Current and future display technology (part I)

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The most popular methods of producing displays today are CRT, LCD, plasma, LED and e-paper.

CRT - light bulb technology

CRT uses fluorescent screens and cathode ray tube to impact pixels to create light reflection. CRT shows true color, sharpness, high response speed, suitable for gamers and design professionals, graphics processing. However, it is bulky, takes up more space and consumes more power than other screens.

CRT is favored in areas such as China, Asia - Pacific, Central Europe and Africa because of cheaper prices than other technologies.

LCD - liquid crystal

The liquid crystal display is more appreciated than CRT thanks to its sleek design and power saving ability. LCD

is made up of pixels containing liquid crystals capable of changing the polarity and intensity of transmitted light when combined with polarizing filters. Each pixel is divided into three boxes of red, green and blue. Those cells can be independently adjusted to produce thousands or even millions of colors.

The advantage of this type of screen is thin, light, flat, does not occupy the area on the desk, saving power and is said to have less impact on health as the technology of light bulbs.

However, LCD has a lower contrast ratio than CRT, slower response time than plasma, limited viewing angles and pixel dead errors. The new liquid crystal display is overcoming the above disadvantages and analysts hope the technology will be available in about 50% of screens released in 2008.

A popular variant of liquid crystals is TFT, which uses thin-film transistor technology to improve image quality. TFT is widely used in TVs, projectors and mobile phones.

PDP - plasma

Plasma panels are mainly produced for large screens (over 37 inches). Between the two glass panels are small cells containing a mixture of gas and neon. When exposed to electricity, this gas layer will turn into a plasma (ionized gas has the same amount of negative - positive particles) and produce light.

For a long time, superior colors, fast response, wider viewing angles compared to LCDs have made plasma an ideal monitor for high-definition HDTV television. Users also imply that LCD is only suitable for small screens and cannot compete with plasma in the large product market (over 40 inches or 100 cm).

Advances in liquid crystal technology plus the available strength in weight, price, power savings and rich resolution for HDTV made LCD a formidable rival to PDP. At the end of 2006, LCD TVs were able to penetrate into a market of over 40 inches that plasma once dominated.

LED - luminescent diode screen

Each LED (light emitting diode) is a small, glowing diode due to the movement of the electron in a semiconductor environment. To illuminate the entire screen, the LED backlight must be set 1-1 in proportion to the color pixel matrix. Such arrangement helps to adjust the brightness accurately to each pixel, creating a better contrast and eliminating the color difference at the corners where the LCD lighting fluorescent background is often encountered.

LEDs use less electricity than other light-emitting devices, but the bigger the screen, the more LED devices are needed, so the production cost increases. Price is one of the reasons why this technology is still uncommon because users have to spend 2-3 times to buy LED TV compared to regular TV.

E-paper - electronic paper screen

Electronic paper is made of plastic containing tiny charged particles, capable of moving and changing the image displayed on paper. Non-glowing e-paper absorbs and reflects natural light so the reader feels more comfortable than looking at a computer screen. This "paper" is light, bendable, energy-efficient, and in the future, production costs will be cheaper than other technologies.

The weakness of electronic paper is the slow color change and low contrast. But like LCD, those problems will gradually be overcome. Sony was the first company to introduce e-paper products to the market in April 2004.

Currently, some newspapers in the US and France are testing the release of content on e-paper.