

Tech Note - 03

Surveillance Systems that Work!™



Stand-alone vs. PC Based DVRs

(Dispelling the Myths)

At all levels, there is a great deal of confusion regarding the viability of various DVR designs. The vortex of controversy is the great debate over Stand-Alone vs. PC-Based systems. The purpose of this article is centered on addressing the differences so prospective CCTV buyers have a clear and concise understanding of the facts.



Stand-Alone DVR



**PC-Based
DVR**



First, **GuardDog Surveillance Systems**, in the past, has marketed, sold, installed and serviced both stand-alone as well as PC-Based DVR systems. Due to our extensive experience with both types, initially, we chose not to market a Stand Alone or imbedded DVR. Opting instead to design and build PC-Based machines to match our customer's specific application requirements. That practice expanded our PC Based DVR offerings to provide the widest selection of DVR capabilities in the industry. More recently, to address the needs of price conscious buyers with requirements for eight (8) cameras or less, we began again supplying imbedded DVR systems.

FRAMING THE DEBATE

On one hand, there are those who claim – for a host of errant reasons – PC-Based DVR systems are flawed. On the other, reality is that high end users, large retail chains, casinos, most financial institutions and government installations almost always employ PC-Based DVRs in their video surveillance systems.

Alternatively, marketers of PC-Based DVR's almost always claim that stand-alone systems are nothing but junk – not suitable for even the trash collector's mobile compactor. So how does one – in the face of all this CCTV industry-generated static – find a clear channel worthy of listening to?

To answer this question, one must first understand the reasons behind the debate itself and second, sift through the dialogue with a desire to sort out fact from fiction. We'll do that by defining the source of the confusion and by clearly identifying the advantages and disadvantages of both.

UNDERSTANDING THE SOURCE

Video surveillance system providers that market one type of system (vs. the other) are clearly the source of the confusion. The "selling process" of any product is universally used to cultivate the

opinions of prospective buyers. Agents that market one DVR design speak negatively (generally without much attention to factual details) about the other and in the process, opinions are generated and "rumors" run rampant. Let's examine the facts.

Before we begin detailing the differences between stand-alone and PC-Based digital video recorders, let's examine a few of the similarities.

SIMILARITIES

In contrast to the old VCR systems, today, stand-alone and PC-Based DVRs both utilize hard disk drives to store digital video files. The identical HDDs that are installed in PC-Based DVRs are also installed into stand-alone machines.

...a little technical information, simply presented...

We don't want to lose the reader in technical industry specific jargon; however, a little technical information, simply presented, is required for a good understanding of the subject.

Regardless if you are looking at a PC-Based or a stand-alone option, the internal processing of analog video (that which most cameras provide) is exactly the same. First, the analog signal is converted to a digital signal. That digital signal is stored in the machine's memory and displayed to the monitor.

Since both DVR types generally record only if motion from a given camera is occurring, a question is asked... Is there motion happening? And a decision is made... If yes, then record, if no, then discard the signal and don't record. This saves on HDD use – i.e. only video containing motion is recorded so you (and the system) don't have to muddle through a mess of no movement video to find the "event" you're looking for.

Finally, stand-alone and PC-Based systems utilize some kind of case enclosure. Generally they are 19 inches wide so they can be mounted into an industry standard racks. Racks are nice for mounting hardware. Similar to a component cabinet for a home stereo, racks provide for a cleanly integrated, nice looking final product.

Now let's examine the differences between PC-Based and Stand-Alone DVR's.

OPERATING SYSTEMS

Stand Alone

While both DVR types each have an operating system (the internal brain if you will) stand-alone DVRs utilize chip based (ROM – short for Read Only Memory) to store the operating system and video processing software. Today's SA DVRs generally use Linux or RTOS operating systems. The advantage of a ROM based operating system is it cannot easily be written to from the outside world – from a network or via the Internet. This prohibits external file based viruses from corrupting the system. The disadvantage is the DVR software (that does all the video processing) must be comparatively simple (usually menu driven). This greatly reduces stand-alone DVRs from having the capability to perform much more than basic record and/or playback functions.

PC Based

The operating system of most PC-Based DVR systems is Microsoft Windows. The advantage of this operating system is that programmers can develop video processing software that is comprehensive.

Search functions, database creation, storage and high level post processing, input/output functions and most network and/or Internet communication functions are greatly enhanced by the Windows user interface.

Conversely, some believe the inherent instability of the Windows operating system is problematic for reliable DVR use. This postulate would be true if a Windows based DVRs also ran a host of non-compatible, non-surveillance oriented software programs – i.e. business software, games, etc. The truth is, a Windows platform, PC-Based DVR is not designed to run these other software programs (in addition to performing video surveillance functions) and as such they are impeccably stable systems. GuardDog Surveillance Systems has hundreds of PC-Based systems, installed in commercial environments, which have operated continuously without a single instability issue.

VIDEO QUALITY

Stand Alone

Due to the fact that SA DVRs were developed to provide an inexpensive alternative to more costly PC-Based systems, initially these machines were associated with sub-par performance. As time progressed, imbedded or Stand-Alone DVR video quality has greatly improved. While displayed (live) as well as recorded video quality has improved considerably, a high percentage of stand-alone DVRs still do not measure up to **GuardDog Surveillance Systems's** standards of competitive video quality.

*...quality that
meets your
expectations.*

Except in a few rare options, SA DVRs that provide quality video also come with a high price tag. Remember, the primary reason for their initial development was a low cost alternative to the typically higher priced PC Based system.

PC-Based

When it comes to quality video display as well as recording, this type of recorder has been and for the foreseeable future, will remain, the mainstay of the industry. The video quality of most PC Based DVRs is exceptional. However, buyers beware, many less than reputable suppliers are beginning to build PC-Based DVRs using sub-par DVR cards and/or incompatible computer components.

Regardless of your preference in DVR type, Stand-alone or PC-Based, you should carefully examine the recorded video quality from your prospective supplier. A simple request for example still pictures from their recorded video should provide you the necessary comfort the quoted system will deliver video quality that meets your expectations. Recording frame rate specifications are critical as well. For a more comprehensive review, ask your potential supplier to provide real time recorded AVI video files – from a recording frame rate system comparable to that being offered - for your review.

Additionally, many of these sub-par, counterfeit DVR cards – provided by less than reputable suppliers – are plagued with numerous reliability and/or quality issues. In essence, these are the items that have, on occasion, given PC-Based DVRs their unearned bad rap.

EXPANDABILITY and FUTURE VALUE

Stand Alone

The "record on motion" option is available on most SA DVRs but, compared to similarly priced PC-Based DVRs, due to their simple operating systems, these machines are limited in most other typically available options. If equipped with a built in CD burner, backup of stored video is typically limited to a manual process encompassing hundreds of CDs and lots of time. Some (very few) may also have a

USB pen drive, if so, then backup to a USB stick or an external USB connected HDD can be a convenient option.

Generally speaking, the lower priced stand-alone units have few inputs and outputs and are limited in their capabilities. Some of the more expensive SA units are equipped with similar options as the mid-grade PC based systems but few (if any) have any capability for future expandability.

Other than hard drive storage failures, if something ever goes wrong with a Stand-Alone DVR, like your home VCR or DVD player, typically, your only recourse is to toss the old and replace with new.

PC Based

PC Based DVRs, with a reliable software suite, can be used to view multiple systems from a single location. The higher performance units can also be integrated with Point-of-Sale (POS) and Access System hard/software. The built in system supplied I/O is normally robust with the ability to extensively map-out the desired process. Backup can be performed (as an automated task) over a network or it can be done manually with the integrated DVD burner or USB pen drive. Even manual backup has several options that suit the desired need. Motion detection is comprehensive and controllable, even down to the individual camera level.

If something goes wrong with your PC Based DVR, because it is build with readily available and highly interchangeable components, repairing a PC Based DVR is usually a simple and inexpensive option.

UPSHOT: PC based systems have far more options than can be covered in this paper.

RELIABILITY

Stand Alone

Other than the real low cost units (previously noted) SA DVRs have an excellent reliability history. Their highest component failure is the system has been the internal hard drive – which we've previously noted is the same piece of hardware in a PC-Based DVR.

PC Based

PC-Based reliability is truly a mixed bag. This is so primarily due to the marketplace demand for (and unscrupulous suppliers willingness to deliver) inexpensive PC-Based equipment. For this reason, we'll address this issue in two parts - Quality verses Cheap.

Cheap – There are numerous cheap PC-based systems on the market and there is a reason why we, as opposed to inexpensive, choose to call them cheap. Many of these have knock-off DVR cards that, unlike the originals they're copied from, are not manufactured with adequate quality control standards. In addition, many have flawed, design inconsistencies. Regardless of problem, they tend to be prone to "quirky" operation.

...choose to call them cheap.

To further reduce cost, often second rate and/or incompatible components are used in the construction of cheap PC-Based DVRs. The result: Quality and reliability become the sacrificial characteristics of the product.

Finally, questionable assembly practices have also lead many well-intentioned consumers, looking for a bargain, to end up paying more in maintenance and service expenditures than they would have if they'd invested just a bit more at the outset.

Quality – The primary characteristic of quality PC-Based DVRs is they are built with high quality, compatible PC components that are specifically chosen to enhance the performance and durability of the digital video recorder. Such a unit is every bit as reliable as any stand-alone DVR.

Many, understanding the rapid changes in computer technology, have asked about the PC-Based DVRs obsolescence. The thing to understand is, computer technology becomes obsolete because, new software programs (mostly games) are being developed that require the latest in hardware technology. A PC-Based DVR is a completely different animal – one that has been engineered for a specific task – namely, video surveillance. If the PC-Based DVR lives up to the task of providing quality video surveillance today, it will continue to do so for a good long time – far longer than the same PC today will function in the ever-changing game software environment.

The thing to understand is...

EASE OF USE

Stand Alone

Beyond all of the previously noted features, ease of use is probably the single largest reason GuardDog Surveillance Systems moved from Stand-Alone to PC-Based DVRs. Unless you consider only the most expensive Stand-Alone DVRs you're going to find PC-Based DVRs far superior when it comes to ease of use.

Generally speaking Stand-Alone DVRs are "controlled" by an infrared remote control – similar in many respects to your television remote. Unfortunately, tasks such as searching recorded video and burning still images and/or AVI files do not lend themselves to the same simplicity as changing a channel or setting the Tevo clock. As such, reasonably priced Stand-Alone DVRs with their simple remote controls are cumbersome at best and in reality, most of the time cannot compete with their PC-Based counterparts – equipped with keyboard and mouse control.

In order to understand this, one must have a rudimentary understanding of the "typical" or "everyday" tasks users of Surveillance System DVRs utilize. The two major "everyday" functions are searching for "events" within the systems recorded video and copying sections of recorded video from the DVR to easily read media – usually a CD.

Burning a CD with a single video clip, from a single camera or a single still image from most remote controlled Stand-Alone DVRs is generally NOT too difficult a process. However, in most instances, for law enforcement as well as other reasons, single images or single camera video clip request is the exception to the rule. Usually, multiple video clips from multiple cameras as well as a number of still images (JPG Files) of a given event are needed to "build" a successful, prosecutable case. Often, even mid-range priced DVRs automatically close the DVR burn session after a single files recording – thus requiring multiple CDs for a single event record. If you find a Stand-Alone system that does allow multiple camera burns, almost always each successive video clip requires it's own specific setup – multiple setups = longer time to perform what in a PC-Based DVR is a simple and quick process.

That said, many of today's Stand-Alone DVRs are now equipped with Ethernet communications. While manually configuring a network connection may be beyond most users capabilities, once networked,

many of these machines hand off the previously intricate and difficult with just a remote controller functions (via a network) to a simple and more widely used (and understood) Windows™ Based PC. This is a much needed improvement for the individual and/or small firm that has access to a PC, but for those who do not, simple PC Based tasks still remain difficult and cumbersome operations.

PC-Based DVRs

Search functions (in most PC-Based DVRs) are a sophisticated yet simple process. Since today's digital video recorders are generally set to record only when motion is detected, PC-Based systems, with their point-click mouse tools are uniquely capable of negotiating simple graphics (complete with date and precise time of day by camera) representing video events. Literally within 2-3 mouse clicks a user can be viewing the recorded event(s) of their choice. Additionally, with a couple more clicks of the mouse one can view the event as recorded by 4 or more cameras simultaneously.

PC-Based DVRs, since their base design is a computer, are tailor-made for data management. Burning CDs with multiple video files as well as still images is a simple process. Furthermore, if designed correctly, multiple events can be copied to a secure (not to be written over) section of hard drive storage and "saved" until CD writing is desired.

CONCLUSION

If your video surveillance application requirements are simple, "*All I need is a system that will record what happens under watchful eye of the installed cameras,*" then a quality stand-alone DVR (with a built-in DVD burner – should you ever need to provide stills or video to law enforcement) – is probably a great choice. Alternatively, if you'll be using your system to review recorded video events on a regular basis then perhaps it would be wise to invest a few additional dollars for a quality PC-Based DVR. The added ease of use benefits and the significantly greater performance will greatly outweigh the slight addition in original purchase price.

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