Customer Specification

HL1916

19 Inch LCD Display

Name	Department/Title	Date	Signature
Cheng HuanJun	SSME CT PL		
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CONTENTS

Federal Communications Commission (FCC) Statement

You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment

FCC- Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a communications. However, there is no guarantee that interference will not occur in particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- **Reorient or relocate the receiving antenna.**
- **Increase the separation between the equipment and receiver.**
- **Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.**
- **Consult the dealer or an experienced radio/TV technician for help.**

1. SCOPE

This document defines the performance requirements for a 19.0-inch TFT LCD color monitor for medical use. This product is controlled by model name; any change will be recorded in the list and confirmed by SIEMENS MED.

This high-resolution color display is specifically designed to meet the rigorous performance standards needed for diagnostic, interventional radiology, and other medical applications. To guarantee image integrity, features include accurate signal conversion and a wide range of interfacing options.

This monitor is factory calibrated to achieve DICOM part 3.14 compliance and Gamma CIE at the factory set point. The luminance stabilization circuit employs a built in photo sensor to keep the back-light lamps at a constant luminance for consistent calibration over the life of the display and can control the back light system automatically to extend the life of the monitor and achieve very short warming up time.

The surface of the monitor has an anti-glare coating to minimize reflection and a hard coating to reduce scratch.

With the deliberate designed bracket the monitor can stick on the desktop firmly.

2. ELECTRICAL PERFORMANCE

2.1 Power Supply

-Input Voltage	: AC100-240 ± 10%
- Current (max)	: 0.25A(AC220-240V); 0.55A(AC100-120V)
- Frequency	: 50/60Hz ± 3Hz
- Power Consumption	: <54W

2.2 Power Management

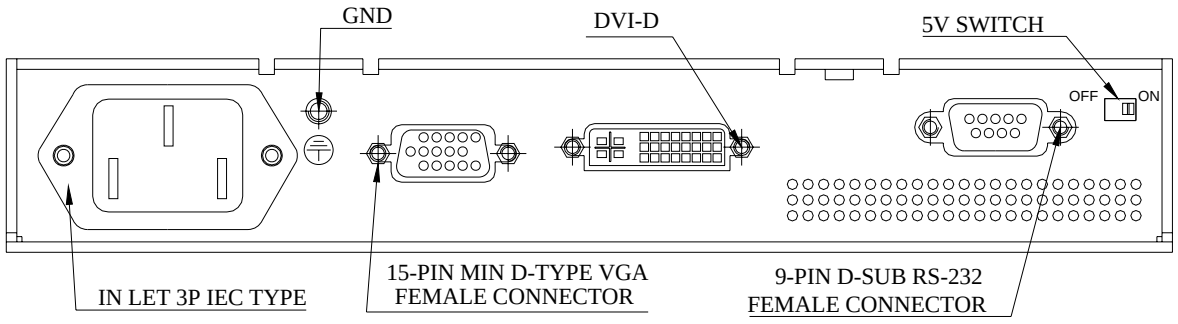
Power Management condition and status for ANALOG Input mode

State	SIGNALS			Power	LED
	Horizontal	Vertical	Video	Consumption	Status
ON	ON	ON	Active	<54W	Green
	OFF	ON	Blanked		Orange
Active off	ON	OFF	Blanked	<2W	Orange
	OFF	OFF	Blanked		Orange

Power Management condition and status for DIGITAL Input mode

State	SIGNALS				Power	LED
	DE	Horizontal	Vertical	Video	Consumption	Status
ON	Pulses	ON	ON	Active	<54W	Green
Active off	NO Pulses	N/A	N/A	Blanked	<2W	Orange

2.3 Signal Interface



2.3.1 Signal Specifications

Item		SPEC
Signal Input (Analog) D-SUB	Frequency	Analog: H 30 ~ 82kHz V 50 ~ 85Hz
	Pixel clock	25--165MHz
	Video Input	Analog 0.7Vpp Input Impedance 75 Ohm
	Signal Input	Separate Sync, TTL (N or P)
CVS Signal		Video Level: 0.5---1.0V Sync level: 0.2---0.3V
DVI-I Input		Via DVI-I to VGA connector
DVI-D Input		DVI-Digital DDC via DVI

2.3.2 D-SUB Connector and Pin Assignment (Figure1)

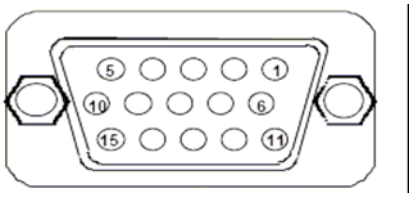


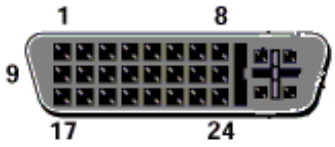
Figure 1

15-pin Min D-type Female Connector

Table 1

Pin - Assignment of 15-pin D-sub:					
1	Red Video	6	Red Ground	11	Monitor Ground
2	Green Video	7	Green Ground	12	DDC-Serial Data
3	Blue Video	8	Blue Ground	13	H-Sync.
4	N/C	9	NC	14	V-Sync.
5	GND	10	Logic Ground	15	DDC-Serial Clock

2.3.3 Digital Visual Interface and Pin Assignment (DVI)



DVI-D Receptacle Connector

Figure 2

29-pin DVI-D Female Connector

Table 2

Pin - Assignment of 29-pin DVI-D/DVI-I Female Connector		
Pin 1 - TMDS Data 2-	Pin 12 - TMDS Data 3-	Pin 22 - TMDS Clock Shield
Pin 2 - TMDS Data 2+	Pin 13 - TMDS Data 3+	Pin 23 - TMDS Clock+
Pin 3 - TMDS Data 2/4 Shield	Pin 14 - +5 V Power	Pin 24 - TMDS Clock-
Pin 4 - TMDS Data 4-	Pin 15 – Ground	
Pin 5 - TMDS Data 4+	Pin 16 - Hot Plug Detect	
Pin 6 - DDC Clock	Pin 17 - TMDS Data 0-	
Pin 7 - DDC Data	Pin 18 - TMDS Data 0+	
Pin 8 - Analog Vertical Sync	Pin 19 - TMDS Data 0/5 Shield	
Pin 9 - TMDS Data 1-	Pin 20 - TMDS Data 5-	
Pin 10 - TMDS Data 1+	Pin 21 - TMDS Data 5+	
Pin 11 - TMDS Data 1/3 Shield		

2.3.4 Control Interface

Beside the OSD, we also support RS-232 interface to update and control the monitor by software. When the monitor is connected with a CT or other iatrical diagnosis instruments, we provide additional interface for the service technician to get the status of the monitor and update software. When use RS-232 for software update, first put 5V switch (near the RS-232 input) to on position. And then load the soft ware from computer. After complete software update, slide the switch to off position. And then power off the monitor. Power on again the software update is completed.

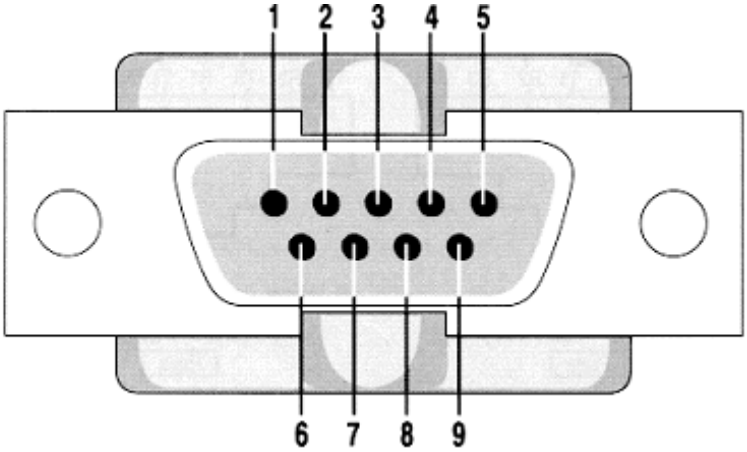


Figure 3 Female 9-PIN D-SUB connector

Table3

Pin	Signal	Pin	Signal
1	Data Carrier Detect	6	Data Set Ready
2	Received Data	7	Request to Send
3	Transmitted Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicator
5	Signal Ground		

2.4 Product Features

Item			Specification	
			Analog Input	Digital Input
LCD	Panel Module		LG.PHILIPS LM190E05-SL02	
	Size		19.0” (48 cm diagonal)	
	Active Display Area		376.32 (H) x 301.056 (V) mm	
	Resolution		1280 x 1024 dots (SXGA)	
	Pixel Pitch		0.294(H) x 0.294(V) mm	
	Color Depth		16.7M true 8 bit	
	Luminance		280 cd/m2 (typical); 230cd/m2 (min.)	
	Viewing Angle (Type.)	CR>10	H	L 89 degree
				R 89 degree
			V	H 89 degree
				L 89 degree
	Contrast Ratio		600:1 (typical); 400:1 (min.)	
	Back Light		CCFL x 6pcs.	
Input Signals	Horizontal frequency		31kHz -82kHz	31kHz -82kHz
	Vertical frequency		50.0Hz - 85.0 Hz (Non-Interlaced)	50.0Hz - 85.0 Hz (Non-Interlaced)
	Video Signal		Analog RGB	Digital RGB
	Sync. Signal		Separate Sync. (TTL) Composite Sync. Sync on green	TMDS
	Pixel Clock		25.0MHz -165.0MHz	25.0MHz -165.0MHz
	Input connector		Mini D-sub 15Pin	DVI-I (D) & DVI-D
Preset Timings			Factory preset: 39 / User preset: 10 *	
Functions	Control key		Select, up, down, exit	
	OSD		Backlight Brightness, Contrast, Color control, Position, Size, Phase, Gamma, etc.	
Regulations	Safety		IEC60601-1, CCC	
	EMC		IEC60601-1-2	
	Power Management		VESA DPMS, EPA,	

	Plug and Play		VESA DDC2B
Environment Condition	Temperature		5-40 degree C
	Humidity		30-80% (without condensation)
Power Supply	Input Voltage		AC100-240V, 50 / 60Hz; <0.5A
	Power Consumption	Normal operation	<54W
		Power saving	<2W
	Input Connector		3P IEC Type
VESA compatible arm mounting interface			100mm x 100mm
Height up/down			60mm—80mm (around)
Tilt adjust			Up & Down –5--15 degree
Accessories	AC Power cord (Extension Type)		3.0 m
	Signal Cable		3.0 m: D-sub15pin VGA; 3.0 m: DVI-D
	Others		User's manual, DVI-I to VGA connector

- Remark: The monitor shall recognize preset modes within a range of ±1KHz for horizontal and ±1Hz for vertical. (See appendix 1)

2.5 Screen Performance

2.5.1 Standard Testing Conditions

- Warm up time **≥ 20 minutes.**
- AC supply voltage **100-240VAC, 50/60Hz**
- Ambient temperature **20°C -25°C**
- Relative Humidity **30% --80%**
- Video signal **1280 x 1024 @ 60Hz; DVI-D**
- Ambient Environment **Dark**
- Setting **Set to Gamma CIE factory preset**
- Luminance meter **Minolta CA-210**

2.5.2 Brightness

- Factory Preset (Gamma CIE) : Lmin = 0.36+0.15/-0.1 cd/m²

  Lmax = 137+5/-5 cd/m²

- Factory Preset (DICOM) : Lmin = 0.45+0.15/-0.1 cd/m²

  Lmax = 137+5/-5 cd/m²

Max. Brightness: ≥230cd/m2 (adjust CCFL, Contrast and Brightness to Maximum)

- Test Condition: White Luminance (L_{max}) is defined as a luminance of L255 Gray Level at the center point on LCD surface. Also Black Luminance (L_{min}) is defined as a Luminance of L0 Gray level at the center point on LCD surface. (See Note 1 Note 4)

2.5.3 View angle

Left/Right and Up/Down typical 178 degree (CR≥10) (Note 2)

2.5.4 Brightness Uniformity

Deviation less than 20% (Note 5)

Comply with DIN6868-57 Class B

2.5.5 Contrast radio

Over 400:1 (note 3)

2.5.6 White Color Coordinates

X=0.313 ± 0.03

Y=0.329 ± 0.03

(Note 7)

2.5.7 Response Time

Typical (Tr+Td): 18ms (Note 6)

2.5.8 Color Gray

64 gray level should seen clearly

256 gray levels should be seen smoothly

2.5.9 Gamma Curve

Within ± 10% tolerance of calculated value

Factory Preset gamma value: Gamma CIE; DICOM; Gamma 2.0; 2.2; 2.4; NATIVE

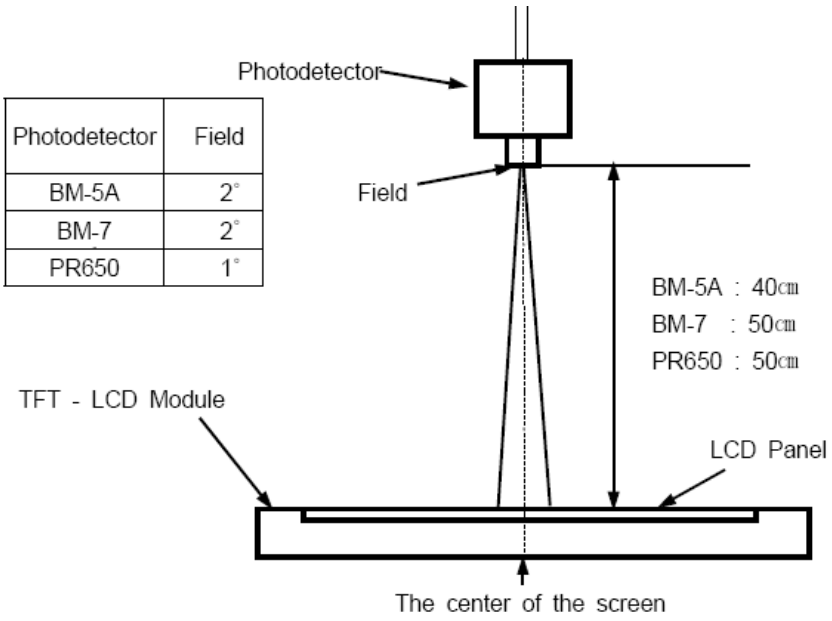
(Gamma CIE is default setting)

Note1: Test Equipment Setup

The measurement should be executed in a stable, windless and dark room between 20 minutes after the backlight at the given temperature for stabilization of the backlight. This should be measured in the center of screen. Test equipment should be equivalent with the following equipment.

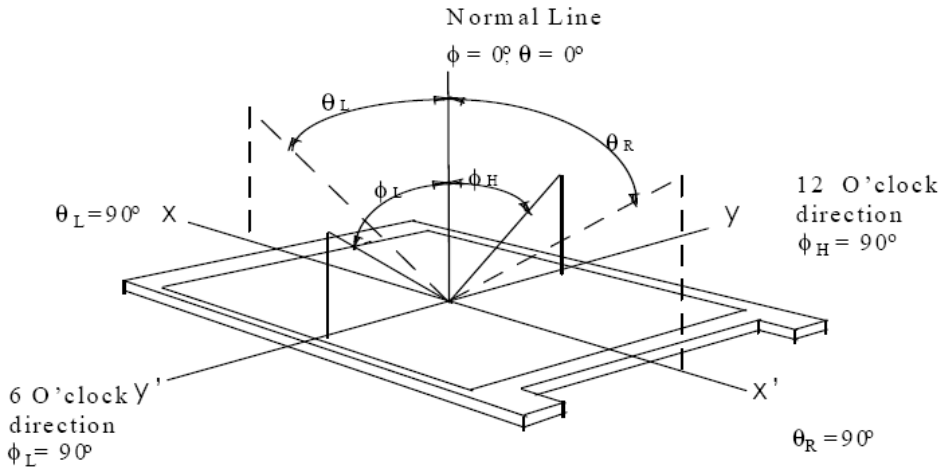
Environment condition: Ta=25**±2°C**

Photodetector	Field
BM-5A	2°
BM-7	2°
PR650	1°



Optical Measuring Equipment Setup

Note2: Viewing angle is measured as follow:



Note 3: Definition of contrast Ratio (CR):

Ratio of gray max (Gmax) & gray min (Gmin) at the center point of the panel.

$$CR = \frac{G\max}{G\min}$$

Gmax: Luminance with all pixels white

Gmin: Luminance with all pixels black

Note 4: Definition of Luminance of White: Luminance of white at center point.

Note 5: Definition of brightness uniformity

$$Buni = 100 * \frac{(B\max - B\min)}{B\max}$$

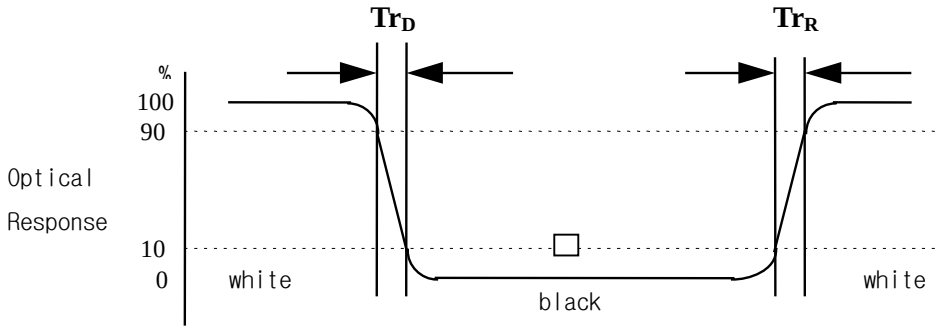
Bmax: Maximum brightness

Bmin: minimum brightness

Note 6: Definition of response time is as follows:

Sum of TrD, TfR

When the display data is changed from white to black, response time is measured



Note 7: Definition of Color Chromaticity (CIE 1931)

Color coordinate of Red , Green, Blue & White at center point .

3. OPERATING GUIDE

3.1 Keys assignment

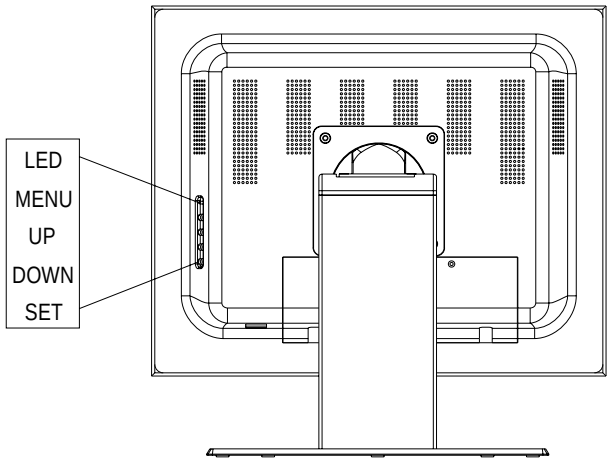


Figure 4

3.2 Key Functions without active OSD Menu

Key	Action
Menu	Activate OSD
Up	Select VGA (DVI-A) input source
Down	Select DVI-D input source

Note: This choice is in case all the signal sources are available. If not, the signal on the any one input will be displayed.

3.3 Key Functions in the OSD Menu

Keys	Situation	Action
Menu	Always	Jump to next line
Up	Slide controller	Increase Value
	Command	"Enter Key"
Down	Slide controller	Decrease value
Set	Except "Exit OSD" Menu	One menu level upwards (Settings are retained)
	In "Exit OSD" Menu	Return to main menu (Settings are retained)

3.4 Submenu Calls

Press the "Menu" key while the OSD is active, the function icon will jump to next line. Pressing the "Up" key, the coordinate submenu will be selected.

3.5 Locking of OSD Menu

Keys	Action
1 time Set key 3 times Up key within 3 seconds	Lock or unlock OSD If the OSD is locked, it is only possible to select input source (see 3.1 section).

3.6 Description of OSD Menu

Main Menu	Function	Adjustment range	Description
Brightness /Contrast	Brightness	0…100%	It is used to adjust the black level of the monitor. This allows the darker area to be seen more distinctly. Note: for DVI-D signals the brightness setting is optimized. Manual changes are not recommended.
	Contrast	0…100%	Adjustment of contrast This allows the brighter area to be seen more distinctly. Note: for DVI-D signals the Contrast setting is optimized. Manual changes are not recommended.
	Backlight	0…100% Recommended setting Max. 80%	Adjustment brightness of LCD backlight to adapt total brightness for room illumination
	Color	1,2,3 User 1, 9300K 2, 7300K 3, 6500K User define	Set desired color or Hue Three fixed color temperatures and one adjustable color temperature are available The color locations 1 to 3 can not be saved
	Set user color Red Gain Green Gain Blue Gain	-32…+32	Define user color temperature Select Red, Green, Blue gain separately
Position	H Position	0…100%	Shift picture in horizontal direction
	V Position	0…100%	Shift picture in vertical direction
Picture Source		VGA (DVI-A) DVI-D	Select source for main display When you enter this OSD menu the current source is highlighted. Following switch off and on of the display, the picture sources are searched one after another.
Auto function (Analog input only)			The auto functions are used to assist the automatic setting of parameters. The quality of settings depends on the picture contents and the type of synchronization. Corresponding items in the OSD can adjust all settings finely.

	Auto brightness /contrast	On/Off	Automatically get input signal match with the monitor
	Auto position /phase /frequency	On/Off	Automatically adjusts the image position, H-Size (or V-Size) and Fine settings. Improve focus clarity and image stability.
	Execute selected auto function		The selected auto functions are executed. Note: The quality of the function depends on the applied picture contents. To get better effect it is recommended to apply full screen and including whiteness contents picture.
Language	English Chinese		Select the language of OSD menu. Note: English menu is default state.
Others			You can make further settings for the picture source
	Frequency /Phase		Adjust the frequency and phase of the input signal.
	Sharpness	Interpolation filter 1 to 7	One of the 7 filters can be selected for the focus setting to reduce scaling artifacts. Interpolation filters depend on the input resolution. A filter is not usually used with 1280X1024 since each pixel is controlled by its own pulse. The user should individually adjust the filter depending on the application.
	OSD setting	H position V position	Adjustment of OSD horizontal position Adjustment of OSD vertical position (Default state is on the bottom right corner of the screen)
	DPMS setting	DPMS on	The backlight is switched off while it is no input signal. (The default state is DPMS on)
		DPMS off	The backlight will not switch off if it is no input signal. Only switches off along with the power switches off.
	Status		Current display settings can be called here in the respective picture mode. Working hours of display, firmware type and version, OSD version, configuration version, current source, current timing of input signal, current LUT
Service level 2	Settings in this menu must only be carried out by service person*		
	Quit OSD menu	Accept changes Reject changes	Quick OSD menu and either save or reject the changes. If you have reached this menu unintentionally, you can return to the main

			menu using the Set key. Note: if the OSD menu is quit by changing the timing or by switching off the monitor, the modification you have made are saved.
	OSD is locked		If this message is displayed, you do not have the authority to carry out the changes in the OSD menu. Please contact your servicing partner in this case.

* Service level 2 enter: while the highlight line is on the service level 2 position, press 1 x Up, and 2 x Down keys, it will enter the following submenu.

Service level 2	For LUT select and factory settings recall: Brightness; Contrast; Backlight; Color 3, 6500K; OSD position. (The default state is Gamma CIE)		
		Gamma CIE	Select Gamma CIE LUT
		DICOM	Select DICOM LUT
		Gamma 2.0	Select Gamma 2.0 LUT
		Gamma 2.2	Select Gamma 2.2 LUT
		Gamma 2.4	Select Gamma 2.4 LUT
		Native	Select panel native characteristics

4. MECHANICAL SPECIFICATIONS

4.1 Outline dimensions & weight

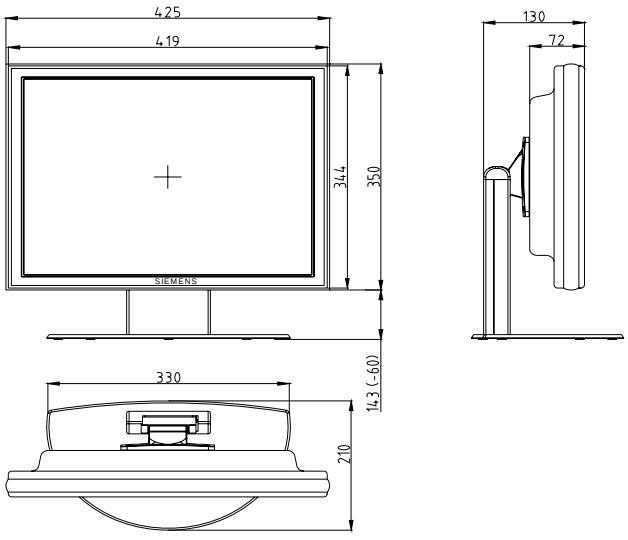
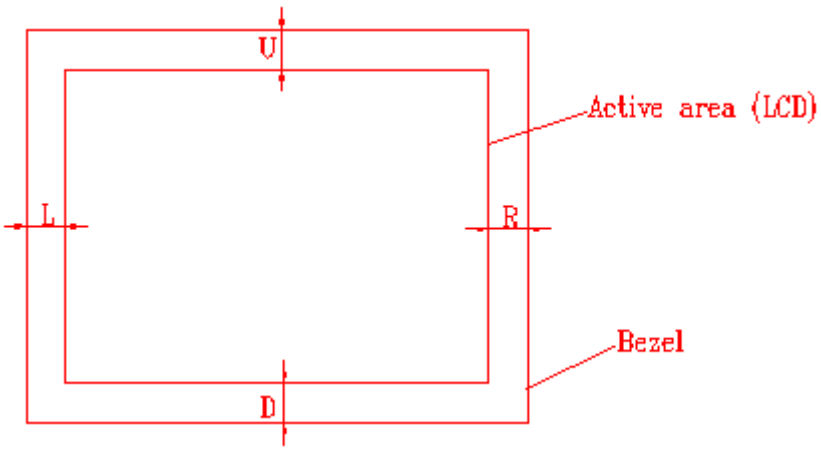


Figure 5

Item	Set	
Size of set	Width	425mm
	Depth	210mm
	Height	493 (-60) mm
Tilt	0 degree – 20degree	
Housing components	Aluminum	
Kensington lock	Yes	
Visible screen surface	Approx. 376mm×301mm	
Ventilation slots	In rear panel	
Degree of protection	IP20 to DIN40050	
Connection panel	At rear, covered	
Net weight	Approximately 5.5 Kg (without stand) Approximately 8.8 Kg (with stand)	

4.2 Screen Quality

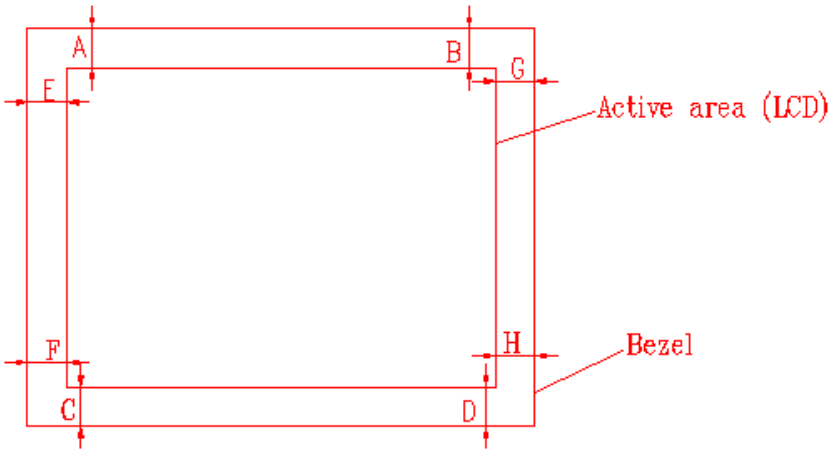
4.2.1 H/V outline position



H: |L-R| ≤1.0mm

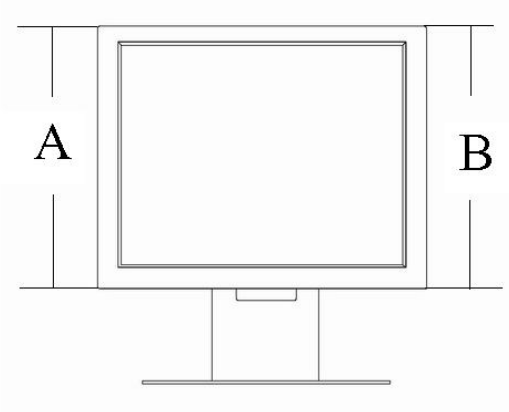
V: |U-D| ≤1.0mm

4.2.2 Outline edge position



A-B	≤1.0mm		C-D	≤1.0mm
	E-F	≤1.0mm		G-H	≤1.0mm

4.2.3 Structure width position



A-B	≤2.0mm

4.3 Packaging

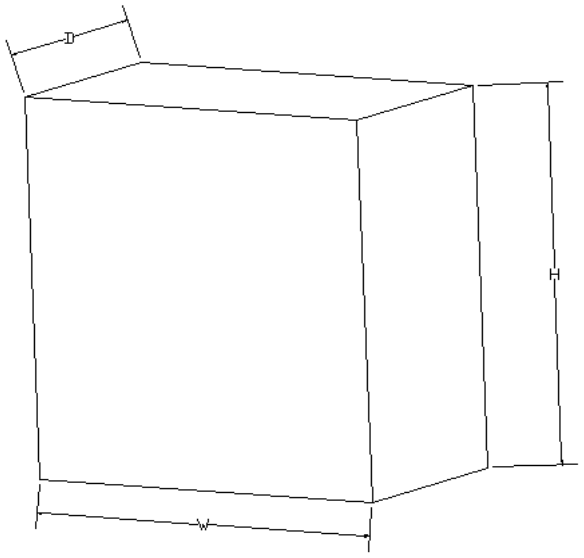


Figure 6

4.3.1 Package dimension and weight

	Box	
Outer size of box	Width (mm)	570
	Depth (mm)	370
	Height (mm)	575
Gross weight	Approximately 12.5Kg	

5. ENVIRONMENT CONDITONS

5.1 Operation Temperature

Ambient temperature range	+5 -- +40℃
Temperature gradient	Max. 5℃/h, no condensation
Atmospheric pressure	1040 – 674 hPa

5.2 Transport and storage (Packed)

Ambient temperature range	-20 -- +60℃
Temperature gradient	Max. 5℃/h, no condensation
Atmospheric pressure	1040 – 674 hPa (0 -- 3048m)

5.3 Mechanical requirements

Operation

Vibration	According to EN60068-2-6 10--58 Hz within ± 0.075 mm deflection 58—500 Hz at 10 m/s2
Shock	According to EN 60068-2-27 (single shock) 150m/s2, 6ms No permanent shock allowed in operating conditions

Packed unit

Vibration	According to EN60068-2-6 5--9 Hz within ± 3.5 mm deflection 9—500 Hz at 10 m/s2
Shock	According to EN 60068-2-27 (single shock) 250m/s2, 6ms(in storage packing) According to EN 60068-2-29 (permanent shock)

5.4 Drop Test (packed)

	Position	Height
Corner	1	76.0cm
Edge	3,2,4	76.0cm
Surfaces	A,B,C,D	76.0cm
	E	76.0cm
	F	76.0cm
(Cushion should be changed to new one.)		
Corner	5	76.0cm
Edge	6,7	76.0cm

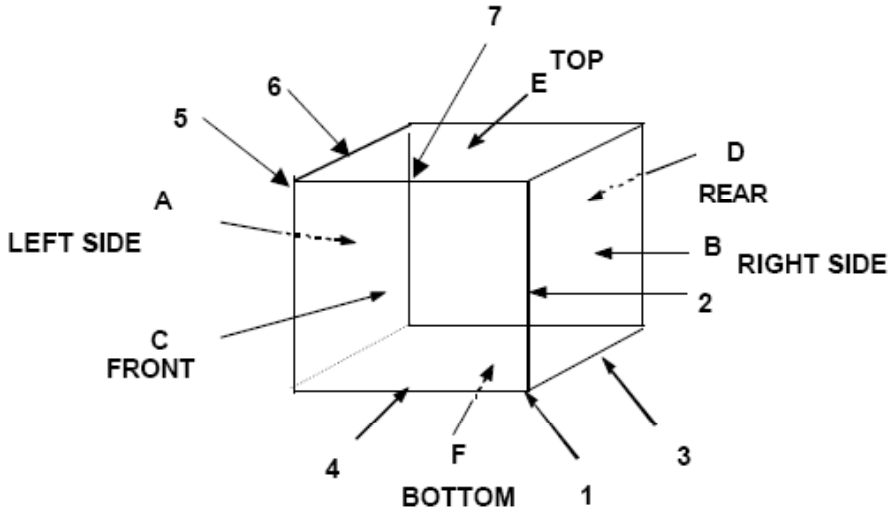


Figure 7

5.5 Safety specifications

Safety standards	EN60601, IEC601
Approvals	CAN/CSA – C 22.2 No 601.1 – M 90 CSA/us mark, UL 2601-1
Protection class	Protection class 1
Degree of protection to DIN 40050	IP 20
Conformity	CE

5.6 Electromagnetic compatibility

EMI voltage/ radiated interference	EN 60601-1-2
Voltage variations	EN 610004-11
Burst on power supply lines	EN 61000-4-4 1 kV
Surge on power supply lines	EN 61000-4-5 1 kV symmetric, 2 kV unsymmetric
Static discharge on casing parts (ESD)	EN 61000-4-2 8 kV air, 4 kV contact
RF irradiation	EN 61000-4-3 80 MHz ... 2,5 GHz, 3 V/m 80% AM 1 kHz
Noise immunity	EN 61000-4-6 150 kHz ... 80 MHz 3 V_{eff} 80% AM 1 kHz
Magnetic constant fields	EN 61000-4-8 Max. 4000 A/m
Magnetic alternating fields	EN 61000-4-8 Min. 10 A/m
Noise emission	FCC Class A

5.7 MTBF

Flat screen without Backlight: 50,000 operation hours.

Flat screen with Backlight: 10,000 operation hours.

6. DEFECT, SCRATCH and DUST

6.1 Condition

These defects are inspected under the following conditions:

Temperature: 20 ~ 25 degrees C

Humidity: 65 ± 5% RH

Illumination: Single 20W fluorescent lamp non-directive

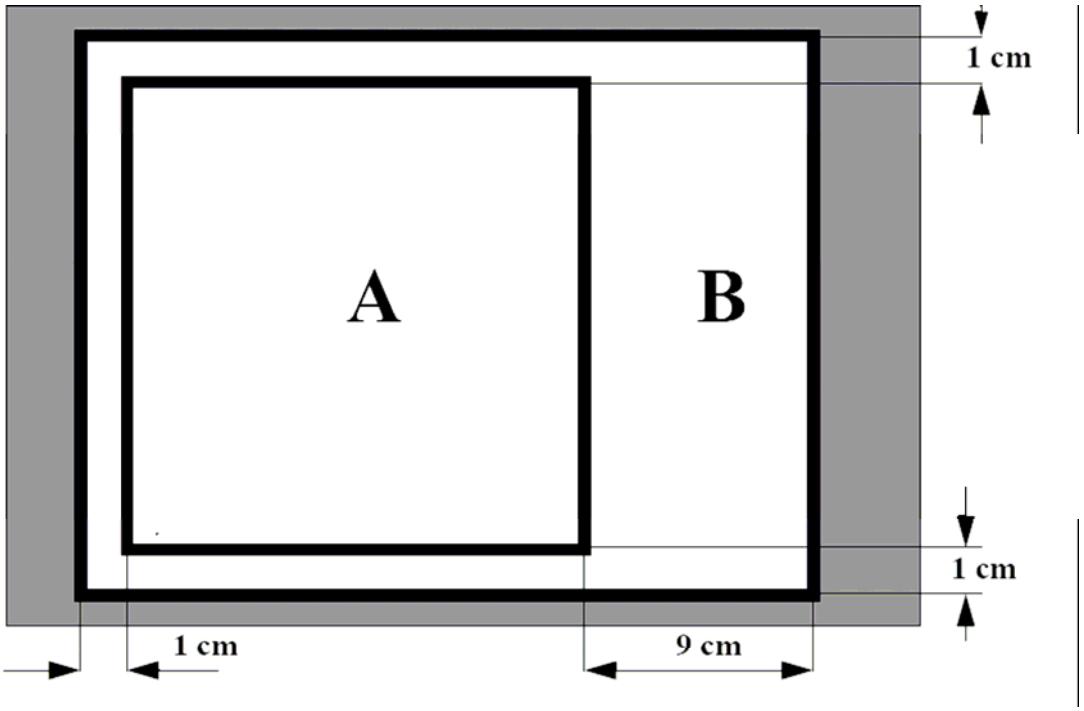
(Appearance: 300 to 700 LUX)

Viewing distance: The distance between the LCM and the inspector's eyes shall be at least 30cm --50 cm.

Viewing angle: The inspection shall be conducted within normal viewing angle range.

6.2 Dot Defect

The number of defect dot is defined as follows:
In the range A, the distance of defect dots from one to each other is at least 5cm. The number is at most 5. In the range B, the distance is at least 1cm. The number is at most 10.



Note 1: a. every dot herein means Sub- Pixel (Each Red, Green, or Blue Color)

b. Damaged less than half size of sub-pixels is not counted as defect

c. Dots darker than half brightness of sub-pixel are not defined as bright dot defect and dots brighter than half brightness of sub-pixels is not defined as dark dot defect.

d. The definition of range A is included in range B.

Note 2: Panel Pixel Defect comply with ISO 13406-2 class 2

6.3 Polarize Defects

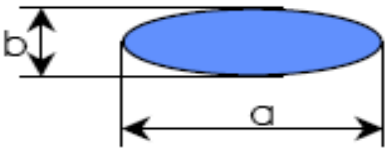
(Unit: mm)

Items		Criteria
Scratches	Linear	0.02 <= W <=0.05, 1.0<= L <=10.0, N <=5
Dent	Circular	0.15<= D <=0.5, N<=5

Where W: Width

L: Length

D: Average diameter = (a + b) / 2



Note：

a. Average Diameter

b. Linear: a>2b, Circular: a<=2b

c. Extraneous substances which can be wiped out, like Finger Print, Particles,

are not considered as a defect.

d. Defect which is on the black matrix (outside of Active Area) are not considered as a defect.

6.4 Foreign Material

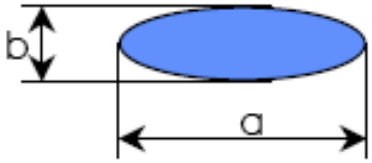
(Unit: mm)

Items		Criteria
Foreign Material	Linear	0.02<= W <=0.1, 0.3<= L <=3.0, N <=5
	Circular	**0.2<= D <=0.5, N<=5**

Where W: Width

L: Length

D: Average diameter = (a+b)/2



Note)

a. Average Diameter

b. Linear: a>2b, Circular: a<=2b

6.5 Line Defect

All kinds of line defects such as vertical, horizontal or cross are not allowed.

6.6 Others

Issues, which are not defined in these criteria, shall be discussed with both parties, Customer and Supplier, for better solution.

7. NOTICE FOR HANDING

7.1 Handing

(1) When the module is assembled, it should be attached to the system firmly using all mounting holes. Be careful not to twist or bend the modules.

(2) Because the inverters use high voltage, power should be disconnected before it is assembled or disassembled.

(3) Refrain from string mechanical shock and /or any force to the module. In addition to damage, this may cause improper operation or the module and CCFT backlight.

(4) Note that polarizers are very fragile and could be easily damaged. Do not press or scratch the surface using the harder than a HB pencil lead.

(5) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining and discoloration may occur.

(6) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

(7) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might damage to the polarizer due to chemical reaction.

(8) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs or cloths, it must be washed away thoroughly with soap.

(9) Protect the module from static which may cause damage to the CMOS Gate Array IC.

(10) Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(11) Do not disassemble the module.

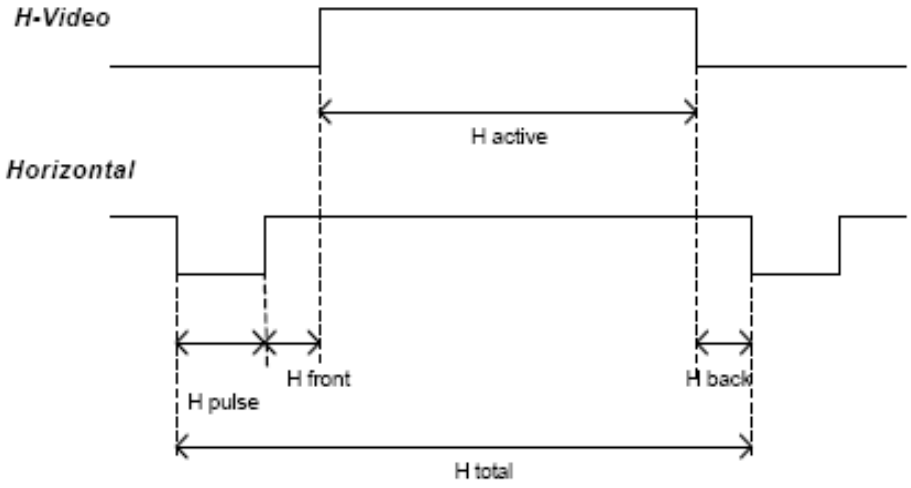
(12) Do not pull or fold the lamp wire.

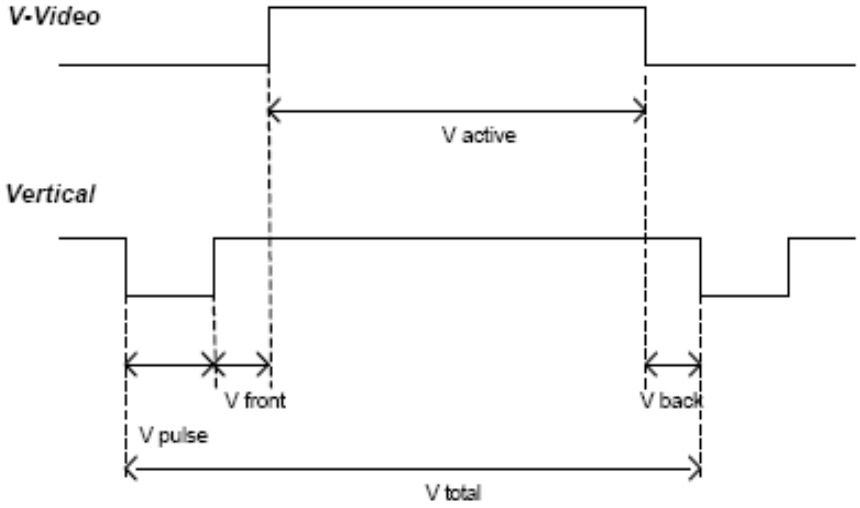
(13) Do not adjust the variable resistor located on the module.

(14) Protection film for polarizer on the module should be slowly peeled off just before use so that the electrostatic charge can be minimized.

(15) Pins of I/F connector should not be touched directly with bare hands.

Appendix 1 Preset Timings





- **Analog Signal Timings**

NO	Timing	Dot freq (Mhz)	H.freq (Khz)	H.dis (us)	H.back porch (us)	Hs width (us)	V.freq (Khz)	V.dis (us)	V.back porch (us)	Vs Wid (us)	Hs. Vs pol	Interlace
1	1024*768@43 HZ	44.900	35.522	22.806	1.247	3.920	86.958	10.810	0.296	0.056	P P	YES
2	1024*768@60 HZ	65.000	48.363	15.754	2.462	2.092	60.004	15.880	0.600	0.124	N N	NO
3	1024*768@70 HZ	75.000	56.476	13.653	1.920	1.813	70.069	13.599	0.513	0.106	N N	NO
4	1024*768@75 HZ	78.750	60.023	13.003	2.235	1.219	75.029	12.795	0.466	0.050	P P	NO
5	1024*768@85 HZ	94.500	68.677	10.836	2.201	1.106	84.997	11.183	0.524	0.044	P P	NO
6	1024*768@60 HZ	MAC										
7	1024*768@72 HZ	IBM										
8	800*600@56 HZ	36.000	35.156	22.222	3.556	2.000	56.250	17.067	0.626	0.057	P P	NO
9	800*600@60 HZ	40.000	37.879	20.000	2.200	3.200	60.317	15.840	0.607	0.106	P P	NO
10	800*600@72 HZ	50.000	48.077	16.000	1.280	2.400	72.188	12.480	0.478	0.125	P P	NO
11	800*600@75 HZ	49.500	46.875	160162	3.232	1.616	75.000	12.800	0.448	0.064	P P	NO
12	800*600@85 HZ	56.250	53.674	14.222	2.702	1.138	85.061	11.179	0.503	0.056	P P	NO
13	832*624@75 HZ	MAC										
14	640*480@60 HZ	25.175	31.469	25.422	1.907	3.813	59.940	15.253	1.048	0.064	N P	NO
15	640*480@72 HZ	31.500	37.861	20.317	4.064	1.270	72.809	12.678	0.739	0.079	N N	NO
16	640*480@75 HZ	31.500	37.500	20.317	4.064	1.270	72.809	12.678	1.739	0.079	N N	NO
17	640*480@85 HZ	36.000	43.269	170778	2.222	1.556	85.008	11.093	0.578	0.069	N N	NO
18	640*480@66 HZ	MAC										

19	**640*350@70 HZ**	**25.175**	**31.469**	**25.422**	**1.907**	**3.813**	**70.087**	**11.122**	**1.907**	**0.064**	**P N**	**NO**
20	**720*350@70 HZ**											
21	**640*400@70 HZ**	**25.175**	**31.469**	**25.422**	**1.907**	**3.813**	**70.087**	**12.711**	**1.112**	**0.064**	**N P**	**NO**
22	**720*400@70 HZ**											
23	**640*350@85 HZ**	**31.500**	**37.86**	**20.317**	**3.048**	**2.032**	**85.080**	**9.244**	**1.585**	**0.079**	**P N**	**NO**
24	**720*350@85 HZ**											
25	**640*400@85 HZ**	**31.500**	**37.86**	**20.317**	**3.048**	**2.032**	**85.080**	**10.565**	**1.083**	**0.079**	**N P**	**NO**
26	**720*400@85 HZ**	**35.500**	**37.927**	**20.282**	**3.042**	**2.028**	**85.039**	**10.546**	**1.107**	**0.079**	**N P**	**NO**
27	**1152*864@60 HZ**	**80.000**	**54.346**	**14.400**	**2.400**	**1.200**	**60.053**	**15.898**	**0.681**	**0.055**	**P P**	**NO**
28	**1152*864@70 HZ**	**94.200**	**63.955**	**12.229**	**2.038**	**1.019**	**70.016**	**13.501**	**0.719**	**0.047**	**P P**	**NO**
29	**1152*864@75 HZ**	**108.00**	**67.500**	**10.667**	**2.370**	**1.185**	**75.000**	**12.800**	**0.474**	**0.044**	**P P**	**NO**
30	**1152*870@75 HZ**	**MAC 21**										
31	**1152*900@66 HZ**	**SUN**										
32	**1152*900@76 HZ**											
33	**1280*960@60 HZ**	**108.00**	**60.000**	**11.852**	**2.889**	**1.037**	**60.000**	**16.000**	**0.600**	**0.050**	**P P**	**NO**
34	**1280*960@85 HZ**	**148.50**	**85.938**	**8.620**	**1.508**	**1.077**	**85.002**	**11.171**	**0.547**	**0.035**	**P P**	**NO**
35	**1280*1024@ 60HZ**	**108.00**	**63.981**	**11.852**	**2.296**	**1.037**	**60.020**	**16.005**	**0.594**	**0.047**	**P P**	**NO**
36	**1280*1024@ 75HZ**	**135.00**	**79.976**	**9.481**	**1.837**	**1.067**	**75.025**	**12.804**	**0.475**	**0.038**	**P P**	**NO**
37	**1280*1024@ 85HZ**	**157.50**	**91.146**	**8.127**	**1.422**	**1.016**	**85.024**	**11.235**	**0.483**	**0.033**	**P P**	**NO**
38	**1280*768@ 60HZ**											
39	**1600*1200@ 60HZ**	**162.00**	**75.000**	**9.877**	**1.877**	**1.185**	**60.000**	**16.000**	**0.613**	**0.040**	**P P**	

- **Digital Signal Timings**

Resolution	Horizontal Frequency (kHz)	Refresh Rate (Hz)	Pixel Frequency (MHz)	Standard Type	Comments
640 x 350	31.5	70	25.175	VGA	Visible*
	37.9	85	31.500	VESA	Visible*
640 x 400	31.5	70	25.175	VGA	Visible*
	37.9	85	31.500	VESA	Visible*
640 x 480	31.5	59.9	25.175	VGA	Yes
	35.0	66.7	30.240	Mac	Yes
	37.9	72.8	31.500	VESA	Yes
	37.5	75.0	31.500	VESA	Yes
	43.3	85.0	36.000	VESA	Yes
720 x 350	31.5	70.1	28.322	VGA	Yes
	37.9	85.0	35.500	VGA	Yes
720 x 400	31.5	70.1	28.322	VGA	Yes
	37.9	85.0	35.500	VESA	Yes
800 x 600	35.2	56.3	36.000	VESA	Yes
	37.9	60.3	40.000	VESA	Yes
	48.1	72	50.000	VESA	Yes
	46.9	75.0	49.500	VESA	Yes
	53.7	85.1	56.250	VESA	Yes
832 x 624	49.7	74.5	57.280	Mac	Yes
1024 x 768	48.4	60.0	65.000	VESA	Yes
	56.5	70.1	75.000	VESA	Yes
	60.0	75.0	78.750	VESA	Yes
	68.7	85.0	94.500	VESA	Yes
1152 x 864	67.5	75.0	108.000	VESA	Yes
1152 x 870	68.7	75.1	100.000	Mac	Visible*
1152 x 900	62.0	66.1	94.200	SUN WS	Yes
	71.9	76	107.500	SUN WS	Yes
1280 x 960	60.0	60.0	108.000	VESA	Yes
	75.0	75.0	126.200	Mac	Yes
1280 x 1024	64.0	60.0	108.000	VESA	Yes
	71.7	67.2	117.000	SUN WS	Visible*
	80.0	75.0	135.000	VESA	Visible*
	81.1	76.1	135.000	SUN WS	Visible*