

appy Holidays

What was on my Christmas list? Well, aside from the \$100,000,000 and a Cray T3E with a tape silo, I'd like a Sony GDM-F500 Multiscan, which introduces us to this month's topic: **CRTs**. For the jargon buffs out there, **CRT** stands for **Cathode Ray Tube**. **CRTs**, the most common of all display types, have a picture tube and a screen where the picture is displayed.

The **cathode** (the negative electrode sometimes referred to as an electron gun) fires off a beam of electrons at the screen that causes the **phosphors** on the inside of the screen to become excited (they emit light!). The position the electrons beam is focused as is controlled by electromagnetic coils located on the outside of the tube. On color monitors, there are three types of **phosphors**: red, green, and blue. Each of the three types of **phosphors** make up a single **pixel**. The **phosphors** only glow for a brief instant, so the electron gun has to scan over the screen often and **refresh** the **pixels**. A fast **refresh rate** will produce a solid picture while a low **refresh rate** will produce a flickering effect on the screen.

he Who's What of CRTs

The tube inside all **CRTs** is basically just a glorified glass bottle. The shape and size of the tube determines how large the picture is and what it looks like.

Shadow Mask: The oldest, and cheapest, of the tubes is rounded on the corners and bulges in the middle. The **pixels** look like round dots, which can

reduce clarity. **Shadow mask CRTs** have been around for a long time, and the technology is quite established. Thusly, they are the cheapest to manufacture. The downsides of **shadow mask CRTs** are limited size and reduced clarity.

Aperture Grille: This technology was introduced and patented by Sony Corporation and was marketed under the name **Trinitron**. **Trinitron** displays are cylindrical with consistent curving. The display is nearly flat which leads to a large image with excellent clarity. The flatness of **Trinitron** displays reduces glare, which in turn leads to less eyestrain. Recently, **Trinitron** patent expired and this has led to several manufacturers introducing their own **aperture mask** screens, so this once high-priced technology is becoming quite affordable.

Size Does Matter

When looking at a monitor's size specifications, make sure you look at the **viewable area**. Many manufactures measure the entire monitor diagonally, which can be very inaccurate. The **viewable area** is the diagonal measurement of the actual screen on which an image can be displayed.

Resolution is a measure of the number of **pixels** displayed horizontally by how many **pixels** are displayed vertically. 640 x 480 is by far the most common **resolution** and is oftentimes the default on new computers. This is starting to change as companies become more competitive and consumers demand more. As you move up in size of the display, the **resolutions** move up also, the most common **resolution** types include 800 x 600, 1024 x 768, 1600 x 1200. Typically, the ratio is that of 4:3, which also happens to be the ratio of most televisions.

MultiSync monitors are **CRTs** that can support several different **resolutions**. The monitor can actually recalibrate itself to switch from one resolution to another. Gamers are very familiar with this technique, it is generally accepted that the smaller the **resolution**, the faster the screen can refresh and the less memory and CPU time is needed (less pixels to keep track of). Games run faster in smaller resolutions — they won't look as good as they would in higher **resolutions** though.

Another critical size measurement for monitors is the size of each **pixel**. Referred to as **dot pitch**, it is the diagonal distance between two **phosphors** of the same color. Generally, the smaller the **dot pitch**, the better the **CRT**. Smaller **dot pitches** will yield a much more crisp and clearer image. Beware though, there are two different types of screens, stripes and dots. Dots, the

older of the two types, actually has individual holes for each [pixel](#) while stripes only have long vertical lines that separate the pixels. Striped displays can generally squeeze [pixels](#) a little closer (some striped displays have a [dpi](#) of .22), because of this difference it is best not to compare striped and dot displays together.

omplete CRT Control

There are three types of controls that you will find on monitors: Basic, Geometric, and Color.

Basic controls include [brightness](#), [contrast](#), [horizontal/vertical centering](#) and [horizontal/vertical sizing](#) controls. As CRTs age, the screen can change shape on the edges which in turn changes the [viewable area](#). Changing the [centering](#) or [sizing](#) actually changes the calibration of the [electron gun](#) so it is aimed at a different portion of the screen.

Geometric controls include settings for the [tilt](#) and [pincushion](#) of the display. Contrary to popular belief, the [tilt](#) settings will not help you cheat in pinball games — [tilt](#) simply changes the angle which the image is displayed on the screen. [Pincushion](#) refers to how square the image is. If the image on the screen is fat in the middle and skinny on the top and bottom or the image is skinny in the middle and fat on the top and bottom (hourglass shaped) the [pincushion](#) needs to be adjusted.

Color controls are simply calibration controls to adjust the tints. The room lighting or even the monitor position generally only affect colors.

There are two different types of controls, [analog](#) and [digital](#). [Analog](#) controls are found on older monitors and are generally just knobs that you physically turn on the monitor. [Digital](#) controls are commonly found as on-screen controls. While on-screen controls are more precise to set and can be easier to use I find [analog](#) controls less annoying and faster. When you are perched on a ledge in an Unreal game picking people off with a sniper rifle and you notice you need to adjust the [brightness](#) it is much easier to just turn a knob a couple of degrees instead of wasting time wading through the on-screen menus.

ck! I Am Blind!

The burning sensation in the eyes caused by too many hours hunched in front of a low resolution, glare-ridden monitors is called [Raster Burn](#). [Raster](#) is the name of the pattern that the electron gun fires at the screen. If you spend many hours in front of a computer hacking code or saving the universe make sure you get a monitor that has both a high resolution and has an anti-glare feature. Some monitors actually have microscopic grooves that reduce the glare from outside light.

[liquid crystal display](#) \li-kwid kri-stal diss-puh-lay\): A display type that is commonly used in portable applications because of its low power requirements and its small profile.

A [LCD](#) is basically a liquid crystal between a set of electrodes. The [liquid crystal](#) changes the phase of the light passing through the display. Changing the voltage applied to the [electrodes](#) can change the phase of the light.

he display used in digital watches and calculators are extremely simple. They are a single [electrode](#) on one side and several [electrodes](#) on the other. The single [electrode](#) acts as a universal negative and the side that has multiple [electrodes](#) can be individually turned on and off without affecting the others, thereby allowing you to create any pattern you need.

Computer displays are extremely complicated and generally have tens of thousands of pixels. The work-around for LCDs divides the screen into rows and columns to form a matrix, with each intersection of the matrix forming a pixel. To change the phase of a pixel, voltage is applied to the row and column that form the intersection.

. I was lucky enough to purchase a Furby before the rush. I know there are infrared transmitters/receivers on my Furby, so is it possible for my Palm Pilot to link to my Furby?

on the IR
Furbys are put
Several
control in
react to

A. Tiger (now Hasbro) hasn't released any documents specifications of the Furby. It is known that two together they will "communicate" with each other. Several people have reported that if they place a TV remote front of their Furby and press buttons their Furby will react to them. One particular rumor maintains that if the power button is pressed the Furby will immediately fall asleep. This particular rumor is unlikely at best because remote controls differ in the frequencies they use.

In theory, it should be possible to design an application that will record Furby IR talk. With this information, it shouldn't be too hard to decode this information (how difficult could Furby talk be?) and then write a program that could implement it to communicate back with the Furby.

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