Looking back and reflecting on a passing decade occurs to each of us at least once during our lifetime. Highly memorable events, enjoyable or otherwise, instinctively trigger this reminiscence. The passing of the InfoComm Projection Shoot-Out event is one such memorable event for me. For the past 10 years of the Shoot-Out’s 13 year history, it has been my distinct pleasure to be involved with its technical design, production, and management. Extron Electronics and those of us in the regular staff supporting the event have become synonymous with the InfoComm Projection Shoot-Out.

Considered the crème de la crème of large-scale, side-by-side display image comparison, the Shoot-Out was, at the height of its popularity, the most anticipated event of InfoComm. It became a renowned tradition the world over as the Shoot-Out was introduced to all the international InfoComm venues. As Chairman of the Projection Shoot-Out Committee, it was a real balancing act for me. The logistics of designing and producing such an event were, in fact, very demanding and time-consuming. Planning for the following year’s event began shortly after the prior InfoComm show and, therefore, involved many months of special attention. Producing the Shoot-Out was a high pressure project, but on opening day of the show, I would stand there on the floor, see the event finally fully functional, observe the excitement of the attendees...
and walk away with a feeling of personal satisfaction and accomplishment.

When the decision was made to retire the Shoot-Out, I believe I felt a mixture of sadness and relief. I believe that people and entire industries will continue to have shoot-outs in one form or another. We are always comparing one thing to another...it's our only frame of reference. Amidst all the talk on the InfoComm 2002 show floor this past June, it was difficult to determine whether or not the event was even missed.

Nevertheless, Extron’s role in supporting ICIA and the InfoComm Projection Shoot-Out® was acknowledged when Extron President Andrew Edwards and I were honored during the InfoComm keynote session on Tuesday evening, June 11th at the posh Venetian Hotel in Las Vegas. ICIA Executive Director Randal A. Lemke presented Andrew with a plaque of special recognition for Extron’s significant support as the leading ICIA partner of the event. It was both emotional and gratifying as Andrew expressed appreciation for the opportunity to take a central role in such an important industry event, as well as convey to the industry, ICIA, the dealers, and manufacturers our sincere appreciation for their support over the years. Mr. Lemke presented a plaque to me for my service as Projection Shoot-Out Committee Chairman. Audience excitement during our reception of those awards was a gratifying indication that our efforts were appreciated by many throughout the industry.

If anything, being recognized for my role in the Shoot-Out moved me to reflect on its impact on the A/V industry with the sort of fondness normally reserved for things of a much more personal nature. It is with the same conviction that I recall a past that has had such a profound effect on the future.

A Shoot-Out Timeline

The Shoot-Out’s origins stem back to 1988 when most reasonably priced projectors were CRT-based and a handful of product managers from prominent, competitive projector manufacturers of the day proposed the concept for a high profile comparison event at the 1989 InfoComm show in Dallas. The old West was known as a place and an era where an individual publicly confronted another in a shoot-out to determine which man was the better. When the event debuted at the 1989 InfoComm Show and the NAVA became ICIA, it seemed fitting to name this new event the InfoComm Projection Shoot-Out. The Shoot-Out was invariably the talk of the show and, I believe, nearly every attendee, including myself, visited this first display of 24 projectors side-by-side in the C Ballroom of the Dallas Convention Center.

The reference to the Shoot-Out became even more poignant when Imre Csaszar, the event’s original technical coordinator and committee chairman, showed up dressed as a cowboy packing two white-handled six-shooters. Needless to say, the Western motif stuck as the competitive nature between projector manufacturers intensified with each passing year. In September 1991, Imre decided it was time for him to hang up his six-shooters and move on to other endeavors. At the official meeting of the Projection Shoot-Out Committee, all attending display manufacturers voted in favor of Extron’s support for future Shoot-Outs. We had only four months to prepare for our first Shoot-Out, set to take place at the upcoming InfoComm in Washington, D.C. in January 1992.

Over the course of the next nine years, the Shoot-Out went through a number of transformations. This was due, largely in part, to projection technology in the 90s experiencing stellar advancements. The advent of digital imaging, improved light sources, and improved optics caused several expansions and contractions in how the Shoot-Out was organized. As projection technology matured, differences between products became smaller so the methods and tools for producing and utilizing the Shoot-Out became more demanding.
Each year, the Shoot-Out required the creation of new software—not only to keep the event fresh, but to present a greater challenge to display technologies that were incrementally becoming very close to one another in performance. Many weeks were required to identify and source royalty-free content that could be used. The still graphic images used in the show came from prominent stock photo libraries and other sources willing to donate high quality material. Each image selected for use in the Shoot-Out represented about 300 images that I had personally reviewed. Imagery was selected on the basis of detail content capable of providing challenges to the various image generation technologies. By 1994, we were regularly asked if the Shoot-Out imagery was for sale so that individuals could stage their own comparisons. Thus, the idea of producing the computer graphics portion of the Shoot-Out software as a saleable item through ICIA was born and continues to the present day.

As for moving video material, we started with movies on commercial laser discs. In 1997, the Projection Shoot-Out Committee requested digital video source material be converted to NTSC and distributed throughout the event. This move raised the moving video image caliber of the Shoot-Out significantly. While technically a good decision, this significantly complicated the sourcing of software for the event as all materials of this type must come directly from sources in the movie industry. With the aid of a well-connected consultancy firm, we were able to obtain very high quality material in the digital domain. But, regardless of the video source, we were restricted in our ability to reisel the Shoot-Out video material to those interested in setting up their own shoot-outs. So, for most years, the Shoot-Out software consisted only of the graphic images for which we had copyright permission.

In 2000 and 2001, the Shoot-Out was completely reorganized into an applications-oriented event. Projector groups were broken down by weight and/or light output. We guided attendees toward products best suited for business office applications, large audience applications, high-definition video applications, high-definition large audience, and self-contained standard format as well as widescreen format displays. Additional high definition material was available in 720p so that attendees could compare it to the 1080i material traditionally shown. An entirely new display category was also introduced: Large Area LED displays.

The InfoComm Projection Shoot-Out DVD: The Legend Lives On

The discontinuation of the Shoot-Out as an InfoComm event hasn’t prevented Extron and ICIA from preserving some of its best attributes in another format. Ironically, in the first year without the Shoot-Out event, the Shoot-Out software has been completely redesigned and ready-made for dealers and technicians to stage their own shoot-outs, thanks to the InfoComm Projection Shoot-Out DVD – Volume 1.5. Produced and distributed by Extron, the Shoot-Out DVD provides royalty-free, high quality still graphics, AND video material for the staging of virtually any type of display shoot-out. As executive producer, I can say that the level of effort required to create this DVD closely paralleled the entire effort to stage a complete Shoot-Out event.

Extron and ICIA will introduce Volume 1.5 of the Shoot-Out DVD in the fourth quarter of 2002. It will include a number of significant enhancements including additional royalty-free video.

A Graphic Slide Show CD-ROM is also available with the DVD or sold separately.

Though we traditionally produced a companion CD-ROM for previous Shoot-Outs, the new DVD encompasses the entire event and then some. Whereas, we were limited to about 60 images in eight different resolutions on the CD-ROM, DVD technology allowed me to expand the software to 100 images in 10 different resolutions, including 2048 x 1536. But that’s only half the story. The DVD is actually a hybrid of computer-based, multi-resolution images, royalty-free video montages (in both NTSC and PAL), set-up test patterns, and background music. In addition, users have the ability to add their own background music. It includes several customized enhancements such as customizable image sequencing and a “Business Card” feature that allows a user to insert a personalized slide with text and logos into a presentation. Multi-system, coordinated operation of the DVD (mimicking the traditional operation of the Shoot-Out) is made possible via Ethernet control. Up to three computers can run the software at the same or different resolution. However, individual copies of the software must be purchased for each computer used.

With both NTSC and PAL video available, this multi-region compatible DVD really shines in its ability to provide private shoot-out support domestically and internationally. Three distinctive video loops, along with ten video setup test patterns, provide a variety of imagery challenging to all display technologies. Video loops include people, landscapes, and a space shuttle launch that may be played individually or in a looped sequence. In addition, all loops may be played in 16:9 widescreen or standard 4:3 aspect ratios.

Advancements in digital video and audio technology have paved the way for a full-featured evaluation tool like the Shoot-Out DVD. To that end, we’ve been able to supply the end-user with a comprehensive set of software tools—the culmination of everything Shoot-Out participants have asked for over the years. And as for me...well, my role in the Shoot-Out has merely shifted into a different mode. As the saying goes: The more things change, the more they stay the same.
Extron and Inline: A Natural Combination

If you haven’t heard by now, we have combined the operations — sales, marketing, engineering, product development, and production of Extron Electronics and Inline, Inc. The combined group will be known as Extron Electronics and will continue to focus on providing the highest-quality audio-video (A/V) products, education and industry-leading customer support to you, our world-class A/V dealers and consultants.

A BETTER Extron Electronics

Owning both companies was very effective in the past. Although competing in some product categories, the two organizations focused on different products that suited the strengths of each. As the industry matured and both organizations grew, it became clear both companies would be stronger working as one. As a result, we will be able to provide more product solutions to you sooner. The combination of Extron and Inline will enhance our efforts to lead the A/V industry in “glue” product development in support of you, our customer.

How will this affect you? In the short term, the way you conduct business with either company will not change. INLINE PRODUCTS ARE STILL AVAILABLE, as are Inline sales, product and technical support personnel — all through existing Inline communication channels and now through Extron.

In the long term, you will see some changes to our product lines. Many of the Extron and Inline products complement each other, and some products offer identical functionality. Where duplication exists, one of the two products will be phased out. Be assured we have not eliminated Inline product lines, regardless of industry rumors.

To the contrary, the combined Extron and Inline products are stronger and growing. By capitalizing on the strengths of each organization, we are accelerating the creation and delivery of system integration solutions. For example, Inline’s twisted pair (Cat 5) products and technology combined with Extron’s provide a more complete system solution especially when combined with our recently introduced 8 X 8 twisted pair (Cat 5) matrix switcher, the TPX 88/TPX 88A. I expect many new and exciting product developments to come from the pairing of Extron and Inline.

Many of Inline’s key personnel have been integrated into Extron’s organization, creating a more experienced staff to meet your product and solution needs in the future:

• Art Garcia, Inline’s President, joins Extron as a Vice President reporting to me.

• Mike Andrews, Inline’s Vice President of Marketing, joins Extron as Director of Marketing, reporting to Lee Dodson, Vice President of Marketing.

• Manfred Schneider, Inline’s Vice President of Engineering, joins Extron as Vice President of Engineering, reporting to Brian Taraci, Vice President of Research and Development.

Andrew Online

On another note, I am pleased to announce this article is the launch of a new column on our web site, www.extron.com. On the Dealer and Consultant Only web pages, you’ll find Andrew Online — a forum for my views on various subjects that I believe affect you, my perspectives on a range of industry topics, and business in general. I look forward to addressing newsworthy items, rumors, and many issues relevant to my experience and yours as business owners.

Thank you for your support during this transition. We welcome those Inline dealers who may be working with Extron for the first time. If you have any questions, please contact me or your customer support representative.

Andrew Edwards, President of Extron Electronics
The Extron Party at InfoComm is a Hit Again!

Once again, the music was pumping, food was bountiful, and everyone had an all-around great time at the Extron Rock & Rodeo Bash at InfoComm 2002!

Literally thousands of people turned out for the 2002 Extron Rock & Rodeo Bash. As always, this year’s party was a great place to meet up with friends and associates and network with other A/V professionals, as well as an opportunity for Extron to show our appreciation for your support throughout the year. To accommodate the unique, dual venue event, the party was held at the Thomas and Mack Arena on the University of Las Vegas’ campus. Two separate areas were set up, each with its own stage, to provide both country and rock music entertainment.

The Rock venue offered a high energy atmosphere where people danced their socks off to the rock and roll stylings of The Zippers. Games included slap shot hockey, shoot-the-hoops basketball, robo-surfer, and a rock climbing wall for all the athletic types in attendance.

The Rodeo side provided a relaxing environment complete with the country/ Cajun music of The Doo-Wah Riders, as well as pool tables, ranges, rodeo ropers, and the main attraction of the evening—the mechanical bulls. Michael Gaffney from the Professional Bull Riders Association was even on hand to give live demonstrations of proper riding techniques. Extron’s own president, Andrew Edwards, was the first to grab the proverbial bull by the horns and test out his riding skills.

Both venues had a smorgasbord of food and beverages to choose from including Italian, American, South of the Border, and the most popular—East Meets West, a combination of western-style Chinese and Japanese. Partygoers just couldn’t get enough of the sushi!

But the night wouldn’t have been complete without the traditional Battle of the Bands. Thanks once again to performers from Christie Blues Band and the NEC Maximum Bandwidth and the Ceiling Mounts.

We look forward to seeing everyone again next June at InfoComm 2003 and the Extron Bash in Orlando, Florida!
Producing the 2002 Winter Olympics, held in Salt Lake City, UT, earlier this year, was a massive undertaking that required a substantial amount of AV equipment. For Hi-Tech Rentals, Inc., a full-service AV rental company out of Atlanta, GA, the stakes were high as they were handed the torch by Compass Collective, an exhibit design and fabrication company also out of Atlanta, to supply and install all the audio-visual equipment for two Coca-Cola® sponsorship tents located in Park City and Salt Lake City. Over the course of 16 days, approximately one million visitors came through these facilities to catch interviews with the athletes and celebrities, watch cable feeds of the events, trade pins, purchase souvenirs, and take in a variety of shows and festivities.

Extron Products Support the 2002 Winter Olympics

Let the Games Begin
As the Official Soft Drink of the 2002 Winter Games, it was imperative that Coca-Cola, now in their 74th year as a major sponsor of the Olympics, maintain a high and distinguished profile in every aspect of their presence. Trew Rickers, Sales Manager of Hi-Tech Rentals, acknowledged the scope and obstacles he and his team of 16 technicians and installers faced. “The project was a challenge logistically since the venues consisted of temporary structures outdoors,” he said. “The heightened level of security made it very difficult to get equipment and personnel in and out of the work areas. All the trucks and all the people who came and went through the Salt Lake Olympic Square had to go through full security check points where they checked all the cargo and x-rayed handbags and boxes. Workers would even have to open up their lunch to be inspected. This created such a time drag when we were trying to get crews in. We worked a solid eight days just getting everything in place.”

Within the Salt Lake City tent, the bigger and more populated of the two, the Hi-Tech staff installed 22 television monitors throughout, as well two DLP projectors set up at the live performance theater known as Coca-Cola Live! Input sources included a camera for live interviews, a Beta SP player for pre-recorded footage, a VCR for sponsor-driven infomercials, and three PCs for MS PowerPoint® presentations, computer-generated graphics, and Internet updates.

Going the Distance
Eleven cable feeds provided by the Olympic Committee featured live action from the surrounding areas of various events. The cable feeds were run through 11 VCR/tuners, offering technicians the option of changing the channel, as well as running VHS tapes if the need presented itself.

Long-distance signals running to the television monitors and projectors were distributed using the Extron ADA 6 300 MX HV, a one input, six output distribution amplifier capable of outputting composite video signals, as well as RGBHV, RGBS, RgsB, RsGsBs, component video, and S-video (Note: this DA has recently been replaced by the Extron DA6 RGBHV, also a one input, six output distribution amplifier that accepts and distributes RGBHV, RGBS, RgsB, RsGsBs, component video, S-video, and composite video signals). With cable runs routinely reaching lengths of 200 feet and more, the ADA 6 300 MX HVs were perfect for maintaining optimum signal quality throughout the tent, as well as to the monitors located around the perimeter of the area.

The PC video signals were integrated with the Extron RGB 109xi, a dedicated computer-video interface with a 15-130 kHz scanning range, 300 MHz (-3dB) of RGB video bandwidth, and a 15-pin HD connector. Rickers explained that all of the RGB signals from the PCs were scanned down to NTSC. This made controlling the system much easier.
At the heart of the whole set-up was the Extron MAV 1616 composite video and stereo audio matrix switcher. “We ran everything into the MAV 1616,” Rickers noted. “It enabled us to take any signal to any monitor.”

The MAV 1616 matrix switcher is equipped with 16 inputs and 16 outputs, and is capable of switching NTSC 3.58, NTSC 4.43, PAL, and SECAM video, as well as balanced and unbalanced stereo audio. Features such as video genlock and vertical interval switching were important in making the numerous transitions between all the sources smooth and seamless.

The complexity of the job demanded the ease of operation the MAV 1616 offers. The MAV includes several different control options, including RS-232 and IP control (24x12 to 32x32 sizes only) as well as optional remote controls such as the MCP 1000 control panel and MKP 1000 control keypad. Hi-Tech Rentals maintained an eight man crew on the premises each day of the games, making it possible for one person to handle the switching via the front panel. With Extron’s QuickSwitch Front Panel Controller (QS-FPC™), touch-of-a-button input and output selection along with the LED input switch indicator, system control was a breeze. “If we wanted to show ice skating on the outdoor monitors or a PowerPoint on all monitors, the MAV enabled us to easily manipulate the entire process,” Rickers said.

Closing Ceremonies
Just a few hours after a number of entertainers, dancers, and ice skaters brought down the house for the closing ceremonies, Compass Collective and Hi-Tech Rentals conducted a closing ceremony of their own. Tearing down the temporary facilities took two days. Rickers happily noted that all of the A/V equipment operated without a hitch. “From a system standpoint, everything ran very well, even with our early concerns about the elements—how the equipment would react to getting very cold at night, and then the potentially warm weather during the day. Everything performed without failure.”

Citing the reliability of the MAV 1616, the ADA 6 300MX HV, and the RGB 109xi, Rickers was impressed with the outcome. “Even though the venues ran 16 hours a day for 16 days and the equipment was subjected to cold weather and moderate moisture, the Extron products performed effortlessly. Our content sources and signal switching systems were stable throughout the entire project.”

Given the task of evaluating displays, wouldn’t you prefer to look at interesting and pleasing images versus test patterns? Among those in the industry that I know, descriptions of favorite, but provocative, imagery immediately comes to mind. Though great for evaluating skin tones, we find ourselves wanting a method that anchors us to the very basics that will help us get the job done. Using pretty pictures to initially consider display performance is like having dessert before the main course. It looks great and provides some short term nourishment, but leaves us with the reality that we must dine on the meat and potatoes in order to fully round out our knowledge, as well as our waistline.

Simplify Your Life

Test patterns simplify the process of making quantitative, not just qualitative, decisions about display performance. They are specifically designed to pinpoint, or demonstrate, unique attributes within images while intentionally avoiding others. While this makes the evaluation process easier, another really important function of test patterns is as a display setup and calibration reference. Without test patterns, proper setup is next to impossible. In fact, all DVD material should include an integral set of basic setup test patterns. Why? Proper display setup means that, in most cases, the signal source must be included in the setup equation. Yes, DVD players as well as most all video sources are not perfect. Typically, there are slight level differences and internal calibration issues among equipment types. For example, touching up the black level (brightness control) and contrast (gain) is usually necessary from disc to disc or from source player to source player. Setting up a display one time with test equipment does not mean the display will look its best for each use. Incorporating test patterns within the material allows the technician to quickly review and adjust for the situation. In other words, I am saying that before one would use the Shoot-Out DVD material, the test patterns are the initial step before moving to the more attractive images.

So, that metaphorical discourse brings us to the ubiquitous InfoComm Projection Shoot-Out® DVD and its significant caché of pretty pictures and very capable test patterns. I do highly recommend the static and moving imagery provided in this version of Shoot-Out software since, for the first time, we are able to offer everyone high quality, royalty-free NTSC and PAL video in addition to the famous and expanded computer graphics image show. But I’m an engineer, so it’s the test patterns I want to address in this article. Test pattern knowledge is nourishment that you need and you’re going to consume it whether you want it or not. So, hold your nose and get ready to eat your veggies.
pattern section should first be used to review setup of the display using THAT disc in THAT player. The test patterns that you saw as you walked through the InfoComm Projection Shoot-Out are the same patterns the manufacturers used for display calibration during the setup period prior to show opening. A good understanding of test pattern use will simplify your life where displays are concerned.

Test Pattern Celebrities

Two distinct suites totaling 21 test patterns are included in the Shoot-Out DVD Volume 1.5, 11 for computer graphics and 10 for video. Since these test suites support two distinct divisions of the disc, we will consider their application separately. But, don’t get frightened, the space allotted to this article does not allow me to embellish on each and every pattern. While simple in use and construction, there are many features of each pattern. I’m going to talk about some basics in the uses of the patterns and acquaint you with their application via some illustrative tables. I’ll leave the detailed discussion of each pattern to the two expert contributors’ technical descriptions that are included within the tutorial section of the Shoot-Out DVD. By the way, the tutorial section of the DVD contains these descriptions and much more in pdf file format. These files can be easily printed for future reference.

The graphics test patterns, located within the static image “slide show” portion, have evolved through our technical relationship with Dr. Raymond Soneira, President of DisplayMate Technologies Corporation. I have found Ray to be an authority in the development of test signals for high bandwidth RGB (computer) graphics displays and, since 1994, have worked closely with him to develop meaningful test patterns for the Shoot-Out and this DVD product. I use the term “meaningful” in that it relates to real details seen in real images of everyday occurrence. Since the InfoComm Projection Shoot-Out had a limited amount of time and number of images that could be displayed, test patterns were carefully crafted and honed in order to promote the challenge for which the Shoot-Out is known.

Joe Kane of Joe Kane Productions (JKP), known by most in our industry as an authority in video systems development and performance measurement, supplied all 10 video test patterns that accompany the high quality digital video material licensed from his HD video library. The video test patterns were MPEG-2 encoded directly from JKP’s programmable digital test pattern generator. Only high bit rate encoding was employed for maximum signal playback quality. Television video test patterns support calibration and evaluation of all signal processing functions prior to conversion to the RGB format which drives the display imager. Careful construction and encoding of these signals ensure proper display system response. These test patterns are accessed from the main menu of the DVD when used in DVD player system.

Test Pattern Boot Camp

Since the computer graphics image show is designed to convey information about RGB-based displays, these test patterns are optimized for just such a task. Refer to Table 1 (left) for a list of display attributes and the appropriate graphics test signal to use. The video test patterns associated with the moving video material, while having features targeted to the RGB portion of the display, also include the television signal processing occurring prior to the RGB portion of the display. Any signal arriving at the display not in the RGB domain is considered to fall within the signal processing area with one qualifier: image scaling is an integral part of fixed resolution displays and is considered to be part of the
RGB section of the display. Refer to Table 2 (below) for a list of display attributes and the appropriate video test signal to use.

The effects of test patterns are easier to interpret if we first realize how we see them. Remember that in the raster scanning system developed for television, the image is a construction using an electron beam that moves from the viewer’s left to right. As it moves, the beam is modulated ON and OFF as well as linearly so as to reproduce all intensity points in between. The rapid movement from left to right, then top to bottom, create the perception of an image. This is orthogonal scanning.

Think about that for a moment. It means that many effects we will study with test patterns are significant in those orthogonal directions. A perturbation of image creation seen on the left side of some visual feature represents a pre-occurring event. While the same perturbation seen on the right side of some feature represent a post-occurring event. The image scans horizontally at a higher rate of speed than it scans vertically from top to bottom. Because of this, all high frequency information is seen as a dot or vertical line structure on the screen. Vertical line structures merely represent a succession of dots that happen to occur at the same time on each successive horizontal line and stack one above the other. Medium range frequencies are represented by how long the beam remains ON during a horizontal line. The low range frequencies are represented by the number of horizontal lines comprising identical information...the more lines, the lower the frequency. The total number of visible lines represents the display’s maximum vertical resolution. The relationship of image artifacts seen either vertically or horizontally in a static image are said to be spatial, or spatially related.

With moving images, orthogonal considerations still apply, plus now we are concerned with image movement and the changing of details over time, or temporal issues. Test patterns with moving elements allow us to predict the temporal performance of the display. But the generation of moving test signals, while possible, is most times either technically difficult, expensive, or both.

Understanding some constructs of static images and imagining where the features will be with different types of movement help us understand the temporal effect. Most times, it is much easier and less expensive to identify a specific movie or video clip having temporal effects that vet the abilities of a particular display.

Start With Calibration

Whether they handle RGB graphics and/or video, displays are evaluated on their ability to make black and white plus all levels of gray in between. This is called grayscale. All RGB and video displays must have proper grayscale calibration in order to render information accurately. Both the graphics test suite and video test suite include the PLUGE, Picture Line-Up Generating Equipment, pattern in one form or another. PLUGE is used for proper adjustment or check of black level threshold and peak white settings. The low-level stripes in the PLUGE are used to set and verify black level is at its proper threshold. The larger boxes having varying luminance levels are used to set and verify the peak white excursion of the display. Once the end points between black and white are correct, we can concentrate on the grayscale performance in between those extremes.

The video test pattern suite contains four “window” patterns of differing levels. Window patterns provide a moderate to low duty cycle pattern for setting grayscale tracking via colorimetric test equipment. A low level window, 20% for example, is used to adjust grayscale for the correct color temperature just above black. A high level, 100% for example, is used to adjust grayscale for the correct color temperature at or near peak white. Calibration is interactive and usually requires several measurement passes at each level before grayscale linearity is obtained.

Antidote for Bandwidth Sufferers

I want to introduce you to four new, unique patterns within the computer graphics suite: the Video Bandwidth, Video Bandwidth Balance, Gamma, and Color Tracking Error (gamma related) patterns. Each of these patterns indicates, at a glance, information about real system bandwidth and the shape, or condition, of the display’s grayscale.
Video Bandwidth and Bandwidth Balance

The video bandwidth pattern is composed of sets of horizontal line groups and vertical line groups using only the green channel; I’ll get to the reason for that in a moment. The horizontal line groups represent low frequency information at calibrated levels. The vertical line groups represent high frequency information at full amplitude. Amplitude (perceived brightness) of the vertical line groups will attenuate with system bandwidth limitations. Compare their brightness to the calibrated horizontal line groups. The row having the closest match to the columns indicates the percentage of full bandwidth for the particular graphics line rate being used.

Why only green? Human vision is most sensitive to the green channel which makes for easier matching of the intensity levels in the pattern. Only one channel is needed to get a good idea of system bandwidth since the RGB video channels in a display process information identically. Or do they?

They should, but they don’t always. That’s where the Video Bandwidth Balance pattern comes into play. Now, all three channels are enabled which means we are looking at sets of white horizontal and vertical line groups. With all three channels operating, what should we see? We should arrive at the same percentage of bandwidth if the display is properly aligned. But, what if the boxes are tinted a different color of white? If you see tinted groups of lines, then one or more video processing channels are bandwidth deficient. By evaluating the color of the tint and the way in which colors add and subtract, we can determine which channel(s) have less bandwidth and approximately how much.

Gamma and Color Tracking Error

All “AV Guys” have heard the term “gamma”. Gamma and gamma correction have gotten much more press in the past few years as new, non-CRT projector technologies emerged into the market. Quoting Dr. Soneira, “the shape of the projector’s grayscale as it increases from black to peak white is described in terms of a mathematical power-law function with an index called Gamma”. That is to say the light output response of a CRT is not linear with respect to the input stimulus. Television is based on a gamma index value for a CRT. This is important because it means that at the signal source (TV camera) the signal is pre-emphasized by the inverse function in order to compensate the nonlinearity. On non-CRT displays, image grayscale will not be correctly reproduced. Graphics images sourced from a computer with unity gamma will appear dark on a CRT monitor. Non-CRT displays have gamma values nearer to, but not exactly, one.

Therefore, using the gamma pattern provides the answer at a glance. Gamma is most obvious near the middle of the grayscale and this pattern allows you to evaluate gamma near this point. The pattern is green like the video bandwidth pattern so that we can first consider the basic system response. The construction is similar in that the pattern is constructed of alternate groups of horizontal and vertical line groups. Match the row to the columns where the intensities come closest and read out the gamma value. The pattern provides a range of 1.4 to 2.6, which covers most displays.

Like the video bandwidth balance pattern, the gamma pattern with all channels enabled provides information about the tracking of each channel to the other with respect to the gamma index. This version is called the Color Tracking Error pattern. Normally, the red, green, and blue channels vary identically with signal level. If this is not observed, color tinting will occur within the various line groups in the pattern. As the intensity of the tint increases, likewise the color tracking error is larger.

This was a glimpse of some unique test patterns and an introduction to the test resources available on the Shoot-Out DVD. I wish there were enough time and space here to cover all aspects of the DVD test pattern suites. Today, having test materials on digital disc and a DVD player equip anyone with low-cost competitive technical resources to evaluate, calibrate, or just plain enjoy higher quality image display more than ever before.

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The InfoComm Projection Shoot-Out DVD, Volume 1.5, copyrighted and co-produced by the International Communications Industries Association, Inc.® (ICIA), is available from Extron Electronics. For further information on DisplayMate Technologies Corp., go to www.displaymate.com. For information on Joe Kane Productions, Inc., go to www.videoessentials.com. 

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For The Record...

We would like to refer your attention to Steve Somers’ article, “IR Control – The Invisible Frontier” from the Technically Speaking column, ExtroNews, Issue 13.2, April - June 2002. There are four statistics referencing carrier frequency that are incorrect. Specifically, wherever Hz (hertz) appears following a numerical figure should actually be kHz (kilohertz). It is our hope that these errors have not been critically misconstrued, and that your faith in our expertise and use of precise technical jargon and specifications has been restored.
Out-of-Sight Solutions:
Extron Hideaway™ HSA Product Line Feature

One of the biggest sensations in the Extron booth at InfoComm 2002 was the Hideaway™ Surface Access (HSA) family of enclosures, which includes the new Cable Cubby™ line. HSAs provide inconspicuous access to computer-video interfaces as well as A/V system controls and connections. Once installed, Hideaways fit nearly flush with the tabletop, storing the connectors out of sight when not in use. And, because HSAs are available in a variety of aesthetic finishes, including brushed black anodized, brushed aluminum, brushed brass, polished aluminum, and polished brass, they can be discreetly mounted into high-end boardroom and conference room tables, as well as podiums and lecterns. For installations outside the USA, HSAs and Cable Cubbys are available in world models, compatible with Central Europe, UK, Australia, Switzerland or universal female IEC power connectors.

HSA 200 Series
The smallest enclosures in the Hideaway family are the four models in the Hideaway HSA 200 Series: HSA 200C, HSA 200CE, HSA 200S, and HSA 200SE. These enclosures offer fixed configurations ideal for classroom environments, including one female 15-pin HD connector, one grounded AC outlet, two bezel-mounted RJ-45 (CAT 6) network/data/phone connectors, and 3.5 mm stereo jack audio connector on its faceplate.

To access the connectors, users press down on the top of the enclosures, thereby releasing a mechanical latch. The HSAs pivot open, presenting the connectors at a 49˚ angle to the tabletop. The main difference between models is that the HSA 200C and HSA 200CE feature a circular bezel, allowing installation with a standard six inch hole saw (USA version only), while the HSA 200S and HSA 200SE feature a square bezel. Routing guides are available for the world models of the HSA 200C and HSA 200 CE and for the square bezeled models.

The HSA 200CE and HSA 200SE also provide a built-in Extron Extender line driver, which allows computer-video signals to be output on five BNC pigtails and driven over long cable runs without degradation of the signal. The Extender also converts unbalanced audio to a balanced signal.

HSA 400 Series
The three models in the HSA 400 Series offer tilt-up access to connectors and controls, and can be optimized by using them in conjunction with the RGB 580xi, a universal, computer-video interface with audio and Advanced Digital Sync Processing (ADSP™). The HSA 400 Series is ideal for boardrooms and other corporate settings.

The HSA 400 offers one AC outlet, and two bezel/mounted RJ-45 (CAT 6) network/data/phone connectors on its faceplate. In addition to the AC outlet and RJ-45 connectors, the face of the HSA 400 includes room for two double space Extron Architectural Adapter Plates (AAPs).

The HSA 402 offers two grounded AC outlets, and four bezel/mounted RJ-45 (CAT 6) network/data/phone connectors on its faceplate, enabling simultaneous hook-up of two laptop PCs, as well as room for two double space Extron AAPs.

The HSA 452 offers one AC outlet and two bezel-mounted RJ-45 (CAT 6) network/data/phone connectors on one side of its faceplate and a pullout, female 15-pin HD cable, as well as a pullout, male 3.5 mm stereo jack audio cable on the other side of the faceplate. In addition to these connectors, the faceplate also includes room for two double space Extron AAPs.

HSA 800 Series
The Extron Hideaway HSA 800 Series differ from the other models in the way the connectors are presented to the user. The HSA 800s vertically lift into view as opposed to tilting up. To access the connectors, users...
press down on the top of the enclosure. The HSA 800 Series can also be optimized by using with the unique Extron RGB 580xi remote interface. The HSA 800 Series is ideal for conference rooms and other business settings where A/V users sit across the table from one another.

The HSA 800 one AC outlet and two bezel/mounted RJ-45 (CAT 6) network/data/phone connectors. In addition to the AC outlet and RJ-45 connectors, the faceplate of the HSA 800 includes room for two double space Extron AAPs.

The HSA 802 provides a faceplate on both sides of the product, each with one AC outlet and two bezel/mounted RJ-45 (CAT 6) network/data/phone connectors, enabling simultaneous hook-up of two laptop PCs. Additionally, each of the faceplates include room for two double space AAPs.

**Cable Cubby**

The Extron Cable Cubby is designed to provide access to A/V power, data, and video connections, including Extron AAPs. Half-moon cutouts in the lid enable cables to be run in or out of the Cable Cubby's base with the lid closed. Most models are equipped with a square bezel with the exception of the Cable Cubby 300, which also is available with a circular bezel.

Within its base, the Cable Cubby offers adjustable panels with three sizes of openings to accommodate a variety of cable diameters. The adjustable panels can be raised or lowered to suit cable lengths and connector types. Any of the Extron optional AAPs can be inserted in place of the panels. The US models can accommodate up to three in the 300 model, six in the 600 model, and eight in the 800 model while the world models have room for two, five, or seven single space AAPs respectively. The Cable Cubby also includes one or two height/location adjustable, unswitched AC power outlets for additional power support (Australia, UK, and Central Europe models have one; USA, Switzerland, and universal IEC models have two).

**Architectural Adapter Plates (AAPs)**

Extron AAPs are mountable metal plates that provide pass-through connectors and control modules that can be installed into a variety of products to maintain a clean and efficient A/V system design. There are hundreds of Extron AAPs available, in a variety of connectors including AAPs that allow passive pass-through connection for audio, composite video, computer, data, and power, as well as connection points for 15-pin HD, RCA, BNC, S-video (4-pin mini DIN), 3.5mm, XLR, captive screw, RJ-45, 9-pin, and AC plugs. There is also an Extron Flexible Conduit Adapter Kit available to convert the male IEC plug on the bottom into a connection that can be hardwired by an electrician.

**Easy Installation**

Extron Hideaway and Cable Cubby products can be easily installed using either a six-inch hole saw (for circular US HSA 200C and Cable Cubby 300C models) in three simple steps or with one of the Extron router templates available to our customers free-of-charge. Templates and cut-out dimensions can be quickly downloaded from the Extron Web site or requested from your Extron Customer Service Representative.

**Step-by-step instructions from site preparation to troubleshooting for the HSA 400 and HSA 800 Series** are also available in the form of an I-Demo. This streaming video can be viewed directly from the Extron Web site or conveniently downloaded to your computer to train installation personnel or to view on-site from a laptop if questions arise during the installation. Of course, assistance is always just a phone call away with the Extron 24-hour Sales and Technical Support Hotline.

For additional information on HSAs, the RGB 580xi, or Extron AAPs, refer to the 2002-2003 Extron Product Catalog or visit the Extron Web site at: www.extron.com.
The CrossPoint Series of matrix switchers now includes the CrossPoint 42HVA, a four input, two output RGBHV and stereo audio matrix switcher with 300 MHz (-3dB) RGB video bandwidth, fully loaded. All other features are consistent with the CrossPoint line including buffered I/Os, global presets, and RS-232 control.

The CrossPoint Series provides a single box solution to many routing applications. Each input and output is individually isolated and buffered, and any input(s) can be switched to any one or all outputs with virtually no crosstalk or signal noise between channels. Extron designed the CrossPoint Series to deliver performance and value to the professional A/V market.

Housed in a rack-mountable, 19 inch wide enclosure, the CrossPoint Series includes RS-232/422 capability. The unique advantage of the RS-232/422 control is Extron’s exclusive Simple Instruction Set (SIS™). These instructions are simple to use, easy to read, ASCII command codes. All CrossPoints come standard with the QuickSwitch Front Panel Controller (QS-FPC™), which allows for touch-of-a-button input and output selection directly from the front panel.

**CrossPoint 42HVA**

**Part Number**
60-504-01

**List Price:**
$1,660.00*

**URL**
www.extron.com/crosspoint42

* Prices listed in US Dollars, valid for US sales only.

**CrossPoint Plus Series**

**Part Number**

**List Price:**

| CrossPoint Plus 2412HVA | 60-470-01 | $29,195.00* |
| CrossPoint Plus 2412HV | 60-470-02 | $20,795.00* |
| URL | www.extron.com/crosspointplus2412 |
| CrossPoint Plus 2424HVA | 60-468-01 | $33,395.00* |
| CrossPoint Plus 2424HV | 60-468-02 | $23,695.00* |
| URL | www.extron.com/crosspointplus2424 |
| CrossPoint Plus 3216HVA | 60-471-01 | $33,595.00* |
| CrossPoint Plus 3216HV | 60-471-02 | $23,695.00* |
| URL | www.extron.com/crosspointplus3216 |
| CrossPoint Plus 3232HVA | 60-469-01 | $43,395.00* |
| CrossPoint Plus 3232HV | 60-469-02 | $34,495.00* |
| URL | www.extron.com/crosspointplus3232 |

* Prices listed in US Dollars, valid for US sales only.

The Extron CrossPoint Plus Series are ultra-wideband, analog RGBHV matrix switchers. In addition to the existing six models, Extron is now offering eight new larger CrossPoint Plus switchers—24x12, 24x24, 32x16, and 32x32, with or without audio—for high performance routing applications. Each model is able to switch RGBHV video signals down to composite video. The “HVA” models also switch two-channel stereo audio, while volume adjustment and muting eliminate the need for a pre-amplifier.

Other features of the Cross Point Plus Series include redundant power supplies, which means there is no loss of functionality should the system’s primary power supply fail. With IP (Ethernet) control, the switcher can be accessed from anywhere on the network—from multiple sites or even over the Internet. For added IP support, Web hosting capabilities are provided so the full functionality and monitoring of the switcher is possible via any Internet browser. Custom Web pages can be produced with any off-the-shelf software program to create your own HTML pages or java applets. Firmware updates can also be downloaded through the RS-232/RS-422 or Ethernet port.
The Extron **MSW 4V** Series are four input video Mini Switchers. There are three models in the series. The **MSW 4V** model is a composite video switcher utilizing BNC connectors. The **MSW 4SV** model is an S-video switcher using 4-pin mini DIN connectors. The **MSW 4V SDI** is an SDI video switcher with two buffered, re-clocked outputs on BNC connectors. All three models include two parallel outputs for simultaneous viewing on a monitor and projector (the **MSW 4SV** features a built-in video encoder to output composite video through a BNC connector to a composite video monitor). Each model also includes a 3.5 mm captive screw contact closure connector for remote control, as well as four direct push-button input selects with a LED indicator for each input.

To ensure glitch-free transitions, the **MSW 4V** and **MSW 4SV** switch during the vertical interval of input one. Autoswitching is also available on all three models, selectable via the front panel. An LED on the front panel indicates that the autoswitching feature is on. The **MSW 4V** and **MSW 4SV** are compatible with NTSC, PAL, and SECAM video formats, while the **MSW 4V SDI** is compatible with all composite (143 and 177 Mbps), component (270 Mbps), and wide-screen (360 Mbps) serial standards.
MediaLink™ MLS 100 Series Switchers
Quarter Rack Mountable Switchers for Composite Video, S-Video, RGB Computer Video, and Stereo Audio.

The Extron MediaLink™ MLS 100 Series are compact, affordable switchers housed in quarter rack width, 1U high metal enclosures. There are four models of the MLS 100 switchers for RGBHV video, composite video, S-video, and audio. Each video switcher comes with 250 MHz (-3dB) of bandwidth. All switchers include four switchable audio inputs and pre-amp volume control. An additional input is an active auxiliary line level mono audio input that can be mixed with any of the other four selectable inputs. When used with a MediaLink Controller MLC 206, input switching and volume are easily achieved via the MLC 206’s user interface. As stand-alone products, the MLS 100 switchers can be controlled via the front panel input buttons or RS-232.

**MLS 100 A**
The MLS 100 A is a four switchable audio input, one audio output active switcher utilizing 3.5 mm captive screw connectors.

**MLS 102 VGA**
The MLS 102 VGA is a two RGB computer-video input, one RGB video output active switcher utilizing 15-pin HD connectors. It includes four switchable audio inputs and pre-amp volume control.

**MLS 103 V**
The MLS 103 V is a three composite video input, one composite video output active switcher utilizing BNC connectors. It includes four switchable audio inputs and pre-amp volume control.

**MLS 103 SV**
The MLS 103 SV is a three S-video input, one S-video output active switcher utilizing 4-pin mini-DIN connectors. It includes four switchable audio inputs and pre-amp volume control.

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<th>MLS MediaLink Switchers</th>
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<td>MLS 100 A</td>
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<td>MLS 103 SV</td>
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* Prices listed in US Dollars, valid for US sales only.

IRCM-DV+
IR Control Module

The Extron IRCM-DV+ is a four space, dual function IR Control Module Architectural Adapter Plate (AAP) for use with the MediaLink Controller. Once configured, it is able to provide control of a VCR and DVD player’s most commonly used functions. The IRCM-DV+ is available in gray, black, and white. It ships with two IR Emitters.

<table>
<thead>
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<th>IRCM-DV+</th>
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| URL | www.extron.com/ircmdvplus |

* Prices listed in US Dollars, valid for US sales only.
The Inline VTT001CM Transmitter and VTR001CM Receiver are affordable, high performance products for transmitting and receiving high-resolution video signals up to 500 feet (152 meters) over any UTP cable, including the new Extron Skew-Free A/V UTP cable. The VTT001CM and VTR001CM system lets A/V system designers and installers leverage the many benefits of signal distribution over UTP cabling and offers an excellent choice for hotels, large training facilities, office buildings, and any other application that requires long distance runs of high-resolution computer video signals.

VTT001CM / VTR001CM Features:

- **Compatible with RGBHV, RGBS, and RGsB high-resolution computer-video signals** — At resolutions up to 1600 x 1200
- **System integration** — Multiple VTT Series transmitters and VTR Series receivers can be used in conjunction with the Extron TPX 88, an 8x8 twisted pair matrix switcher, to create a larger integrated system
- **Multiple mounting options** — Double space A/V modules (Installation -1 and -2 models) can be installed in Inline CPM Series modular connector plates and Inline CIA Series interfaces, as well as other Inline installation interfaces and distribution amplifiers, wall plates, floor plates, and rack plates. Tabletop models (-3 models) can be placed on tabletops and other surfaces, as well as in equipment racks or data displays.
- **Remote power capability** — The VTT001CM /VTR001CM system operates with an external DC power supply connected to either the transmitter (receiver remote power) or receiver (transmitter remote power). For longer cable runs, power is applied to both the transmitter and receiver.
Eliminate your Sync Problems, Part 1
A Shotgun Approach to Troubleshooting Sync Problems in RGBHV Systems

Troubleshooting, according to Webster’s, “is the process of finding and eliminating sources of trouble.” It can be argued that troubleshooting is best done as just that, a process, in which a methodical and thorough approach is taken to identifying and eliminating problems.

Effective troubleshooting arises from the situation at hand, and is affected by technique, methodology, the amount of time, tools, test equipment, or replacement parts available, and the knowledge and experience of the troubleshooter.

A shotgun approach to troubleshooting is how virtually every troubleshooting effort begins, and how it often ends in success. When confronted with a problem, a technician will attack the things he or she knows about and has experienced before. The cold, clean, methodical, and thorough approach will inevitably be the last resort, and will be fallen back upon only after the shotgun has run out of ammunition.

So what constitutes effective shotgun troubleshooting? The answer is knowledge of the systems one is working with, as well as experience with similar problems in the past.

Bad Sync

Of all the problems that can plague high-resolution display systems, bad sync is probably the most common. While display systems can suffer from a plethora of problems affecting image quality, bad sync is the most likely to leave you with an unrecognizable image or no image at all. Before getting into specific problem details however, some background is in order.

Every color video signal consists of five elements: red, green, blue, horizontal sync, and vertical sync. Although many video signals are distributed in other combined formats, such as RGBS, S-video, and composite video, they all contain the RGBHV elements. The RGB elements of the signal carry the color intensity information, and the HV elements carry the timing information that tells a display where on the screen to display the RGB information.

Sync refers collectively to the horizontal and vertical synchronization components (H & V) of the RGBHV signals. Bad sync refers to either or both of the H and V sync signals not being effectively delivered to the display device. Bad sync can exhibit itself in a number of different ways. Part 1 of this article will document two specific scenarios in which bad sync is encountered, what causes it, and how to fix it. In the next issue of ExtroNews, Part 2 of this article will cover two additional bad sync scenarios.

Scenario 1 – Flashing image: An image from a display device, usually a projector, is seen to be stable for a time but will vanish intermittently. Often the loss or return of the image will be accompanied by a rolling or scrambled image. The timing of the stable image and the lost image can vary from a matter of seconds to a matter of minutes. If the image rolls or scrambles upon loss or return it will typically do so for less than a second.

The display device may be receiving sync on more than one of its inputs that are sensitive to sync. Many display devices are designed to accept RGBs, RGBS, or RGBHV, though most work best with RGBHV. If horizontal or vertical sync are present on more than one of these connectors, a display may experience logical indecision on which signal to lock to, and exhibit the flashing image problem as it loses sync switching from one sync source to the next. This problem usually occurs when a computer-video interface is delivering more than one sync format to a display device. The most common example of this problem is when an interface delivers RGB, composite sync, and vertical sync, RGBSV, as opposed to RGBHV, though it can occur when any combination of multiple sync signals are delivered.

Solution: The way to resolve such a problem depends upon the system in which the problem occurs. The most common configurations in which the problem appears, and the corresponding resolutions are outlined below along with general notes to cover the less frequent occurrences of this problem.

When using an Extron interface with RGBHV connections in an RGBHV system, the H sync line may be attached to the S sync connector on the interface. Ensure that the “H” sync connector is attached to the horizontal line, as opposed to the “S” connector, to resolve this problem. The “S” line delivers both horizontal and vertical sync, thus potentially causing the problem.

When using an Extron architectural interface with RGBHV connections in an RGBHV system, make certain that the composite sync DIP switch is turned off.

When using an older model Extron interface with RGBHV connections, ensure that the “Force H & V” sync DIP switch is turned on. Some older models of Extron computer-video interfaces had a feature called Auto Sync Output Detection, which allowed the H/HV connector of the
interface to deliver horizontal or composite sync depending on the sync termination characteristics of the display device. If a display device did not have sufficient termination to turn on the appropriate sync signals, the “Force H & V” DIP switch on the interface could be used to force the H/HV connector to output only horizontal sync. The “Defeat Sync On Green” DIP switch might need to be turned on to eliminate sync on that channel as well.

When using an older model interface with the Auto Sync Output Detection feature, which does not have a “Force H & V” DIP switch, the interface must be fooled into outputting separate H and V sync by “double terminating” the vertical sync line at the projector. This is accomplished by attaching a BNC T connector to the vertical sync input to the projector, and attaching the vertical sync line that runs from the interface to one end of the “T”, and a 75 ohm terminator to the other end of the “T” (see Image 1 above). This double termination must be done at the projector’s input, rather than at the interfaces output, in order to avoid sync reflection problems caused by creating an impedance mismatch.

When using any other combination of RGB signals with any other interfaces, configure the interface through DIP switches, connections, or double termination to deliver H and V sync to only one of the connectors of the display device, each.

**Scenario 2 – Double Sync Swap:** In an RGBHV system employing the use of a switching scaler, such as an Extron DVS 204, computer-video sources will appear correctly on the display device, but scaled video will not. Swapping the H and V sync lines at the display device causes video sources to appear correctly on the display device, but causes computer-video will not appear.

**Solution:** This problem occurs when H and V connections from a computer source have been swapped when connected to the scaler, and the H and V connections from the scaler have been swapped again when connected to the display device. The lack of industry standards in cable color coding, especially with 15-pin HD to RGBHV (BNC) adapter cables, contributes to the frequency with which this problem arises.

To correct for or prevent this problem from occurring, consistency in H and V cable assignment must be ensured throughout an RGBHV system. Using cables which employ the same color coding scheme for H and V sync throughout a system is the best way to manage H and V sync consistency. (See illustration below.) Extron cables consistently use yellow cables for V sync and black cables for H sync throughout the product line, including the various 15-pin HD to RGBHV (BNC) adapter cables.

**For Next Time…**

In the next installment, bad sync and its relationship to Reflections and Cable Problems will be discussed.
An Overview of Active vs. Passive UTP Technology

The practicality of using UTP (unshielded twisted pair) cable for certain specific high-resolution A/V applications, such as long cable runs, existing infrastructure, and limited space, has already been established. However, once we’ve made the initial decision to use UTP, we’re left with the question of whether to choose active (powered) or passive (unpowered) technology to implement our decision. The issues we’ll confront are balanced signal, impedance matching, and signal loss. Cost will no doubt be a factor in our decision, but as A/V professionals, signal quality must be our primary consideration. This Tech Corner will examine the factors that will influence our choice.

Balanced Signal

Due to the way UTP cable is constructed, it is more susceptible to noise than coaxial cable. Common mode noise from such things as electric motors, transformers, fluorescent lighting, and other common sources is present in most installation environments and is a problem due to the UTP cable’s lack of shielding. Adjacent pair crosstalk, due to the close proximity of several pairs of wires, is also a potential issue. Minimizing this type of interference requires a special type of signal called differential, which requires a dedicated transmitter and receiver.

Essentially, here’s how it works. In differential mode (Figures 1 and 2), when the transmitter receives a source signal, it creates a complimentary (mirror) signal and then sends this balanced pair of signals to the receiver. The differential receiver receives the balanced positive and negative input signals and uses the difference between the two to form an output signal. Any induced common mode noise from other sources causes the same noise signal to be induced into both wires equally. The receiver processes this common mode noise in the same way it processes the signal; however, since the amplitude and polarity of the induced noise are the same on both wires, the noise cancels out and only the original signal is output by the receiver. This is true for both active (transmitter/receiver pair) and passive (balun transformer) solutions.

For example, in (Figure 3) the transmitter changes the input signal into a balanced analog signal and sends it along the twisted pair cable. The differential receiver uses the difference between the signals to produce the output signal. The result is a noise free signal.

Impedance Matching

In addition to interfacing the physical connectors of the several types of cable involved, consideration must also be given to the issue of impedance matching. Coaxial cable has an impedance of 75 ohms, video signals have 75 ohm impedance, and displays have 75 ohm input impedance. UTP cable typically has an impedance of
approximately 100 ohms (Figure 4). If impedance is not matched, the result is a less than optimum power transfer from the source to the destination. This causes energy to be reflected back to the source and results in ghosting and a poor quality picture. Again, both active and passive solutions will resolve the issue.

**Signal Loss**

Signal loss, also called attenuation, is measured in dB (decibels). The more attenuation there is, the poorer the signal will be at the receiver. Attenuation is a problem with UTP cable due to the cable’s inherent lack of uniformity caused by differences in twist tension and rate, bends in the cable, and other inconsistencies, as well as lack of shielding and variances in insulation type/thickness—all problems that are not an issue with coaxial cable.

The use of passive balun transformers does not address these issues. By their very nature, passive transmitters and receivers can provide no help for signal loss. Passive devices actually further attenuate the video signal, making the problem more serious. Far more satisfactory are the superior results obtained by using active transmitter/receiver pairs, which do not share this limitation, and overcome the problem of signal loss by providing amplification, complemented by variable level and peaking controls designed to optimize the signal.

To illustrate this, actual oscilloscope shots (Figures 5 and 6) show a comparison of rise times between passive (balun transformer), and active (Extron transmitter/receiver pair) configurations. The test signal is 1024 x 768 @ 60Hz, with an approximate rise time of 1.5 ns (nanosecond). Scope measurements in Figure 5 (passive) and Figure 6 (active) were taken using the same 100 feet and 300 feet of UTP cable. In each case, the reference signal, provided by a video test generator connected directly to the scope, appears as a thin black line, and the test signal (Ch1) appears as a heavy yellow line. Note the inferior response of the passive solution (poor rise time and low amplitude, resulting in a soft, dim image) using either length of UTP cable. At the same time, in both of the active scope shots the active transmitter and receiver pair were able to compensate for the distance by using the peaking adjustment to improve the rise time (sharpening the picture) and the level adjustment to boost the amplitude of the signal to acceptable levels (brightening the picture).

**Active Solutions**

To provide solutions to these problems, Extron has designed a special class of transmitters and receivers especially suited for twisted pair (TP) applications, with specific features designed to address each issue. These products are compatible with Category 5, 5e, or 6, shielded or unshielded cable and are available in configurations suitable for BNC or 15-pin HD video connectors, with 3.5 mm captive screw and/or RCA audio connections. In addition to converting the video and audio signals to differential analog, which is suitable for longer distances, they also provide a mechanical (connector) and electronic (impedance) interface between dissimilar cable types. Finally, they compensate for signal loss by providing amplification, with level and peaking controls to adjust for cable length.
ExtronNews publishes information about new products that are relative to the Extron product line in the New News section. Also listed are the recommended Extron products that will complement these new display devices in their targeted applications. If you would like a new product to be reviewed for New News, please send a press release, literature, contact name, and a four-color slide or photo to: New News c/o Pat Charlton, Extron Electronics, 1230 South Lewis Street, Anaheim, CA 92805, phone: (714) 491-1500, ext. 6244 or e-mail to pcharlton@extron.com.

Christie Digital Systems, Inc.
www.christiedigital.com

Christie Digital Systems introduces the Vivid LX33 and Vivid LX41 to its Vivid series of high performance LCD projectors. Christie’s Vivid LX33 is ideal for mid-sized installations in boardrooms, meeting rooms, and classrooms. It weighs 17.4 lbs (7.9 kg), delivers 3300 ANSI lumens, has a contrast ratio of 500:1, and a native resolution of 1024 x 768. The LX41 is a lightweight compact projector for large conference and meeting rooms. It weighs 18.5 lbs (8.4 kg), delivers 4100 ANSI lumens, has a contrast ratio of 800:1, progressive scan video processing, and a native resolution of 1024 x 768. The Vivid LX33 and Vivid LX41 offer a number of analog and digital inputs supporting various video and data formats, as well as analog HDTV sources. The suggested USD list price is $13,995 for the Vivid LX33 and $19,995 for the Vivid LX41.

Recommended Extron product:
For fixed installations using the Vivid LX33 or Vivid LX41, the Extron System 7 SC Switcher will offer more inputs, making it ideally suited for education and corporate environments. The System 7 SC is a seven input, dual output switcher with scaling capabilities and advanced film mode processing: 3:2 pulldown detection for NTSC and 2:2 film detection for PAL. Six of the seven inputs of the System 7 SC accept composite video, S-video, component (including HDTV), or RGBHV while the seventh input accepts composite video, S-video or RGBHV. Audio is available on all seven inputs with adjustable gain and attenuation.

Epson America, Inc.
www.epson.com

Epson America Inc. has introduced its first home theater LCD projector, the PowerLite TW-100. The PowerLite TW-100 projects high-resolution video at HDTV 720p native resolution and in a 16:9 wide format aspect ratio required for movies. The projector offers 700 ANSI lumens, a 600:1 contrast ratio, is HDTV-ready, and supports other digital video signals such as 480i, 480p, 720p, and 1080i. It supports a variety of video sources as well, including composite video, component video, S-video, and PC digital/analog RGB. The suggested USD list price is $4,995.

Recommended Extron product:
For home theater installations using the PowerLite TW-100, the Extron DVS 204 Digital Video Scaler offers an affordable switcher and scaler solution. With the DVS 204, up to four video sources can be switched into the projector. Inputs one through four consist of an RGB input that works as a pass-through to simplify system design, as well as accommodate component video, S-video, and composite video. The output of the DVS 204 can then be scaled to the native 1024 x 768 resolution of the PowerLite TW-100 using proprietary Extron scaling technologies including Dynamic Motion Interpolation (DMI™), 3:2 pulldown detection, True Rate™, and Accu-RATE Frame Lock™ (AFL).

Fujitsu
www.plasmavision.com

Fujitsu announces the PDS-5003, a 50-inch wide screen (16:9) plasma display monitor. The PDS-5003 delivers 3000:1 contrast ratio and features an on-board audio amplifier. It features a high-resolution 1366 x 768 native resolution that can display the output from any digital and analog video source in full resolution, including the RGB output from a computer up to UXGA 1600 x 1200 resolution, true 1080i and 720p HDTV and 480p signals from a DTV set-top box or computer. The PDS-5003 provides multiple video and audio connections including DVI-D digital video, component video, S-video, composite video and analog RGB video connections. The suggested USD list price is $14,999.

Recommended Extron product:
For switching and distribution of HDTV/component and S-video sources to the Fujitsu PDS-5003, Extron offers a selection of switchers and distribution amplifiers. For HDTV/component applications, the Extron SW 6 YUV A Switcher allows multiple HDTV/component video images to be switched to one plasma, while the Extron DA 6 YUV A Distribution Amplifier allows one HDTV/component image to be displayed on six plasmas. For S-video applications, the Extron SW 65VA Switcher can be used to switch up to six S-video sources, while the Extron SVDA 6 MX Distribution Amplifier can be used to distribute one S-video source to six plasmas.
Panasonic has introduced a 42-inch TH-42PHD5UY High Definition Plasma Display Panel that offers a 3000:1 contrast ratio, XGA 1024 x 768 progressive-scan native resolution, and is capable of displaying images up to UXGA 1600 x 1200. It accepts NTSC, PAL, SECAM, component, composite, and S-video. An optional TY-42TM4D DVI interface allows for direct digital input of RGB signals. The TH-42PHD5UY weighs 66 lbs and has a suggested USD list price of $7,995.

Recommended Extron product:
Whether the TH-42PHD5UY will be used in conference rooms or control rooms, using an Extron ISS Integration Seamless Switcher allows eight additional inputs to be added to the Panasonic plasma. The ISS switcher also features two scaled signal outputs for "program" and "preview" simultaneously on BNCs and 15-pin HD connectors. The ISS provides truly seamless, glitch-free switching between eight inputs and delivers superior up/down scaling technology. The ISS supports 15 scaled output rates while the ISS 408 accepts HDTV and supports 33 scaled output rates.

NEC Solutions (America), Inc.
www.necvisualsystems.com

NEC Solutions (America), Inc. has announced that its SXGA resolution High Light Output (HLO™) Nighthawk and Tri Digital™ Series projectors will now utilize a new three chip 0.9-inch DLP™ system featuring Dark Metal Process from Texas Instruments. This process incorporates a dark layer over the chip substructure, absorbing scattered light entering the substructure for improved darkness and a significant increase in contrast ratio. NEC’s SXGA Nighthawk Series projectors will benefit from a doubling in contrast ratio from 400:1 to 800:1 as a result of the new process. The new versions of these projectors will feature a ‘D’ at the end of their name to indicate the incorporation of the Dark Metal Process (SX4000D, SX6000D, SX10000D). NEC’s enhanced HLO products will ship in fall 2002. Contact NEC for pricing.

Recommended Extron product:
The Extron CrossPoint and Extron CrossPoint Plus Series Switchers allow multiple inputs to be routed to multiple outputs and are a perfect fit in control room environments. All models switch separate horizontal and vertical sync to ensure proper sync compatibility, providing a more stable image. All models also switch RGBs, RGBsB, HDTV, component video, S-video and composite video. These CrossPoint switches are available with or without audio and are offered from sizes from 4 x 2 up to 32 x 32. The audio versions have input gain and attenuation adjustable from the front panel or RS-232.

PLUS Vision Corp.
www.plus-america.com

PLUS Vision Corporation of America announces the U2-X2000 DLP™ projector, the brightest, most portable projector in the PLUS Vision family line of products. It offers 2000 ANSI lumens, weighs 5.6 lbs (2.6 kg) and has a native resolution of 1024 x 768. It includes a CompactFlash card insert and presentation download software, which lets you load your presentation into the projector, eliminating the need to carry a PC. It also offers a “chalkboard” function allowing you to plug in a USB mouse directly to the projector in order to draw on screen. The U2-X2000 includes inputs for a wide selection of video signals including composite, S-video, component, 15-pin HD, and DVI for computer signals up to 1600 x 1200. It has a suggested USD list price of $6,495.

Recommended Extron product:
When using the DVI (Digital Visual Interface) input of the U2-X2000 DLP projector, the Extron DDTX/DDRX DVI driver will lengthen the distance run, and the Extron D/2 DA4 DVI distribution amplifier will multiply the output of the PC’s DVI graphics card. Since the DVI signal is recommended for runs up to 15 feet, the DDTX-DDRX DVI driver allows the signal of the DVI graphics card to be driven up to 330 feet using Extron’s SHR cable. If multiple U2-X2000 projectors are needed, the D/2 DA4 DVI distribution amplifier splits the signal of the DVI graphics card to four outputs.
Tweeker Use #65

Car Cylinder Pin
While driving to work in January, Neal Gass, Director of Engineering for Video Applications, Tustin, CA, was unpleasantly surprised when he pushed in the clutch pedal and it went straight to the floor! After careful inspection, a broken clutch slave cylinder clevis pin was found to be the cause of the problem. Luckily, Neal had 3 or 4 Extron Tweezers in the “boot” of his car and was able to bend one into a U shape, put it through the cylinder actuator, and go on his way! “Anyone with an Extron tweezer, flashlights and a roll of gaffers tape could possibly rule the world! (or become an Austin-Healey Mechanic),” exclaimed Neal.

Upcoming Tradeshows, 2002
Sept. 25-30 ................................................Photokina ..................Köln, Germany
Sept. 27-29 ...............................................CEDIA .......................Minneapolis, MN
Oct. 18-20 ................................................LDI ..................................Las Vegas, NV
Oct. 22-24 ................................................SATIS ..............................Paris, France
Dec. 2-5 ......................................................I/ITSEC ..........................Orlando, FL
Dec. 4-5 ......................................................Gov’t Video ..................Washington, DC

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Extron Institute Upcoming Schedule, 2002
Sept. 16-17 ................................................Minneapolis, MN
Sept. 18-19 ................................................Minneapolis, MN
Oct. 14-15 ..............................................The Netherlands
Nov. 7-8 .......................................................Singapore
Nov. 14-15 .............................................Anaheim, CA
Nov. 18-19 .............................................The Netherlands
Nov. 21-22 ................................................Tampa, FL
Dec. 5-6 .....................................................Anaheim, CA
Dec. 9-10 ..................................................New York, NY
Dec. 11-12 ..............................................New York, NY
Dec. 16-17 .............................................The Netherlands

Send us a photograph and brief explanation of how you use the Tweezer. If we publish it in a future issue of ExtroNews, we’ll give you a free VTG 150. Please send entries along with contact information to:
Extron Tweeker Contest, 1230 South Lewis St., Anaheim, CA 92805.
Or e-mail a high resolution photo and explanation to tweeker@extron.com

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