A NEW Generation of CrossPoint Matrix Switchers
CrossPoint 300 Series and CrossPoint 450 Plus Series

When matrix switchers were first introduced to the audio-visual presentation market, just about everything, from the number of I/Os to signal compatibility, had to be ordered as a separate line item. In 1996, Extron responded to dealer requests and launched the groundbreaking CrossPoint Series: a family of fixed configuration matrix switchers that provided out-of-the-box functionality for most common video and audio switching applications.

Now Extron is proud to unveil the CrossPoint 300 Series and CrossPoint 450 Plus Series — a new generation of wideband and ultra-wideband matrix switchers that replace the CrossPoint Series and CrossPoint Plus Series.
The New CrossPoint Matrix Switchers (cont.)

With a single part number and efficient, one-box design, the CrossPoint matrix switchers are simple to order and install. In addition, they also accommodate high resolution signals as easily as standard resolution signals, greatly simplifying system design requirements in mixed signal applications.

The New CrossPoint Series

There are eight I/O sizes in the CrossPoint 300 Series, from 4x2 up to 16x16, including new 8x16 models. Fifteen models are available in two versions: “HV” models switch RGBHV signals only, while the “HVA” models offer switching for RGBHV and balanced or unbalanced stereo audio. To meet the widest range of signal routing requirements, all CrossPoint 300 Series models are also fully compatible with RGBS, RGsB, HDTV, component video, S-video, and composite video signals.

CrossPoint 300: Increased Bandwidth Compared to Original CrossPoint Series

With ever higher computer-video and HDTV resolutions now the norm in AV system design, one of the key upgrades in the new CrossPoint 300 Series is an increase in RGB video bandwidth from 200 MHz offered by the original CrossPoint Series to 300 MHz (-3 dB), fully loaded. This additional bandwidth improves overall performance compared to the CrossPoint models they replace. More importantly, switcher performance has been enhanced by improvements in the bandwidth curve. The extremely flat response (see Figure 1) in the critical portion of the bandwidth curve underscores the switcher’s consistent performance across the frequency spectrum. With minimal signal loss and gain, the switcher operates transparently to the system, even when fully loaded, which means that whatever signal is input through a CrossPoint matrix switcher is what is output.

CrossPoint 300: Now with ADSP™

In addition to the boost in bandwidth, the CrossPoint 300 Series now feature Extron’s exclusive Advanced Digital Sync Processing (ADSP) technology. ADSP significantly reduces sync related problems, improving signal compatibility and image stability with digital display devices. To learn more about the role that ADSP technology plays in the CrossPoint 300 Series, as well as the CrossPoint 450 Plus Series, see the ADSP sidebar on page 4.

CrossPoint 300: Now Offering Audio Output Volume Control

The video enhancements are complemented by the addition of audio volume control to enable adjustment of each audio output. This convenient feature simplifies system design by eliminating the need for separate audio preamplifiers, which offers a number of benefits, including:

- Less heat
- Additional rack space available
- Simplified wiring and integration
- One less product to control
- Cost reduction

CrossPoint 450 Plus Replaces the CrossPoint Plus Series

For the most demanding systems that require the highest performance possible, the CrossPoint 450 Plus Series is the “plus” model of the new CrossPoint family. In addition to the new features found in the CrossPoint 300, the CrossPoint 450 Plus offers even higher bandwidth performance, I/O sizes up to 32x32, and integrated IP Link™ for enhanced control and asset management capabilities.

The CrossPoint 450 Plus Series includes 22 models in 11 I/O sizes ranging from 8x4 up to 32x32. Each model is available in two versions: “HV” for switching RGBHV signals and “HVA” for switching RGBHV signals and stereo audio (balanced and unbalanced).

CrossPoint 450 Plus: Higher Bandwidth Performance

Many CrossPoint 450 Plus Series models now feature 450 MHz (-3 dB) RGB video bandwidth, fully loaded, providing exceptional performance in any signal routing application. All models provide extremely flat response characteristics typified by the response curve shown in Figure 2.

CrossPoint 450 Plus: New Features

In addition to the audio and video signal improvements are three significant Extron asset management and control technologies in the new CrossPoint 450 Plus version: an enhanced QuickSwitch Front Panel Controller (QS-FPC™), IP Link™ Ethernet monitoring and control, and Digital Sync Validation Processing (DSVP™).

CrossPoint 450 Plus: Enhanced QuickSwitch Front Panel Controller

The CrossPoint 450 Plus Series is equipped with a new enhanced front panel controller.
with large, tri-color, backlit buttons that can be custom labeled to identify input sources and output destinations. The buttons illuminate red, green, and amber, depending on their function, for quick and easy viewing of input and output ties, preset configurations, muted outputs, and audio volume settings.

**CrossPoint 450 Plus: Digital Sync Valification Processing (DSVP™)**

DSVP is an Extron technology that works in concert with IP Link or a third-party control system to provide detailed information about the RGBHV signals connected to each input. It continuously polls the switcher’s inputs for active sync signals, reads the horizontal and vertical sync rates, and makes the information available through the IP Link port using the switcher’s built-in web pages or via the RS-232 port.

**IP LINK FEATURES**

- **IP (Ethernet) Control**
  - Use popular browsers such as Microsoft® Internet Explorer®
  - Monitor and control matrix switcher function using built-in web pages
  - Supports 10BaseT or 100BaseT standards

- **Online Diagnostics and Self-Monitoring**
  - Advanced system monitoring of:
    - Power supplies
    - Fans
    - RS-232 processing
    - RGB and RGBHV sources with DSVP™

- **E-Mail Status and Service Notification**
  - Added value for customers
  - Proactive service and support
  - Know about failures before your customer
  - Capable of notifying pagers, cell phones, and PDAs

Remote asset management is facilitated when the CrossPoint 450 Plus Series’ embedded IP Link Web page is linked to Extron’s free GlobalViewer™, a Web-based application that can access hundreds of IP Link enabled devices simultaneously. IP Link enabled products can be used with GlobalViewer software to provide a variety of powerful asset management func-

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Figure 2. Actual sweep from a CrossPoint 450 Plus 128 HVA. Input 4 (green channel) is tied to all outputs. Even in this worst case fully loaded configuration, the frequency sweep is flat through the critical portion of the bandwidth curve.
Advanced Digital Sync Processing (ADSP) is a proprietary Extron technology found in all Extron RGBHV matrix switchers as well as many Extron products that support RGBHV computer video signals. ADSP addresses potential issues with video sync signals that can compromise proper video display. Such problems may be caused by a variety of factors in an A/V system, including deficient signal levels produced by certain laptops and PC graphic cards, multiple steps in signal distribution, faulty equipment, losses caused by lengthy or poor cables, and impedance mismatching between source and display.

Sync Shaping and Voltage Restoration
ADSP processes sync signals using several techniques to specifically address potential problems. First, ADSP adjusts the amplitude to proper TTL levels (5.0 V peak-to-peak). Then, in order to correct for long distance losses and other factors which may have affected the waveform of the signal, ADSP actually reshapes the signal, recreating the sync pulses essential for proper sync detection by digital displays (see diagram below).

Sync Timing Restoration
Extron interfaces with ADSP, as well as the SS 200 Sync Stabilizer provide additional processing to ensure the proper timing relationship between the sync signals and video signals, and between the horizontal and vertical sync signals. These products also enable horizontal and/or vertical image shifting without affecting the timing of the sync signals. Extron products equipped with ADSP help guarantee that sync signals are robust once they reach the display.

In today’s budget-minded environment, many A/V systems are being installed without proper sync processing devices. However, the new CrossPoint 300 and CrossPoint 450 Plus Series of matrix switchers, equipped with onboard ADSP will help ensure sync signal integrity, and therefore, reliable video presentations in systems that otherwise may not sufficiently address sync signal issues.
A prosecutor faces the traditional challenge of convincing the jury that the defendant on trial is guilty beyond a reasonable doubt. But the courtroom housing the trial is not traditional by any means. In this forum, the prosecutor has the capability of exhibiting a crucial piece of evidence through an array of digital displays, positioned at key locations throughout the courtroom. Everyone present, particularly the jurors, views this evidence close-up and with all of its native clarity. The result: a highly compelling presentation with maximum impact.

This high technology courtroom is representative of an ever-increasing number of state and local courts throughout the US, utilizing advanced A/V and IT functionality. One such facility in an academic setting is the Julian C. Dixon Memorial Courtroom and Advocacy Center at Southwestern University School of Law in Los Angeles. Intended to serve as a model for jury and appellate courtrooms of the future, this center will provide law students with the capability to leverage A/V and IT technologies for effective advocacy and litigation in tomorrow’s courtrooms. In addition to serving as an important venue for teaching and training, the center houses actual court sessions and is also a community resource for attorneys, judges, and court administrators.

A State-of-the-Art Legal Center
The Dixon Courtroom and Advocacy Center features an extensive lineup of Extron equipment, including matrix switchers, HSA (Hideaway™ Surface Access) enclosures, distribution amplifiers, switchers, and video scalers. Collectively these products provide a major portion of the underlying infrastructure for the center’s highly sophisticated A/V operations.

The centerpiece of the Dixon Courtroom and Advocacy Center is the jury trial and appellate courtroom. Adjoining the courtroom is the jury deliberation room, as well as a small conference room as part of the judge’s chambers. In addition, an Alternative Dispute Resolution (ADR) suite, comprising a conference room and two interview rooms, is devoted to conferences and settlement negotiations. Each room has been equipped for various A/V presentation needs. The building housing this center was originally the Bullocks Wilshire department store (opened in 1929), and is listed on the National Register of Historic Places.

A central control room, directly adjacent to the courtroom, ties together the technical operations and A/V signal distribution for all rooms. Altogether, the legal center boasts the following A/V and IT capabilities:

• Audio and video distribution throughout the facility
• Plasma displays for presentation of evidence, multimedia content, videoconferencing, and camera feeds
• LCD monitors at strategic locations for personalized viewing of evidence, electronic documents, and presentations
• Comprehensive audio systems and optimized acoustic treatments

Above: The building housing the Dixon Center was originally the Bullocks Wilshire department store and is listed on the National Register of Historic Places.

Left: The jury trial and appellate courtroom features plasma displays that remedy sight line problems.
Southwestern University (cont.)

- Multimedia and Web-based evidence presentation
- Electronic distribution of legal materials including appellate briefs
- Local computer-video, power, data, and phone connectivity
- Videoconferencing for remote testimonies, depositions, court appearances, settlement negotiations, etc.

Uniquely Complex and Sophisticated A/V System Design

For the design and specification of the Dixon Center’s A/V operations, Southwestern collaborated with Martin Gruen of Applied Legal Technologies and Fredric Lederer, Chancellor Professor of Law and Director of the Courtroom 21 Project at College of William & Mary School of Law. ExhibitOne Corporation served as the systems integrator for this project, implementing the equipment acquisition, installation, set-up, and support of the A/V operations.

Courtrooms augmented with A/V capabilities require effective signal distribution and processing solutions to meet the day-to-day needs of mission critical applications with consistent reliability and robustness. According to ExhibitOne, Extron equipment was selected for their “reliability, benchmark products, size, price, and signal quality in meeting specifications.” Gruen, who has specified Extron products for several other courtroom installations, commented, “I’ve been very comfortable with the overall performance of Extron products.” He noted further, “It’s a nice feeling to know that you can put equipment into the system and know that it’s going to work properly.”

According to Gruen, the specific requirements for the Dixon Center were unprecedented, and therefore, particularly challenging given the sheer scale and complexity. The A/V infrastructure for the Dixon Center would have to fulfill the needs of not only a fully functioning courtroom, but also a classroom. Comprehensive audio and video processing and distribution was necessary so that the facility could accommodate live proceedings and conferences, both within the center and with remote participants via videoconferencing. Audio and video would have to be distributed to classrooms throughout the campus, so that students can remotely monitor mock trials, jury deliberations, settlement negotiations, and more.

With the necessity to design the A/V foundation that would meet all of the needs of instruction and legal proceedings, Gruen noted that the audio and video needs for the Dixon Center were pushing the envelope well beyond that of previous, advanced technology courtroom projects. “What we have here at Southwestern is really unsurpassed throughout the country,” commented Gruen.

Extron Equipment Provides the Foundation for A/V Distribution, Signal Processing, and Access

Essential to successful implementation of the center’s A/V operations was the ability to flexibly route video, computer-video, and audio to any room, display, or recording/documentation device. Two Extron matrix switchers were selected for this purpose, the Extron CrossPoint Plus 3232HVA for distribution of computer-video, and the Extron MAV 3232 Composite for composite video routing of camera feeds throughout the center. Both matrix switchers are situated in the control room of the center. Each offers the ability to distribute any of 32 input sources to any of 32 output destinations.
The Extron CrossPoint Plus 3232 HVA is used to distribute computer-video throughout the Dixon Center and to classrooms throughout the campus.

The matrix switchers significantly exceed the requirements of the Dixon Center, but the intention is to enable video and audio distribution to classrooms throughout the law school, each of which features advanced A/V and IT capabilities of their own, as well as additional areas of the Bullocks Wilshire building. The matrix switchers enable evidence, multimedia presentations, video, and live camera feeds from the center to be shared with professors and students as valuable resources for education, as the students monitor mock proceedings and conferences.

Extron HSA products offer convenient connectivity so that the users (judge, counsel, students, instructors, etc.) can easily tie their laptops into the center’s sophisticated A/V resources. In the courtroom, nine HSA 200S units have been installed at locations where laptop computer-video, power, and data connectivity are likely, including the plaintiff and defendant seating areas, judge’s desk, witness stand, and the clerk’s desk. In the ADR conference room, three HSA 400 and four HSA 402 units allow for laptop power, data, and phone access, as well as computer-video hookup for presentations. For the jury deliberation room, an HSA 822 with various Architectural Adapter Plates (AAPs) facilitates various A/V connections for the jury foreman, including laptop power and data, as well as audio and video to accommodate a document camera, VCR, and DVD player for viewing evidence. Similarly, an HSA 822 is used in the small conference room for the judge.

In addition to the HSAs and matrix switchers, several Extron distribution amplifiers and VGA switchers are in the system. The Extron CVDA 6 MX Quad Composite Video Distribution Amplifiers are used for video distribution from 13 video cameras. The Extron SW VGA Series switches provide local autoswitching for computer-video sources and document cameras. Video signal processing to ensure compatibility and optimized picture quality is provided by the Extron System 7SC Switcher with Built-In Video Scaler and two DVS 204 Digital Video Scaler units. An Extron MVP 104GX Multi Video Processor enables display of multiple video sources for videoconference applications.

“I’ve had many years of past experience with Extron products and have always been pleased with their reliability and functionality,” commented Keith Evans, Audio-Visual Technologies Specialist for the Dixon Center. “In our very sophisticated world of A/V operations, I feel confident in stating that Extron products are serving in many of the most important roles for our facility.”

**Video Displays Everywhere**

Perhaps the most visible aspect of the Dixon Center’s A/V operations is the nearly ubiquitous presence of flat panel displays. These displays can play a key role in the presentation of evidence, as well as the shared viewing of documents. In the Dixon Center courtroom, six LCD monitors are located in the jury box, each shared between two jurors. LCD monitors also figure prominently in the ADR room, with seven displays on the conference table for viewing of electronic presentations, documents, or evidence. A total of 23 LCD displays have been installed throughout the center, with three of them serving double duty in the courtroom as A/V system control panels and computer-video monitors.

The courtroom also features a total of six plasma displays. In addition to the four units installed on the support columns, a plasma display is located behind the judge, and an interactive display is situated on a mobile cart. Plasma displays are also used in the judge’s chamber, ADR room, and jury deliberation room. They serve multiple purposes, including evidence viewing, multimedia presentations, and videoconferencing.

**The Vital Role of A/V Technology in the Courtrooms of Tomorrow**

Regarding the integration of A/V technologies into courtrooms, Fredric Lederer has written that “Lawyers who wish to win have little choice but to investigate the potential offensive and defensive options supplied by legal technology. Increasingly, for many cases, technology will not be an option but a necessity.”

The Dixon Courtroom and Advocacy Center gives law students, as well as those already in the legal profession, a special opportunity to learn how to effectively employ advanced A/V courtroom technologies to help optimize their advocacy, litigation, and alternative dispute resolution skills.
With over 120 instructors and campuses in Marion, Citrus, and Levy counties, Central Florida Community College (CFCC) required a uniform A/V system, from campus to campus and classroom to classroom. It needed to be straightforward and easy-to-use, while offering the ability to monitor, manage, and control all classrooms from a central location.

Armed with clear criteria for their A/V system control and integration needs, CFCC personnel explored a number of possible equipment and control system providers, but had concerns about cost and engineering support. Then Rick McGinnis, of Southern Business Communications in Tampa, FL, suggested Extron products as a cost-effective alternative. “Working with Dan Johnson and CFCC was a pleasure! He had an understanding of what CFCC wanted for its classrooms. I knew after discussing his needs that Extron had the right products and necessary resources. This project was made much easier for CFCC and Southern Business Communications because of all of the great products and support from Extron, and is a perfect example of a reseller utilizing a great manufacturer to satisfy a client’s needs,” he says.

The final design, a result of collaboration between CFCC, Southern Business Communications, and Extron, is a long-term and effective solution that allows for easy upgrades and more classroom systems to be integrated for a lower total cost of ownership. To date, 84 of the planned 100 classrooms have been installed.

At the heart of the system are the Extron MLC 206 AAP MediaLink Controller and MLS 102 VGA MediaLink™ Switcher configured with an Extron IRCM-VCR Architectural Adapter Plate (AAP) for standard VCR control, as well as an Extron 15-pin AAP with 3.5 mm with audio for use with a laptop computer. The automated teaching station also houses the MLS 102 VGA, a computer with a built-in DVD player, and a 15-inch interactive, touch-screen annotation monitor. Closed captioning is available through the VCR and a closed caption decoder. Centralized remote IP monitoring and control of the projector and the MLC 206 AAP is provided via the Extron IPL T S4 Ethernet Control Interface.

By all accounts, the A/V teaching stations at CFCC are an unqualified success. Ron Kielty, Computer Sciences Network Engineer, noted that prior to the classroom upgrades, instructors never knew what A/V equipment they would come across as they moved from room to room and campus to campus. They often struggled just to get a particular device to operate, depending on the state in which the prior user left it. “Every time we got a new projector there was a new remote and teachers had to learn how to use it,” Kielty said. “Now we can change out a projector and the teacher doesn’t know the difference. It doesn’t alter how the room operates.”

Even instructors who previously shied away from technology enhancements have become proponents of the new A/V systems. They are now convinced that uniformity does not compromise academic freedom or restrict individual teaching styles. The teaching stations are simple to operate and virtually the same, regardless of the classroom or campus. Instructors can walk in a classroom and have the latest A/V tools at their disposal without struggling to make them work.

According to Johnson, an early advocate for the project, in-field service calls have easily dropped by 90 percent for those classrooms with the teaching stations. Using Extron’s GlobalViewer™, a free Web-based asset management and remote control software application, the CFCC technical support staff can remotely troubleshoot many problems from a central location over the schools’ network. They can also proactively monitor equipment, schedule maintenance, and reduce downtime.

For additional information, see:
Extron Electronics
http://www.extron.com/
Central Florida Community College
http://www.gocfcc.com/
Southern Business Communications Group
http://www.sbcg.com/

Central Florida Community College (below) is upgrading 100 classrooms on three campuses with the MLS 102 VGA MediaLink™ Switcher and MLC 206 AAP MediaLink Controller (left) that is installed using an Extron Surface Mount Box.
A Graphics Processor for a New Generation of A/V Communications
The Extron MGP 462

The possibilities for A/V communications have been expanding dramatically the past several years. High resolution graphics capabilities for PCs and laptops have enabled the creation of multimedia with unprecedented detail and clarity. DVD and HDTV have raised the bar for full-motion image quality. Furthermore, these high quality sources can now be presented via high resolution projectors and flat-panel monitors, most of which feature 16:9 screens and HDTV capability.

The MGP 462 is a powerful graphics and video processor for this new generation of A/V communications possibilities. It is specifically designed for presentations requiring the simultaneous display of multiple, high quality A/V sources. Do you need to support videoconferencing and multimedia on a single screen, combining a remote presentation feed with local, high resolution computer-video? Do you want to display two computer-video or even HDTV sources using just one projector? Or, would you like to display your company’s logo as a background to your presentations? The MGP 462 lets you accomplish all of this, and much more.

High Performance Scaling is Just the Beginning
The MGP 462’s graphics and video processing begins with two high performance scaling engines. Each is capable of processing a wide range of sources including standard definition video, HDTV, and computer-video, converting them to a wide array of available scan rates including HDTV and UXGA. In addition to upconversion of standard definition video, which many scaling solutions today are fully capable, the scaling engines within the MGP 462 also deliver high performance RGB scaling, so that computer-video can be optimally upconverted or downconverted as necessary, maintaining or even improving image quality.

Any Window, Any Way You Want
The MGP 462 accepts any two of six input sources, either video or computer-video, and places them in windows for display on the same screen. You control how you want these windows to appear. Each window can be sized, positioned, and zoomed. Similar adjustments can be made with the image within the window. Using combinations of these settings, panning and cropping pictures within windows is possible. The window and image adjustments work in concert with the MGP 462’s dual scaling engines to ensure optimized picture quality for the two windows.

Additionally, picture controls are available for each window including contrast, brightness, color, tint, and detail (sharpness). Fine control knobs on the front panel enable precise window and image adjustments as necessary for the needs of the presentation.

Once a picture-in-picture window configuration has been created, it can be saved into one of 25 available memory presets and easily recalled when needed. These presets have been factory loaded with various default window configurations, which can be further customized or simply overwritten.

Full Input and Output Flexibility
The six inputs of the MGP 462 include four multi-configurable inputs that accept the majority of available video sources, from composite video to RGBHV. These sources include HDTV at 720p, 1080i, and 1080p, and computer-video at various rates up to UXGA (1600 x 1200). The inputs are on five BNC connectors. In addition, a fifth input supports component video, S-video, or composite video on BNC connectors. The sixth input provides an S-video connection on a 4-pin mini DIN, composite video on a BNC connector, or optionally, SDI input, which is available with the MGP 462D or as an add-on option for the MGP 462.

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www.extron.com
Graphic Still Store

The MGP 462, with high performance graphics processing and window customization features, is ideal for a wide range of applications requiring the simultaneous display of two sources. But a unique and powerful feature, Graphic Still Store, offers users the opportunity to take multi-window presentations to new levels of professionalism, impact, and sophistication. With Graphic Still Store, a screen capture of the output from the MGP 462 can be stored as a digital image in memory. This image can then be recalled for display as a background to the two picture-in-picture windows.

Display Uploaded Images
Graphic Still Store also allows a bitmap (BMP) graphic file to be uploaded from a computer into the MGP 462 and then stored in memory. (The resolution of the graphic must match the native resolution of the display being used with the MGP 462.) The MGP provides for 16 MB storage, enough for six 1024 x 768 images.

Image Capture for Archival Use
Images stored via Graphic Still Store may be downloaded from the MGP 462 to a computer as BMP files. This capability may seem simple, but it enables the MGP 462 to serve as a valuable and cost-effective tool in the creation of important archives for applications such as medical facilities and courtrooms. Compared to video printers, the MGP 462 is a considerably more economical and versatile solution, with the ability to create visual records of up to UXGA (1600 x 1200) resolution.

Frame Your Windows In Style
Graphic Still Store offers an appealing alternative to just a black or color background, and enables the creation of themed multimedia presentations. Perhaps the most apparent application is a corporate videoconference session, with windows displaying the near end and far end participants, and the background behind them a custom graphic displaying the company logo. Background image display can also be very effective in distance learning, corporate, and command and control applications.

Videoconferencing
The MGP 462 generates a multi-image display, overlaying near end and far end video windows from a videoconferencing system on top of a background image.

Distance Learning
The background image serves as the theme for a distance learning session featuring the instructor from a remote location, and a local PC delivering high resolution graphics.

Command and Control
The map is a captured computer-video graphic from a PC that serves as the background image, while two full-motion video windows use composite video sources (cable TV tuner and camera feed).

Medical Applications
The background is created by capturing a computer-video graphic display of an x-ray within a window. The PC is the source for a slide show of images, while the VCR replays the surgery.
Professional Switching Effects
Any input to the MGP 462 can be displayed in either or both windows. High performance, independent source switching is available for each window, so that video and computer-video sources can be smoothly interchanged without glitches or signal interruption. For video output, the MGP 462 offers considerable flexibility, with the ability to output at any of 59 available rates including HDTV and UXGA, and rates common to flat panel LCD and plasma displays. RGB or component video is simultaneously output through five BNC connectors and a 15-pin HD connector.

Presentation Enhancements
The MGP 462’s feature set facilitates the creation of professional quality A/V presentations. A window may be transitioned into or out of the image with any of 22 smooth, professional effects including dissolves, wipes, or a simple cut. Additionally, any input to a window can be frozen, so that a frame of video or graphics can be captured for extended display.

Each window may be labeled with text of up to 16 characters. The text color is selectable, as well as the surrounding border and background. The background behind (surrounding) both windows can be assigned a color as well.

But the MGP 462 offers still much more for customized, professional, high impact A/V presentations. With Graphic Still Store, a powerful feature exclusive to Extron, images captured from the MGP 462’s video output, or created on a computer and then uploaded, can serve as a background to the windows. This background is especially useful when serving as a specific theme for a multimedia presentation. With Graphic Still Store, new and exciting applications are possible (see opposite page).

User and Integrator Friendly
The MGP 462 was designed from the outset for intuitive and comprehensive accessibility to both the integrator and the user. From the front panel, all features and functions are available, including system configuration, input source selection, picture and window customization, memory preset and recall, and more. The alphanumeric LCD display and the MGP 462’s menu navigation facilitate expedited operation and control. All buttons are backlit and easily identifiable via clear overlay labels. Two rotary knobs allow for fine tuning of all picture and window adjustments.

The MGP 462 can also be remotely controlled and configured through RS-232 or RS-422. In addition to duplicating all of the front panel functions, text for window labels and background graphics can be uploaded. Additionally, up to 128 global memory presets are accessible for saving and recalling input configuration settings, an especially convenient feature when the operation of the MGP 462 is to be integrated with a matrix switcher.

For integration with IP networks, the MGP 462 is equipped with IP Link™ Ethernet control, enabling remote management and support from any computer with a Web browser. Through IP Link, all functions possible through front panel and serial control are available. IP Link is also required for uploading graphics (BMP files) from a computer for Graphic Still Store. Additional features through IP Link include access to status parameters including internal temperature.

Ideal for Sophisticated A/V Communications
A high performance universal scaler that accommodates and outputs HDTV and high resolution computer-video. A high performance video and computer-video switcher. A fully customizable, multi-window processor. Capable of themed multimedia presentations. A cost-effective tool for archiving important records. The MGP 462 is all of these, ready to meet the need for increasingly sophisticated A/V communications in videoconferencing, conference rooms, boardrooms, command and control centers, distance learning, and event staging systems.
For example, as an engineering student, I repaired TVs, radios, and audio systems in my father’s television sales and repair shop. Telling most people about the times I powered up defective equipment only to blow the fuse isn’t very exciting. Oh, but how about the time I applied power to a defective five-tube clock-radio while the customer looked on? The clock-radio suffered from a blown fuse (I bypassed with a clip lead) and a shorted AC rectifier. Anyone remember those radios? They had no power transformer; just a series line capacitor connected to the hot side of the power line via a wired fuse, then onward into a half-wave rectifier that works only half time charging up the main electrolytic capacitor to produce about 150 volts DC. Now, here’s a thermal management folklore gem.

To access the line fuse, I had to remove the chassis and invert it on the bench. After bypassing the fuse with the clip lead (now don’t do this at home), I plugged the radio into the AC outlet and switched it ON. In the blink of an eye, and with all the excitement of a July 4th aerial starburst, the main electrolytic capacitor ignited under the heavy AC current inrush. A platoon of flames shot skyward bolstered by the brusque low frequency buzz note that only an overloaded AC line can create. The amazement on my face and the customer’s was deadlocked into a photo finish. Here before us was a prime example of inadequate thermal management under stressful conditions. The transfer of energy and heat orchestrated itself within a time span of only milliseconds; thus demonstrating a forthrightness that would have easily launched the cylinder-shaped electrolytic capacitor into suborbital heavens was it not for its sturdy mounting. As the final sacrificial element to this dazzling display, wisps of the capacitor’s magic smoke were forever lost to the environment. And, my recovery comment to the astonished customer (along with my incredibly obvious troubleshooting naiveté)? “I believe I have isolated the faulty component.”

Watts in the Box
Seriously, the thermal management of real interest to us is the heat energy transfer process, albeit much slower, that is expected in functional integrated systems. Thermal Management Part 1 discussed units of energy and some rules of thumb for first order thermal management. This installment intends to describe methods for implementing good thermal management in real applications.

In most open room applications, we seldom consider thermal effects since the mass of circulating air usually more than overcomes any heat rise contribution from electronic products unless either or both of two things happen: 1) the room itself overheats; 2) the product produces more heat than that which can be dissipated via radiation or available air convection. Small box products may be tucked into tight spaces such as podiums, desk recesses, or other equipment cabinets, if space permits. This creates new challenges to reliable operation.

Let’s put this situation into terms we can relate to. When the surrounding ambient
conditions are able to absorb all the power (watts) generated by an equipment item (the heat load), the ambient is a heatsink. When the generated heat is not absorbed, the ambient is a heat contributor. For this discussion, I'll define the power generated by the installed equipment as the input power and define the heat conduction capability into a cooler environment as the output power. Let's call the ratio of the output power divided by the input power the “heat transfer ratio”. As long as the resulting ratio value is greater than one, the ambient environment is a heatsink and reliable operation should be possible. If the ratio value is less than one, the ambient is a heat contributor and will further stress equipment within its environment. See Figure 1 for an illustration of this concept. Further, if the ratio of output to input equals one, the current amount of heat generated (watts/hour) will be the maximum allowable for reliable operation. Let's look at how we can use this concept to pre-calculate realistic heatsink environments for enclosed equipment prior to installation.

Fourier Is Your Friend

Suppose you must place an electronic equipment item in some type of non-vented enclosure such as a wooden podium. Space is a premium and there is likely to be very limited air space surrounding the equipment. How can we predict whether the equipment will survive in this environment?

I'm going to show you an easy way to calculate the answer with reasonable certainty. First, we need to make some assumptions based on what we've learned about thermodynamics so far. Our assumptions are:

- During the initial operating period, the limited internal podium air volume will heatsink the equipment until equilibrium is attained.
- Eventually, the equipment, the internal air, and the internal walls of the enclosure will equalize at some temperature, providing the equipment’s power input remains constant.
- At thermal equilibrium, heat conduction will occur through the walls of the wooden podium into the external environment. At this point, we can consider the equipment exterior, the podium air, and its internal walls to be at the same temperature.

In order to move ahead, we must become acquainted with Fourier's Law of Conduction (see illustration on previous page) so as to calculate the heat transfer to the external environment. Fourier's Law will tell us if the equipment is likely to survive by conduction or require cooling augmentation, such as forced air. Don’t be put off by Fourier’s equation. It’s just the product of some basic terms divided by the wall thickness of the enclosure… in this case, a wooden podium. The minus sign indicates heat travel direction (i.e., hot to cold). The “q” term represents watts per hour that may be transferred through our podium. The “k” value for thermal conductivity we’ll take from Table 1 of Part 1 of this series (wood = 0.130 watts/m°C). The “A” represents the area (in square meters) of the enclosure walls that conduct heat outward. Measure the internal podium space and convert to square meters (assume a volume of 3”x10”x12” which converts to a surface area of 0.24 sq. meters). We need the podium wall thickness (say, .75 inch or 0.019m) and the difference in temperature between the internal space where the equipment rests and the average outside air temperature. Further, we’ll assume that heat conducts through all podium walls evenly, but your actual situation may vary.

In Part 1, I mentioned the manufacturer’s maximum operating environment for equipment as being about 40°C to 50°C. We will assume that if we use the manufacturer’s maximum value, the podium internal air must be at that value and no higher. Let’s use 40°C. If the outside environment is normal room temperature, or about 25°C, our temperature differential is 40 - 25 = 15°C.

Plugging all the previous numbers into Fourier’s formula, we have:

\[ q = \frac{-0.13 \times 0.24 \times 15}{0.019} = -24.6 \text{ watts} \]

This tells us that the wooden podium is capable of transferring up to 24.6 watts into the external environment with an internal temperature of 40°C. Suppose the equipment item is a computer video interface that only uses 12 watts. We have a 2:1 design factor or we know that the internal podium temperature will be lower. No fan is required.

Towers of Power

Great information, but you say “I mostly build rack systems for my projects. How do I thermally manage my rack designs?” Rack enclosures can be both good and bad from a temperature management point of view. Properly designed rack installations may actually extend equipment life by providing better air circulation than the original equipment would otherwise receive. Equipment racks with improperly designed cooling can significantly shorten equipment life by creating hot spots, trapping heated air, and focusing heat from hotter products onto other products.

We already know that heated air rises and cooler air falls. By now it is clear that heat flow conducts only one direction: from the hotter body to the colder body. So, let’s think only in terms of removing hot air…colder air will automatically follow to fill the void. With this in mind, it is typically easier to “pull” the hot air away than to “push” cold air into a hot environment. Pushing colder air into a
warmer environment increases the chance that condensation may occur at an inappropriate time or place. In addition, it is highly probable that the cooler air may bypass some equipment in such a way as to create eddy currents, or dead circulation areas, where air flow becomes stifled. This latter situation ensures the shortening of equipment life.

From a weight distribution perspective, good design practice recommends placing larger, heavier equipment at the bottom of the rack. Larger equipment usually produces the most heat and this heat affects equipment above. For example, audio power amplifiers most times produce more heat during operation than much of the combined power requirements of the remaining equipment collection in the rack. While these larger items will heat other items, placing them in the bottom of the rack will more readily produce an upward convection to facilitate cooling overall. However, where room ambient temperature is high, it may be better to place hotter equipment at the top of the rack. This tradeoff can become problematic for areas of seismic activity or for transportation of rack systems to the job site.

The designer must attempt to position equipment to minimize hot spots and provide an overall chimney effect within the rack so as to move as much air through as possible. Practically, there are other facets of equipment layout that must be considered, such as placement of products in ergonomic locations within the rack for user interface. The system designer must rationalize many aspects of the rack build between user access, safety, thermal management, and servicing. Placement of equipment in a rack having proper thermal design is one consideration, but equally important is the circulation of air within the room where the rack is located.

The external room environment of the equipment rack must have a lower average temperature than the internal rack environment; otherwise, there will be no heat flow from the rack into the environment. Electronic equipment is not much different than people, when it comes to the temperature of the environment. Most of us perform well and feel comfortable in a room of about 23°C (73°F). It’s good practice to keep the equipment room environment within normal bounds too. As shown by Fourier’s Law of Conduction, the key to good heat transfer is a high temperature differential between the body of air surrounding the hotter item to be cooled. As the warmer air rises from the equipment, ideally cooler air should easily stream into the rack and set up a natural air flow. This action describes the process of natural convection.

Convection cooling is the lowest cost and lowest maintenance form of thermal management, but is not always easy to implement such that all equipment is cooled equally. Rack-mounted equipment produces nearly 400 BTU/hour of heat for every one ampere of line current at 117 volts AC (one half ampere at 230 VAC). Since the power consumption of most equipment items is relatively constant during operation, this is a straightforward heat calculation. Where heat generation varies most is with products delivering power on a variable basis. Such is the case with large audio power amplifiers. (Class D audio power amplifiers may be an exception where their worst-case power usage occurs typically when idling, as opposed to hard use where their power usage is lowest.) Your ability to calculate heat load for larger equipment items will rest with having the manufacturer’s specs and estimating an average value under normal and worst-case use conditions.

**Venting IS Critical**

What about vent sizing? Whether you use convection or resort to forced air cooling, air intake and outtake openings are very important. In most cases, unless equipment perimeters are completely sealed, air ingress may be expected at various points around equipment items and through lower vents in the rack assembly. It is generally good practice to pull cooler air in from the front of the rack around each item and exhaust through the top of the rack. In this scenario, the sources for air ingress are likely to be equivalent to a large opening. The exhaust vents must then be carefully designed. Since this is a series system of air moving in and moving out, the exhaust vent must be at least equal in opening area.

Calculation of actual vent efficiency is not always as simple as adding up the areas of the holes or slots. For convection, larger thermal gradients between the internal air and the outside air generate more rapid air convection. Rapidly moving air will more easily overcome vent airflow resistance. Vent openings exhibit resistance to air flow depending on their dimensions and number. Air flow is characteristically laminar and will “see” vent resistance as it relates to the vent openings’ physical geometry. For example, long slot-shaped vents conduct airflow better than bulkheads perforated with small round holes. Although both geometries may have the same vent area, air flow will tend to be reflected by the bulkhead of round holes while it will
more easily flow through the wide slots. Any air reflected back into the rack will encounter the normal air upflow convection and create eddy currents, which are stagnating air patterns that hinder cooling performance.

A common question is: Should I separate each item in the rack by at least one rack unit space? Rack space is at a premium in many system designs. Certainly, if you can separate items, it’s usually a good idea, but there is no single correct answer here. The right answer depends on several factors, such as:

- Whether adjacent items are significant generators of heat, since the resulting heat will physically transfer from a hotter box to a colder box.
- How items are vented individually. If there are no vents on top or bottom, then chances are that separating them will provide no additional heat relief, unless your plan is to pull cooler air through front panels between items. If there are vents on top and/or bottom, do not defeat them by stacking the item.
- The power rating on each item. Keep in mind the 400 BTU/hour per ampere of line current (115VAC), which translates to 115 watts draw.

Let’s say you have a short stack of 1U pizza-box-sized items that each use 50 watts. For each two you stack, you’ll be generating nearly 400 BTU per hour. Pizza box type products tend to extend into the rack space and block air flow past smaller, less deep products that might be located above or below them. This situation is ripe for establishing eddy currents, particularly when the equipment above does extend deeper into the rack. The overall profile of equipment extension into the rack’s air space is another consideration for good thermal management. To destroy the eddy, allow air to pass through the front of the rack, and just below, the smaller items.

**Forced Into Forced-Air**

In many cases, equipment type and density will not allow proper cooling via convection, so forced-air cooling must be implemented. Of course, forced-air implies use of fans. Even with forced-air, the best approach is to pull hot air out and not attempt to force downward airflow into an enclosure. Pushing the air into the enclosure tends to set up internal currents which are deflected in uncertain directions and does not necessarily move air into all the areas where needed.

When using equipment items with internal fans, pay particular attention to the direction of the exhaust so as not to disturb the normal convective flow within the rack, even though you may or may not use fans for the rack itself. There are many scenarios for the management of forced-air cooling. Depending on circumstances, any one of several approaches may be appropriate. I highly recommend reading the white paper on “Controlling the Temperature Inside Equipment Racks” by Bob Schluter of Middle Atlantic Products2. It covers a wide variety of installation scenarios and design calculations too numerous to explore here.

Key points to remember with forced-air cooling are:

- Make temperature measurements at various points in the rack to determine if the temperature gradient from bottom to top is normal (linear).
- Avoid extra equipment vents near the top of the rack in front or back as they tend to short-circuit airflow.
- Fan airflow ratings in CFM (cubic feet per minute) represent the maximum volume of air per unit time that may be moved and does not account for any vent resistance or other obstructions.
- Static pressure describes the suction or pressure the fan is capable of developing so as to overcome the resistance to airflow.
- Fans with ball bearings have a significantly longer life...as much as 50% longer than low cost sleeve bearings.

- Typically, the best location for fans is at the top of the rack with airflow oriented upward to pull cooler air from the bottom of the rack and expel hot air through the top.

Forced-air cooling requires more maintenance. In high dust and dirt environments filters are required to extend fan and equipment life. Clogged air filters are a common cause of system failure when not serviced regularly. One way to extend fan life is to design the rack for the best convective flow possible without the fan. Then, install the fan with a proportional controller so that the fan runs only when needed and at a speed appropriate for attaining the minimum cooling required. These days, proportional controllers may have integral thermostats to enable and disable fan operation. On a grander scale, connection of an internet-enabled interface, such as Extron’s IP-Link, provides the ability to control system cooling from afar and, minimally, be warned via email should the fan fail and rack temperature rise to a destructive level.

The possibilities are endless. Thermal management plays a key role in designing reliable system installations. As this installment concludes my discussion on thermal management, I hope both Part 1 and Part 2 provided some insight and understanding of the measurement units and physical concepts guiding good thermal management decision-making. Unlike the poor example I set as a trouble-shooter during the five-tube radio story, don’t allow your system designs to go up in smoke due to inadequate thermal management planning. Remember, once the magic smoke is lost, it’s virtually impossible to replace.

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References:

1. **Conductive Heat Transfer**
   from the Engineering Tool Box web site at: www.engineeringtoolbox.com/24_428.html

2. **Controlling the Temperature Inside Equipment Racks**
   by Bob Schluter, President and Chief Engineer, Middle Atlantic Products, Inc. © 2002-2004. Download this paper from: http://www.middleatlantic.com

www.extron.com
Extron’s ground-up design approach for the IP Link™ family of products is centered around A/V resource and device management over today’s widely available transport medium — the corporate Ethernet network. One of our newest additions, the Extron IPL M PDP-ES, is a great example of how A/V manufacturers can implement networking capabilities using IP Link technology. Conforming to the open architecture Expansion Solutions (ES) slot on some models of Pioneer Electronics (USA) Inc. PureVision™ plasma displays, the IPL M PDP-ES Ethernet Control Card provides integrated network monitoring and control.

Currently seven models of Pioneer PureVision displays feature the Expansion Solutions card slot. Each of these models, like the 50-inch PDP-504CMX, is supplied with an ES communication card that includes an RS-232 interface. This card can be removed and replaced with the Extron IPL M PDP-ES, which features an integral IP Link Web server, enabling remote monitoring and control of the display. We’ve also included the RS-232 connector for configuring the interface card for first time use and passing Pioneer command codes from a third-party control system.

IP Link Inside
Like all IP Link-enabled products from Extron, the IPL M PDP-ES interface card features a built-in Web server with sufficient memory available for storing device drivers and Web pages. The Web server’s high performance architecture means Web pages are served many times faster (6 Mbps transfer rate) than similar products, so data is refreshed at a consistently high speed.

The IPL M PDP-ES uses industry standard Ethernet communication protocols, including ARP, DHCP, ICMP (ping), TCP/IP, UDP/IP, Telnet, HTTP, and SMTP. Each interface card also supports multiple concurrent users, improving system throughput by sending information in parallel, and multiple levels of security with password protection. Administrator access level permits full access to advanced settings, while user access level authorizes limited entry to only pre-designated functions.

Plug & Play™
With the IPL M PDP-ES, no additional software is required to make it work. The on-board Web server contains a set of built in, default Web pages that can be accessed via a Web browser. Set up is simple and requires only a few steps. For use on an existing Ethernet/LAN, the interface card supports either a fixed IP address or a dynamically assigned address using DHCP.

Once the IP address has been assigned, plug an Ethernet cable into the RJ-45 port on the IPL M PDP-ES, launch a Web browser using a computer with network access, and enter the interface card’s IP address in the browser’s address field. The preloaded default Web pages can then be used to complete configuration of the interface card.

Preloaded Web Pages
The Pioneer tab on the main Web page provides access to the preloaded pages for monitoring and controlling the Pioneer plasma. Some of these pages are restricted according to the user’s password privileges, and there are three levels of user access definable during configuration: administrator, user, and read-only. Only those users who log in as administrator or user have access to the Pioneer tab.

The Pioneer Display Status Page is the default page of the Pioneer tab and it allows users to view the description and current status of the Pioneer plasma.

The Display Controls Page (not shown) is accessible from the Controls link on the left side of the window. According to password level, the buttons and fields on this page allow users to control or view input selections, power status, audio settings, PIP (Picture in Picture) settings, and more.

The Advanced Controls Page allows those with an administrator password to change settings for advanced functions such as mullion compensation, on-screen display, function lock, the orbiter function (prevents “screen burn”), and energy savings controls. Those who log in with a user password can only view the settings described above.

Events such as power on, power off, input changes, and status e-mails can be configured using the Pioneer Schedule Page. The graphical calendar and intuitive check box layout make it easy schedule events on a daily or weekly basis.
Using the Pioneer Monitor Page, users can monitor power levels, internal temperature, and usage data of the Pioneer plasma. Administrators can configure e-mail notifications to be sent when specified conditions are met or exceeded.

Pass Through RS-232
When the original ES communication card is removed from the display, the included RS-232 port is removed along with it. Unlike other ES card products, we added the RS-232 connector back in, and in so doing, we added back in the ability to control the plasma display using RS-232. The 9-pin D-sub serial port can be configured to pass through Pioneer command codes from a third-party control system.

GlobalViewer™ Provides Even More Capability
While it’s not required for basic functionality, Extron’s GlobalViewer™ software is fully supported by the Web server built into the IPL M PDP-ES. GlobalViewer software is a free Web application with robust features including multiple room views, real-time device status, e-mail notification, and event scheduling. GlobalViewer extends the asset management functionality of the IPL M PDP-ES, allowing status information for multiple Pioneer plasmas to appear in a single GlobalViewer screen along with data for other IP Link-enabled products.

Numerous Applications
The proliferation of plasma displays and the critical nature of the information displayed on them puts a lot of pressure on AV system managers to get real time device status in a centralized location. There’s no better medium for connecting an organization’s displays than an Ethernet network, and there’s no better system for linking them together than IP Link. With the integration of IP Link and Pioneer plasmas, system integrators and technology managers have an intelligent solution for deploying professional display systems.
IP Link FAQs

As with most new technologies, Extron IP Link™ generates many questions from our dealer community. The following details answer two of the most frequently asked questions we receive.

Do I have to be a programmer to install IP Link systems?

No! All of the tasks associated with setting up an IP Link system are done using a powerful Windows-based program called the GlobalViewer Configurator. No programming skills are needed. The Configurator contains several intuitive screens for adding devices, setting IP address information, configuring serial ports, and defining management options. The configuration utility automatically generates all the Web pages you need. Device drivers are easy to load using the Configurator. Extron maintains a library of over 2,100 downloadable serial and IR drivers for devices from dozens of manufacturers.

Web pages are stored on the IP Link control interface and can be viewed from any computer with access to the network. Web pages produced by the configuration utility are fully customizable using standard HTML editing tools. You can add images and modify and background colors, creating a user interface that reflects your brand or your user's special requests.

How do I configure a pass-through port?

Configuring a serial port for pass-through mode can be done in one of three ways: through the GlobalViewer Configurator, through Telnet, or using Simple Instruction Set™ (SIS™) commands built into a GlobalViewer Web page. (SIS is a set of commands developed by Extron that allows easy RS-232 control of certain Extron products with a minimal number of characters in the commands and responses.)

Configuring a pass-through port is easy with the GlobalViewer Configurator. The following steps for configuring a pass-through port can be found in the Installation and Configuration section of the GlobalViewer Software user’s manual:

To configure a pass-through port using GlobalViewer:
1. Select a port in the directory view pane. Configuration fields for that port appear in the right pane of the GlobalViewer Configuration Utility window (see figure below).
2. In the Serial Port Info area, select Pass Through. The COM Port Pass Through Configuration area appears to the right.
3. In the COM Port Pass Through Configuration area, select a port to receive data using the To Port drop-down menu. The port will now be labeled as a pass-through port in the directory view pane.
4. Repeat steps 1 through 3 to configure additional ports for pass-through operation.

To configure a pass-through port using Telnet:
Open a Telnet session to the IP Link interface and type:
```
Esc <port to receive redirected commands> <port to be redirected> cd
```
Example: `Esc 2001 2002 cd`

To configure a pass-through port using a Simple Instruction Set (SIS) command and Global Viewer:
The SIS command to redirect a port is:
```
W<port to receive redirected commands>%2a<port to be redirected>cd
```
Example: `W2001%2a2002cd`

The SIS command can be embedded into a custom Global Viewer Web page using standard syntax:
```
http://<IP Link interface IP Address>?cmd=<SIS Command>
```
Example: `http://192.168.244.244?cmd=W2001%2a2002cd`

Configuring serial port pass-through using GlobalViewer Configurator

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Configuring serial port pass-through using GlobalViewer Configurator
The new MAV Plus Series of video and audio matrix switchers are ideal for virtually any standard analog video and audio signal routing application. With 56 models to choose from, ranging in sizes from 8x8 up to 32x32, the new MAV Plus Series is packed with a host of innovative features, including Extron’s exclusive IP Link™ control and monitoring technology, enhanced QuickSwitch Front Panel Controller (QS-FPC™) with large, tri-color backlit I/O selection buttons, and audio output volume control. MAV Plus matrix switchers are designed for fast and efficient integration and offer versatile switching solutions for applications that route HDTV and component video, S-video, composite video, and stereo audio. In addition, a full line of stereo audio only MAV Plus matrix switchers are available for switching both balanced and unbalanced stereo audio signals.

56 models available. Please call Extron for part numbers and prices.

URL: www.extron.com/mavplus
Select Models Now Shipping

The new CrossPoint 300 Series of Wideband Matrix Switchers replaces the popular original CrossPoint Series. Now offering 300 MHz RGB video bandwidth, fully loaded, the new CrossPoint 300 Series switches provide enhanced performance and new features for the same price as the original CrossPoint Matrixes. CrossPoint 300 matrix switchers come with many new features, including Extron’s exclusive Advanced Digital Sync Processing (ADSP™) technology and audio output volume control.

15 models available. Please call Extron for part numbers and prices.

URL: www.extron.com/crosspoint300
Select Models Now Shipping

The new CrossPoint 450 Plus Series of Ultra-Wideband Matrix Switchers is designed for exceptional performance in the most demanding high resolution computer-video and audio routing systems. Replacing Extron’s popular CrossPoint Plus Series, CrossPoint 450 Plus matrix switchers offer 450 MHz (-3 dB) RGB bandwidth, fully loaded, and are loaded with a host of new standard features, including Extron’s exclusive Advanced Digital Sync Processing (ADSP™) technology, IP Link™ Ethernet control and monitoring technology, and audio output volume control. The CrossPoint 450 Plus Series consists of 22 models in 11 I/O sizes, ranging from 8x4 up to 32x32, including a new 8x16 size. Each I/O size is available in two versions: “HV” for switching RGBHV signals and “HVA” for switching RGBHV signals and stereo audio.

22 models available. Please call Extron for part numbers and prices.

URL: www.extron.com/crosspoint450plus
Select Models Now Shipping

www.extron.com
**NEW PRODUCTS**

### IPL T PCS4
**Power Control Current Sensor (120VAC)**

Two new IP Link™ interfaces enable centralized, Web-based power management for A/V systems. The Extron **IPL T PCS4** Power Control and Current Sensor features four 120VAC (Edison) outlets with a maximum 10 amp load. An international version, the **IPL T PCS4i**, features four 220VAC (IEC) power outlets with a maximum 6 amp load.

The IPL T PCS4 Series features built-in Web-based monitoring, scheduling, and control capabilities. Using the default Web pages built into the device, administrators can control outlets, set up outlet groups, configure alarms, and modify the schedule.

**Model** | **Part#** | **List Price**
--- | --- | ---
IPL T PCS4 | 60-544-07 | $995.00
IPL T PCS4i | 60-544-09 | $995.00

URL: [www.extron.com/ipltpcs4](http://www.extron.com/ipltpcs4)

Available April 2005

### VTG 400
**Programmable Video and Audio Test Generator**

The Extron **VTG 400** is an advanced, programmable, and upgradeable A/V test generator that delivers accurate, full bandwidth video signal reproduction and high performance audio test signals. This professional quality reference tool is ideal for commissioning, calibrating, and testing audio and video systems.

The VTG 400 offers 34 video test patterns, several exclusive to Extron, and seven audio test signals. Video output includes RGB, component video, S-video, and composite video, while audio output is both balanced and unbalanced. The VTG 400D also adds SDI/HDSI output. For universal display compatibility, 97 scan rates are available, and up to 180 custom rates can be programmed.

A powerful and innovative feature is Scope-Trigger™ (Patent Pending), which greatly simplifies the use of an oscilloscope for analyzing video signals. The VTG 400 generates a special trigger signal that is precisely timed to a user-selected target location within the video image. For more information on Scope-Trigger, see the article on page 24.

**Model** | **Part#** | **List Price**
--- | --- | ---
VTG 400 | 60-564-01 | $1,995.00
VTG 400D | 60-564-02 | $2,795.00

URL: [www.extron.com/vtg400](http://www.extron.com/vtg400)

Now Shipping

### AVT 100
**TV and Cable Tuner**

The Extron **AVT 100** is a compact, high performance analog cable and television (TV) tuner. Ideal for boardrooms, conference rooms, and classrooms, the AVT 100 can also be employed in large-area RF distribution systems in stadiums, arenas, and campus CCTV systems.

The AVT 100 features direct front panel channel access. Expanded control features are available via RS-232 as well as optional IR remote control. The AVT 100 can be set for full or selective channel access. Configuration settings for channel presets can be exported to a file and then uploaded to additional units for expedited set-up.

**Model** | **Part#** | **List Price**
--- | --- | ---
AVT 100N (NTSC) | 60-647-01 | $575.00
AVT 100P (PAL) | 60-647-02 | $575.00

URL: [www.extron.com/avt100](http://www.extron.com/avt100)

Now Shipping

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

**M59 Series**

**Mini 59 Flex Cable**

Combining higher performance than Mini High Resolution cable with more flexibility than RG59 cable, Extron M59 Series High Resolution Cable offers unique characteristics ideally suited for composite, S-video, component, HDTV, RGBs, and RGBHV applications. These durable and ultra flexible 24 AWG cables provide high resolution signal distribution and multipurpose interconnectivity solutions for a wide range of A/V environments. For permanent installations, M59 Series cables are well suited for use as interconnect cable with equipment racks. They are also ideal for rental and staging A/V systems and other temporary installations that require frequent cable handling.

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<thead>
<tr>
<th>Model (500' / 150 m roll)</th>
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<tr>
<td>M59-3 (3 conductor)</td>
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<td>M59-5 (5 conductor)</td>
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<td>M59-6 (6 conductor)</td>
<td>22-133-02</td>
<td>$1,630.00</td>
</tr>
</tbody>
</table>

URL: www.extron.com/m59series

Now Shipping

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**NEW**

**MIX 301**

**Three Channel Line Level Mixer**

The Extron MIX 301 is an audio mixer which combines three line level mono audio sources, or a stereo and a mono source, into a single line level mono output. The MIX 301 accommodates balanced or unbalanced audio. Each input features mix level control from -80 dB to +20 dB.

The MIX 301 is an economical problem-solver for incorporating additional audio sources into a switcher or projector, and is ideal for a wide variety of applications such as retail environments, presentations, and classrooms. It is housed in a compact 1U, one-eighth rack width enclosure.

<table>
<thead>
<tr>
<th>Model</th>
<th>Part#</th>
<th>List Price*</th>
</tr>
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<tr>
<td>MIX 301</td>
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<td>$150.00</td>
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</table>

URL: www.extron.com/mix301

Now Shipping

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**NEW**

**MKP 2000**

**Matrix Switcher X-Y Remote Control Panel**

The Extron MKP 2000 is an economical X-Y remote control panel designed to work with any Extron matrix switcher equipped with either RS-232 or IP Link™ Ethernet control capabilities. In large-scale switching environments, an unlimited number of MKP 2000s can be easily added wherever switcher control is needed. Virtual I/O grouping is a key feature that allows each MKP 2000 to be configured with its own unique set of inputs and outputs. By limiting user access to specific I/O ties, custom switching zones can be easily created. With an intuitive, easy-to-read LED display and 12-button keypad, the MKP 2000’s compact, two-gang design provides for convenient mounting in virtually any location.

<table>
<thead>
<tr>
<th>Model</th>
<th>Part#</th>
<th>List Price*</th>
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<tbody>
<tr>
<td>MKP 2000 (black)</td>
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<tr>
<td>MKP 2000 (white)</td>
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<td>MKP 2000 (RAL 9010 white)</td>
<td>60-682-05</td>
<td>$595.00</td>
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</table>

URL: www.extron.com/mkp2000

Now Shipping

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www.extron.com
Hofstra University

Hofstra University, located in Hempstead, NY, is the largest private university on Long Island. In 2002, it was announced that Hagedorn Hall, named after philanthropists Amy and Horace Hagedorn, would become Hofstra’s new home for the School of Education and Allied Human Services. Located at the site of a former federal courthouse, Hagedorn was slated for a complete renovation, including the addition of a state-of-the-art networked A/V system throughout the building.

The $10 million construction project (which included a generous gift from Mr. and Mrs. Hagedorn and $3 million from New York State) was part of the 2002 Biotechnology Investment Initiative. Portions of the project called for the A/V systems to be integrated into the design of the building. Systems would not only be placed into the classrooms as teaching aids, but also in faculty conference rooms and public areas. Several new programs within the school are targeted at dramatically improving teacher education on Long Island.

Diversified Systems, based in Kenilworth, NJ, has maintained a long-standing relationship with the university and was awarded the A/V design contract. The job took about eight months to complete. “In the classroom and conference areas, we provided all of the architectural detail necessary to seamlessly integrate the A/V equipment,” said Kevin Collins, senior vice president for Diversified.

The project comprised 12 presentation classrooms with interactive whiteboards and projection systems. Each classroom also includes a customized workstation outfitted with a computer, DVD player, and several Extron products including an MLC 206 AAP MediaLink™ Controller, MLS 506MA MediaLink Switcher, and IPL T S4 Four Serial Port IP Link™ Ethernet Control Interface. Four faculty conference rooms have the same capabilities as the presentation classrooms. Altogether, the Extron products provide a turnkey solution with simple push-button, remote control and monitoring capabilities.

“The cost effectiveness of the MediaLink System with IP Link allows us to provide monitoring and problem troubleshooting from one central area for the entire building,” Collins said. “The instructors are very pleased with the simplicity and reliability of the system.”

For additional information, see:
Hofstra University
http://www.hofstra.edu/home/index.html
Diversified Systems
http://www.divsysinc.com

Above: Hofstra University’s Training Lab incorporates Extron’s MediaLink System with IP Link to provide monitoring and problem troubleshooting from one central area.
Left: A customized workstation outfitted with the latest technology in A/V systems.
Extron VersaTools products are great AV system design problem solvers, not only because of their small size and integration friendly design, but also for their low power requirements. The majority of the VersaTools products operate using a 12V power supply. Many of them require under 0.5 Amps. Thanks to their compact size and minimal power requirements, it is often possible to mount the VersaTools products needed on a single shelf, all powered from one supply. While all VersaTools products ship with included power supplies, many of them utilize a common 12VDC, 1A supply (70-055-01) that can be used to power multiple units.

Utilization of a single supply to power multiple VersaTools products can provide the following benefits:

- Only one outlet of a power strip required
- Results in less rack clutter
- Reduces possible points of failure
- Helps simplify the troubleshooting process

There is any number of conceivable applications using the one power supply scenario given Extron’s large line of VersaTools products. Consider, for example, an Extron MSW 4V four input, compact composite video switcher connected to an MDA 2V EQ, composite video mini distribution amplifier that outputs to a local monitor as well as to an MTP T AV composite video twisted pair transmitter. The MTP T AV then provides long distance transmission up to 1,000 feet to a remote kiosk. The MSW 4V conveniently switches between video sources, while the MDA 2V EQ includes gain and EQ adjustments to compensate for signal loss. As illustrated in the accompanying reference chart, the combined power requirements of the three VersaTools products is below 0.6 Amps, well under the 1 Amp amount provided by the included power supply.

Chaining VersaTools products’ power connections in a series to a single power supply is a practical, cost-effective solution whenever:

- Electrical outlet availability is at a premium
- Multiple power supplies cannot be conveniently located within the available space
- The distance between a device and a readily available power source is a design factor
- Only one outlet of a power strip required
- Results in less rack clutter
- Reduces possible points of failure
- Helps simplify the troubleshooting process

**Powering Multiple VersaTools® Products**

<table>
<thead>
<tr>
<th>VersaTools Product</th>
<th>Current Draw</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSW 4V</td>
<td>175 mA</td>
</tr>
<tr>
<td>MDA 2V EQ</td>
<td>150 mA</td>
</tr>
<tr>
<td>MTP T CV</td>
<td>200 mA</td>
</tr>
<tr>
<td><strong>Combined Current Draw</strong></td>
<td><strong>525 mA</strong></td>
</tr>
</tbody>
</table>

Available Current from Included Power Supply
(PN# 70-055-01) 12V, 1A

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combined Current Draw</strong></td>
<td><strong>525 mA</strong></td>
</tr>
<tr>
<td><strong>Available Headroom</strong></td>
<td><strong>475 mA</strong></td>
</tr>
</tbody>
</table>

*Individual product power ratings can be found in their respective specifications section.*
Scope-Trigger™: Effortless Video Signal Analysis

The oscilloscope can be a very useful tool in analyzing video signals, particularly in situations where troubleshooting or detailed calibration is necessary. But just about anyone who has set up an oscilloscope for displaying video signals knows that the process is often frustrating, entailing rather extensive trial and error. In an attempt to yield a stable, usable display, you’re constantly fumbling and experimenting with the scope controls. And if that’s not enough, chances are you’re also faced with the challenge of matching a specific spot of interest on the video image with what you’re seeing on the oscilloscope.

Enter Scope-Trigger, a new Patent Pending technology exclusive to Extron. Featured on the new VTG 400 and VTG 400D reference A/V test generators, Scope-Trigger greatly simplifies display of video signals on an oscilloscope to a quick, easy, and painless “1-2-3” process.

Why Are Video Signals Difficult To Analyze On an Oscilloscope?

Video signal analysis using an oscilloscope is difficult because of the lack of a reliable trigger signal that the scope requires as a synchronization reference. As a result, the user attempts to subjectively control how and what part of the video signal is displayed, usually with a low degree of certainty. Oscilloscopes may be capable of triggering to the embedded sync in standard video signals, especially with the addition of an external device. However, display of HDTV and high resolution computer-video signals is troublesome.

Several challenges arise in successfully using an oscilloscope with video signals. Chief among them is achieving a stable display. This may be possible if the video image is a static test pattern. However, with dynamic video, stable scope display becomes much more difficult when the scope is relying on the video signal itself as its trigger. Similarly, a stable display cannot be guaranteed if you are analyzing various points within a circuit or a system. For RGB video, steady display may be possible by using the horizontal (H) or vertical (V) sync signals as the external trigger for the oscilloscope.

But more often than not, achieving stable display is just the beginning. Typically, your ultimate objective will be to analyze and troubleshoot some sort of localized visual glitch on the screen. Since you’re feeding the same video signal for the display into the scope, you will need to somehow ensure that this glitch is being shown on the scope. To accomplish this, you’ll first have to count, or estimate, from the top of the screen, the line where the glitch occurs. Then, with your scope, you’ve got to fumble with the trigger delay control, and try to sequence through the lines of video along the signal by counting the number of horizontal sync intervals. There are 240 lines to count within a field of interlaced standard definition video. But try keeping track among 1,024 lines in a frame of SXGA computer-video!

Scope-Trigger To the Rescue

With Scope-Trigger, you can now bypass all the hassle in setting up an oscilloscope for video signal analysis. In fact, all you really need to do with the scope is just ensure that the connections are correct! The VTG 400 then takes care of the rest.

Essentially, the way Scope-Trigger works is that you determine the location on the screen to analyze, and then the oscilloscope displays the signal at that exact location. This is possible because the VTR 400 generates a special trigger signal for the oscilloscope, with the triggering pulse timed precisely to the location on screen you have selected. Experimenting with the scope controls or counting lines of video is no longer necessary!
**Scope-Trigger in Three Easy Steps**

1. **Set-Up**
   Set up the system as illustrated at left. A duplicate of one of the RGB video signals for the display is input to the oscilloscope. (Component video, S-video, and composite video signals can be analyzed as well.) Be sure to connect the Scope-Trigger output of the VTG 400 to the external trigger input of the oscilloscope. Also, be sure that you have selected the desired video test pattern (the Checkerboard pattern is shown illustrated).

2. **Identify the Location**
   Engage Scope-Trigger by pressing any of the dedicated buttons on the main panel. An orange crosshatch cursor appears on screen, which you can also change to a single pixel cursor. Using the directional buttons, position this cursor at any desired location (pixel).

3. **Oscilloscope Display**
   Now, look at the oscilloscope. The trace that is displayed is centered precisely at the location of the Scope-Trigger cursor.

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**VTG 400: Looking Beyond the Visual Image**
In addition to analyzing areas of the image on-screen, Scope-Trigger enables convenient examination of the horizontal and vertical sync intervals. This is useful when checking the polarity or integrity of the sync waveform, or for the presence of serration pulses. To display sync on your scope, simply position the cursor beyond the visible (active) image area, using the pixel counter for the total image area (shown on the VTG 400 LCD display) as a guide. If you’re working with RGBHV, swap the video input to the scope for either the H or V sync cable, depending on whether you’re analyzing horizontal or vertical sync.

The Windows® software that is included with the VTG 400 enhances and expedites the functionality of Scope-Trigger. Using your mouse or other pointing device, you can simply “click” anywhere within the image to locate the cursor. Analyzing sync intervals is much easier since all you’ll need to do is click outside of the active image area.

**A Convenient, Universal Tool for Video Signals**
For measurement and analysis of video signals, professionals in broadcasting and video production use specialized oscilloscopes known as waveform monitors and vectorscopes. However, these devices are specialized for television signals including NTSC, PAL, and HDTV, and are not compatible with computer-video. The VTG 400 and Scope-Trigger, along with a conventional oscilloscope, allow for analysis of any video or computer-video signal, from composite video to HDTV, to ultra-high resolution computer-video (such as QXGA, or 2048 x 1536). Extron recommends the use of an oscilloscope with 200 MHz bandwidth to accommodate computer-video resolutions up to UXGA (1600 x 1200).
Extron’s New On-Line Training Program
Access to Extron A/V product and technology training has never been easier

With our new online “A/V Associate” Training Program, it is now even easier to begin or build an audio/video knowledge base anytime, anywhere without traveling or significantly impacting hectic work schedules.

As always, education and training remain the cornerstones of Extron’s commitment to our customers. To help A/V industry professionals keep up with the accelerated pace of technological growth and change, Extron continues to develop and deliver world-class education and training programs.

This month we’re pleased to introduce our brand new A/V Associate (AVA) training program for anyone interested in advancing their audio/video knowledge. The training is delivered completely online and provides interactive instruction ranging from A/V essentials to basic Extron product knowledge. Our AVA program is ideal for new hires, sales personnel and anyone else who wants to gain a basic understanding of audio, video, and networking fundamentals; build awareness of technologies; and improve troubleshooting skills.

Increased knowledge like that provided by our AVA program can save valuable time and money, and provide customers with a higher level of service and satisfaction.

Students begin with an orientation course that prepares them for successful completion of the online training and an introductory course about Extron. Next, they’ll explore lessons in basic electricity, computer systems, display technologies, general signal types, and Ethernet basics. Students then move on to A/V Technologies, which includes lessons in interfacing and architectural solutions, switching and matrix switching, signal distribution and processing, control technologies, and cable basics. The training also includes a course on Extron product solutions, which gives an excellent overview of all the Extron product categories.

The online training program consists of two self-paced courses that utilize a highly interactive format including Flash animations, drag-and-drop design exercises, and the opportunity to ask questions via e-mail about the material.

Throughout the courses, students are given frequent quizzes to test their knowledge and reinforce the basic concepts, leading up to an online final exam for each course. Those who successfully complete the program will receive a certificate of completion.

For more information about any of Extron’s training programs, or to register for Extron’s new online A/V Associate training, call your Extron Customer Support Representative.
ExtroNews publishes information about new products that are relative to the Extron product line in the New News section. If you would like a new product to be reviewed for New News, please send a press release, literature, contact name, and a color slide or photo to: New News c/o Mike Andrews, Extron Electronics, 1230 South Lewis Street, Anaheim, CA 92805, phone: (714) 491-1500, ext. 6394, or send e-mail to extronews@extron.com.

**CANON**
www.canon.com
The Canon Realis SX50 is an LCoS-based projector, completely designed and manufactured by the company. This projector features three LCoS panels at native SXGA+ (1400 x 1050) resolution. Brightness is rated at 2,500 ANSI lumens, and contrast ratio is specified at 1,000:1, both attributable by Canon to their proprietary AISYS (Aspectual Illumination System) optical technology. The Realis SX50 features multiple image modes including sRGB, a 1.7x optical zoom lens, and a soft carrying case. This projector has an estimated USD list price of $3,999.

**SONY**
www.sony.com
Sony has added two new LCD displays to its line of professional flat-panel displays, the 42-inch FWD-42LX1 and the 32-inch FWD-32LX1. They deliver 1366 x 768 (WXGA) native resolution and 16 millisecond video response time. Both models feature the Sony WEGA Engine™ digital video processing, as well as Block Noise Smoother to minimize noise that sometimes occurs with MPEG-2 sources such as DVD and digital satellite. The FWD-32LX1 and FWD-42LX1 have suggested USD list prices of $4,000 and $7,700, respectively.

**VIEWSONIC**
www.viewsonic.com
ViewSonic has introduced the VPW5500, a 55-inch plasma display with a native resolution of 1366 x 768. The VPW5500 features an ALiS plasma display panel and offers 1,000 cd/m2 brightness and 160-degree horizontal and vertical viewing angles. The proprietary ViewSonic Clear Picture™ video processing is said to eliminate noise, increase contrast and detail, and optimize color for both standard and high definition sources. The VPW5500 has a suggested USD list price of $9,999.

**SHARP**
www.sharpusa.com
The XG-PHS50X is a single chip DLP projector from Sharp, that offers a native resolution of 1024 x 768, as well as single and dual lamp operating modes. This projector features power horizontal and vertical lens shift, power focus, six available lens options, and Ethernet connectivity. Brightness capability is rated at up to 4,000 ANSI lumens, and contrast ratio is listed as 1,000:1. The XG-PHS50X has a suggested USD list price of $6,995.

**CHRISTIE**
www.christiedigital.com
Christie recently introduced the Christie Matrix 3000 DLP™ projector. The Christie Matrix 3000 features a single DLP imaging device with SXGA+ native resolution. Light output is rated at 3,000 ANSI lumens, and contrast ratio is specified at up to 4,000:1. Key features include 10-bit image processing, built-in edge blending and image warping hardware, ChristieNET™ network connectivity, seamless switching between sources, and Comprehensive Color Adjustment (CCA™). The Christie Matrix 3000 has a suggested USD list price of $21,995.

**EPSON**
www.epson.com
The PowerLite® 7900p from Epson features three Epson LCD panels at XGA (1024 x 768) resolution, 700:1 contrast ratio, and 4,000 ANSI lumens light output. Additional, key features include EasyManagement™ technology for integration over IP networks, a suite of image correction tools including QuickCorner™ and WallShot™, and a preview function with SnapWindows™. The PowerLite® 7900p has an estimated USD price of $4,619.
Tweeeker Chopper

Tweeeker Use #71

Jason Dicampello, an A/V Technician who hails from Normandy, France, utilized Extron Tweekers to fashion a miniature Chopper complete with chrome wheels on a stretched front fork and low slung Tweeker frame with kickstand worthy of the customized Harley-Davidson motorcycles it readily evokes. Jason notes he spent a month building his Chopper including the exacting task of notching the holes to fit the Tweekers perfectly. Jason even wired the bike mounting a working headlight powered by a 24 volt power supply. “I hope you enjoy my Chopper,” he says.

Send us a photograph and brief explanation of how you use the Tweecker. If we publish it in a future issue of ExtroNews, we’ll give you a free VTG 300.

Please send entries along with contact information to: Extro Tweecker Contest, 1230 South Lewis St., Anaheim, CA 92805. Or e-mail a high-resolution photo and explanation to tweeeker@extron.com.

Send us a photograph and brief explanation of how you use the Tweeker. If we publish it in a future issue of ExtroNews, we’ll give you a free VTG 300.

Please send entries along with contact information to: Extro Tweecker Contest, 1230 South Lewis St., Anaheim, CA 92805. Or e-mail a high-resolution photo and explanation to tweeeker@extron.com.

Extron Institute
Apr 11-12 The Netherlands
Apr 13-15 Singapore
Apr 21-22 Anaheim, CA
May 2-6 Boston, MA

May 9-10 The Netherlands
May 11-13 Bangalore, India
May 23-24 The Netherlands

Tradeshow
June 8-10 InfoComm US Las Vegas, NV

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