

OS2/513 PAL SUBCARRIER OSCILLATOR

Introduction

The OS2/513 is a crystal oscillator which provides a 1-volt peak-to-peak sinewave of nominal frequency 4.43361875 MHz (PAL subcarrier frequency).

It is designed to operate as part of the CO2/523 Natlock-to-PAL Converter in which application the PAL subcarrier-frequency output is correctly related to and has the same stability as the Natlock-frequency input to the Converter.

With appropriate strapping the OS2/513 can be used as an independent source of PAL subcarrier but used in this way the long-term stability of the oscillator is only a few parts in 10^5 .

The oscillator is constructed on a CH1/12A Chassis with index-peg positions 6 and 34. It is powered by an integral PS2/22B power supply which can also provide a 12-volt supply at up to 440 mA d.c. for other equipment.

General Specification

<i>Output Signal</i>	PAL subcarrier-frequency sinewave
<i>Frequency Range</i>	± 100 Hz
<i>Output Level</i>	1 volt peak-to-peak
<i>Output Impedance</i>	75 ohms
<i>Power Input</i>	200 to 240 volts, 20 mA a.c.
<i>Mains Fuse</i>	150 mA
<i>Power Output</i>	12 volts, 440 mA d.c. Positive or Negative to earth
<i>Ambient Temperature</i>	
Range	-10°C to $+45^{\circ}\text{C}$
Weight	0.9 kg (2 lb)

Circuit Description

The circuit of the OS2/513 is shown in Fig. 1. TR1 is a common-base amplifier with a collector load consisting of a tuned circuit L3 C5 which has a nominal resonance frequency of 4.5 MHz. The output of TR1 is coupled via C6 to the base of TR2 the output from the emitter of which is fed back to the emitter of TR1 via C8, L1, a crystal X1 and a variable-capacitance diode D1.

At its series resonance frequency the crystal offers a low impedance feedback path between TR2 output and TR1 input. The circuit therefore oscillates at approximately this frequency. The exact frequency of oscillation depends upon the setting of L1 and the reverse bias on D1. In the CO2/523 Natlock-to-PAL Converter this bias is derived in a CO2/527 PAL Subcarrier Converter. When the OS2/513 is used on its

own the reverse bias on D1 is fixed by strapping together pins 4 and 5 on the 15-way Painton plug.

TR2 has a tuned collector load comprising L2, C12 and C13. A signal is taken from the junction of C12 and C13 via the output level control, R12, to the Darlington output stage TR3 TR4. Resistor R4 increases the output impedance of the oscillator to about 75 ohms.

Alignment

Apparatus Required:

Painton 15-way socket type 316128

AVO meter model 8

Oscilloscope

Frequency Counter to read up to 5 MHz

Procedure:

1. Wire a mains cable to the Painton socket: Line to pin 1, Neutral to pin 2, Earth to pin 3.
2. Connect the AVO meter (25-V d.c. range) positive to pin 11, negative to pin 12 on the Painton socket. Adjust RV1 on the PS2/22B board for 12 volts.
3. Link pin 4 to pin 5 and pin 13 to pin 14 on the socket.
4. Connect a 75-ohm resistor between pins 6 and 7 on the socket.
5. Use the oscilloscope, with its earth on pin 7, to monitor the waveform on pin 6.
6. Adjust the core of L2 for maximum subcarrier output, starting with the core well out and setting it for the first peak.
7. Adjust pre-set resistor R12 to give 1-volt peak-to-peak subcarrier output at pin 6 of the socket.
8. Connect the Frequency Counter between pins 6 and 7 (earth to pin 7) and adjust the core of L1 to give a frequency of 4.433619 MHz ± 5 Hz.

Note: If R12 has insufficient range to provide the correct output level or is very close to the end of its track change the value of C13. A 20% increase in the value of C13 increases the output level by 15%. If such a change is made L2 must be re-tuned as in (6) above.

References

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| CO2/523 | Natlock-to-PAL Converter |
| CO2/527 | PAL Subcarrier Converter |
| PS2/22B | Regulated Power Supply |

JRWC 11/71

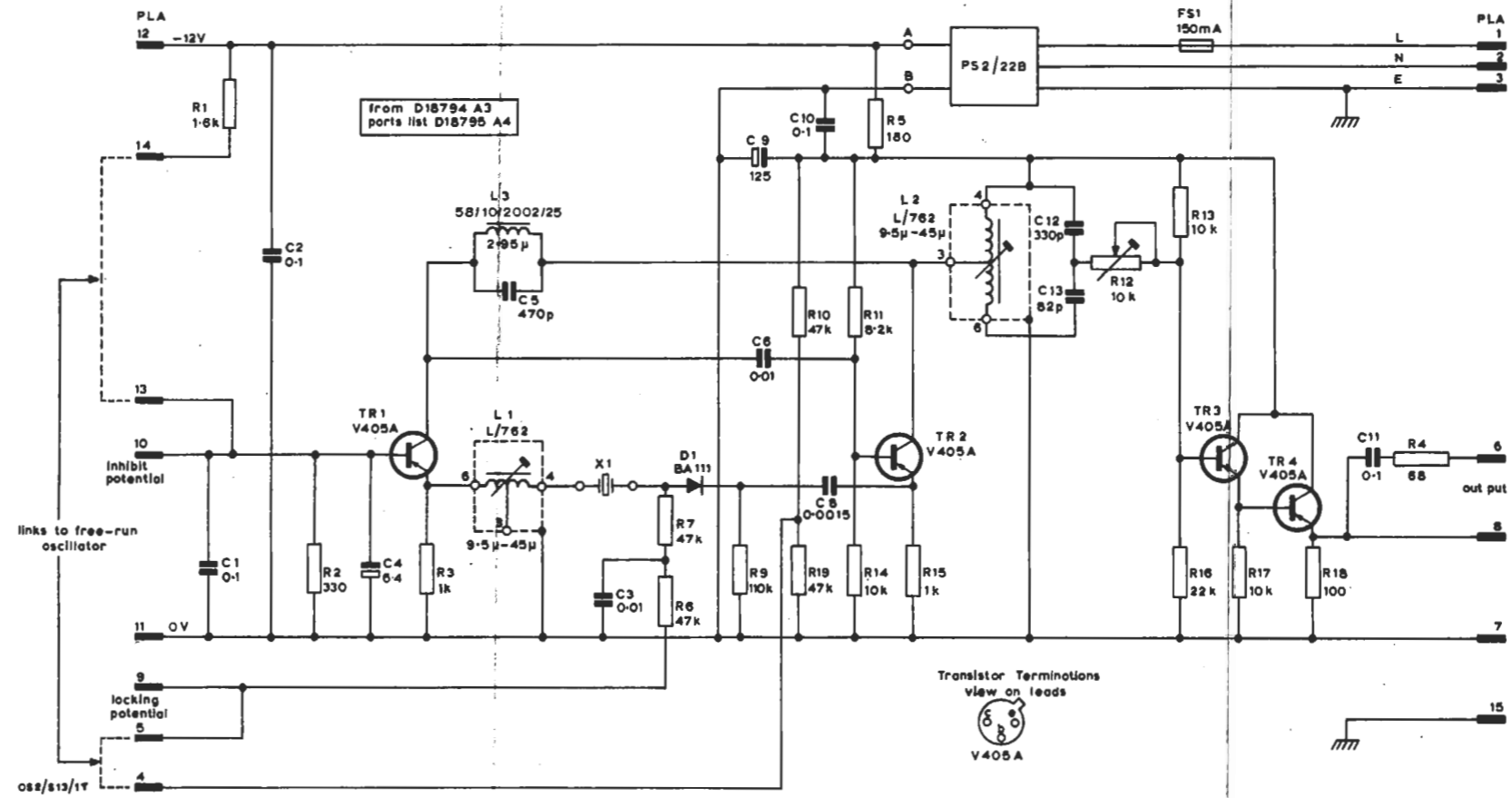


Fig. 1. OS2/513: Circuit Diagram