

Key differences between IP and analogue CCTV systems

In an IP system, the cameras are connected to a Network Video Recorder (NVR) using ethernet cable (typically CAT5e or CAT6). The camera converts its video feed into a digital format, and this digital information is sent to the NVR to be recorded.

In an analogue system, cameras are connected to a Digital Video Recorder (DVR) using coax cable (typically RG59 or RG6). The video feed is sent to the DVR and then converted into a digital format to be recorded onto the DVR.

Some DVRs are actually hybrid, meaning you can connect one or more IP cameras via a switch. These can be useful if you're upgrading an existing analogue system but don't want to change all cameras straight away.

IP based systems will generally have more features as the cameras are essentially self-contained computers. They are also more flexible and easier to upgrade, since you can connect additional cameras via a switch, whereas analogue cameras all need to be wired directly back to the DVR.

If the NVR or DVR is connected to a router with Internet access, then it will be possible to view the cameras via a mobile app (Android and iPhone).

Which lens option (focal length) to choose

The focal length of the lens on a camera will affect the view the camera provides. A short focal length will give a wide field of view but will only show details at a relatively short distance. A longer focal length will give a narrower field of view, but it will be at higher magnification, meaning details can be seen at further distances.

The most common focal length lens used in CCTV cameras is 2.8mm — this is good for a general overview of an area. It has a wide horizontal field of view — typically about 90 degrees, although this varies for each camera model, and can be found on the datasheet.

A 4mm lens by comparison, will have a field of view closer to 70 degrees, therefore providing coverage of a narrower area, but with more details due to the higher magnification.

For greater flexibility, you may want to consider a camera with a varifocal (i.e. adjustable focal length) lens. The most common of these can be set anywhere from 2.8mm to 12mm, allowing the camera view to be adjusted during installation to give the most useful view.

PoE

Power over Ethernet (PoE) allows IP cameras (and some other computer equipment) to be powered by the NVR or a separate PoE enabled switch, using the same ethernet cabling as the video data. This saves time and money on cabling and does not need a qualified electrician.

A number of PoE standards (e.g., 802.3af, 802.3at, 802.3bt) have been developed, capable of delivering different amounts of power (watts) to end devices. It's important to ensure that the NVR or switch supports the standard required by the cameras. For standard cameras (bullets, domes, turrets etc.) this is rarely a problem, but for PTZs and other cameras with high power requirements it's important to check compatibility.

HIKVISION®

Additional features of Hikvision cameras

ColorVu

ColorVu is a technology developed by Hikvision to provide high quality, full-colour video at night. ColorVu cameras have a larger than normal lens meaning they let in more light, enabling them to provide colour video in lower light conditions than a standard camera. In addition, they have a warm white LED which can be configured to switch on when needed, to provide full colour 24/7. ColorVu is available in selected IP and analogue Hikvision cameras



AcuSense

AcuSense is a technology from Hikvision which significantly reduces the number of false alarms generated by a CCTV system. It uses Deep Learning technology built-in to the camera, DVR or NVR to constantly analyse the scene looking for humans or vehicles. When an event such as line crossing or intrusion detection is triggered, the system can ignore alarms caused by anything other than a human or vehicle.

PoC

Power over Coax is similar to PoE but for analogue devices. It sends power from a DVR to the connected cameras via standard coax — no 'shotgun' cable or individual PSUs are required.

It's important to note that there are no official standards for PoC — the DVR and cameras need to be Hikvision products to ensure compatibility. Additionally, as with PoE, different devices may require (or be able to supply) different amounts of power (watts), so ensuring compatibility is crucial.

Storage Calculation — How Much Hard Drive Space is Needed

To record video footage onto an NVR or DVR you need to install one or more hard disk drives (HDDs) into the machine. HDDs are available in various capacities, typically ranging from 1 terabyte (TB) to 8 terabytes, although larger capacities are also available. Most NVRs and DVRs support a maximum capacity of 8TB per drive. The total number of drives supported will vary — the standard machines typically support one or two drives, which is perfect for a typical residential or small office system. If you're using more than one HDD they should all be the same capacity.

There are various factors which will affect the total hard drive capacity required for each system:

- Total number of cameras
- Camera Resolution
- Recording Schedule
- Recording Retention Time
- Frame Rate
- Compression Format

We can help with these calculations and can also provide access to a tool which you can use.

Total Number of Cameras

Storage requirements will of course be affected by the number of cameras being used. It's also worth considering if additional cameras may be required in future. You may wish to allocate extra HDD capacity to allow for this future expansion. You might also consider using an NVR / DVR which supports more cameras or HDDs for the same reason.

Camera Resolution

The most common resolution used today is 4 Megapixel (MP). For most uses, this provides the best balance between high video quality and reasonable storage requirements.

8MP is becoming more popular and while it will provide even higher quality video, this comes at the expense of doubling the required storage. If you think there will be a need to zoom in to see more details on recorded footage, then 8MP may be the best choice.

Recording Schedule

In a high security area, you may need all cameras to be recording 24/7.

However, it may be appropriate to record only when there's an event, such as motion detection or line crossing, or only at certain times of day.

A camera inside a shop might be recording when the shop is open, to protect against shoplifters, but an external camera might only record out of hours.

Recording Retention Time

It is common to store recorded video footage for 30 days before allowing it to be overwritten by newer video. However, if the footage only needs to be kept for 7 or 14 days, then less total storage will be required. Conversely, some installations may need footage kept for 90 days or even longer, so this should be considered.

Frame Rate

A video is made from a series of pictures (frames) which change so quickly that the human eye perceives it as motion. The most common frame rate in the CCTV industry is 12 frames per second (fps), however many cameras and recorders will be set by default to 25fps.

Unless you have very fast-moving objects in your scene (e.g., cars travelling at highway speeds) then 25fps is unnecessary. Using 12fps rather than 25fps will halve your storage and bandwidth requirements.

For even more flexibility, you may want to record 24/7 at a low frame rate but increase to a higher frame rate when an event occurs.

Compression Format

By default, video files contain a huge amount of information.

To reduce the amount of storage space needed, video needs to be compressed. This is done by removing some details which the human eye won't miss, as well as by using some extremely clever algorithms.

There are two compression standards typically used in CCTV products, known as H.264 and the newer H.265. H.265 is more efficient — it will halve your storage and bandwidth requirements and is highly recommended. By default, the latest IP cameras, NVRs and DVRs will be set to use H.265, however not all older equipment will support it.