

REPORT NO : HEI-RF-9807004

FCC ID : CKLHT-7687B

DATE : JULY. 14, 1998

ATTACHMENT A. USER'S MANUAL

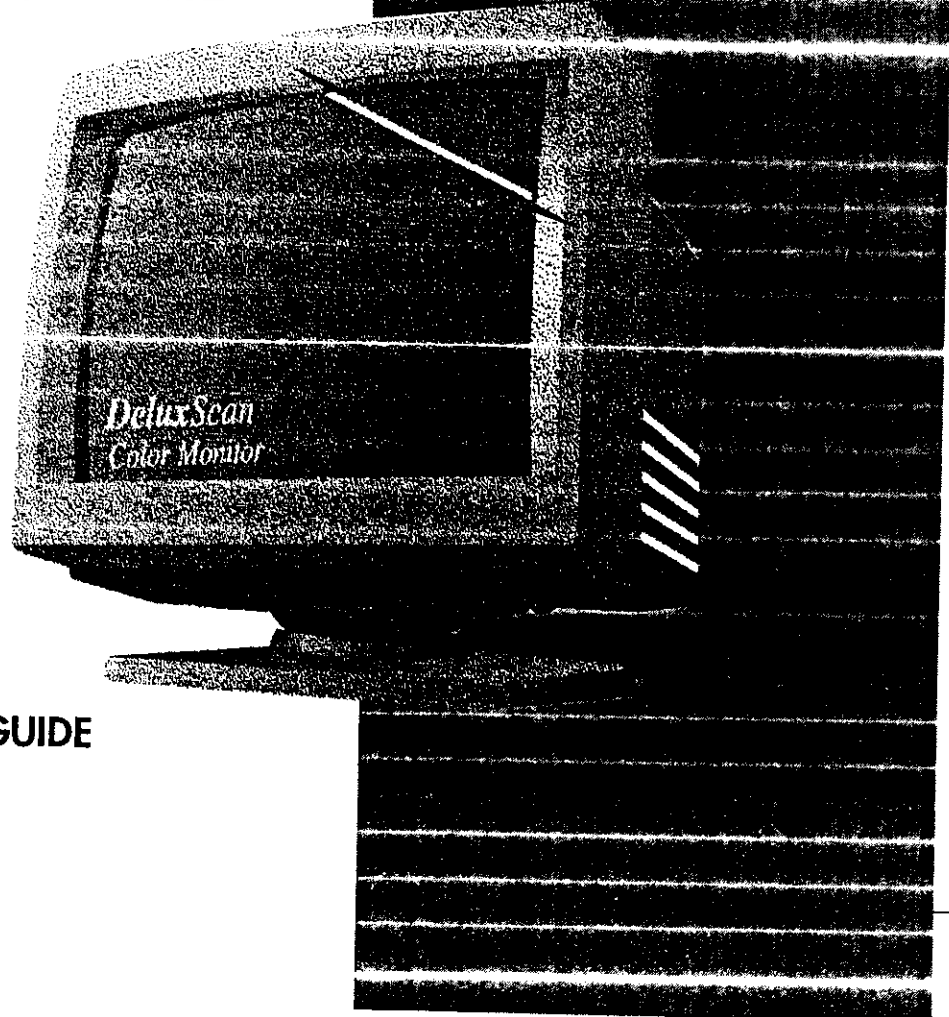
HYUNDAI

► *MULTI - LINGUAL OSD*

DeluxScan™ 7687

17" Color Monitor
(15.7" viewable)

MODEL : HL/HT-7687B



■ **USER'S GUIDE**

U.S.A.

**U.S.FEDERAL COMMUNICATIONS COMMISSION
RADIO FREQUENCY INTERFERENCE STATEMENT
INFORMATION TO THE USER**

NOTE: 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 residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a 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 of a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for assistance.

Changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
Connecting of peripherals requires the use of grounded shielded signal cables.

DECLARATION OF CONFORMITY

WE HYUNDAI ELECTRONICS INDUSTRIES CO., LTD.
Ami-ri Bubal-Eub Ichon-Si Kyungki-Do
467-860 KOREA

declare under our sole responsibility that the product:

Kind of equipment : COLOR MONITOR

Type-Designation : HL-7687B

to which this declaration relates is in conformity with the
following standard(s) or other normative document(s)

Safety : EN60950 : 1992 + A1, A2, A3
EMC : EN 55 022/1994, EN 50 082-1/1992
IEC 801-2/1991, IEC 801-3/1984, IEC 801-4/1988

following the provisions of the Low Voltage Directive 73/23/EEC,
93/68/EEC and the EMC Directive 89/336/EEC.

Accredited testlaboratory:
TÜV Rheinland
Am Grauen Stein
51105 Köln

KOREA/1998. 6. 1
(Place and date of issue)

HONG KI, KIM
(Name and signature of
authorized person)

Hong Ki Kim

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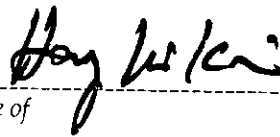
Safety : EN60950 : 1992 + A1, A2, A3
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1. How to get the most enjoyment with this monitor

This is a 17"(15.7" viewable) color monitor to display signals from personal or micro computers.

This manual has been prepared to assist you in becoming familiar with your new display monitor.

Color display tube

Dot Pitch 0.26mm

Notice

In order to prevent fire, shock hazards, do not expose this display to rain or moisture.

Features

- High resolution CRT for sharp and crisp images.
- 17"(15.7" viewable) Diagonal screen with non-glare direct etched surface.
- Unlimited Color Display.
- DPMS(Display Power Management Signaling).
- OSD(On Screen Display) controls.
- DDC 1/2B

This monitor includes DDC 1/2B feature.

DDC 1/2B (Display Data Channel 1/2B) is a communication channel over which the monitor automatically informs the host system of its capabilities(e.g. each supported resolution with its corresponding timing).

DDC 1/2B uses a formerly unconnected signal pins in the 15-pin VGA connector. The system will perform "Plug & Play" feature if both monitor and host systems support DDC 1/2B protocol.

Note

Some computer systems are not compatible with the DDC standard. If your monitor is displaying a wrong resolution, please check your computer system including a DDC compatible video card.

General safety precautions

This monitor has been engineered and manufactured to assure your safety, and you can prevent your safety from serious electrical shock and other hazards by keeping in mind the following attentions.

- Do not place anything heavy, wet or magnetic on the monitor or the power cord.

- Be sure to turn the monitor off before plugging the power cord into the socket of power source.
- Make sure that the power cord and the other cords are securely and rightly connected.
- Avoid operating the monitor in the place extremely heated, humid or affected by dust.
- Never cover the ventilation openings with any material and never touch them with metallic or inflammable materials.
- Overloaded AC outlets and extension cords are dangerous. So are frayed power cords and broken plugs. They may result in a shock or fire hazard. Call your service technician for replacement.
- Do not open the monitor. There are no user serviceable components inside. There is dangerous high voltages inside, even when the power is off. Contact your dealer if the monitor is not operating properly.
- Do not use an aerosol directly on the picture tube because overspray may cause electrical shock.

Precautions for using the video monitor

As with any electrical equipment, careless use and unprofessional maintenance are able to cause serious electrical shock and other hazards. In the interests of safety, the following suggestions should be followed at all time. Your monitor includes an appropriated plug for your area.

Power source precautions

Never remove the backcover of the monitor.

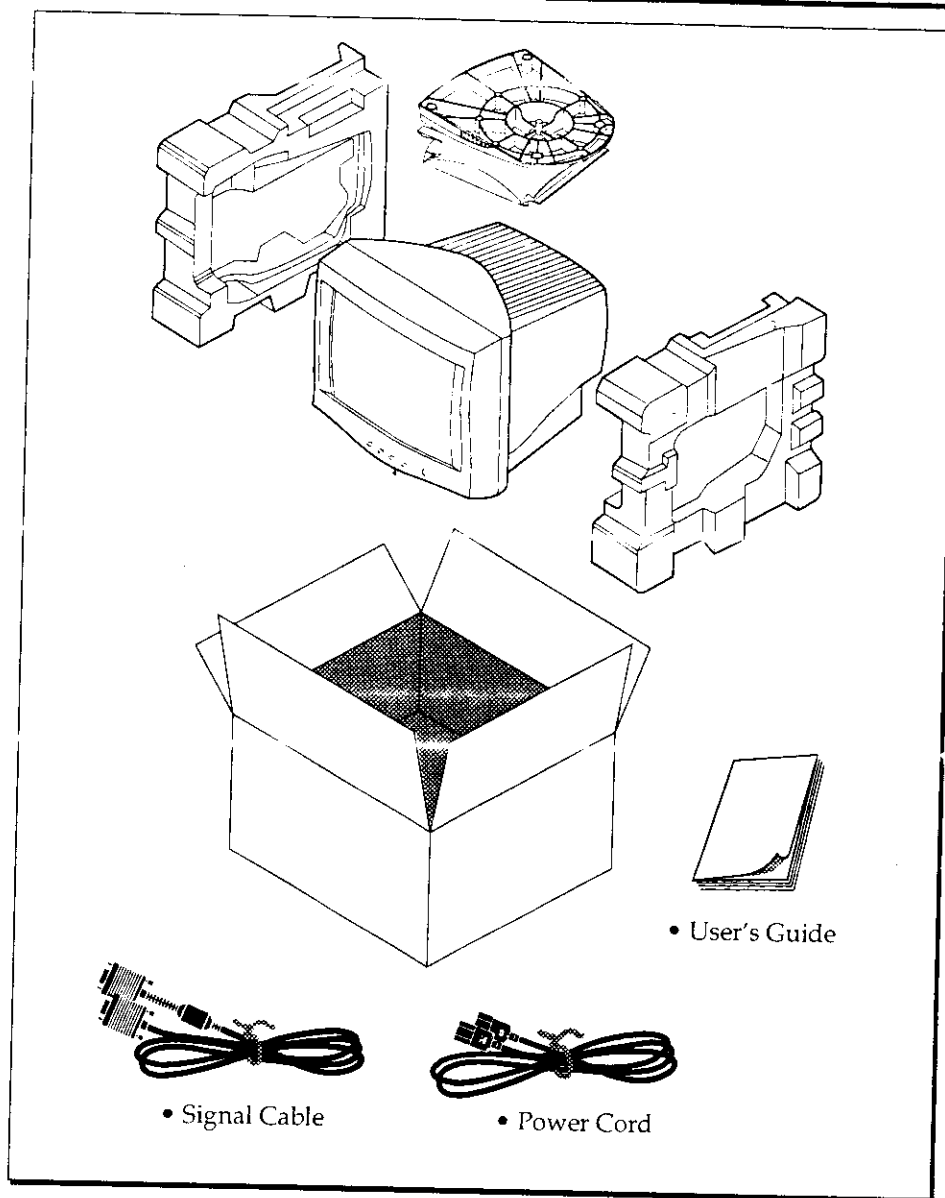
This will expose you to very high voltages and other hazards. If the display monitor does not operate properly, remove the power cord from the wall outlet, and contact your dealer. As a safety feature, this monitor is equipped with a polarized, alternating current line plug.(Grounded, 3 prong plug)

This plug will fit into the outlet only one way. If you are unable to insert the plug fully into the outlet, or if the plug simply does not fit, contact an electrician to replace the obsolete outlet.

Do not defeat the safety purpose of this polarized plug.

WARNING: When positioning this equipment, please ensure that the main plug and the socket are easily accessible.

2. Packing list

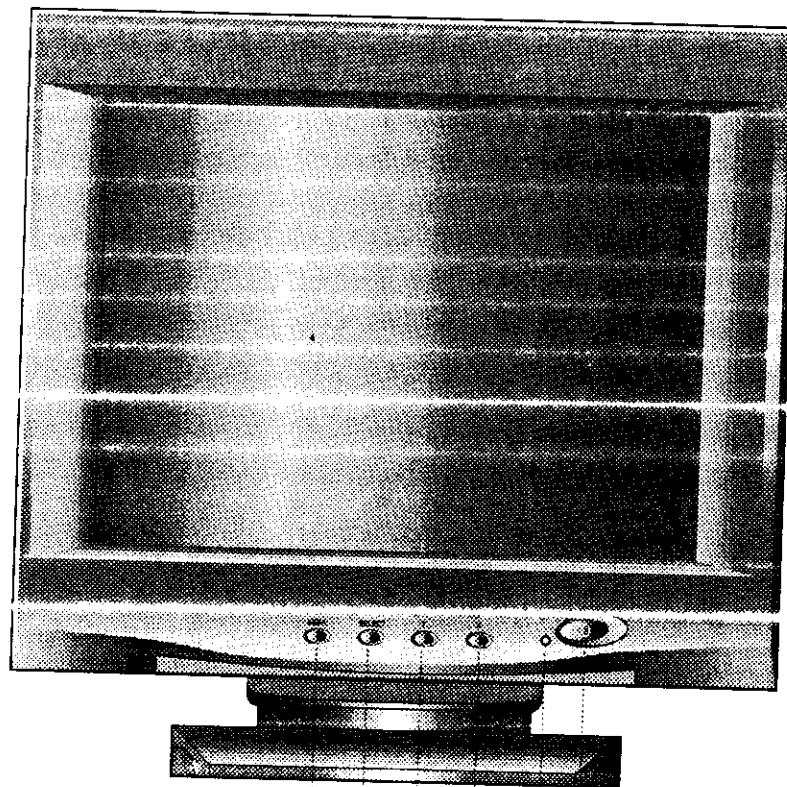


Notice

Above power cord can be changed upon different voltage areas.

3. Control description

Front view



MENU

SELECT

Adjust -

Adjust +

Power switch

Power (DPMS) LED

4. Micro-controller features

The microcontroller automatically detects the video board installed in your system. When you turn on the monitor, the microcontroller first checks the display mode memory stored in the user setting area and the factory presetting area.

Display modes memory

The microcontroller has the memory capacity to store 33 different display modes including timing formats and display settings. This memory capacity is divided into two parts. One is the user setting area, the other is the factory presetting area.

- **User setting area**

The user can add nonstandard modes. If you adjust display image, the image is saved automatically. Then the microcontroller always detects and displays the mode stored in the user setting area when the monitor is turned on.

The user setting area maintains the 20 display modes set by the user in its memory. When the user setting area is full (20 modes are registered), if new nonstandard timing is registered, the oldest timing settings will be deleted.

- **Factory presetting area**

There are 13 display modes stored in this area. These display modes are preset at the factory and include most of the display modes currently available (see TIMING CHART of this manual). You can also retrieve the factory preset mode by selecting the RECALL menu.

- **Automatic save**

The monitor automatically saves the new setting after 1 second inactivity.

5. Power management

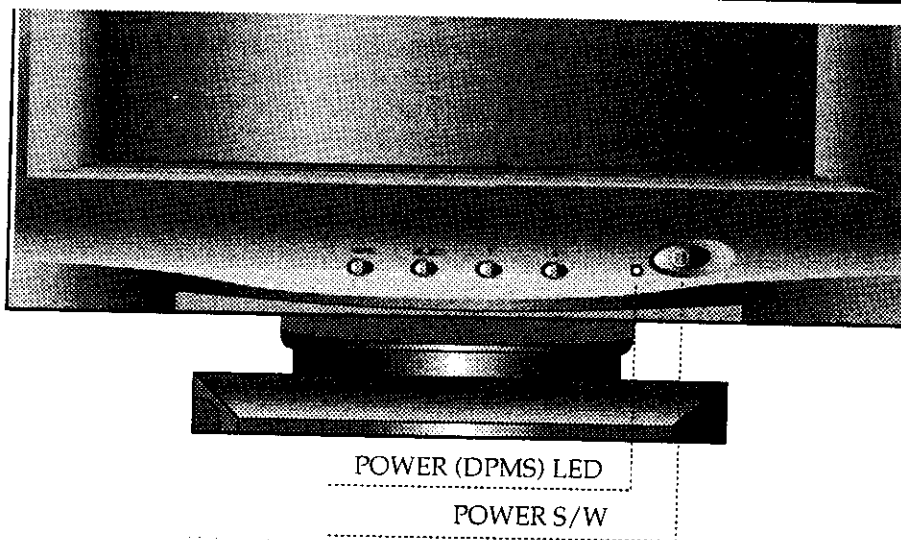
This monitor is equipped with DPMS(Display Power Management Signaling) function which automatically leads the monitor to the state of power saving that consumes just a little power less than 8W, when the computer is left unattended. Although the monitor can be left in power-saving mode for longer periods, we recommend that you turn it off after your daily work, because degaussing helps maintain faultless color purity, every time you turn the power on.

Operation

The DPMS function requires support from the computer system or any software DPMS function applied, currently being used. If the keyboard(or mouse) is left unattended for a certain period, the program or system will set the sync signals to DPMS modes. The DPMS function has three states. The recommended signals, power consumption and recovery times are shown in the table below.

STATES	SIGNAL			POWER CONSUMPTION	RECOVERY TIME	LED INDICATOR
	H.S	V.S	VIDEO			
ON	PULSES	PULSES	ACTIVE	100W(normal)	-	GREEN
STAND-BY	NO PULSES	PULSES	BLANK	20W	WITHIN 1 SEC	ALTERNATING GREEN (1.0 SEC) / ORANGE (1.0 SEC)
SUSPEND	PULSES	NO PULSES	BLANK	LESS THAN 20 W	• HL-7687B: WITHIN 15 SEC • HT-7687B: WITHIN 3 SEC	ALTERNATING GREEN (0.5 SEC) / ORANGE (0.5 SEC)
OFF	NO PULSES	NO PULSES	BLANK	LESS THAN 8 W	WITHIN 30 SEC	ORANGE

6. On screen controls & LED indicator



Main menu & control selection

Press the MENU, ▼ or ▲ key to access the main menu.
The resolution and vertical frequency are displayed on the top in the menu box.
When nonstandard signal is detected, the horizontal and vertical frequency is displayed.
Place the highlighted bar on the control you wish to adjust by pressing the ▼ or ▲ key.
Press the SELECT key to access the control.

Exit menu

Press the MENU key two times to exit.

Auto exit

The OSD images are disappeared automatically after 10 seconds inactivity.

Auto save

The monitor automatically saves the new setting after 1 second inactivity.

Normal mode

POWER LED is lit Green

DPMS mode

- OFF MODE: - No Signal cable or signal isn't detected.
- any key is pressed on Self test Mode.
- Power LED is lit orange.

Out of range

When an unsuitable signal is detected, the OSD images, OUT OF RANGE, is displayed.


Check your system or setup video mode again.

Aging Mode

The monitor has an enhanced level of self-diagnostics.


When the signal cable is removed or signal isn't detected, the monitor is operated to OFF-Mode.


If you press any key over 10 seconds on OFF-Mode, the system has the ability to generate on demand an R,G,B Test pattern and the following OSD image is displayed on screen.

NOW WE ARE GETTING IN AGING
NO(↓) / YES(↑)
IF YOU WANT POWER SAVE MODE
RUN  FUNC. IN MAIN-MENU

Note

After you press any key over 10 seconds in self test mode, monitor is entered in aging mode in case of selecting " YES " on the menu.

If you want to exit from aging mode, please execute preset  function on the menu, after connect signal cable.

In order to execute preset  function, you should input normal signal source to monitor.

※AGING Mode : Monitor Burn-In mode using in product Line.

Factory-Menu State

If you press the menu key and power switch on, at the same time factory-menu is displayed.

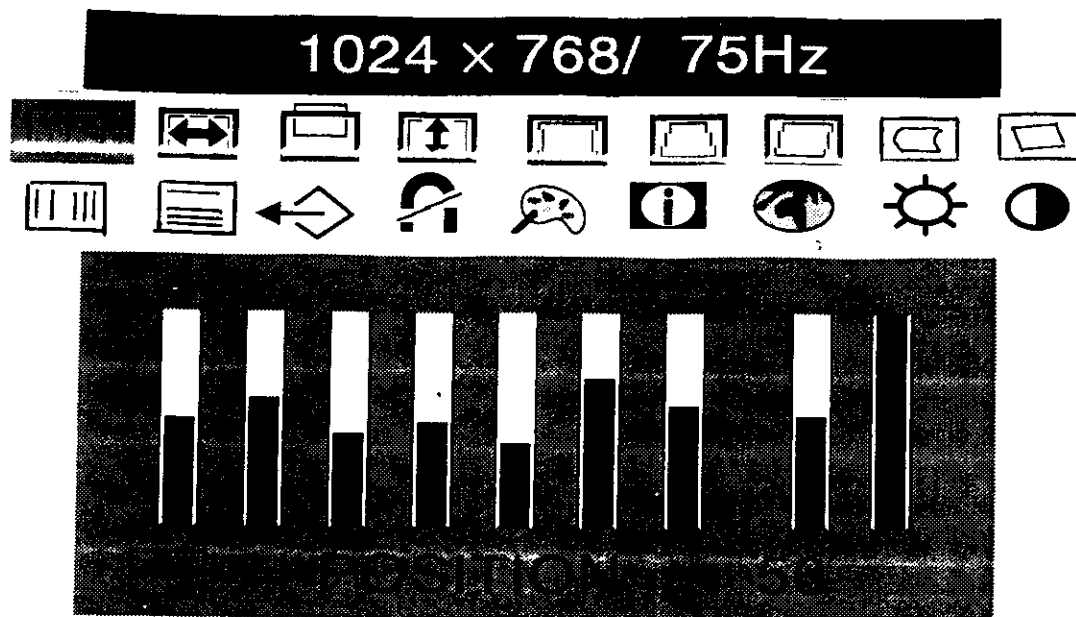
After the factory-menu is displayed, if you change the value, this value is the state of user mode's recall. If possible, please don't press the menu key and power switch at the same time.

Self-diagnost

If you press the select key and power switch on at the same time, the monitor's function will be checked automatically and then get back to initial state, you can find easily the problem.

7. External controls

MAIN MENU



H-POSITION



- A) Press (▲) button to adjust the screen to the right.
- B) Press (▼) button to adjust the screen to the left.

H-SIZE



- A) Press (▲) button to increase the horizontal size.
- B) Press (▼) button to decrease the horizontal size.

V-POSITION



- A) Press (▲) button to adjust the screen to the top.
- B) Press (▼) button to adjust the screen to the bottom.

V-SIZE



- A) Press (▲) button to increase the vertical size.
- B) Press (▼) button to decrease the vertical size.

PINCUSHION



- A) Press (▲) button to bow out the vertical side line.
- B) Press (▼) button to bow in the vertical side line.

TRAPEZOID

- A) Press (▲) button to make the image wider at the bottom.
 B) Press (▼) button to make the image wider at the top.

TILT

- A) Press (▲) button to adjust the tilt to the clockwise direction.
 B) Press (▼) button to adjust the tilt to the counterclockwise direction.

PARALLELOGRAM

Press (▲ or ▼) button to get up right Image.

PIN BALANCE

Press (▲ or ▼) button to adjust vertical edges' convex and concave pitch.

H-MOIRE

Press (▲ or ▼) button to reduce interference which causes unwanted color texturing, or blemished patterning.

V-MOIRE

Press (▲ or ▼) button to reduce interference which causes unwanted color texturing, or blemished patterning.

RECALL

In a factory preset mode the RECALL will reset the image size, position and geometry settings to the factory presetting. In a user setting mode, this control has no effect for the image size, position and geometry settings. But the contrast will be reset to maximum luminance and brightness to cut-off level by selecting this control in any modes.

DEGAUSS

Press the select key to eliminate any purity distortion due to tilt, rotation or residual magnetism.

CAUTION: Please allow a minimum of 20 minutes to elapse between uses of the Degauss Button, when not switching from mode to mode. Do not hold the button down continuously to avoid damage to the monitor.

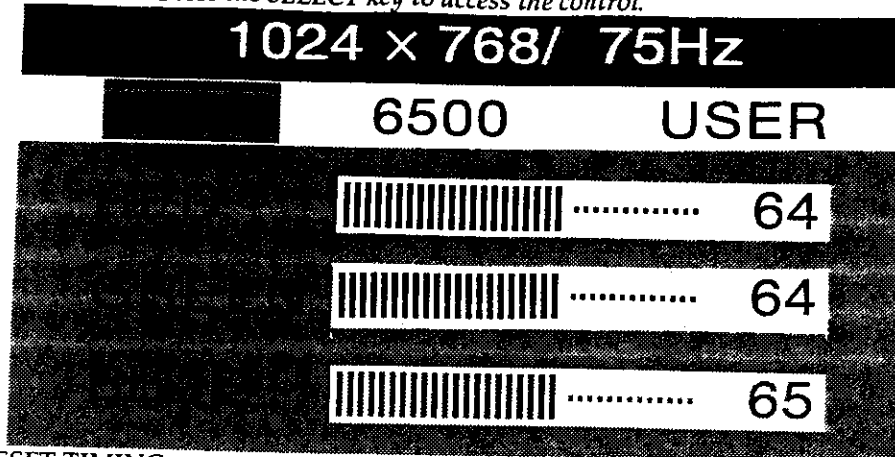
COLOR ADJUST



You can select the color temperature 9300°K or 6500°K by selecting this control. Select the COLOR ADJUST menu to access the sub-menu of color adjustment.

And you can define your own color by selecting user. Place the highlighted bar on the control you wish to adjust by pressing the (▲) or (▼) key.

Press the SELECT key to access the control.



PRESET TIMING



You can see the 13 factory presetting modes by selecting this control.

ENGLISH



You can select one of 5 language OSD by selecting this control. This monitor supports English, German, French, Italian, Spanish. Place the highlighted bar on the language you wish to use by pressing the SELECT key.

BRIGHTNESS



- A) Press (▲) button to heighten the brightness level of the picture.
- B) Press (▼) button to lower the brightness level of the picture.

CONTRAST



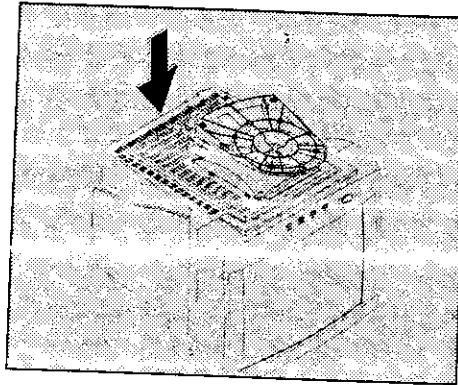
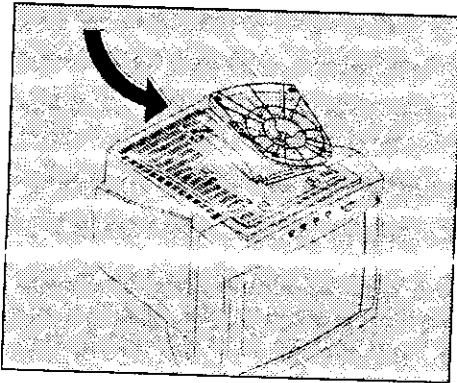
- A) Press (▲) button to heighten the contrast level of the displayed image.
- B) Press (▼) button to lower the contrast level of the displayed image.

8. Tilt & swivel-fixing/removing

Fixing

This product consists of the display monitor and the tilt and swivel. When fixing the tilt and swivel to the display monitor, please follow the steps below.

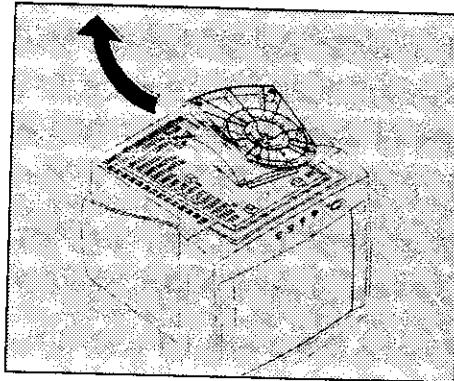
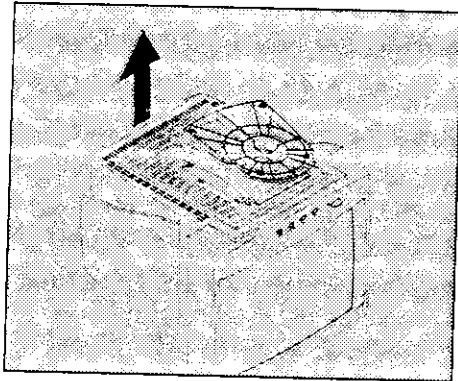
- Push the four hooks of the tilt and swivel into the four holes at the bottom of the display monitor.
- Then slide the tilt and swivel forward.
- Then the latch is going to come above the tilt and swivel base, and it is fixed firmly.



Removing

Please remove the tilt and swivel when transporting for repairing.

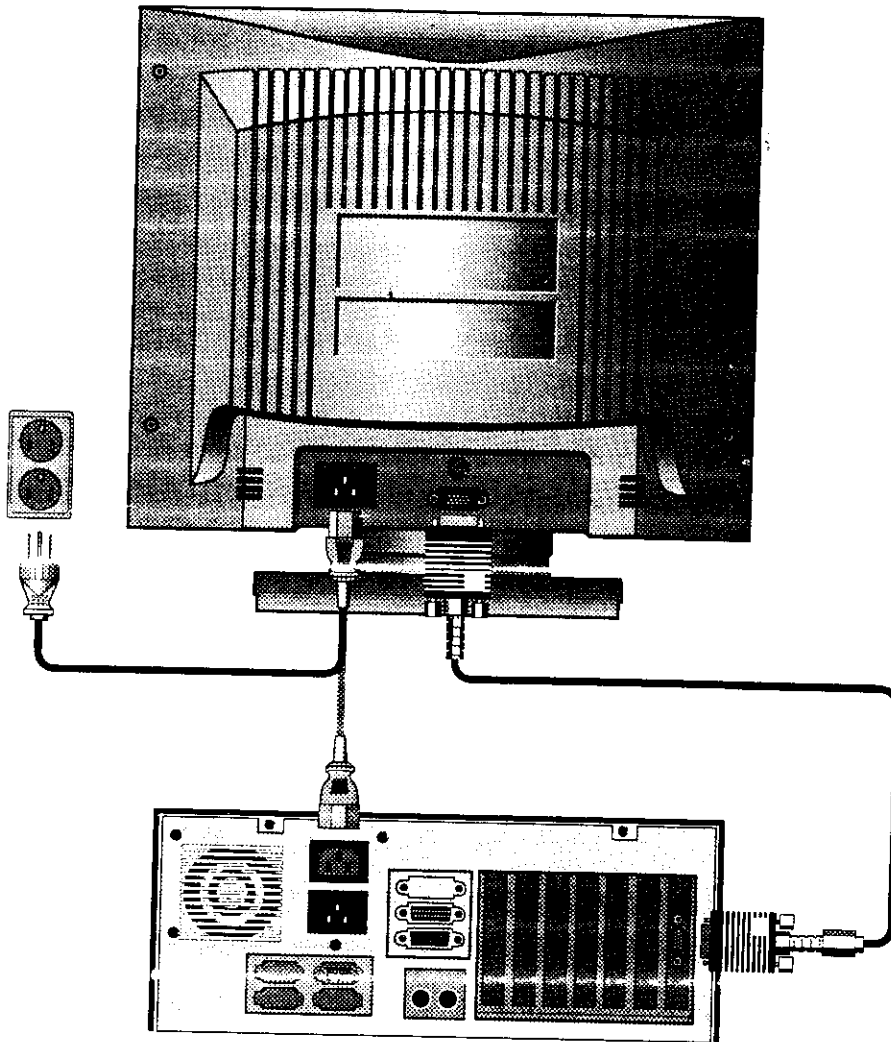
- Push down the latch of the display monitor and pull out the tilt and swivel.
- Slide backward the tilt and swivel from the front of the display monitor.
- Pull out the tilt and swivel from the holes of the display monitor.



9. Connecting with external equipment

Cautions

Be sure to turn off the power of your computer before connecting the monitor.



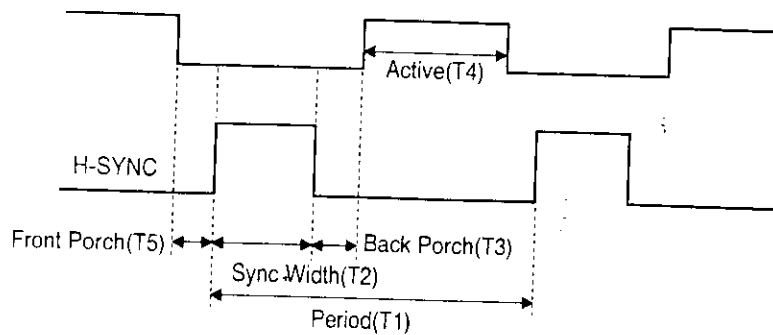
10. Preset timing chart

TIMING CHARTS

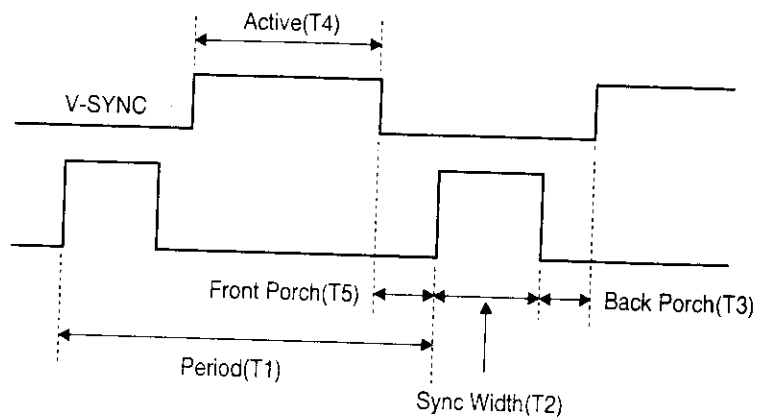
Supported video timings

This monitor shall be capable of displaying following video timing charts.

- Timing charts



(FIG.1 H-SYNC)



(FIG.2 V-SYNC)

- Input timing limits

H-sync pulse width: $1.0\mu s \leq \text{Sync Pulse Width} \leq 8.0\mu s$

V-sync pulse width: $0.04ms \leq \text{Sync Pulse Width} \leq 0.5ms$

Note : If the sync pulse width of input timing is out of range of input timing limits, monitor may be able to operate abnormal.

Be sure to check the sync pulse width of input timing.

- Input level limits

Low level : 0.4V max

High level : 2.4V min

• Timing table

Horizontal		Pixel	720	640	640	640	800	800	800	1024	1024	1024	1280
Frequency		kHz	31.469	31.469	37.500	43.269	50.625	46.875	53.674	63.920	60.021	68.677	79.976
Period(T1)		μ s	31.778	31.778	26.667	23.111	19.752	21.333	18.631	15.645	16.660	14.561	1.504
Sync Width(T2)		μ s	3.813	3.813	2.032	1.556	1.580	1.616	1.138	1.185	1.210	1.016	1.067
Back Porch(T3)		μ s	1.907	1.907	3.810	2.222	1.975	3.232	2.702	2.015	2.235	2.201	1.837
Active(T4)		μ s	25.422	25.422	20.317	17.778	15.802	16.162	14.222	11.852	13.003	10.836	9.481
Front Porch(T5)		μ s	0.636	0.636	0.508	1.556	0.395	0.323	0.569	0.593	0.203	0.508	0.119
Vertical		Lines	400	480	480	480	480	600	600	600	768	768	1024
Frequency		Hz	70.087	59.940	75.000	85.008	100.049	75.000	85.061	100.03	75.020	84.997	75.025
Period(T1)		ms	14.268	16.683	13.333	11.764	9.995	13.333	11.756	9.997	13.323	11.765	13.329
Sync Width(T2)		ms	0.064	0.064	0.080	0.069	0.059	0.064	0.056	0.063	0.050	0.014	0.038
Back Porch(T3)		ms	1.080	1.048	0.427	0.578	0.435	0.448	0.503	0.501	0.466	0.524	0.475
Active(T4)		ms	12.711	15.253	12.800	11.093	9.481	12.800	11.179	9.387	12.795	11.183	12.804
Front Porch(T5)		ms	0.413	0.318	0.027	0.023	0.020	0.021	0.019	0.047	0.017	0.015	0.013
Interlaced		Y/N	N	N	N	N	N	N	N	N	N	N	N
Sync Polar	H		-	-	-	-	-	-	-	-	-	-	-
	V		+	+	+	+	+	+	+	+	+	+	+

The monitor is compatible with additional modes within the specified frequency ranges provided that they are different at least for one of the following :

Horizontal Freq.: $\pm 0.7\text{kHz}$

Vertical Freq.: $\pm 1\text{Hz}$

Note: Even if the monitor detects the input timing as a factory preset mode, the size and position may not be able to be set as desired. Check the input timings are under the specifications and adjust the image as you want.

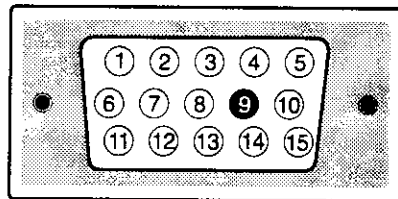
For better quality of display image, use the timing and polarity shown in the table above. Please see your video card user's guide to ensure compatibility.

11. Video input terminal

A 15 pin D-sub connector is used as the input signal connector.
Pin and input signals are shown in the table below.

PIN NO.	Pin Description	
	SIGNAL	
1	RED	RED
2	GREEN	GREEN
3	BLUE	BLUE
4	GROUND	GROUND
5	DDC RETURN	DDC RETURN
6	RED GROUND	RED GROUND
7	GREEN GROUND	GREEN GROUND
8	BLUE GROUND	BLUE GROUND
9	N.C	N.C
10	LOGIC GROUND	LOGIC GROUND
11	GROUND	GROUND
12	SDA	SDA
13	H-SYNC	(H+V) SYNC
14	V-SYNC(VCLK)	VCLK
15	SCL	SCL

D-Sub miniature connector



12. Specifications

CRT	SIZE	17"(15.7" viewable) Diagonal, Flat
	Dot Pitch	0.26 mm
	Type	Non-glare, Anti-Static
Input	Signal	R.G.B Analog
	Connector	15 pin D-Type, 6 pin Mini-DIN
SYNC	H-F	30~87kHz(Automatic)
	V-F	50~150Hz(Automatic)
Video Bandwidth		130 MHz(Max dotrate)
Display	Area(H×V)	300×225 mm(Max. OVERSCAN)
	Color	Infinite
Resolution		Max. 1280 x 1024 (80KHz/65Hz)
User Controls & OSD Controls		H/V Position, H/V Size, Pincushion, Trapezoid, Parallelogram, Pin Balance, H/V Moire, Tilt, Recall, Degauss, Color adjust, Preset timing, 5-languages, Brightness, Contrast, DPMS LED, Power Switch
Power Management		As per VESA Standard, Lower than EPA's recommendation
VESA DDC 1/2B		Basic
Compatibility		VESA, 8514/A, XGA, EVGA, MAC II
Power Source		100-240 VAC(Universal Power) 1.3A 100W
Safety & Regulation	MPR II	HL-7687B
	TCO	HT-7687B
	EMC	FCC Class B, CE
	Safety	UL, CSA, TUV-GS, ISO-9241-3, DHHS, NEMKO, DEMKO, FIMKO, SEMKO
Temperature	Operating	0 to 40 degree celsius
	Storage	-10 to 60 degree celsius
Humidity	Operating	35% to 80%(Non-condensing)
	Storage	30% to 85%
Weight		Unit : 16.3Kg Carton : 19.0Kg
Dimension(W×H×Dmm)		422×410×447 mm

► Specification is subject to change without notice for performance improvement.



Printed in Korea.

632 0171 108

HYUNDAI

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ATTACHMENT B. SCHEMATIC(BLOCK DIAGRAM)