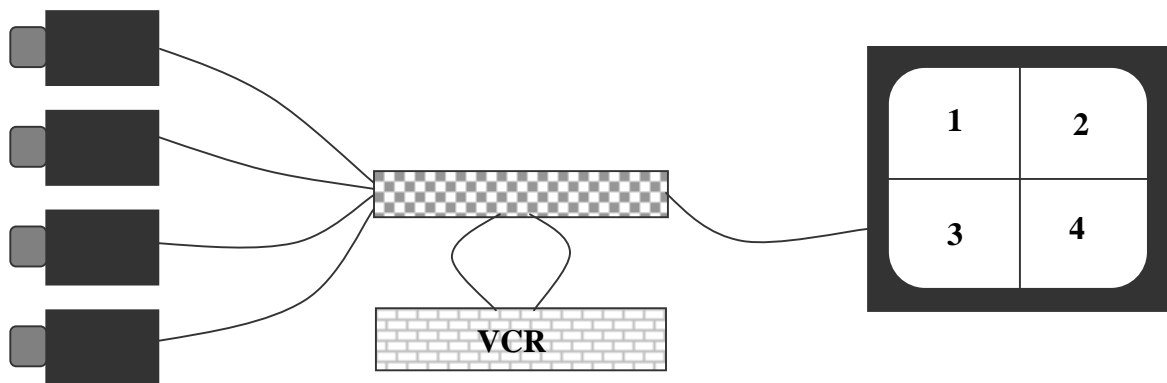


Multiplexers

Multiplexers combine the best features of switchers and quads. They allow full screen, full resolution recording of cameras. They allow multiple cameras to be displayed at the same time. Multiplexers are available for use with black and white and color cameras. A color multiplexer will typically display black and white cameras normally, but a black and white multiplexer will only display color cameras in black and white.



Recording Comparison – Switcher

When the output of a switcher is connected to a recording device only the camera being displayed is recorded. The images are recorded full frame, full resolution, but they are only recorded when they are displayed. While the switcher is displaying camera #1, it is missing cameras two through four. The amount of time lost is dependant upon the dwell time of the switcher.

Switcher Recording Example

1	1	1	2	2	2	3	3	3
---	---	---	---	---	---	---	---	---

Recording Comparison – Quad

When the output of a quad is connected to a recording device, all 4 cameras are recorded to a single frame. The images are compressed by the quad, and up to 75% of the original resolution are lost. No recording is lost, but the quality of the recording is less than that of a switcher.

Quad Recording Example

1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4

Recording Comparison - Multiplexer

When the output of a multiplexer is connected to a recording device, all cameras are individually recorded in sequence. Since the cameras are recorded individually, each with it's own frame, there is no loss from compression. The cameras are recorded in sequence frame by frame so significantly less recording time is lost due switching.

Multiplexer Recording Example

1	2	3	4	1	2	3	4	1
---	---	---	---	---	---	---	---	---

Multiplex Display

Multiplexers are also capable of displaying multiple cameras at the same time. Multiple screen display options are available. 4-way, 9-way, 16-way are common. Some vendors also offer usually splits like 10-way (8+2).

Display Examples



4-way



16-way

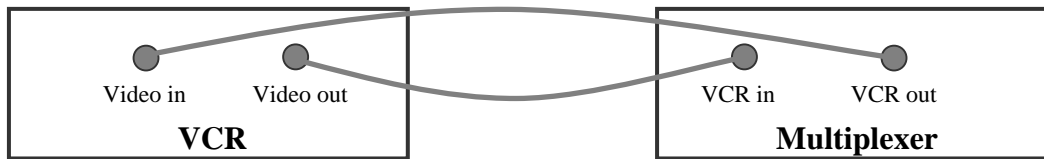


10-way
(8+2)

Multiplex Playback

Multiplexers tag each camera with an identification number as they send it to the recorder. When the multiplexer plays back the recording it reads the ID number and send the camera image to the appropriate place on the screen. Multiplexers connect to the recorders video input and output. The monitor output comes of the multiplexer itself. This allows the multiplexer to decode the recording before it displays the video.

Multiplexer and Recorder Interconnection



Simplex vs. Duplex

Multiplexers are described as simplex or duplex. This is a description of how many multiplexing functions they can perform at one time. Multiplex recording is one multiplexing function, multiplex display is another.

A simplex multiplexer can only perform one of these functions at a time. When a simplex multiplexer is multiplex recording it displays cameras individually like a switcher. If a simplex multiplexer is being used to multiplex display the cameras are recorded just like they are displayed – all in one frame. Simplex multiplexers are common in unmanned sites, where a multiple camera screen display is not required.

A duplex multiplexer performs both of these functions at the same time. A duplex multiplexer has two multiplexing processors in the same unit. It can display multiple cameras at the same time while multiplex recording those cameras. There is usually not a large difference in price between simplex and duplex multiplexers, consequently duplex multiplexers are considerably more popular.

Triplex

Triplex is a relatively new feature in some multiplexers. Triplex adds a third multiplexing processor to the unit allowing a third multiplexing function: the ability to view live and recorded video on the same screen at the same time. In order to accomplish this a second recorder is required to playback video while the first recorder continues to record.

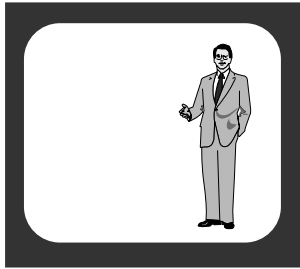
Switch Pulse

Switch pulse is an input on the multiplexer that connects to the recorder. The switch pulse output of the recorder tells the multiplexer when it is ready to record the next frame of video. This is not a required connection for the recorder and multiplexer to operate together, but it is recommended since it helps them to synchronize. This feature is sometimes called VEXT.

Activity Detection

Activity detection is a rudimentary form of motion detection that looks for changes in the picture from frame to frame. It is usually selectable by camera, area, and sensitivity. If it sees change, it provides an alarm output or other alarm reaction. It can be used to call up cameras full screen on the main monitor or on a spot monitor, provide an output to alert the viewer, cause the recorder to record images at a faster rate, or interleave the alarmed image.

No
Activity



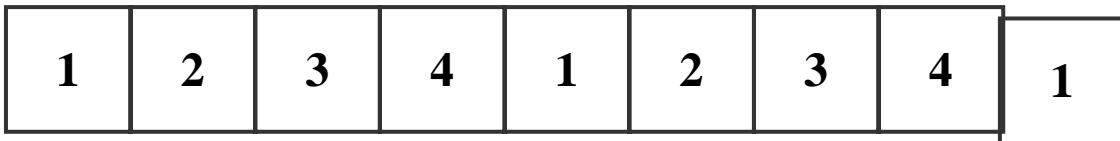
Activity



Interleaving

Interleaving records some cameras at higher rate than others. Interleaving allows more video to be recorded from these cameras. This feature is usually tied to an alarm input or activity detection.

Normal Recording



Interleaved Recording – Camera #3

This document is part of a complete book entitled:
CCTV System Design & Installation

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