



# CCTV Update: Run Fiber Run

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**T**he big buzz in the CCTV and surveillance industry is the migration to IP utilizing a structured cabling system. This is prevalent at industry events, such as the most recent ISC West, but more importantly in the field. Security integrators and cable installers, alike, are becoming cross-trained in all low-voltage systems, such as data, voice and security. Today, surveillance and other building automation systems, which once ran over proprietary systems, are now operating over parallel structured cabling systems alongside other network functions.

The major focus for the cable selection for CCTV over IP has been UTP, mainly for its inherent qualities over coaxial cables. True, there are many benefits to using UTP over coax and it provides the path to IP. It also allows multiple functions, such as power, data and video, to all run over one cable. But even twisted pair has its limitations – such as distance and signal interferences.

Where copper falls short, installing fiber is preferred. In a nutshell, fiber runs are longer, bandwidths are much higher, and concerns for EMI and RFI are eliminated when terminated properly and it becomes the most secure cable for network privacy. Recently, a major Midwest security integrator, Dowley Systems (Oklahoma City, OK), was faced with the mission of installing of two sizable IP-based CCTV systems that included incorporating megapixel technology in challenging installation environments. Therefore, all factors pointed to fiber as the preferred media.

These installations were for a major casino and a large municipality. For the casino installation, the challenge was getting data and video to cameras perched atop each light pole in the parking lot. This involved careful planning for the distance and cable size. For the municipality, the challenge also included bandwidth considerations. Fiber optic cable was selected, and in the process, a new two-strand fiber optic cable was developed specifically for these installations and, consequently, resulted in a new cable design for the entire security market.

## FIBER SAFELY GOES THE DISTANCE

“One of the biggest challenges in getting cable out to the electrical poles, where cameras are mounted, is that the electrical contractors selected and installed the conduit. Obviously the cameras are installed way after the pole lights are already in place. The conduit size had been determined by the smaller power cables, and not upsized for thicker data/video twisted-pair cabling. And, although UTP is smaller than coax, copper conductors can create a pathway for lightning or any other EMI or RFI to travel right into the building. To prevent this, protection blocks have to be installed at the entrance of the building,” explains Robert Hudson, RCDD, project manager for Dowley Systems. “If there are a lot of camera terminations, it can create a real mess of copper cabling. To alleviate this, fiber is the sensible choice,” he notes. Fiber has a much smaller diameter so it takes very little room in the conduit. At the pole locations, Dowley installed transceivers to convert the fiber signal so that copper patch cords could run up the poles into the IP camera. Local power for the camera was provided on each pole.



OSP cable needs to be transitioned into the building within 50 feet of the building entrance. If OSP cable is copper, then there is the addition of protection blocks at the entrance and proper grounding procedures. Installing an indoor/outdoor rated fiber optic cable eliminates a protection block, as well as the splice limitation distance limit at the building entrance.

## FIBER FOR THE BANDWIDTH

Today's cameras with megapixel technology require very large bandwidth streams. Camera selection depends on the purpose of the camera and data to be transmitted. Network video cameras utilize network bandwidth based on their configuration. Bandwidth selection depends on

**Berk-Tek's Adventum™ two-fiber indoor/outdoor, tight buffered cable, was designed specifically for the security market.**

the image resolution, compression ratio, frame rate and the complexity of the scene – basically what the user is trying to capture. Complex patterns and colors equate to more detail, which increases the file size. For example, a camera pointed to an empty parking lot will have file sizes much lower than a camera pointed at a busy one. Before the increase in Homeland Security, bandwidth was not a primary concern with camera cabling. Today, video analysis, instead of video mining is driving smarter, more complex cameras, which is one of the reasons why fiber was selected for the camera for these installations. "Megapixel camera technology plays a major role in gaming, finance and law enforcement. The assessment on that far exceeds anything we have done before," states Hudson.

## SELECTING THE PROPER FIBER OPTIC CABLE

There are basically three types of optical fibers to choose from, two grades of multimode fiber (50 or 62.5 micron) or single-mode. Once the optimum media is determined, then the appropriate cable construction needs to be selected. Basically, the choice of fiber type is dependent on distance, bandwidth and cost. Multimode fiber (MMF) optic cabling is more commonly used in LANs (< 600 meters) compared to single-mode fiber (SMF) cabling because the system (electronics) is less expensive than SMF, thus better on a cost basis for short-distance applications. While SMF is used in some relatively short-distance applications, it is primarily used for long and ultra long-range applications, such as outside plant WAN applications. Single-mode fiber was selected for the municipality primarily because of distance and unlimited band-

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width, whereas, multimode was selected for the casino parking lot.

Deciding on the fiber type was relatively straight forward, deciding on the cable construction was more of a challenge. A major concern in selecting a fiber optic cable for IP cameras is finding a very robust two-fiber cable construction. “Previously the lowest number of strands for a standard tight buffered cable for an outside run was six strands. For CCTV, we really only need two fibers – one to transmit and one to receive,” states Hudson. “Therefore, installing a six-strand cable is really a waste of four strands, as well as adding thickness to the cable, where conduit space is a concern,” Hudson further explains.

“Ordering a two-strand tight-buffered type cable would be considered a specialty cable and therefore the initial cost of the cable itself would be more costly than a

standard six-strand,” notes Hudson. So Dowley Systems took this concern to one of the leading cable manufacturers. “After meeting with Beni Blell, RCDD, Berk-Tek’s fiber optic business manager, and our local rep, Michele Steffen with the Ascend Group, we expressed our requirements. They realized the need for producing this particular cable for this market and got the ball rolling,” he adds. “As a result, Berk-Tek created the two-fiber Adventum indoor/outdoor tight buffered cable. They had the forethought to think of security as an integral part of their cabling offerings. They brought to the surface that there is a market out there that required their own standard of fiber optic cable.”

Dowley Systems, one of the biggest low-voltage installers in Oklahoma, has been pulling cable for security for 15 years. As integrated installers, and with the addition of an RCDD on staff four years ago,

they crossed into the data and voice world. “All low-voltage installation companies must have the knowledge and skill set to install copper and fiber for voice, data, security and all building automation systems, or they will be left behind,” states Jerick Henley, owner of Dowley Systems. “Surveillance and BAS systems are starting to look a lot like LAN systems. In fact, I don’t have an access panel today that doesn’t reside on the client’s network,” he explains. “All security integrators should seek education on data and voice cabling, as we see the majority of it going over IP. And, on the flip side, data and voice contractors need to learn about security cameras, access control and fire life safety devices and their operational requirements. It’s the only way that proper products can be specified and best installation procedures can be practiced.” ■