XVI. Unit 5 Vertical decoder

This unit consists of a "500 kHz oscillator" supplying the 250 kHz black-white squares and a "16:1 divider", which controls the vertical decoder.

The 500 kHz oscillator is an emitter coupled multivibrator TS4 - TS5.
Start and stop of the oscillator are controlled by the flip-flop IC2/2 via TS3.
The oscillator is started by the H5-25 pulse.
The front of this pulse is triggering one-shot TS1 which is adjustable by R2.
This one-shot, which gives the delayed start of the 500 kHz oscillator, is triggering one-shot TS2, supplying the set pulse to flip-flop IC2/2.

The oscillator is then running until the H37-39 pulse is applied to the reset input of the flip-flop.

The gate IC1/4 secures that the oscillator is only started in the wanted horizontal bar (V9-11).
The 500 kHz signal is applied to the 2:1 divider IC2/1, which supplies the 250 kHz black-white signal.

The 16:1 divider is dividing the V_L pulse (appears for every 21st line). Additionally the divider is supplied with an extra counting pulse V_I, which gives an extra counting pulse at the horizontal center line (selected by gate IC3/2).
The blanking signal, applied to gate IC3/3 controls the start and stop of the pulses applied to the divider.
The $\overline{field}$ pulse is setting the divider before start to secure the correct sequence of the output pulses A, B, C and D.

The A, B, C and D pulses are applied to the vertical decoders which supply the vertical picture division: the V 0-3, V 3-5, V 5-7 ... V 29-0 pulses, and the vertical gate pulses for the colour difference, the Bl/Wh circle and the center cross gates.

The "Narrow line generator", which is triggered by the vertical white lines $\overline{H_L}$, is a one-shot supplying white lines of half the width (H_L').
This signal applied to the (R-Y), (G-Y) and (B-Y) gates (unit 7) secures that the colour steps between (G-Y) = 0 and the (R-Y) respectively (B-Y) are symmetrical with respect to the vertical grid lines.

Checking and adjusting

Measuring equipment:
Oscilloscope   : e.g. PHILIPS PM 3330 with delay unit PM 3347.
Bl/Wh monitor : e.g. PHILIPS LDH2110

The frequency of the 250 kHz generator

Connect the oscilloscope to terminal 70'.
Trigger ext. with pulse $\overline{f_H}$ (e.g. terminal 17' unit 4).
Put the oscilloscope in pos.: 2 μs/div. -
                                        delay: $\approx$ 15 μs (5 μs x 3.00).
5 periods of 250 kHz should cover 10 cm ±0.2 cm.
If not, select another value of R15 (2.7 kΩ - 5.6 kΩ)

The horizontal placing of the 250 kHz bar

Connect the monitor to BU7 - "Y-OUTPUT".
The 250 kHz bar should be placed in such a way with respect to the circle that the bar starts with ½ black in the left side and ends with ½ white block in the right side.
If not, adjust R2.

The narrow line generator

Press SK6: COLOUR DIFF. NORM.

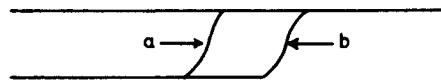Connect the oscilloscope to terminal 56' at unit 7.

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

Put the oscilloscope in pos.: 0.1 μs/div. -

                     delay: $\approx$ 11 μs (2 μs x 5.20).

The transient between +(R-Y) and (G-Y = 0) bars should be as shown in Fig. XVI-1.
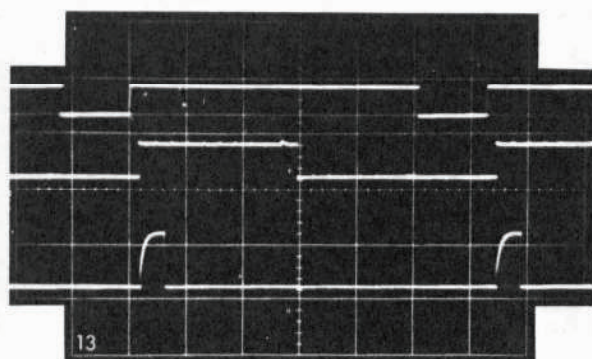
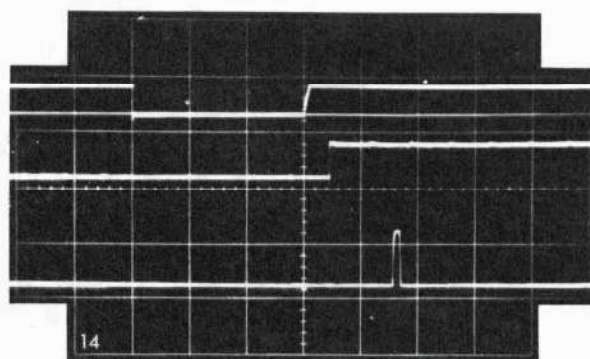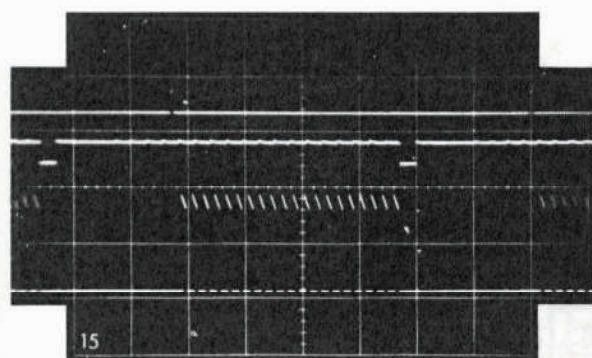If not, select another value of C5 (270 - 470 pF), until 115 ns is obtained.

a - b : 115 n sec.
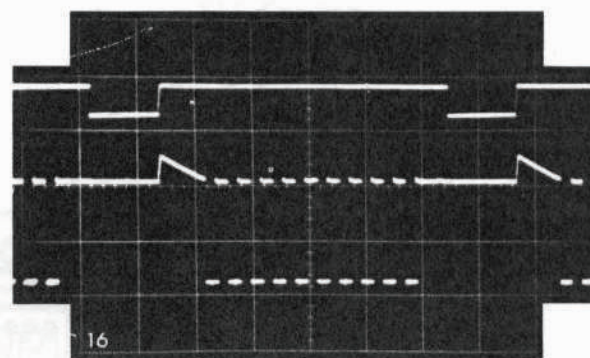
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Fig. XVI-1. Pulse diagram, transient adjustment
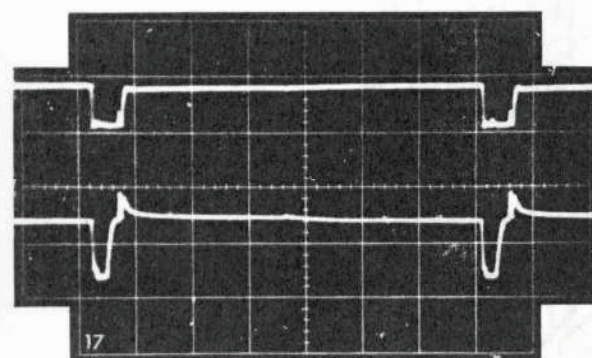
5 V/div.   10 μs/div.
Ref.: b̄l and H5-25

5 V/div.   4 μs/div.
Ref.: b̄l and H5-25

2 V/div.   10 μs/div.
Ref.: TS2c and H37-39

2 V/div.   10 μs/div.
Ref.: b̄l

2 V/div.   0.4 μs/div.
Ref.: H̄L
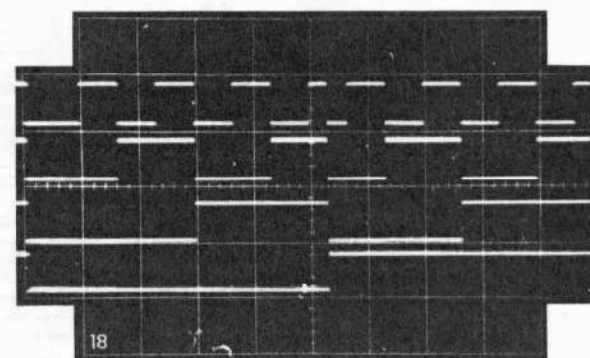
5 V/div.   2 ms/div.
Pulse A-B-C-D

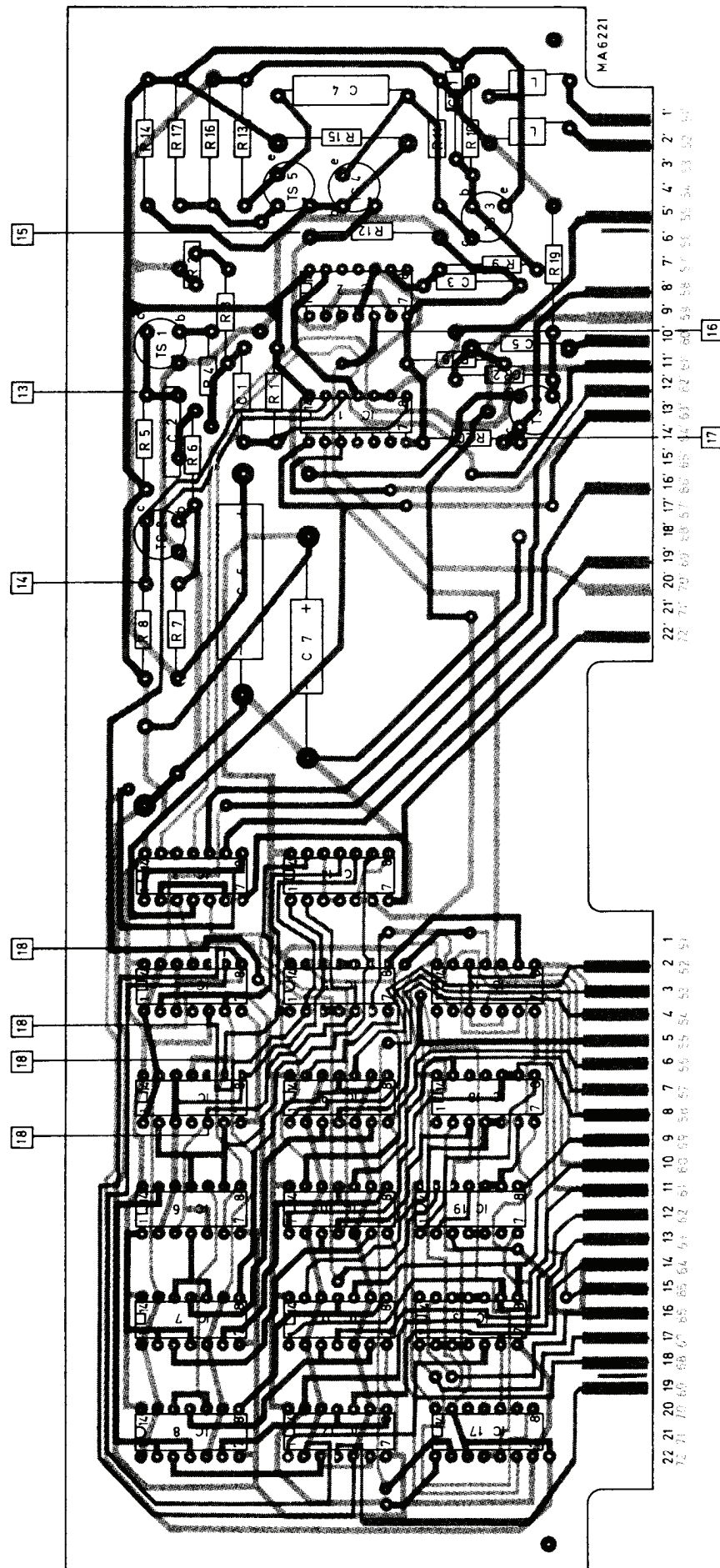Fig. XVI-2. Oscillograms, unit 5

STS
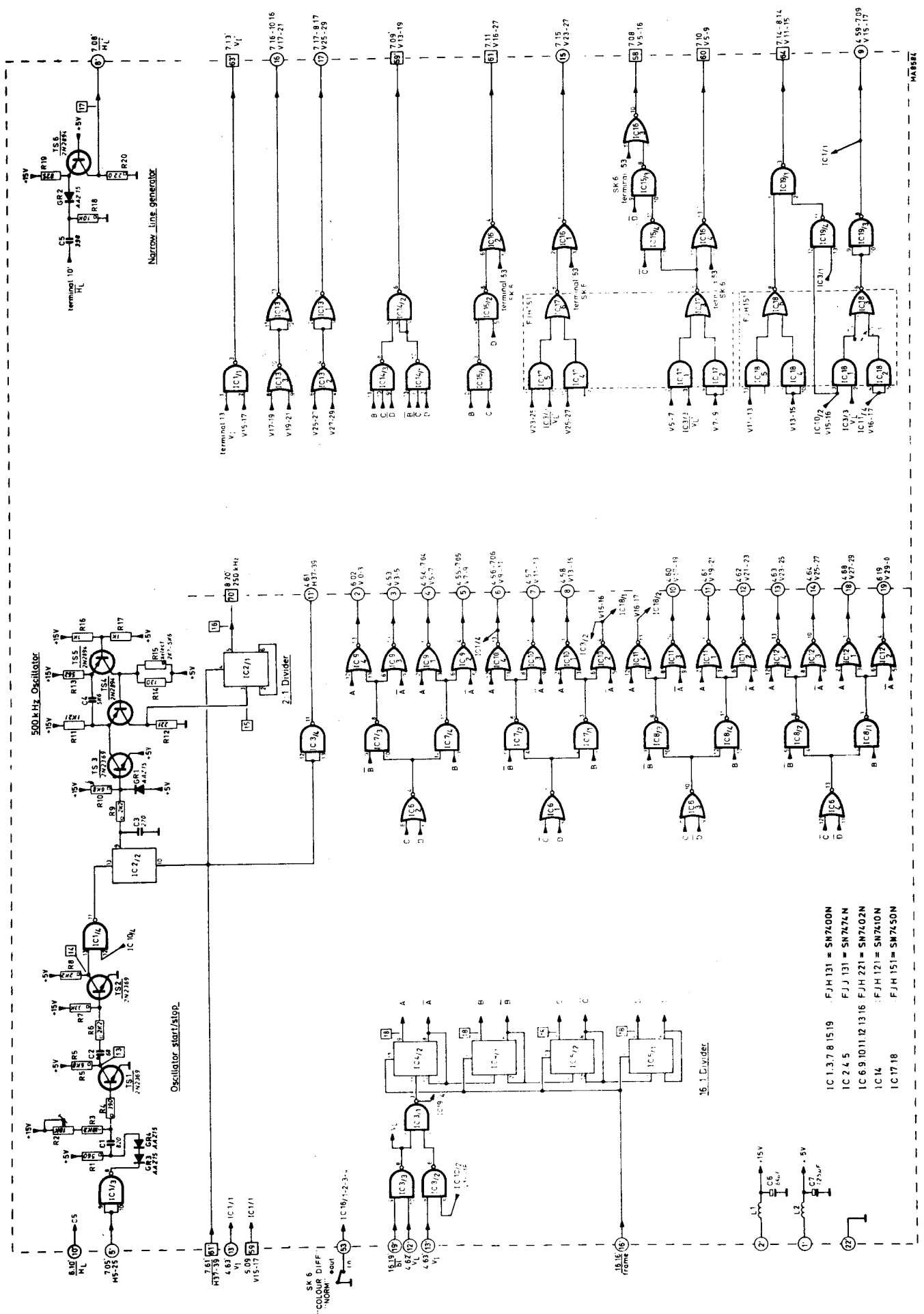
Fig. XVI-3. Printed wiring board, vertical decoder, unit 5

Fig. XVI-4. Circuit diagram, vertical decoder, unit 5