THORBURN ASSOCIATES INC.
Acoustic and Technology Consultants
Newsletter

Summer 1996

Everyone knows that Spring is the traditional time for growth, but we've waited until the Summer. Within the next month we'll be moving to a new set of suites near our current office. In fact, it's so close (within the same complex) that our address and phone numbers will remain the same. Next time you're in the area, be sure to stop by for a quick tour of the new place and a cup of coffee!

Keeping Up With Multimedia Projection Technologies

Many people are familiar with Liquid Crystal Display (LCD) as the innovation which made it easier to read a watch. Since then, the original monochrome image has blossomed into the full color spectrum. The advancement of its color technology has allowed LCD to spread far beyond watches and into other fields. To find out how big the LCD market is, just look at a laptop computer screen, a child's hand-held video game, viewing screens on some video cameras, hand-held portable televisions, or seat-back monitors on airplanes.

During the past few years, many companies have incorporated LCD into their multimedia presentation devices. Recent improvements let the units interface with a wide range of audio, video, and computer software systems. Whether used for educational, business, or entertainment purposes, LCD panels and projectors can help maximize the impact of any display. While panels and projectors share many similarities, it's important to know their differences.

LCD Panels are like an electronic version of the overhead transparency. They are flat screens whose image is projected by shining a light through it. Images on the screen are created by a grid of pixels, or individual points of color. The color screens have three overlapping layers of these pixels, one for each of the primary colors—red, green, and blue. The ability of a panel to create shade variations within the pixels determines its color scale. Depending on price, the color ranges start at a simple gray scale and can reach higher than 16 million colors.

The image is cast onto a presentation screen using an extremely bright overhead projector. These are nearly identical to the overheads many people remember from their school days, the main difference being a much brighter light source. The bulb needs to be brighter because the LCD image blocks most of the light trying to pass through it. The more powerful the bulb in the overhead, the more vivid the projected image.

LCD Projectors are self-contained units which handle both the image processing and projection duties. Some inexpensive models shine one light through a single miniature color LCD screen. Others filter the light source into its three basic spectral components using a series of dichroic mirrors. These mirrors allow one color to pass through while the remaining light is reflected towards other mirrors for further separation. Lenses in Blue Blocker sunglasses are similar to the glass in these mirrors. Once isolated, the three beams are sent through their own miniature gray-scale LCD screens, combined back into a complete color beam, and projected onto a presentation screen.

Both projectors and panels achieve almost identical results. They have high resolutions (up to 1024 x 768 pixels in a screen), are able to show computer graphics as well as video, and can support a remote mouse control for connected computers. These units are even capable of reversing the image for rear projection applications.

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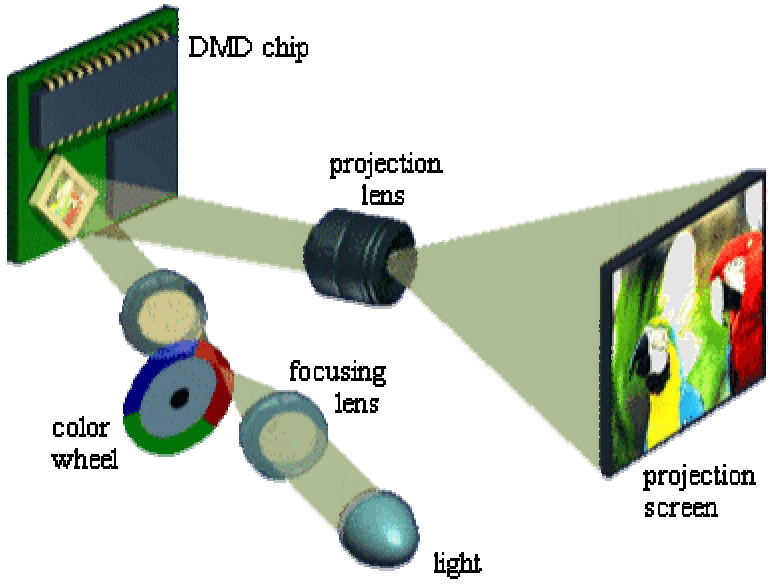
When it comes to portability, panels have an advantage. They are small-usually only a couple inches thick-and weigh less than 10 pounds. But portable overhead projectors weigh even more, and you'll have to bring your own unless there's one provided at your destination. Although the LCD projectors are self-contained, certain models can weigh nearly 30 pounds! For either system, plan on carrying a projection screen unless one is provided.

A New Competitor

Electronic technologies develop so rapidly it's not surprising to see LCD screens being followed by a newcomer, Digital Light Processing (DLP). This breakthrough promises better image resolution, smaller and lighter projection units, clear projections in well-lit rooms, and low prices. The most distinct advantage this system has is that it *reflects* light off an image instead of transmitting it through a screen. The key to this new process is the Digital Micromirror Device (DMD). This is a thumbnail-sized microchip with a reflective surface made from more than 500,000 tiny aluminum alloy mirrors. A memory cell beneath each mirror can be activated by a simple binary code. The signal tilts certain mirrors towards an ON direction, reflecting light through a lens system; others tilt to the OFF position, directing unwanted light into absorbing material within the projector.

High-end DLP units split an initial beam of light into three base colors using prisms, each color beam is bounced off a chip, then they are merged back into one. Inexpensive units use a "color wheel" to briefly flash different colors from a lone shaft of light onto a single or double chip system. The image on the mirrored chip is updated as each colored section of the wheel passes through the light. The separate color images are projected onto the screen in such rapid succession that the human eye detects them as a single picture.



Single chip DLP System using a color wheel

What Lies Ahead

The future for Digital Light Processing is very bright indeed. Several factors give it an edge over LCD:

- No light is lost due to saturation. DLP's light beams are split with prisms and bounced off a mirrored surface, not sent through polarized mirrors and darkened screens. This allows for a much brighter projection in well-lit areas.

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- There is less space between mirrors on a DMD chip than between pixels on an LCD screen. This helps eliminate visible traces of the grid pattern and increases the picture's resolution.

- Being semiconductor-based lets DLP broadcast flicker-free video that, unlike CRT projections, won't "drift".

- DLP images are updated in microseconds, as opposed to the slower milliseconds with LCD.

- Current DMD chips can hold 848 x 600 mirrors, but later versions will contain arrays as high as 2048 x 1152.

Perhaps the most important sign of its future success is that several companies are currently working on their own versions of DLP projectors. This is a product that is definitely worth keeping your eye on.

From the Editors

Our next newsletter will focus on green insulations. We'll describe the changing ingredients in common thermal insulations and the effectiveness of these environmentally-friendly products. This will be of great interest to anyone who's looking for a safe, recyclable alternative to traditional forms of thermal and acoustical insulation.

Educational Opportunities!

The International Communications Industry Association (ICIA) just completed their annual conference and trade show. This association is quickly becoming a leader in providing quality education to its members. We are pleased to be a part of their education program. At their recent conference, Steve Thorburn taught 4-day class on Presentation Facility Design. This class is certified by the ICIA and provides continuing education units. During the conference Steve also taught 4 two-hour sessions concerning Acoustics, Facility Design, Facility Installation, and Computer Control of Audio & Video Systems. If you're interested in expanding you knowledge of these or other topics, let us know.

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