Going Tapeless: *Switching to Digital Video Recorders*

by Chuck Colby

Important new changes in casino surveillance video recording are coming with the switch to digital video recorders (DVRs). For the past twenty-five years, the standard video recording technology in the casino industry has been videotape, but now the golden years of videotape are gone.

Casino surveillance managers/directors have relied on VHS video cassette recorders (VCRs) to track casino activities. Today, with the introduction of digital recording technology, it no longer makes operational or economic sense to continue using videotapes. Within the next couple of years, most casinos plan to replace their VCRs with more reliable and versatile DVRs.

There are many reasons and pressures for the migration. For one thing, the move from VCRs to DVRs is inevitable because fewer and fewer companies are selling VCRs and videotape. The writing is on the wall, VCRs are quickly going the way of the 45 and 78 RPM record players.

DVRs are no longer just for the rich and famous. Their costs are now more competitive than VCRs when you consider their high reliability, low maintenance and the fact that they do not require troublesome videotape changing and filing systems. The new DVR technology has brought about numerous advantages not previously available with analog videotape units:

- DVRs do not experience non-recording down time, because rewinding is not necessary and video can be played back and transferred to a CD/DVD while in the recording mode. There is simply no lost recording time.
- DVRs have instant recall and fast search capability that is not possible with VCRs. This is a real time saver when trying to find an incident, and extremely valuable when there is a need to do a review of a gaming table that has had the game stopped pending a review of an incident.
- DVRs can record continuously without human intervention to change and file tapes. Seven to fifteen day periods are the most common, but video recordings may be saved for periods depending upon the amount of hard disk storage provided.
- DVRs (high-end) have a backup technology capability called Redundant Array of Inexpensive Disks (RAID). If the primary drive fails, you could lose all recorded information unless it is also recording simultaneously to a redundant hard drive. This essential redundancy capability is not available with videotape recorders.
- DVRs do not experience maintenance for worn out head replacement and periodical tape path cleaning.
- DVRs can contain a digital watermark that makes it possible to go to court and prove that there was no tampering or editing of digital video copies (CDs/DVDs). A digital thread monitors the integrity and alerts the user if even one pixel is changed from the original. This is not at all possible with analog videotape.
- DVRs generally require less AC power per channel to operate than VCRs. With the exception of single-channel DVRs, the average AC power per channel required for multi-channel DVRs is about 70-80% less than that required for the equivalent number of single-channel VCRs. This results in significantly less electrical costs, for both video recording and air conditioning for heat compensation.

There are basically no disadvantages to digital video recorders compared to video tape recorders. Although the apparent initial costs may be higher for digital, the true long-term costs are considerably less than VCRs. Because of the lower maintenance requirements and the longer mean time between failure (MTBF) for DVRs, the new equipment warranty should be at least 3 years. This means that for the first 3 years, DVRs have essentially zero maintenance costs. Quality DVRs presently start at about $300 per-channel. With a 3 year warranty, this should be the only per-channel DVR costs for the first 3 years. By comparison, VCRs could cost almost twice that amount for the first 3 years when including all associated maintenance costs.

Although most surveillance managers/directors are already familiar with the shortcomings of VHS video tape recorders, it is important to review the magnitude of the disadvantages to appreciate the vast difference offered by digital video recorders:

- Video tape recorders can easily get clogged record heads. There is no way to tell this has happened until the tape is played back. Often, there was nothing recorded on the tape. Many important events have been lost in casinos because of this problem.
- Each tape must be removed and replaced by a blank tape.
- Each tape must be rewound after 8 hours of recording time.
- Each tape must be retained for 1-4 weeks depending upon local gaming control rules. This requires a large storage room and an inventory control system.
- Each VCR must be manually restarted in record mode.
- VCRs have an inherent amount of downtime that can amount to a very large amount of lost recording time whereby casinos are not protected. This unprotected time for a casino with hundreds of cameras can amount

to thousands of hours per month. This is a tremendous liability to the overall security of the casino.

- VCR manufacturers are stopping production of recorders and tapes, so they will be more difficult to get, and prices will rise. Already, two of the three major VCR manufacturers have discontinued production.

- With VCRs, surveillance personnel are spending untold hours changing tapes, not doing their main job of surveillance.

All of the negative items above will disappear with the conversion to digital recording. In digital recording, there are no tapes to change, store, or need for repair.

What to Look for When Buying a DVR System

Make sure the company specializes in the casino DVR business. This should include DVRs installed in casinos for at least 5 years. The DVR should have a dual redundant hard drives. This will ensure that you have a copy of everything in case of a hard drive failure.

Make sure the DVR has an accepted digital signature watermark. This will enable the casino to go to court and prove there has been no tampering with the video. The player software should allow frame by frame play in both forward and reverse motion. Some companies offer this software as a standard feature on casino DVRs. This is important in detecting some sleight of hand card tricks and chip/money movements.

Make sure the DVR has at least a 3-year warranty. This is very important to keep the cost of the unit less than the cost of the tape recorders being replaced. Every channel should be able to record and playback at 30 frames per second (fps). In order to get their costs per channel down, some companies are offering 8 to 16 channel DVRs at 7.5 or 15 frames per second. This constitutes a considerable loss of information. Therefore, 30 fps is necessary to have at least the same frame rate as the VHS tape recorders being replaced. A lower frame rate will lose 1/2 to 1/3 of the video information.

The DVR should have a record failure alarm. This alarm should be both a visual and an audible alarm. This is important because you need to know if the DVR is not recording so it can be fixed or replaced before too much time is lost. The DVR should reboot and resume recording automatically in case backup power runs out.

The DVR should have removable, hot swappable hard drives that unplug from the front of the unit. Since the hard drive is the most likely part of a DVR to fail, it is important that it be removable and replaceable by non-technical personnel.

Make sure the DVR is replaceable quickly and easily. If something other than a hard drive fails in the DVR, it will require that the whole DVR be replaced. Some gaming control boards require a time limit for the change-out capability.

Since a 16 channel DVR has 16 coax video cable connectors, a power cable and a CAT-5 network cable, this presents a formidable obstacle for a technician and unlikely for a non-technical person to do this job. Some DVR manufacturers have "quick-disconnect" cable assemblies whereby the entire DVR can be replaced in 2 minutes with only 4 cables to unplug and re-plug to change out a DVR.

Make sure the DVR can record using MPEG compression. Older compression formats (wavelets or motion JPEG) use much more hard drive space than MPEG, so it is impossible to get 7 or 10 days of recording time on a 16 channel DVR.

To save rack space, it is recommended that you buy DVRs in a 1U or 2U size rack mount box. A 1U (1-unit) enclosure is 1.75 inches high and a 2U enclosure is 3.5 inches high. Most VCRs are 3U or 4U in rack height. Some manufacturers put their 16-channel DVR in 4 or 5U boxes that are 8 to 10 inches high and weigh 70 or 80 pounds. This takes up much more rack space and makes it hard for even 2 people to install and remove a DVR that is of this size and weight. ♣

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