

Magazine Issue: **January 2005**

TECHNICAL MANAGEMENT — DVRs: Digging Beyond the Basics

by Al Colombo

Digital signal processing and the invention of the digital video recorder (DVR) have most assuredly propelled the state of video technology beyond anyone's expectations the past 10 years. Can you think of a single aspect associated with CCTV technology that has had as much impact on our industry as the DVR?

A number of factors have contributed to the success of today's security-based DVR. As with the CCD camera, that success is largely due to widespread consumer acceptance of the digital video device (DVD), which in turn has driven research and development within the security industry. This has created a valuable tool in the fight against crime and a significant decrease in cost to the dealer.

To some extent in the commercial and institutional sectors, the proliferation of network technology has also created an ongoing interest in a DVR technology solution instead of the traditional mechanical timelapse and event recorder. In a digital world, one naturally gravitates toward an all-digital solution.

In most cases, once a security contractor sells and installs a number of DVRs, he or she won't want to sell anything else. Many end users feel the same way once they've experienced the ease of operation, which includes a basket full of nifty features and resulting benefits.

Perhaps another indicator of the impact that network and DVR technology have had on the industry relates to the end result — discernable images the authorities can use to catch the bad guys. As most security dealers know, this goal has not always been realized using videotape and a mechanical tape chassis.

With that in mind, we will discuss the basic differences between VCR and DVR technology; how security contractors can capitalize on and sell DVR systems to end users accustomed to VCRs; and how to best choose and install DVRs.

2 Basic DVR Types Are Manufactured for Security Use

DVRs are versatile and agile in the manner in which they operate and conduct their mission, but there is a fundamental difference between some systems that dealers should be aware.

"One is hardware-based with firmware and the second is PC-based with an operating platform like Windows 2000™," says Faraaz Kolsy, a security systems engineer with Torrance, Calif.-based Vector Resources.

The embedded DVR usually takes the form of a self-contained black box in which all the components necessary to record, archive and search images in a digital format are contained in one standalone package.

Embedded systems, for example, are more useful in situations where the end user does not expect to manage his or her DVR. These customers would rather have it installed, turned on and forgotten about — until something takes place and it's necessary to review the relevant images saved on hard disk.

Embedded systems are also manageable nearly to the same degree as the PC-based system. However, training is usually necessary for novice users to understand the ins and outs of their use. In many cases, they can be connected to a PC with the right remote software.

The PC-based DVR, on the other hand, looks pretty much like anybody's personal computer in the office or at home, with the exception of the amount of hard drive space and a few other components. These systems are useful in applications where the operators are familiar with Microsoft Windows and the general operation of a PC.

Another reason to put PC-based DVRs to use involves the manner in which security personnel are likely to use them. The question to ask the end user is: "Will you use your DVR often each day or do you expect to have it installed and then let it record until something happens and you have to play back the recording?"

Kolsy adds, "If security managers are going to be involved in managing the DVRs on a daily basis, then you should use a PC-based system."

Not everyone agrees with Kolsy on this point, however. There are those who prefer the embedded system simply because operation is so similar in some respects to the common VCR. Many experienced operators know VCRs so well that they are able to use many of the search capabilities inherent in the embedded DVR in much the same way they have for so many years with the VCR.

"That is one of the arguments concerning black boxes and PCs; although the majority of PC-based products are software based, which means they are easier to upgrade than a black box [embedded] DVR," says John Colgan, eastern sales manager for Intervid, a Stanley Security Solutions company based in Indianapolis.

DVRs generally come with four, eight or nine and 16 channels. Recently, DVR products have appeared on the market with a capacity for up to 32 cameras, primarily using a PC platform to do it.

In some embedded DVR product lines, you can actually design the video system to use more than one unit, further expanding the number of allowable cameras. But unless the DVRs can be cascaded properly, this may not be effective.

Single-channel models are also available that can be used as a direct replacement for existing VCRs. These DVRs are designed specifically to mimic the feel and control of a common videotape machine, as are many multichannel embedded models. Although it's a good sell, it is not for everyone.

Multiple-camera installations are a good example where it is better to use a multichannel DVR. "The installer would be better off to take the 16 channels and put them in a DVR than a mux with a single-channel DVR," confirms Colgan.

Integrator Offers a Simple, 4-Step Formula When Selling DVRs

The process of DVR selection has many twists and turns, depending on who you ask. Some security dealers actually sell and engineer their systems according to an easy-to-follow formula. Kolsy offers the following recommendations:

"It begins with looking at the overall requirements of the customer. How large is the job, as in how many cameras? Also, what type of cameras are the customer looking for — are they p/t/z models or fixed?"

When it comes to the video manufacturer of existing equipment, if the upgrade involves p/t/z cameras, the dealer usually will have to buy a DVR that is made by the same manufacturer that made the cameras.

"One thing to look at is what type of cameras they have. This is part of a complete system design, for not always will one brand work with another brand when it comes the DVR," adds Kolsy.

The issue is whether the existing cameras are p/t/z models and whether the data required for camera control runs through a separate twisted pair or through the same coaxial cable that carries the video signal. DVRs will generally only pass a particular p/t/z data protocol, which is manufacturer specific.

According to Kolsy, there are other issues to consider as well. "You must also know how much storage they require and what is their vendor of choice. For instance, do they need to store video for a day, a week, two weeks or two months?"

Although it's important to know the number of cameras required, it's also important to ask whether the client plans to upgrade the system at a later time.

"To have an upgrade path is to have support. It allows the customer to improve on their investment," says Gareth McClean, director of research and development for American Dynamics in San Diego.

Kolsy says it is this reason that it's best to find out whether the client expects to add cameras or upgrade the head-end control system at a later time.

Storage Space Is Critical Now to Facilitate Future Upgrades

Image storage is another important consideration, not only during the initial installation but later in case the customer intends to add cameras.

The amount of storage available on any DVR depends on several factors, including the amount of hard drive space available. It also depends on the compression format used by the manufacturer. Compression relates to image quality as well.

Video compression is required simply because of the sheer size of the files that would ensue if we didn't do something to reduce their size. Through a variety of means, compression

acts to capitalize on all the key data in each video frame, while eliminating what is not required.

The most common compression formats include a variety of JPEG, MPEG, and WAVELET formats. For a detailed explanation of video compression, refer to "Essentials of Digital Video Compression" by Bob Wimmer (see page A2 of the March 2004 issue of Security Sales & Integration or [click here](#)).

Why We Use Digital Video Recorders in Place of VCRs

Before the novice DVR technician can begin selling and installing this relatively new technology, however, there are certain steps that should be taken.

The first is to study the technology and become familiar with how DVRs work, both embedded and PC-based systems. The second step is to study the market and become acquainted with the various makes and models, researching the capabilities and limitations of each one.

There are a host of features and benefits that sell security dealers on DVRs. We have discussed a number of them, such as the ability to marry, or integrate many of the DVRs now on the market with a variety of other systems, and the built-in video motion detection feature that helps save hard drive space.

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