

DISPLAY MONITOR DIVISION  
AVC COMPANY  
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.

1998.10.20  
REV-005

ENGINEERING SPECIFICATIONS (TENTATIVE)

**TX-D9L51NMF ( HL4F 19" ) DIGITAL MULTI-SCAN CHASSIS**

- <FEATURES>
- (1) STEREO SPEAKERS FOR HIGH QUALITY STEREO SOUND
  - (2) USB HUB IN THE PEDESTAL ( UPSTREAM ; 2 , DOWNSTREAM ; 4 )
  - (3) 1280 x1024 RESOLUTION MAX. WITH EQUIVALENT OF 16.78 MILLION COLORS
  - (4) MULTI-SCANNING FROM 30kHz TO 82kHz
  - (5) HIGH CONTRAST WITH 200:1, HIGH BRIGHTNESS WITH 200 cd/m<sup>2</sup>
  - (6) WIDE VIEWING ANGLE ( R/L : +-80Deg., UP : 80Deg., DOWN : 80Deg.)
  - (7) FAST RESPONSE ( 50ms ) SUITABLE FOR MOTION PICTURES
  - (8) ON-SCREEN DISPLAY CONTROL ( 5 LANGUAGES )
  - (9) FULL-SCREEN DISPLAY FROM VGA THROUGH SXGA
  - (10) CLEAR CHARACTERS AND GRAPHICS BY ORIGINAL PIXEL TRANSFORMATION
  - (11) BACKLIGHT WITH A LIFE SPAN OF 50,000 HOURS ( TYP. )
  - (12) UPGRADED AUTO SIZE FUNCTION

- [1] PANEL : TYPE 19.0" IPS TFT Active Matrix, Pixel Pitch 0.294mm  
 COLOR FILTER RGB Vertical Stripe  
 SURFACE Anti-Glare Hard Coat  
 OPTICAL RESPONSE 50ms ( typ. )  
 CONTRAST RATIO 200 : 1 ( typ. )
- [2] INPUT SIGNAL VIDEO RGB Analog ( 75 Ohms, 0.7 - 1.0Vp-p )  
 SYNC H/V Separate (TTL), Sync-on-Green  
 fH = 30 - 82kHz, fV = 50 - 77Hz  
 PRESET MODES 1280 x 1024 ( Non-I/L ) ,etc. / Factory : 16 USER : 16  
 AUDIO 2.0 Vrms (.max.) ( 180 kohms typ. )
- [3] CONNECTOR : VIDEO IN 15Pin mini D-Sub x 2 ( IBM PS/2 Compatible ) <Rear>  
 AUDIO IN Dia.3.5mm Mini Jack ( stereo ) x 2 <Rear>  
 HEADPHONE OUT Dia.3.5mm Mini Jack ( stereo ) <Front>  
 USB Upstream : 2, Downstream : 4 <Pedestal>  
 POWER ( USB ) Jack x 2 <Rear, Pedestal>  
 POWER ( Monitor ) 3-Pin Plug ( CEE22 ) <Rear>
- [4] POWER : VOLTAGE 90 - 132, 198 - 264Vac ( Auto-switching )  
 CONSUMPTION TBD W ( typ. )  
 POWER SAVE VESA STANDARD ( DPMS ) Suspend/>=3W, Off/>=3W
- [5] CONTROL : FRONT Power On/Off, Audio Volume ( Up and Down ), Audio Mute, Auto  
 OSD Contrast, Brightness, Backlight, H/V Position, Color,  
 Video Level, Recall, Disp Frequency, Language, Resolution  
 Phase, Clock, Auto Size, OSD Position, Aspect  
 Picture, Gamma Compensation, Peaking, Volume, Mute, Surround  
 Bass, Treble, Input Select, USB Select, Audio Select
- [6] MAX. BRIGHTNESS : 200 cd/m<sup>2</sup> ( typ. ) 'at White Flat Field
- [7] DISPLAY AREA : 376(H) x 301(V) mm ( typ. )
- [8] OPERATING TEMPERATURE 0 - 35Deg. C  
 CONDITION : HUMIDITY 5 - 90% ( Non-condensation )
- [9] DIMENSION : 447 (W) x 459 (H) x 240 (D) mm ( typ. )
- [10] WEIGHT : 13 kg ( typ. ) ( Net )
- [11] SAFETY/REGULATIONS : UL, CSA, TUV/GS, NORDIC, FCC-B, IC-B, CISPR-B  
 MPR II, CE,TCO'92/'95 ( optional )
- [12] AUDIO : 1W x 2 Speakers ( optional )  
 Upstream : 2, Downstream : 4 ( optional )

6.3 STANDARD TIMING

Following 16 modes are reserved in the memory as standard timings at the factory. But the best adjustment conditions are different due to the characteristics of each video board in your Computer. Please re-adjust for your Computer.

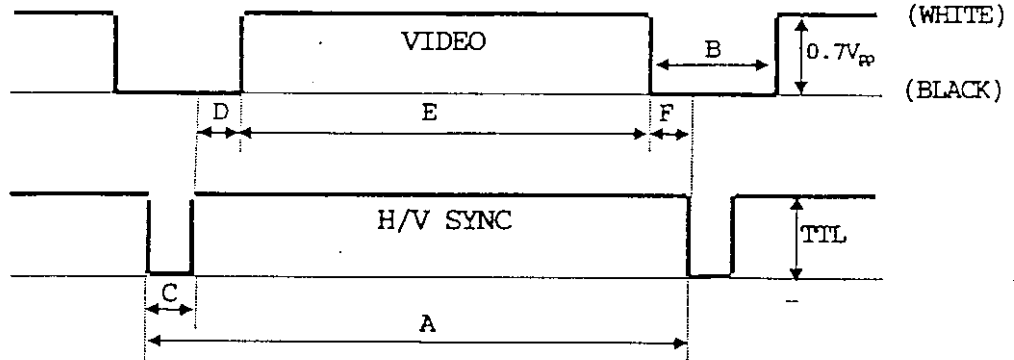
Fig-1 shows a definition of timing and signal level.

Electrical performance is specified based on 1280x1024 mode unless otherwise mentioned.

Fig-1:TIMING CHART

< HORIZONTAL / VERTICAL >

- A: Period
- B: Blanking
- C: Sync Width
- D: Back Porch
- E: Active
- F: Front Porch



RESERVATION TIMING

		MODE 1	MODE 2	MODE 3	MODE 4
		VGA480(Industry STD) 640x480 @60Hz	VGA400(Industry STD) 640x400 @70Hz	MAC 13 640x480 @67Hz	VESA Standard 640x480 @75Hz
DOT CLOCK		25.1745MHz	25.1745MHz	30.2410MHz	31.5000MHz
	fh	31.4681kHz	31.4681kHz	35.0012kHz	37.500kHz
H	A-Period	31.778 us( 800 dots)	31.778 us( 800 dots)	28.570 us( 864 dots)	26.667 us( 840 dots)
O	B-Blanking	6.355 us( 160 dots)	6.355 us( 160 dots)	7.407 us( 224 dots)	6.350 us( 200 dots)
R	C-Sync width	3.813 us( 96 dots)	3.813 us( 96 dots)	2.083 us( 63 dots)	2.032 us( 64 dots)
I	D-Back porch	1.907 us( 48 dots)	1.907 us( 48 dots)	3.241 us( 98 dots)	3.810 us( 120 dots)
Z	E-Active	25.423 us( 640 dots)	25.423 us( 640 dots)	21.163 us( 640 dots)	20.317 us( 640 dots)
	F-Front porch	0.636 us( 16 dots)	0.636 us( 16 dots)	2.083 us( 63 dots)	0.508 us( 16 dots)
	fv	59.9393Hz	70.0849Hz	66.6689Hz	75.000Hz
V	A-Period	16.684 ms( 525 lines)	14.268 ms( 449 lines)	15.000 ms( 525 lines)	13.333 ms( 500 lines)
E	B-Blanking	1.430 ms( 45 lines)	1.557 ms( 49 lines)	1.286 ms( 45 lines)	0.533 ms( 20 lines)
R	C-Sync width	0.064 ms( 2 lines)	0.064 ms( 2 lines)	0.086 ms( 3 lines)	0.080 ms( 3 lines)
T	D-Back porch	1.049 ms( 33 lines)	1.112 ms( 35 lines)	1.114 ms( 39 lines)	0.427 ms( 16 lines)
	E-Active	15.254 ms( 480 lines)	12.711 ms( 400 lines)	13.714 ms( 480 lines)	12.800 ms( 480 lines)
	F-Front porch	0.318 ms( 10 lines)	0.381 ms( 12 lines)	0.086 ms( 3 lines)	0.027 ms( 1 lines)
Sync polarity (H/V)		Negative / Negative	Negative / Positive	Negative / Negative	Negative / Negative

Note :The aspect ratio of MODE 2 is not 4:3, but display image of these timings is expanded into the full size(Aspect Ratio 4:3).

## RESERVATION TIMING

		MODE 5	MODE 6	MODE 7	MODE 8
		VESA Standard 300x500 455Hz	VESA Proposal: SVGA 300x600 460Hz	VESA Proposal 300x500 475Hz	MAC15 332x524 475Hz
DOT CLOCK		36.000MHz	40.000MHz	49.500MHz	57.2832MHz
FH		35.1562kHz	37.8788kHz	46.875kHz	49.7250kHz
H	A-Period	28.444 us(1024 dots)	26.400 us(1056 dots)	21.333 us(1056 dots)	20.111 us(1152 dots)
O	B-Blanking	6.222 us( 224 dots)	6.400 us( 256 dots)	5.171 us( 256 dots)	5.587 us( 320 dots)
R	C-Sync width	2.000 us( 72 dots)	3.200 us( 128 dots)	1.616 us( 80 dots)	1.117 us( 64 dots)
I	D-Back porch	3.556 us( 128 dots)	2.200 us( 88 dots)	3.232 us( 160 dots)	3.910 us( 224 dots)
Z	E-Active	22.222 us( 800 dots)	20.000 us( 800 dots)	16.162 us( 800 dots)	14.524 us( 832 dots)
	F-Front porch	0.667 us( 24 dots)	1.000 us( 40 dots)	0.323 us( 16 dots)	0.559 us( 32 dots)
fV		56.250Hz	60.3165Hz	75.0000Hz	74.5502Hz
V	A-Period	17.778 ms( 625 lines)	16.579 ms( 628 lines)	13.333 ms( 625 lines)	13.414 ms( 667 lines)
E	B-Blanking	0.711 ms( 25 lines)	0.739 ms( 28 lines)	0.533 ms( 25 lines)	0.865 ms( 43 lines)
	C-Sync width	0.057 ms( 2 lines)	0.106 ms( 4 lines)	0.064 ms( 3 lines)	0.060 ms( 3 lines)
R	D-Back porch	0.626 ms( 22 lines)	0.607 ms( 23 lines)	0.448 ms( 21 lines)	0.784 ms( 39 lines)
T	E-Active	17.067 ms( 600 lines)	15.840 ms( 600 lines)	12.800 ms( 600 lines)	12.549 ms( 624 lines)
	F-Front porch	0.028 ms( 1 lines)	0.026 ms( 1 lines)	0.021 ms( 1 lines)	0.020 ms( 1 lines)
Sync polarity (H/V)		Positive / Positive	Positive / Positive	Positive / Positive	Negative / Negative

		MODE 9	MODE 10	MODE 11	MODE 12
		VESA Standard 1024x768 460Hz	VESA Standard 1024x768 470Hz	1024x768 472Hz	VESA Standard 1024x768 475Hz
DOT CLOCK		65.000MHz	75.000MHz	65.000MHz	75.000MHz
FH		48.3631kHz	56.4759kHz	57.8703kHz	60.0229kHz
H	A-Period	20.677 us(1344 dots)	17.707 us(1328 dots)	17.280 us(1296 dots)	16.660 us(1312 dots)
O	B-Blanking	4.923 us( 320 dots)	4.054 us( 304 dots)	3.627 us( 272 dots)	3.657 us( 288 dots)
R	C-Sync width	2.092 us( 136 dots)	1.813 us( 136 dots)	1.920 us( 144 dots)	1.219 us( 96 dots)
I	D-Back porch	2.462 us( 160 dots)	1.920 us( 144 dots)	1.387 us( 104 dots)	2.235 us( 176 dots)
Z	E-Active	15.754 us(1024 dots)	13.653 us(1024 dots)	13.653 us(1024 dots)	13.003 us(1024 dots)
	F-Front porch	0.369 us( 24 dots)	0.320 us( 24 dots)	0.320 us( 24 dots)	0.203 us( 16 dots)
fV		60.0038Hz	70.0694Hz	71.7978Hz	75.0286Hz
V	A-Period	16.666 ms( 806 lines)	14.272 ms( 806 lines)	13.928 ms( 806 lines)	13.328 ms( 800 lines)
E	B-Blanking	0.786 ms( 38 lines)	0.673 ms( 38 lines)	0.657 ms( 38 lines)	0.533 ms( 32 lines)
	C-Sync width	0.124 ms( 6 lines)	0.106 ms( 6 lines)	0.104 ms( 6 lines)	0.050 ms( 3 lines)
R	D-Back porch	0.600 ms( 29 lines)	0.513 ms( 29 lines)	0.501 ms( 29 lines)	0.466 ms( 28 lines)
T	E-Active	15.880 ms( 768 lines)	13.599 ms( 768 lines)	13.271 ms( 768 lines)	12.795 ms( 768 lines)
	F-Front porch	0.062 ms( 3 lines)	0.053 ms( 3 lines)	0.052 ms( 3 lines)	0.017 ms( 1 lines)
Sync polarity (H/V)		Negative / Negative	Negative / Negative	Negative / Negative	Positive / Positive

## RESERVATION TIMING

		MODE 13	MODE 14	MODE 15	MODE 16
		MAC 19 1024x768 375Hz	APPLE-21 1152x870 475Hz	1280x1024 460Hz	VESA Standard 1280x1024 375Hz
DOT CLOCK		80.0000MHz	100.0000MHz	108.0000MHz	135.0000MHz
fH		60.241kHz	68.681kHz	63.9810kHz	79.97631kHz
H	A-Period	16.600 us(1328 dots)	14.560 us(1456 dots)	15.630 us(1688 dots)	12.504 us(1688 dots)
O	B-Blanking	3.800 us( 304 dots)	3.040 us( 304 dots)	3.777 us( 408 dots)	3.023 us( 408 dots)
R	C-Sync width	1.200 us( 96 dots)	1.280 us( 128 dots)	1.037 us( 112 dots)	1.067 us( 144 dots)
I	D-Back porch	2.200 us( 176 dots)	1.440 us( 144 dots)	2.296 us( 248 dots)	1.837 us( 248 dots)
Z	E-Active	12.800 us(1024 dots)	11.520 us(1152 dots)	11.852 us(1280 dots)	9.481 us(1280dots)
	F-Front porch	0.400 us( 32 dots)	0.320 us( 32 dots)	0.444 us( 48 dots)	0.119 us( 16 dots)
fV		74.927Hz	75.062Hz	60.0190Hz	75.0247Hz
V	A-Period	13.346 ms( 804 lines)	13.322 ms( 915 lines)	16.661 ms(1066 lines)	13.329 ms(1066 lines)
E	B-Blanking	0.597 ms( 36 lines)	0.656 ms( 45 lines)	0.657 ms( 42 lines)	0.526 ms( 42 lines)
R	C-Sync width	0.049 ms( 3 lines)	0.044 ms( 3 lines)	0.047 ms( 3 lines)	0.038 ms( 3 lines)
T	D-Back porch	0.498 ms( 30 lines)	0.568 ms( 39 lines)	0.594 ms( 30 lines)	0.475 ms( 38 lines)
	E-Active	12.749 ms( 768 lines)	12.667 ms( 870 lines)	16.005 ms(1024 lines)	12.804 ms(1024 lines)
	F-Front porch	0.049 ms( 3 lines)	0.044 ms( 3 lines)	0.016 ms( 1 lines)	0.013 ms( 1 lines)
Sync polarity (H/V)		Negative / Negative	Negative / Negative	Positive / Positive	Positive / Positive