IBM Displays Reference (Technology)

632x = 14V, 15V, 17V
952x = 14P,15P, 17P, 21P (and Touch **14PT, 15PT, 17PT, 21PT**)

The **952x** and **63xx** (except 6318 and 14L8) displays are **multi-sync (multifrequency, multiscanning, variable frequency, autosyncing)** displays and are capable of any modes whose refresh rates fall within the displays range (for example, 50 to 100 Hz). **Preset modes** allow the picture on screen to be perfectly positioned without adjustment.

Premium displays (**85xx** and **952x**) work on all IBM system brands and on non-IBM brands.
Value displays (**63xx**) work on all IBM system brands and on non-IBM brands.
951x displays **ONLY** work with 95xx PS/2's which have XGA-2 or PCs upgraded with XGA-2 Display Adapter (MCA or AT bus). However, 951x displays work with SVGA on the Model 85, but only at 640 x 480 at 75 Hz (9515 and 9517 will not run at 1024 x 768 on Model 85).

	85xx Display	**951x** Display	**63xx and 952x**
PS/2 85XX **(VGA, XGA)**	VGA 60 Hz (NI) XGA 43.5 (I)	Will **NOT** work	VGA 60 Hz (NI) XGA 43.5 (I)
PS/2 95XX **(XGA-2)**	VGA 60 Hz (NI) XGA 43.5 (I)	VGA 75 Hz (NI) XGA2 75 Hz (NI)	VGA 72 Hz (NI) SVGA 72 Hz (NI) XGA2 72 Hz (NI)
638X Value **(SuperVGA)**	VGA 60 Hz (NI) EVGA 43.5 (I)	Will **NOT** work	VGA 72 Hz (NI) SVGA 72 Hz (NI) EVGA 72 Hz (NI)

The number of frames a display draws per second is called the **frame rate, vertical refresh rate, or vertical scanning frequency.**

85xx also have 720 x 350 and 720 x 400 text modes at 70 Hz (NI).
63xx displays also have 720 x 350 and 720 x 400 text modes at 70 Hz (NI) and 88 Hz (NI). (6318 and 14L8 is only 70 Hz).
951x also have 720 x 350 and 720 x 400 text modes at 88 Hz (NI).
952x also have 720 x 350 and 720 x 400 text modes at 70 and 88 Hz (NI).

A refresh rate (Hz) of 70 Hz or higher provides flicker free displays. 72 Hz is minimum ISO compliant refresh rate.

The resolution, vertical refresh rate, and maximum colors are controlled by a combination of the video controller, device driver, and display.

Analog = knobs / thumbwheel; **Digital** = pushbuttons.

All IBM color displays have automatic **degauss** at power on.

Coaxial BNC connections on **17P**, **17PT**, **21P**, and **21PT** split the video signal into separate parts (red/green/blue scans, horizontal and vertical syncs) which are transmitted by five coaxial cables. This offers the highest available RGB picture quality and allows attachment to other systems (Apple, RISC workstations).

17P, 17PT, 21P and **21PT** incorporate special sync processing which allows connection to Apple® Macintosh® systems via optional cables or cable adapters. The **17P** and **21P** can also connect to the **RS/6000**® and other workstations such as **Sun**® and **Unisys**®.

Maximum pel rate is the fastest speed that pels are written across the screen (varies with mode).

At 800 x 600, characters are 20% smaller than 640 x 480.
At 1024 x 768, characters are 37% smaller than 640 x 480.
1024 x 768 shows 2.5 times more information than 640 x 480.

POWER MANAGEMENT

Power Management: the display's ability to automatically power-down into a low power state after a period of inactivity.

US Energy Star ⇒ **30 watts maximum at idle**
**NUTEK**   ⇒ **8 watts maximum at idle**

The US Environment Protection Agency "Energy Star" program requires maximum of 30 watts at idle.
NUTEK requires maximum of 8 watts at idle.

Power mgmt in the **14V, 15V, 17V, 14P, 15P, 17P,** and **21P** follows the VESA DPMS (Display Power Management Signaling) standard, shutting off circuitry in stages after a defined period of system inactivity. The stages are controlled by the Horizontal and Vertical sync lines on the incoming video signal as follows:

Step	H-Sync	V-Sync	Display status	VESA state
1	Active	Active	Normal operation	On
2	Inactive	Active	Blank screen - Instant restart	Standby Recover in 1 second
3	Active	Inactive	Blank screen Video and scans off - Instant restart	Suspend **30 watts max** Recover in 2 seconds
4	Inactive	Inactive	Blank screen Only micro active - Delayed restart	Off **8 watts max** Recover in 10 seconds

The **14P**, **15P**, **17P**, and **21P** have all 4 states available. The **14V**, **15V**, and **21V** have only On, Standby, and Suspend available.

These displays utilize the VESA DPMS protocol software to execute the power saving stages. The power management is actually activated by a specific sofware utility which must be resident in the system driving the display. The displays have the necessary power saving circuitry built in to them standard. This software must support the VESA DPMS hardware interface to the display.
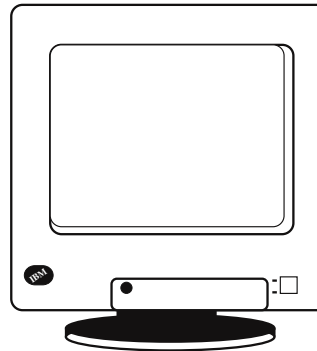
EMISSION GUIDELINES

Stringent	VLMF
↓	MPR-II
Most stringent	TCO-91

640 x 480 is good for a 14" display
800 x 600 is good for a 15" display
1024 x 768 is good for a 17" display
1280 x 1024 is good for a 21" display

Trinitrons and **Diamondtrons** are cylindrical (vertically flat).
FSTs and rounded are spherical (curved in both planes).
FST (Flatter, Squarer, Tube) have slightly flatter glass (but still spherical) and square off the tube corners. A flat/flatter screen produces less glare.

Color tint (color point) **setting** (color matching) adjusts the strength of the red, green, and/or blue electron beams so screen colors more closely match printed colors.

17" displays provide about 50% more viewing area than a 14" display.

I = Interlaced; NI = Non-interlaced