

## TECH FOCUS

# New age display technologies

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**D**ISPLAY units are an integral component of any computer system. We depend on it to see the output of any given instruction. Most of us regularly come in touch with it to learn the result of an executed task, to play games, watch movies, listening to music or any other activity on our computers. At this moment, the most common display technology is Cathode Ray Tube (CRT). CRT monitors look bulky, and continually expose us to gamma rays which are detrimental to our health.

Ever since researchers realized these drawbacks, they have worked on display technologies to make them less harmful to our health as well as eliminate the structural limitations. Presently, different display technologies are readily available in the market, namely Liquid Crystal Display (LCD), plasma display, touch screen, Organic Light Emitting Diode (OLED) and others. However, all display technologies, except CRT are expensive as they have embedded some advanced features. In this article I make a comprehensive survey of CRT, LCD, plasma display, touch screen and OLED that hopes to provide a clearer picture of existing display technologies.

### Cathode Ray Tube (CRT)

The era of CRT monitors is approaching its conclusion. Surprisingly, large numbers of TV sets and computer monitors continue to be based on CRT technology. The underlying reasons for continuing CRT's dominance is its ability to produce a crisp and vibrant image.

The entire circuitry within the monitor can be grouped into three main categories: video signal processing and amplification, horizontal/vertical deflection and synchronizing and power supply. The operation of a CRT monitor is not very complex. A heating element in a CRT monitor heats the cathode and causes it to emit electrons, which are accelerated and focused on a phosphor screen through high voltage grids. An image (raster) is displayed by scanning the electron beam across the screen. Since the phosphor's luminance

begins to fade after a short time, the image needs to be refreshed continuously. In order to eliminate this flicker, most monitors refresh the screen at a 60 Hz rate.

Consumers with a limited

budget are likely to be most attracted to CRT monitors as it is a low cost solution and generates better image than LCD monitors. For general purposes such as preparing documents and watching movies or videos enjoy, 15 inches is usually enough but graphics and multimedia performances are better achieved by 17 inches monitors.



**Liquid Crystal Display (LCD)**  
LCD monitors break the trend of traditional display technologies. They are slim, lightweight and consume much less power than LED and gas-displays because they work on the principle of blocking light rather than emitting it. Most portable devices like laptops, PDAs and nowadays many desktop PCs used LCD technology.

**Plasma Display**  
The inside story of a plasma display is it illuminates tiny, color fluorescent lights to produce an image. Each pixel is made up of three fluorescent lights; red, green and blue. The charge causes the gas in the fluorescent light to emit ultraviolet rays, which causes the phosphor to emit color. The amount of charge

each pixel intersection, requiring less current to control the luminance of a pixel. For this reason, the current in an active matrix display can be switched on and off more frequently, improving the screen refresh time.

A Dual scanning technique is used in some passive matrix LCD's. In this scheme, the grid can scan twice with the same electricity and time as it took for the original technology to scan only once. Despite this advantage, the active matrix still leads the LCD world.

**Touch Screen**  
Touch screen is an exciting technology that allows users to give input through monitor. Currently two types of touch screen technology are used the

most frequently, which are the resistive system and capacitive system.

The resistive method is completely pressure sensitive. It uses a plastic layer on top of a metallic-coated glass layer that is separated by spacers. When a user touches the screen the two layers make contact on that spot. As a result, the electric field changes and the computer detect it to determine coordinates. Then a special driver translates the touch into a format that is compatible with the operating system.

The capacitive method uses a metallic coated glass panel, but without the plastic overlay. It senses the change in electricity from the electricity in your finger or from a stylus wired to the computer that emits a charge. The capacitive system transmits almost 90 percent of the light from the monitor, whereas the resistive system only transmits 75 percent, giving the capacitive system better picture quality than the resistive system.

### Organic Light Emitting Diode (OLED)

It is a thin-film, light-emitting device that typically consists of a series of organic layers between two electrical contacts (electrodes). OLEDs can be made using small-molecular weight organic materials (SM-OLEDs) or polymer-based materials (PLEDs, LEPs). Unlike LCDs and FEDs, which are constructed of layered materials, OLEDs are monolithic devices, because each layer is deposited on the other, creating a single unit.

In May 2005, Samsung demonstrated a 40" OLED panel for use in future high-definition TV sets. Initially developed for display applications, OLEDs offer bright, colorful images with a wide viewing angle and low power. They do not need backlights like LCD screens. OLEDs are commonly constructed on glass, but can also be fabricated on plastic and other flexible substrate films, such as Universal Display's Flexible OLED (FOLED).

References: www.wikipedia.com  
www.howstuffworks.com

## Macintosh Iicx

Half a year following the release of the Macintosh Iix passed before Apple introduced the Macintosh Iicx in 1989. Despite resembling the Iix to a great extent, the Iicx was quieter (due to its quieter fan on a smaller power supply) than its predecessor. The design was also much more compact because it had only three NuBus slots. The new case, Apple's only to be designed to operate in horizontal or vertical orientation, remained in use for its successors the Ici and Quadra 700. This model was superseded by the Macintosh Ili.



## TECH NEWS

# New toys read brain waves

AP, San Jose

**A** convincing twin of Darth Vader stalks the beige cubicles of a Silicon Valley office, complete with ominous black mask, cape and light saber. But this is no chintzy Halloween costume. It's a prototype, years in the making, of a toy that incorporates brain wave-reading technology.

Behind the mask is a sensor that touches the user's forehead and reads the brain's electrical signals, then sends them to a wireless receiver inside the saber, which lights up when the user is concentrating. The player maintains focus by channeling thoughts on any fixed mental image, or thinking specifically about keeping the light sword on. When the mind wanders, the wand goes dark.

Engineers at NeuroSky Inc. have big plans for brain wave-reading toys and video games. They say the simple Darth Vader game a relatively crude biofeedback device cloaked in gimmicky garb portends the coming of more sophisticated devices that could revolutionize the way people play.

Technology from NeuroSky and other startups could make video games more mentally stimulating and realistic. It could even enable players to control video game characters or avatars in virtual worlds with nothing but their thoughts.

Adding biofeedback to "Tiger Woods PGA Tour," for instance, could mean that only those players who muster Zen-like concentration could nail a put. In the popular action game "Grand Theft Auto," players who become nervous or frightened would have worse aim than those who remain relaxed and focused.

NeuroSky's prototype measures a person's baseline brain-wave activity, including signals that relate to concentration, relaxation and anxiety. The technology ranks performance in each category on a scale of 1 to 100, and the numbers change as a person thinks about relaxing images, focuses intently, or gets kicked, interrupted or otherwise distracted.

The technology is similar to more sensitive, expensive equipment that athletes use to achieve peak performance. Koo Hyoung Lee, a NeuroSky co-founder from

South Korea, used biofeedback to improve concentration and relaxation techniques for members of his country's Olympic archery team.

"Most physical games are really mental games," said Lee, also chief technology officer at San Jose-based NeuroSky, a 12-employee company founded in 1999. "You must maintain attention at very high levels to succeed. This technology makes toys and video games more lifelike."

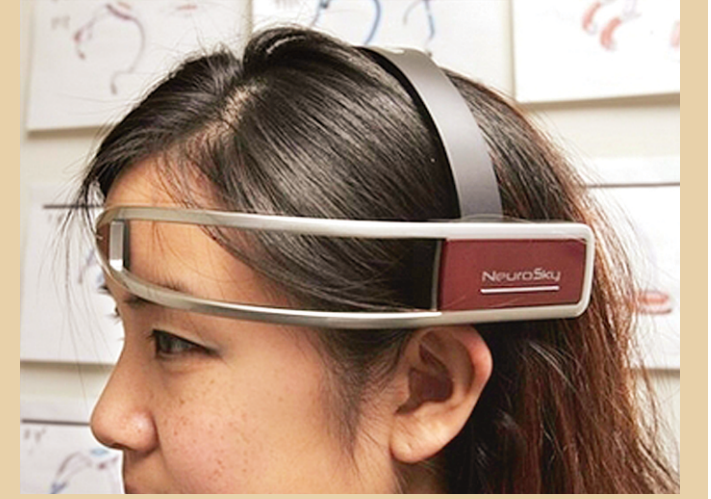
Boosters say toys with even the most basic brain wave-reading technology scheduled to debut later this year could boost mental focus and help kids with attention deficit hyperactivity disorder, autism and mood disorders.

But scientific research is scant.

Even if the devices work as promised, some question whether people who use biofeedback devices will be able to replicate their relaxed or focused states in real life, when they're not attached to equipment in front of their television or computer.

Elkhonon Goldberg, clinical professor of neurology at New York University, said the toys might catch on in a society obsessed with optimizing performance but he was

Yang is secretive about his company's product lineup because of a nondisclosure agreement with the manufacturer. But he said an international toy manufacturer plans to unveil an inexpensive gizmo with an embedded NeuroSky biosensor at the Japan Toy Association's trade show in late June. A U.S. version is scheduled to debut at the American International Fall Toy Show in



NeuroSky worker Cynthia Lee wears one of their head sets at NeuroSky headquarters in San Jose, Calif. The startup company aims to add more realistic elements to video games by using brain wave-reading technology to help game developers make gaming more realistic.

skeptical they'd reduce the severity of major behavioral disorders.

"These techniques are used usually in clinical contexts. The gaming companies are trying to push the envelope," said Goldberg, author of "The Wisdom Paradox: How Your Mind Can Grow Stronger As Your Brain Grows Older." "You can use computers to improve the cognitive abilities, but it's an art."

It's also unclear whether consumers, particularly American kids, want mentally taxing games.

"It's hard to tell whether playing games with biofeedback is more fun the company executives say that, but I don't know if I believe them," said Ben Sawyer, director of the Games for Health Project, a division of the Serious Games Initiative. The think tank focuses in part on how to make computer games more educational, not merely pastimes for kids with dexterous thumbs.

The basis of many brain wave-reading games is electroencephalography, or EEG, the measurement of the brain's electrical activity through electrodes placed on the scalp. EEG has been a mainstay of psychiatry for decades.

An EEG headset in a research hospital may have 100 or more electrodes that attach to the scalp with a conductive gel. It could cost tens of thousands of dollars.

But the price and size of EEG hardware is shrinking. NeuroSky's "dry-active" sensors don't require gel, are the size of a thumbnail, and could be put into a headset that retails for as little as \$20, said NeuroSky CEO Stanley Yang.

October.

"Whatever we sell, it will work on 100 percent or almost 100 percent of people out there, no matter what the condition, temperature, indoor or outdoors," Yang said. "We aim for wearable technology that everyone can put on and go without failure, as easy as the iPod."

Researchers at NeuroSky and other startups are also building prototypes of toys that use electromyography (EMG), which records twitches and other muscular movements, and electrooculography (EOG), which measures changes in the retina.

While NeuroSky's headset has one electrode, Emotiv Systems Inc. has developed a gel-free headset with 18 sensors. Besides monitoring basic changes in mood and focus, Emotiv's bulkier headset detects brain waves indicating smiles, blinks, laughter, even conscious thoughts and unconscious emotions. Players could kick or punch their video game opponent without a joystick or mouse.

"It fulfills the fantasy of telekinesis," said Tan Le, co-founder and president of San Francisco-based Emotiv.

The 30-person company hopes to begin selling a consumer headset next year, but executives would not speculate on price. A prototype hooks up to gaming consoles such as the Nintendo Wii, Sony PlayStation 3 and Microsoft Xbox 360.

## PHOTO TECH



### PORTABLE DVD PLAYER

Japanese electronics giant Sony employee Masayo Endo displays the new portable DVD player "DVP-FX850", equipped with a high-resolution 8-inch swivel and flip multi-angle LCD display which enables it to display super-imposed titles at the company's headquarters in Tokyo 01 May 2007. Sony started to sell 01 May with a price of 35,000 yen (290 USD)

## TECH NEWS

# Asus unveils W5Fm Notebook

STARTECH DESK

**T**HE latest W5Fm model of the Asus notebook laptop has been unveiled by the Global Brand Private Limited, to offer enhanced mobile performance, new high-definition capabilities and

book uses Intel Pentium-M Merom Core 2 Dual T5500 technology, and offers a breakthrough experience in mobile computing technology through four new dimensions.

Equipped with the latest Dual Core processing, the W5Fm enables users to simultaneously run multiple applications. Even demanding applications such as virus scans can be run while making pc-to-pc phone calls and browsing the internet.

The W5Fm's exciting new features will allow users to experience

ence music, videos, and movies through enhanced multimedia capabilities with the built-in features of the new mobile 2 dual-core processor-based laptops.

The W5Fm Asus notebook also has an inbuilt 1.3 megapixel 235° swivel webcam that allows users to experience video conversations on the go. A built-in microphone and the exclusive LiveFrame software, developed especially for the W5Fm model, enable users to capture, record and play photos and videos.

The notebook is also available in several colours to keep up with an increasing demand to integrate style and functionality in modern technology.

W5Fm also packs its functions and special features into a sleek and lightweight 1.6kg design. Together with wireless mouse receiver mobility, the laptop makes it less cumbersome for users to carry around.

