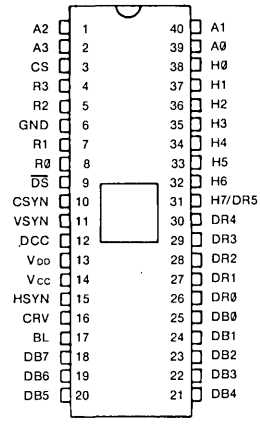
Preprogrammed CRT Video Timer and Controller VTAC®

FEATURES

- ☐ Preprogrammed (Mask-Programmed) Display Format
  - 80 Characters Per Data Row
  - 24 Data Rows Per Frame
  - 9 Scan Lines Per Data Row
- ☐ Preprogrammed Monitor Sync Format
  - 262 Scan Lines Per Frame
  - 6 Character Times for Horizontal Front Porch
  - 8 Character Times for Horizontal Sync Width
  - 6 Character Times for Horizontal Back Porch
  - 16 Scan Lines for Vertical Front Porch
  - 3 Scan Lines for Vertical Sync Width
  - 27 Scan Lines for Vertical Back Porch
  - Non-Interlace
  - 15.720KHz Horizontal Scan Rate
  - 60Hz Frame Refresh Rate
- ☐ Fixed Character Rate
  - 1.572MHz Character Rate (636.13ns/Character)
  - 11.004MHz Dot Rate (90.88ns/Dot) for 7 Dot Wide Character Block
- ☐ Character Format
  - 5 X 7 Character in a 7 X 9 Block
- ☐ Compatible with CRT 8002B-003 VDAC™
- ☐ Compatible with CRT 7004B-003
- ☐ May be mask-programmed with other display formats

PIN CONFIGURATION



PACKAGE: 40-pin D.I.P.

SECTION V

GENERAL DESCRIPTION

The two chip combination of SMC's CRT 5047 and CRT 8002B-003 effectively provide all of the video electronics for a CRT terminal. This chip set along with a μC form the basis for a minimum chip count CRT terminal.

The CRT 5047 Video Timer and Controller is a special version of the CRT 5037 VTAC® which has been ROM-programmed with a fixed format. It is especially effective for low-cost CRT terminals using an 80 X 24 display format with a 5 X 7 character matrix. The use of a fixed ROM program in the CRT 5047 eliminates the software overhead normally required to specify the display parameters and simplifies terminal software design.

The Cursor Character Address Register and the Cursor Row Address Register are the only two registers accessible by the processor. The CRT 5047 is easily initialized by the following sequence of commands:

Reset Load Control Register 6 Start Timing Chain

The parameters of the CRT 5047 have been selected to be compatible with most CRT monitors. The horizontal timing is programmed so that when the two character skew delay of the CRT 8002 VDAC™ is taken into account, the effective timing is: Horizontal Front Porch—four characters, and Horizontal Back Porch—eight characters.

Figure 1 shows the contents of the internal CRT 5047 registers. Other mask-programmed versions of the CRT 5037 are available. Consult SMC for more information.

VTAC® WORK SHEET

1. H CHARACTER MATRIX (No. of Dots): . 5
2. V CHARACTER MATRIX (No. of Horiz. Scan Lines): 7
3. H CHARACTER BLOCK (Step 1 + Desired Horiz. Spacing = No. in Dots): .. 7
4. V CHARACTER BLOCK (Step 2 + Desired Vertical Spacing = No. in Horiz. Scan Lines): 9
5. VERTICAL FRAME (REFRESH) RATE (Freq. in Hz): 60
6. DESIRED NO. OF DATA ROWS: 24
7. TOTAL NO. OF ACTIVE "VIDEO DISPLAY" SCAN LINES (Step 4 x Step 6 = No. in Horiz. Scan Lines): 216
8. VERT. SYNC DELAY (No. in Horiz. Scan Lines): 16
9. VERT. SYNC (No. in Horiz. Scan Lines; T= 190.8 μs*): 3
10. VERT. SCAN DELAY (No. in Horiz. Scan Lines; T= 1.718 ms*): 27
11. TOTAL VERTICAL FRAME (Add steps 7 thru 10 = No. in Horiz. Scan Lines): ... 262
12. HORIZONTAL SCAN LINE RATE (Step 5 x Step 11 = Freq. in KHz): 15.720
13. DESIRED NO. OF CHARACTERS PER HORIZ. ROW: 80
14. HORIZ. SYNC DELAY (No. in Character Time Units; T = 3.817 μs**): 6
15. HORIZ. SYNC (No. in Character Time Units; T = 5.090 μs**): 8
16. HORIZ. SCAN DELAY (No. in Character Time Units; T = 3.817 μs**): 6
17. TOTAL CHARACTER TIME UNITS IN (1) HORIZ. SCAN LINE (Add Steps 13 thru 16): 100
18. CHARACTER RATE (Step 12 x Step 17 = Freq. in MHz): 1.572
19. CLOCK (DOT) RATE (Step 3 x Step 18 = Freq. in MHz): 11.004

*Vertical Interval **Horizontal Interval

REG. #	ADDRESS A3 A0	FUNCTION	BIT ASSIGNMENT	HEX.	DEC.
0	0000	HORIZ. LINE COUNT 100	0 1 1 0 0 0 1 1	63	99
1	0001	INTERLACE 0 H SYNC WIDTH 8 H SYNC DELAY 6	0 1 0 0 0 1 1 0	46	70
2	0010	SCANS/DATA ROW 9 CHARACTERS/ROW 80	X 1 0 0 0 1 0 1	45	69
3	0011	SKEW CHARACTERS 0,0 DATA ROWS 24	0 0 0 1 0 1 1 1	17	23
4	0100	SCANS/FRAME 262 X = 3	0 0 0 0 0 0 1 1	03	03
5	0101	VERTICAL DATA START = 3 + VERTICAL SCAN DELAY: SCAN DELAY 27 DATA START 30	0 0 0 1 1 1 1 0	1E	30
6*	0110	LAST DISPLAYED DATA ROW (= DATA ROWS)	X X	–	–

*Register 6 has an initialization option. It is loaded with the data contained in Register 3 by a "Load Register 6" command. The "Up Scroll" command can be used to effect scrolling operations.

Figure 1: CRT 5047 Mask Programmed Registers