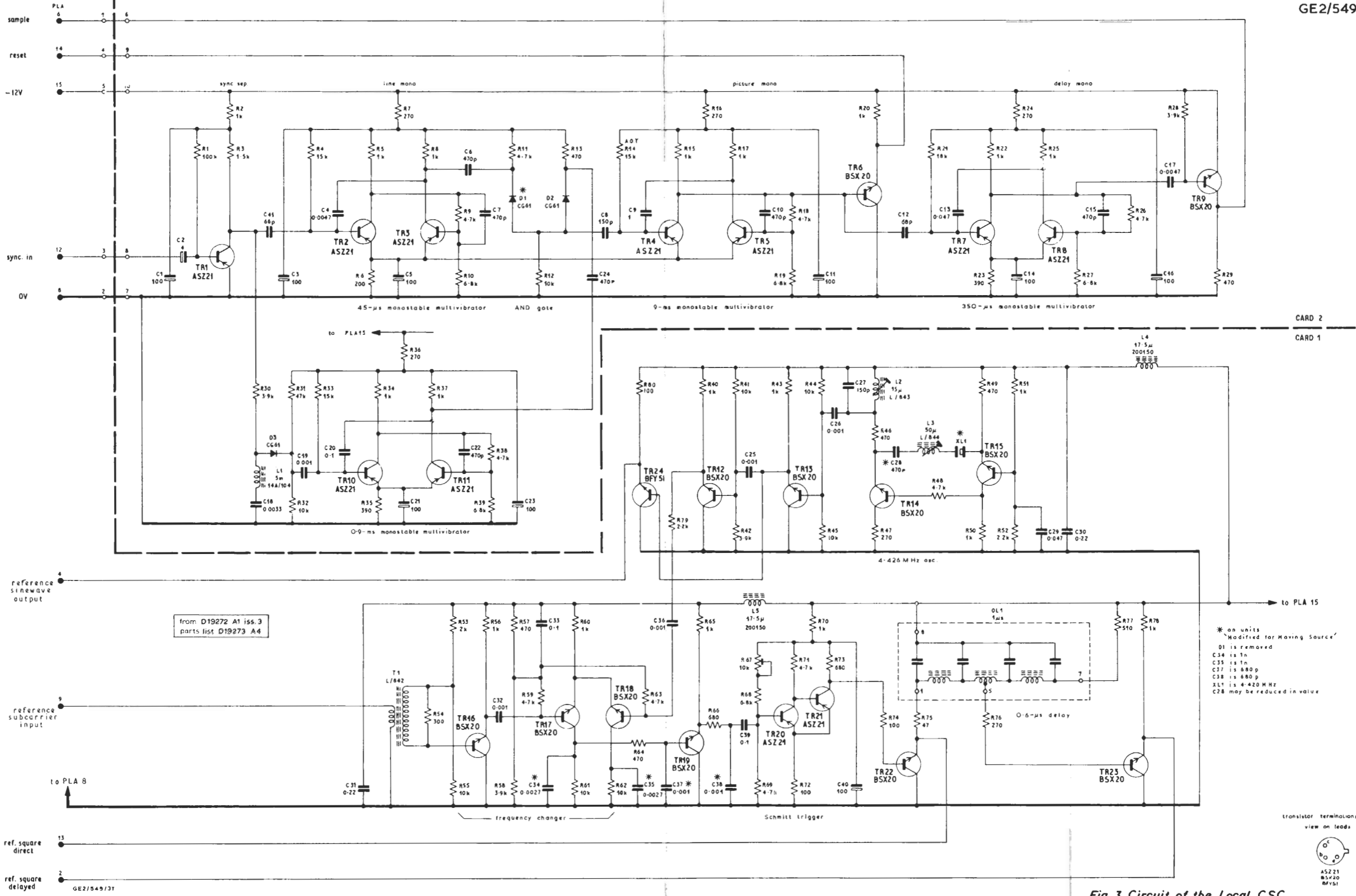
Details of modification and operation are given in Designs Department Technical Memorandum 10.31(70).

References to Typical Associated Equipment

1.   Colour Subcarrier Phase Comparators EP5/505 and EP5/506.
2.   Remote CSC Pulse Unit GE2/550.

MJR 4/69

RDH 8/72

sample

reset

−12V

sync sep   line mono   picture mono   delay mono

sync in

OV

45-μs monostable multivibrator   AND gate   9-ms monostable multivibrator   350-μs monostable multivibrator

CARD 2

CARD 1

to PLA15

0·9-ms monostable multivibrator

4·426 MHz osc.

reference
sinewave
output

from D19272 A1 iss.3
parts list D19273 A4

to PLA 15

reference
subcarrier
input

to PLA 8

* on units
'Modified for Moving Source'
D1 is removed
C34 is 1n
C35 is 1n
C37 is 680p
C38 is 680p
XL1 is 4·420MHz
C28 may be reduced in value

frequency changer   Schmitt trigger

ref. square
direct

ref. square
delayed

transistor terminations
view on leads

ASZ21
BSX20
BFY51

GE2/549/3T

Fig. 3 Circuit of the Local CSC
Pulse Unit GE2/549

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