

VARIABLE DIVIDER UN17/514

Introduction

The UN17/514 accepts inputs of NTSC colour subcarrier^{1,2} on 3.579545 MHz, three error signals³ and a picture pulse signal⁴. It has a nominal division ratio of 2184 so that the nominal frequency of the output signal is 1639 Hz, but these figures may be modified by the error signals⁵.

The UN17/514 is constructed on a CH1/26A chassis with index-peg positions 5 and 38.

Circuit Description

The circuit diagram is given in Fig. 1.

The divider consists basically of divider circuits and error control circuits. The divider has three sections, $\div 7$ (nominal), $\div 39$ and $\div 8$, each section being built up from Bistable Units UN9/528.

The division ratio of the $\div 39$ and of the $\div 8$ sections is invariable, but that of the remaining section can be changed to 6 or 8 in two modes, depending on the polarities of the error-signal input terminals, 4, 5 and 8. Table 1 lists the various conditions.

TABLE 1

Condition	Terminal Polarities		
	4	5	8
Fast Advance	+	-	-
Advance	+	-	+
Normal	+	+	+
Retard	-	+	+
Fast Retard	-	+	-

In the advance and retard modes, a change takes

place for one cycle only of the divider and at a rate of once in every picture. This corresponds to a phase change (advance or retard) of $360/7$ degrees, i.e., approximately 51 degrees, which is reduced by the following dividers to 0.165 degrees at the output⁶. In the fast mode the changes take place approximately 500 times as often. The action is as follows.

Under Normal conditions, with no input of error signals (terminals 4, 5 and 8 positive), bistable units 14 and 15 are held in the Set state ($Q_1 +ve$, $Q_2 -ve$) by the positive going edges from Q_1 of bistable unit 3 (the negative edges have no effect). In these conditions the division ratio of the first 3-stage section is modified from the basic 8 to 7 by feed back from bistable unit 3 to bistable unit 1. (Feedback to bistable unit 2 is inhibited by the negative potential from Q_2 of bistable unit 15, via R16).

When error signals are received, terminals 4, 5 and 8 are made negative in the various combinations shown in the Table and the feedback paths to bistable units 13, 14 and 15 are opened or held closed correspondingly. Bistable units 14 and 15 are switched via their feedback paths by bistable unit 13, thus opening or closing the feedback paths in the first 3-stage section. This is accomplished in two modes depending on the operation of bistable unit 13. With terminal 8 positive, bistable unit 13 is switched once per picture pulse, but with terminal 8 negative, it is switched some 500 times as often by the positive going edges from Q_1 of bistable unit 9.

References

1. Oscillator OS2/514.
2. Fixed Divider UN17/515.
3. Control Unit UN17/504.
4. Picture Unit UN17/516.
5. Waveform Generator Drive Unit GE1M/530.
6. *Digital Methods of Controlling Frequency and Phase*; Instruction V.1, Appendix A.

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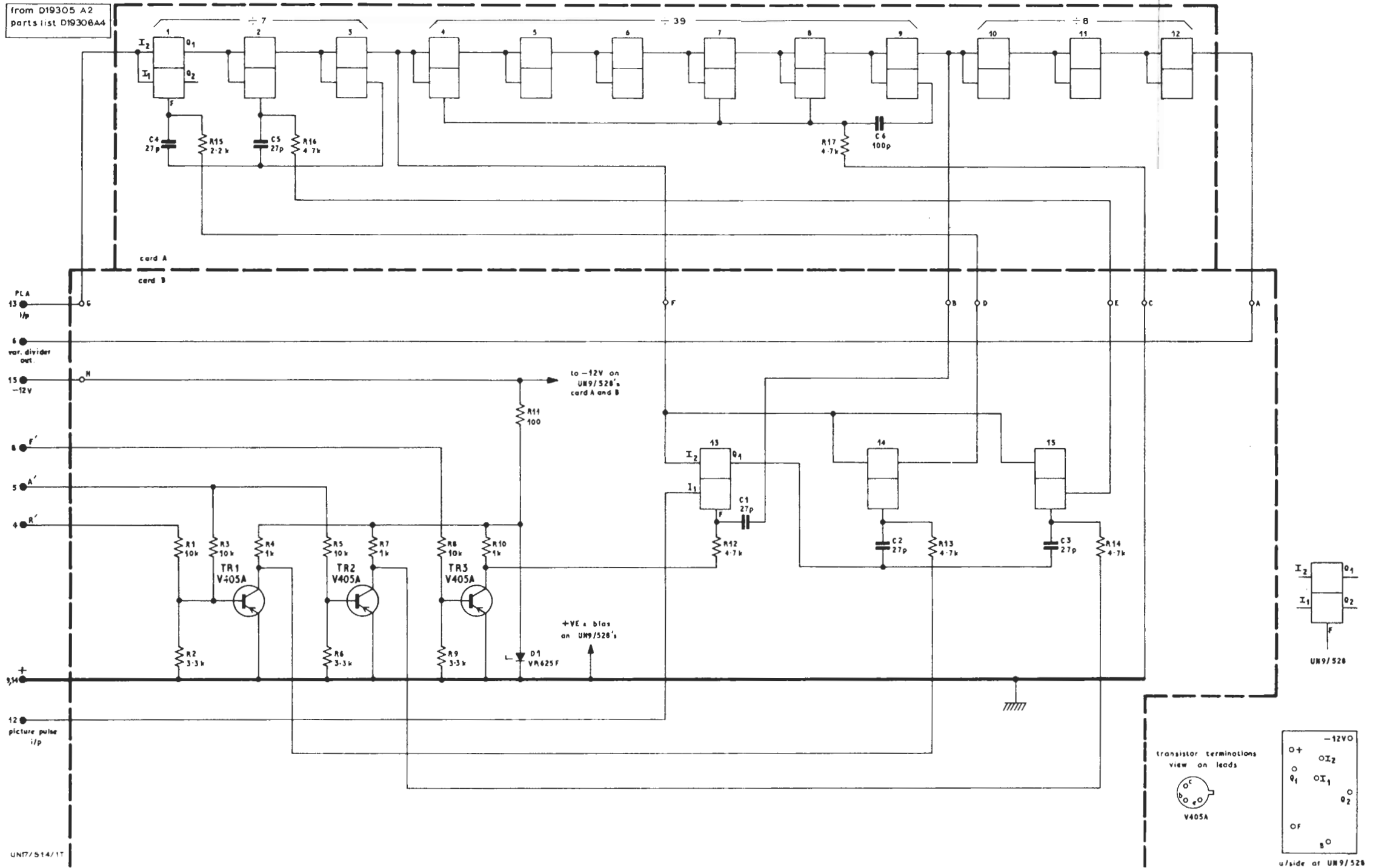


Fig. 1 Circuit of Variable Divider UN17/514