

CO2/543 LINE-TO-NATLOCK REFERENCE CONVERTER

Introduction

The CO2/543 accepts a 625-line video signal, two feeds of PAL subcarrier and a set of control signals. It provides Natlock Frequency at a multiple ($567/2$) of the line sync frequency of the video input signal and one or neither of the two subcarrier feeds depending upon the control signals present.

In conjunction with a Natlock to PAL Converter¹ and a Fast-genlock S.P.G.² the CO2/543 enables a colour area (e.g. a colour studio) to be genlocked to a monochrome or colour source. Without the Fast-genlock S.P.G. the CO2/543 is used with modified Natlock equipment in the BBC Fast-genlock system. These applications of the CO2/543 are described in Instruction P.1 Section 4.

The Converter consists of the following units:

UN1/589 Sync Separator

OS1/516 Line-locked Oscillator

mounted on a PN3A/16C Interconnection Panel. The converter is mains-powered, the UN1/589 and OS1/516 having integral power suppliers.

General Specification

Signal Input	625-line composite video
Signal Input Level	1 volt p-p
Signal Input Impedance	high relative to 75 ohms
Signal Output	Natlock Frequency sine-wave ($567/2 \times$ line frequency of input signal)
Signal Output Level	1 volt p-p
Signal Output Impedance	75 ohms
Gate Inputs	Station Colour Subcarrier Synthetic Colour Subcarrier derived from the Natlock Frequency output of the CO2L/543
Nominal Gate Input Level	1 volt p-p
Gate Input Impedance	75 ohms
Gate Output	selected Colour Subcarrier or no output
Gate Output Level	as input
Gate Output Impedance	75 ohms
Gate Control Inputs	Local/Genlock Burst/No Burst
	(0V/-12V nominal in each case)
Mains Input	240 volts a.c. fused at 150 mA on both OS1/516 and the UN1/589
Weight	2.7 kg (6 lb)
Temperature Range	0°C to 45°C

General Description

Fig. 1 shows how the CO2/543 is used with a Natlock to PAL Converter and a Marconi Fast-genlock S.P.G.² The system as a whole accepts a 625-line video signal and produces 625 pulses and PAL subcarrier genlocked to the syncs and subcarrier of the video signal.

When the video input is a colour signal, a burst-locked-oscillator in the S.P.G. locks up to the burst on the video so that the S.P.G. produces syncs and correctly-related subcarrier directly. In this mode control signals from the S.P.G. inhibit the CO2/543 subcarrier output.

When the video input is a monochrome signal the burst-locked-oscillator in the S.P.G. cannot take its reference from the video and control signals from the S.P.G. open a gate in the CO2/543 which feeds synthetic line-related subcarrier to the burst-locked-oscillator in the S.P.G.

When video is absent, or the Marconi S.P.G. is switched to *local* (or *Genlock off*) control signals from the S.P.G. open a gate in the CO2/543 which feeds local station subcarrier to the S.P.G. B.L.O.

The combinations described above are summarised in Table 1.

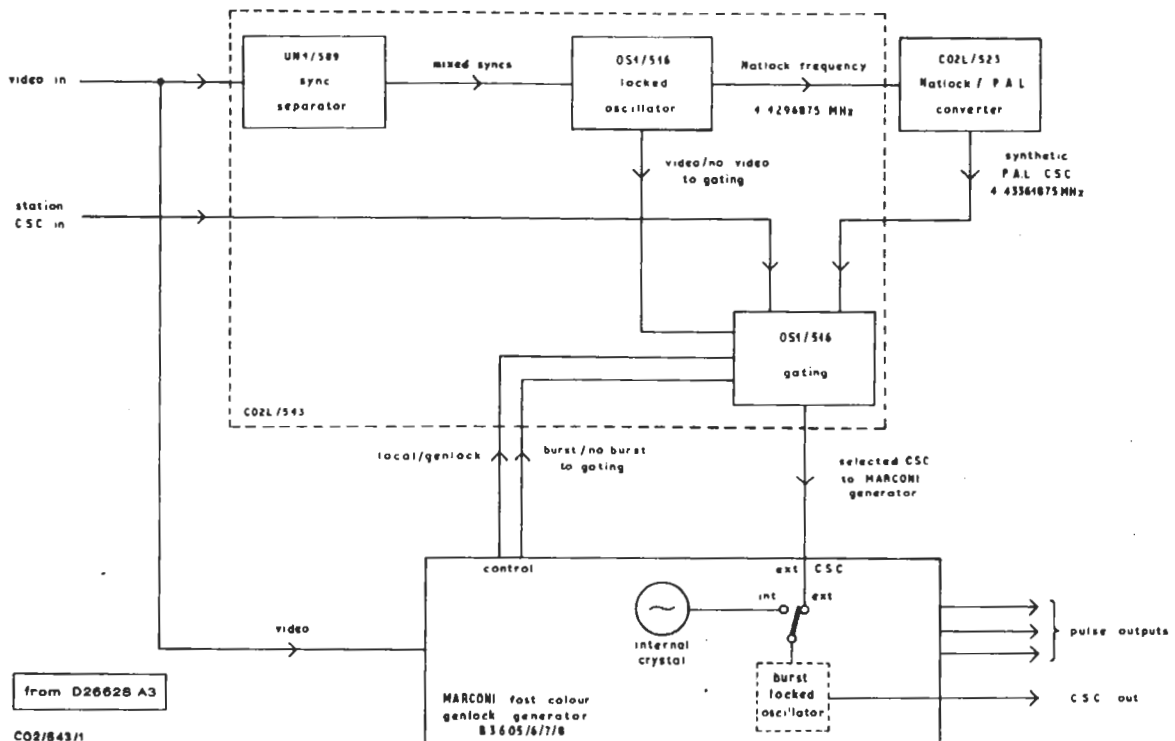


Fig. 1. Block Diagram of the CO2/543 used with a Natlock to PAL Converter and a Marconi Fast-genlock S.P.G.

TABLE 1

Input and Output Combinations for the CO2/543

<i>Marconi S.P.G. Function</i>	<i>Video Input</i>	<i>CO2/543 Output</i>
Local	Any or none	Station c.s.c.
Genlock	Colour	Nil
Genlock	Monochrome	Synthetic c.s.c.
Genlock	Nil	Station c.s.c.

Alignment*Apparatus Required*

AVO meter

Oscilloscope and probe with level response up to 5 MHz

Frequency counter to read 5 MHz within 0.1 Hz
CO2/537 or GE1/520 Waveform Generator Drive Unit625-line S.P.G. with twice-line frequency input
75-ohm 20 dB attenuator

75-ohm termination; connector to suit Frequency Counter input

Source of variable Natlock frequency, e.g. OS1/513 with its PAL subcarrier crystal replaced by a parallel-resonant Natlock frequency (4.429675-MHz) crystal. The required degree of adjustment of the Natlock-Frequency Output (± 100 Hz) can be achieved by adjusting the core in L1.*PROCEDURE***(a) UN1/589 Sync Separator**

This unit is tested as described in the Instruction on the UN1/589.

(b) OS1/516 Line-locked Oscillator*Power Supply*

1. Set the AVO to its 25V d.c. range and connect it to the Painton *Control* plug at the rear of the back connector; positive lead to pin 7, negative lead to pin 6.
2. Connect the mains supply to the unit and switch on.
3. Disconnect the AVO and connect the Oscilloscope Probe to pin 6 with its earth lead to pin 7. The ripple displayed should be less than 5 mV p-p.

Oscillator Free-running Frequency

5. Connect T-pieces to the Oscilloscope and Frequency Counter Inputs.
6. Connect the *Nat. Ref. Out* socket on the CO2/543 back connector to one side of the T-piece on the Oscilloscope.
7. Connect the other side of the T-piece on the Oscilloscope to one side of the T-piece on the Frequency Counter. Terminate the other side of the T-piece on the Frequency Counter.
8. Adjust L1 on printed circuit board No. 1 on the OS1/516 until the Frequency Counter reads 4.429730 MHz.
9. Check the waveform displayed on the Oscilloscope. It should be approximately sinusoidal and of amplitude 2V p-p.

Text continued overleaf

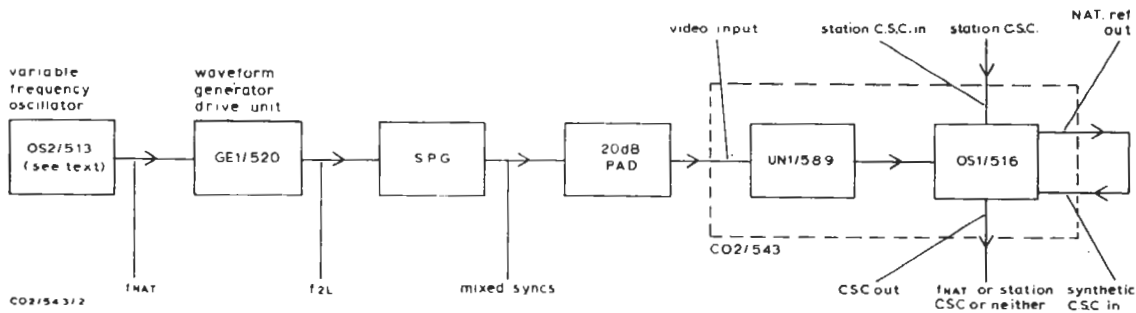


Fig. 2. Test Circuit for the OS1/516

Oscillator Locking

10. Set up the circuit of Fig. 2.
11. Connect the Oscilloscope Probe to the *Monitor Lock* point on the front panel of the OS1/516. The waveform displayed should be a sawtooth with a positive-going pulse on every other ramp, as shown in Fig. 3.
12. Vary the Natlock Frequency into the waveform Generator Drive Unit - this should cause the pulse to move up and down the ramp.
13. Check that the Frequency of the signal at the *Nat. Ref. Out* socket on the CO2/543 can be varied between the limits $4.4296875 \text{ MHz} \pm 75 \text{ Hz}$ before the pulse starts slipping off the ends of the ramp.
14. Adjust the variable Natlock Frequency source to bring the OS1/516 Output Frequency within 5 Hz of 4.4296875 MHz .
17. Connect the Frequency Counter to the *C.S.C. Out* socket on the back connector.
18. Connect together pins 2, 3 and 6 on the *Control* plug to simulate *Genlock, No Burst*. Check that the Frequency Counter reads $4.4296875 \text{ MHz} \pm 5 \text{ Hz}$.
19. Disconnect the link to pin 2, but leave pins 3 and 6 connected. Connect together pins 2 and 7 to simulate *Genlock, Burst*. Use the Oscilloscope to check that there is less than 2 mV p-p output from the *C.S.C. Out* socket.
20. Remove the lead from the *Video Input* socket to simulate *No Video*. Check that the Frequency Counter reads 4.43361875 MHz .
21. Disconnect pins 3 and 6 on the *Control* plug.
22. Connect pin 3 to pin 7 to simulate *Local*.
23. Re-connect the video input and check that the Frequency Counter reads 4.43361875 MHz .

Gating Circuits

15. Connect a link between the *Nat. Ref. Out* and *Synthetic C.S.C. In* socket on the back connector of the CO2/543.
16. Connect a feed of PAL subcarrier to the *Station C.S.C. In* socket on the back connector.

References

1. CO2/523 Natlock to PAL Converter.
2. Marconi type BS605/6/7/8 Fast-genlock S.P.G. UN1/589 Sync Separator. OS1/516 Line-locked Oscillator.

JRWC 3/71

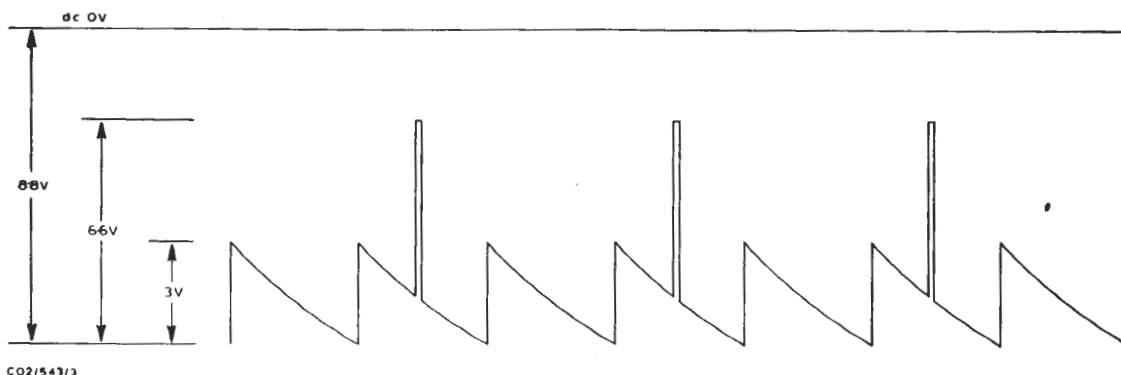


Fig. 3. Waveform at the Monitor Lock point