ATTACHMENT E. USERS MANUAL

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DELUXSCAN P990
Multiscanning Color Monitor

- USER'S GUIDE
- MANUEL D'UTILISATION
- GUIDA DELL'UTENTE
- BENUTZERHANDBUCH
- GUÍA DEL USUARIO

DELUXSCAN®

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.

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DELUXSCAN P990
Multiscanning Color Monitor

USER'S GUIDE

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How to get the most out of this monitor

This 19" color monitor (18' viewable) displays signals from personal or micro-computers.
This manual has been prepared to familiarize you with your new display monitor.

Color display tube
Dot Pitch 0.25mm

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

Features
- High contrast CRT for sharp and crisp images.
- 19" Diagonal screen (18" viewable) with non-glare direct etched surface.
- Unlimited Color Display.
- DPMS(Display Power Management Signaling).
- OSD(On Screen Display) controls.
- DDC 1/2B (Display Data Channel 1/2B)

General safety precautions
This monitor has been engineered and manufactured to ensure your safety.
You can prevent serious electrical shock and other hazards by keeping in mind the following :

- 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 power source.
- Make sure the power cord and all other cords are securely and correctly connected.
- Avoid operating the monitor in extreme heat, humidity or an area affected by dust.
- Never cover the ventilation openings with any material and never touch them with metallic or inflammable materials.
- Do not overload AC outlets. Extension cords, frayed power cords and broken plugs are dangerous and may result in electric shock or fire. Call your service technician for replacement.
- Do not open the monitor. There are no user-serviceable components inside and there are dangerously high voltages inside, even when the power is turned off. Contact your dealer if the monitor is not operating properly.

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- Do not use aerosol directly on the picture tube because the spray may cause electrical shock.

Video monitor precautions

As with any electrical equipment, careless use and unprofessional maintenance may cause serious electrical shock and other hazards.
In the interests of safety, the following suggestions should be followed at all time.

Power source precautions

Never remove the monitor's backcover.
Doing so will expose you to high voltage electricity 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 one way only. 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 by attempting to force.

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

Cleaning and Maintenance

The monitor must be switched off and the power supply cable disconnected during all cleaning operations.

- Use a damp cloth for cleaning the monitor.

- Do not touch the screen with your fingers, as the natural oils from your body leave smears on the screen and tend to attract dust.

- Do not use petrol, alcohol, solvents or abrasives for cleaning the monitor. These substances could corrode the external parts.

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Packing List

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Signal Cable

Power Cord
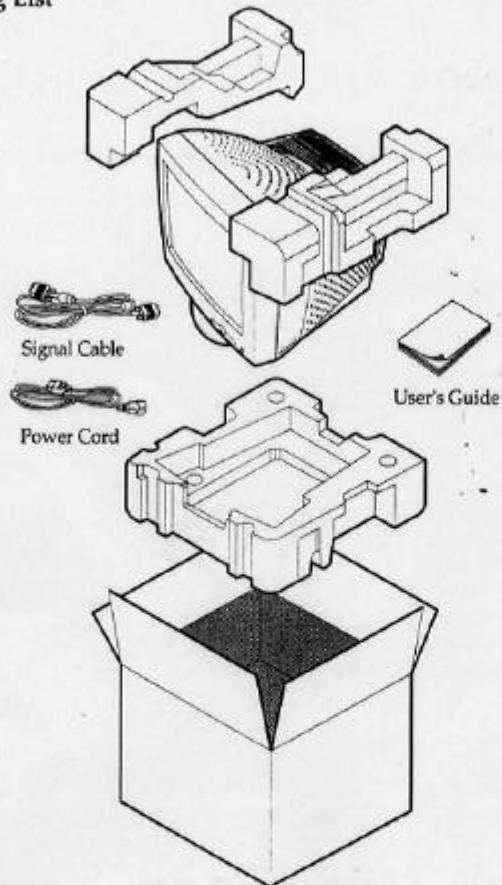
User's Guide

! *Above power cord can be changed upon different voltage areas.*

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Connecting with external equipment

Check that the computer is switched off before installing the monitor. The monitor is equipped with a cable for connection to the computer. The cable for connection to the power supply is provided with the computer. Follow the procedure described below to make the monitor operational :

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■ P/C
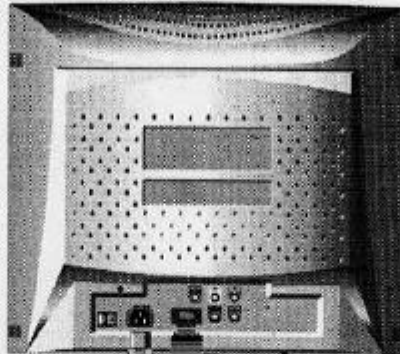
Connect the video signal cable (15-pin connector) to the connector on the video board inside the computer, usually located on the rear panel of the computer.

Connect the power supply cable to the monitor and then to the power supply.

! *Remember to turn off the power of PC before installing this monitor to it.*

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After powering on the computer, wait for 30 seconds, then adjust the display using the various controls provided (see later). For further information on the installation procedure, refer to the operating guide of the computer being used.

- **WORKSTATION**

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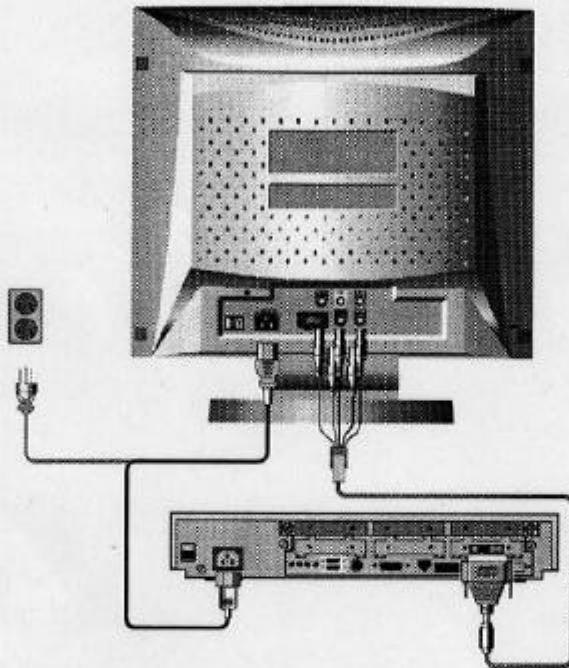
!   *Remember to turn off the power of workstation before installing this monitor to it.*

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Micro-controller features

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

Display modes memory

The micro-controller has the memory capacity to store 22 different display modes
including timing formats and display settings. This memory capacity is divided into
two parts. One is the user-setting area, and 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. The micro-controller then always detects and displays the mode stored
in the user-setting area when the monitor is turned on. The user-setting area
maintains up to 10 display modes set by the user in its memory.

Factory-presetting area

There are 12 display modes stored in this area.
These modes are preset at the factory and include most of the display modes currently
available (see TIMING CHART in this manual). You can also retrieve the factory-
preset mode by selecting the RECALL menu.

DDC 1/2B (Display Data Channel 1/2B)

This monitor includes a DDC 1/2B feature.
DDC 1/2B (Display Data Channel 1/2B) is a communication channel by 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.

> **!** Some computer systems are not compatible with the DDC standard. If your
> monitor displays the incorrect resolution, please check your computer system
> including a DDC compatible video card.

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On screen controls and LED indicator

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Recall key

Function Button

Adjust Dial(Rotary Volume)

Power LED
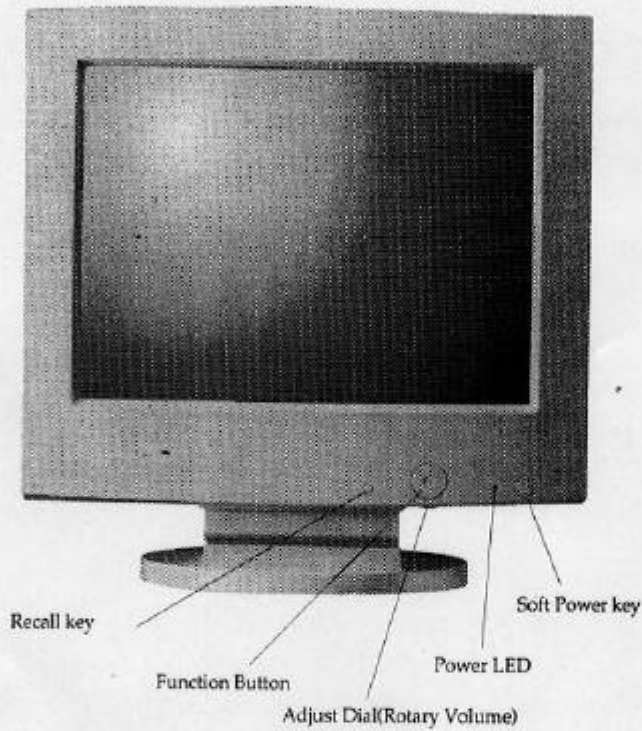
Soft Power key

Monitor control panel
The monitor's control panel consists of the Soft power key, Power LED, Function dial (Adjust dial), Menu/select key, recall key, zoom key.

Soft power key
The soft power key is used to put the monitor into power down mode.
To enter power down mode, press the soft power key.
To return the monitor to normal operation, press the soft power key one more time.

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Adjust dial

Adjust dial is used to select a OSD control from the OSD main menu and to adjust selected function.

When the OSD menu is off, you can adjust contrast by rotating the adjust dial. To increase the screen's contrast, rotate the dial clockwise; rotate counterclockwise to decrease.

Recall key

1) The Recall key is used to exit OSD menu
   When the OSD menu is displayed, if you press the recall key one time, OSD menu is disappeared.
2) 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 setting. But the contrast will be reset to maximum luminance and brightness to cut-off level by selecting this control in any modes.

Power LED

When the main power switch on the rear panel (OPTION) and the soft power key on the front panel are switched on, this LED lights in green.

- Normal mode : Power LED is lit green
- DPMS mode : This LED indicates different status when this unit operates in different power saving modes.
- Soft power down : Power LED is not lit.

Main menu / select key

This key is used to bring Main menu and to select the function. Press the menu/select key to access the main menu.
The resolution and frequency are displayed at the top of the menu box. When nonstandard signal is detected, <<USER MODE>> message and the frequency is displayed.
Select the menu which you wish to adjust by rotating the menu/select key to the clockwise or counterclockwise.
Press the menu/select key and you can adjust selected function.

Exit main menu

Press recall key one time or press function button for seconds.

Auto exit

The OSD images are disappeared automatically according to the setting time of OSD display time (5, 8, 12, 20, 30 sec)

Auto save

This monitor automatically saves the new setting after 1 second.

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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.

Self Test 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 the menu/select key is pushed on OFF Mode, the system has the
ability to generate on demand an RGB test pattern and the following OSD image is
displayed on screen.

```
NO SIGNAL
  SELF  TEST  MODE
  SELF  TEST  MODE
  SELF  TEST  MODE
```

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External Control

1. Geometry : H/V-POSITION, H/V-SIZE, PINCUSHION, TRAPEZOID, PARALLEL, PINBALANCE ,TOP-CORNER, BOTTOM-CORNER, ROTATION

1) Press the menu key, and the OSD MENU is displayed.
2) Place the cursor to the GEOMETRY menu by rotating the adjust dial.
3) Press the menu key, and you can select the item you want by rotating the dial.
4) Press the menu key, you can adjust the selected item by rotating the adjust dial.
5) To go back previous status, press RTN key.
6) To go back OSD MAIN MENU, rotate the adjust dial to select RTN, and press the menu key.
7) If you press the RECALL key only one time, the OSD menu is disappeared.

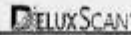**2. COLOR: CONTRAST, BRIGHTNESS, 6500, 9300, USER**

1) Press the menu key, and the OSD MENU is displayed.
2) Place the cursor to the COLOR menu by rotating the adjust dial.
3) Press the menu key, and you can select the item you want by rotating the dial.
4) Press the menu key, you can adjust the selected item by rotating the adjust dial.
5) To go back previous status, press menu key.
6) To go back OSD MENU, rotate the adjust dial to select RTN, and press the menu key.
7) If you press the RECALL key only one time, the OSD menu is disappeared.

* At the USER menu you can adjust red and blue color by select the adjust dial.
1) Place the cursor to USER by rotating the adjust dial
2) Press the menu/select key, and you can adjust red color by rotating the adjust dial.
3) Press the menu/select key, and you can adjust blue color by rotating the adjust dial.
4) Press the menu/select key, and the cursor move to RTN.
5) Press the menu key to return to OSD MENU.

3. LANGUAGE

1) Press the menu key, and the OSD MENU is displayed.
2) Place the cursor to the LANGUAGE menu by rotating the adjust dial.

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3) Press the menu key, and you can select the language you want by rotating the dial.
4) Press the menu key, and you can see the selected language.
5) To go back OSD MENU, rotate the adjust dial to select RTN, and press the menu key.
6) If you press the RECALL key only one time, the OSD menu is disappeared.

4. MODE INFORMATION

1) Press the menu key, and the OSD MENU is displayed.
2) Place the cursor to the INFORM menu by rotating the adjust dial.
3) Press the menu key, and you can see more mode information by rotating the dial.
4) To go back OSD MENU, rotate the adjust dial to select RTN, and press the menu key.
5) If you press the RECALL key only one time, the OSD menu is disappeared.

5. OSD Adjust: H/V-DELAY, HEIGHT, DISPLAY TIME

1) Press the menu key, and the OSD MENU is displayed.
2) Place the cursor to the OSD menu by rotating the adjust dial.
3) Press the menu key, and you can select the item you want by rotating the dial.
4) Press the menu key, you can adjust the selected item by rotating the adjust dial.
5) To go back previous status, press menu key.
6) To go back OSD MENU, rotate the adjust dial to select RTN, and press the menu key.
7) If you press the RECALL key only one time, the OSD menu is disappeared.

6. MISC.: BNC/DSUB, DEGAUSS, ABL, MOIRE

1) Press the menu key, and the OSD MENU is displayed.
2) Place the cursor to the MISC menu by rotating the adjust dial.
3) Press the menu key, and you can select the item you want by rotating the dial.
4) Press the menu key, you can adjust the selected item by rotating the adjust dial.
5) To go back previous status, press menu key.
6) To go back OSD MENU, rotate the adjust dial to select RTN, and press the menu key.
7) If you press the RECALL key only one time, the OSD menu is disappeared.

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* At the MOIRE menu you can adjust H-MOIRE and V-MOIRE color by select the MOIRE menu.
1) Place the cursor to MOIRE by rotating the adjust dial
2) Press the menu/select key, and the MOIRE is displayed.
3) By selecting ON menu, and the cursor positioned the H-MOIRE.
4) Press the menu/select key, and you can adjust H/V-MOIRE by rotating the adjust dial.
5) To go back previous menu, select UP menu.
6) Press the menu key RTN to return to OSD MENU.

7. EXIT
1) Press the menu key, and the OSD MENU is displayed.
2) Place the cursor to the EXIT menu by rotating the adjust dial.
3) Press the menu key, and then the OSD menu is disappeared.

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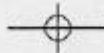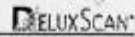
Preset timing chart

TIMING CHARTS

Supported video timings
This monitor is capable of displaying the following video timing charts.

Timing charts
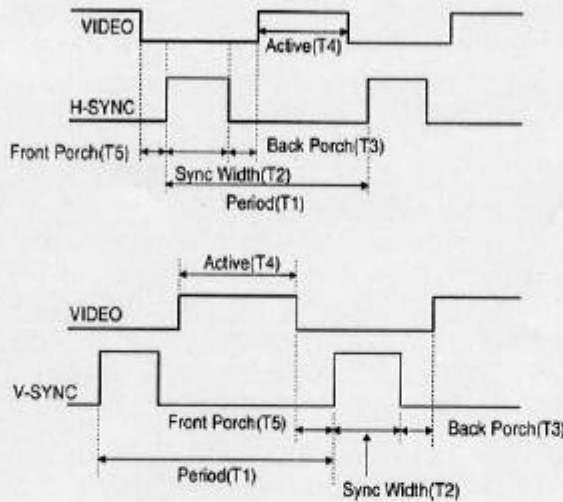
Input timing limits

H-sync pulse width: $1.0\mu s \leq$ Sync Pulse Width $\leq 8.0\mu s$
V-sync pulse width: $0.04ms \leq$ Sync Pulse Width $\leq 0.5ms$

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

Input level limits

Low level : 0.4V max
High level : 2.4V min

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Timing table

Horizontal	Pixel	720	640	640	640	800	1152	1024	1024	1280	1280	1600	1600
Frequency	kHz	31.469	31.469	43.269	63.657	53.674	67.500	68.677	81.845	79.976	91.146	75.000	93.750
Period(T1)	μs	31.778	31.778	23.111	15.709	18.631	14.815	14.561	12.219	12.504	10.971	13.333	10.677
Sync Width(T2)	μs	3.813	3.813	1.556	1.745	1.138	1.185	1.016	1.164	1.067	1.016	1.185	0.948
Back Porch(T3)	μs	1.907	1.907	2.222	1.745	2.702	2.370	2.201	1.455	1.837	1.422	1.877	1.501
Active(T4)	μs	25.422	25.422	17.778	11.636	14.222	10.667	10.836	9.309	9.481	8.127	9.877	7.901
Front Porch(T5)	μs	0.636	0.636	1.556	0.582	0.569	0.593	0.508	0.291	0.119	0.406	0.395	0.316

Vertical	Lines	400	480	480	480	600	864	768	768	1024	1024	1200	1200
Frequency	Hz	70.087	59.940	85.008	120.110	85.061	75.000	84.997	100.795	75.025	85.024	60.000	75.000
Period(T1)	ms	14.268	16.683	11.764	8.325	11.756	13.333	11.765	9.922	13.329	11.761	16.667	13.333
Sync Width(T2)	ms	0.064	0.064	0.069	0.094	0.056	0.044	0.044	0.037	0.038	0.033	0.040	0.032
Back Porch(T3)	ms	1.080	1.048	0.578	0.566	0.503	0.474	0.524	0.464	0.475	0.483	0.613	0.491
Active(T4)	ms	12.711	15.253	11.093	7.450	11.179	12.800	11.183	9.384	12.804	11.235	16.000	12.800
Front Porch(T5)	ms	0.413	0.318	0.023	0.126	0.019	0.015	0.015	0.037	0.013	0.011	0.013	0.011
Interlaced	Y/N	N	N	N	N	N	N	N	N	N	N	N	N
Sync Polar	H	-	-	+	-	+	+	+	-	+	+	-	+
	V	+	-	-	-	+	+	+	-	+	+	-	+
Pixel Clock	MHz	28.300	25.100	36.000	55.000	56.200	108.000	94.500	110.000	135.000	157.500	162.000	202.500

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

Horizontal Freq.: ±400Hz
Vertical Freq.: ±0.91Hz

Even if the monitor detects the input timing as a factory preset mode, you may not be able to set the position as desired. Check the input timings are under the specifications and adjust the image as you want.
For better display image quality, use the timing and polarity shown in the table above. Please see your video card user's guide to ensure compatibility.

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Power management

This monitor is equipped with a DPMS(Display Power Management Signaling) function which automatically cuts power use to just a little less than 5W, 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, which occurs every time your power is turned on, helps maintain faultless color purity.

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 mode. 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	150W	-	Green
Stand-by	No Pulses	Pulses	Blank	60W	Within 1sec	Alternating Green (1sec)/ Orange (1sec)
				15W	Within 3 sec	*Selectable on OSD menu
Suspend	Pulses	No Pulses	Blank	Less than 15W	Within 3 sec	Alternating Green (0.5sec)/ Orange (0.5sec)
OFF	No Pulses	No Pulses	Blank	Less than 5W	Within 30 sec	Orange

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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 Description

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SIGNAL / PIN NO.	SEPARATE/COMPOSITE SYNC
1	RED
2	GREEN/SYNC ON GREEN
3	BLUE
4	GROUND
5	GROUND
6	RED GROUND
7	GREEN GROUND
8	BLUE GROUND
9	+5V
10	LOGIC GROUND
11	GROUND
12	SDA
13	H-SYNC/H+V SYNC
14	V-SYNC(VCLK)
15	SCL

5 BNC	
R	RED
G	GREEN/SYNC ON GREEN
B	BLUE
H/H+V	H-SYNC/H+V SYNC
V	V-SYNC

VIDEO INPUT

D-Sub miniature connector

① ② ③ ④ ⑤
⑥ ⑦ ⑧ ⑨ ⑩
⑪ ⑫ ⑬ ⑭ ⑮

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Specifications

CRT	SIZE	19"(18" viewable) Diagonal, Flat
	Dot Pitch	0.25 mm
	Type	Non-glare, Anti-Static
Input	Signal	R.G.B Analog
	Connector	15 pin D-Sub, 5 BNC
SYNC	H-F	30~95kHz(Automatic)
	V-F	50~150Hz(Automatic)
Video Bandwidth		150 MHz(-3dB)
Display	Area(H×V)	360×370 mm(Max. OVERSCAN)
	Color	Infinite
Resolution		Max. 1600×1200 (95kHz/75Hz)
User Controls & OSD Controls		RECALL, CONTRAST, BRIGHTNESS, H/V POSITION, H/V SIZE, PINCUSHION, TRAPEZOID, PARALLEL, PIN BALANCE, CORNER PIN, ROTATION, H/V MOIRE, DEGAUSS, COLOR ADJUST, MODE INFORMATION, 5-LANGUAGE, OSD DISPLAY TIME, OSD ADJUST, DPMS SELECT, SOFT POWER DOWN, POWER SWITCH(OPTION)
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) 3A 150W
Safety & Regulation	TCO 95	P990
	EMC	FCC Class B, CE
	Safety	UL, CSA, TUV-GS, ISO-9241-3, DHHS, NEMKO, DEMKO, FIMKO, SEMKO
Temperature	Operating	0 to 35 degree celsius
	Storage	-10 to 60 degree celsius
Humidity	Operating	35% to 80%(Non-condensing)
	Storage	5% to 85%
Weight		Unit : 21Kg Carton : 24.7Kg
Dimension(W×H×Dmm)		626×632×566 mm

▶ *Specification is subject to change without notice for performance improvement.*

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