



Part No.  
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NEC Technologies, Inc.  
1255 N. Michael Drive  
Wood Dale, Illinois 60191-1094

**NEC**

**13" True Color TFT LCD Monitor**

**13" True Color TFT LCD Monitor**

**LCD1280<sup>TM</sup>**

User's Manual

**NEC**



## Information for LCD1280

**WARNING**  
TO PREVENT FIRE OR SHOCK HAZARDS, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE. ALSO, DO NOT USE THIS UNIT'S POLARIZED PLUG WITH AN EXTENSION CORD RECEPTACLE OR OTHER OUTLETS, UNLESS THE PRONGS CAN BE FULLY INSERTED.  
REFRAIN FROM OPENING THE CABINET AS THERE ARE HIGH VOLTAGE COMPONENTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



**CAUTION:** TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



This symbol warns user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any part inside this unit.



This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.

### FCC Information

The Federal Communications Commission Radio Frequency Interference Statement includes the following warning:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the

FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### DOC Compliance Notice

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

### DOC Avis de Conformation

Le présent appareil numérique n'émet pas de bruits radio-électriques dépassant les limites applicables aux appareils numériques de la Class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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## Introduction

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### Contents of Package

Congratulations on your purchase of the NEC LCD1280™ True Color monitor!

Included with your LCD1280 monitor are the following items:

1. NEC LCD1280 (Model #LA-1331JSW) True Color monitor.
2. AC power cable.
3. Video signal cable (15 pin mini D-sub male to 5 branched BNC male).
4. User's Manual.

Remember to save the original box and packing materials to transport or ship this monitor.

### Introduction to the NEC LCD1280 True Color Monitor

The LCD1280 monitor provides superior display performance, a reduced footprint and the flexibility and adaptability required by today's complex computing environments.

The LCD1280 features a 13-inch (diagonal viewable image size), active matrix, true-color, thin-film-transistor, liquid crystal display to provide superior display performance with a reduced footprint. Less than seven inches in depth, the LCD1280 monitor is ideal for environments with space and weight constraints that require superior image quality. The LCD1280 also delivers the outstanding per-

formance necessary for today's sophisticated Windows, Macintosh, Silicon Graphics, Sun and other workstation applications.

In addition to offering support for VGA graphics mode (640 x 480), the LCD1280 supports WS high resolution mode (1280 x 1024). The LCD1280 automatically detects and changes between WS high resolution mode and VGA graphics mode. The LCD1280 can display an infinite number of colors in its high resolution mode.

### Analog Interface

Because the LCD1280 accepts an analog input, a graphics card with digital output is not required. The same graphics board can be used to drive the LCD1280 or a standard CRT monitor. The analog interface also provides the LCD with its true-color capability. Unlike digital panels, the LCD1280 is able to display a continuous spectrum of "true" colors.

### Reduced Footprint

The LCD1280 monitor offers nearly the same active display size as a conventional 15-inch CRT (13.8" diagonal viewable image size) at 40% of the depth and 30% of the weight. With a depth of less than seven inches, the reduced footprint of the LCD1280 provides the ideal solution for applications requiring a large display and high resolution but where space and weight are of particular concern.

# Introduction

## Low Power Consumption

The LCD1280 has been designed with NEC's IPM™ (Intelligent Power Manager) System. When utilized with an Energy Star system or video card, the LCD1280's IPM System is an innovative power saving utility that complies with both the EPA's Energy Star requirements and Europe's NUTEK's power management requirements.

With a maximum power consumption of only 50 watts in its on mode, the LCD1280 monitor consumes up to 50% less power and emits less heat than conventional CRTs. In its power saving mode, the LCD1280 consumes less than 8 watts. All this translates into energy savings, environmental protection, reduced emissions and reduced air conditioning costs of the work environment.

The LCD1280 monitor follows the Video Electronics Standard Association (VESA) approved DPMS power-down signaling method. VESA's Display Power Management Signaling (DPMS) method which is endorsed by the EPA is the power-down process a system should use to communicate to the monitor to save power. Power-down functions can only be utilized with an Energy Star system or video card which adheres to the VESA DPMS standard. By using the monitor's horizontal and vertical SYNC signals, the monitor can be prompted into the

different IPM modes. The following is the description of the LED indicator for the IPM power saving modes:

Mode	LED Indicator	Power Consumption
ON	Green	Typical: 45 watts
Stand By & Suspend	Amber	Typical: Less than 8 watts
Power Switch, OFF	No Light	No Power Used

## ErgoDesign™

The LCD1280 utilizes NEC's ErgoDesign philosophy to make the panel more comfortable and easy to use. The panel's power and brightness control are positioned within easy reach, and the tilt base adjusts to each individual's preferred angle of vision. The LCD1280 monitor's cabinet design and aesthetics look good from all angles.

## Reduced Emissions

Incorporating NEC's own Reduced Magnetic Field™ technology, the LCD1280 has minimal field emissions and follows the strictest magnetic field, alternating electric field and electro-static recommendations of the Swedish Board for Technical Accreditation, or SWEDAC (previously known as MPR, National Board for Measurement and Testing). The LCD1280 conforms to SWEDAC MPR 1990:8 (MPR II) Testing Methods for Emissions. These standards are the most restrictive guidelines in the world.

## 2

## LCD1280 Specifications

Display:	13-inch (13.0" viewable image size), active matrix, thin film transistor (TFT), liquid crystal display (LCD); 0.201mm dot pitch; RGB vertical stripe color filter arrangement; 100 cd/m <sup>2</sup> white luminance, typical; 100:1 contrast ratio, typical		
Compatibility:	640 x 480: VGA, 60 Hz vertical refresh 1280 X 1024: WS high resolution, 60 Hz vertical refresh		
Synchronization Range:	VGA:	Horizontal:	29.5 kHz to 33.5 kHz
		Vertical:	> 60 Hz
		Pixel Frequency:	25.175 MHz ± 50 ppm
	High Resolution:	Horizontal:	63.0 kHz to 66.4 kHz
		Vertical:	> 60 Hz
		Pixel Frequency (switchable):	107.5 MHz ± 50 ppm, or 107.352 MHz ± 50 ppm
Resolution:	Horizontal:	1280 dots	
	Vertical:	1024 lines	
Active Display Area:	Horizontal:	257.3 mm, 10.13"	
	Vertical:	205.8 mm, 8.10"	
Minimum Viewing Angles:	Up 10°, Down 30°, Right 30°, Left 30°		
Input Signal:	Video: Analog Red, Green, Blue Input Impedance: 75 ohms +/- 5% (at 100 kHz) Sync: Separate sync. TTL level Horizontal sync: positive/negative Vertical sync: positive/negative Composite sync: TTL level, positive/negative Composite sync. on green video: 0.3 Vp-p (+/- 3 dB) negative (Video 0.7 Vp-p positive)		

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# Introduction

## LCD1280 Specifications

Display Colors:	Unlimited colors (depends on graphics interface and/or application)	
User Controls:	Power, brightness, horizontal position, vertical position, clock delay adjust	
Signal Cable:	15-pin mini D-sub male to 5 branched BNC male	
Power Supply:	AC 90 to 264 V worldwide input, 48 to 62 Hz	
Power Consumption:	Typical: 45 watts in ON mode, Under 8 watts in power saving mode.	
Dimensions (W, H, D):	344 x 325 x 171 mm/13.5 x 12.8 x 6.7 inches	
Weight:	Net: 5.0 kg /11.0 lbs. Gross: 6.8 kg /15.0 lbs.	
Tilt Rotation:	Up: 25 degrees Down: 5 degrees	
Environmental:	Operating temperature:	10°C to 30°C, 50°F to 86°F; humidity 80% maximum
	Storage temperature:	-10°C to 60°C, 14°F to 140°F, humidity 85% maximum

**Note:** All technical specifications are subject to change without notice.

## 4

# Installation

## Recommended Use

For optimum performance, please note the following when setting up and using the LCD1280 color monitor:

- The optimum monitor position is facing away from direct sunlight.
- Match the monitor's brightness to the ambient room brightness. The brightness control should be adjusted to a point where the overall background area just begins to disappear.
- If possible, use a white background and black text to ease eye strain.
- Do not place any heavy objects on the power cord. Damage to the cord may cause shock or fire.
- Handle with care when transporting.
- Use the monitor in a clean and dry area.
- Clean the LCD surface with a lint-free, non-abrasive cloth and a non-alcohol, neutral, non-abrasive cleaning solution or glass cleaner.
- For optimum performance, allow 20 minutes for warm-up.
- Avoid displaying fixed patterns on the monitor for extremely long periods of time to avoid after-image effects.

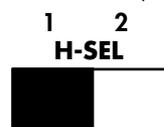
## Connection to Graphics Cards using BNC cables

The NEC LCD1280 color monitor complements a host of computing platforms. However, because the LCD1280 is a high resolution, full color analog monitor, it may require the use of a graphics card (sometimes referred to as a video card, video adapter or graphics board) that supports high resolution graphics (1280 x 1024), 24-bit color (16.7M colors), delivers an analog output, and which has

a high resolution pixel frequency of 107.5 MHz  $\pm$  50 ppm or 107.352 MHz  $\pm$  50 ppm. Silicon Graphics' INDIGO2 workstation does not require a graphics card. (For a current list of compatible platforms please call NEC's FastFacts at 1-800-366-0476 and request document #52301280).

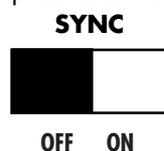
To attach the monitor to your system, follow these instructions:

1. Turn off the power to the monitor and computer.
2. If necessary, install the graphics card and drivers. Determine the pixel frequency (DOT clock) output and the SYNC method used by the graphics card or system. For more information, refer to the graphics card or system manual or the FastFacts document referred to above.
3. Make sure the H-SEL switch on the rear of the panel is positioned to the appropriate pixel frequency (if you are not sure, refer to the board manual or documents). Under most cases, a timing of 107.5 MHz will apply (Mode 1). For SGI's INDIGO2, a timing of 107.352 MHz applies (Mode 2).



Pixel Frequency (DOT clock):  
H-SEL Mode 1 — 107.5 MHz  
H-SEL Mode 2 — 107.352 MHz

4. Make sure the SYNC switch on the rear of the panel is positioned to the appropriate mode.

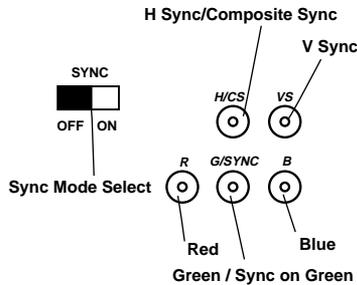


Input Mode:  
OFF — Separate Sync/  
Composite Sync  
ON — Sync on Green

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# Installation

5. Make sure the appropriate BNC cable is used. Should the graphics adapter require a connector other than the 15 pin mini D-sub male included with the monitor, please call NEC at (800) 820-1230. Connect cable to system.
6. Connect BNC cables as follows according to the input video mode selected above. (Note: incorrect cable connections may result in irregular operation, damage display quality/ components of LCD module, and/or shorten the module's life.)



Input Video Mode	H/CS	VS	R	G/SYNC B	B
Separate Sync	○	○	○	○	○
Composite Sync	○	X	○	○	○
Sync on Green	X	X	○	○	○

○ - BNC connector is utilized; X - BNC connector is not utilized

7. Connect one end of the power cable to the LCD1280 monitor and the other end to the power outlet.
8. Turn on the monitor and the computer.  
 Note: If the settings and connections were made properly, the LED on the front of the LCD1280 will show green. If the LED displays an amber color, the monitor is not receiving the appropriate input. Please make certain that the above settings were made properly. If the LED continues to display an amber color or the monitor is not displaying a stable image, please refer to the Troubleshooting section of this manual.
9. This completes the installation.

# Controls

## Front Controls:

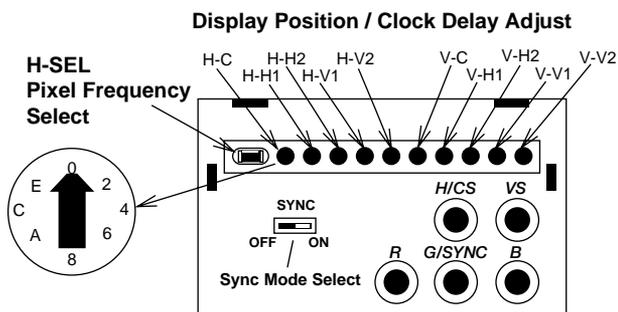
- Brightness:** slide type control adjusts the overall image and background screen brightness.
- LED Power Indicator Light:** indicates the monitor's power mode. Each mode reduces the amount of power used by the monitor:

Mode	Light
ON	green
Stand By & Suspend	amber
Power Switch, OFF	no light

## Side Control:

- Power Switch:** push type button located on right side of monitor base turns the power on or off. When the power is on, the LED is lit.

## Rear Controls:



- SYNC Mode Select Switch:** allows selection between Standard mode (OFF) and Sync on Green (ON) priority mode.
- H-SEL Pixel Frequency Select Switch:** selects the external pixel clock source for WS timing 1 (107.5 MHz) or WS timing 2 (107.352 MHz).
- WS Clock Delay Adjust (H-C):** adjustment of WS pixel clock delay rate.
- Rough WS Horizontal Adjust (H-H1):** rough adjustment for horizontal position of WS mode (16 dot increment per operation).
- Fine WS Horizontal Adjust (H-H2):** fine adjustment for horizontal position of WS mode (1 dot increment per operation).
- Rough WS Vertical Adjust (H-V1):** rough adjustment for vertical position of WS mode (16 line increment per operation).
- Fine WS Vertical Adjust (H-V2):** fine adjustment for vertical position of WS mode (1 line increment per operation).
- VGA Clock Delay Adjust (V-C):** adjustment of VGA pixel clock delay rate.
- Rough VGA Horizontal Adjust (V-H1):** rough adjustment for horizontal position of VGA mode (32 pixel / 16 dot increment per operation).

## Controls

**Fine VGA Horizontal Adjust (V-H2):** fine adjustment for horizontal position of VGA mode (2 pixel / 1 dot increment per operation).

**Rough VGA Vertical Adjust (V-V1):** rough adjustment for vertical position of VGA mode (32 pixel / 16 line increment per operation).

**Fine VGA Vertical Adjust (V-V2):** fine adjustment for vertical position of VGA mode (2 pixel / 1 line increment per operation).

## Troubleshooting/Support

Problem	Check These Items
No Picture	<ul style="list-style-type: none"> <li>The signal cable should be completely connected to the video card/computer.</li> <li>The video card should be completely seated in its slot.</li> <li><b>Power Switch</b> and computer power switch should be in the <b>ON</b> position.</li> <li>Check BNC connectors to make certain that each connector has been attached correctly.</li> <li>Check <b>H-SEL Switch</b> and <b>SYNC Switch</b> to make certain that they are in the correct position according to the Installation section of this manual.</li> </ul>
Image is unstable or swimming is apparent	<ul style="list-style-type: none"> <li>Signal cable should be completely attached to the computer.</li> <li>Check the monitor and your video card with respect to compatability and recommended signal timings (Please see FastFacts document #52301280 and Appendix 2).</li> <li>Check the <b>SYNC Switch</b> and <b>H-SEL Switch</b> for their correct position.</li> </ul>
LED on the monitor is not lit (no green or amber color can be seen)	<ul style="list-style-type: none"> <li>Power Switch should be in the <b>ON</b> position and the power cord should be connected.</li> <li>Make certain the computer is not in a Power-Saving mode (touch the keyboard or mouse).</li> </ul>
Picture is not focused or jitter is present	<ul style="list-style-type: none"> <li>Use <b>WS Clock Delay Adjust</b> (H-C) or <b>VGA Clock Delay Adjust</b> (V-C) to focus display. When the display mode will be changed, the clock settings may need to be re-adjusted.</li> </ul>
Display image is not centered	<ul style="list-style-type: none"> <li>Use <b>WS</b> and <b>VGA</b> horizontal and vertical adjustment controls located on the rear of the panel to adjust centering.</li> </ul>

# Troubleshooting/Support

## Technical Support

If the problem persists, call NEC Technologies, Inc. at (800) 388-8888. Before you call, please follow these instructions to allow for faster service:

- Call from a location at or near your monitor.
- Know the name and model number of your monitor: LCD1280, LA-1331JSW
- Know the name and the model number of the computer you are using, and have its manual nearby.
- Know the name of the graphics card you are using, and have its manual nearby.
- If it is more convenient to fax a question to NEC's Technical Support, the fax number is (508) 635-4666.

## The BBS

The NEC Remote Bulletin Board System (BBS) is a great way to keep in touch with NEC. It is an electronic service accessible with your system and a modem. You can tell us things about yourself, your experience with the product, and leave messages requesting on-line help. Also, the BBS keeps you up to date on the latest NEC products and lets you download new product information when it is available.

To contact the BBS using any computer with a modem, dial: (508) 635-4706.

Communications parameters are: 300/1200/2400/9600 bps, no parity, 8-data bits, 1 stop bit.

## FastFacts™

FastFacts system is an easy-to-use, automated facsimile service that provides you with information whenever you need it, 24 hours a day, seven days a week. You can call the FastFacts system with your touchtone telephone, order a catalog listing the available documents, or order the document you need. Within minutes, your requested information will be sent to your fax machine. The information includes:

- product brochures
- installation procedures
- quick reference guides
- troubleshooting information
- compatibility charts

To contact FastFacts, dial: (800) 366-0476.

## Limited Warranty

NEC Technologies, Inc. (hereinafter NECTECH) warrants this Product to be free from defects in material and workmanship and agrees to repair or replace any part of the enclosed unit which proves defective under these terms and conditions.

## How Long is the Warranty

Parts and labor are warranted for one (1) year from the date of the first consumer purchase. Spare parts are warranted for ninety (90) days.

## Who is Protected

This warranty may be enforced only by the first consumer purchaser and is not transferable.

## What is Covered and What is not Covered

Except as specified below, this warranty covers all defects in material or workmanship in this Product. The following are not covered by this warranty:

1. Any Product which is not distributed in the U.S.A. or Canada by NECTECH or which is not purchased in the U.S.A. or Canada by the first consumer purchaser.
2. Any Product on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from, but not limited to:
  - a. Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature, improper storage, unauthorized Product modification, or failure to follow instructions supplied with the Product.
  - b. Alteration, repair or attempted repair by anyone not authorized by NECTECH.
  - c. Any shipment of the Product (claims must be presented to the carrier).
  - d. Removal or installation of the Product.
  - e. Any other cause which does not relate to a Product defect.
4. Cartons, carrying cases, batteries, external cabinets, magnetic tapes, or any accessories used in connection with the product.

5. This warranty covers only NECTECH-supplied components. Service required as a result of third party components is not covered under this warranty.

## What NECTECH Will Pay For and What We Will Not Pay For

NECTECH will pay labor and material expenses for covered items, but we will not pay for the following:

1. Removal or installation charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls.
3. Payment of shipping and related charges incurred in returning the Product for warranty repair.

## How You Can Get Warranty Service

This product must be returned to a NECTECH factory for repair. It shall be your obligation and expense to ship the Product, freight prepaid, to a facility authorized by NECTECH to render the warranty services in either the original package or a similar package affording an equal degree of protection. NECTECH may require that you provide the original bill of sale or receipt as proof of purchase in order to obtain warranty service. Please retain such proof of purchase with your records.

# Troubleshooting/Support

## Limitation of Damages and Implied Warranties

NECTECH'S SOLE LIABILITY FOR ANY DEFECTIVE PRODUCT IS LIMITED TO THE REPAIR OR REPLACEMENT OF THE PRODUCT AT OUR OPTION. NECTECH SHALL NOT BE LIABLE FOR:

1. DAMAGE TO OTHER PROPERTY CAUSED BY ANY DEFECTS IN THIS PRODUCT, DAMAGES BASED UPON INCONVENIENCE, LOSS OF USE OF THE PRODUCT, LOSS OF TIME OR DATA, COMMERCIAL LOSS; OR
2. ANY OTHER DAMAGES, WHETHER INCIDENTAL, CONSEQUENTIAL OR OTHERWISE.

THIS WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES OR THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. THEREFORE, THE ABOVE EXCLUSIONS OR LIMITATIONS MAY NOT APPLY TO YOU.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

## For Information, Telephone 1-800-388-8888

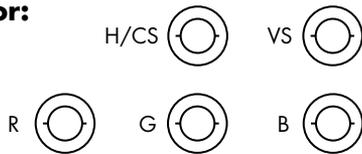
NOTE: All Products returned to NECTECH for service MUST have prior approval; this may be obtained by calling the above number.

This Product is warranted in accordance with the terms of this limited warranty. Consumers are cautioned that Product performance is affected by system configuration, software, the application, customer data, and operator control of the system, among other factors. While NEC TECHNOLOGIES, INC. Products are considered to be compatible with many systems, the specific functional implementation by the customers of the Product may vary. Therefore, the suitability of a Product for a specific purpose or application must be determined by the customer and is not warranted by NECTECH.

# Appendix 1

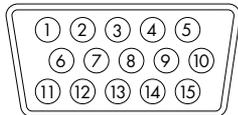
## Pin Assignment Table

### For the Monitor:



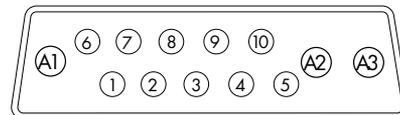
BNC Number	Separate SYNC	Composite SYNC	Sync on Green
1	Horizontal	Composite SYNC	No Connection
2	Vertical	No Connection	No Connection
3	Red	Red	Red
4	Green	Green	Green with SYNC
5	Blue	Blue	Blue

### For the Graphics Board:



**IBM VGA  
15-pin mini D-Sub female**

1	Red Video	9	Reserved
2	Green Video	10	Digital Ground
3	Blue Video	11	Reserved
4	Reserved	12	Reserved
5	Reserved	13	Horizontal SYNC
6	Red Ground	14	Vertical SYNC
7	Green Ground	15	Reserved
8	Blue Ground		



**13W3 Male**

A1	Red Video
A2	Green Video
A3	Blue Video
3	Sense Code
4	Return for Sense Code
5	Composite Sync
8	Sense Code
9	Sense Code
10	Sync Return

## Appendix 2

### Signal Timings

#### Input Signal Timings (WS High Resolution Mode)

Item	Abbreviation	Monitor Rating			
Pixel frequency	fc	107.5MHz $\pm$ 50ppm	9.302nsec/pixel	107.352MHz $\pm$ 50ppm	9.315nsec/pixel
Horizontal frequency	fh	64.60KHz		63.9KHz	
Line Time total	Th	15.479usec	1664CLK	15.649usec	1680CLK
Horizontal active display	Thd	11.907usec	1280CLK	11.923usec	1280CLK
Horizontal sync pulse	Thp	1.786usec	192CLK	1.118usec	120CLK
Horizontal baack porch	Thb	1.488usec	160CLK	2.329usec	250CLK
Horizontal front porch	Thf	0.298usec	32CLK	0.279usec	30CLK
H-sync Rise & Fall	Thrf	5ns(max.)			
Vertical frequency	fv	59.93Hz		60.0Hz	
Frame time total	Tv	16.686msec	1078H	16.667msec	1065H
Vertical active display	Tvd	15.850msec	1024H	16.025msec	1029H
Vertical sync pulse	Tvp	0.062msec	4H	0.047msec	3H
Vertical back porch	Tvb	0.666msec	43H	0.548msec	35H
Vertical front porch	Tvf	0.108msec	7H	0.047msec	3H

**IMPORTANT:** The Jitter on Hsync output from video card should be less than 300 psec or you may see some jitter on the screen.

#### Input Signal Timings (VGA Mode)

(The values of Front & Back porch are for reference only)

Item	Abbreviation	Monitor Rating	
Pixel frequency	fc	25.175MHz $\pm$ 50ppm	39.72nsec/pixel
Horizontal frequency	fh	31.469KHz	
Line Time total	Th	31.778usec	800CLK
Horizontal active display	Thd	25.422usec	640CLK
Horizontal sync pulse	Thp	3.813usec	96CLK
Horizontal back porch	Thb	1.907usec	48CLK
Horizontal front porch	Thf	0.636usec	16CLK
Vertical frequency	fv	59.94Hz	
Frame time total	Tv	16.683msec	525H
Vertical active display	Tvd	15.253msec	480H
Vertical sync pulse	Tvp	0.063msec	2H
Vertical back porch	Tvb	1.017msec	32H
Vertical front porch	Tvf	0.350msec	15H

**IMPORTANT:** The Jitter on Hsync output from video card should be less than 300 psec or you may see some jitter on the screen.

## Appendix 2

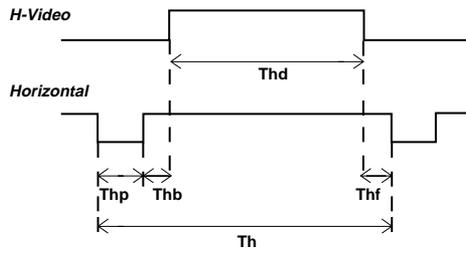


Fig. A2-1: Horizontal Timing

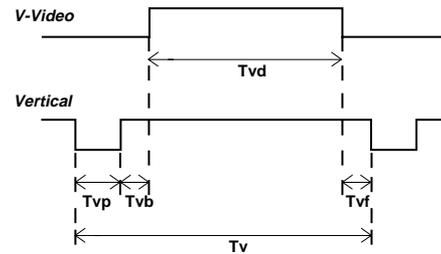


Fig. A2-2: Vertical Timing

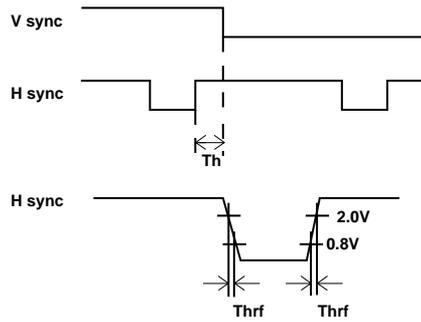


Fig. A2-3: Sync Timing

## Appendix 3

### Signal levels

	Min.	Typ.	Max.
Video Swing (White – Blank: W/O Sync process)	-	-	0.765V
Setup level (Black – Blank)	0.035V	0.054V	0.072V
White level (White – Black)	0.627V	0.660V	0.694V
Video input offset (VAIO)	.05V	-	0.5V

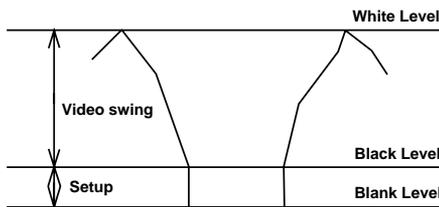


Fig. A3-1: Separate video wave forms

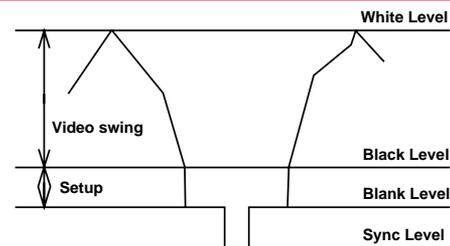


Fig. A3-2: Sync on Green video wave forms

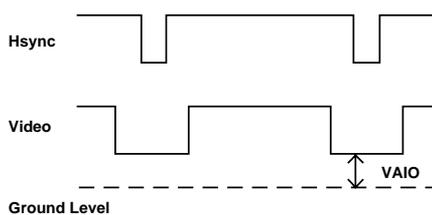


Fig. A3-3: Video input offset

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