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Macintosh 21 Color Display (International): Specs (Disc.)

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TOPIC -----

This article gives the technical specifications for the Macintosh 21" Color Display.

DISCUSSION -----

Product Overview

This document describes the special features of Apple's Macintosh 21" Color Display. (As of June 1991, this display is not available for sale in the United States.)

Feature Set

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- Two full pages of color display
 - Asymmetric .26 mm horizontal by .29 mm vertical dot pitch
 - 1152 horizontal pixels by 870 vertical lines
 - 79 dots per inch
 - Horizontal scan rate 68.7 kHz
 - Vertical refresh rate 75 Hz
 - Automatic degaussing
 - Excellent ergonomic design
 - Two ADB ports for keyboard and mouse
 - Anti-glare screen
 - Vertically and horizontally pivoting base
 - Meets Swedish recommendation for low frequency magnetic and electric field emissions.

Video Card Support

The 21" Color Display is supported by the same video cards as Apple's Two-Page Monochrome Monitor. Cards supporting the 21" Color Display include:

- Macintosh Display Card 4•8 at 4 bits per pixel
- Macintosh Display Card 8•24 at 8 bits per pixel
- Macintosh Display Card 8•24 GC at 8 bits per pixel
- SuperMac Spectrum 24/PDQ Card at 24 bits per pixel

RasterOps has also indicated that their 24-bit card will support the 21" Color Display. The 21" Color Display is not supported by on-board video on the Macintosh IIci, Macintosh IIcx, or Macintosh LC.

Shadow Mask

A metal shield or mask acts as a filter to separate the red, green, and blue electron beams that create the images you see. The Macintosh 21" Color Display uses a perforated shield called a shadow mask. This differs from some other monitors which use a vertically-oriented aperture grill design. After the electron beams pass through a mask or grill, they strike the designated red, green, or blue dots of phosphor on the back of the screen. When the beams strike the colored phosphor dots, they glow. The combination of the glowing dots produces the color images you see.

Traditional mask and grill designs use perforations arranged in a pattern that interacts with the changing pattern of the electron beams as they scan across the shield. The interaction of these patterns frequently causes a subtle screen interference, called a moire pattern. Certain Macintosh desktop patterns cause the interference to be quite obvious.

The Macintosh 21" Color Display has a unique design for the pattern of tiny holes in its shadow mask. The 21" Color Display uses an asymmetric dot pitch of .029 mm horizontally and .026 mm vertically. This pattern does not conflict with the one created by electron beams and thus avoids the distracting effects of the most common moire patterns.

Uniform Brightness

Traditional CRT technology has limitations that cause many large-screen color monitors to show uneven brightness across the screen. Variable screen brightness degrades the image quality and increases eye fatigue.

The Macintosh 21" Color Display uses a CRT design that provides uniform brightness across the entire screen. All parts of the screen show the same vivid colors. There is no degradation between the center of the screen and the edges.

Adjustable White Point Color Temperature

The white point color temperature is a measure, in degrees Kelvin, of how white a display's white is. Traditional displays use a 9300 degree Kelvin white which has a bluish tint to it and a high contrast. A 6500 degree Kelvin white is similar to page white and is more useful for color matching.

The Macintosh 21" Color Display features an adjustable white point color

temperature. The white point color temperature can be adjusted by selecting the monitors CDEV in the control panel and clicking on the option button. The options dialog offers a choice of gamma tables and among them are the "Mac Std Gamma" and "Page-White Gamma". The "Mac Std Gamma" is the 9300 degree Kelvin option that is the traditional bluish display white. The "Page-White Gamma" is the 6500 degree Kelvin white that closely resembles the white of a printed page.

Automatic Degaussing

The Macintosh 21" Color Display has innovative circuitry that provides automatic degaussing, ensuring that you always have the best image possible on your screen. Color display technology uses magnetic fields to guide electron beams inside the CRT to the screen. If a foreign magnetic field comes close to the CRT, it may disturb the internal magnetic field and cause the beams to be slightly misdirected, distorting the screen image.

Most monitors have circuitry that compensates for the distortions by adjusting the internal magnetic field to counteract the external magnetic field. However, most monitors degauss only when they first start up. If the external magnetic field changes enough during operation to distort the screen image, the image remains distorted until the power is turned off and on again.

The AppleColor™ High-Resolution RGB Monitor has a manual degauss control that allows you to press a button to degauss the monitor without turning it off.

The Macintosh 21" Color Display has startup, manual, and automatic degaussing features. If the small magnetometer (a device that measures magnetic fields) inside the case senses a major change in the ambient magnetic field, it sends a signal that initiates a degauss.

Tilting or swiveling the monitor may change the magnetic field enough to cause distortion, and to trigger automatic degaussing. Automatic degaussing guarantees that the image on your screen is the best it can be. Occasional automatic degaussing is normal. The magnetometer is operational whenever the power is on so it can occur even when there is no image on the screen. If degaussing occurs when you haven't moved the monitor, there may be a source of interference in the room. It may be necessary to move the source of interference to another location to reduce the frequency of automatic degaussing.

Ergonomics

The Macintosh 21" Color Display has several ergonomic features that provide optimum flexibility for viewing comfort and ease of use.

- An antiglare, antistatic panel greatly reduces glare and dust buildup.
- The built-in tilt and swivel base makes it easy to change your viewing angle.
- A 75 hertz screen refresh rate eliminates any flickering on your screen.

- The easily accessible ADB ports on the front of the base offer flexibility for arranging your system's components.
- Brightness and contrast controls on the front of the monitor make it easy to make adjustments.
- The curved and recessed base, the recessed video cable connector, and the right-angled power cord all help to reduce the total desk space needed for the monitor.
- The hard plastic spheres on the bottom of the base make it easier to lift and slide the monitor to a new location nearby.

Specifications

Picture Tube:

- 21-inch diagonal, 20-inch viewable, with in-line gun
- 90 degree deflection angle
- Black matrix-type dot screen
- Phosphor type (aluminized), P22
- Flat square faceplate with gray filter glass, 50% nominal light transmission
- Shadow mask
- Dot pitch 0.26 x 0.29 millimeters
- Phosphor CIE coordinates: red, green, blue
- Color Temperature 6500 degrees K

Input Signals:

- Red, green, and blue video signals; TTL separate sync

User Controls:

- On/off switch (back, above power cord)
- Brightness, with detent reference (front, right)
- Contrast (front, left of brightness control)
- Manual degauss switch (back, above security lock)

Scanning and Refresh Rates:

- Horizontal scan rate 68.7 kHz
- Vertical refresh rate 75 Hz

Video Rise and Fall Time:

- 5 nanoseconds maximum

Active Video Image Area:

- Adjusted at the factory to produce an active video area described by an ideal rectangle of 371 mm by 280 mm. The remainder of the screen is used for the dark border around the screen.

Resolution:

- 1152 horizontal pixels by 870 vertical lines; 79 dots per inch

Dimensions:

- Weight 79.6 lb. (36.2 kg)
- Height 46.1 cm

Electrical Input Requirements:

- Voltage 85-135 volts (AC) or 170-270 volts (AC)
- Frequency 47-63 Hz
- Power 165 watts maximum, all line conditions

Operating Ambient Temperature:

- 50-95 degrees F (10-35 degrees C)

Environmental Requirements:

- Operating Humidity 95% maximum, noncondensing
- Operating Altitude 10,000 feet maximum

Fuse Protection:

- The monitor contains internal power line fuse protection. Its fuse should be replaced with a fuse of the same type by a qualified service technician.

Warm-up Time:

- 30 minutes to meet all specifications (however, the monitor can be used immediately after it's turned on)

Video Input signal jack pin assignments:

Pin	Function
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A1	Blue video
A2	Green video
A3	Red video
1	Hsync return
2	Vsync
3	Sense #3
4	Sense ground
5	Csync
6	Hsync
7	Vsync return
8	Sense #2
9	Sense #1
10	Csync return
Shell	Shell ground

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