Introduction to CCTV

Closed Circuit Television

Order Online

CCTV Definition

A closed circuit television is a system in which the circuit is closed and all the elements are directly connected. This is unlike broadcast television where any receiver that is correctly tuned can pick up the signal from the airwaves.

Significance of CCTV

Security experts in retail long ago learned that video taping a shoplifter in the act improves the likelihood that the **alleged criminal is convicted** in a court of law. "Photographs [video] of a crime scene, or any pertinent segment thereof, are as much a form of evidence as a gun used in a murder or a knife in an assault case" (Gilbert B. Stuckey, Evidence For The Law Enforcement Officer, McGraw Hill Book Company, New York, NY).

Not only is video helpful in **establishing the identity** of a criminal who has committed a crime, but it also documents what the crime scene looked like at the time that the crime took place. This is ideal for viewing at a later time. Video recording also helps establish mood and they help to refresh peoples' memories of a crime incident, long after it has occurred.

In the hands of a security manager, a recorded video of a crime in progress is a valuable tool. It enables security to remove the alleged criminal to the security office or surveillance room where he is made to watch the alleged crime. In most cases, this is enough to convince the culprit to settle the incident out of court.

CCTV systems are also helpful in **the residential security market**. They allow homeowners to see their callers, thus establishing their identity before they open an outside entrance door. This is an important feature too, because otherwise, they might open their door to a criminal.

Applications for CCTV

Probably the most widely known use of CCTV is in security systems and such applications as retail shops, banks, government establishments, etc. The true scope for applications is almost unlimited. Some examples are listed below.

- Monitoring traffic
- Watch kids at home with the babysitter
- Monitoring a day care center
- Production control in a factory
- A temporary system to carry out a traffic survey in a town centre
- The well-publicized use at football stadiums
- Reduce employee theft and shop lifting
- Hidden in buses to control vandalism
- Recording the birth of a gorilla at a zoo
- Aerial photography from a hot air balloon

The list is almost endless and only limited by the imagination.

Do you really need CCTV?

Closed Circuit Television is not the panacea to all security and safety problems that many people believe it to be. CCTV should only be part of an integrated approach that considers all aspects of the security problems being experienced.

1. Set out your problem

There must be a starting point for preparing a specification so that it will reflect the reason for producing it. Make a statement of the problems that are to be resolved, such as:

- Vandalism in Town Centers.
- Shop theft.
- Industrial or commercial break-ins.
- The target for the intruder, is it material goods or information? I.e. industrial espionage.
- Danger to individuals from attack.
- Health and safety of individuals on the premises or site.
- To replace or reduce manned guarding.
- To supplement manned guarding, making them more efficient.
- To monitor persons entering and leaving the premises.
- To provide visual confirmation of intruders activating an alarm.
- To monitor a remote, unattended site.

The list is obviously endless in general terms, but for a particular site, there must be definite reasons for considering CCTV. If they cannot be listed, you probably don't need it.

2. Set out possible solutions

Having set out the problem to be resolved, the next consideration is how a solution can be achieved. Some of the possibilities are:

- Better lighting, in itself a strong deterrent.
- Better fencing and gates around the perimeter.
- An intruder alarm.
- Perimeter protection by fencing movement detection.
- Perimeter protection by buried detectors.
- Improving physical security, better locks and doors, etc.
- CCTV
- Passive infrared beams.
- Active infrared beams.
- Access control, barriers.
- Manned guarding.

Again, the list will depend on the circumstances and requirements on any particular site, but it is important to at least make a list and consider all the possibilities.

3. List pros and cons for each possible solution

Many of the items in the list will be impracticable and so you should finish up with a short list of possibilities. The next thing is to comment against each one the pros and cons. Sometimes the solution will point to a need for integrating two or more types of system.

Choosing a CCTV system

1. Set down a list of objectives for the system

Set down what you expect the system to achieve. This can be a simple statement describing the aims of the system and will help in designing the layout. The overall objective could be the statement describing the aim of the system. For example,

"The system will consist of three fully functional monochrome cameras at specified locations. The cameras will be fitted in discrete domes and be capable of being directed to eight pre-set positions of pan, tilt, and zoom. These will be connected back to a control room at the Police Station. The controls will consist of a multiplexer, time lapse VCR and telemetry controller. The system will be monitored on one 17" and three 12" monochrome monitors. There will be a real time VCR for recording events from the 17" monitor."

Then the system is needed for the following achievements:

- *To provide a deterrent to crime and vandalism in the Town Center.*
- *To enable 24 hour monitoring of all the designated areas.*
- *To enable clear identification of miscreants within the range of the cameras.*
- *To provide continuous recording of all cameras in the system.*
- *To enable rapid movement of any camera to pre-set positions of pan, tilt and zoom.*
- *To provide independent viewing of any camera at the police station.*
- *To enable live, real time recording of selected cameras.*

Basic System Layout - There are two possibilities:

1. The first is that the end user knows exactly where all the cameras are to be fitted and the location and operation of the control room. This is quite common in Town Center systems where the Local Authority, Police, and other parties have determined the areas for surveillance and operation of the system. In these cases, the next step is to prepare the specification.

2. The second possibility is that the end user knows the problems to be tackled but does not have a clue how a solution can be achieved. The common approach to this is to describe the problems to several installation companies and obtain quotations. The problem with this is that the customer will not have the knowledge to make an objective assessment of the several different solutions and costs submitted. The answer here would to employ the services of a competent consultant.

Prepare the specifications

The form of the specification will depend on the technical knowledge of the person producing it. This is an area where a little knowledge can be very dangerous and costly. The concept of the specification should be that is easy for tendering companies to understand exactly what they are expected to price for without wading through reams of documents. The more difficult it is to comprehend a specification; the greater will be the variation in tender prices.

CCTV Market

The Closed Circuit Television (CCTV) market is one of the fastest segments of the security industry today.

One reason for this is the fact that a picture is worth a thousand words. This is especially true in a court of law where an eye witness is required who can place the criminal at the scene of a crime. Otherwise, chances are he won't be convicted.

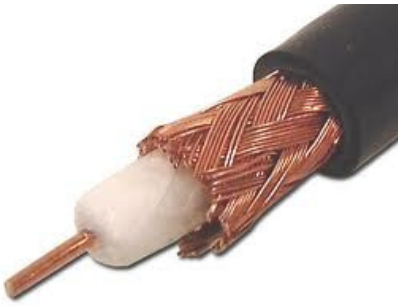
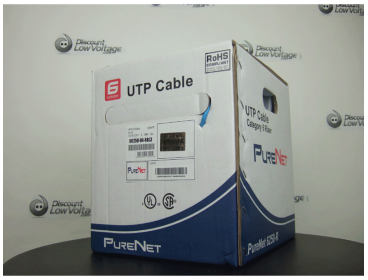
CCTV Equipment Basics

Camera systems often appear to be complicated; but in truth, they can be categorized into three groups

1. Video collection: This end collects the image from object and send via the transmission media to the processing end. It is constructed from camera, lens, power and mounting accessories.




2. Signal Transmission Media: This media will receive the signal from the camera end and send it to the video management end with lowest possible attenuation. This media could be wired or wireless transmission.

3. Video management: This end will receive the signal and process it to be viewed. A video processing unit, recording unit and a monitor construct this end.



Video Collection

Camera

Lens

Housing

Mounting Accessories

Camera

A camera is designed to collect the reflected light from objects around them and then to convert them into electronic video signals that measure 1 Vpp (Volt, peak to peak). These signals then are transported by one of many transmission media to the monitor, where these signals are converted back to visible light in a CCTV monitor.

Cameras could be divided into 4 categories:

- Monochrome camera

  Produce black and white picture

- Color camera

  Produce Color picture

- Day/Night Camera

  Color picture in a daytime light level

  Monochrome picture below certain light level, automatically changed

- IR (Infrared) Cameras

  Color picture during the day

  Monochrome picture when used with infrared illuminator.

Cameras require more knowledge and skill to install than any other part of a CCTV system. There are several factors that have to be considered to choose the right camera. Installers must consider such things as light sensitivity, lines of horizontal and vertical resolution, available light at the target, and the technology behind the imager. All of these things are important because they help determine how well a camera performs in an environment.

Some of the main factors that have to studied before choosing a camera are:

Pickup Element

It is the electronic element that captures the image and change to electronic signal. Obviously, the pickup element is one of the major features of the CCTV camera. This element will affect the rest of the features of the camera such as resolution and illumination, electronic shutter, etc

There are two basic types of pickup elements in the market, the older CRT (cathode ray tube) type and the more recent CCD (Charged Coupled Discharge), which all CCTV manufacturers use the later.

Horizontal resolution

Chrominance and luminance resolution (detail) are expressed horizontally across a picture tube. This is usually expressed as a number of black to white transitions or lines that can be differentiated. It is always limited by the bandwidth of the video signal or equipment.

Illumination

Illumination is a standard measurement for light. In CCTV, minimum illumination is the minimum amount of light necessary for the camera to capture an acceptable image. Illumination is usually expression if fc (foot candle) or in Lux.

$$.0929\ fc = 1\ Lux$$

Or simply

$$10\ Lux = 1\ fc$$

Light Levels		
Direct sunlight	1000000 to 200000	Lux
Full daylight	10000 to 90000	Lux
Overcast day	1000	Lux
Dusk	100	Lux
Twilight	10	Lux
Deep twilight	1	Lux
Full moon	0.1	Lux
Quarter moon	0.01	Lux
Moonless night	0.001	Lux
Overcast night	0.0001	Lux

Synchronization

Electronic pluses that are inserted into the video signal in order to assemble the picture correctly.

Line Lock

The ability to synchronize AC powered cameras to the same line voltage frequency

AGC

Automatic Gain Control, an electronic circuit that amplifies the video signal when the strength of the signal falls below a given value

BLC

Back light compensation. A function of the camera that compensates for excessive light directed at the camera causing the video to bloom or causing the images in front of the light to be unusable

ES

Electronic Shutter. CCD Iris, which eliminates the need for an Auto Iris Lens. The CCD Iris automatically controls the light intensity by adjusting the electronic shutter speed to mimic auto iris control.

Aperture Correction

Compensation for the loss in sharpness of detail because of the finite dimensions of the image elements or the dot-pitch of the monitor

Auto White Balance

A feature that allows a color camera to automatically adjust its color to sharpen white areas within the picture

SNR

Signal-to-noise ratio. The SNR relates how much stronger a signal is than the background noise. Usually expressed in decibels (dB)

SNR (S/N)	Picture quality
60 dB	Excellent, no noise apparent
50 dB	Good, a small amount of noise but picture quality good.
40 dB	Reasonable, fine grain or snow in the picture, some fine detail lost.
30 dB	Poor picture with a great deal of noise.
20 dB	Unusable picture.

Lenses

A basic definition of a lens is "A device that collects light from an environment, narrowly focusing it onto either a cathode ray tube or solid-state target."

Without the proper lens, video images cannot be focused onto the light-sensitive target in a video camera to produce a "usable" video signal. Among the many issues that pertain to a CCTV system, the most important that should be considered before buying a lens are:

Format

Lenses and cameras now come in four formats: 1/3-, 1/2-, 2/3-, and 1-in. Lens format is actually determined by the size of the opening in a camera where the lens attaches. When the diameter of this opening measures 1/3 in., the camera is said to be a 1/3-in. formatted camera.

For proper viewing, use only a lens that is formatted the same or higher than the camera used. For example, if the opening in a camera (camera format) is 1/2 in., a 1/2- to 1- in. formatted lens should be used for optimum viewing. Or, if a camera with an opening of 1 in. is used, use a 1-in. formatted lens. To do otherwise will result in the projection of only part of the viewing area onto the target in the camera.

C and CS Mount

C and CS mount camera is the positioning of the pickup element. A C-mount camera sets the lens at a distance of 17.526 mm away from the pickup chip. Whereas, A CS-mount camera sets it at 12.526 mm. So there is a 5 mm difference between the C and CS mount.

For instance CS-camera works with CS-lens, C-camera works with C-lens, and CS-camera with C-lens if we add a *5 mm extension ring*.

Iris

The iris is a small aperture through which light must pass before it can strike the light-sensitive target inside a camera. In low light, for example, the aperture is fully opened and in bright light, it will nearly be closed.

Fixed-Iris and Manual-Iris

Fixed-iris and manual-iris lenses can be used in situations where the light essentially stays the same all of the time. This type of application is often found inside of buildings where the lights never vary, no matter what time of day it may be.

Auto-Iris Lenses

A lens with an auto-iris feature should be used in environments where the light intensity can vary from minute by minute, hour by hour, or day by day. This is almost a necessity in outdoor applications and where lights change throughout the day.

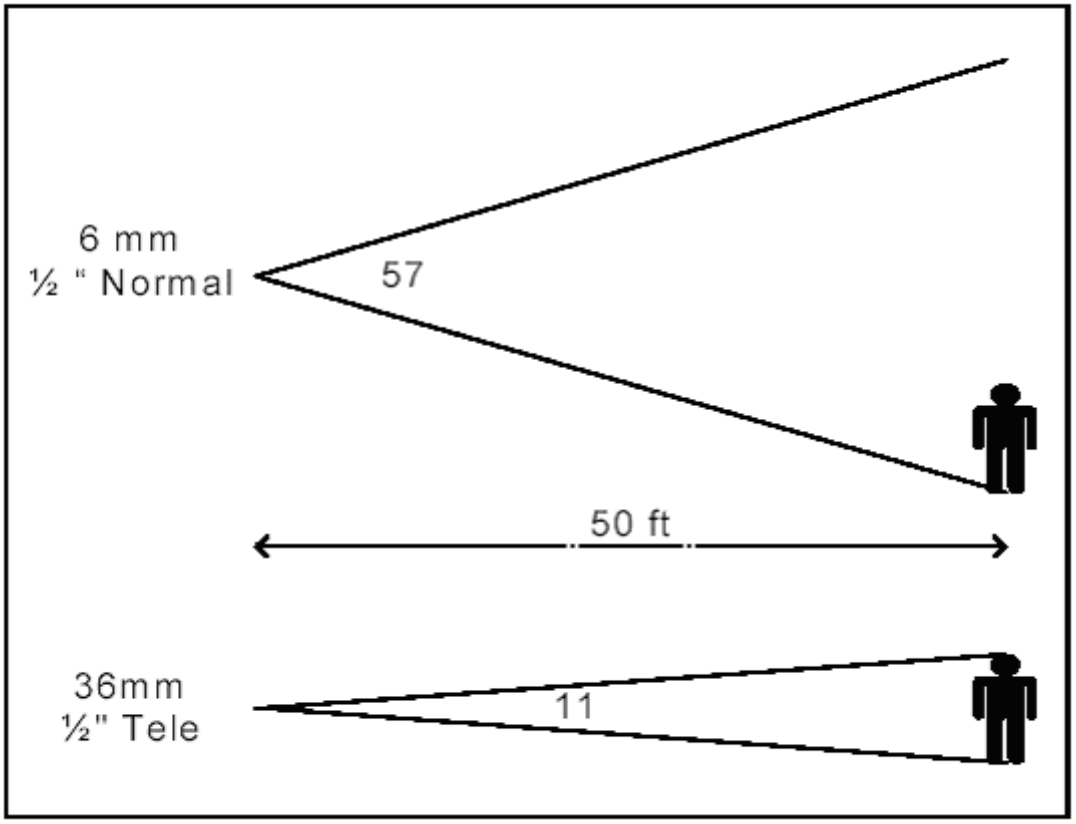
To measure the size of an aperture opening, the lens industry adopted the F-stop measurement. The larger the F-stop number, for example, the smaller the opening. Thus, when a camera is set to an F-stop of f-1.4, the size of the aperture is larger than when the same lens on the same camera is adjusted to f-8 or f-22. In a fixed-iris lens, the aperture is set and cannot be changed. In manual- and auto-iris lenses, however, the aperture can be changed to suit the amount of reflective lighting in the environment.

Focal Length

The Focal Length (FL) of a lens is actually the distance from the center of the lens to the surface of the tube or solid-state target.

As the focal length of the lens **increases**, the area being viewed **decreases**. Focal length may be fixed (fixed field of view) or variable (variable field of view using a zoom length).

Description	1"	2/3"	1/2"	1/3"	Horiz FOV
Telephoto	25mm	16mm	12mm	8mm	30°
Normal	12.5mm	8mm	6mm	4mm	55°
Wide Angle	6.5mm	4mm	3.6mm	2.6mm	95°
Super Wide Angle		3.8mm	2.6mm		140°

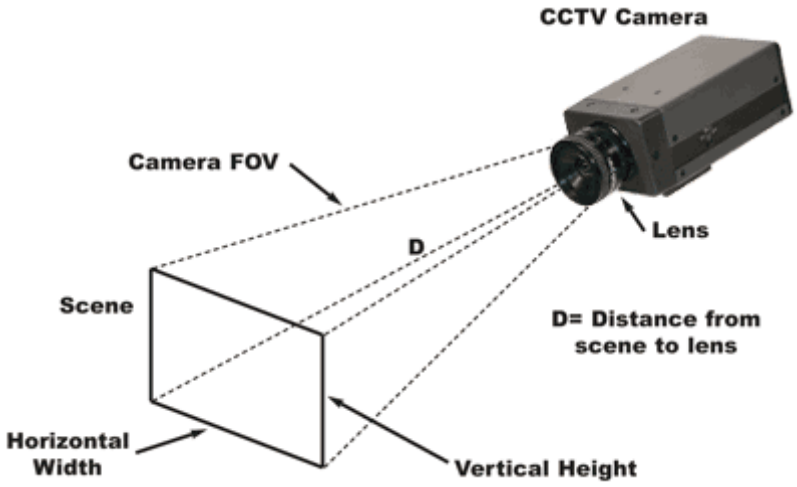


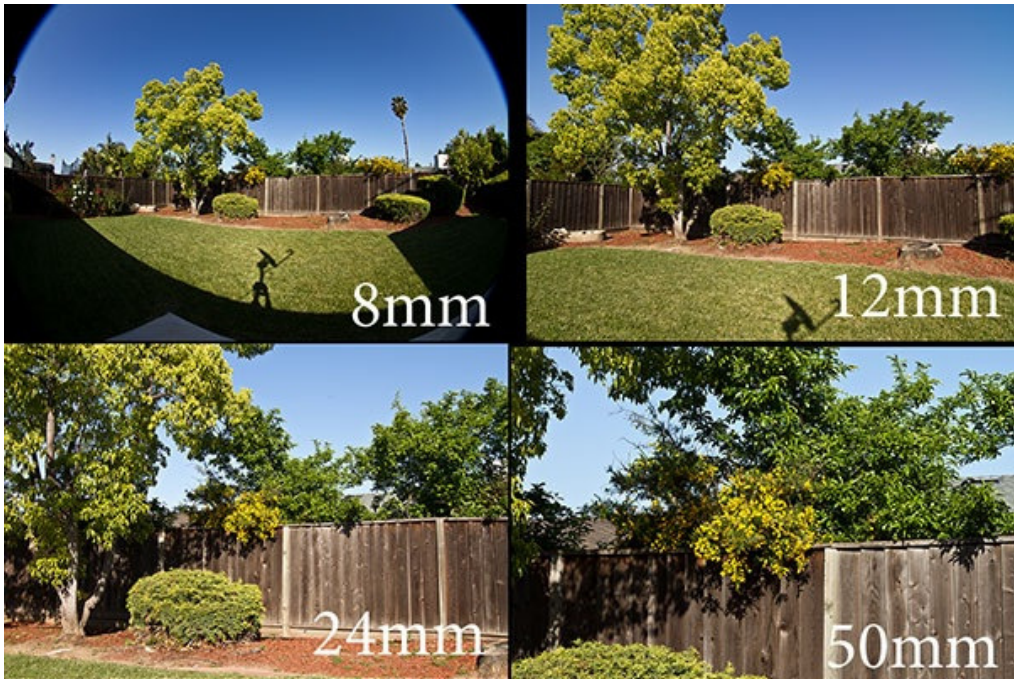
Field of View

The FOV is the horizontal or vertical scene size at a given length from the camera to the subject. An important aspect that must be considered before choosing a camera lens is the field of view (FOV), or the actual area that the camera is expected to "see."

Below is a table that shows the width and the height of the FOV on a 1/3" format camera and lens.

Focal Length (mm)	5 ft		10 ft		20 ft		40 ft		50 ft		100 ft	
	W	H	W	H	W	H	W	H	W	H	W	H
2.6	9	7	19	14	37	28	74	55	92	69	185	139
3.6	7	5	13	10	27	20	53	40	67	50	133	100
4	6	5	12	9	24	18	48	36	60	45	120	90
6	4	3	8	6	16	12	32	24	40	30	80	60
8	3	2	6	5	12	9	24	18	30	23	60	45
12	2	2	4	3	8	6	16	12	20	15	40	30
16	2	1	3	2	6	5	12	9	15	11	30	23
25	1	1	2	1	4	3	8	6	10	7	19	14
36	1	1	1	1	3	2	5	4	7	5	13	10
50	1	0.4	1	1	2	1	4	3	5	4	10	7
75	0.3	0.2	1	1	1	1	3	2		2	6	5



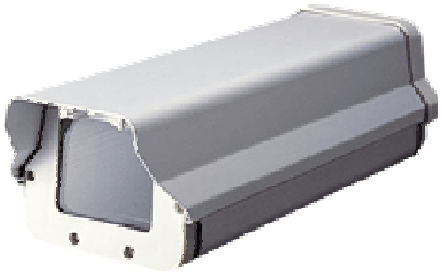


Housing

Housing are made in different shapes, materials, and mounting forms to fits different applications. It could be for protecting from the weather and environment, for protecting from vandalism, or for hiding the pointing direction of the camera.

Shapes

YouTube **DOME**



BLOCK

MOUNTS

YouTube **CEILING OR WALL - 3 AXIS**

YouTube **PARAPET**

PENDANT

Video Transmission Media

Video

Data

Power

CCTV transmission is mainly related to transmission of video, data and power. The transmission of video and data signals could be done using wires or wireless, whereas, the power signal has to be connected using wires.

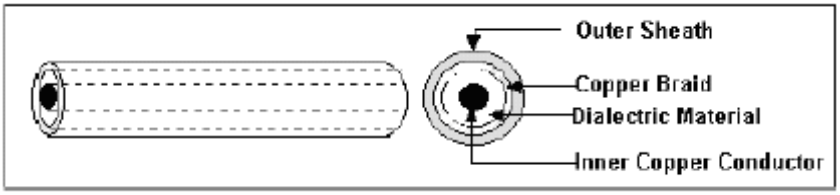
Video Cable Types

There are two main types of cable used for transmitting video signals, which are: Unbalanced (coaxial) and balanced (twisted pair).

Unbalanced (Coaxial) Cables

This type of cable is made in many different impedances. In this case impedance is measured between the inner conductor and the outer sheath. 75-Ohm impedance cable is the standard used in CCTV systems. Most video equipment is designed to operate at this impedance. Coaxial cables with an impedance of 75 Ohms are available in many different mechanical formats, including single wire armored and irradiated PVC sheathed cable for direct burial. The cables available range in performance from relatively poor to excellent. Performance is normally measured in high frequency loss per 100 meters. The lower this loss figure, the less the distortion to the video signal. Therefore, higher quality cables should be used when transmitting the signal over long distances.

Another factor that should be considered carefully when selecting coaxial cables is the quality of the cable screen. This, as its name suggests, provides protection from interference for the center core, as once interference enters the cable it is almost impossible to remove.



Balanced (Twisted Pair) Cables

In a twisted pair each pair of cables is twisted with a slow twist of about one to two twists per meter. These cables are made in many different impedances, 100 to 150 Ohms being the most common. Balanced cables have been used for many years in the largest cable networks in the world. Where the circumstances demand, these have advantages over coaxial cables of similar size. Twisted pair cables are frequently used where there would be an unacceptable loss due to a long run of coaxial cable.

The main advantages are:

1) The ability to reject unwanted interference.

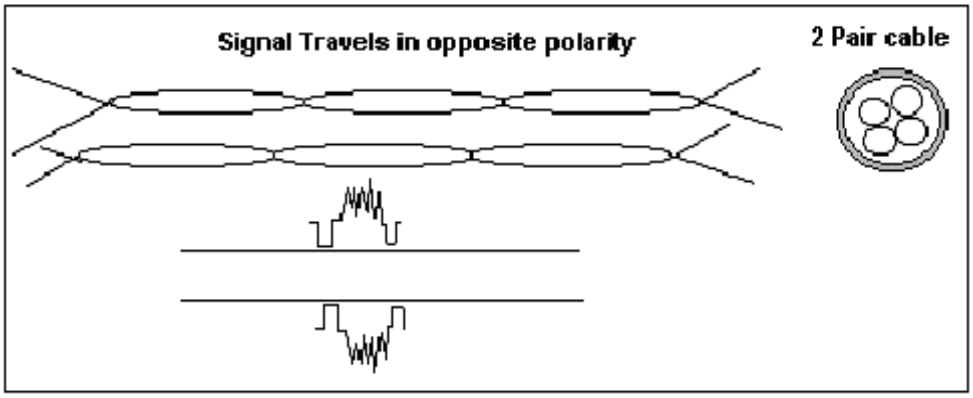
2) Lower losses at high frequencies per unit length.

3) Smaller size.

4) Availability of multi-pair cables.

5) Lower cost.

The advantages must be considered in relation to the cost of the equipment required for this type of transmission. A launch amplifier to convert the video signal is needed at the camera end and an equalizing amplifier to reconstruct the signal at the control end.



Typical Cable Losses

A selection of commonly used cable specifications is given below.

Cable ref.	Type	Impedance	Loss/100Metres
CT125	Coaxial	75W	1.1dB
CT305	Coaxial	75W	0.5dB
CT600	Coaxial	75W	0.3dB
URM70	Coaxial	75W	3.3dB
RG59	Coaxial	75W	2.25dB
TR42/036	Twisted Pair	110W	2.1dB
9207	Twisted Pair	100W	2.3dB
9182	Twisted Pair	150W	2.7dB

Video non-cable type transmission

The previous section dealt with the transmission of video signals by various types of cable. There are many instances where it is not possible or desirable to use cable and other methods need to be employed. These can be:

- Infrared beams
- Microwave
- Public telephone networks
- Optical fiber cables

Infrared Beams

With this type of system the video is superimposed onto an infrared beam by a transmitter. The beam is aligned to strike a receiver where the signal is output as a conventional composite video signal. The infrared beam is at a wavelength of 860 nanometers, which is above the visible part of the spectrum. The system may be configured as a full duplex set up. Then it is possible to transmit telemetry control signals in the reverse direction to control pan, tilt units. The system can also carry speech in both directions. The actual configuration must be specified at the time of obtaining quotations or ordering.

Microwave Transmission

Microwave links carry the video and telemetry along a link from a transmitter to a receiver. They are capable of much farther transmission distances from 1 kilometer to 50 kilometers. They are largely unaffected by weather conditions. On the other hand they are more expensive than infrared links.

Transmission by Telephone Systems

There are two main methods of transmitting speech or data through the system. The original is the **P**ublic **S**witched **T**elephone **N**etwork, abbreviated to PSTN. The latest system is known as the **I**ntegrated **S**ervices **D**igital **N**etwork, abbreviated to ISDN. The fundamental difference between the two systems is that the PSTN uses analogue signals whereas the ISDN uses digital transmission. The most significant benefit of ISDN is in the speed of transmission, which is many times that of the PSTN.

Fiber Optic Transmission

Fiber optics is the technology of transmitting data along cables that consist of **optical fiber.**

- Optical fibers are much smaller and lighter than copper, therefore easier and cheaper to install in long runs.
- A major advantage of optical fibers is that they can carry far more information than copper.
- Optical fibers are completely immune to interference from electromagnetic sources.

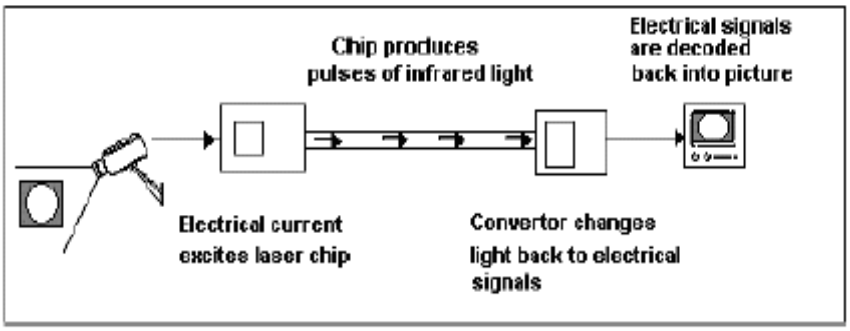


Diagram Basics Of Fiber Optic Transmission

Power Cable

The CCTV cameras usually use 3 different kinds of voltages: 12V DC, 24V AC and 110V AC (220 V AC).

Usually 12 VDC cameras come with its power supply pre-wired.

When 24 VAC PSU is used, the recommended cables are:

UL SPT-1 VW-1 E94163 18AWGx2C

UL SPT-2 VW-1 E94163 18AWGx2C

UL E115988 SUT 105□C VW-1 18AWGx3C

Video Management

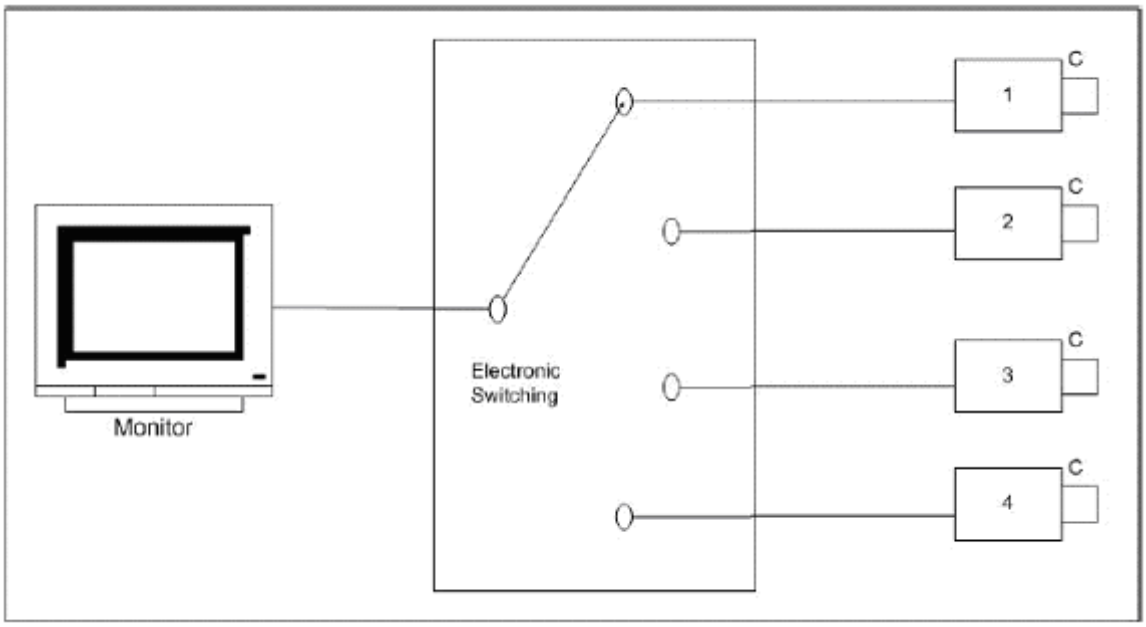
Switcher / Matrix Switcher

Multiplexer / Quad

Recorder (Analog and Digital)

Monitors

Basic Switcher Concept



The “basic” switcher, as shown above, will select a video signal from any of the inputs and route it to the monitor for display.

This can be a manual switch – Callup, or automatically switched – Sequencing.

Common Features

- Sequence Capability
    1. All Inputs
    2. Selected Inputs Only
- Adjustable Dwell Time
- Individual Call-up

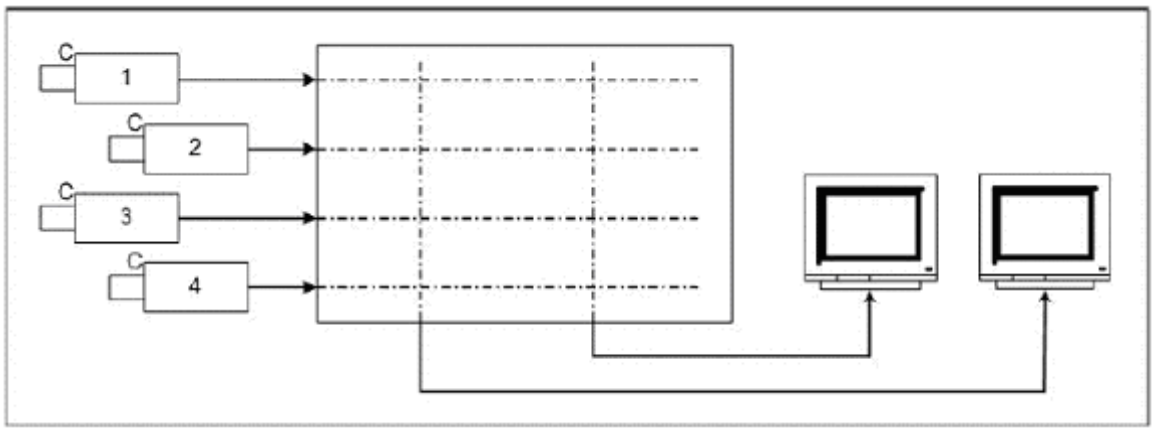
Vertical Interval Switching

Good Features to Look For:

- Alarm Call-up
    1. Automatic/Manual Acknowledge
    2. Alarm Capture
    3. Multiple Alarm Adjustable Dwell Time
    4. Alarm Output

- Sequence Auto-Skip
- Camera Identification
- Individual Dwell Time Per Camera
- On-Screen Programming
- On-Screen System Status (User Selectable)
- Looping Inputs
- Remote Site Control Capability

Matrix Switcher



Matrix Switching Conceptional Diagram

General Definition

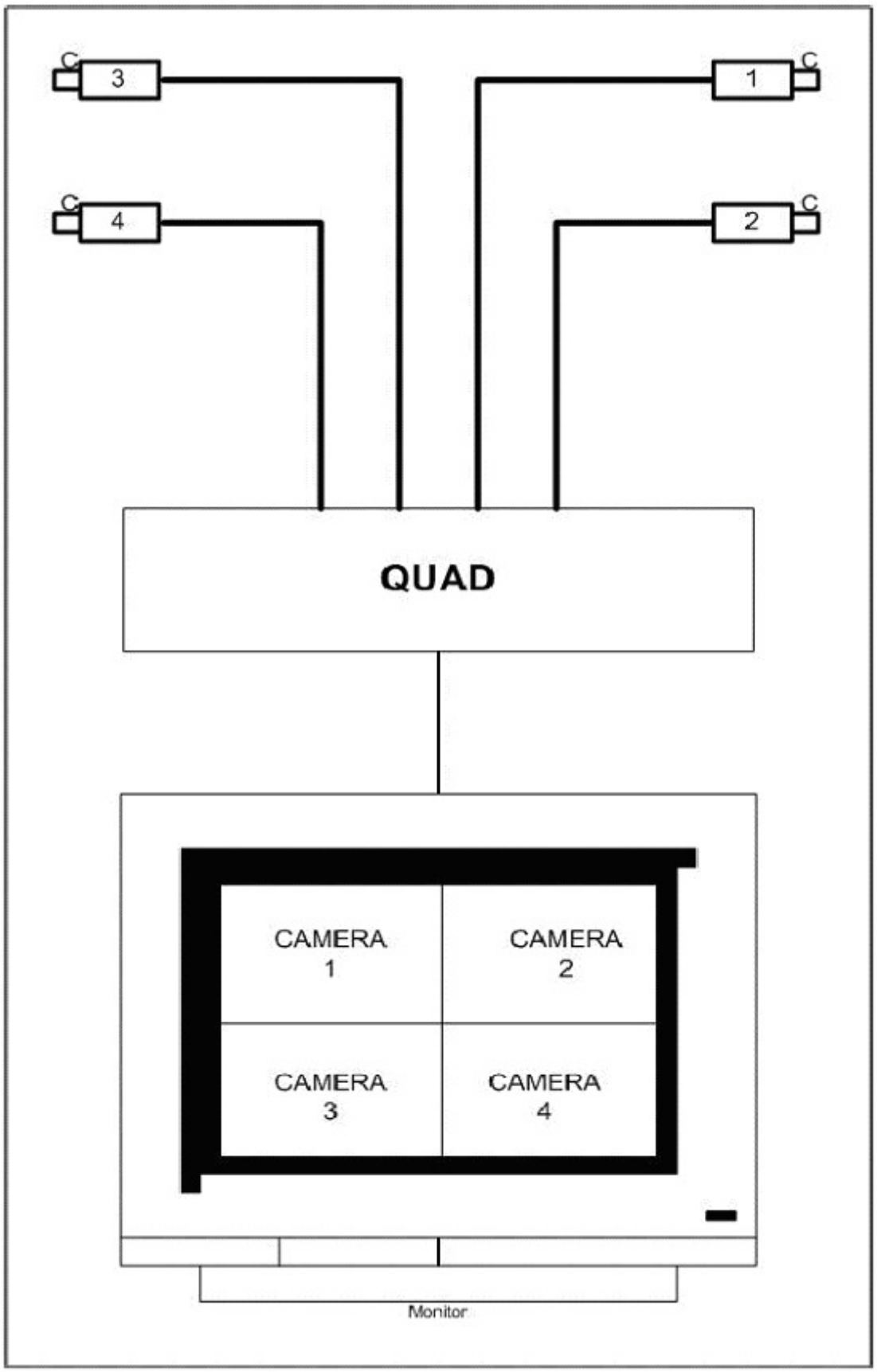
A Matrix Switcher is a video switcher that permits any camera to be displayed on any system monitor AND permits a single camera to be displayed on all system monitors simultaneously. This capability is also known as Full Crosspoint Switching.

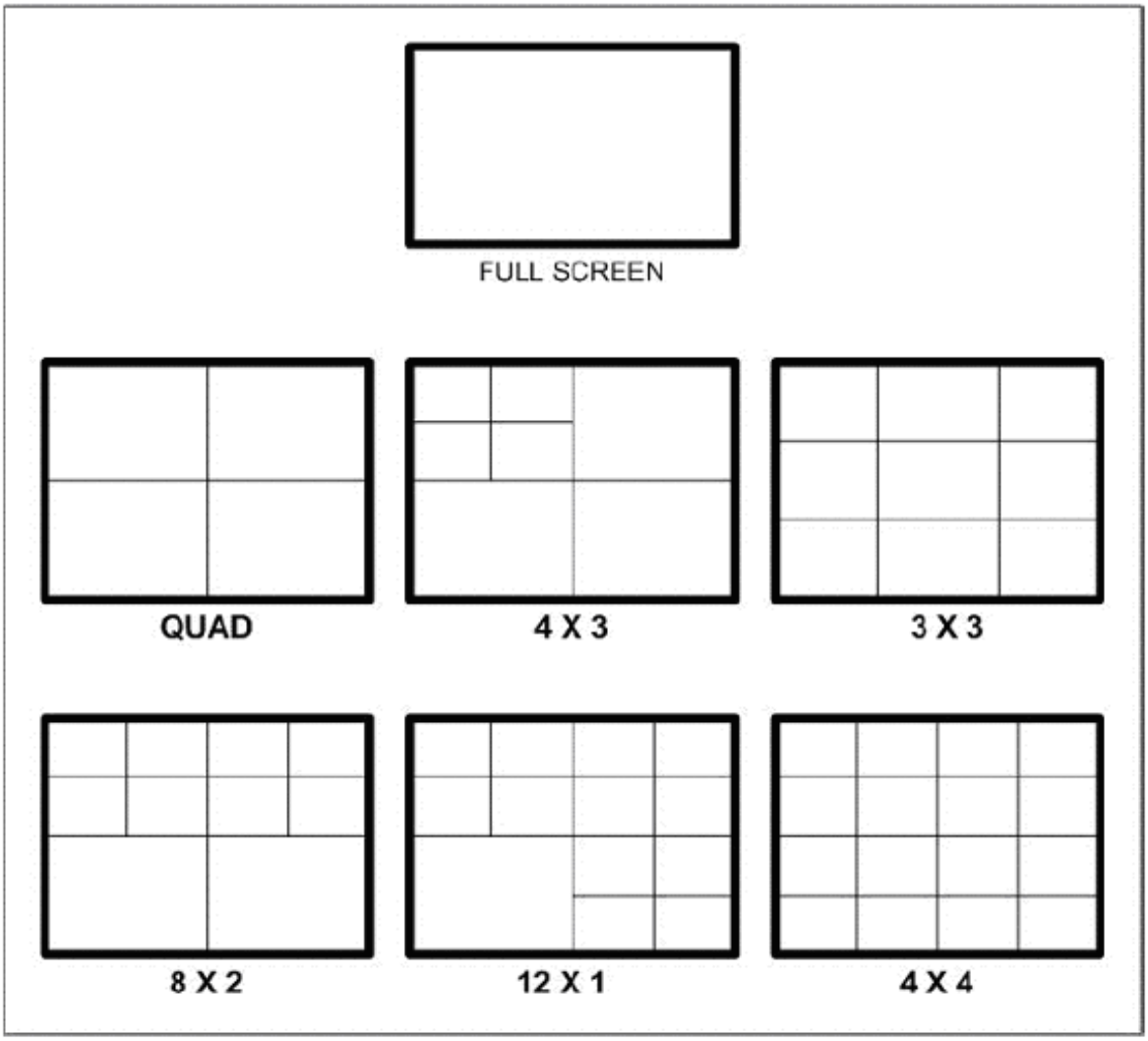
Common Features of a Matrix

- Capacities range from a dozen cameras and a handful of monitors up to several hundred cameras and tens or hundreds of monitors
- May consist of a dingle equipment bay or multiple bays
- Contain integral generator for camera number, title and time/date
- Any system monitor can run an independent sequence
- Usually microprocessor based
- Most have the ability for pan/tilt/zoom control
- Automatic alarm activated video capabilities
- Multiple keyboards especially on the larger systems

Good Features to Look For:

- Directional sequence control and Salvo switching capability
- Flexible alarm configuration with alarm titles, selectable alarm capture, activation of receiver / driver functions on alarm (especially preposition), multiple alarm response modes, etc
- In addition to pan/tilt/zoom control, capability for remote auxiliaries, and multiple prepositions should exist
- Dwell time of sequencing cameras should be independently selectable
- PC driven configuration program should be available
- Various lockout/operator restriction capabilities for multiple keyboard systems
- Receiver/driver local test feature at pan/tilt/zoom site
- Time activated features to include at least sequence control
- Camera renumbering capability
- Modular design especially on larger systems
- Installer friendly design


3
1
4
2
QUAD
CAMERA 1
CAMERA 2
CAMERA 3
CAMERA 4
Monitor



Multiplexer Screen Formats

CCTV VCR

Video Recorders

Today, VCR's are considered a mature technology – having been commonly used in a domestic capacity since the early 80's. The principal function difference is the ability for a VCR to record for at least a 24 hour period. This is achieved as information is taped periodically rather than continuously.

A standard domestic VCR records continuously in real time, with 25 frames per second, 2 fields per frame (a total of 50 images in all). An industrial machine, on the other hand, has selectable recording intervals, allowing you to reduce the amount of information you tape depending on your requirements. If the record rate is dropped to 8.33 frames per second (16.66 images in total) the VCR can then span recording to 24 hours worth of information.

Good Feature to Look For

- Test Output
- Audio Record in Time Lapse
- Alarm Input
- Alarm Output
- Alarm Search
- Alarm Priority
- Multiple Camera Inputs
- Selectable manually or via alarm input

Digital Video Recorders

The late 1990's have seen the emergence of Hard Disk Recorders (HDRs) that are essentially multiplexers with a computer hard disk memory to store images. HDRs are excellent at reproducing high quality images with little noise or picture degradation and are extremely useful in calling up an alarmed picture.

Most HDRs use JPEG compression, which requires significant memory to store information. HDR technology is advancing rapidly and promises to revolutionize the ease of retrieval and quakity of video information and have an equally dramatic effect on the CCTV market.

The switch from VCRs to digital video recorders (DVRs) began a few years ago and has been slow: however the pace is quickening. Here are a few good features to look for in a DVR

Ability to download video to an external media.

Many low-end digital recorder units are missing one of videotape's key features. When an incident happens, such as a robbery, police will ask for the tape. With video tape this is simply a process of removing the tape, handing it over to the authorities and placing a fresh tape in the VCR.

Amazing as it may seem, there are digital recorders on the market that do not have an easy way to provide police with a copy of the event images. The entire machine has to be given to police, leaving the establishment without a recording device.

What you should be looking for is a digital recorder that allows the user to simply and quickly download mages to some type of external media, such as a Zip disc.

Play and record at the same time remotely or onsite.

View over your mobile phone.

The ability to play back images and record at the same time is a huge advantage. VCRs simply can't do this. But be wary, because not all digital recorders offer this feature. When in playback mode, some digital recorders stop recording.

The same thing applies when viewing live images. Digital recorders should be capable of multitasking or "duplexing" by performing the record and playback or live viewing functions simultaneously.

Remote access to live or recorded images.

One of the most attractive features digital recorders have to offer is the ability to view live or recorded images from a remote location. This feature alone generates interest and often leads to a decision by your customer to make a purchase.

Users quickly recognize the benefit of monitoring multiple sites for both security and operational purpose from the comfort of their own office. The reduced travel time is usually enough to justify the cost.

Internal or integral motion detection to maximize storage and search capabilities.

Many digital recorders available today can easily save images for 90 days or longer. One reason is that the cost of adequate hard drive space has dropped significantly and is very affordable.

But the bigger reason is a feature known as internal motion detection. This feature extends the hard drive storage capacity – in some cases up to 50 percent – to more than was previously thought possible.

Capacity is increased because the only images saved to the hard drive are those where motion is detected. Plus, recorders with internal motion detection will create a searchable audit trail by camera every time there is motion.

The audit trail of motion is the single most important feature when it comes to searching for images. Unlike videotape, you can instantly find images by date and time with a digital recorder. Also, you only need to look at images that have activity.

DVRs are multifunctional devices

A true digital recorder is a multifunctional device. The very nature of the technology allows a single unit to replace not only the recorder, but also all of the accessory items needed to run a VCR-based CCTV systems. There is no need for multiplexers, switchers or any other device other than cameras.

There are products claming to be digital recorders that require the the user to have a multiplexer or some other device. These products will not survive the digital revolution once the consumer is educated and understands the availability of products that perform multiple functions.

Monitors

After a camera converts an image into an electrical signal, the video signal is transported to a remote point for viewing and possibly recording. This is common in applications where one or more cameras are monitored at a security kiosk or an administrative office. Here the video signal is then converted from its electronic form back to light, via a CCTV monitor, so security guards, office personnel, or others can perform surveillance duties.

Televisions, for example, are designed to receive commercial video and audio signals that are broadcasted over the UHF and VHF frequency bands. CCTV monitors, on the other hand, are designed to receive composite video signals direct over a coaxial cable, whether they arrived over the same coaxial cable, a fiber-optic link or a microwave/radiated radio-frequency link.

Viewing Distance and Resolution

One accepted method of determining monitor distance and size is based on the mathematical formula:

Monitor (inches) - 4 = Viewing Distance (+/- 25%)

For example, to find out how far away a 12-in. monitor should be used, plug the values into the equation and do the math:

12 - 4 = 8 ft.

To establish the upper and lower viewing limits, multiply the value of 8 ft. by 1.25 and .75, or:

8 x 1.25 = 10 ft.

8 x .75 = 6 ft.

Thus, a 12-in. monitor should be viewed effectively at a distance of 6 to 10 ft. a 9-in. monitor can be viewed effectively from a distance of 3.75 to 6.25 in.

Discount-Low-Voltage.com is the e-commerce division of Cable & Wireless Technologies, Inc., a wholesale distributor of low voltage products, tools, testers, and other devices for telephone, computer network, home theater, commercial sound, video surveillance, CCTV, and other types of low voltage installations. We promise to deliver a high quality product to you quickly at a competitive price. As a small employee owned business, we're motivated to get your order right and make you happy, because we value your repeat business. Customer service is our #1 priority. There are no automated messages here. Give us a call, we'll make you glad you did!

History

Cable & Wireless Technologies was founded in 1999 as a low voltage voice and data wiring products distributor, focused on serving the contractor and state government markets. In 2008, we saw the need for an online web store that could serve our customers needs 24-7-365. We opened Discount-Low-Voltage.com to fulfill that need. With decades of years experience in the low voltage industry, we have the know-how to offer you the best products available at the best prices around. And were proud to say, in over 11 years of business, we have never had an automated voice mail system answer your calls. That's right! We pick up the phone.

Discount-Low-Voltage.com
Cable & Wireless Technologies, Inc.
4071 E. La Palma Avenue #G
Anaheim, CA 92807
(888)797-3697
sales@discount-low-voltage.com