COLOUR SUBCARRIER PHASE COMPARATORS
EP5/505 AND EP5/506 SERIES

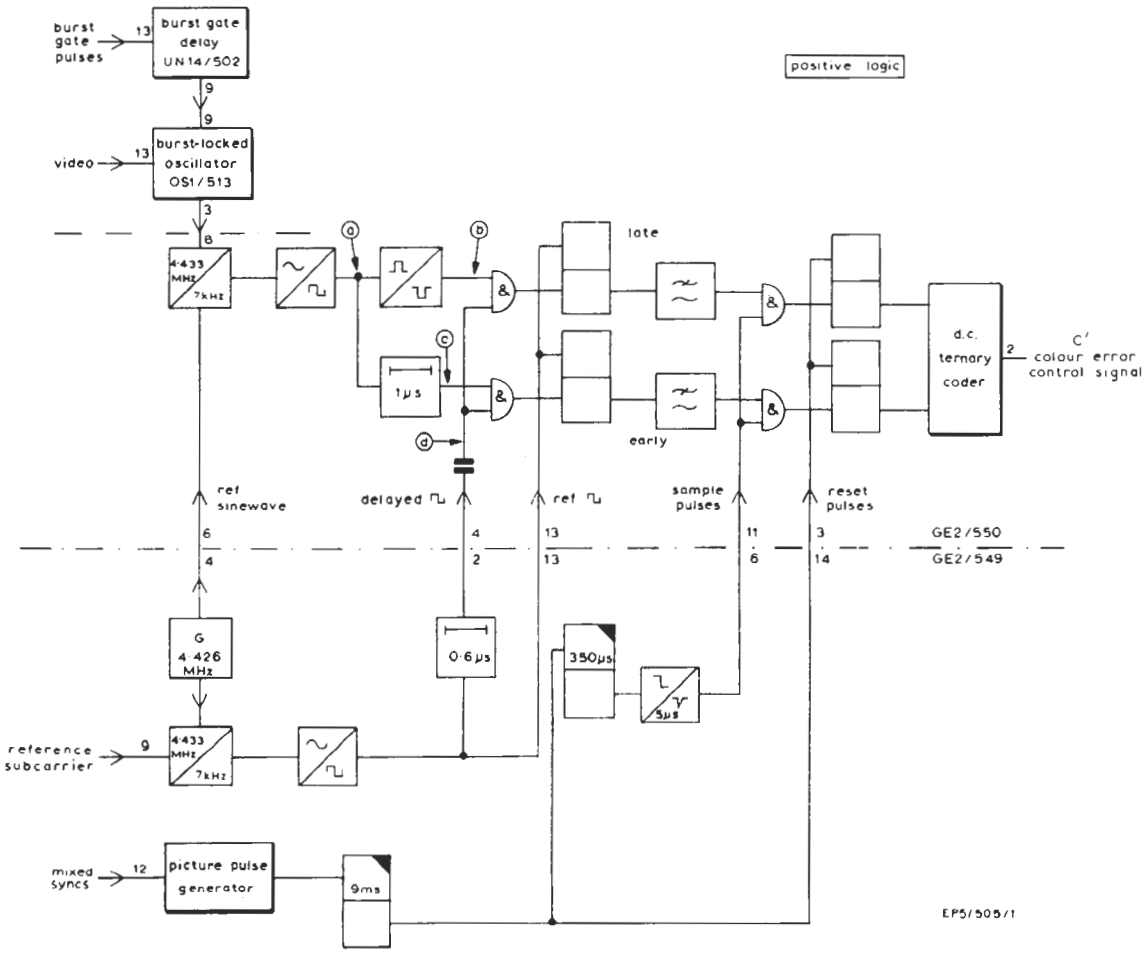

Fig. 1 Block Diagram of the EP5/505 and EP5/506

Introduction

These comparators accept colour video signals, reference subcarrier signal, mixed sync pulses and burst-gating pulses; they produce a ternary-coded (three-state) d.c. output signal for each video input. These output signals are related as shown in Table 1, to the phase error between the mean phase of the colour burst in the video input signal and the phase of the reference subcarrier. The EP5/505 accepts two video inputs, the EP5/506A accepts four video inputs and the EP5/506 accepts six video inputs.

The comparators comprise the following units mounted in either a single or a double panel PN3/23:

Local CSC Pulse Unit	GE2/549
Remote CSC Pulse Unit (two, four or six)	GE2/550
Burst-locked Oscillator (two, four or six)	OS1/513
Power Supplier (EP5/505)	PS2/21B
or Power Supplier (EP5/505,6)	PS2/13F
Power Supplier (EP5/505)	PS3/35A
or Power Supplier (EP5/506A)	PS3/35B
or Power Supplier (EP5/506)	PS3/35C
Burst Gate Delay Unit	UN14/502

General Description

A block diagram of the comparators for one video input is given in Fig. 1. Burst gate pulses are delayed by 0·6 μs and fed to a burst-locked oscillator. This delay compensates for the delay that occurs in colour coders.

The burst locked oscillator produces a subcarrier signal which is locked in frequency and phase to the frequency and mean phase of the colour burst in the video input.

The 2½ degrees range in phase error for which the error-output is zero (see Table 1) corresponds to a timing error of 1·6 ns at 4·433 MHz. For purposes of measurement the frequency of the reference subcarrier and of the burst locked oscillator is changed to 7 kHz using an internal 4·426-MHz oscillator; this changes the range of timing error to 1 μs without affecting the phase error*.

Table 1

Phase-error of Subcarrier in Video Input Relative to Reference Subcarrier	*Output (volts)*
Less than 1° early / 1½° late	0
Early by more than 1°	−3
Late by more than 1½°	−6

The relative timings of the two 7-kHz signals are compared by gating differentiated positive-going edges of one signal with two versions of the other signal (one version inverted and the other version delayed by 1 μs). These waveforms are shown in Fig. 2.

If the timing error lies outside the 1 μs range a positive voltage builds up at the output of the corresponding low-pass filter. This voltage is sampled approximately 9 ms after the start of each picture period. A bistable multivibrator stores the sampled information until just before the next sampling. The 9-ms delay permits the burst locked oscillator output phase to settle down after a correction has been applied at the start of a picture period.

*Instruction GP.3

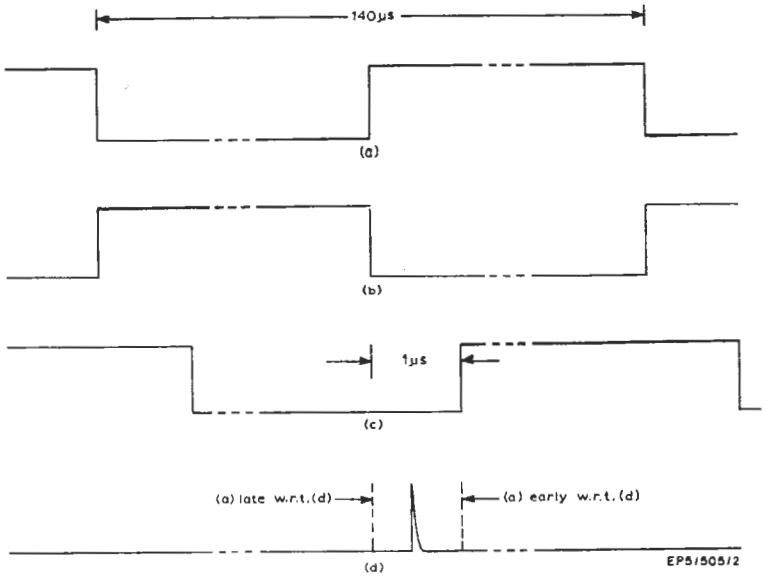

Fig. 2 Waveforms in the EP5/505 and EP5/506

More detailed descriptions are given in the Instructions on the sub-units.

Modifications for Use with a Moving Source

Some units GE2/549 and GE2/550 in the EP5/505 may bear the label *Modified for Moving Source.* In this case the error-sampling rate of the Phase Comparator has been doubled to field frequency (50 Hz) and the size of the dead-space has also been doubled to 5 degrees. The consequent changes are shown only in the appropriate circuit diagrams.

Details of modification and operation are given in Designs Department Technical Memorandum 10.31(70).

Test Procedure

The burst-locked oscillators are tested separately.

Feed the comparator with a reference subcarrier signal and with a colour video signal derived from the same drive unit but incorporating a subcarrier phase shifter controlled by the output of the comparator.

Compare the phase of the reference subcarrier and the burst of the video signal on a vectorscope and wait until phase correction is completed.

Disconnect the output of the comparator and vary the relative path lengths of the two inputs by plus and minus two feet of cable. Check that the comparator output is correct as shown in Table 1.

MJR 5/69

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