COLOUR SUBCARRIER PHASE SHIFTER EP1L/509

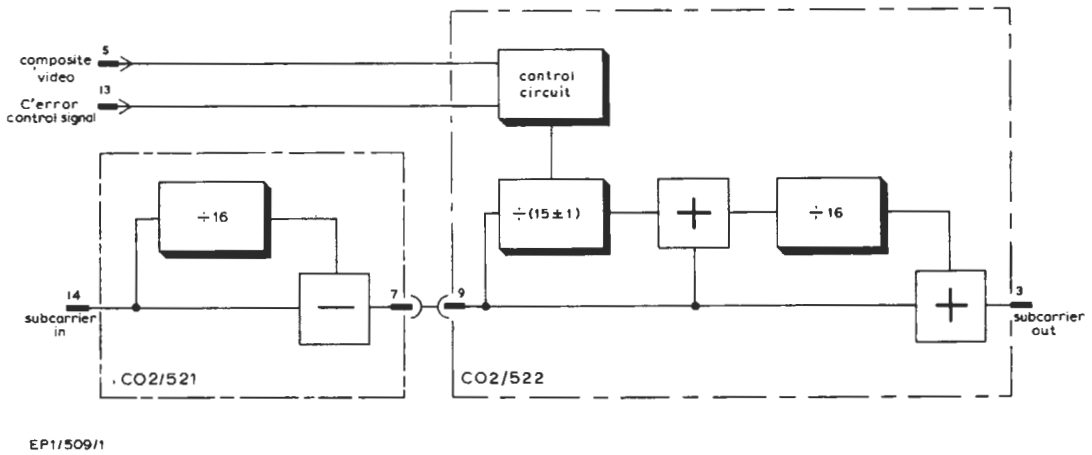

Fig. 1. Block Diagram of the EP1L/509

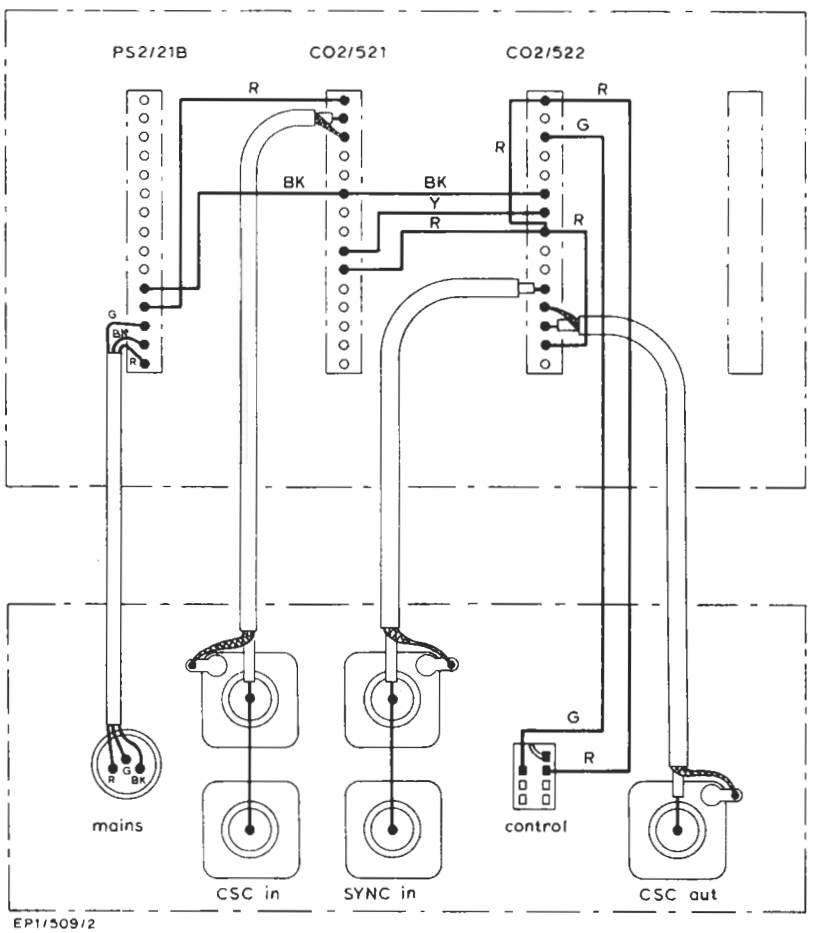

Fig. 2. Wiring Diagram of the EP1L/509

Introduction

The EP1L/509 accepts an input of reference colour subcarrier, a d.c. colour error control signal and mixed sync pulses: its output is a colour subcarrier signal whose phase with respect to the input signal is changed in steps of 1·5 degrees by the application of the error control signal.

The EP1L/509 comprises the following units mounted in a modified PN3A/16C rear-interconnection panel.

Colour Subcarrier Frequency Converter	CO2/521
Digital Phase Shift Frequency Converter	CO2/522
Power Supplier	PS2/21B

A chassis guide PN3A/23 is fitted between the two Converters to minimize 50-Hz modulation of the output signal.

General Description

A block diagram of the EP1L/509 is given in Fig. 1; operation of the equipment is described in Instruction GP.3. A wiring diagram is given in Fig. 2.

Test Schedule

Apparatus Required

Oscilloscope.
Non-linearity Test Signal Generator GE4M/520P.
Remote Signal Analyser EP1M/508.
Tuned 4-MHz detector such as a Marconi CR100 receiver with signal-level meter.
90-dB 75-ohm switched attenuator.
Variable d.c. supply, 0 to 7 volts.

Test Procedure

1. Feed the terminated input of the EP1L/509 with colour subcarrier signal.
   Feed the output of the EP1L/509 via the switched attenuator to the tuned detector.
   Check that the amplitudes of the signals at various points in the CO2/521 and the CO2/522 agree with the figures given on their circuit diagrams in the coded Instructions.
   Check that the rise-time of the inputs to each of the counter circuits is not more than 50 ns.
2. Tune the detector to 4·43 MHz and set the attenuator to give an acceptable meter reading. Tune the detector to each of the unwanted sideband frequencies 3·88 MHz, 4·16 MHz and 4·71 MHz. The output level of the EP1L/509 at each of these frequencies should be 60 dB lower than the output level at 4·43 MHz.
3. Blank the output of the EP1L/509 by feeding it through the GE4M/520P and use the EP1M/508 to measure the phase modulation of this output (see D.D. Tech. Mem. 8.233). It should be less than 0·2 degrees.
4. Feed mixed sync pulses and the variable d.c. supply to the EP1L/509 and observe the phase of the output signal on the socilloscope.
   For a control voltage between −2·5 volts and −3·5 volts the output phase should retard one cycle in 9·6 seconds.
   For a control voltage between −4·5 volts and −7 volts the output phase should advance one cycle in 9·6 seconds.

Further Information

The filters may be realigned using the steps given below. The component references for the three filters are given in Table 1.

TABLE 1

Unit	*LA*	*LB*	*LC*	f_1 (MHz)	f_2 (MHz)
CO2/521	L3	L2	L4	4·711	4·157
CO2/522	L4	L3	L5	3·880	4·434
	L8	L7	L9	3·880	4·434

1. Remove the core of inductor LA.
   Connect the input of the tuned detector to the collector of the filter output transistor.
2. Adjust inductors LB and LC for a maximum output at frequency f_1.
3. Reinsert the core of inductor LA and adjust this inductor for minimum output at frequency f_1.
4. Adjust inductors LB and LC for a maximum output at frequency f_2.

Modifications for Use with a Moving Source

Some units CO2/522 in the EP1L/509 may bear the label *Modified for Moving Source.* In this case the phase-stepping rate has been doubled to field frequency (50 Hz) and the phase step has also been doubled to 3 degrees. The consequent changes are shown only in the appropriate circuit diagram.

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

SECTION 9

COLOUR SUBCARRIER PHASE SHIFTER EP1L/509

Introduction

The EP1L/509 accepts an input of reference colour subcarrier, a d.c. phase-error signal and mixed sync pulses: its output is a colour subcarrier signal whose phase with respect to the input signal is changed in steps of 1·5 degrees by the application of the error signal.

The EP1L/509 comprises the following units:

Unit	*Instruction*
Colour Subcarrier Frequency Converter CO2/521	V.9
Digital Phase Shift Frequency Converter CO2/522	V.9
Power Supplier PS2/21B	G.2

General Description

The operation of the EP1L/509 (block diagram in Fig. 9.1) is described in Instruction V.1, Appendix A.

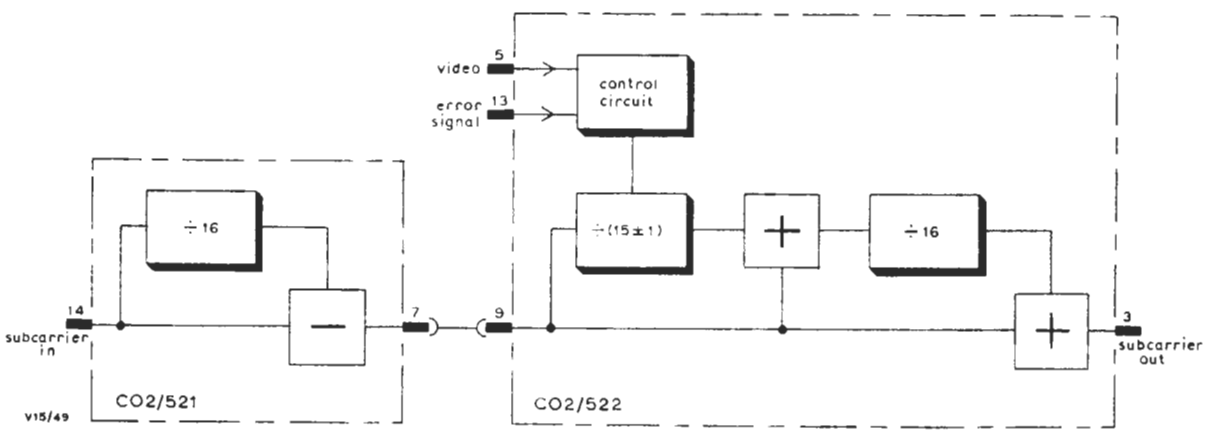

Fig. 9.1 Block Diagram of the EP1L/509

Test Schedule

Apparatus Required

Oscilloscope.
Non-linearity Test Signal Generator GE4M/520P.
Remote Signal Analyser EP1M/508.
Tuned 4-MHz detector such as a Marconi CR100 receiver with signal-level meter.
90-dB 75-ohm switched attenuator.
Variable d.c. supply, 0 to 7 volts.

Test Procedure

1. Feed the terminated input of the EP1L/509 with colour subcarrier signal.
   Feed the output of the EP1L/509 via the switched attenuator to the tuned detector.
   Check that the amplitudes of the signals at various points in the CO2/521 and the CO2/522 agree with the figures given on their circuit diagrams in Instruction V.9.
   Check that the rise-time of the inputs to each of the counter circuits is not more than 50 ns.
2. Tune the detector to 4·43 MHz and set the attenuator to give an acceptable meter reading. Tune the detector to each of the unwanted sideband frequencies 3·88 MHz, 4·16 MHz and 4·71 MHz. The output level of the EP1L/509 at each of these frequencies should be 60 dB lower than the output level at 4·43 MHz.
3. Blank the output of the EP1L/509 by feeding it through the GE4M/520P (see Instruction V.10) and use the EP1M/508 to measure the phase modulation of this output (see D.D. Tech. Mem. 8.233). It should be less than 0·2 degrees.
4. Feed mixed sync pulses and the variable d.c. supply to the EP1L/509 and observe the phase of the output signal on the oscilloscope.
   For a control voltage between −2 volts and

−3 volts the output phase should retard one cycle in 9·6 seconds.
For a control voltage between −4·5 volts and −·7 volts the output phase should advance one cycle in 9·6 seconds.

Further Information

The filters may be realigned using the steps given below. The component references for the three filters are given in Table 1.

TABLE 1

Unit	*LA*	*LB*	*LC*	f_1 (MHz)	f_2 (MHz)
CO2/521	L3	L2	L4	4·711	4·?57
CO2/522	L4	L3	L5	3·880	4·434
	L8	L7	L9	3·880	4·434

1. Remove the core of inductor LA.
   Connect the input of the tuned detector to the collector of the filter output transistor.
2. Adjust inductors LB and LC for a maximum output at frequency f_1.
3. Reinsert the core of inductor LA and adjust this inductor for minimum output at frequency f_1.
4. Adjust inductors LB and LC for a maximum output at frequency f_2.

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