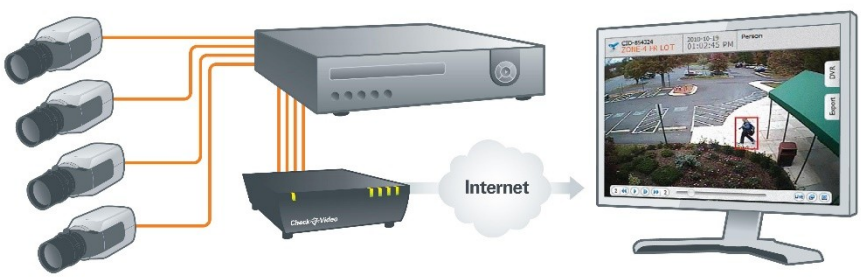
Closed-circuit television (CCTV) also known as video surveillance, is the use of video cameras to transmit a signal to a specific place, on a limited set of monitors. It differs from broadcast television in that the signal is not openly transmitted, though it may employ point to point (P2P), point to multipoint, or mesh wireless links.

History

The earliest usage of Closed Circuit Television (CCTV) actually dates back to 1942 when it was first used by the military in Germany. The military used remote cameras with black and white monitors to observe the launch of V2 rockets. During the 1940's the US military also used CCTV when developing and testing atomic weapons, as this allowed them to observe the tests from a safe distance.

In the years since that time CCTV has become very common in non-government and military sites. In the 1970's and 1980's CCTV was commonly used as an added security measure in banks. Many other retailers also began to use these CCTV's in their stores as a method to both prevent and record any possible crime. They are extremely popular in convenience stores and gas stations. Gas stations have used them to record drivers who leave without paying for their gas. There is no proof that CCTV's decreased crime rates, but they have been very successful in helping to apprehend criminals who were recorded in the act.

What Components Make Up A CCTV System?



Every CCTV system is comprised of cameras, a monitor and a recording device. These three components have their own separate functions. A camera is used to capture videos or still images which are recorded with a digital video recorder. These recorded videos or images can then be viewed with the help of a monitor. Depending upon the usage and area which needs to be covered a CCTV system may employ one or more cameras. In CCTV systems for strata the number of cameras installed will be more as they need to be placed at specific places for best coverage. You can choose to install either a wired CCTV system or wireless CCTV system. They both have their advantages and disadvantages.

Cameras

There are numerous kinds of CCTV cameras and each of them are built and designed for various purposes. There are a few criteria which determine the type of CCTV camera is needed. Placement of the camera is one such criterion. A camera which has to be placed outside will need to have a robust casing to withstand the outdoor conditions. Depending upon the range of area to be covered you may need to install cameras of different resolutions. A high resolution camera will be necessary to cover big spaces whereas a low resolution camera might be enough for a small room. There are cameras which can be hidden from normal view if you do not want people to know that they are being watched. You can also install PTZ cameras which can be remotely controlled. A PTZ camera has functions for panning, tilting and even zooming to focus. A CCTV system for strata may employ a lot of these different types of cameras. It all depends on the requirement of the strata. Cameras can be even connected to a computer network. There are two modes by which a camera may operate: wired and wireless. In a wired mode the camera transmits videos through a cable to the recording device whereas a wireless transmission occurs in wireless cameras. Wireless cameras reduce the installation cost and provide more flexibility but it is subjected to transmission failures.

Recorders

Recorders are mainly of two types; standalone DVRs and NVRs. DVR stands for Digital Video Recorder and NVR stands for Network Video Recorder. Standalone DVRs record and store the images or videos sent by the CCTV cameras. A standalone DVR is not connected to any network but just a single computer system. NVRs perform the same function as standalone DVRs but are connected not to just a single computer but a whole network. The images or videos stored by NVRs can be viewed by anyone in the network. With NVRs it is easier to authorize who can view the videos or images over internet.

Monitors

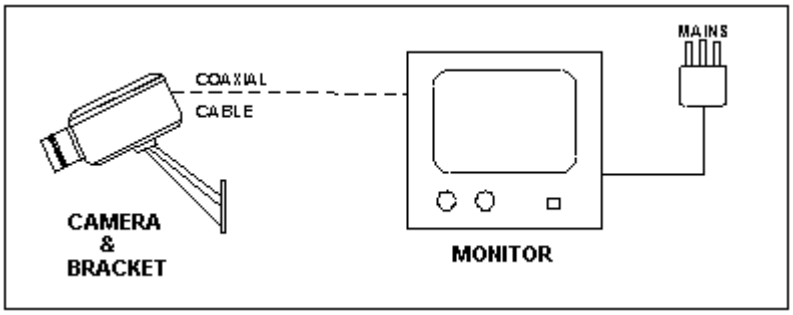
Monitors are the screens which display the recorded images or videos to be seen by the security personnel. There are various kinds of monitors available: LCD monitors, LED monitors and TFT monitors. To view the feedback from more than one camera you may need to setup more than one monitor. To deter thieves, some shops even position the monitors where they can be viewed by customers. By doing this, people entering the shops know that they are being watched and any undesirable incident may be avoided.

As we can see that the basic components of CCTV system are typically cameras, a recording device and a monitor. The difference lies in the types of components used. Choosing from various types of cameras to installing the monitors and choosing which recorder to use is what constitutes different types of CCTV systems. It might be imperative to choose not one but many different types of cameras and installations in CCTV systems for strata. Choosing the right component and suitable installation is important as it will enable the security personnel to monitor the area better.

CCTV SET-UP

Simple CCTV Systems

The simplest system is a camera connected directly to a monitor by a coaxial cable with the power for the camera being provided from the monitor. This is known as a line powered camera. The diagram below shows such a system. Probably the earliest well-known version of this was the Pye Observation System that popularized the concept of CCTV, mainly in retail establishments. It was an affordable, do-it-yourself, self-contained system.



A Basic Line Powered CCTV System

The next development was to incorporate the outputs from four cameras into the monitor. These could be set to sequence automatically through the cameras or any camera could be held selectively. The diagram shows a typical arrangement of such a system. There was even a microphone built into the camera to carry sound and a speaker in the monitor.

The speaker, of course, only put out the sound of the selected camera. There were however a few disadvantages with the system, although this is not to disparage it. The microphone, being in the camera, tended to pick up sound close to it and not at the area at which it was aimed. There was a noticeable, and sometimes annoying, pause between pictures when switching. This was because the camera was powered down when not selected and it took time for the tube to heat up again.

The system was, though, cheap to buy and simple to install. It came complete in a box with camera, 16mm lens, bracket, switching monitor and 12 meters of coaxial cable with fitted plugs. An outlet socket for a video recorder was provided, although reviewing could be a little tedious when the cameras had been set to sequence.

There are now many systems of line powered cameras on the market that are more sophisticated than this basic system. Most of the drawbacks mentioned have been overcome.

Cameras had been around for a long time of course, before this development. The example is given to show the simplest, practical application. The use of some line powered cameras can impose limitations on system design. They do though; offer the advantage of ease of installation.

Types of CCTV

1. **Bullet:** A bullet CCTV camera is a wall-mount or ceiling-mounted unit that is typically designed for indoor use, but can also be fill some outdoor applications. The camera derives its name from its sleek, thin cylindrical shape. Many bullet cameras also tout themselves as being waterproof. The camera is not typically designed to have pan/tilt/zoom control but instead to capture images from a fixed area. The unit is mounted pointing at a particular area.

2. **Dome:** A dome cameras get their name from the dome-shaped housing in which they sit. These housings are designed to make the cameras unobtrusive… not covert or hidden. Typical applications are retail, where the camera is designed to be unobtrusive, but visible.

3. **Webcam**: These tiny cameras are well suited for desktop use for Skype and other low-resolution teleconference applications.

4. **Discreet Cameras:** It's clock, it's a smoke detector, its motion sensor. The real answer is none of the above. These are just some of the disguises for covert cameras. Of course, covert cameras can also be characterized by conventional cameras placed in discreet locations.

5. **Infrared/Night Vision**: These night-vision cameras have the ability to see images in pitch black conditions using IR LEDs. In some cases they are for mobile applications.

6. **Outdoor**: The key to outdoor cameras is the housing itself, which must be impenetrable to moisture, insects, dust and other elements.

7. **Varifocal:** A camera with a varifocal lens allows the operator to zoom in or out while still maintaining focus on the image.

8. **PTZ/Speed Domes**: Pan/tilt/zoom cameras give the surveillance operator the ability to move the camera left or right (pan); up and down (tilt); and zoom the lens closer or farther. These are relegated to surveillance situations where there is an actual live guard or surveillance specialist monitoring the images. There are cameras that have automated pan/tilt/zoom functionality where the camera is moving on a timed basis. These are many times used to cover a wide area with only one camera, or to avoid poor light conditions, such as a setting sun.

IP Camera

An **Internet protocol camera**, or IP camera, is a type of digital video camera commonly employed for surveillance, and which, unlike analog closed circuit television (CCTV) cameras, can send and receive data via a computer network and the Internet. Although most cameras that do this are webcams, the term "IP camera" or "netcam" is usually applied only to those used for surveillance.

There are two kinds of IP cameras:

- Centralized IP cameras, which require a central network video recorder (NVR) to handle the recording, video and alarm management.
- Decentralized IP cameras, which do not require a central NVR, as the cameras have recording function built-in and can thus record directly to any standard storage media, such as SD cards, NAS (network-attached storage) or a PC/server.

IP Camera Configuration

1. Install IP Camera software to the computer.

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