

## XV. Unit 4 Vertical divider

This unit contains a "Line counter", two horizontal generators, a "Field control" circuit and the start pulse generators for the circle register.

The line counter is a 21:1 divider (M-version 17:1 divider) counting the line pulses  $\overline{f_H}$ .

To obtain the correct sequence of the pulses, the line counter (IC4+IC7/2) is reset to zero for every field.

As the pulses from the counter should first appear in the active field period, a certain delay is introduced from the field pulse (front porch) to the start of the divider.

This delay is obtained in two ways. The field pulse supplied to terminal 16\* is triggering the one-shot IC1.

The delay can be adjusted within 0.35 ms and 0.65 ms by means of potentiometer R1.

Via the gate IC3/3 this delay pulse controls the supply of the line pulses ( $\overline{f_H}$ ) to the divider.

IC3/2 is coupled as an one-shot by means of C3/R7 and supplies a negative going pulse at the field front edge.

This pulse is used as a reset pulse for the line counter and for the flip-flop IC2/1 and IC2/4.

The field control pulse "h" (25 Hz) is also controlled by the delay pulse from IC1, which is supplied to TS1.

TS1 is coupled as a one-shot, which supplies a positive going pulse (approx. 25  $\mu$ s), that is wide enough to let the first line pulse from IC3/3 in every second field pass the gate IC2/2.

The flip-flop IC2/1 and IC2/4 in the field control circuit will thus be shifted with a frequency of 25 Hz.

The "Horizontal line generator" and the "Horizontal bar generator" generate the white horizontal lines ( $V_L$ ) and the white bars ( $V_B$ ), which are used for the border castellation.

The V4-28 pulse (terminal 5\*) is generated by means of IC8/1.

The V3-5 pulse is used as J-input and the V27-29 pulse is used as K-input of IC8/1. The clock pulses are gated out from the line counter IC4 by means of IC3/4 and IC5/1.

The start I and start II generators IC9-IC6/2 and IC10-IC6/4 respectively are one-shots, which are triggered by the positive-going edge of the H9-29 pulse and the negative-going edge of the H1-21 pulse respectively.

These circuits control the circle registers for respectively the left and the right part of the circle (unit 2).

**NB.** For modifying this unit into a M-version the three G-jumpers have to be removed and one M-jumper should be inserted (see circuit diagram Fig. XV-9).

### Checking and adjusting

Measuring equipment	:
Oscilloscope	: e.g. PHILIPS PM 3250
BI/Wh monitor	: e.g. PHILIPS LDH 2110

The adjustments in unit 2 and unit 4 secure a proper symmetry and placing of the circle.  
When adjusting, the following sequence must be observed.

#### 1. The start I pulse. Unit 4

Connect the oscilloscope to terminal 4 at unit 11B.

Trigger ext. with pulse  $\overline{f_H}$  (e.g. terminal 17' - unit 4). (Put the oscilloscope in pos.: 0.5  $\mu$ s/div.-delay:  $\approx$  75  $\mu$ s (10  $\mu$ s x 7.50).

Press SK4 "EXT. PICT"

The start of the circle should be half the way between the 3rd and the 4th of the vertical white lines (see Fig. XV-2). If not, adjust R8.

#### 2. The oscillator frequency, unit 2

Connect the BI/Wh monitor to BU7 "Y-OUTPUT".

Remove unit 12.

Press SK4 "EXT. PICT."

The distance a-b should be equal to c-d (see Fig. XV-3).

If not, readjust C2.

### 3. The start II pulse. Unit 4

Connect the oscilloscope to terminal 4 at unit 11B.

Trigger ext. with pulse  $\overline{f_H}$  (e.g. terminal 17' - unit 4).

Put the oscilloscope in pos.:  $0.5 \mu\text{s}/\text{div.}$  - delay:  $\approx 45 \mu\text{s}$  ( $10 \mu\text{s} \times 4.40$ ).

Press SK4 "EXT. PICT."

The right part of the circle should stop half-way between the 3rd and the 4th last vertical white line (see Fig. XV-4).

If not, readjust R11.

### 4. Vertical position of the test pattern. Unit 4

Connect the oscilloscope to terminal 4 at unit 11B.

Trigger ext. with field pulse, e.g. terminal 16' - unit 4.

Put the oscilloscope in pos.:  $0.2 \text{ ms}/\text{div.} \times 2$  -

delay:  $\approx 18 \text{ ms}$  ( $2 \text{ ms} \times 9.20$ ) and

$\approx 20 \text{ ms}$  ( $2 \text{ ms} \times 10.0$ ) resp.

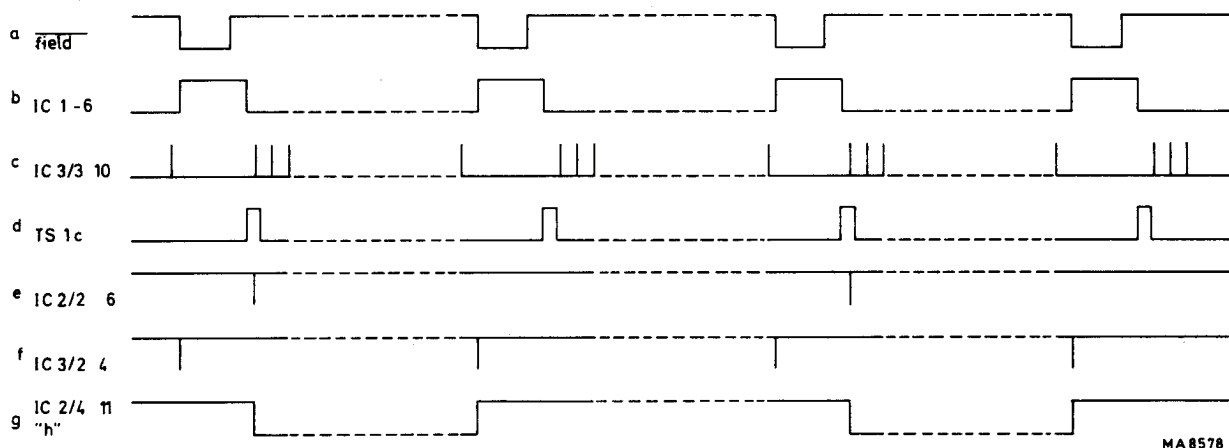
The black/white castellations in the top and in the bottom of the picture should consist of a number of lines according to the survey table (Fig. XV-5).

In case of deviation, adjust R1 until correct numbers are obtained.

#### Note:

When adjusting, make sure that the interlacing is correct. (The first and the last lines in the circle should be of the same length).

The number of lines depends on the width of the supplied field blanking.



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Fig. XV-1. Pulse diagram, vertical divider

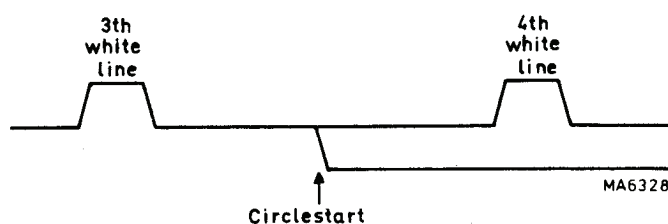


Fig. XV-2. Pulse diagram, start of the circle

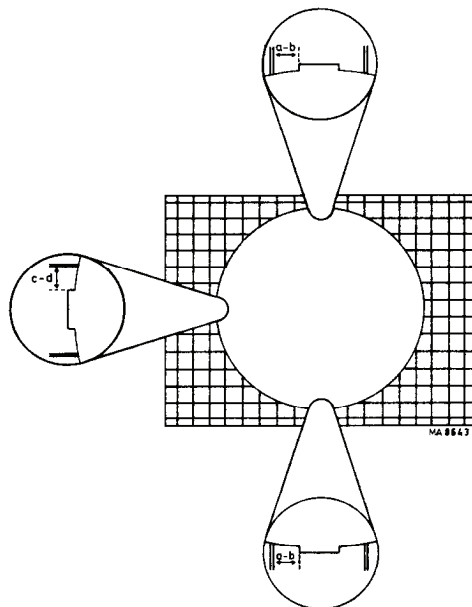


Fig. XV-3. Pulse diagram, frequency adjustment

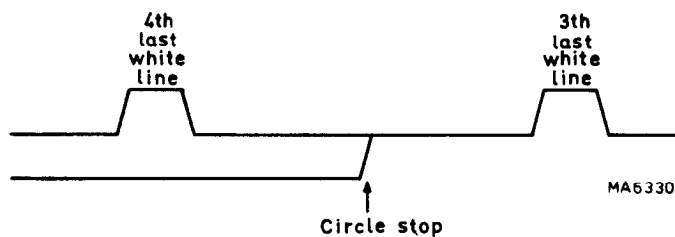


Fig. XV-4. Pulse diagram, stop of the circle

G-version					M-version			
Numbers of lines in the supplied frameblanking	Numbers of lines in the black/white castellation.*							
	1.field		2.field		1.field		2.field	
	upper	lower	upper	lower	upper	lower	upper	lower
18	10	10 1/2	10 1/2	10	11	11 1/2	11 1/2	11
19	10	9 1/2	9 1/2	10	11	10 1/2	10 1/2	11
20	9	9 1/2	9 1/2	9	10	10 1/2	10 1/2	10
21	9	8 1/2	8 1/2	9	10	9 1/2	9 1/2	10
22	8	8 1/2	8 1/2	8	9	9 1/2	9 1/2	9
23	8	7 1/2	7 1/2	8	9	8 1/2	8 1/2	9
24	7	7 1/2	7 1/2	7	8	8 1/2	8 1/2	8
25	7	6 1/2	6 1/2	7	8	7 1/2	7 1/2	8

\* When changing to another width of the supplied frameblanking following other adjustments must be carried out:

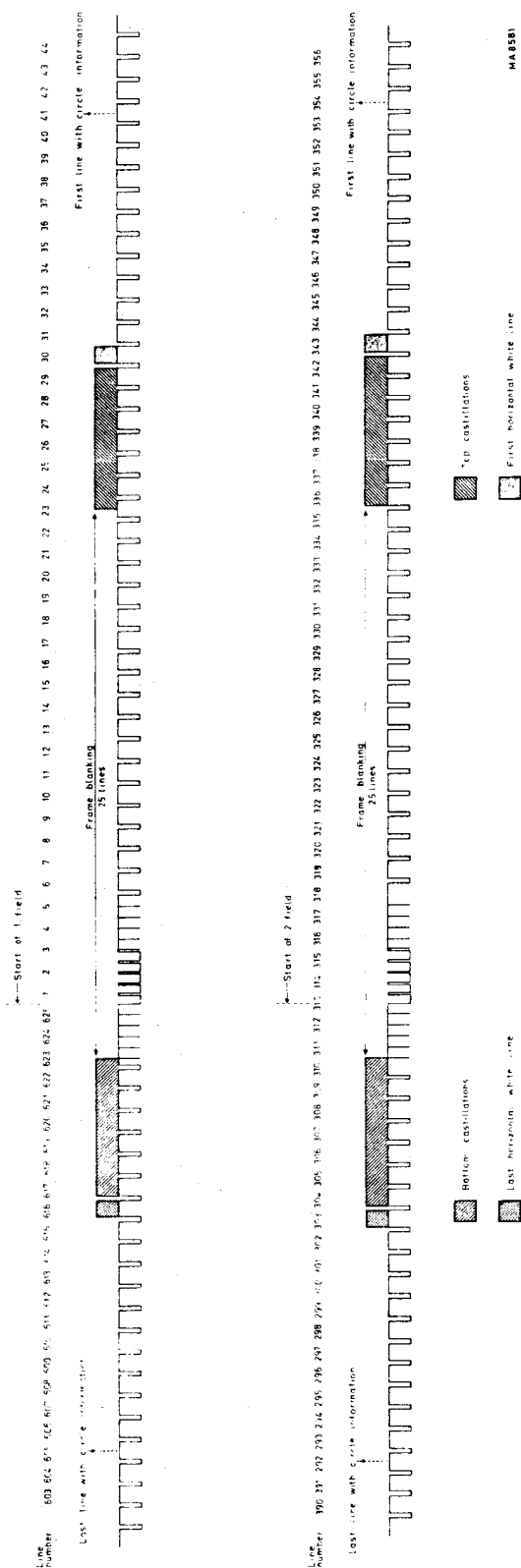
Unit 6 : oscillatorstart and oscillatorfrequency.

Unit 2 : oscillatorfrequency.

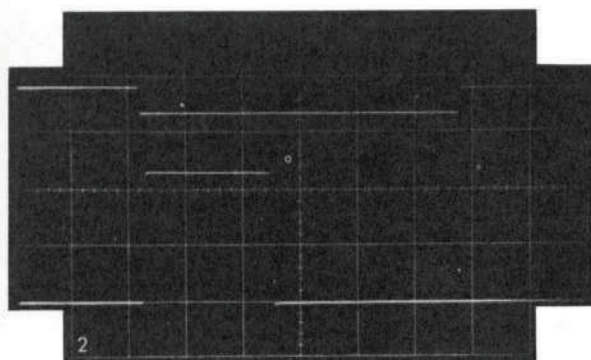
Unit 4 : start I and start II pulses.

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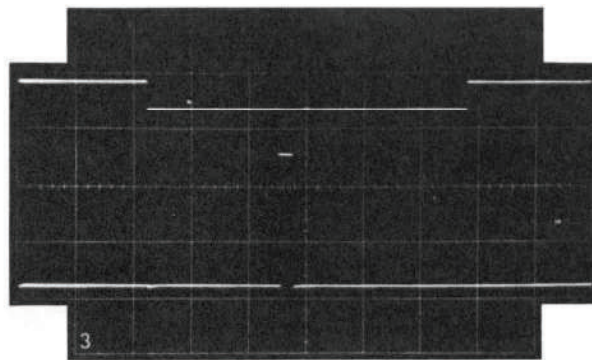
Fig. XV-5. Survey of the vertical position of the test pattern



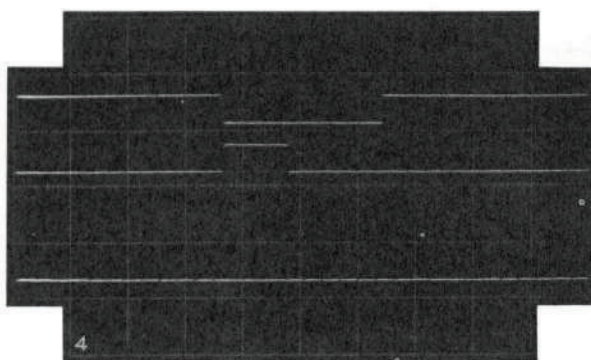
**Fig. XV-6. Example of the vertical position of the test pattern for 25 lines field blanking**



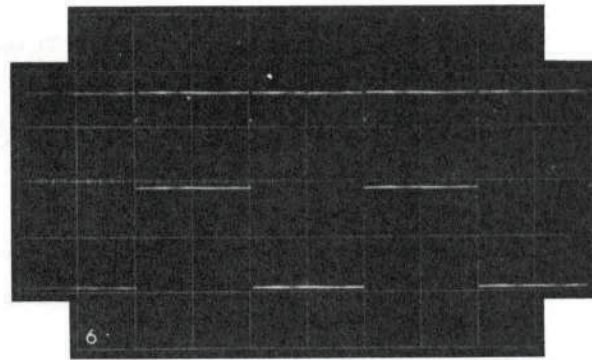
2 V/div. 0.1 ms/div.  
Ref.: field pulse



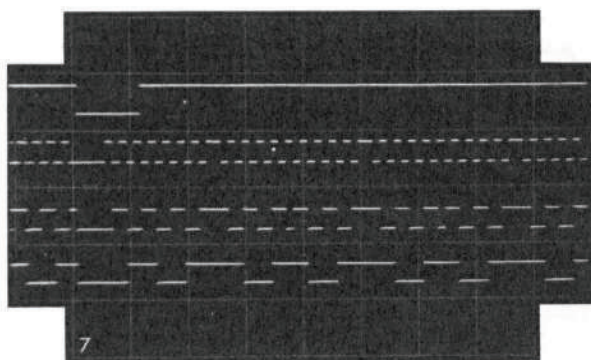
2 V/div. 0.1 ms/div.  
Ref.: field pulse



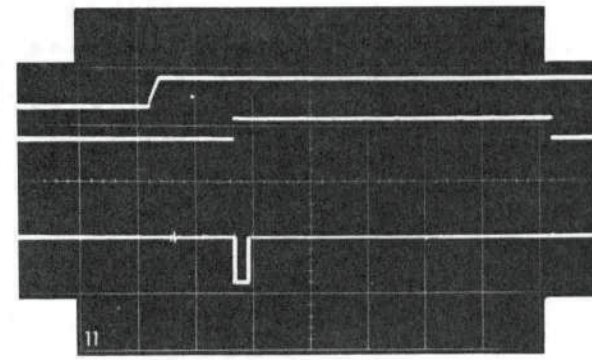
5 V/div. 0.2 ms/div.  
Ref.: field and IC  $\frac{1}{4}$  - 11 pulse



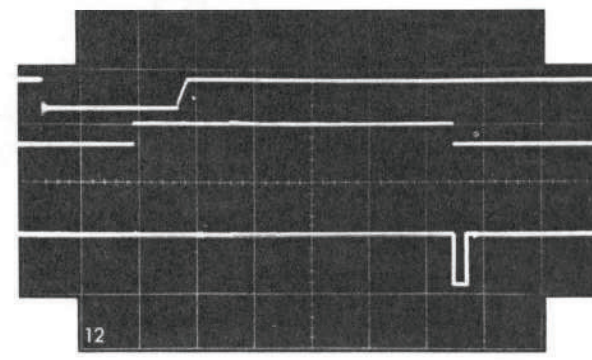
2 V/div. 10 ms/div.  
Ref.: field pulse



10 V/div. 0.5 ms/div.  
(r-s-pulses)  
Ref.: field pulse



1 V/div. 5  $\mu$ s/div.  
Ref.:  $\bar{b}1$  and H9-29



1 V/div. 5  $\mu$ s/div.  
Ref.:  $\bar{b}1$  and H1-21

Fig. XV-7. Oscillograms, unit 4



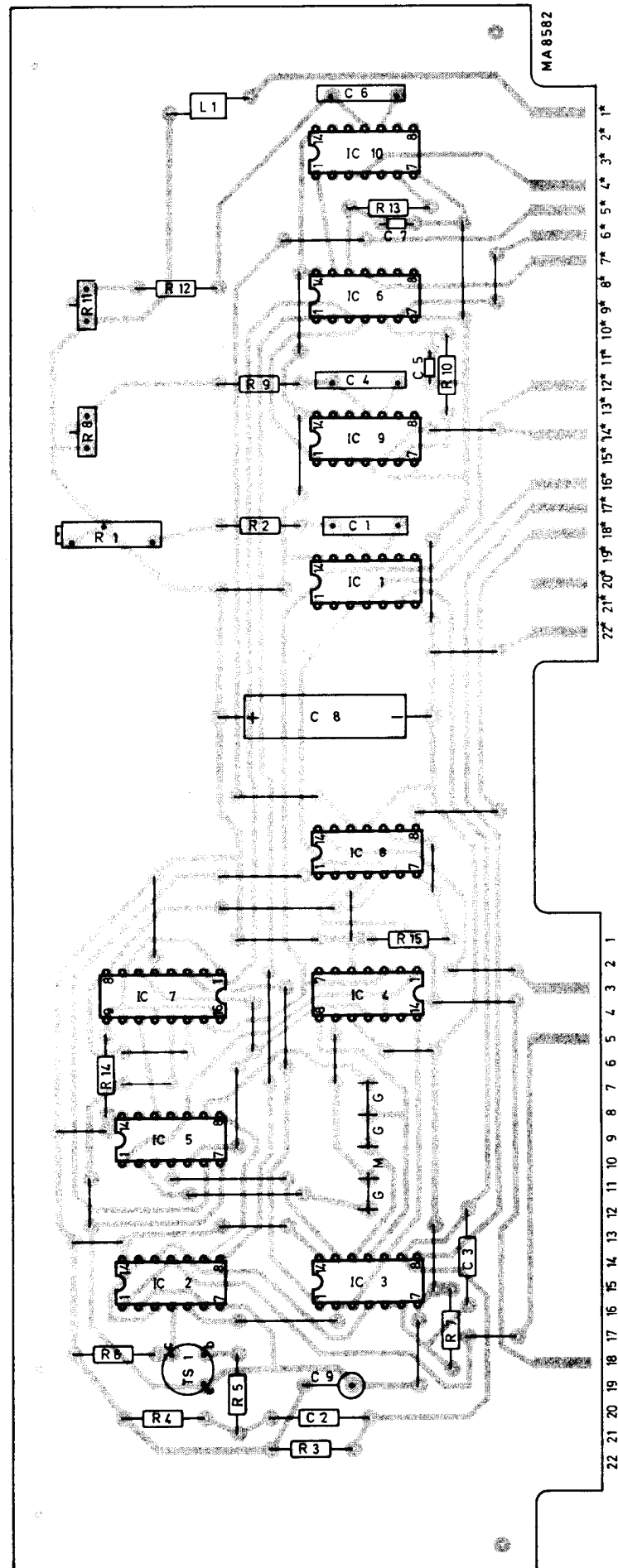


Fig. XV-8. Printed wiring board, vertical divider, unit 4

7 03  
V3-5

5.18  
V27-29

