VBrick

Analog vs. Digital Video

Do you really have to choose?

White Paper

If analog coax cable is already in place and is used to distribute video to television monitors, you may be completely happy with the result. Some institutions, for lack of a better solution at the time, have even deployed coax to PCs outfitted with "TV Tuner Cards" to bring television signals to desktops. Analog cameras, used for security and monitoring, have been installed and they too operate over analog coax cable. Clearly, this 50-year old technology works well and represents a cost effective solution wherever coax exists. Cost and complexity can quickly creep into such systems when RF modulators, matrix switching, and frequency managers are necessary to enable anything other than the distribution of one-way signals. For some, the thought of transmitting video over a digital network represents a "if it's not broken, why fix it?" phenomena.

But the cost of any technology is not in the initial acquisition, but the installation, maintenance and support. Depending on the needed reach of the video, it can easily cost less to send video over an existing Ethernet data network than to install new coax cable alongside an existing network that is perfectly capable of delivering video everywhere. For those who want to bring improved communications, training, security, or entertainment to a wide audience, the choice is digital transmission.

For example, if you simply want to send a live security camera video signal a short distance to a television monitor, coax cable may do nicely. But if you want to view that video at distant locations (your office, or your home), analog coax is obviously out of the question.

Analog and digital systems both seek to deliver video to viewers. But digital systems go much father than merely "distribution", enabling two-way television for improved communication and distance learning. Some of the differences between analog systems and digital systems are illustrated in *Table 1*.

Table 1

DESCRIPTION	ANALOG	DIGITAL
Number of "Channels"	1 per coax (video) 100+ via RF modulation	Virtually Infinite using IP Multicasting
Video Sources	Analog cameras, tuners, satellite feeds	Analog cameras, tuners, satellite feeds
Reach	Anywhere there is a coax	Anywhere there is Ethernet
Quality	Variable	DVD-quality
Network Input	RF Modulators	MPEG Encoders
Network Output	Analog Set Top,TV monitor	Digital Set Top, PC Screens
Video On Demand	Limited: Requires RF Frequency Management (one VoD per RF Channel)	Limited only by network bandwidth (one Ethernet switch supports 20 to 200 VoD sessions)
Two Way Television (conferencing)	Difficult: each source requires its own RF modulator and dedicated RF TV "channel"	Unlimited, automatic setup. Very few network dependencies
Installation	Costly: Coax cable to every location	None: Uses existing Ethernet network
Live Television Channel Selection	IR Remote Control	IR Remote Control, mouse-click for PC
Management	Static channel assignment	Automatic- channels exist as needed
Channel Guide	Fixed or scheduled channel guide on dedicated RF channel	Dynamically generated digital display on TV and PC
Recording	Analog VCR's connected via coax spider	Digital recording scheduled or on demand
Viewer statistics	Difficult	Automatic
Skills Required	Video, RF engineering	IP Networking
Cost	Low	Medium (low compared to installing new coax everywhere)

Hybrid Analog/ Digital Solutions

The best capabilities of analog coax systems and digital video delivery are easily combined to provide system solutions. It is usually unnecessary to choose one type of system over another, especially when cable-TV infrastructure exists. The following are a few examples:

Example 1

A TV channel that is delivered via conventional coax to TV monitors may also be encoded into MPEG by a VBrick and delivered on the enterprise Ethernet network for viewing on PC screens everywhere. Any number of channels can be delivered in this way.

Example 2

A VBrick Video On Demand system delivers video programs to PC screens and also delivers selected video to VBrick decoders that are placed in the coax cable wiring center. The VBrick decoder sends analog audio/video to an RF modulator, let's say set to TV channel 2, making Video On Demand instantly available on an existing coax system. Viewers select their video from a browser on any PC.

Example 3

A VBrick decoder is connected to a RF modulator that delivers audio/video on TV channel 2 in an existing coax system. The VBrick decoder is connected to the Ethernet network. At any time, a VBrick encoder is connected to the Ethernet network, at virtually any location (e.g. classrooms, board rooms, auditoriums, conference centers, etc.). When the VBrick's IR remote control button is pushed, the video is available to all TVs connected to the coax. Delivering digital video from anywhere to the analog "cable head end" in this manner eliminates the issues with RF amplifiers and directional couplers which prevent RF signals from originating from within the coax cable plant. Further, the source video may also be viewed on PC screens everywhere.

Good Questions

If the goal is to deliver high quality audio/video, the best solution is one that has the lowest total cost and meets the needs of today and tomorrow. You might ask yourself the following questions as you make your technology selections:

- Does the quality of the video meet the needs everywhere it is delivered?
- Is there value in delivering live and on-demand video to everyone, or are coax-only termination points sufficient?
- Do I know what will be needed in the next few years?
- Do I find the ability to easily support two-way television (a.k.a. videoconferencing) attractive?
- What is the cost of installing coax cable to every location?
- Is my digital backbone network built using Fast Ethernet and is there adequate bandwidth?
- If needed, should I invest in a digital network upgrade, or should I invest in a parallel network and install analog?

- Do I want to source my own video content from various locations in my building?
- Do I need to deliver video to remote locations over the Internet?
- Do I prefer digital recording or will analog tapes meet my needs?
- Is Video On Demand part of my vision?

Conclusion

Delivering television over IP networks is rapidly becoming the preferred method of video delivery, but coax systems – in particular if they are pre-existing – can be leveraged to provide enhanced video services.

About VBrick Systems, Inc.

VBrick is the leader in Enterprise IP Video solutions, with over 6,000 corporate, education and government customers and 60,000 installations worldwide. VBrick solutions work over standard IP networks and the Internet to deliver rich media communications that connect people everywhere – from employees and customers, to partners and shareholders. Our comprehensive product suite and end-to-end solutions are used in a wide range of live and on-demand applications including meeting and event broadcasts, distance learning, digital signage, TV distribution, video surveillance, and Web-based marketing campaigns. Headquartered in Wallingford, CT, VBrick's products and services are available through industry-leading value-added resellers.

For more information, visit www.vbrick.com

Version R01072010