XXVIII. Unit 17 Text generator (Option)

Characters

The function of the text generator is based on the integrated circuit FDR 116 Z1. This is a so-called R.O.M.-circuit (Read Only Memory) which generates 64 different characters in a 5 times 7 dot matrix (see Fig. XXVIII-1).
In a TV display the dot is formed by a white square having a width of 0.2 s and a height of 2 lines/field.
This means that one character, white on a black background, takes the space of a rectangle of 1 µs times 28 lines/frame.
The horizontal position of the character rows are independently adjustable giving the possibility of a symmetrical display of the text in both bars.
The text amplitude is automatically the same as peak white in the testpattern.

Programming of the PM 5543 (see fig. XXVIII-3)

The logical state of each of the six inputs to the text ROM FDR 116Z1 determines the character to be read out.

The logical state of these 6 inputs to the ROM is determined by the six sign selectors (IC16 to IC21) of which each one selects one out of the 16 inputs (E0 to E15) to the output.

The sign selectors are shifted during the horizontal scanning of the text field, and in this way 16 different 6 bit words can be transferred to the text ROM. In principle the logical state of the first input (E0) of the six sign selectors determines the first character, - the second input (1) of the six sign selectors determines the second character, and so on up to character no. 16. In practice, however, only 14 (E1 up to E14) of the 16 inputs to the sign selectors can be used for the text coding giving 14 characters as a maximum.

The two text lines from the PM 5543 are obtained in a special way, whereby the logical state of the inputs to the sign selectors can be either maintained during the full field or shifted from the upper to the lower text field.

If for instance one sign input to a sign selector, in accordance with a different upper and lower character, should be "1" for the upper text field and "0" for the lower, then this input is connected to a signal with this logical shift.
As we have both low level (= "0" - "0") and +5 V (= "1" - "1") as well as shift up ("0" - "1") and shift down ("1" - "0") it becomes possible to programme the upper and lower text independently of each other.

When programming the PM 5543 each of the 10 used inputs to a sign selector has then to be connected in one of the four following ways:

1. connected to +5 ("1", "1")
2. connected to ground ("0", "0")
3. connected to IC15 pin 6 ("1", "0")
4. connected to IC15 pint 8 ("0", "1")

The figures in the brackets indicate the logical state of the inputs to the sign selector for the upper and lower text respectively.

The programming takes place in the sign matrix (terminals E0-E15; see diagram), and is carried out by means of jumpers soldered at the rear of the printed wiring board.

The working principle of the text generator is as follows:

The generator is supplied with the necessary drive pulses from the units 5, 7 and 10.
The pulses V5-7, V23-25 and H14-34 are applied to the clock key generator, which secures the start/stop of the 8.6 MHz clock oscillator. The clock pulses are applied to the divider system which is controlled by the line- and field pulses. The obtained pulses (A...H) control the sign selectors, the read in/read out gates and the clock gate.
The sign selectors select successively the terminals E0 up to E15 by means of the pulses A, B, C and D.
These terminals are connected via the sign matrix to logical 1 or 0.
The output pulses W1 up to W6 of the sign selectors are applied via amplifiers to the inputs of the R.O.M. circuit (A4 up to A9).
The pulse Ø1 and Ø2 control the read-in and the horizontal read-out of the R.O.M. circuit, while the vertical read-out is controlled by the pulses A1, A2 and A3 which are supplied from the line selector.

The output of the R.O.M. circuit (Q1...Q5) is applied to the shift register, which is controlled by the pre-set gate and the clock gate.
The obtained signal is applied to the output circuit via a flip-flop.

Checking and adjusting

Measuring instrument:
Oscilloscope : e.g. PHILIPS PM 3250
Monitor : e.g. PHILIPS LDH2110

Connect monitor to BU1 (BU10-BU11) "Video out".
The horizontal width of the letters can be changed by changing the clock oscillator frequency.
The Text position is varied by R9 in unit 5 - Vertical Divider.

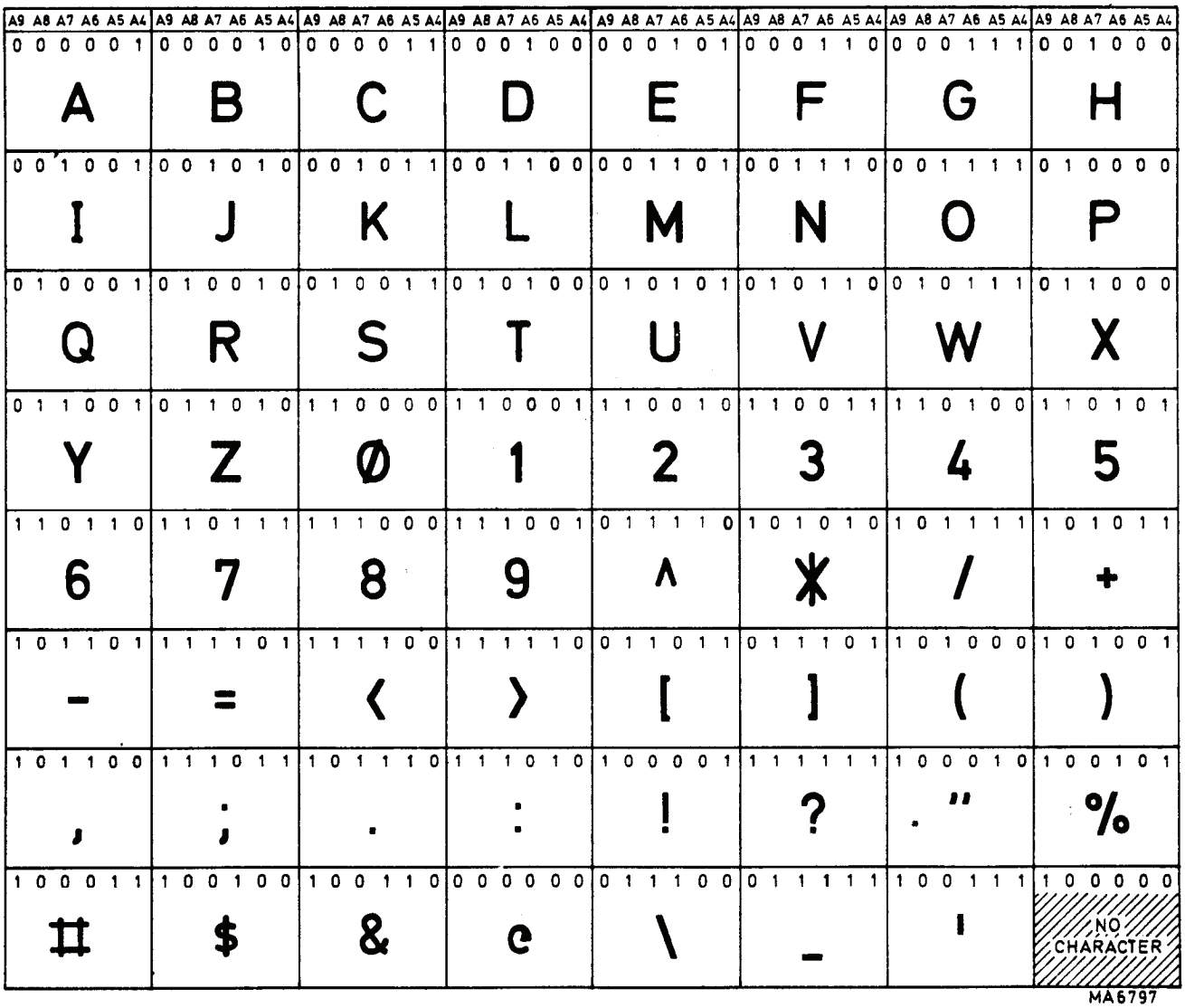


Fig. XXVIII-1. Survey of the different characters

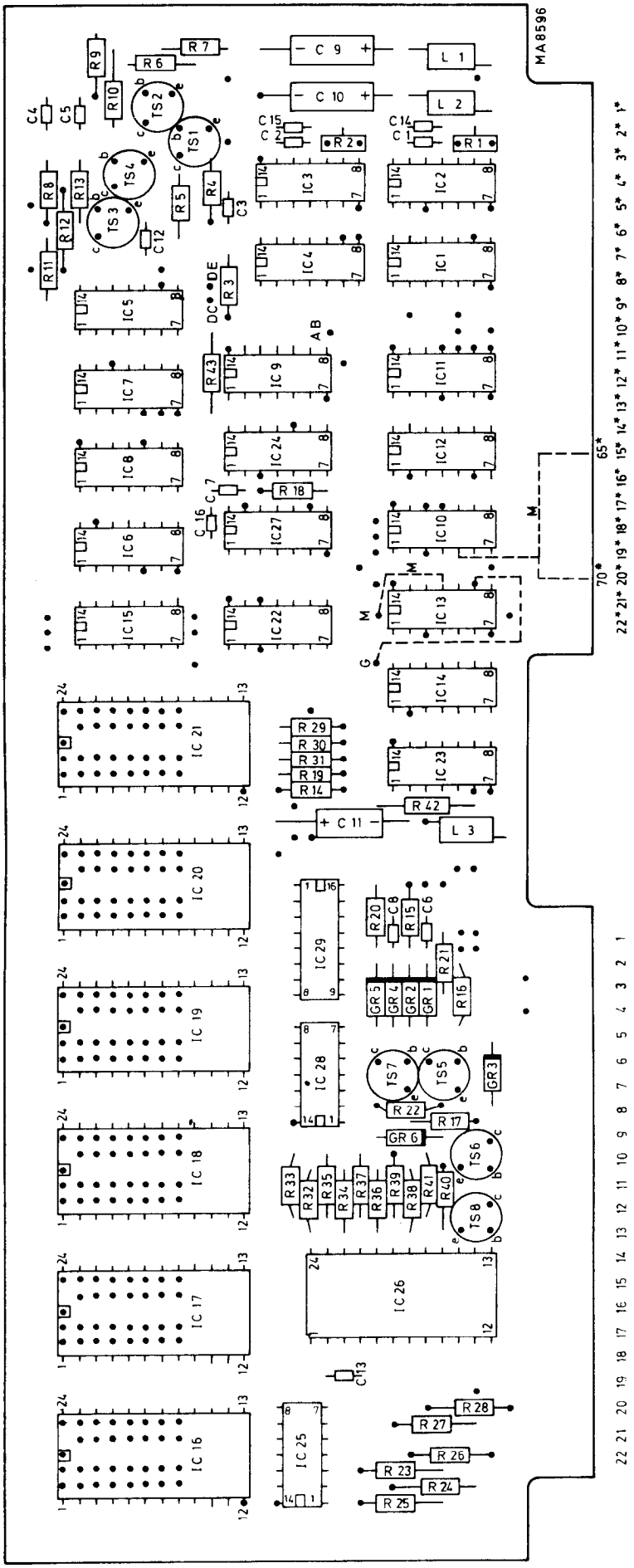


Fig. XXVIII-2. Printed wiring board, text generator, unit 17

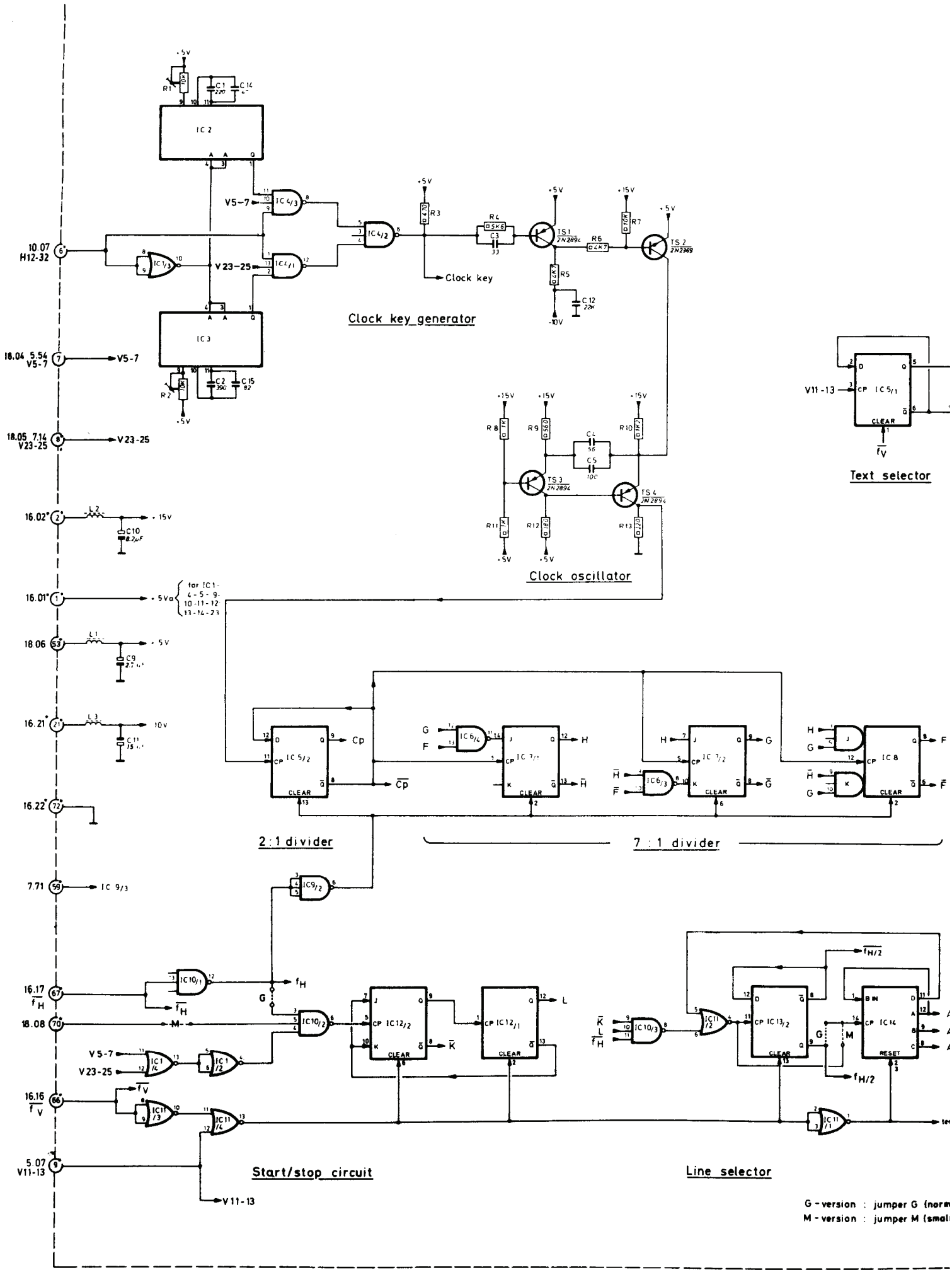
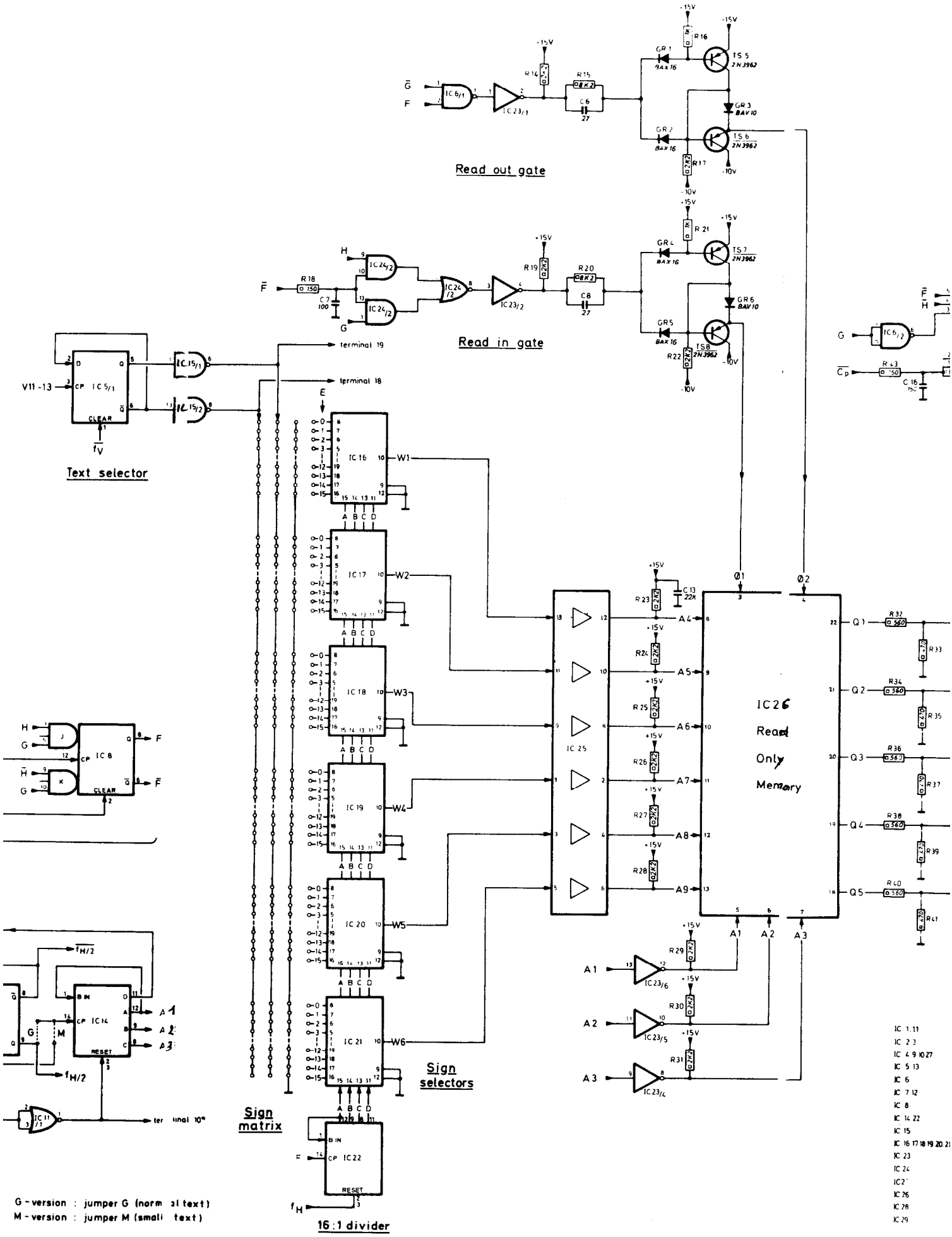
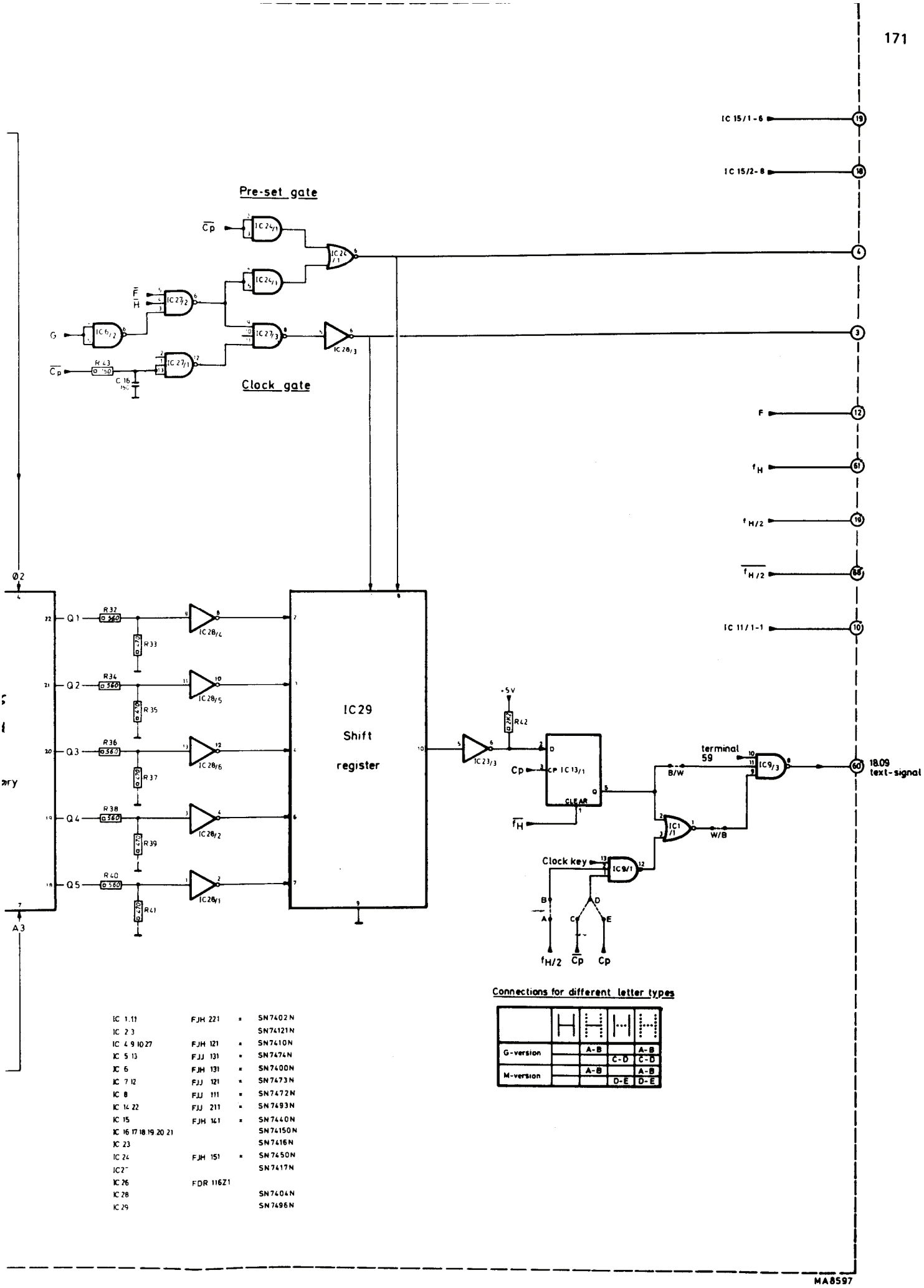


Fig. XXVIII-3. Circuit diagram, text generator, unit 17


Read out gate
Read in gate
Text selector
Sign matrix
Sign selectors
16 : 1 divider
IC26 Read Only Memory
G - version : jumper G (normal text)
M - version : jumper M (small text)



IC 1.11	FJH 221 = SN7402N
IC 2 3	SN74121N
IC 4 9 10 Z7	FJH 121 = SN7410N
IC 5 13	FJJ 131 = SN7474N
IC 6	FJH 131 = SN7400N
IC 7 12	FJJ 121 = SN7473N
IC 8	FJJ 111 = SN7472N
IC 14 22	FJJ 211 = SN7493N
IC 15	FJH 141 = SN7440N
IC 16 17 18 19 20 21	SN74150N
IC 23	SN7416N
IC 24	FJH 151 = SN7450N
IC2[illegible]	SN7417N
IC 26	FDR 116Z1
IC 28	SN7404N
IC 29	SN7496N

MA8597

XXIX. Unit 18 Current gate

This unit consists of a "Current gate", a "Vertical text position" circuit and a "Dot width circuit".

"Current gate"

The current gate decreases the power consumption of the text generator PM 5543 (unit 17). This circuit supplies the +5 V d.c. only during the text periods (upper bar V5-7 and lower bar V23-25).

"Vertical text position"

IC2/1 and IC2/2 form a 4:1 divider
The output at terminal 8 is thus $\overline{fH/4}$.
This output pulse (text position pulse) determine the vertical position of the text in the text areas.

"Dot width circuit"

The function of this circuit is to change the aspect ratio of the dots and thereby giving the characters from PM 5543 a more smooth appearance than the characters made up by the squared dots.

The circuit consists of the one-shot generator IC3. This one-shot is triggered by the text output from unit 17. The one-shot time can be adjusted within 0.2 µs. to 0.5 µs. by means of potentiometer R6.

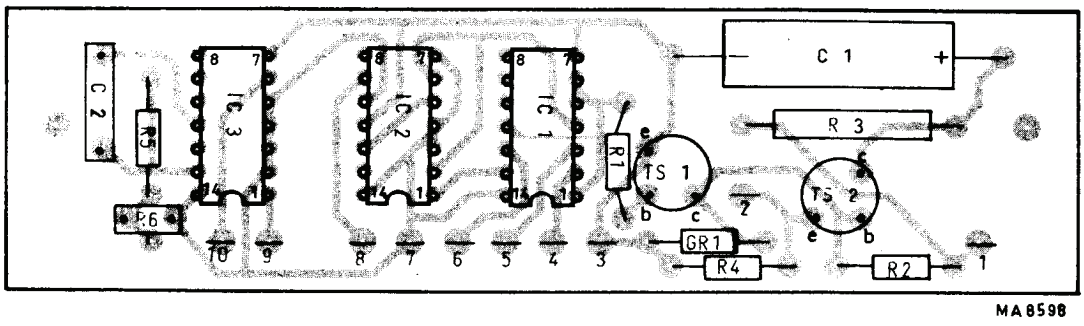


Fig. XXIX-1. Printed wiring board, current gate, unit 18

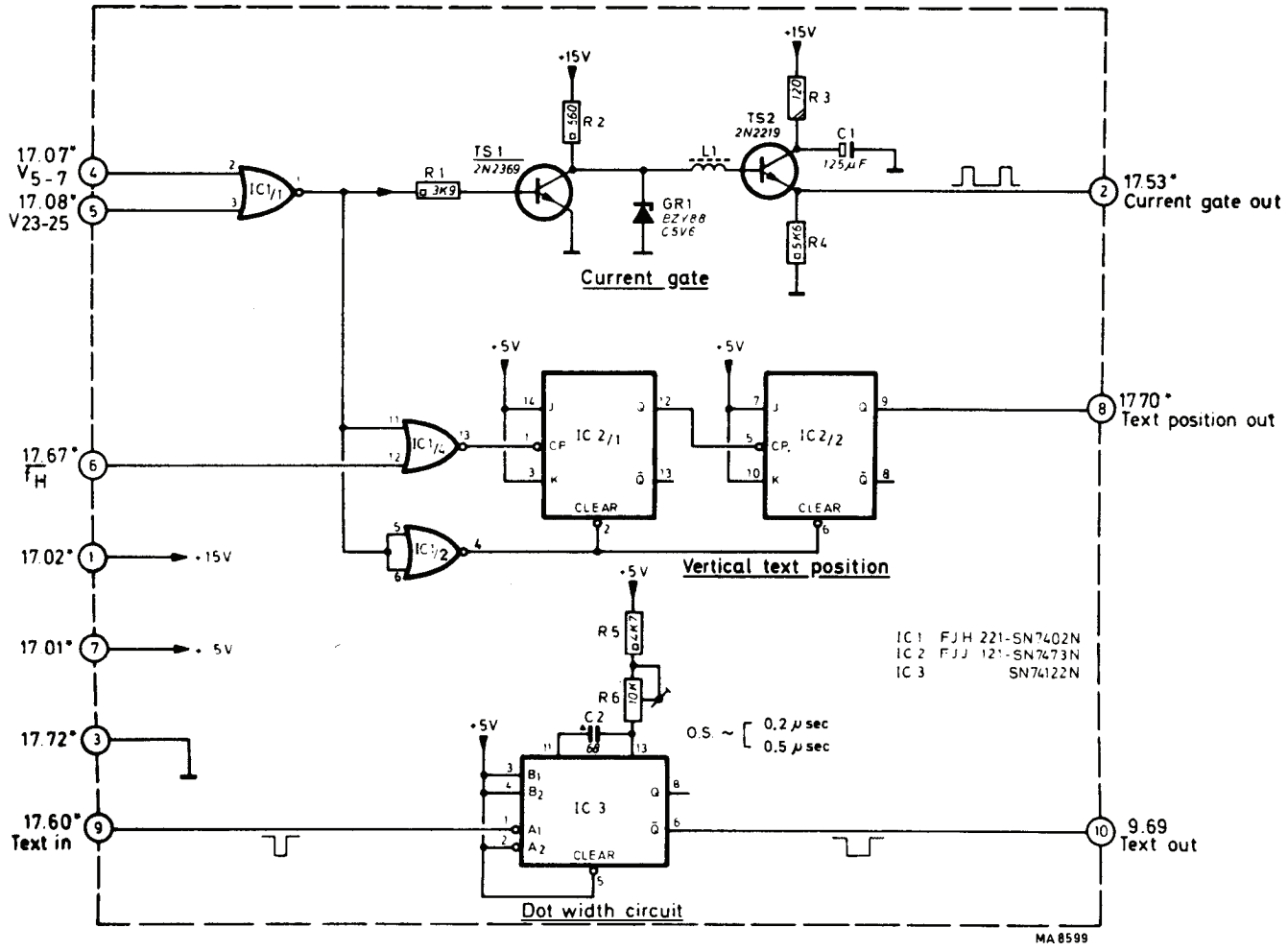


Fig. XXIX-2. Circuit diagram, current gate, unit 18