Digital Video Manager

Honeywell

Digital Solutions For An Analog World. Honeywell's Digital Video Manager (DVM) addresses the challenges of today's video surveillance, security and enterprise operations. Its architecture takes advantage of your network communications structure - eliminating the need for coaxial cables and providing unmatched camera portability. DVM's flexibility protects your existing investment, allowing you to re-use your CCTV infrastructure of analog switchers, multiplexers, monitors and coaxial cabling, while extending their functionality through integration to the enterprise network. Video images are stored in the DVM database, where they can be quickly located and viewed using advanced search capabilities. In addition, DVM is tightly integrated with Pro-Watch™ Security Management Software, providing alarm and event-activated recording so that you only capture the video you need, when you most need it.
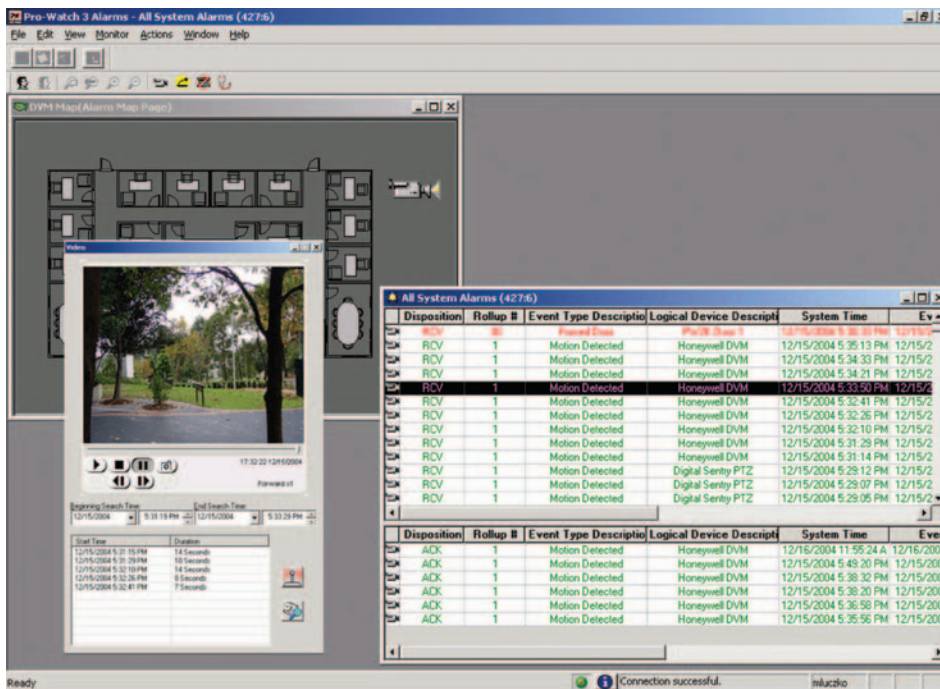
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EFFICIENT VIDEO COLLECTION, STORAGE AND RETRIEVAL

With Digital Video Manager's intelligent recording options, only needed video is recorded. This helps to optimize video archives by reducing the collection of redundant and irrelevant video recordings.

Additionally, users can specify how many frames per second should be recorded for each camera and for each recording type per camera. For example, a particular camera can be configured as:
25 frames/sec for viewing, 10 frames/sec for operator-activated recordings and 15 frames/sec for video motion detection

recordings. Furthermore, each schedule and individual alarm/event can have its own frame rate settings. The duration of pre-recording and post-recording is also configurable for each recording type and each alarm/event and schedule.

Recordings (or sections of recordings) can be exported as Microsoft Windows™ Media files, in MPEG 4.0 format, for viewing by standard Microsoft Windows Media players. These files can then be stored on DVD or CD, e-mailed or used as evidence of an incident.

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SYSTEM ARCHITECTURE

Honeywell's Digital Video Manager is built upon industry standard open networking, PC hardware, and software applications, taking advantage of the most cost-effective, powerful components available.

Using commercial off-the-shelf hardware allows you to use the cameras, PC, storage, and networking hardware of your choice – no need to pay premiums for proprietary hardware. Unlike proprietary digital video recorders (DVRs), DVM allows you to deliver system hardware and software upgrades independently. This lowers your support costs and ensures a "future-proof" upgrade path. Use of off-the-shelf components also ensures that DVM can easily be integrated into your existing enterprise system support strategy, further simplifying support needs and reducing the cost of ownership.

The basic architecture consists of a Database Server and a Camera Server, which may be installed on the same machine. Additional Camera Servers can be added to the architecture to support larger numbers of cameras.
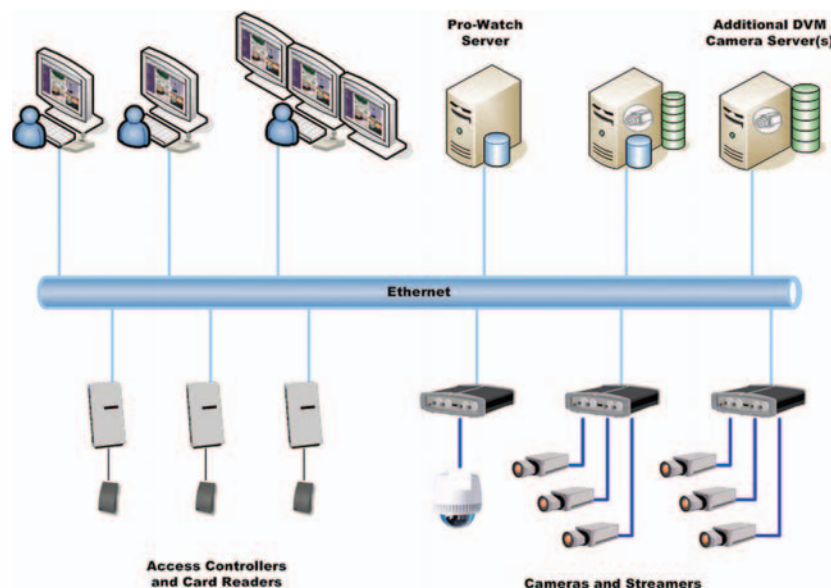
DVM can integrate with your legacy CCTV equipment and take full advantage of open TCP/IP network technologies to deliver software-based camera switching and control, as well as digital recording. In this way the enterprise network becomes a "virtual" matrix switcher. This revolutionary architecture makes it remarkably easy to add or relocate cameras within your building's network without the need for any dedicated coaxial cables. New CCTV monitors simply require a network-connected PC with suitable software. In fact, any PC with a connection (including wireless) to the network can view and control DVM.

Because all video is digitally stored, you no longer need to purchase and maintain racks of recording equipment, monitors and switches, not to mention the security room space and utilities required to support them.

DVM's advanced Fault Management features far exceed those of other digital video systems. When a DVR fails it must be physically replaced with another DVR unit, which is costly in terms of both hardware replacement and labor expenses. Additionally, the loss of the DVR unit reduces productivity and increases risk as the cameras attached to the failed DVR are no longer available for viewing and recording. With DVM, the Database Server is available in a redundant configuration, so that if the Master Database Server fails, the system immediately switches to the Backup Database Server. This minimizes disruption and ensures that recording continues uninterrupted.

Since DVM uses off-the-shelf PCs, you can use hardware that meets your IT organization's standards, ensuring that server replacement is quick and cost effective. DVM's cameras are connected directly to the network, so there are only power and network connections to deal with when replacing the server hardware. Compare this with the numerous (32 or more) coaxial connections that need to be disconnected and re-connected when replacing a DVR.

In a distributed architecture environment, DVM can protect against failure of a Camera Server by taking advantage of your enterprise structured cabling solution and dynamically reassign cameras to other Camera Servers. Manual cable swapping of the cameras and/or standby (redundant) equipment is not required.

INTEGRATION WITH PRO-WATCH

Digital Video Manager seamlessly integrates with Honeywell's Pro-Watch Security Management Software, including the user interface, the alarm and event subsystems, and controllers. Now your security system and CCTV system are completely integrated, with your operators viewing and controlling all systems from a single workstation.

This integration with Pro-Watch includes:

• Full control, view and playback of DVM systems from within Pro-Watch workstations.
• Integrated facility segregation, whereby cameras can be assigned to the same areas as points. In this way, operators can only view and control cameras in the areas assigned to them.
• Integrated operator-based security
• Integrated workstation-based security
• Alarms and events occurring within Pro-Watch can be configured to automatically initiate recordings, and automatically switch Stations (as well as alarm monitors) to show a particular camera.
• Direct access is provided from within the Pro-Watch Alarm and Event summary displays to display any recordings initiated by a Pro-Watch alarm/event or motion detection.
• All DVM system alarms/events (including video motion detection) appear within the Pro-Watch Alarm and Event summary displays.

Because of this integration with Pro-Watch, DVM can respond to Pro-Watch alarms and events, automatically recording vital video, making the system less dependent on operator observations and enabling real-time decision making. Operators are only presented with information related to an abnormal event or threat situation. There is no need to watch a video monitor wall, manually call up cameras, or search through dozens of tapes to find the associated information.

Operators can view and move cameras while simultaneously monitoring and controlling doors and hallways. Integrated navigation displays, menus and toolbars are provided to allow operators to quickly navigate to the desired display, which may be Pro-Watch-specific, DVM-specific, or an integrated display containing a combination of security management data and live (or recorded) video.

Operators can control individual camera pan-tilt-zoom functions, enter recording commands, view high-quality live images, as well as record and play stored video. And for maximum ease of use, Station uses Web-style navigation buttons, tab views and VCR-style recording controls.

ADVANCED SEARCH CAPABILITIES

DVM provides powerful search and retrieval capabilities that free operators from the frustrating task of fast-forwarding and rewinding videotapes to find a particular incident. Operators can search for recorded incidents based on criteria such as date/time, camera, recording type, and alarm/event type. These advanced search and retrieval capabilities are powered by a Microsoft SQL Server relational database to optimize speed and flexibility

ADVANCED, INTEGRATED SECURITY

Digital Video Manager delivers features previously found only in the most expensive high-end video surveillance management systems, and never before available in a CCTV system. DVM allows you to specify which operators can view which cameras, and even which operators have access to which recordings. This is achieved with no additional configuration because DVM integrates seamlessly with Pro-Watch's security model. An operator, once assigned areas of viewing and control within the building, has immediate access to cameras within those areas. The operator's security level and control level within Pro-Watch determines what degree of view and control they have within DVM, with all operator and DVM system actions being logged.

SINGLE, INFORMATION RICH USER INTERFACE

Digital Video Manager puts advanced functionality at your fingertips, helping to increase personnel productivity and responsiveness. Your operators can perform all viewing, recording, archiving and retrieval of DVM video from their Pro-Watch workstation – they do not need to leave their workstation to view the CCTV system, replace a tape in the video recorder, activate a recording or search for a video tape.

INTELLIGENT RECORDING

Digital Video Manager recordings can include not only what happened after the event (post-event recording), but also what happened prior to the event (pre-event recording). This provides a complete picture of the entire event, significantly enhancing investigations, evidence and outcomes. This feature is provided without the need to perform a continuous recording (as is traditionally performed in CCTV systems).

Digital Video Manager provides four methods of initiating recordings:

- **Alarm/Event-activated Recordings:** Integration with Pro-Watch enables activation of a recording when an alarm or event occurs. Your Pro-Watch system determines when recordings should be made on any camera, with video prior to the alarm or event also captured using the pre-record feature.
- **Scheduled Recordings:** Recordings are scheduled on particular cameras at specified times. Each camera has its own schedule, which can be configured for any time in the future. Re-current (repeated) scheduling is also provided on a daily, weekly and monthly basis.
- **Operator-initiated Recordings:** An operator initiates these recordings during viewing of the camera. An operator who has noticed an incident simply clicks the record button to record the video. Video prior to the record button being pressed is also stored in the recording using the pre-record feature.
- **Video Motion Detection Recordings:** Video is recorded when DVM detects motion within a "region of interest" of the camera view. Again, video prior to the detection of motion can also be stored with the recording using the pre-record feature.

A combination of all these types of recordings is available on every camera in the system, with each one individually configured for maximum flexibility and simplicity. All recordings are stored on the hard drives of the Camera Servers until they are either deleted or archived. The storage of recordings is managed automatically by DVM, or can be set manually for any camera.

VIDEO MOTION DETECTION

For many applications, motion detection is a key requirement. Digital Video Manager's video motion detection features do not simply replicate the standard functionality available in today's CCTV systems, they also include:

- Continuous or scheduled detection.
- Automatically perform any or all of the following actions:
  - Initiate an alarm (of configurable priority) in Pro-Watch
  - Activate a recording to record for a fixed amount of time or until the motion has finished (no motion has been detected for a configurable amount of time)
  - Automatically display the camera's live video in a workstation or dedicated alarm monitor
- Configurable "regions of interest" within the camera view to be used for motion detection. Only motion within these regions causes DVM to detect motion.
- Individual tuning of each region of interest, to minimize false detections.
- Simultaneous tuning and testing of the "regions of interest" by viewing the live video in tuning mode. This enables the engineer to finely tune the motion detection algorithm and test the results, without any real detections occurring.
- Choice of two motion detection algorithms, both executed by the Camera Servers:
  - The standard algorithm uses the "pixel rate of change" method and is ideal for indoor use. Each detection frame is compared with the previous detection frame, with the amount of difference determining whether motion has been detected (depending on the sensitivity used in the tuning).
  - The premium algorithm is an "adaptive" algorithm, which detects and tracks the movement of objects. It continuously learns the scene, adapting to the environment. This allows the algorithm to ignore environmental changes such as rain, hail, wind, dust, trees swaying and gradual light changes. This algorithm is ideal for both indoor and outdoor use.

INTERNET EXPLORER CLIENTS

Digital Video Manager allows any PC (using the appropriate operating system) to be a DVM client. In such cases, Microsoft Internet Explorer is used to host the DVM displays. This provides the following major benefits:

- Any PC that has a TCP/IP connection to DVM can have full view and control (subject to the user's security level). Management, quality assurance, safety and other personnel can view cameras from their own PCs without the need for expensive CCTV monitors and cabling.

- System administrators can configure and maintain DVM (including exporting, archiving, deleting and restoring recordings) without using a Pro-Watch workstation.

DVM is configured with login accounts for all users that require access to the system using these clients. Each user account is assigned a security level, a control level and accessible areas. This security ensures that users of these clients can only view and control cameras they are authorized to access.

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STATE-OF-THE-ART VIDEO STORAGE

Digital Video Manager supports any Windows 2000™ compatible storage device, providing you with the flexibility needed to meet your storage requirements.

A DVM system consists of two types of storage: online and offline. Online storage is used for video clips which must be readily available for viewing. Typically this type of storage uses hard drives. DVM supports all hard drive configurations supported by Windows 2000. For small systems (with low online storage require-ments), internal drives with fault tolerant drive controllers may be used. For large systems (with large online storage requirements), high capacity, fault tolerant storage arrays may be used. Irrespective of the storage requirements, DVM is able to make use of fault tolerant, RAID based storage solutions to ensure the highest levels of system availability. Where multiple Camera Servers are used, these storage requirements can be split among Camera Servers, further reducing storage costs.

Offline storage (archiving) is used for video clips that are not regularly required by operators, but which must be kept for a period of time. All relevant information about the archived recordings remains within the DVM database for use in searches. These recordings also appear in the list of recordings for the camera, shown in a different color to indicate that the recording has been archived and needs to be restored before viewing. With the falling cost of hard disk storage, removable hard drives are a convenient, cost-effective and increasingly popular alternative to other archiving media such as digital tapes. Hard disk storage is faster, cheaper and easier to manage than tapes. Now, with DVM, you can eliminate tapes forever.

Because recordings are stored digitally, they do not suffer from the aging and deterioration problems associated with VCR tapes. In addition, because hard drives and most digital archiving media have significantly greater recording capacity and are physically smaller, requiring less storage space than VCRs.

DIGITALLY SIGNED VIDEO WITH AUDITING

With Digital Video Manager, every exported recording is digitally signed to provide authentication (of the origin of the recording) and integrity (proof that the recording has not been tampered with). Digital Signatures provide many inherent advantages over watermarking. A visible watermark may obscure part of an image, and an invisible watermark can potentially introduce visual artifacts. In either case, the original file is altered, which could reduce the evidential weight of the digital image. Digital Signatures, on the other hand, do not alter the original files, ensuring that there is no loss of evidential weight.

DVM also provides a complete audit trail (log) of all operator actions and system events. This audit trail provides you with a record of all changes made to the DVM configuration, as well as when and who controlled cameras, viewed cameras, initiated and viewed recordings. The audit trail can be exported when exporting a recording, and then saved with the recording. When used in conjunction with site chain-of-custody processes and procedures, digital signatures and the audit trail greatly enhance the evidentiary weight of a recording in a legal proceeding.

OTHER POWERFUL FEATURES

- **Snapshot:** DVM captures the current frame of video and saves it as a bitmap image. This is available when viewing both live video and recorded video.
- **Quad View:** Four cameras can be viewed simultaneously on a single monitor. Each quad view can be configured to cycle through a selection of cameras on a timed basis.
- **Sequence View:** The presets of PTZ cameras (as well as fixed cameras) are cycled on a timed basis, within a single view.
- **Dedicated Alarm Monitors:** If an alarm/event occurs in the Pro-Watch system, or video motion is detected, a camera can be automatically icon will be displayed on an alarm monitor signifying that there is a video clip attached to the event.
- **Dedicated Surveillance Monitors:** An operator may switch cameras, sequence views and quad views on dedicated monitors.

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