Understanding Storage Capacity and Storage Capacity Tips

HDD Storage and Storage Space

Digital video recorders (DVRs) contain a hard disk drive (HDD) that records video from connected cameras. The following variables determine how much video you can record on the internal hard drive of your DVR:

- Storage Capacity
- Compression
- Recording Mode (continuous, motion, alarm, schedule)
- Number of Cameras recording
- Resolution
- Recording Quality
- Frames Per Second (FPS)
- Audio (On, Off)
- Lighting Conditions

Space saving tip: Be sure to review the space saving tips at the end of key sections to help you get the most out of your storage device.

Definitions

- **Codec**: Short for "Compression / Decompression." A codec is technology for compressing and decompressing data, and is used on DVRs to reduce the space needed to store video images.
- **RAW:** Unprocessed data directly from an image sensor chip. Raw format is very large as the video is uncompressed and unaltered.
- **JPEG:** Short for "Joint Photographic Experts Group". JPEG is a digital file format, and is a commonly used standard method of compression for photographic images.
- **MJPEG:** Short for "Motion JPEG". MJPEG is a format where each frame or interlaced field of a digital video is separately compressed as a JPEG image.
- **MPEG-4:** Short for "MPEG (Moving Picture Experts Group) Layer-4". A standard for low bandwidth video.
- **H.264:** Also known as MPEG-4 AVC (Advanced Video Coding). H.264 is a video compression standard with increased compression over MPEG-4, and better transfer speeds over a network.

Storage Capacity

The capacity of the hard drive is one of the biggest determinants of how much video can be recorded. The larger the storage device the more video you can record. Once the storage device is full, the user has the option to stop recording or record over the oldest video recordings (overwrite setting). The following factors determine how quickly your hard drive fills up.

Compression

Compressing the digital video on your DVR is the process of removing unnecessary image data to allow for smaller file sizes, such as infrared light, certain audio, or duplicate images. The higher the compression rate, the more original data is lost. The key is to keep the perceived quality the same by removing data that you would not necessarily notice is missing. The compression also depends on the processing capabilities of each DVR, and therefore a customized storage calculator (per model) can be used to get an estimate of recording capacity. Please see the end of this document for an example of the storage calculator.

Recording Modes

DVRs give the user a choice between continuous, motion, alarm, and scheduled recording. **NOTE:** Certain DVRs also offer Continuous + Motion recording.

Recoding Mode	**Description**
Continuous recording	Will record for 24 hours a day, 7 days a week.
Motion recording	Will only record when motion is detected by the camera
Alarm recording	Will only record when an external alarm is triggered. (i.e.) When a sensor is triggered by someone opening a window, when a camera has been unplugged, or when an external motion sensor picks up movement in the hallway.
Scheduled recording	Will record during specific time ranges selected by the user (i.e. Always record from 9AM-5PM Monday – Friday).

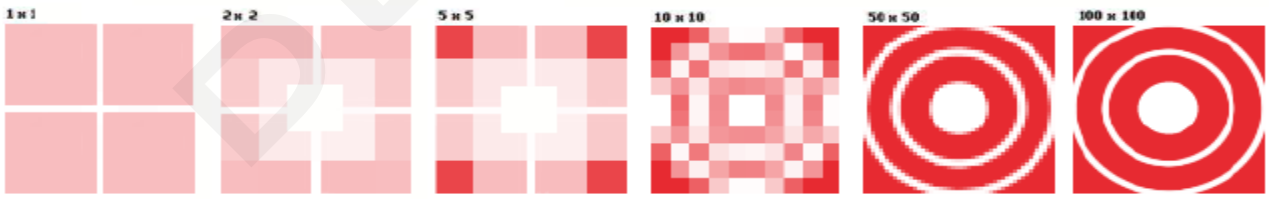
Space saving tip: Depending on your home or business you may only want to record video if something is happening. For example: You may want to consider using scheduled recording when employees are scheduled to work. Combining this with after-hours motion detection will save more space and ensure you don't miss anything.

Number of Cameras Used

The number of cameras you use to secure your home or business will directly relate to the size of the recorded videos. The more cameras you have recording the more storage space will be required.

Resolution

Resolution is the term used to describe the number of dots (pixels) per inch (DPI) used to display an image. The higher the resolution the more dots will be needed to create the image, resulting in better quality pictures and larger file sizes. See below for a visual example:



The resolution is increasing from left to right

Resolution is generally stated as AxB, referring to the number of dots horizontally and vertically that create the image. Your DVR may offer the following options when choosing your resolution: CIF (352x240), 2CIF (704x240), D1 (704x480).

Space saving tip: Lowering the resolution will make the size of the video recording smaller. However, this gain in storage space will be at the cost of lower video resolution. It is always a good idea to adjust these settings to see which one is best for you. You may also be able to set the resolution individually for each camera. For example, in a high traffic area such as an entrance to a convenience store you may want to record at the highest resolution while at an area of lesser importance (e.g. garbage bins) you may want to capture less data.

Recording Quality

Recording quality is how visible the relevant information is in the image. Your DVR may offer the following options when choosing your recording quality: Highest, High, Standard, or Low.

Space saving tip: Lowering the recording quality will make the size of the video recording smaller. However, this gain in storage space will be at the cost of lower video quality. It is always a good idea to adjust these settings to see which one is best for you. You may also be able to set the recording individually for each camera (i.e. setting only critical cameras to the highest quality while leaving the rest at a standard setting).

Frames Per Second (FPS)

Your recorded video is composed of individual image snapshots that were taken at a specified number of times per second. The higher your FPS the smoother your video will appear. The lower your FPS the choppier your video will appear. The number of FPS can be adjusted on your digital video recorder. 30 FPS per camera is the maximum, which is equivalent to real-time.

Space saving tip: Reducing the FPS can increase the length of time the DVR can record. Generally, it is not necessary to record in real-time. Typically, recording at 7.5 FPS is sufficient for police and court evidence.

Audio

Depending on the cameras connected to your DVR, you may have the option to record audio along with the live video. Using audio will increase the size of the video recordings.

Space saving tip: Audio may not be required for all cameras and can be turned off to save storage space (i.e. audio is not usually required when monitoring a parking lot).

Lighting

It is important to note that recording capacity will also vary depending on lighting conditions and movement within the scene.