Security Management
AMERICAN SOCIETY FOR INDUSTRIAL SECURITY

1655 North Fort Myer Drive, Suite 1200, Arlington, VA 22209 703/522-5800 Telex #901892 ASIS AGTN FAX 703/522-5226

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Steve Wilbur
Robot Research Inc.
5636 Ruffin Rd.
San Diego, CA 92123

Dear Mr. Wilbur:

The editors of SECURITY MANAGEMENT wish to thank you for your contribution to this issue of our publication. We realize the time and effort involved in writing and are very pleased you chose to direct this effort toward SECURITY MANAGEMENT.

Like you, our readers are concerned about the security profession, and we know they will appreciate your views and expertise. We rely on people like you to keep SECURITY MANAGEMENT in top form.

Enclosed you will find two copies of the current issue and a token gift of our appreciation.

Again, thank you for your submission to SECURITY MANAGEMENT. We look forward to your future manuscripts and article ideas.

Sincerely,

Mary Alice Crawford

Mary Alice Crawford
Publisher

enclosure

On the Cover: Retail store shrinkage is a numbers game. For tips on using the numbers to determine who's tapping the till, and to what extent, see page 25.

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FEATURES

continued

WHAT'S NEW ON CCTV?

BY STEVE C. WILBER

A MAN WALKS UP TO THE SIDE entrance of a closed warehouse. Casually glancing from side to side, he slips a crowbar into the door jamb and pops the door open. Unbeknownst to him, a still-frame video device is transmitting these events to a central monitoring station via the phone line.

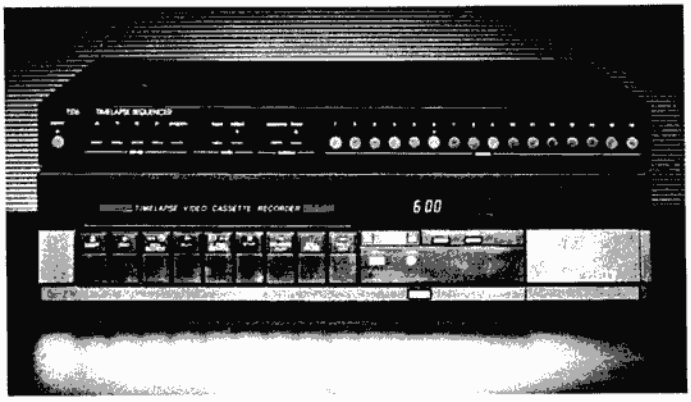
Every area the trespasser enters is monitored by 16 cameras and recorded onto one VCR. A digital motion detector tracks his every move.

Within minutes, local police and security officers arrive. The security officers deliver a printout of the suspect from the central station, and police begin looking for him immediately. Security personnel review the videotape and identify the stolen items. The visual information also identifies the suspect quickly and accurately, increasing the chance of capturing him.

Not long ago this security system was not available at any price. Today, it is an affordable reality thanks to advances in digital video technology. Digital processing plays a significant role in almost every aspect of video security. Digital technology continues to simplify installation with more effective and efficient use of other parts of the system.

But what is digital processing? A video signal produced by a closed-circuit television (CCTV) camera is a series of pictures or fields that update 60 times per second, giving the viewer the illusion of motion. In reality, the television system operates much like film, by rapidly moving individual pictures onto a screen.

In television, each field is made of 262.5 horizontal lines that consist of a continuously amplitude modulated (AM) signal interrupted only by synchronization pulses. This analog signal is too complex for a computer or digital processing device to handle directly. Much like an infant being fed, the computer needs the signal chopped into small pieces or "bits" before it can process the signal. This is known as an analog to digital conversion.



Advances in digital technology have played a significant role in almost every aspect of video security—from cameras to time-lapse recording.

Each piece is commonly referred to as a pixel. A pixel is a series of numbers that define shades from light to dark. A pixel defined by six numbers or bits can be any one of 64 shades of gray. A seven-bit system has up to 128 gray shades.

The more shades a picture contains, the more detailed and lifelike it appears. For video, 64 shades are the minimum required to produce a picture that doesn't look computerized.

How many pieces each line is divided into defines how many pixels it has. When a specifications sheet lists the image display as 512 x 480 x 6, the first number (512) defines the number of pixels along a horizontal line. The second number (480) defines the number of horizontal lines processed, and the third (6) defines the number of bits each pixel has. The specifications sheet may list "6 bit quantization" instead, which is more of an engineering term.

The greater the number of pixels and lines, the more detailed the image. The common measurement for image detail is defined by lines of horizontal resolution. Most digital manufacturers list the image display memory rather than resolution specifications because it's technically more precise.

You can easily convert horizontal pixels to lines of horizontal resolution by multiplying by .7 (70 percent). For example, 512 pixels yields 368 lines of horizontal resolution. Developments in digital processing have led to products with 1,024 pixels. Higher pixel resolution is required to recover all the details contained in today's high-resolution chip cameras and time-lapse recorders.

Digital technology is growing rapidly. The earliest digital processors used discrete logic, which limited integrated circuit (IC) performance to a specific task. Today we can greatly reduce the number of individual ICs with microprocessor-based systems, letting software programs do most of the work.

A surprising number of digital video processors still use basic logic systems, which require more parts and are more prone to breakdowns. Microprocessor-based systems are normally more reliable because they have fewer parts. New features are easily added, updating the system with a simple software change. Adding new features to discrete logic usually means a complete board-level redesign.

Digital processing in any form is a more effective method of processing video or audio signals than analog. A good digital design has fewer parts than

an equivalent analog design. In addition, it operates more consistently. Analog designs have more circuits and go out of calibration. They usually don't perform as well under temperature extremes.

The expanded use of digital circuitry has simplified and, thereby, lowered installation costs. Prior to digital technology, CCTV cameras in a single system had to be synchronized to properly switch and play back distortion free on a time-lapse recorder. Operation required additional cables or complicated camera adjustments to align the synchronization phase from each camera. Continuous viewing of individual camera outputs required one monitor per camera.

The digital quad has simplified those installation problems and lowered associated costs. That device allows a single monitor to display four nonsynchronous cameras at the same time. Second generation quad products have recognized the need to expand recorded quadrants to a full screen.

Digital technology is the cornerstone of many advances in video security. The ability to conduct video tours and control devices over standard telephone lines has resulted in better use of security personnel. While cost is usually of primary concern, it is not the only factor in developing new surveillance systems. Personnel safety is a more important consideration.

Remote surveillance and control distance observers from potentially dangerous situations, so they can concentrate on taking quick corrective action. Central alarm stations can more effectively protect their clients, increase safety, and decrease costs by using remote video surveillance. New technology does not emerge solely to introduce new products. For any product to succeed it must perform more efficiently than its predecessors.

The term *digital* is often overused. In some industries, such as the consumer video industry, the term is also misdefined. As products in the security industrial video arena are mass marketed, dealers should be alerted to the term's misuse.

Advances in digital technology hold great promise for the future. Obviously, high definition television (HDTV) will have a big effect on security CCTV. VCRs especially will improve since they tend to be the weakest link in the video chain. In the meantime, improved definition formats will offer some improvement.

As the resolution of cameras and time-lapse recorders increases, manufacturers in digital design will have to further increase the resolution of their products. Quad compressors will offer higher resolution and more sophisticated image enhancement. Video motion detectors, some of which are sophisticated enough to trigger on direction of movement, will offer even better performance on outdoor scenes. "Smart" circuitry will further reduce triggering on false signals.

Phone line video transmission systems will greatly benefit from imminent use of fiber-optic lines. Faster and higher quality video transmission will result and real-time transmission should be possible using advanced compression techniques. For those in digital video, the challenges are just beginning. ■

About the Author . . . *Steve C. Wilber is product manager for Robot Research Inc. in San Diego, CA.*