WHITEPAPER

HIGH DEFINITION OVER COAX SOLUTIONS

A COMPARISON OF AHD, HD-CVI, HD-SDI AND HD-TVI

INTRODUCTION

High definition over coax technology emerged in the video surveillance market in 2010 as an alternative to analog and IP video surveillance solutions. HD over coax technology delivers high definition video and digital zoom capabilities by transmitting 720p or 1080p resolution over coaxial cable. The following whitepaper will give a brief overview of the following technologies.

Available HD over coax technologies include:

- AHD (Analog High Definition)
- HD-CVI (Composite Video Interface)
- HD-SDI (Serial Digital Interface)
- HD-TVI (Transport Video Interface)

HD OVER COAX BENEFITS

When compared to traditional analog or IP technologies, HD over coax offers some significant advantages. Benefits of the HD over coax technology include:

HIGH DEFINITION IMAGE QUALITY

Most HD over coax technologies currently render two HD video formats – 720p HD (1280 x 720) and 1080p Full-HD (1920 x 1080) – by progressive scanning, offering more pixels than traditional analog. The increased number of pixels supports the ability to zoom in on areas of interest during live and recorded video without distortion. The overwhelming benefit of HD over coax technologies is the ability to transmit up to seven times more detail than the standard definition, 640 x 480 resolution, of an analog camera.

IMPRESSIVE RECORDING TECHNOLOGY

HD over coax digital video recorders (DVR) offer "hybrid" or "tribrid" recording. Hybrid DVRs support the simultaneous connection of both analog and HD over coax cameras. Tribrid DVRs support the simultaneous connection of all three technologies: analog, HD over coax, and IP. This recording technology allows you to upgrade your existing analog system to HD without the need to replace all of the analog cameras.

TRANSITIONAL TECHNOLOGY

HD over coax will work for a variety of applications. From new system installations to upgrading your current analog system, HD over coax technology offers flexibility in design. The "hybrid" and "tribrid" DVRs support multiple video inputs, making it possible to mix and match a variety of technologies.

EASY INSTALLATION

HD over coax technology can run long distances over coaxial cable, both RG59 and RG6, and twisted pair. Each HD over coax technology and cable combination offers different transmission distances. Coaxial cable can be existing from a previous analog system, eliminating the need to replace existing cables. There is no networking required for HD over coax installations, making HD over coax systems as easy to install as traditional analog systems.

COST EFFECTIVE SYSTEM

HD over coax is affordable technology for any budget, offering high definition megapixel technology at a fraction of the cost of IP. With traditional analog coaxial cable in place, you can easily upgrade to HD over coax technology with minimal cost.

AHD

AHD (Analog High Definition) is an HD over coax technology that converts digital signals to analog signals. AHD can support up to 960H resolution analog cameras and up to 720p AHD cameras. NextChip, a Korean based company that specializes in the design of semiconductor chipsets for the video surveillance industry, developed AHD technology. AHD is an open platform technology, giving manufacturers the technology necessary to produce their own AHD product lines. AHD does not currently support up-the-coax control of PTZ's, camera menu controls, and remote focus and remote zoom lens control. Each of these features provide significant advantages to surveillance systems and their installers. With the introduction of other technologies, many manufacturers have turned to other technologies offering higher resolution capabilities and more features.

HD-CVI

HD-CVI (Composite Video Interface) is an HD over coax technology that converts digital signals to analog signals. HD-CVI can support up to 960H analog cameras and up to 1080p HD-CVI cameras. A China based company that specializes in manufacturing and supplying video surveillance products developed the HD-CVI technology. Previously, HD-CVI was proprietary to the developer, giving them the competitive advantage as the only manufacturer with HD-CVI. HD-CVI is unique in the fact that the developer controls both the hardware and the intellectual property of the HD-CVI protocol. The HD-CVI technology is now available for licensing, making it an open platform giving limited manufacturers the technology necessary to produce their own HD-CVI product lines. With the introduction of other technologies, many manufacturers have turned to other technologies offering a true open platform.

HD-SDI

HD-SDI (Serial Digital Interface) is an HD over coax technology that transmits uncompressed digital signals over coax. Unlike the other three HD over coax technologies, HD-SDI does not convert the digital signals to analog signals. Designed in 1989 for the broadcast industry, HD-SDI technology has been around the longest of the HD over coax technologies. This video transmission technology is known as SMPTE, which stands for the Society of Motion Picture and Television Engineers. The use of this technology, originally adopted for TV broadcast, has been limited in the video surveillance industry due to the high hardware costs and limited transmission distance of 100 meters (330 feet) in length. With the introduction of other technologies, most manufacturers have abandoned the HD-SDI format and turned to other technologies offering lower cost hardware and longer transmission distances.

HD-TVI

HD-TVI (Transport Video Interface) is an HD over coax technology that converts digital signals to analog signals. HD-TVI can support up to 960H analog cameras and up to 1080p HD-TVI cameras. A manufacturer partnered with a California based company that specializes in the design of integrated circuits for high definition video to develop the HD-TVI technology. HD-TVI is an open platform technology, giving manufacturers the technology necessary to produce their own HD-TVI product lines. Even with the introduction of other technologies, HD-TVI has attracted over 100 manufacturers to design and distribute their own HD-TVI product lines. With so many manufacturers adopting the HD-TVI technology, a wide variety of camera housings is available along with additional features, such as remote focus and remote zoom lens control.

HD OVER COAX TECHNOLOGY COMPARISON

While most HD over coax technologies offer the same benefits compared to analog or IP, each of these technologies feature unique capabilities and compatibilities. Here is how the different HD over coax technologies compare:

Table 1. Technology Comparison

SPECIFICATION	ANALOG	AHD	HD-CVI	HD-TVI	HD-SDI	IP
Resolution	960H	720p HD 1080p Full-HD	720p HD 1080p Full-HD	720p HD 1080p Full-HD	720p HD 1080p Full-HD	5MP +
Transmission	Analog	Analog	Analog	Analog	Digital	Digital IP
Coax Cable (RG59) Transmission Distance	300m (1000ft)	500m (1500ft)	500m (1500ft)	500m (1500ft)	100m (330ft)	N/A
Twisted Cable (CAT5) Transmission Distance	100m (330ft)	150m (500ft)	100m (330ft)	200m (700ft)	100m (330ft)	100m (330ft)
720p HD Frames Per Second	N/A	25/30/50/60	25/30/50/60	25/30/50/60	25/30/50/60	25/30/50/60
1080p Full-HD Frames Per Second	N/A	25/30	25/30	25/30	25/30	25/30
Supported Video Inputs	Analog	Analog, AHD	Analog, CVI, IP	Analog, TVI, IP	SDI	IP
Up-the-coax Camera and OSD Menu Control	No	No	Yes	Yes	No	N/A
Installation Cost	Low	Low	Low	Low	High	High
Format Compatibility	Open	Proprietary	Open	Open	Open	Open

CHOOSING THE RIGHT TECHNOLOGY

When compared to traditional analog and IP technologies, HD over coax technology has many benefits. The key is choosing the right technology for your application.

HD over coax technologies offer camera resolution beyond the current standard definition analog cameras. The majority of HD over coax technologies support up to 1080p resolution but currently do not exceed this resolution. If an application requires resolution higher than 1080p then HD over coax may not be the best fit.

If an application requires technicians to adjust the cameras from a remote location with remote focus and remote zoom control then HD-CVI or HD-TVI technology is the best fit. If an application requires a transmission distance longer than 100 meters (330 feet) then it excludes the use of HD-SDI technology. If an application were budget focused, then HD-SDI technology would be the least cost effective technology whereas AHD technology would be the most cost effective technology. However, AHD technology currently has the lowest resolution capabilities at up to 720p.

CONCLUSION

Costar Video Systems has released an HD-TVI product line of cameras and digital video recorders that utilizes the Transport Video Interface technology. The decision to add an HD-TVI product line was made after researching and considering each of the HD over coax technologies. Costar offers a complete solution to their customers, allowing them to select between analog solutions, IP solutions, or a combination of the two technologies. HD-TVI was the technology that best aligned with Costar's existing solutions and software. HD-TVI will offer customers even more flexibility when it comes to selecting a solution, allowing them to use analog, HD-TVI, IP, or a combination of the three technologies.

The HD-TVI product line is compatible with iRAS, Costar's powerful Video Management Software (VMS). iRAS is a multi-site and multi-user remote access software that allows users to remotely view live and recorded video. iRAS is a scalable software, allowing for the management of a single location to more complex multi-site locations. iRAS can support up to 1,024 recorders with up to 16 cameras per device, or 16,384 cameras. iRAS incorporates features such as advanced event notification, map monitoring, system status monitoring and many more.

ABOUT COSTAR VIDEO SYSTEMS

Costar Video Systems is a leading provider of electronic security products for the video surveillance market. Our product portfolio consists of video management software (VMS), surveillance cameras, network video recorders (NVRs), digital video recorders (DVRs) and more to create a complete system. Our products provide surveillance solutions for commercial, financial, retail, education and health care industries. For more information on Costar Video Systems or our products, please visit costarvideo.com.