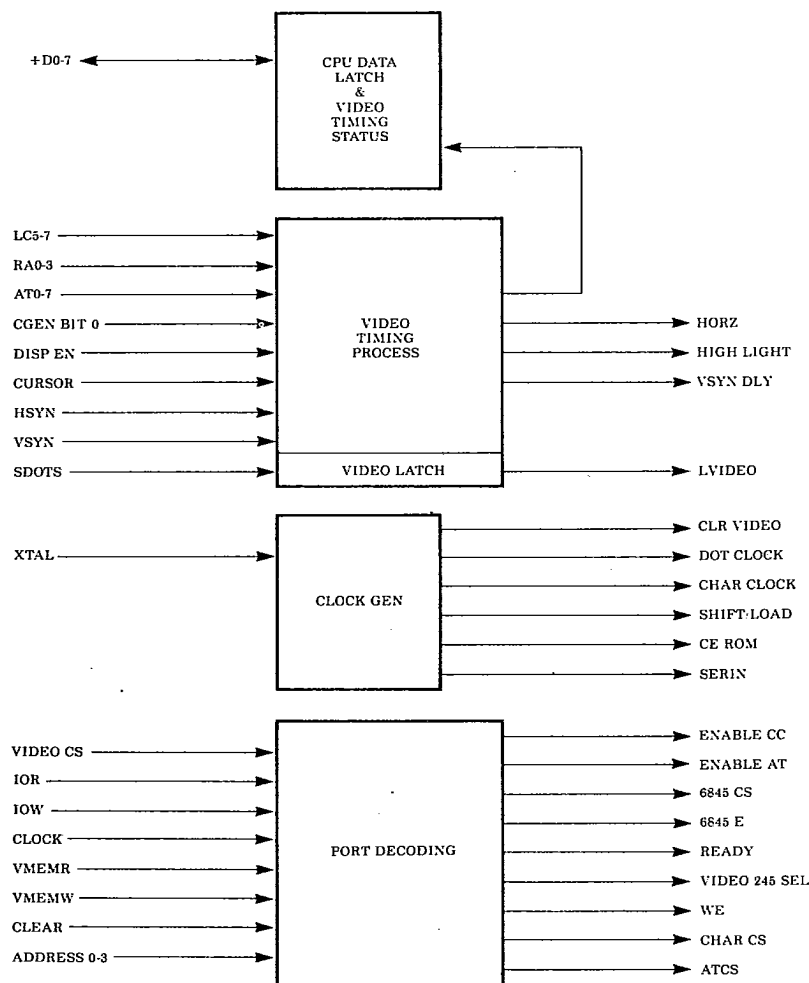


FARADAY

FE2200 FEATURES:

- Generates the CRT Display Controller Clock and Other Timing Signals
- Uses a Crystal or a TTL Signal for Frequency Source
- Incorporates Complete Attribute Decoding
- Provides I/O Channel Synchronization
- 68 Pin Leaded Surface Mount Package
- Single +5 Volts Supply
- CMOS

FE2200 MONOCHROME DISPLAY CONTROLLER



The FE2200 is a monochrome display controller containing logic to build an IBM PC compatible display adapter. The chip replaces the following components:

<u>Qty.</u>	<u>Type</u>		<u>Description</u>
1	74LS273	20 pin	Octal D - flipflops
5	74LS138	16 pin	3 to 8 Decoder
2	74LS174	16 pin	Hex D - flipflops
1	74S112	16 pin	Dual J-K flipflops
1	74LS139	16 pin	Dual 2 to 4 Decoder
3	74LS175	16 pin	Quad D - flipflops
1	74LS157	16 pin	Quad 2 to 1 Mux
1	74LS125	14 pin	Quad Bus Buffer Gates
2	74LS32	14 pin	Quad 2 input OR Gates
4	74LS08	14 pin	Quad 2 input AND Gates
3	74LS04	14 pin	Hex Inverters
2	74LS74	14 pin	Dual D - flipflops
1	74LS02	14 pin	Quad 2 input NOR Gates
1	74LS00	14 pin	Quad 2 input NAND Gates
1	74S86	14 pin	Quad 2 input XOR Gates
1	74LS10	14 pin	Triple 3 input NAND Gates
1	74S74	14 pin	Dual D - flipflops
1	74LS11	14 pin	Triple 3 input AND Gates
1	74S393	14 pin	Dual 4 bit Counters
1	74LS20	14 pin	Dual 4 input NAND Gates
1	74S11	14 pin	Triple 3 input AND Gates
1	74S32	14 pin	Quad 2 input OR Gates

1 - 20 pin chip
 13 - 16 pin chips
22 - 14 pin chips

Total Components Replaced 36

By utilizing the FE2200 you will:

- 1) lower assembly cost during manufacture
- 2) lower power requirements on the resultant board
- 3) attain higher quality and reliability due to having less total I. C. 's
- 4) reduce the size of a densely populated 4 layer board by at least 12 square inches.

C

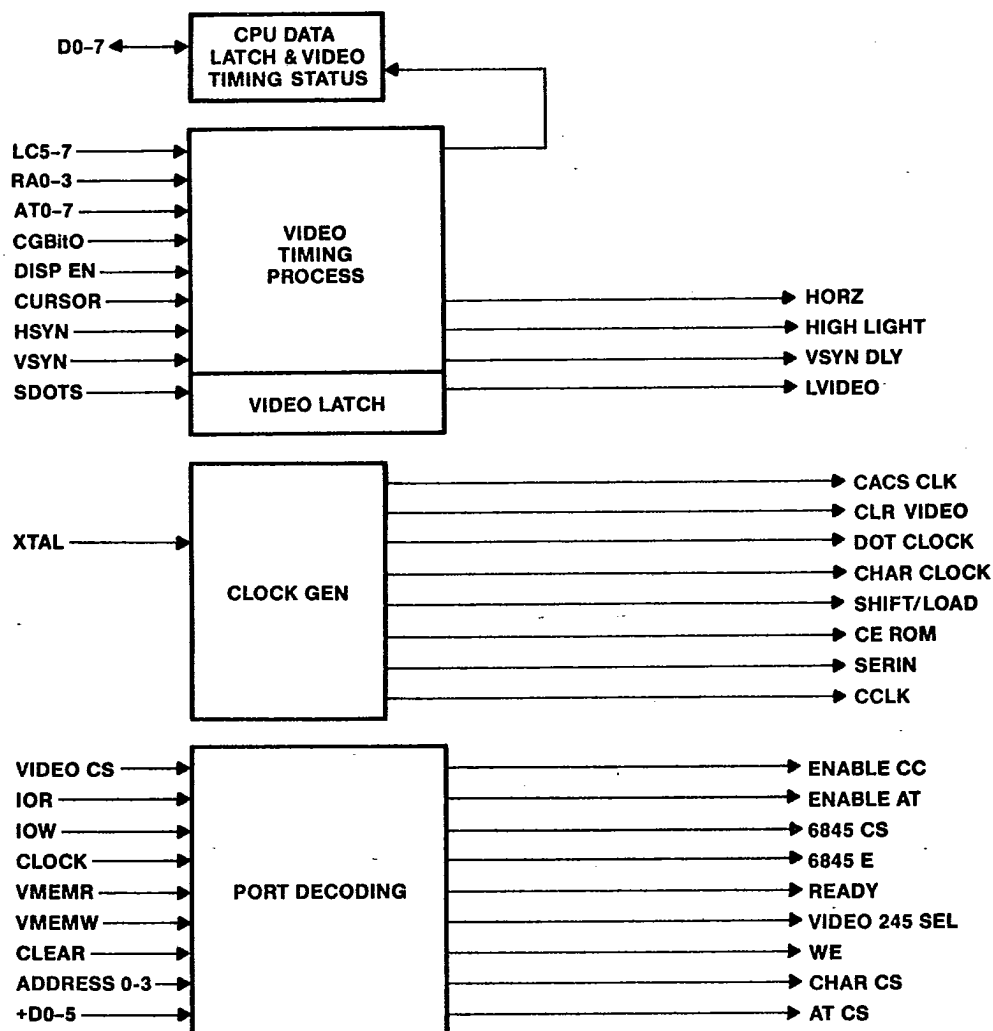
Faraday Monochrome Display Controller — FE2200

Features:

- Generates the CRT Display Controller Clock and Other Timing Signals.
- Uses a Crystal or a TTL Signal for Frequency Source
- Incorporates Complete Attribute Decoding
- Provides I/O Channel Synchronization
- 68 Pin Leaded Surface Mount Package
- Single +5 Volts Supply
- CMOS

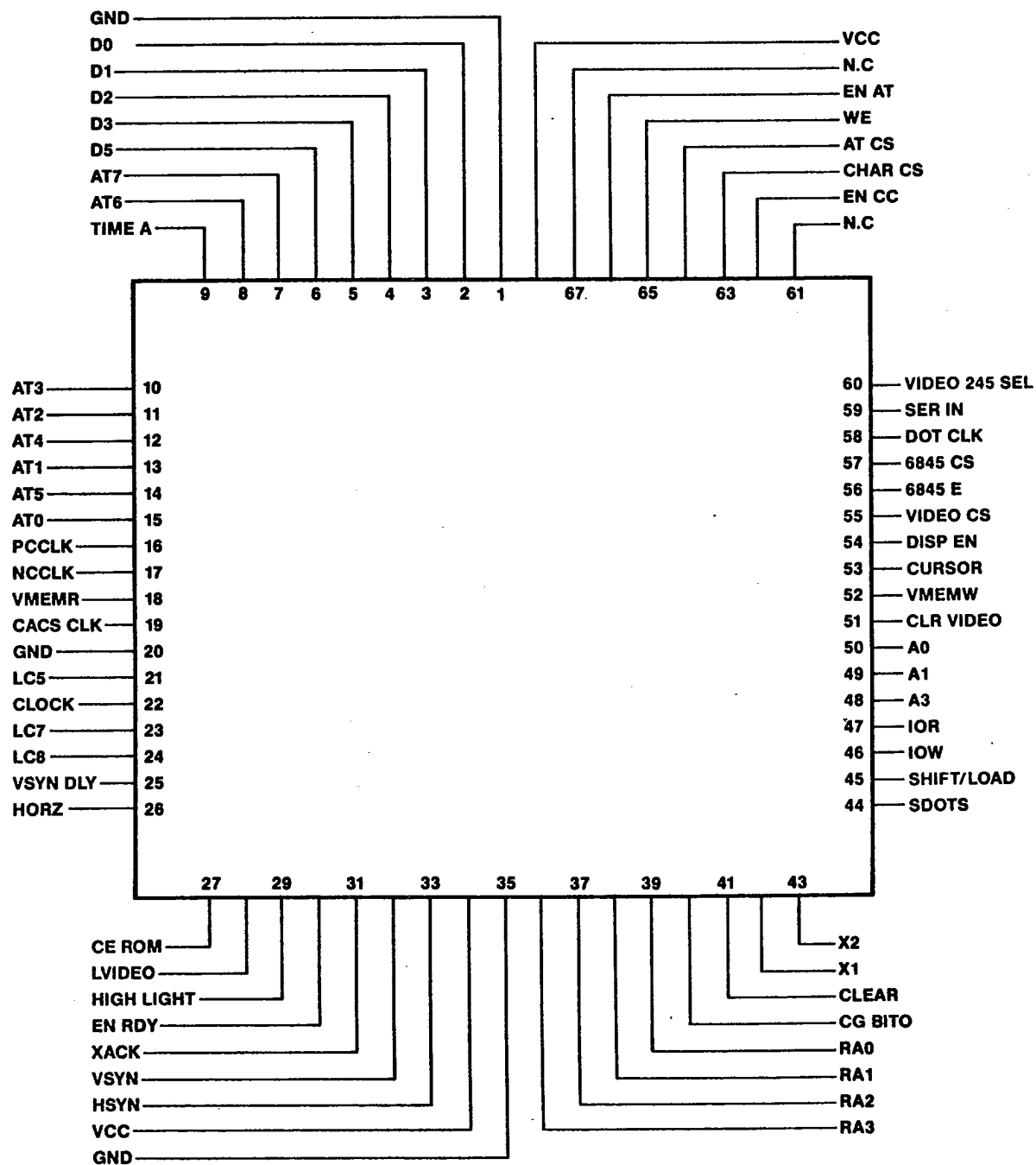
Faraday Monochrome Display Controller (FE2200) is a single chip with various control logic designed to build an IBM compatible monochrome display adapter. The chip is packaged in a 68 pin J-type lead surface mount and uses HCMOS technology. The chip carrier socket for this plastic chip carrier is available from Burndy (Part #QILE68P-408).

Figure: 1 FE2200 Block Diagram



Faraday Monochrome Display Controller — FE2200

Figure 2: Pin Diagram



Faraday Monochrome Display Controller — FE2200

Pin Description:

PIN	TYPE	SYMBOL	FUNCTION
1	—	GND	Ground
2	I/O	+D0	CPU data bus bit 0
3	I/O	+D1	CPU data bus bit 1
4	I/O	+D2	CPU data bus bit 2
5	I/O	+D3	CPU data bus bit 3
6	I/O	+D5	CPU data bus bit 5
7	I	+AT7	Attribute code bit 7
8	I	+AT6	Attribute code bit 6
9	O	+TIME A	Phase 5 clock source
10	I	+AT3	Attribute code bit 3
11	I	+AT2	Attribute code bit 2
12	I	+AT4	Attribute code bit 4
13	I	+AT1	Attribute code bit 1
14	I	+AT5	Attribute code bit 5
15	I	+AT0	Attribute code bit 0
16	O	+PCCLK	CRT controller cycle clock positive
17	O	-NCCLK	Inverted signal of PCCLK
18	I	-VMEMR	Video memory read
19	O	+CACS CLK	Video MEM address MUX select
20	—	GND	Ground
21	I	+LC5	Latched character to display bit 5
22	I	+CLOCK	System clock 4.77 MHz
23	I	+LC7	Latched character to display bit 7
24	I	+LC8	Latched character to display bit 8
25	O	-VSYN DLY	Vertical drive signal to display
26	O	+HORZ	Horizontal drive signal to display
27	O	-CEROM	Select line for character GEN PROM
28	O	+LVIDEO	Latched video signal to display
29	O	+HIGH LIGHT	High light control to display
30	O	-EN RDY	Tri-state enable line for I/O CH ready control to I/O bus
31	O	+XACK	Display adapter acknowledge to CPU
32	I	+VSYN	VSYNC signal from CRT controller chip
33	I	+HSYN	HSYNC signal from CRT controller chip
34	—	VCC	+5 volts supply
35	—	GND	Ground
36	I	+RA3	Refresh address bit 3 from CRT controller
37	I	+RA2	Refresh address bit 2 from CRT controller
38	I	+RA1	Refresh address bit 1 from CRT controller
39	I	+RA0	Refresh address bit 0 from CRT controller

Faraday Monochrome Display Controller — FE2200**Pin Description** (continued)

PIN	TYPE	SYMBOL	FUNCTION
40	I	+CGBIT0	CHAR generator PROM bit 0
41	I	-CLEAR	To initialize all the latches
42	I	+X1	Crystal input
43	O	-X2	Crystal output
44	I	+SDOTS	Display dot signal to video latch
45	O	+SHIFT/LOAD	Shift/LD PROM character code
46	I	-IOW	I/O write from CPU bus
47	I	-IOR	I/O read from CPU bus
48	I	+A3	Address bus bit 3
49	I	+A1	Address bus bit 1
50	I	+A0	Address bus bit 0
51	O	-CLR VIDEO	Clear display data register
52	I	-VMEMW	Video memory write
53	I	+CURSOR	Cursor control from CRT controller
54	I	+DISP EN	Display enable from CRT controller
55	I	-VIDEO CS	Video adapter IO Decode
56	O	+6845E	Enable line to CRT controller
57	O	-6845CS	Chip select to CRT controller
58	O	+DOT CLK	Display dot clock (16.257 MHz)
59	O	+SER IN	Serial data to display shift REG
60	O	-VIDEO 245 SEL	Gate video data on CPU bus
61	—	—	—
62	O	-EN CC	Enable character code to CPU bus
63	O	-CHAR CS	Select character code RAM
64	O	-AT CS	Select attribute code RAM
65	O	-WE	Write control to video RAM
66	O	-EN AT	Enable attribute code to CPU bus
67	O	—	—
68	—	VCC	+5 volts power supply

Faraday Monochrome Display Controller — FE2200

Programming:

CRT Output Port (Write)

VIDEOCS	A3	A1	A0	IOW	DATA BUS
0	0	0	0	0	D0-D7

Bit #	Function
0	Not used
1	Not used
2	Not used
3	+Video enable
4	Not used
5	+Enable blink
6,7	Not used

CRT Status Port (Read)

VIDEOCS	A3	A1	A0	IOR	DATA BUS
0	0	1	0	0	D0-D7

Bit #	Function
0	+Horizontal drive
1	Not used
2	Not used
3	+B/W video
4-7	Not used

Faraday Monochrome Display Controller — FE2200

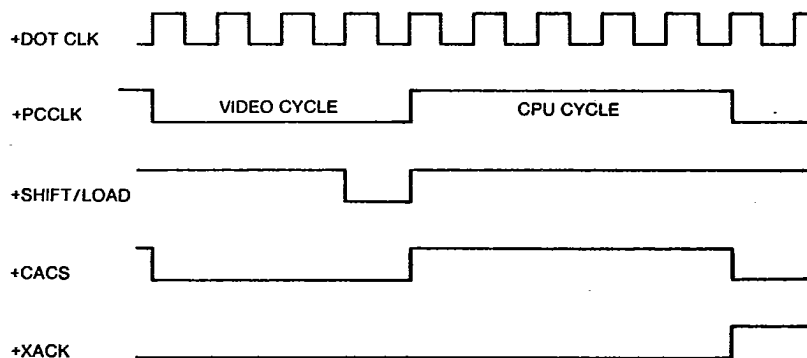
Temperature 0C to 70C

Supply Voltage

Minimum	Nominal	Maximum
4.75 V	5.00 V	6.00 V

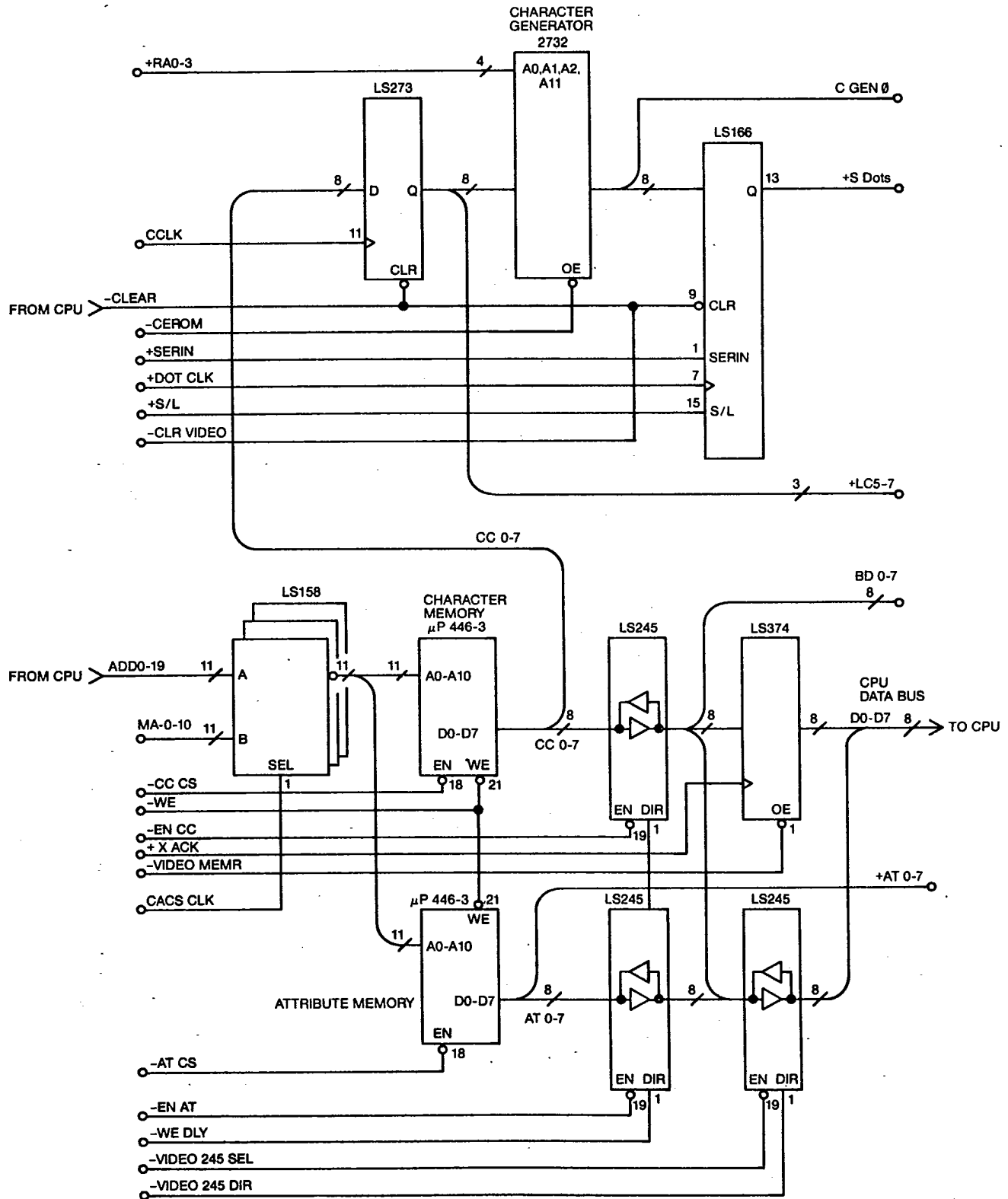
All inputs and outputs are TTL compatible.

Signals	Timings		
	Minimum nsec	Typical nsec	Maximum nsec
DOT CLK fall time			10
DOT CLK rise time			10
DOT CLK high	25		35
DOT CLK period		61	
DOT CLK $\rightarrow$ to SHIFT/LOAD $\rightarrow$			30
DOT CLK $\rightarrow$ to SHIFT/LOAD $\rightarrow$			30
DOT CLK $\rightarrow$ to XACK $\rightarrow$			37
DOT CLK $\rightarrow$ to WE $\rightarrow$			30
DOT CLK $\rightarrow$ to CCLK $\rightarrow$			35
DOT CLK $\rightarrow$ to CCLK $\rightarrow$			30
DOT CLK $\rightarrow$ to LVIDEO $\rightarrow$			10
CCLK high	271	276	281
CCLK $\rightarrow$ to CLEAR $\rightarrow$			25
CCLK $\rightarrow$ to HORZ $\rightarrow$			30
CCLK $\rightarrow$ to HORZ $\rightarrow$			30
CCLK $\rightarrow$ to CACS CLK $\rightarrow$			16
IOR $\rightarrow$ to VIDEO 245 SEL $\rightarrow$			38
IOR $\rightarrow$ to VIDEO 245 SEL $\rightarrow$			33
IOR $\rightarrow$ to EN RDY $\rightarrow$			35
IOR $\rightarrow$ to D0-D5			83
IOW $\rightarrow$ to VIDEO 245 SEL $\rightarrow$			38
VMEMR $\rightarrow$ to EN RDY $\rightarrow$			36
VIDEO CS $\rightarrow$ to VIDEO 245 SEL $\rightarrow$			30
VIDEO CS $\rightarrow$ to VIDEO 245 SEL $\rightarrow$			33
VIDEO CS $\rightarrow$ to EN RDY $\rightarrow$			40
MEMR $\rightarrow$ to EN RDY $\rightarrow$			36



Faraday Monochrome Display Controller — FE2200

Video (Sheet 1 of 2)



Faraday Monochrome Display Controller — FE2200

Video (Sheet 2 of 2)

