

THE NEW ERA OF 'CONNECTED' PROJECTORS

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There has been a sea change in projector technology over the past ten years. Instead of a simple 'light box' projecting images of graphics text, and video, projectors have evolved into media hub products that not only support both analog and digital display signals, but can also play back presentations and content directly from flash memory, portable hard drives, and through Ethernet connections.

The idea of computer-less presentations isn't new; manufacturers and end-users have been dreaming and talking about it since the first portable LCD projectors appeared in the early 1990s. A handful of Internet Protocol (IP)-addressable AV products appeared at InfoComm in the late 1990s, but their adoption was limited by the comparatively slow Internet connections and speeds of the day.

That didn't stop the pundits, who forecast that we were on the cusp of an unprecedented AV-IT 'convergence.' In this brave new world, AV equipment would reside comfortably on wired and wireless networks, allowing seamless file interchange and playback of content anywhere in the world on any connected device.

TOMORROW IS HERE

Not surprisingly, the worlds of AV and IT took a lot longer to come together than predicted. But it did happen, although in a more subtle manner than anyone expected. Coupled with a slow but steady increase in broadband connections, the seamless application of IP addressing to everything from video cameras to media players is now an everyday occurrence.

Now, the pieces are finally in place to make Ethernet connections work seamlessly with projectors. And that connectivity isn't just a gimmick: There are many compelling reasons to 'net up,' from remote projector monitoring and operation to downloading and playing back Web content and presentations.

There's a second part to the story, and that's the explosive growth of wireless Ethernet connectivity. An ever-increasing number of projectors are coming to market with built-in wireless connectivity, simplifying connections and presentations. And the new projector connectivity 'trifecta' is completed with the widespread adoption of the universal serial bus (USB) interface for local playback of media files without a computer.



Epson's PowerLite 1735W is one of a new generation of 'connected' 3LCD projectors.

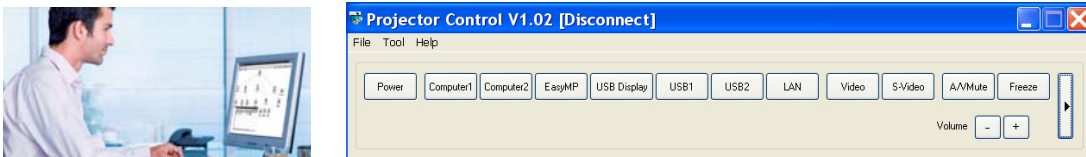
Early iterations of Ethernet connections were motivated by the idea of sending a presentation directly to your projector, leaving your computer in the office or at home. While that made for a powerful sales message, the concept just didn't work reliably enough of the time to interest potential customers.

STAYING IN TOUCH

Fortunately, manufacturers soon realized they could also use that Ethernet port to monitor and remotely operate one or more projectors. The limited Internet speeds of the late 1990s easily handled the small email-based commands that checked on lamp hours, switched inputs, and monitored air filter life cycles.

Now, remote control of projectors isn't anything new. In fact, it's been done with conventional analog signal wiring for several decades, using a simple communications protocol known as RS-232C that employs small command strings of text. Ethernet-connected projectors retain all of that functionality while adding another layer.

With simple Windows[®]-based software, classroom and conference room projectors can be fully monitored and controlled remotely. Anyone can log in and get an instant snapshot of the projector's operating status with a user-friendly graphic interface. Changing an input is now a simple 'point and click' operation. Filter status, lamp life, and hours of operation are quickly accessed by selecting a tab.



Epson's Easy MP projector control software uses a simple dashboard interface with pushbutton control.

And projectors can talk back, too. Email alerts based on the standard Simple Mail Transport Protocol (SMTP) can be automatically sent from one or more projectors to as many as three different email addresses. These messages alert recipients to operational errors, provide end-of-life alerts for lamps, request scheduled maintenance, or deliver 'at a glance' status updates.

The benefit of remote monitoring and control should be immediately obvious to anyone who has had to maintain projectors in a campus environment. But there's a 'green' aspect to Ethernet control as well. Let's say a meeting or class has concluded for the day, but someone forgot to shut down the projector before closing up the room. Now, it can be remotely powered down manually or automatically, instead of idling for several hours or over a weekend.

For more advanced presentation facilities, those same projector command and control connections can be tied into room automation systems that will sense motion, sound, and temperature to determine if a room is occupied or empty, and make adjustments accordingly.

COMPUTER-LESS PRESENTATIONS

An interesting but largely-ignored development was happening in concert with the growth of Ethernet connections: Projector manufacturers were also implementing the universal serial bus (USB).

Nowadays, USB is a standard feature on every piece of AV equipment. It has completely replaced serial ports for computer mice and keyboards, and parallel ports for printers. Every digital camera, camcorder, and scanner is equipped with it, as are most new HDTV sets.

The current implementation of USB (2.0) can pass data back and forth at very high speeds. Coupled with inexpensive memory sticks, the USB interface is now an indispensable projector connection, making it finally possible to leave the computer behind and make presentations directly from 'thumb' style flash memory drives.



Powerpoints, photos, and videos can be downloaded to USB flash drives (left) and played back directly on compatible Epson projectors through their USB ports (right).

This is all made possible by a small operating system that resides in each compatible projector. This software recognizes certain file types automatically, such as the JPEG still image format, and displays those files in sequence – just like a conventional presentation. Additional software for desktop and notebook PCs converts Powerpoint slides to a projector-compatible playback format.

USB connections are also invaluable for showing photos and videos directly from still cameras and camcorders. Many projectors support and play back digital video content encoded in MPEG formats, which makes it possible to use nothing more than a ‘thumb’ drive for rich media presentations.

EXTEND YOUR WORLD

This widespread compatibility with JPEG and MPEG file formats extends to the projector’s Ethernet connections as well. It took over a decade, but the wait was worth it: Content found anywhere on a private or public Internet connection is accessible and displayable with projectors without having to use a computer to first locate and download each file. As long as the files are encoded in the JPEG or MPEG formats, they can be viewed.

As a result, it’s now practical to think about streaming content directly to a classroom projector. The only real limitation is network bandwidth. While Ethernet connections are theoretically capable of high data rates, they are usually much slower because of their shared-bandwidth nature. That is; more than one user on the network reduces the available bandwidth for all users.

Even so, one of the most bandwidth-intensive applications – streaming standard-definition video – can now be accomplished reliably everywhere from home networks to college campuses. And with continued refinement of digital compression technology, we’re not far from the day where HDTV will stream just as easily to projectors across the same networks.

SETTING THEM FREE

Wired Ethernet connectivity and USB flash drive presentations are leading the charge to eliminate projector cabling. The next step is to ‘cut the cord’ completely and move to wireless Ethernet connections.

Wireless connectivity has been around since 1995. It’s evolved several generations from the first widely-implemented standard, IEEE 802.11b, better known as WiFi (or Wireless Fidelity). ‘Wireless-B’ has a maximum data rate of 11 Mb/s, but early adopters rarely saw connections that fast.

Not surprisingly, early demonstrations that streamed Powerpoint slides through 802.11b connections to projectors were plagued with slow connections and dropped data, and the concept never really caught on, despite being a featured demonstration annually at trade shows. Even the move to faster 802.11g and 802.11a protocols (maximum data rate of 54 Mb/s) didn’t significantly improve streaming speeds.



It took more than a decade to happen, but wireless presentations are now practical and reliable.

But that's all changed now. The next-generation wireless standard, 802.11n, offers shared-bandwidth data rates in excess of 144 MB/s by using multi-input, multi-output operation. (That's about seven times as fast as the speed used to transmit high-definition television programs to homes.)

Even with multiple users, 802.11n now provides fast enough download speeds to stream video and audio. And it's backwards-compatible with the older 'g' and 'b' standards, which benefit from much faster connection and download speeds.

While wireless connectivity is just now appearing in classroom projectors, it will move quickly from a novelty to a 'must have' for instructors, incorporating automatic network configuration, a provision for secure media exchange, and 'plug and play' operation.



Inexpensive USB WiFi adapters are now available for Epson projectors.

Wireless projector connectivity can be implemented in two ways. The first is to build a wireless adapter directly into the projector housing, a trend that started in 2006 and is rapidly gaining in popularity for ultraportable and desktop projectors. For projectors equipped solely with a USB 2.0 port, a low-cost, plug-in wireless adapter does the trick.

CONCLUSION

Today's projectors are a far cry from their ancestors in both intelligence and connectivity. Thanks to wired and wireless Ethernet connections and USB interfaces, these next-generation projectors fully embrace the 'anywhere, anytime' philosophy of accessing and playing back media files, are smart enough to monitor themselves, can connect to any Internet port, and are helping to get rid of cable clutter...raising the curtain on a new era of projector connectivity.