

WHITE PAPER

Implementing Cost Effective CCTV at your premises



How to Implement Cost Effective **CCTV at your premises**

IP convergence spawns new generation of security solutions

Advances in technology now provide opportunities for ADC KRONE structured cabling products in solutions outside of the traditional voice and data. The Closed Circuit Television (CCTV) and security market, previously dominated through the use of coaxial cabling solutions, can now be provided for by using far more cost effective structured cabling solutions.

Post 9/11 there has been a dramatic increase in the requirement for cost effective video surveillance and security monitoring. Fuelled by this demand has been the development of a number of technologies to reduce the cost of implementing what was previously projects requiring large investments in both the active devices involved and the passive infrastructure supporting them.

As a result of this requirement and other circumstances, coupled with the ongoing march of IP convergence, the result has been the development of the so called 4th generation video surveillance comprising IP multicasting, Digital to Digital, pure IP based video systems. These solutions provide digital communication based on TCP/IP for high quality, full motion real-time video on standard IP networks over Category 5e structured cabling, fibre optic, or copper based xDSL, PSTN or ISDN services for wide area, broadband access.

Key to 4th generation video surveillance systems has been the development of an IP based "Smartcam" which can provide for both a viewing and control capability on the web based HTTP protocol. IP multicast capability provides for viewing and recording of security footage by multiple clients simultaneously and securely. Lower cost, low voltage smartcams enable video surveillance to be employed at remote locations, industrial environments, on board moving vehicles, or for temporary staged, or seasonal installations such as events, concerts etc. Indeed conversion devices are also available which can IP enable legacy, analogue based CCTV cameras connected in-situ by a short length of coax cable at one end and a Category 5e/6 at the other. This can provide for most of the benefits of a 4th generation video solution to legacy camera systems.

As an alternative to IP camera based systems, for legacy, non-IP CCTV systems or those requiring high resolution/high frame rate monitoring systems for highly secure, real-time environments like banks, casinos, etc has been the development of CCTV over twisted pair. CCTV, up until now, was reticulated through 75 ohm coaxial cabling (typically RG-6). Through development in balun technologies, it is possible to incorporate CCTV signals into structured cabling systems. To apply structured cabling connectivity to CCTV, a reliable way is needed to adapt the video signal to the twisted-pair cable. The CCTV balun is key to this conversion. The CCTV balun is a passive element that converts the unbalanced signal of the coaxial cable to the balanced signal of the twisted-pair. The balun must preserve a clear image quality over the distance of a cable by providing immunity from ground loop, hum and noise so as to produce maximum video quality with minimum loss. The twisted-pair cable has more signal attenuation than the coaxial cable; hence the main factor necessary to determine the maximum



attainable distance is the signal attenuation along the twisted-pair cable. A higher performance category of cable means less attenuation, i.e. Category 6 is better than Category 5e.

Video or CCTV baluns are transmission devices that provide a low cost means of sending live video over unshielded twisted pair, point-to-point wiring for distances of up to 305m (1000 ft). The video baluns are compatible with all coax control systems. A basic system consists of one unit at each end of a twisted pair of wires. The video baluns are intended for use over Category 5e structured cabling runs or higher, to provide a convenient, cost-effective alternative to coax. Most available baluns are designed to provide immunity from noise and interference, even when running next to line power.

As only one pair of wires is required for the video signal, for simpler, fixed cameras not requiring Pan/Tilt/Zoom (PTZ) active control, combined baluns are available which can provide for up to four cameras' video signals to be sent down one twisted pair cable. This allows for a very cost effective CCTV cable deployment. For even longer cable runs, powered (at the receiver end), active baluns are available which can extend the distance up to 915m (3000 ft).

Some balun systems provide controls to make incremental adjustment of both gain and frequency compensation to allow the system to be fine-tuned for the twisted pair cable. Such features provide adjustment for optimum performance over the entire operating range and allow for cable length to be estimated with a wide safety margin; when bidding for CCTV twisted pair transmission jobs.

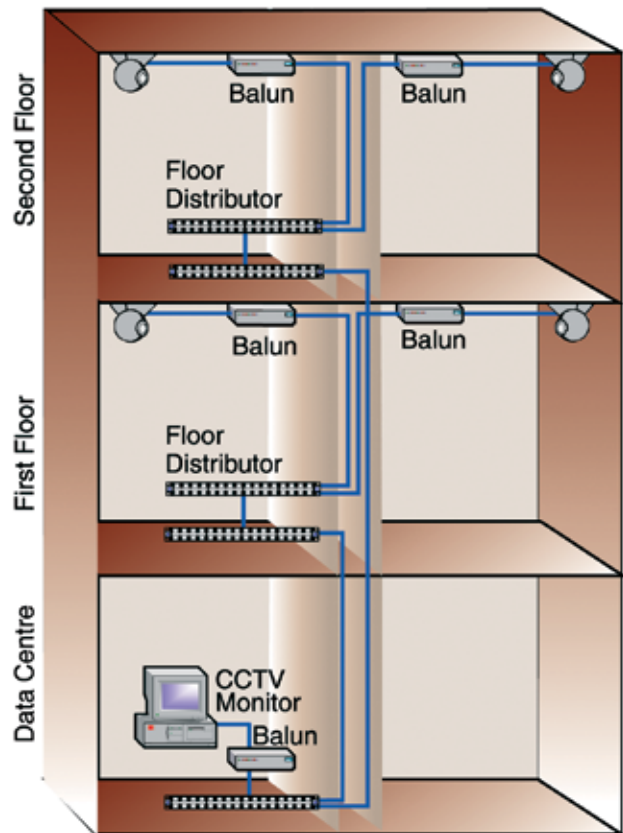
For camera systems requiring more complex controls for PTZ and having inline power requirements, rather than providing separate run cables to each camera for this purpose, it is possible to satisfy this by utilising the other available pairs of a UTP cable, thus reducing the cable requirement. Savings can be realised in lower labour and material costs, smaller conduits, fewer cable pulls, common media topology and easier retrofits using existing cabling deployed for voice and data.

Structured cabling deployment of CCTV is preferred by IT departments, who are increasingly tasked with the responsibility of managing such systems and who have knowledge of structured cabling technology compared to coax. This results in less training and special tooling requirements and improvements in productivity for system management. Moves/Adds/Changes (MACs) are simplified due to the decreased number of proprietary cables and cable pulls needed in a CCTV solution.

Overall there is significantly less redundancy in infrastructure investment as structured cabling deployed for legacy surveillance systems can be later utilised for newer IP based cameras, other IP based security or control devices and traditional voice/data applications.

Using structured cabling for security solutions also provides opportunity to solve potential customer problems with other ADC KRONE products. For security monitoring in industrial or hazardous environments, ADC KRONE's IP67 Industrial Ethernet connectivity products are an ideal way to prevent the ingress of moisture, dust and other contaminants into the connection. Indeed these products may also provide an ideal solution for exterior mounted cameras and equipment. Additionally for security equipment mounted up poles, on roofs, etc which may potentially be exposed to lightning hazards, ADC KRONE ComProtect® products may assist in reducing overvoltage damage to expensive surveillance equipment.

As security monitoring sites are in fixed locations, the need for constant moves and changes is low; hence Patch-by-Exception makes sense. Also, as excellent connectivity transmission performance is required for high picture quality, ADC KRONE's HighBand® products are an ideal solution. Whilst HighBand might seem to be a premium offering, compared to the cost of a coax based solution, a HighBand Category 6 solution would be more cost effective than coax; particularly where many cameras are involved over long runs.



Example of CCTV infrastructure using structured cabling.

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