

# The Technology Manager's Guide to Boardroom AV



## Inside:

- ▶ Top Ten Boardroom AV Essentials
- ▶ Concealing Boardroom AV
- ▶ Optimizing Control System Benefits
- ▶ Boardroom Tech Ticker

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# EDITOR'S NOTE



## Tools for Success

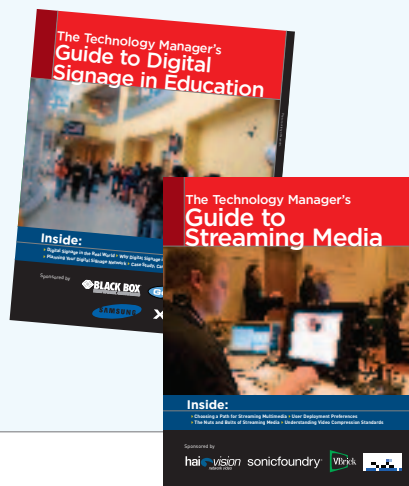
How can tech managers maximize their investment in a high-tech boardroom? Though we see the positive potential of AV, we don't believe in technology for technology's sake. Don't install equipment today just because you feel you *may* need it in the future. Rather, what does a careful needs analysis reveal? As Conference Technologies Inc. CEO, John Laughlin, says, "Make tomorrow's purchases tomorrow." Chances are the equipment will be better and probably less expensive if you wait until you really need it. On the other hand, you need to install the infrastructure today to handle tomorrow's systems. Closely examine your conduit, cabling, switching, and control systems. These can be extremely expensive to retrofit, so a smarter system now may make fiscal sense going forward.

We created this special *Technology Manager's Guide* to identify key areas of the conference room AV process, and share success stories from end-users, tech managers, consultants, and integrators alike. Facility directors need to know that the equipment you buy is the highest quality and able to perform reliably under constant use. The tutorials, new solutions, primers, integrator directory, and CAD renderings in these pages will help you make a more informed lifecycle plan, and, hopefully, add more value to your meeting space.

— Margot Douaihy, managing editor  
*AV Technology*

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# FIRST PERSON: INTERVIEW

JOHN LAUGHLIN, PRESIDENT AND CEO,  
CONFERENCE TECHNOLOGIES INC.



## **AV Technology: Should boardroom AV be considered during the initial design phase of a new construction project?**

**John Laughlin:** Absolutely. The choices you make on your AV system will affect your requirements for the physical space, lighting, furniture, power and HVAC of your new board-

room. You will get a better result at a lower cost the earlier you begin planning for AV.

For example, how many displays will the space require to meet expectations? How large will your displays be and where will they be positioned? Lighting is always important, but if you will be including video conferencing it becomes crucial that the participants on the video call are lit properly to maintain a quality experience. You need to be sure electrical power is in the right locations to support not just the AV equipment but user peripherals such as laptops as well. AV components produce heat, so the placement of projectors, monitors and amplifiers can affect the design of your HVAC system. This should be coordinated during the design phase with the MEP consultant on the project.

Change orders are always expensive, so you want to make sure your architect understands your AV needs before he or she lays out the physical space and furniture. As important, an early start in the AV system design will make it much easier to give your end users exactly what they expect. Any time the AV becomes an afterthought, you almost certainly have to make compromises and incur additional expense.

## **AVT: How best to approach integrating boardroom AV into a renovation project?**

**JL:** It's always more difficult to retrofit an AV system to an older room than to build one in a new space, but of course there are many good reasons why you may want or need to remodel.

The key to making a renovation successful is very careful planning. An experienced AV Integrator will know the right questions to ask and be able to recommend solutions for likely problems.

One common situation that you must address is if the existing furniture is going to be reused. Your Integrator will need to know if you going to try and save your current conference table. If so, how are you going to accommodate new technology in the existing boardroom table? Does it

have cable management features or do they need to be added to the table? Can the tabletop be cut or modified to accommodate touch panels or table boxes? Will you need to core drill the floor to gain access under existing furniture? Will you need new furniture or cabinetry built to match the existing table?

You will need to ask all the questions you would ask for new construction, but with the added issue of whether existing electrical, lighting, and other systems will be adequate to meet your new requirements.

## **AVT: Can a boardroom effectively double as a video-conferencing space?**

**JL:** The short answer is yes, it can and it should, but the long answer is that it often depends on the type of organization building the boardroom and the expectations of the users.

In larger organizations, a boardroom may be used only by board members and C-level executives with very specific desires that may not be compatible with the requirements of a videoconferencing system. Smaller organizations often use their boardrooms for a wide variety of purposes and are more flexible about the way it should be utilized.

## **AVT: What are some of the biggest challenges in designing a modern boardroom? Ambient light? Network? Multiple user concerns?**

One big challenge we see is the aesthetics of the space. As the level of the user rises, expectations for the look of the room rise as well. Generally architects, interior designers, and end users do not want to see projectors hanging from the ceiling, holes cut into tables for cable pop-ups or microphones. So aesthetic concerns can cause challenges in giving users connectivity for their laptops or the audio quality they expect.

The location of the room can be a challenge as well. We sometimes see these rooms positioned where noise and vibration are a problem—for example next to an elevator or on the first floor of a building near a busy street—or perhaps in a spot where morning sunlight floods the room. We can and do design systems to overcome these problems, but the best solution is to avoid the problem in the first place.

Our biggest challenge can often be communicating the need to meet with the CEO so that we can understand his or her expectations. Most executives have little time to spare, but if we are truly building the room for the CEO, a meeting during the design phase can save a lot of time and frustration later.

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# 10 BOARDROOM ESSENTIALS

ROOM TYPES VARY, BUT THERE ARE 10 BASIC INGREDIENTS TO SUCCESSFUL BOARDROOM SYSTEMS.

by Joey D'Angelo

The technology-related capabilities found in conference rooms, or boardrooms where high level executives meet, can vary from company to company. There are common and basic features of a successful room, however, that should be considered early in the design phase.

## 1. INFORMATION TECHNOLOGY (IT) INFRASTRUCTURE

If a boardroom style meeting room has a 24-seat table, there should be power and data access for all 24 seated individuals. There should also be wireless Internet access that is easy to connect with. In these instances, there should be network connectivity should be available for local users and the local area network, and there should be unregulated network connectivity for visitors as some non-native users may require the use of proxy servers. There should also be decent cellular coverage in a boardroom so everyone can still feel connected as well. Although not extremely important, distributed antenna systems to enhance cellular coverage in buildings are gaining popularity. This simple combination of IT features should assure that every important executive's needs are met with little or no on hand assistance.

## 2. HIGH QUALITY DISPLAY SYSTEMS

In any boardroom style meeting space, the main display is very important. The rule of thumb for this is to take the distance to the farthest viewer and divide it by four to determine the required width of the screen. This rule will thus assure that the entire viewership



can see at least 12 point fonts or better, which can be found in excel spreadsheets, documents, or PowerPoint presentations all too often. Oftentimes, boardrooms might also need more than one display if there is videoconferencing. In those instances, the main displays must be located and sized accordingly. The displays should also be capable of handling a minimum resolution of 1920 X 1080 (high definition, or HD). There are numerous types of display including LCD, microtile, or front projection. The best choice is usually dependent upon the architectural features of the room and the budget.

## 3. PRESENTATION CAPABILITIES

There should be multiple, easy to use, readily accessible connections for laptop computer video with built-in captive cables. This enables users to show up with their laptop, use a cable that is built in, and get a presentation started quickly and easily. The number, location, and quantity of laptop video connections can vary, but they depend on the budget and style of use for the room. Each connection should be vividly labeled and offer a VGA connector, a small "headphone style" audio connection, and an HDMI connection for digital video which is more and more common these days. (See figure 3-1) These connections can be custom built, or they can be ordered as an off the shelf item. (See figure 3-2)



Figure 3-1: A "cable cubby" style laptop connection point

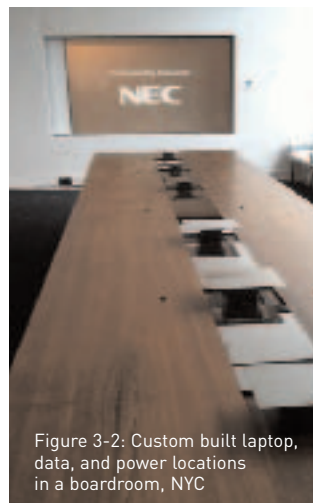
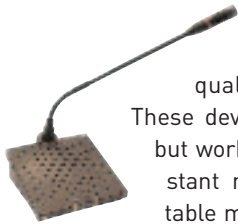


Figure 3-2: Custom built laptop, data, and power locations in a boardroom, NYC

#### 4. TELECONFERENCING CAPABILITIES



Figure 4-1 & 4-2: Fixed and removable table microphones



A modern boardroom must have a reliable, clear, and easy to use teleconferencing system. It must function for every seated individual equally. To accomplish this, table microphones are usually used in conjunction with a device called an echo canceller. The echo canceller allows for the use of microphones in conjunction with ceiling loudspeakers thus delivering the highest possible quality conference experience. These devices must be carefully tuned, but work reliably in rooms with a constant number of seated users. The table microphones can be permanent or fixed and must be properly positioned such that they do not interfere with papers or other objects in the workspace. (See figure 4-1, 4-2) There must also be a visible way to prove the mics are either ON or OFF to assure speech confidentiality, which is important in a boardroom style meeting room.

#### 5. VIDEOCONFERENCING

Most executive level personnel are familiar with videoconferencing and rely on it. A boardroom style meeting space should feature an HD videoconferencing system. Cisco Telepresence is a very popular format



Figure 5-1: HD videoconferencing at Barclays/Blackrock Financial

#### MIC PLACEMENT

“Microphone placement at conference tables is a critical AV design element and based on the specific performance of the selected microphones. Table seams, wood inlays, and the location of table troughs and hatches cannot be the deciding factors as to where microphones are placed.”

—Christopher Maione, CTS-D, InfoComm Adjunct Faculty

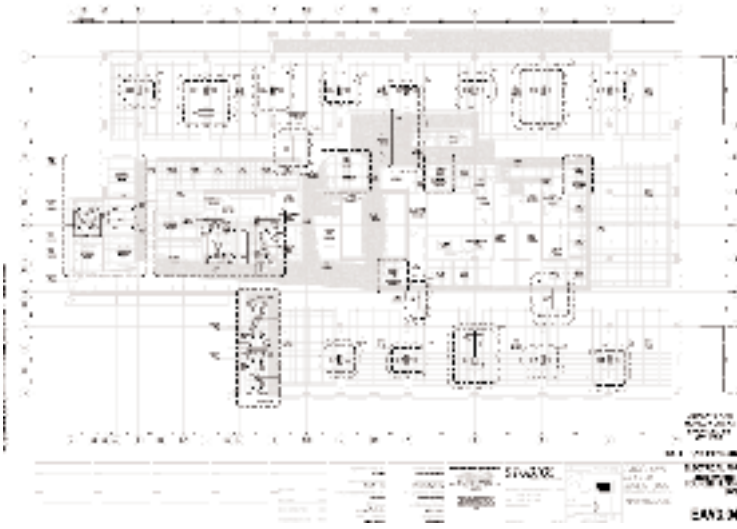
these days. An off-the-shelf HD system from Tandberg or Polycom can also deliver a very high quality experience well suited to a boardroom. In boardrooms, there is typically two or more displays, a front camera on center at slightly higher than eye-level, and a rear camera at 7 feet, 0 inches, so people can remotely view proceedings. (See figure 5-1) A videoconference system can also be used to archive any meetings or presentations (which is a nice feature).

#### 6. LIGHTING

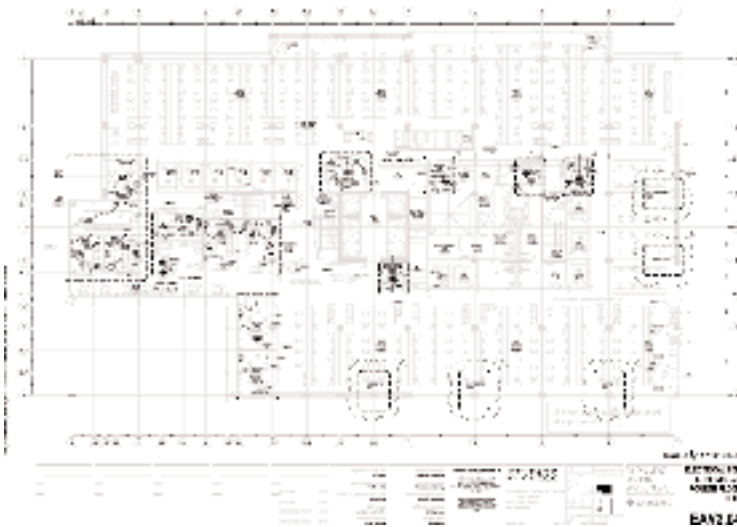
Lighting for a videoconferencing room type should have a separate circuit for any fixtures that may cast light on the wall featuring the room’s display. All light fixtures should be recessed and provide a uniform field of light such that the VTC camera’s iris does not make constant adjustments. Lighting should strike VTC participant faces at 45 degrees, which is typically referred to as “Key Light.”

#### More key points on effectively lighting a videoconferencing space:

- Surfaces behind participants should be lighted which separates the foreground from the background and improves VTC quality. The ratio of foreground to background light can range from 1:1 to 3:1.
- The required lighting levels are 750 Lux (horizontal) on the table with 500 Lux (vertical) on the participant’s faces. It is vital that the lighting is even; with no hot-spotting (fluorescent lighting is therefore more practical than Tungsten Halogen).
- The three walls that make up the backdrop require very even lighting and these need to start at the ceiling line. A popular choice for meeting rooms is to use a line of single fittings; however this always provides a scalloped effect on the wall which looks bad at the other end of the videoconference call.
- All lighting should be a uniform color temperature. A mix of fluorescent and Tungsten Halogen must be avoided.



Boardroom CAD Renderings



- If a dimming system is provided, it should come with an RS-232 interface to allow the touchpanel to control lighting presets.
- Black out shades are recommended for all windows on this room type.
- If motorized draperies are provided, they should come with a low voltage control option to allow the touchpanel to change drapery settings.
- The conference table pedestal should have a large footprint and an access door for device storage and cable management.
- If motorized projector lifts are desired in a boardroom type setting, explore manufacturers such as Draperinc.com.
- There should be provision made for a videoconference camera located at the front of the room on the furniture centerline. If the room is a boardroom, there should be an additional camera located at the rear of the room mounted at a height applicable with local building codes.

### 7. ELECTRONIC ANNOTATION

A more and more popular capability in boardrooms is electronic annotation. This gives users the ability to touch the main displays and mark them up with their fingers or special colored fake markers. These markings can then be saved and printed out for later discussion. (See figure 6-1)

- All lighting should be dimmable. Dimmers should connect to the AV control system for remote control. This should be a serial data connection. Various scenes should be available for when the room is not being used for VC.
- Special fittings designed for videoconferencing are available; these should be used wherever possible.
- Conference table finishes should not be too reflective, which could put a glare in the field of view of the VTC camera.
- The general finish scheme of the room should have minimal reflective surfaces and be that of a darker color scheme as it provides better contrast between participants and background imagery.

Figure 6-1: Electronic annotation



## 8. SOURCE DEVICES

Boardroom-style meeting spaces typically do not have much in terms of source devices since most media is PC or laptop-based. Some rooms will have a decent multi-format Blue Ray DVD player and a built in, remotely located PC with a secure wireless RF keyboard and mouse. (See figure 7-1)



Figure 7-1: Secure RF keyboard and mouse system

## 9. CONTROL SYSTEM

All of the aforementioned systems need to be controlled. In most instances, a touchpanel-based control system is used with a carefully designed and branded interface. The control system will dial for teleconferencing, control the videoconferencing system, select which laptop connection gets displayed, control volume, allow remote assistance and maintenance, and turn the system power on or off. (See figure 8-1). Some people are adverse to touchpanels, and because of this a simple push button panel with basic functions is usually provided adjacent to the lighting switches of the room.



## SIMPLICITY IS THE KEY TO SUCCESS

"The real secret to success when designing and deploying high-end boardrooms and conference rooms is one basic principle: elegance is simplicity. This is the basis for all our designs. Even if the customer wants the most complex switching scenario imaginable, do that, but have hardware and processors running in the background and have a user interface that's easy to interact with. Take the chaos and complexities of a system and command them with a well laid out control system. Your customer (or boss) will love you for it. Spend as much time on the design of your touchpanel as you do on the design of your room, and you will have a system that is tailored to your needs that everyone loves. This (and a well installed system) is a recipe for a good deployment and a happy end user!"

—Travis Askew, Summit Systems, Inc.



Figure 8-1: A variety of touchpanel controllers from Crestron

## 10. SIMPLICITY

The best boardrooms are simple to use and require no additional outside support. Let the executives conduct their own meetings without outsiders assuring that the meetings run smoothly. They should have the reliability of a classroom-style AV system. The better boardrooms err on the side of simplicity, even if it means omitting some functionality.

Joey D'Angelo is Principal Consultant with Charles M. Salter Associates, Inc. in San Francisco.

# COVERING ALL THE BASES

IMPLEMENTING A LARGE-SCALE BOARDROOM SYSTEM REQUIRES COORDINATION AMONG ARCHITECTURAL, MECHANICAL, ACOUSTICAL, ELECTRICAL/CONDUIT, AND TELECOM INFRASTRUCTURE.



## ARCHITECTURAL & MILLWORK CONSIDERATIONS

- If using two projection screens, they should be at 120-inch diagonal minimum. They should be provided with an external low voltage control and a 16:10 or 16:9 aspect ratio screen.
- The projectors should be located at the appropriate screen widths back from the projection screen.
- There will be anywhere from four to eight ceiling loudspeakers that will need to be coordinated with the various ceiling elements.
- The conference table for this room should feature a usable tablebox(es) for device connections. This does not just include power and data; the tablebox must also be capable of accommodating laptop video (VGA) and a USB port. (Any tableboxes for furniture should be reviewed by the architect.)
- Holes will need to be drilled for the table microphones by the onsite millworker or furniture supplier.
- Provide room for a credenza capable of housing a half-height sliding equipment rack and a standard PC.
- There should be access panels on the rear of the credenza for AV, power, and network cabling. In addition to access panels for wiring, there should also be ventilation for a 1200-watt heat load within the credenza.

## TELECOM CONSIDERATIONS

- In addition to the standard network connectivity offered at conference tables and credenzas, there

should be provision for an analog phone line, a connection for the videoconference CODEC, and an additional connection to the AV subnet/RMS system.

- The PC connected to the room's display will require an additional network connection at the credenza, which is where the PC typically resides.
- A network connection for an IP-based Web Camera should be provided for remote monitoring.

## MECHANICAL CONSIDERATIONS

- Aim for acoustical performance of NC-30 or better.
- VAV boxes, pumps, fans, or other noisy mechanical devices should not be located above, adjacent to, or below this room.
- The projectors/displays will introduce 900 watts of heat load into the room. The equipment rack in the credenza could introduce an additional 1,200 watts.

## ACOUSTICAL CONSIDERATIONS

- Parallel wall surfaces should be treated with fabric-wrapped panels that are at least two-inches thick and possess an NRC rating of at least .9.
- All walls and doors for this room type should have an STC rating of at least 50.
- Again, this room type should have an NC rating of 30 or better.

## ELECTRICAL/CONDUIT CONSIDERATIONS

- There should be a conduit pathway from the external low-voltage controller for the projection screens to the equipment within the credenza.
- If projection screens are provided, they should be specified with an AC pigtail for hardwire to the motor.
- There should be a floorbox, conduit stub, or suitable pathway that features (2) 1 1/4-inch conduits from the conference table to an accessible ceiling or raised access floor above or below this room type.

*(Example boardroom specs courtesy of Charles M. Salter Associates, Inc)*

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# MISSION CONTROL

## 5 TIPS TO MAXIMIZING YOUR CONTROL SYSTEM



A well-designed control system adds simplicity, consistency, reliability and efficiency to sophisticated presentation and communication systems.

Suppose someone on your staff wants to initiate a video conference with your Dallas office. Does he or she have to know how to turn on the large screen displays, turn on the videoconferencing codec, adjust the lights, zoom in the camera, switch the input on the sound system, adjust the microphones, choose the correct equalizer settings and dial Dallas? Or does he or she simply push a button labeled “Dallas”?

Our experience is that difficult-to-operate AV systems are not used very often—five to 10 hours per month is typical. Yet well-designed systems with simplified controls are normally used 20 to 30 hours per week or more. A control system adds significantly to the cost of a project, but the return on investment can improve by a factor of 10 or more.

### WHO TO INVOLVE ON YOUR PLANNING TEAM

In evaluating whether a control system is worth the investment, we have found that there are five major areas of concern that you or your AV integrator must address:

### 1. IT Concerns

Your control system will probably run on an existing IP network, so your IT manager should have input into its design. Newer processors from Crestron, Extron, and AMX all connect to control panels and other components via the network, and they can be set up for support and service from a web browser. Your IT manager will want to be sure there are no security holes that might compromise the network.

For larger AV and video conferencing systems, digital signage networks and any system carrying high definition consumer media (such as news, entertainment or Blu-ray), you’ll want to consider an all-digital Internet Protocol (IP) signal path. At this point bandwidth becomes a major concern. It’s important to use an AV integrator who understands network requirements and can work with your IT manager to separate audio/video traffic from data traffic, via either a VLAN or separate networks.

Your IT staff can also be your best resource for AV user support, and if they take on that role, your IT manager should be involved in plans for technical staff training; for helpdesk tools that allow technicians to see and operate room controls from networked PCs; and in any decisions on service and maintenance contracts.

## 2. Facility Management Concerns

Today's AV control systems offer several opportunities for environmental system control that your facilities manager will want to be involved in.

On the most basic level, your AV controls should tie into your lighting system, so that lights adjust easily or automatically as needed. It's also possible to use AV control processors for various "green" initiatives -such as turning AV and lighting on and off automatically, integrating lights and shading into daylight harvesting systems, and including thermostat controls into room scheduling-providing significant energy savings and improving your return on investment.

## 3. Security Department Concerns

If theft is a risk in your facility, your security manager should know that equipment monitoring is an easy addition to networked AV control systems.

Should someone disconnect a piece of equipment, the system can notify security instantly and trigger cameras to record the theft. With the addition of radio frequency ID tags, the system can track stolen equipment as it moves through your building, aiding apprehension efforts.

## 4. Administrative Concerns

Your administrative or office manager should know that you can tie your AV control system into your Microsoft Exchange Server to allow staff to use an Outlook calendar to book meeting rooms or classrooms. (It can also tie into Lotus Notes, Novell GroupWise, or Planon Integrated Workspace Management). Properly programmed, the system can have the room ready at the scheduled time, with AV turned on, lights adjusted, even a videoconferencing call already connected. It's also possible to add the appropriate touchpanel outside each conference room door, allowing users looking for an open room to check availability and book a meeting on the spot.

## 5. User Concerns

This is where a great AV integrator partner will shine. You can buy the hardware from almost anyone—and most integrators have the engineering and programming skills to make your system function. But you need someone who is skilled in listening and analysis, and who has years of practical experience to tailor it to the specific needs of your users.

—John Laughlin, Conference Technologies, Inc.

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# WITHOUT A TRACE

## 6 WAYS TO CONCEAL TECHNOLOGY IN YOUR BOARDROOM



AV end users in the corporate setting are far more interested in what technology can do than how it looks. In a perfect world, products themselves would be invisible. (Or, at least invisible until you need them.) How do we balance performance requirements of boardroom AV systems with the desire to hide it for a smart, sophisticated look?

### 1. GET A LIFT.

One way to creatively hide your LCD, plasma, or LED flat panel display is via a lift that rises from the floor. These units can be automated, remote controlled, and rise to be visible when in use. Motorized lifts can conceal heavy displays within furniture.

There are also numerous drop-down lifts, from companies like Premier Mounts, that descend from ceiling tiles to offer total concealment of video projection systems. Whether the application is for an enterprise setting, boardroom, or educational venue, drop-down lifts are quiet and remote controlled, recessing

when not in use.

One of these devices is the RETRACTA-LIFT by Vutec, the Florida-based manufacturer. Vutec also makes drop-down projection screens in myriad formats so clients can enjoy visual media in a wide viewing format.

Chief Manufacturing, a division of Milestone AV Technologies, based in Minnesota, offers projector lifts that drop from the ceiling, or invert to rise up from a table.

### 2. CUSTOMIZE YOUR BOARDROOM SOLUTION.

Customized solutions are some of the most common ways that clients hide boardroom AV. A 2009 installation at the Wynn Encore in Las Vegas is a great example. The same contractor behind the flagship Wynn, who had collaborated with Premier Mounts in the past, tapped them with a unique request: build a table with mounted flat panels that could ascend from the floor for meetings, then vanish when not in use. Not just the cubby or a screen, but the entire marble table had to lift from the floor.

### 3. TAME THE CABLES!

In a boardroom install, integrators can conceal TVs pesky wires and cables behind woodwork, under carpets, and, even inside AV mounts and accessories. Some products, like Chief swing arms and desk mounts, have a "cabletrac system" within the arm, while other projector mounts like Chief's RPA and RPM mounts have space built in to manage cables.

For practical elegance, FSR suggests you look to their variety of table, floor, and wall boxes. FSR says they can match the décor of any installation with construction, carpet rims, flanges, and accessories.

In addition to "Cable Cubby" style solutions from Extron, the AV Trac is another consideration and lets customers hide the cables while avoid trenching or floor coring.

### 4. BLEND INTO THE WALLS AND CEILINGS.

It seems every loudspeaker manufacturer offers in-wall and in-ceiling, but only a few speakers of them are discreet enough to completely vanish when installed. Check out QSC Audio, Extron, SpeakerCraft, Sonance, and Biamp for wall and ceiling mounted speakers.

And, if your boardroom has a drop ceiling, as many clearly do, Premier Mounts offers a lockable ceiling



box for gear, the GB-PLEN3, for added stealth and security.

### 5. MAKE THE MOST OUT OF YOUR FURNITURE AND RACKS.

Even the techiest among us can appreciate concealing a rack of electronics and control equipment. Raxxess, part of the same Milestone AV Technologies group along with Chief, offers their Elite Converta racks for this purpose. These racks have a locking smoked lexan front door that provides security and visibility. Infrared signals will pass through the front door, so it's not necessary to open it when in use.

Credenzas from Marshall Furniture, an Antioch, Illinois-based company, are also

being used by the style conscious as bases for flat screen monitors and for equipment in rack and on shelves.

Middle Atlantic Products is offering their C5 Credenza Rack Series designed with a steel frame that ships quickly from stock, and a separate outer covering that can be tailored to the customer's specifications. Similarly, the SMARTdesks FFITness (Floor and Furniture Integration Technology) Program is a service that expands the scope of flexible interactive space; power and data outlets in the floor can actually be moved along with the furniture.

### 6. VANISH ARTFULLY.

Transform that boardroom LCD, LED, or plasma screen display into a museum-quality work of art. Disguising a display behind artwork or a mirror until it is needed is not just practical, it's another vehicle for your company's branding or creative expression. Vutec and Chief Manufacturing, among others, offer a host of artful concealment solutions.

## info:

### CHIEF MANUFACTURING

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marshallfurniture.com

### MIDDLE ATLANTIC

middleatlantic.com

### PEERLESS MOUNTS

peerlessmounts.com

### PREMIER MOUNTS

mounts.com

### QSC AUDIO

qscaudio.com

### RAXXESS

raxxess.com

### SMART DESKS

smartdesks.com

### SONANCE

sonance.com

### SPEAKERCRAFT

speakercraft.com

### VUTEC

vutec.com

# AV & Control Over Cat5

Video + Audio + RS232 Over a Single Cat5 Cable

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RS-232 Pass Thru or Triggering Individual Stored Commands



Model HRN-24 ports



Control • Scaling • Extension • KVM • Switching

**HR** HALL RESEARCH

# BOARDROOM TECH TICKER

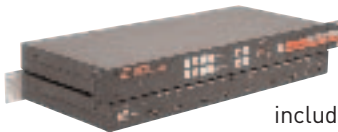
## DLP FOR BOARDROOMS

Digital Projection International's E-Vision series is a platform in DPI's "high-brightness, high-value projection line." The E-Vision WXGA 600 utilizes Texas Instruments' DLP technology and offers lens options, user-swappable color wheels, and advanced color controls. The 6,000-lumen model is designed for lecture halls, conference venues, corporate auditoriums, boardrooms, digital signage, and more. Visit [digitalprojection.com](http://digitalprojection.com).



## LET'S ALL GO TO THE LOBBY

Mitsubishi's MDT521S monitor is a 52-inch LCD monitor built with a commercial-grade panel designed for public information display and digital signage applications. It is designed with a metal finish and features that make it cost-effective solution for corporate lobbies and high-profile public spaces. Offers both front and rear ambient light sensors that gather data on lighting conditions in two areas. It has a brightness control feature that automatically adjusts and balances image brightness. Eliminates cable clutter with its built-in Cat-5 receiver that also keeps image quality consistent. Visit [mitsubishi.com](http://mitsubishi.com).



## ENTER THE MATRIX

Hall Research's HDMI Genesis Matrix Switches, including the HSM-04-04, come in 4x4 and 4x2 configurations that allow you to switch multiple DVI/HDMI sources to multiple displays. Control is via a front panel, IR remote, RS232 and IP. HDMI 1.3, HDCP, and DVI (PC) compliant. Supports lossless digital audio: 5.1 & 7.1 Dolby TrueHD, and DTS-HD. Visit [hallresearch.com](http://hallresearch.com)



## VOIP CONFERENCING

IP is taking voice communication to the next level. The flexibility of Biamp's AudiaFLEX gives you the power to adapt to any environment—analogue or digital—and is setup to work with both VoIP-2 card for IP-based systems and TI-2 cards for analogue systems. As the envi-

ronment changes to the superior IP, it's easy to evolve from analogue to digital with just the switch of a card. Visit [biamp.com](http://biamp.com).

## FAST SWITCHING, 3DTV PASS-THROUGH

Two new ToolBox Splitters come with Gefen Fast Switching Technology (FST) and 3DTV support. The ToolBox 1:4 and 1:8 Splitters for HDMI distribute any HD source using HDMI and deliver it to either four or eight HDTV displays at the same time, ideal for presentations, video walls, and more. Both products work with cameras, Blu-ray players, and set-top boxes. For those integrating analogue devices or certain set-top boxes that will not work with more than one HDCP 'key', Gefen has included a physical bypass switch so users can select slow switching (no FST) if needed. Visit [gefen.com](http://gefen.com).



## DELEGATE MICS AND TOUCHSCREENS



The Media Vision 8300 Series Congress Matrix Solution is the latest installment to the TAIDEN collection of conferencing technology. Used in a variety of applications, including government council chambers, university auditoriums, executive boardrooms, the solution includes delegate microphones with numerous features all of which make the system more adaptable to the specific application. Features include a seven-inch touchscreen for displaying video content and PowerPoint presentations, voting interfaces, and name list results. Units offer a built in video camera to interface with teleconferencing systems and a plethora of accessories. Visit [mediavision-usa.com](http://mediavision-usa.com).

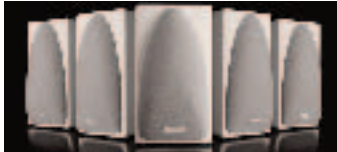
## INTUITIVE CONTROL IS A MUST

"No matter how many features the system has, or how cutting-edge the system might be, making sure the system is intuitive to operate is critical to a successful AV design!"

—Joseph Fusaro, CTS, McCann Systems L.L.C

### ARTICULATING WALL MOUNTS

Video Mount Products has launched two new flat panel articulating wall mounts. Now shipping, the FP-MWAB (MSRP: \$169.95) holds most medium-sized flat panels from 24- to 37-inches, while the "Extra Medium" FP-XMWAB (MSRP: \$239.95) holds most 32- to 52-inch flat panels. Visit [videomount.com](http://videomount.com).



### AUDIO SPEAKER SETS

Gefen is now offering speakers that are wall mountable and designed to deliver superior sound quality in small to medium sized conference rooms. The new speakers sets were devised to interface with the GefenTV Home Theater Audio Processor, and will work with any audio amplifier. Available in two-speaker and three-speaker sets, each can be purchased separately or can work together. Visit [gefen.com](http://gefen.com).



### EXECUTIVE LISTENPOINT SYSTEM

The Executive ListenPoint system is ideal for small to medium size rooms where the user wants a complete system that provides audio structure and improved sound intelligibility. Use the executive system to bring the world into your room via a teleconferencing unit like the SoundStation2 or via computer with Skype/VOIP. Visit [listentech.com/lpt-s5.html](http://listentech.com/lpt-s5.html).

### FAREWELL MILES OF WIRE!

Biamp's Networked Media Systems offer the advantage of sharing processing power and resources between system components. Taking advantage of TCP/IP, Biamp enables you to create decentralized systems that are conveniently managed from a single location. Visit [biamp.com](http://biamp.com).



### BOUNDARY MICS

The BM 6620 Boundary Microphone from Listen Technologies comes with a low-profile omni-directional condenser and is designed for clear, highly intelligible sound reinforcement, professional recording and teleconferencing. It may also be used when microphones are to be visually discreet. Visit [listentech.com/conferencing.html](http://listentech.com/conferencing.html).

### WHY ARE CUSTOMERS USING VOIP?

- Rapid advances in technology and increased adoption of VoIP systems
- Sound quality that will far surpass PSTN with wideband audio
- Enhanced user experience with high-level of voice clarity and natural sound
- Scalability to business needs that also allows for system cost control

*Courtesy of Biamp*

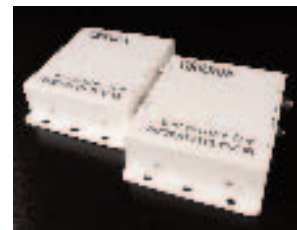


### FULLY DIGITAL IR CONFERRING

The Media Vision 5300 Series Digital Infrared Wireless Conference System is a fully digital IR conferencing system. It is a solution for university or corporate campuses with multiple meeting rooms; the entire solution can be broken down and set up within minutes. Reconfigurable boardrooms benefit from the wireless technology as there are no cables to conceal, and delegate microphones can be set out in any configuration. Additional features: electronic voting and simultaneous interpretation. Visit [mediavision-usa.com](http://mediavision-usa.com).

### DAVINCI CONTROL SCREEN SOFTWARE

Manage your Audia and Nexia systems with daVinci graphic control screen software. You can create a display of room layouts, including master controls, stations, or individual zone controls and customize the look and feel with an array of drawing tools. Visit [biamp.com](http://biamp.com).



### ENHANCE AND EXTEND HD

The Gefen ToolBox Extender for HDMI 3DTV uses HDBaseT technology from Valens Semiconductor to enhance the length and features of its high-definition extension capability. Small sender and receiver units link any hi-def source to an HDTV display using one industry-standard CAT-5 cable, delivering 1080p full HD with 3DTV pass-through, multi-channel audio and IR remote control up to 330 feet (100m). Aside from streamlining cables and enhancing HDMI v1.3 support with 3DTV, this long range extender offers an IR back channel so presenters can conveniently control their source(s) through a remote pointed at the display. The Extender for HDMI 3DTV is HDCP-compliant, with Gefen features such as locking HDMI connection cables and locking power supplies. Visit [gefen.com](http://gefen.com).



### USB TO DVI

Tapped out of video ports but want to add a new display? Gefen has just released USB to DVI HD. This tiny adapter comes equipped with one USB input and one DVI output. Any USB port on the computer can be used to connect a digital display using the DVI, VGA, or HDMI format. For professionals wanting an extended desktop environment, the USB to DVI HD offers plug and play connectivity with support for resolutions up to 1920x1200, 1080p and 2k. Users have the option to select an extended desktop or have the USB-connected display mirror the main display's content. Multiple adapters can also be connected to the same computer system, including six USB to DVI HDs for a PC, and four USB to DVI HDs for a Mac. Visit [gefen.com](http://gefen.com).



### THREE-CHANNEL TRANSMITTER

The Hall Research UH-2C-3S is a three channel transmitter that extends and splits HDMI signals over two Cat5e/6 cables. Drive the signal 1080i/720P to 200 ft or 1080p to 150 ft. Re-clocking receivers can extend the signal further. Power is built-in and LED indicators show LCD connection and power at the remote. Visit [hallresearch.com](http://hallresearch.com).



### SOLUTION FOR INTERPRETING

The DC 6990 P Touchscreen Conferencing Unit is a digital conference microphone loudspeaker unit ideal for meeting rooms with speech, voting, and/or language interpretation applications. The unit can be customized for one or two meeting participants. Users have the ability to hear and be heard, view the agenda, voting results, or speaker list. Visit [listentech.com/dc-6990.html](http://listentech.com/dc-6990.html).

### DON'T FORGET!

- Room acoustics are critical for a properly designed conferencing system. NC-35 must be considered realistic and an achievable noise criteria.
  - Video projectors must be mounted on centerline with screens (or to the limits of reasonable digital offset correction) and placed at specific distances from screens to yield the desired image size based on available lenses.
  - "Portable" and removable equipment is not appropriate for fixed conference facilities.
- Christopher Maione, CTS-D, InfoComm Adjunct Faculty



### COMPONENT EXTENSION IN MULTIPLE CONFIGURATIONS

Long Distance VGA/Component Extension with audio and control on CATx cables comes in several configurations. The UV232A-8S is an eight-channel Splitter/Sender which transmits VGA, audio, and RS232 over Cat5E/6. The URA-232 receiver has cable compensation and skew adjustment to 1,000 ft; the URA-232-XT can be Daisy-chained to 3750 ft. Visit [hallresearch.com](http://hallresearch.com).



### SPACE SAVING DESIGN

With AudiaFLEX, create a complete conferencing system that fits into only two rack spaces. The VoIP-2 card allows AudiaFLEX to connect directly to IP-based phone systems. This enables conferencing over VoIP directly from AudiaFLEX, eliminating the need for VoIP adapters. Each card supports two VoIP lines with caller ID, SIP, auto-answer, speed dial, hold capability, call-progress tone level adjustment and direct dialing. Visit [biamp.com](http://biamp.com).



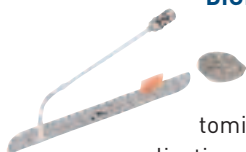
### TELECONFERENCING INTEGRATION

The ListenPoint Control Unit is ideal for audio visual integration as it accommodates integration with teleconferencing devices and offers the maximum number of auxiliary inputs for maximizing audio structure in small room settings. The C6 connects to the Room Module via single Cat-5e cable. Visit [listentech.com/lpt-c6.html](http://listentech.com/lpt-c6.html).



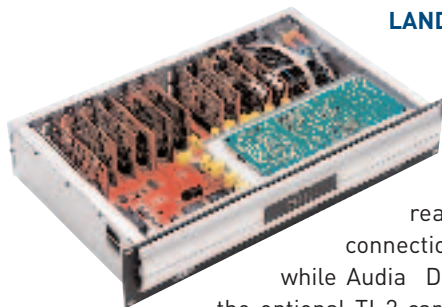
### ALL-IN-ONE

The VSA-32 Switch-CatA/V Room Control System from Hall Research integrates A/V switching, microphone input, projector control, video transmission, and audio amplification in one package. Composed of a transmitter which accepts 2 VGA and 1 TV-Video, a user interface panel and a receiver unit which provides power to the system over Cat5 cables. Visit [hallresearch.com](http://hallresearch.com).



### DIGITAL CONFERENCING

The TAIDEN 4100 N Series of fully digital conference systems from Media Vision provides customized solutions for flush-mounted applications. Classrooms, council chambers and training rooms are applications for the optional features including: IC-card reader, electronic voting (three or five buttons) and 64 channels for simultaneous interpretation. All modules and loudspeaker panels can be installed in a wide variety of ways allowing for subtle aesthetics on the conference table. Visit [mediavision-usa.com](http://mediavision-usa.com).



### LANDLINE OR VOIP?

Biamp has end-users covered for both VoIP and landlines. Nexia DSPs are ready for landline connection out of the box while Audia DSPs connect with the optional TI-2 card. Or, choose the clarity and flexibility of VoIP calling with AudiaFLEX and the VoIP-2 card. Visit [biamp.com](http://biamp.com).

## BOARDROOM AV IN ACTION

### SIMON PROPERTY GROUP, INDIANAPOLIS, IN

Some of the biggest malls in the world are built by Simon Property Group. But before they're constructed, blueprints must be sorted out with people all over the world. That's where AV conferencing comes into play.

The Portfolio Review Room of the new Simon headquarters in Indianapolis is a notable addition for integrators and end-users alike.

The design/build, completed in late 2006 by Sensory Technologies, comprises a new, 14-story building in the heart of Indianapolis. This facility includes atriums, patio space for employees, offices, and conference rooms with cutting-edge conferencing components.

Kevin Markey, Principal, Sensory Technologies, reflects that, "The biggest challenge, outside of outfitting each of the conference rooms with a state-of-the-art system under our deadline, was making sure each system provided crisp, clean conferencing and imaging functionality with a streamlined front end that every employee could operate quickly and efficiently." Of the five conference rooms that have the ability to perform audio and video conferencing, the Portfolio Review room is the largest and most complex. With the ability to seat up to 30 meeting participants, the room is used for audio conferencing as well as still image display, video recording and two-way video conferencing.

Since a picture is worth a thousand words (or in this case millions of dollars), video was a vital aspect of the Portfolio Review room. "Audio and video integration are essential to the leasing process," said Shawn Suter, Director of Corporate Properties, Simon Property Group, Inc. "The ability to connect clients and Simon employees through long distance video is an effective and valuable tool."

To provide a system effective enough to facilitate the transmission of real-time data and video, Sensory first chose a Tandberg 3000MXP codec with Natural Presenter Package. Video is displayed via two Hitachi CP-X1200 3LCD projectors, mounted on the new Draper Orbiter lifts. Data and still images are viewed through a Vaddio CeilingVIEW Mega-Pro Visualizer high-resolution document camera.

Sensory Technologies then turned its attention to developing effective audio conferencing capabilities with even acoustic coverage in the Portfolio Review room. "We knew the audio quality produced by this system had to be second-to-none, since effective communication can not rely on video alone," continued Markey. "So the integration factor of our audio components became key." For the solution, Sensory Technologies decided on 10 Audi-Technica ES947 boundary microphones installed in the 25-foot long Lease Planning Room table.

The microphones are then fed into a Biamp AudiaFLEX processor and filtered through Biamp AEC acoustic echo cancellation cards. The cards filter out audio being received from the remote end that is projected through JBL Control 26 ceiling speakers throughout the room.

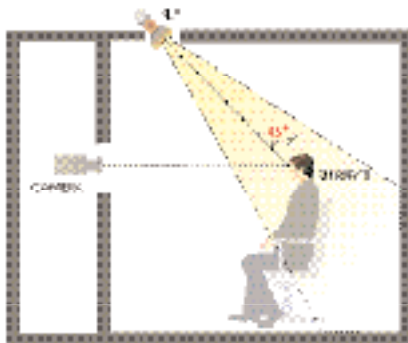
The final element of the conference room system was control. A Crestron Pro2 processor receives controls from a TPMC10 wireless touchpanel. The touchpanel remote gives employees the ability to control individual microphones throughout the room so that, if ever a blueprint or plan is laid out on the table and is covering a microphone, that microphone can be muted to eliminate unwanted interference. The touchpanel also gives employees the ability to manipulate inputs via an Extron Crosspoint 300 switcher for the high-resolution images and MAV 84 Series switcher for the remaining AV components. All of these components are mounted in an adjacent equipment closet in a Middle Atlantic Products ERK enclosure.

# OPTIMIZING YOUR VIDEOCONFERENCE IMAGE

VIDEOCONFERENCING CAN BE JUST LIKE “BEING THERE,” BUT ONLY IF YOU FOLLOW A FEW SIMPLE RULES.

## THE BASICS

- Light the peoples' faces from the front.
- Keep light from going directly into the camera.
- Use fluorescent lamps of the same color temp.
- Light the back and side walls.
- Avoid dark areas or too-bright surfaces.
- If the room has windows, deal with them appropriately.



## LIGHTING YOUR VIDEOCONFERENCE SPACE

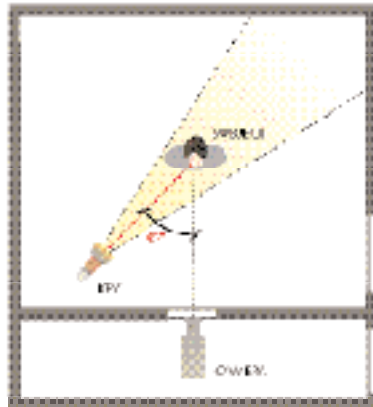
**1. Main lights.** Mount “key” lights at about a 45-degree angle to participants. This results in shadows that define facial features, instead of the shadows you’d see if the light was directly overhead or directly to the side. Some manufacturers (like Lutron) offer recessed fluorescent fixtures with a shaped reflector that throws light at a 45-degree angle, rather than straight down.

**2. Background lights.** If the background is too dark, it will throw off the iris in the camera and peoples' faces will “bloom” and lose detail. If it's too bright, the iris will close and faces will darken. The background should be uniform: avoid dark spots and bright areas.

**3. Windows.** Windows should always be shaded during a videoconference, preferably with blackout shades. Unshaded windows will play havoc on the lighting ratios you carefully establish and introduce light of a very different color than your room lights. Even partially shaded windows will cause problems.

**4. Furniture.** White or very light furniture will reflect too much light upward into people's faces. Medium tones are best: gray, tan, or wood tables work well, if they have a matte finish. Highly reflective furniture is worse, whether light or dark. A polished wood table reflects glare from ceiling fixtures into people's faces or directly into the camera, as can stone or glass. If you can't choose or change the furniture, try adding tablecloths or place mats.

An oval or rectangular conference table all but ensures that some participants will not be seen by the camera at the front of the room. A wedge-shaped table will solve the problem.



**5. Glare.** Think what the room will look like from the camera's point of view. Standard fluorescent fixtures throw a great deal of glare toward the camera, so the ceiling will register as a big bright area in any wide shots. The

same is true of wall sconces and other bright sources of light that will show in the camera's view.

Finally, be sure your window coverings don't have light leaks visible to the camera.

[Sources: John Carlson, Sound Vision, Lutron]

## FROM THE CAMERA'S POV

It's critical to consider how participants will see you through the VC system's camera(s).

- **The vertical position of the camera.** The object is to emulate a real face-to-face, so don't be looking up or down at the camera. Straight on is best.
- **The horizontal position of the camera.** If the display is in the center of the room, the camera should be too.
- **The distance from you to the camera.** Too far, and participants will appear tiny. Too close, and you may appear “larger than life.”
- **The focus of your eyes.** The object is to appear to be looking at the far-end participants, so keep the camera and display at the same location.

[Source: Steve Thorburn, Thorburn Associates]

# TECH MANAGER PRIMER: ROOM ETIQUETTE

BAD HABITS CAN SPOIL YOUR VIDEOCONFERENCE;  
HERE ARE 9 WAYS TO OVERCOME THEM.



Cell phones beeping. Tapping pencils. Checking email. Texting.

These practices are annoying enough during a face to face meeting, but during a videoconference they can be downright detrimental. Not only do they irritate co-workers and distract from the meeting, but they degrade the quality of the audio and video systems that you have spent time (and money) so much to provide.

Videoconferences are different from regular meetings in at least two important ways. First, the technology tends to focus peoples' attention on a speaker more than it would be in a face to face meeting. Prepare well and you can use that attention to your advantage. Come in unprepared and it can be especially obvious to everyone.

Second, a video call requires a little more discipline than you may be used to. The switching of cameras and microphones forces people to speak in turn. There can be a very short delay before sound and video reach the far-end site. That can also require people to slow down a bit and wait their turns before making comments.

Here are nine key areas where some extra effort can make your conferences go a lot better and your system perform at its peak.

**Get more organized.** Because a videoconference looks like television, people have a higher expectation for the pace of the meeting. If you are in charge, consider using a written agenda, creating visuals and appointing someone to make sure you stick with your timeframe.

If this is an important meeting, it can be helpful to assign some participants certain tasks, such as making presentations, being ready to comment on specific topics, or preparing questions to 'prime the pump' for discussion. You may find

it helpful to ask questions via email in advance.

Be sure everyone knows how/when they will be recognized to speak. Try to keep presentations a little shorter than you might otherwise. If a video-based meeting drags, participants will lose interest faster; they will have more trouble paying attention.

**Let participants know who exactly is connected.** Because the camera's point of view is limited, it can be hard to tell who is present in a meeting. If you are in charge of a smaller meeting, introduce everyone. For larger sessions, introduce the main participants and let people know if anyone is sitting in off-screen.

**Speak clearly and naturally.** It's true that the quality of the calls are better than ever, but it's still a little harder to understand someone than in a face to face meeting.

Sit up to make sure you're in range of the camera and microphone. Speak just a tad more slowly and clearly than you would normally. You don't have to raise your voice, but avoid speaking softly or mumbling.

**Hold relatively still.** Your system must compress and decompress the video images, so a lot of movement or excessive gesturing puts more demands on the codec and will result in a somewhat degraded image. It can also be distracting for viewers on the far end.

**Dress conservatively.** Loud colors, shiny jewelry, and busy patterns do not look good on video. Dressing all in white or black can throw off the camera's iris and make your face too dark or too light.

**Be aware of the technology.** Notice where the camera is and look at it when you speak. This will make a better impression on those at the far end, because you will seem to establish eye contact. If you have a near-end monitor, avoid watching it while on camera.

Be aware of the microphone, as well.

**Be extra considerate.** Set your phone on vibrate. Leave the room if you have to take a call.

Act with the assumption that the worst will happen. That is to say, if you start to nod off assume you are on camera. If you make a joke to your neighbor, assume that everyone in the conference will hear you.

**Close the meeting on a strong note.** Make sure people understand the next steps and who will be responsible for each.

**Follow up by email.**

*Courtesy of Conference Technologies, Inc.*



# SCN TOP 50 SYSTEMS INTEGRATOR LISTING

The annual **SCN Top 50 Systems Integrator Listing** sets the benchmark by which many comparisons are made. While regional factors, specialties, and countless other variables make it difficult to quantify the success of companies, it must be noted that these leading integrators set the pace for the AV firms both large and small.

So, with that, SCN presents the 2010 Top 50 Systems Integrators in the U.S. and Canada, ranked by project-ed systems integration revenue for 2010. As some companies are also involved in other segments of AV business, we ask entrants to separate their commercial AV systems installation revenue from total revenue. As always, Top 50 submissions are voluntary. We rank those willing to share their internal numbers to establish an industry snapshot. While the bottom line is important, the Top 50 chart is only one way to view an industry where success is determined by more than mere numbers. *-Kirsten Nelson, editor, SCN*

**1. AVI-SPL**  
Tampa, FL  
866.559.8197 avispl.com

**2. The Whitlock Group**  
Richmond, VA  
800.726.9843 whitlock.com

**3. CCS Presentation Systems**  
Scottsdale, AZ  
480.348.0100  
ccspresentationssystem.com

**4. Electrosonic**  
Burbank, CA  
888.343.3604 electrosonic.com

**5. Diversified Systems**  
Kenilworth, NJ  
divsystems.com

**6. HB Communications**  
North Haven, CT  
800.243.4414  
hbcommunications.com

**7. AVI Systems**  
Minneapolis, MN  
avisystems.com

**8. Roscor Corporation**  
Mount Prospect, IL  
847.299.8080

**9. Xerox Audio Visual Solutions**  
Norcross, GA  
xeroxaudiovisual.com

**10. Ford Audio-Video**  
Oklahoma City, OK  
fordav.com

**11. Video Corporation of America**  
Somerset, NJ  
732.545.8000 vca.com

**12. IVCi**  
Hauppauge, NY  
631.273.5800

**13. Communications Engineering**  
Newington, VA  
703.550.5800 commeng.com

**14. York Telecom**  
Eatontown, NJ  
866.836.8463 yorktel.com

**15. Audio Video Systems**  
Chantilly, VA  
703.263.1002 avsinc.net

**16. Washington Professional Systems**  
Wheaton, MD  
301.942.6800 wpsworld.com

**17. Avidex**  
Bellevue, WA  
avidexav.com

**18. TriTech Communications**  
Garden City, NY  
631.254.4500 tritechcomm.com

**19. Anderson Audio Visual**  
San Diego, CA  
andersonav.com

**20. Verrex**  
Mountainside, NJ  
800.883.7739 verrex.com

**21. Avitecture**  
Sterling, VA  
703.404.8900 avitecture.com

**22. Spinitar**  
La Mirada, CA  
800.722.6444 spinitar.com

**23. CompView**  
Beaverton, OR  
800.448.8439 compview.com

**24. Alpha Video & Audio**  
Minneapolis, MN  
952.896.9898 alphavideo.com

**25. Data Projections**  
Houston, TX  
713.781.1999  
dataprojections.com

**26. Adtech Systems**  
Sudbury, MA  
978.261.1077  
adtechsystems.com

**27. BlueWater Technologies**  
Southfield, MI  
800.344.6575  
bluewatertech.com

**28. SoundCom Systems**  
Cleveland, OH  
440.234.2604 soundcom.net

**29. Digital Networks Group**  
Irvine, CA  
949.428.6333

**30. South Western Communications**  
Newburgh, IN  
812.477.6495

**31. Corbett Technology Solutions**  
Chantilly, VA  
703.631.3377 ctsi-usa.com

**32. United Visual**  
Itasca, IL  
800.780.1907 unitedvisual.com

**33. Sensory Technologies**  
Indianapolis, IN  
317.347.5252  
sensorytechnologies.com

**34. All Pro Sound**  
Pensacola, FL  
800.925.9822  
designbuildperform.com

**35. Advanced AV**  
West Chester, PA  
877.696.7700 advancedav.com

**36. Office Environments of New England**  
Boston, MA  
617.439.4900 oene.com

**37. Snader and Associates**  
San Rafael, CA  
415.257.8480 snader.com

**38. AVW-TELAV Audio Visual Solutions, System Design and Integration Division**  
Montreal, QC, Canada  
800.868.6886 awwtelav.com

**39. Sport View Technologies**  
Brighton, MI  
248.437.0041

**40. Video Systems Of The Carolinas**  
Charlotte, NC  
704.527.9494 videosystem.com

**41. Interactive Solutions**  
Memphis, TN  
901.866.1474

**42. Vistacom**  
Allentown, PA  
610.791.9081 vistacom.com

**43. Tierney Brothers**  
Minneapolis, MN  
tierneybrothers.com

**44. SIGNET Electronic Systems**  
Norwell, MA  
781.871.5888 signetgroup.net

**45. Communications Engineering Company**  
Hiawatha, IA  
800.377.0271

**46. R2W**  
Las Vegas, NV  
702.434.6500 r2west.com

**47. Accent Electronic Systems Integrators**  
Bonita Springs, FL  
239.992.2223 accentesi.com

**48. Total Video Products**  
Mickleton, NJ  
800.447.0920  
totalvideoproducts.com

**49. BURST**  
Denver, CO  
888.472.2820 burstvideo.com

**50. Presentation Products**  
New York, NY  
212.736.6350  
presentationproducts.com