LCD Primer

LCD-s- Many of us own LCD monitors or have heard a lot of information about them over the years. The one main point that resonates with us is the thought that " *bigger is better*". I have to admit that watching HD shows on a large screen still puts a smile on my face, there's more to LCDs than meet the eye. Let's look into some of the information about LCD's.

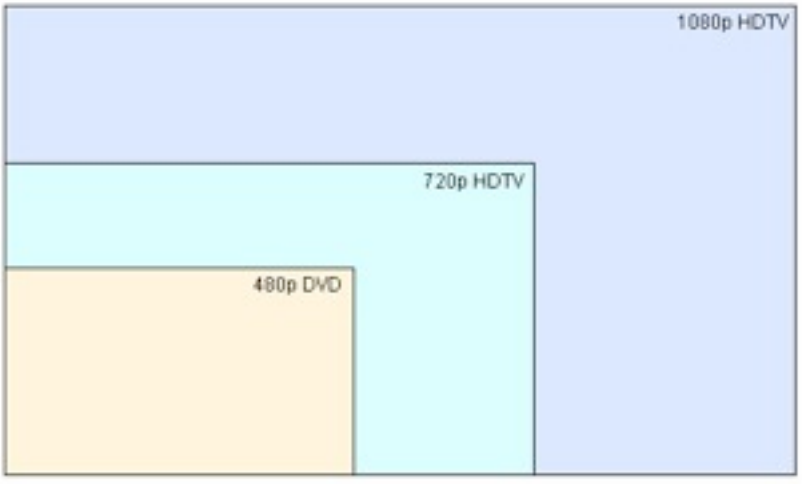
What is a LCD ?

Liquid Crystal Display (LCD) is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals. Liquid Crystals do not emit light directly, therefore LCDs need a light source and are classified as "passive" displays.

Consumer monitors

LCDs started becoming relevant in the late 90's. At first, the technology was limited in the development of large screens. LCDs first started appearing in the computer world, slowly replacing CRT monitors. CRT monitors were banned in much of Europe due to the toxic elements located in the tubes. Many of us can recall having CRT computer monitors footprint taking over half our desk space in the early years, and consumers pushed for smaller sizes. Another big advantage to the new LCDs over CRT's were there faster refresh rates. Ever notice that your eyes do not get as tired looking at an LCD monitor.

As time went on, the resolution became better for LCDs from the 15" to 20" range. By the year 2000, we started seeing LCD monitors for television use. The small depth and large screen size was a thing of beauty, but the price point kept a lot of consumers from purchasing them. As time passed, more companies jumped into the flat panel market, and the prices was lowered and the size of the displays increased. A 32" display, which was considered to be the "holy grail" in the beginning of the LCD TV market, now feels tiny compared to the 46", 52" and 65" displays. The year 2007 marked the first year where LCDs accounted for more than half of the sales for TVs across the US. The main selling point for a lot of manufactures was the resolution of the screens, a higher resolution equals better image quality.



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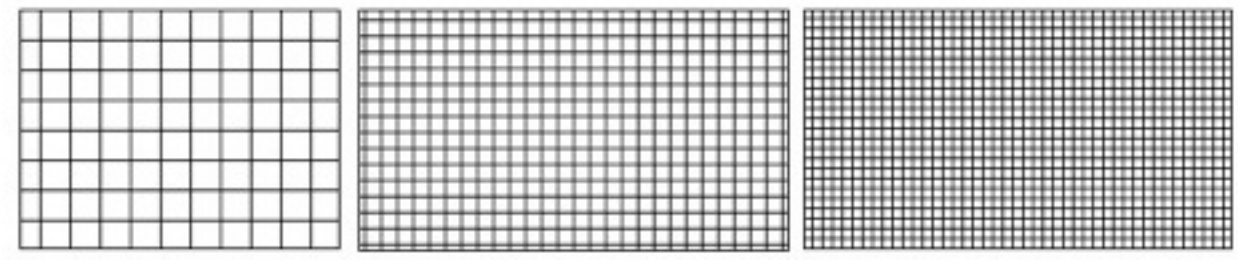
What Is Resolution?

Resolution is a measure that has two components - width (horizontal resolution) and height (vertical resolution). The resolution is used to describe how accurate a device is in replicating an image and how much detail it can offer to the viewer. It is a measure used not just for TVs or displays but also for printers and any other devices that are used to produce an image. Even our eyes acuity can be expressed as resolution (and it is huge compared to the one of any device). When it comes to TVs and displays, resolution is expressed as the number of pixels that the screen has on vertical and horizontal axis. If you multiply the two numbers you get the total number of pixels that the TV has, expressed in megapixels or millions of pixels. This is more commonly used to describe a digital camera's resolution than TVs or displays. As mentioned, the resolution measures the number of pixels. But what are the pixels? Pixels appear as little dots that together form the picture you see. Each pixel can have one specific color depending on the part of the image it must represent. All flat screen TVs (plasma, LCD, etc.) have a fixed number of pixels. For example, a 1080p plasma TV has a resolution of 1920×1080 pixels - 1920*1080=2,073,600 witch roughly is 2Mp (2 megapixels or 2 millions of pixels).

Resolution is also a measure used to define a video signal. For example, you may have a plasma TV with a resolution of 1920×1080 pixels (1080p) but the video signal of the TV channel you are watching can be, and is in many cases, smaller - 1280×720 (720p). In this case, the TV performs a process called "upconversion" to scale the TV signal to it's native resolution. If the TV receives a signal with a higher resolution than it's native resolution then it performs an opposite process called "downconversion". Both upconversion and downconversion are basically resizing processes.

Although resolution has two components - vertical and horizontal - in most of the cases you will see the resolution expressed as a single number followed by a letter (e.g. 1080p, 1080i, 720p, etc). The number represents the vertical resolution and the letter stands for progressive scan (p) or interlaced scan (i) - more about that later. The reason why we find resolution expressed as a single number (vertical resolution) is that the horizontal resolution varies. It is not uncommon to find two HDTV sets with the same vertical resolution but with different horizontal resolutions.



480i
640x480
307,200 pixels

720p
1280x720
921,600 pixels

1080p
1920x1080
2,073,600 pixels

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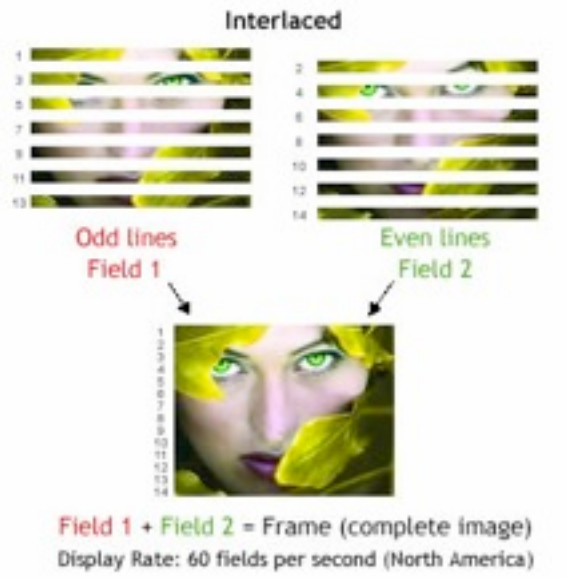
1080p vs 1080i

1080i actually boasts the same 1920x1080 resolution as the 1080p, but it is based on a interlaced format (the *i* in 1080i). 1080i sources get "painted" on the screen sequentially: the odd-numbered lines of resolution appear on your screen first, followed by the even-numbered lines--all within 1/30 of a second. Formats such as 480p, 720p, and 1080p convey all of the lines of resolution sequentially in a single pass which makes for a smoother, cleaner image, especially with sports and other motion-intensive content. Today's HD broadcasts are done in either 1080i or 720p (Direct TV does now offer some selective channels in 1080p). There are some DVD players claiming to upconvert standard DVD movies to 1080p, but all they are doing is taking a 480p image and multiplying it which technically is 1080p, but is a a far cry from native 1080p. Blu-ray DVD players and the Playstation 3 do output in 1080p. The future does promise a broader range of 1080p products and services, but many of us seldom take advantage of our 1080 TV set.



On a side note, you may have heard some of newer flat panel HDTVs & broadcast monitors being referred to as LED TV. This is not new display technology. LED TVs are the same as LCDs, but the only difference is that LEDs are used as a backlight instead of a conventional fluorescent one. While the display technology is the same, LED-backlit LCDs generally have better contrast and more accurate colors than fluorescent-backlit models.

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Conclusion

The push for better image quality has no limits. As technology on the camera side advances, so does the need for a better display. The advent of HD is the reason why we have such beautiful, thin, crisp displays today. Now, with the recent trend of 3D movies, manufactures are starting to introduce 3D LCDs for the consumer market. LCDs are everywhere and having so many choices can be overwhelming at times. When navigating through the world of LCDs, it is important to compare the numbers (resolution & format) and consider what the main use of the display is going to be. This will ensure the consumer gets exactly what they need.

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