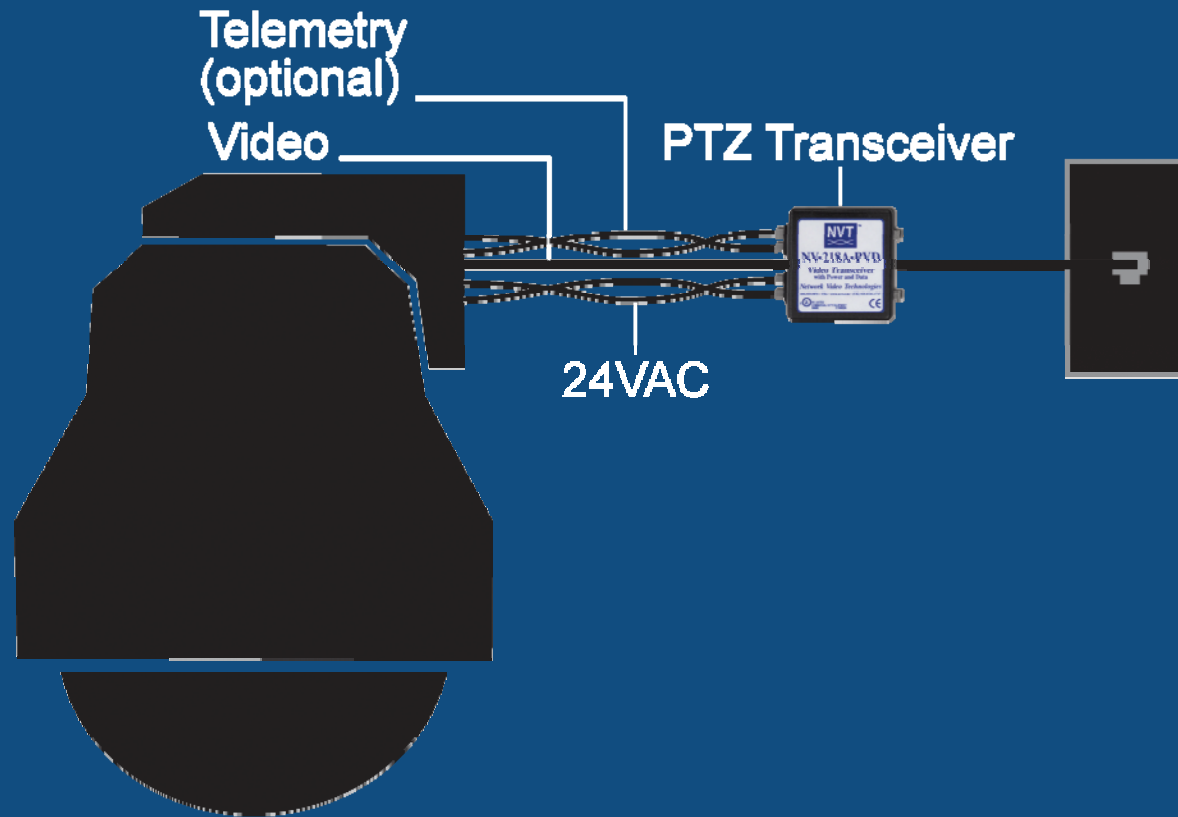


PTZ Applications



PTZ Camera End Connections

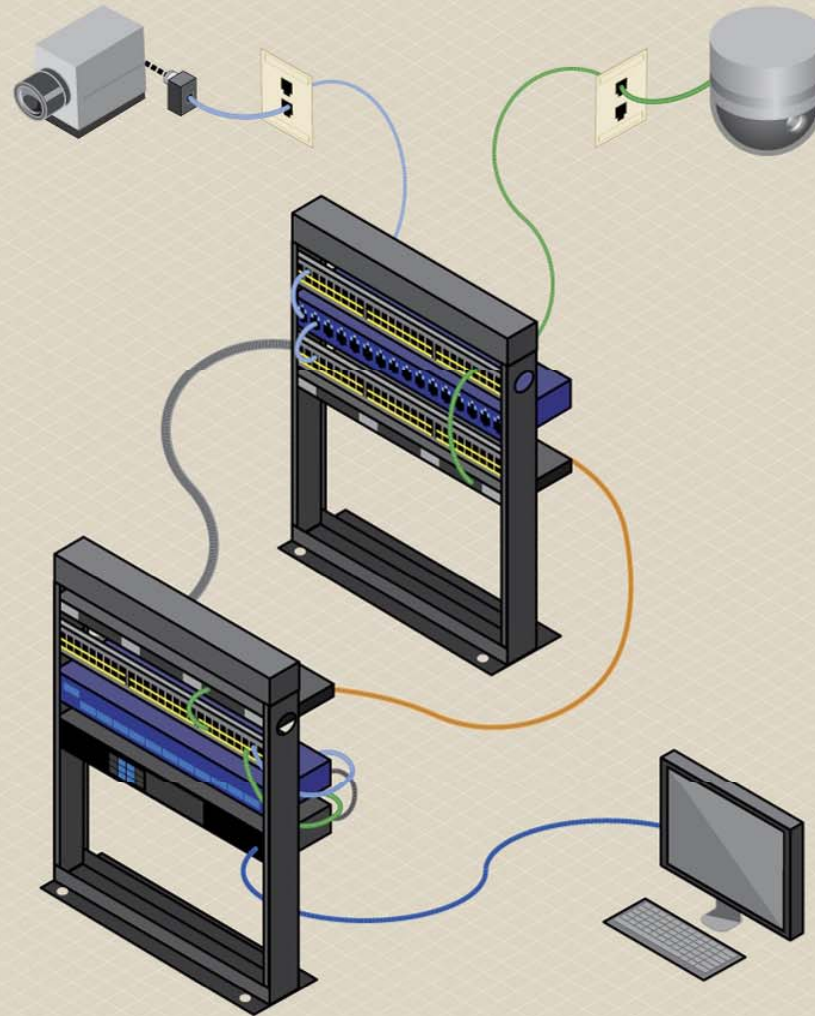


Hybrid Surveillance Systems

- Enjoy functionality of remote viewing and control with more reliable local recording
 - Not subject to network issues
- Most of the functionality at a much lower price for system components
- Lower TCO due to fewer IP addresses
 - Less IT support
- Deploy Surveillance system on UTP structured cabling and have a migration path to IP in the future
 - “Pay for tomorrow’s technology with today’s dollars.”

Hybrid Surveillance Systems

Analog CCTV
over Structured
Cabling



IP CCTV over
Structured
Cabling

10 Reasons for a Hybrid System

1. Analog camera choices significantly outnumber IP camera choices and are less than half the cost
2. Analog cameras with analog video transmission and hybrid NVR/DVR's provide the best of both worlds
3. UTP video signals can share the same pathways as communication networks with no impact on one another
4. Leverage existing infrastructure with minimal or no impact to IT network
5. Stream 30 images per second high resolution video 24 X 7 X 365
6. Only one IP address per DVR vs. multitudes of IP addresses for each IP camera
7. Scheduled network maintenance won't stop a hybrid system from recording
8. Hybrid systems don't require fiber, 10G Ethernet or parallel networks for systems >16 cameras
9. Virus protection issues are limited to the encoder or DVR instead of all cameras
10. Highly reliable 24 X 7 X 365

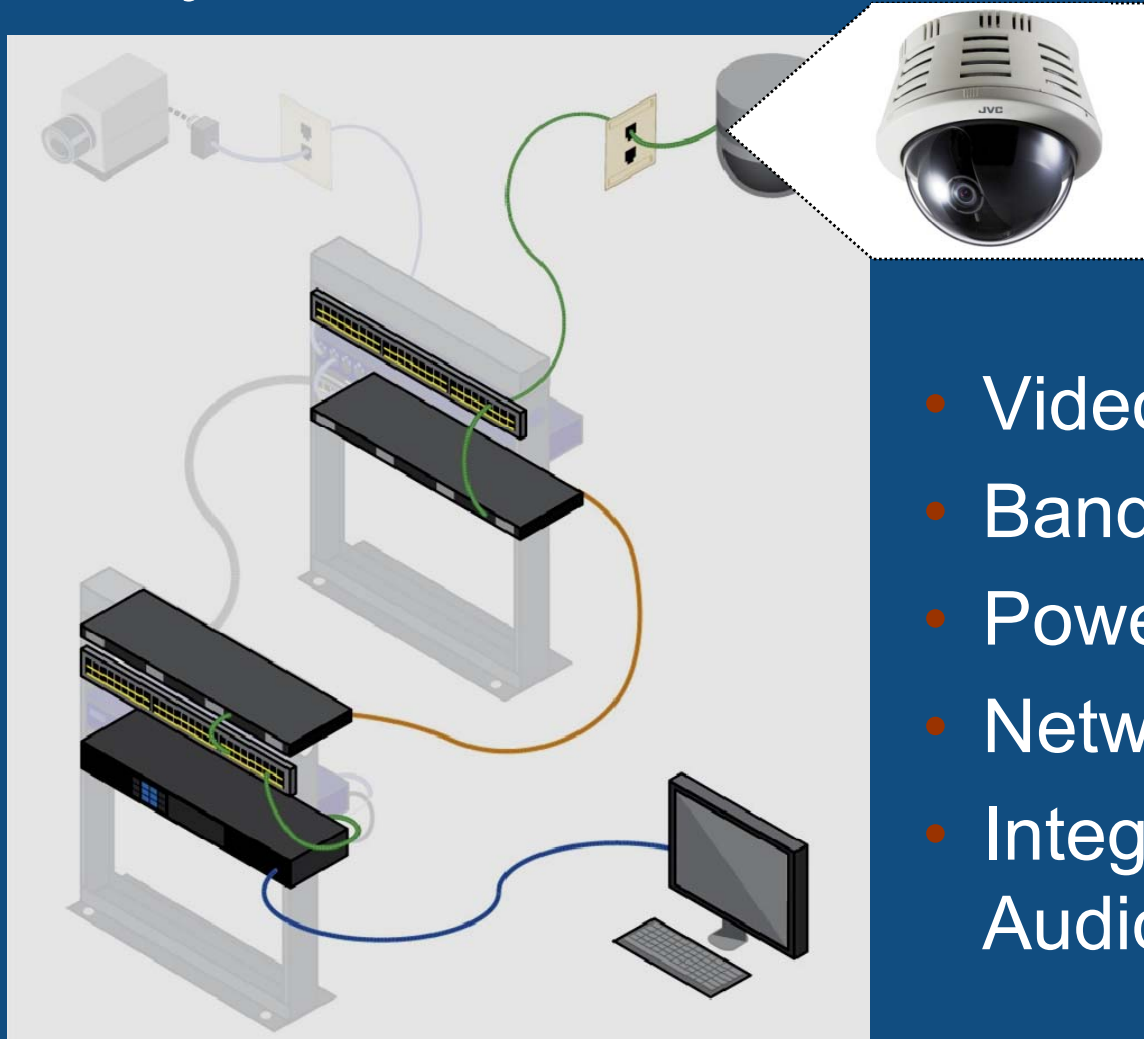


CCTV Convergence: Camera Technology

*Adrian Parvulescu
JVC Professional Products*



Key Elements To Consider in IP Transition



- Video
- Bandwidth
- Power over Ethernet
- Network Architecture
- Integration of Video, Audio and Control

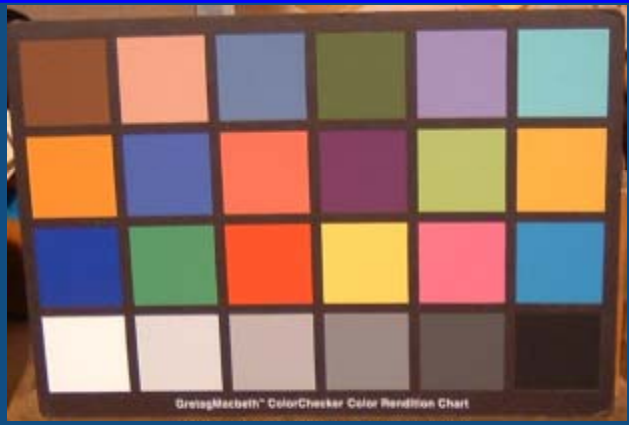
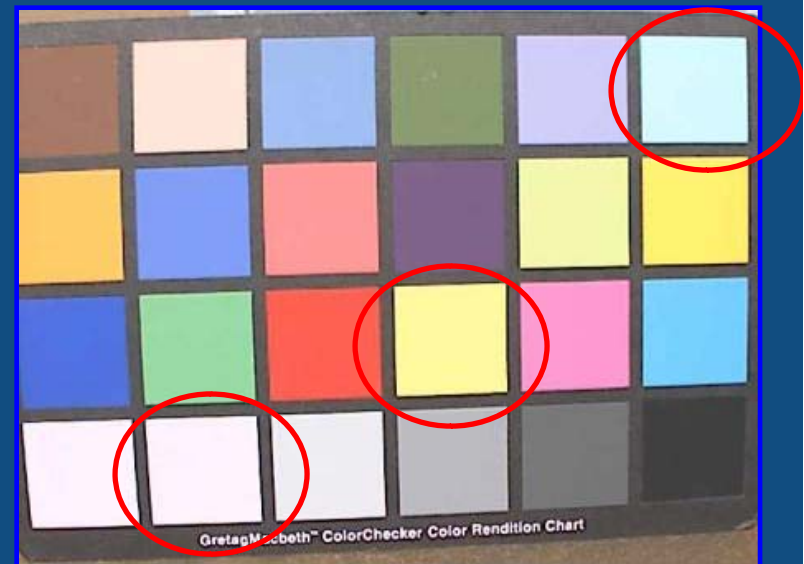
Choosing the right camera

Look for and choose carefully:

- Picture quality.
- Low light operation.
- Motion picture.
- Innovative design.
- Reliable.
- Impact on network performance.

Benchmark (Color Chart)

UNDER THE HALOGEN LAMP 2,380LX



Reference image
Shoot by Digital Still Camera (2M pixel)

Camera on left shows reproduction of all colors, especially light colors like light gray. Overall very similar to the color tone through human eye. Image is like being covered by translucence filter.

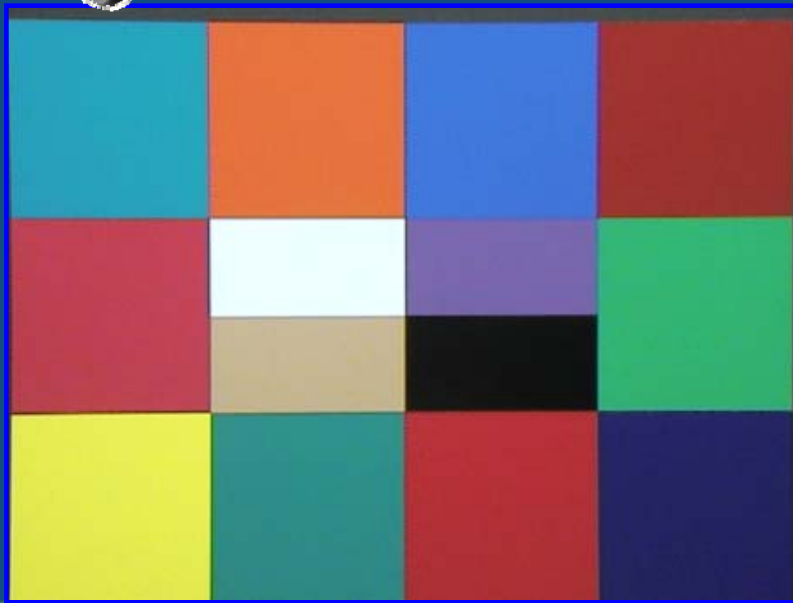
Picture Quality and Color Accuracy



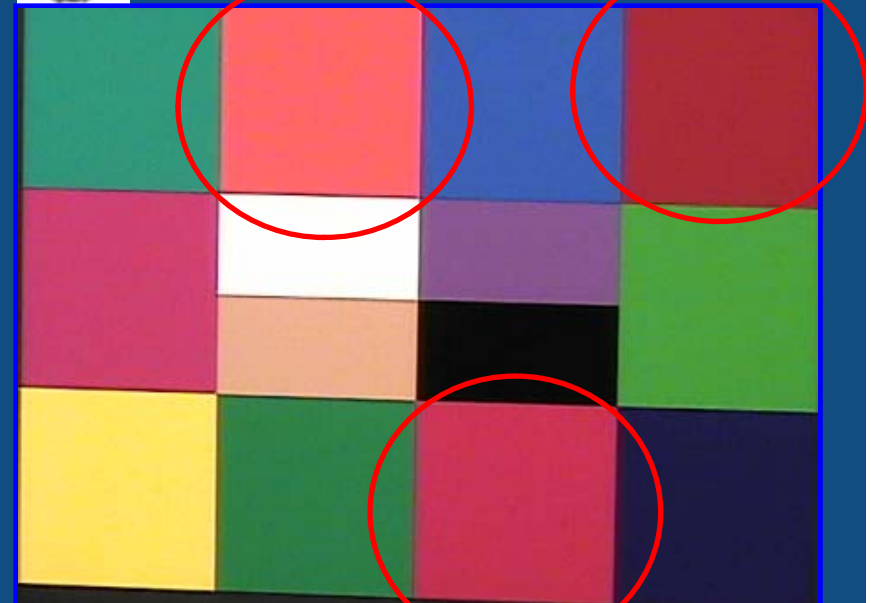
Benchmark (Color Chart)



Camera #1

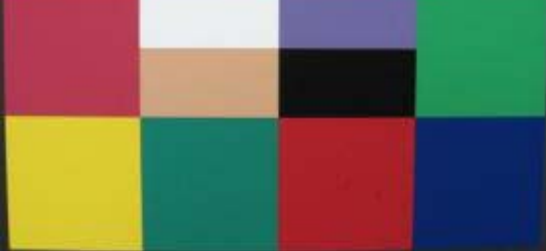


Camera #2



Reference image

Shoot by Digital Still Camera



under the Halogen Lamp 2,770lx

Different Cameras color reproduction for almost all colors, especially for blue-green and orange. Overall very similar to the original color tone through human eye.

Camera on right image, blue-green looks more blue-less, and orange looks pink.

Benchmark (Objects)



Camera #1



Camera #2



**under the Halogen Lamp
1,300lx**

Camera #1 looks very natural;
Camera #2 looks a little pale even
under the halogen lamp.

Camera #1 has richer expression for
the texture like the can surface
below.



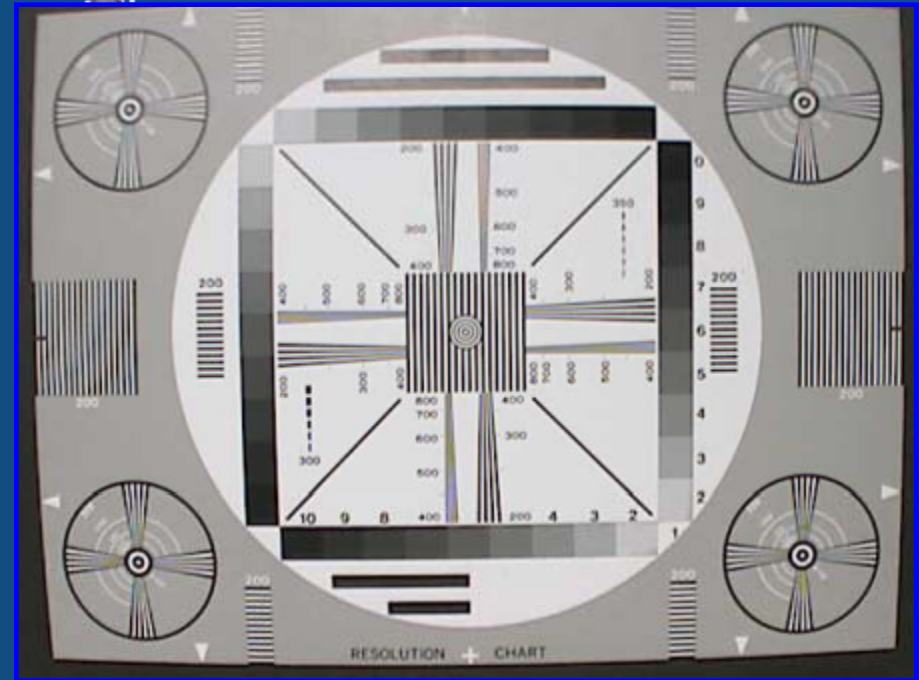
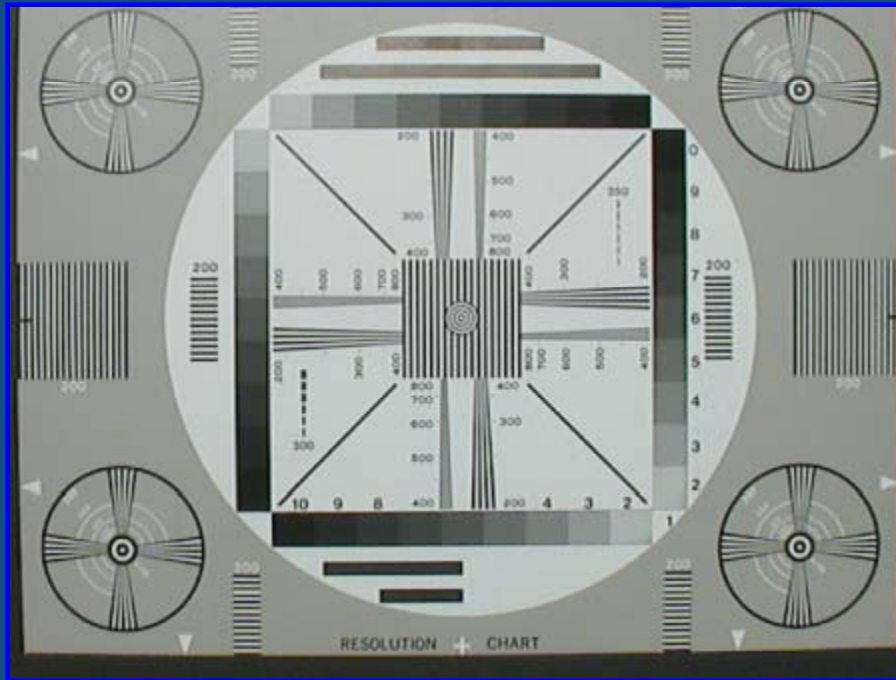
Benchmark (Resolution Chart)



Camera #1 ★★★★★



Camera #2 ★★★★★



Very Similar

Camera #2 has a little distortion for 4 small circle's shape

IP cameras offer powerful features compared to analog cameras ... but there are differences!

- Picture quality.
- Low light operation.
- Motion picture.
- Innovative design.
- Reliable.
- Impact on network performance.

SENSITIVITY GAME...

The **lux** (symbol: lx) **is the SI unit of illuminance** and luminous emittance. It is used in photometry as a measure of the intensity of light, with wavelengths weighted according to the luminosity function, a standardized model of human brightness perception. In English, "lux" is used in both singular and plural.

In photometry, **illuminance is the total luminous flux incident on a surface**, per unit area. **It is a measure of the intensity of the incident light**, wavelength-weighted by the luminosity function to correlate with human brightness perception.

Camera #1

Minimum illumination

??? 1.0 LUX, F1.2,

No indication of how good camera is in low light.....

Camera #2

Minimum illumination

B/W: 0.08 lux, F1.2, 40 IRE, AGC on, 75% scene reflectance

Color: 0.8 lux, F 1.2, 40 IRE, AGC on, 75% scene reflectance



Benchmark (Low Lux)



Camera #1



Camera #2



under the Halogen Lamp 2.08 lx

From Camera #1 image, we can recognize the gray-scale gradation chart on the right behind and the pen holder behind the green bottle, which can be hardly recognized from Camera #2 image.

Benchmark (Low Lux)



Camera #1



Camera #2



under the Halogen Lamp 0.3 lx

Camera #1

Minimum illumination

??? 1.0 lux, F1.2,

??? IRE, xx%

Camera #2

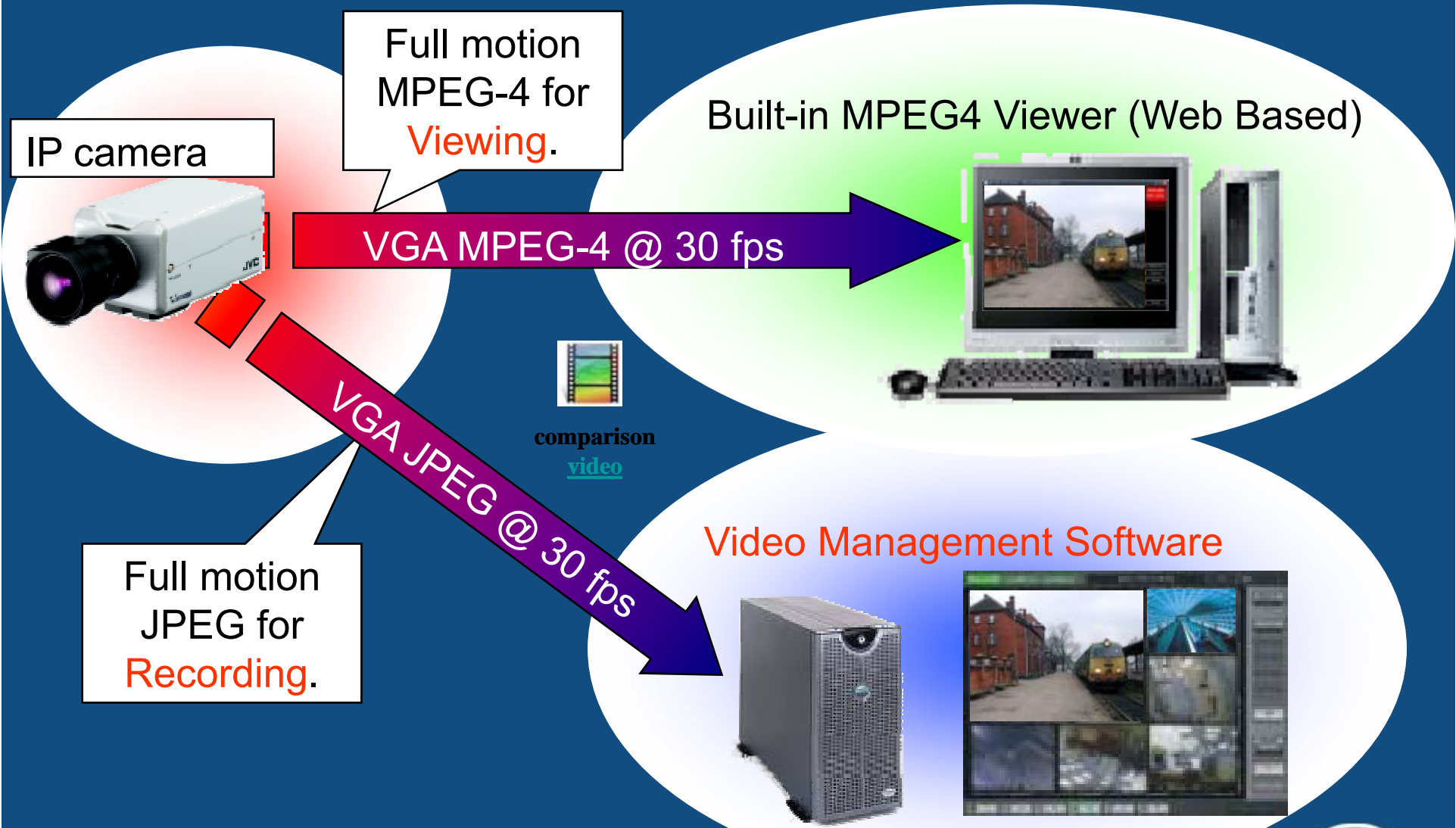
Minimum illumination

B/W: 0.08 lux, F1.2, 40 IRE, AGC on, 75% scene reflectance

Color: 0.8 lux, F 1.2, 40 IRE, AGC on, 75% scene reflectance

IP cameras offer powerful features compared to analog cameras ... but there are differences!

- Picture quality.
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- Motion picture.
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- Reliable.
- Impact on network performance.



IP cameras offer powerful features compared to analog cameras ... but there are differences!

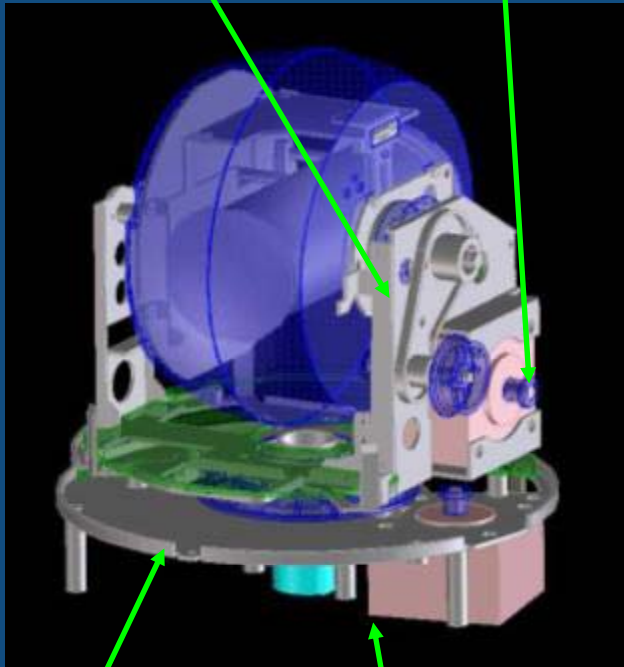
- Picture quality.
- Low light operation.
- Motion picture.
- Innovative design.
- Reliable.
- Impact on network performance.

Direct Drive Motor mechanical design

Conventional cameras

Tilt Mechanical
A S S Y

Tilt Stepping
Motor

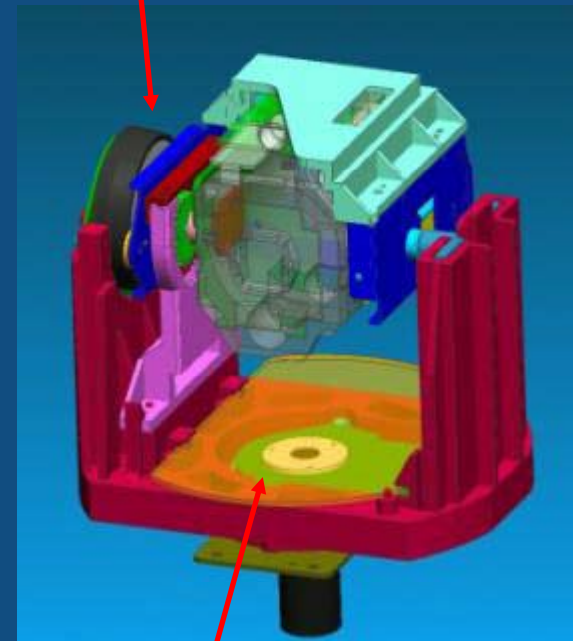


Chassis

PAN
Stepping Motor

Direct Drive PTZ camera

Tilt
motor

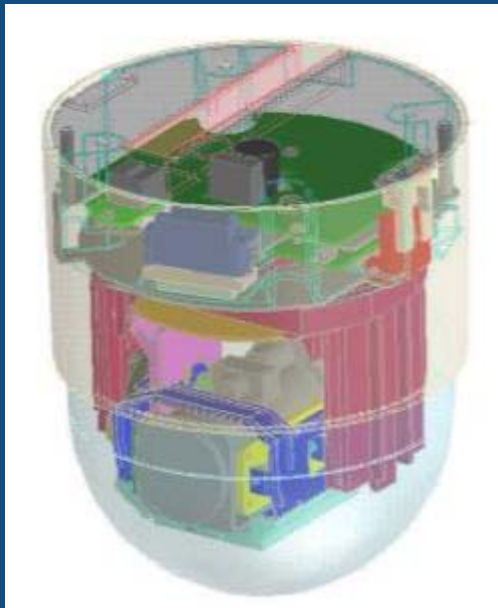


PAN
motor

Easy installation mechanism

PTZ camera utilizes one-touch lock system.

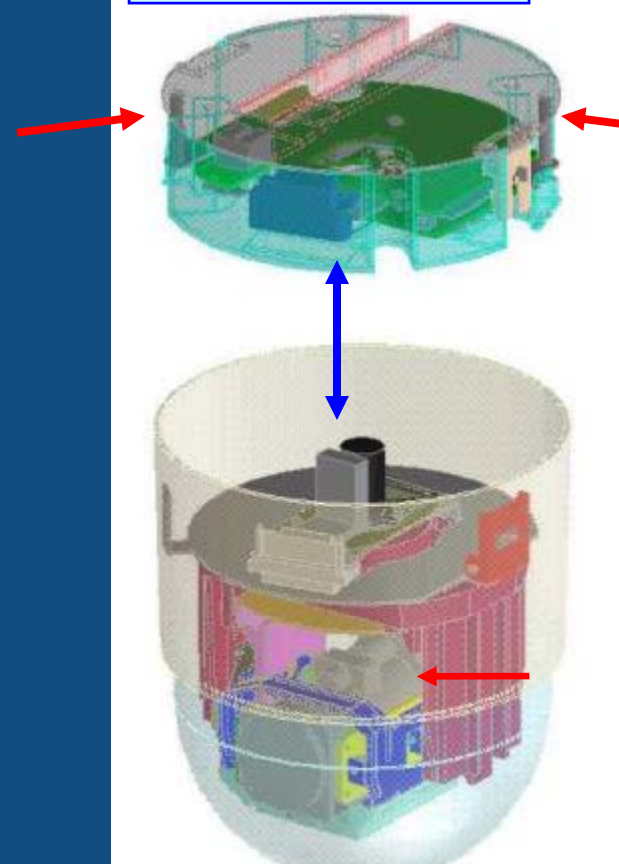
Complete camera



**PTZ Camera Head
+
Ceiling Bracket**

One-touch locking
(just insert and lock)

Ceiling Bracket



Preset data on ceiling bracket

Finger type push release, no need for screw driver

PTZ Camera Head



IP cameras offer powerful features compared to analog cameras ... but there are differences!

- Picture quality.
- Low light operation.
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- Reliable.
- Impact on network performance.

Reliability Example for PTZ Cameras - Professional Durability / Reliability

IR switching

Zoom

5.49 Years



540TV Lines

0.2 million times



5.49 Years

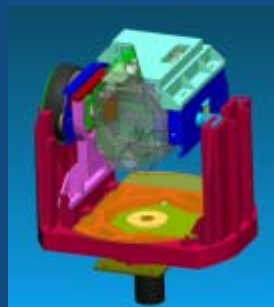
2 million times

Access 1000 times a day

Pan, Tilt

Focus

6.89 Years



2.5 million times



10.95 Years

4 million times



RELIABILITY

LOOK FOR STANDARD CAMERA WARRANTY 3 YEARS PARTS AND
LABOR

24 H/Day x 365 Days/Year = 8760 H/Year

8760 H/Year x 7 Year = 61320 Hours

MTBF example: more than 60,000 Hours

7 Years trouble free

IP cameras offer powerful features compared to analog cameras ... but there are differences!

- Picture quality.
- Low light operation.
- Motion picture.
- Innovative design.
- Reliable.
- Impact on network performance.

Storage & Bandwidth

What it is, and how much bandwidth is required?
How you calculate bandwidth?

Bandwidth is a measure of data pipe size.

MJPEG simple predictable easy to calculate:

MJPEG compression bandwidth bits/sec = Frame Size (Bytes) x 8 bits/Byte x frame rate (FPS) x number of cameras

MPEG4 is very difficult to predict:

- how much motion is detected ???
- what percentage of the view is moving ???

At the lowest frame rates (below 5fps), MPEG4 is actually worse than MJPEG. At higher frame rates, estimates of the benefit vary between none at all (when everything is moving) to 4 X better (when very little is moving). To keep things simple use a 2X multiplication.

MPEG4 compression bandwidth in bits/sec = MJPEG Bandwidth/2 (using MJPEG compression calculated above)

Storage & Bandwidth

Controlling the bandwidth:

- Control the frame rate
- Adjust the resolution
- Adjust the aspect ratio

PC Server vs. NVR

PC Server (+VMS)

- Need to start from system design, deciding PC spec, considering desired frame rate for live viewing, recording and image distribution / storage period and total capacity / number of cameras per 1 server, etc...
- Also need to consider the cost for camera licenses
- Need networking background knowledge and experience
- System performance not guaranteed.

EMBEDDED NVR

- OS (Embedded Windows XP Professional) very safe no need for antivirus
- License by number of cameras not MAC address. Very flexible in case of camera replacement
- Performance Guaranteed by Embedded NVR Manufacturer
- Easy Setup and Installation

PC Server Vs. Embedded NVR

PC server + management software



PC Server
Contact "A"

+



HDD
Contact "B"

+



Management software
Contact "C"

EMBEDDED NVR



Embedded Solution Peace
of Mind

Single point-of-contact:

No Finger Pointing

Embedded Network Video Recorder



Easy to decide system configuration and performance

1. How many NVRs?

Embedded NVRs Should Network Together



2. Camera and Device Licensing?

Find an embedded NVR with camera and device licenses included

3. Frame rate problems?

Select an embedded NVR with frame rates that meet customer requirements or specification requirements

Front panel operation allows easy migration for Non-PC users and DVR users



Power Switch

Live/Playback Selection

Viewed images can be switched between live view and playback view.

Various Camera Controls

Camera selection, PTZ controls, Preset position selection, Search, Zoom-In, Zoom-out, etc.

Playback/Recording Controls

Play/stop of recorded images, Recording, Key Lock/Unlock, Image search, etc.

Jog/Shuttle Dial

Forward/reverse playback, single-step forward/reverse, Playback speed and direction setting, etc.

Typical Functions of NVR Enterprise Viewers

① Sequence function

Automatically create the thumbnail for specified date/time to help find the necessary scene.

② Time Navigation

Display date/time of the image being played back
Specify date/time to get the corresponding image.

③ Time line browser

Dragging the bar for easy seeking with
synchronized visual playback of all cameras.

④ Smart Search

Motion detection against recorded image.



Expandability

① Connection with other security system

Good interoperability with the access control system, POS, people counting, etc.

② Enterprise solution

Scalable installation from prototype to enterprise level.

Already proven over 25,000 installation history all over the world.

Benefits of Megapixel Cameras

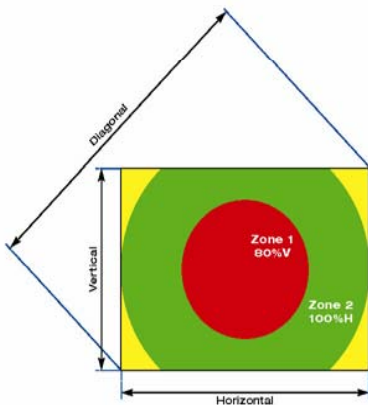
- **General overview image** – Need to be able to discern general movement in restricted areas, see whether a parking lot is at capacity, or whether there is a traffic jam. In these situations one megapixel camera can be used for very large area.
- **Forensic** – A camera needs around 30 pixels per ft. to capture license plate recognition. Only need one megapixel camera for large area in comparison to four VGA network cameras.
- **High detail image** – A camera may needs up to 150 pixels per ft. to determine smaller activity to identify cash register transactions. (see what was purchased and the money exchange) Would need a one megapixel camera to see that detail in a 7 wide by 7 high area. A VGA network camera could only see that detail in very small area

Golden rule: 30 pixels/foot

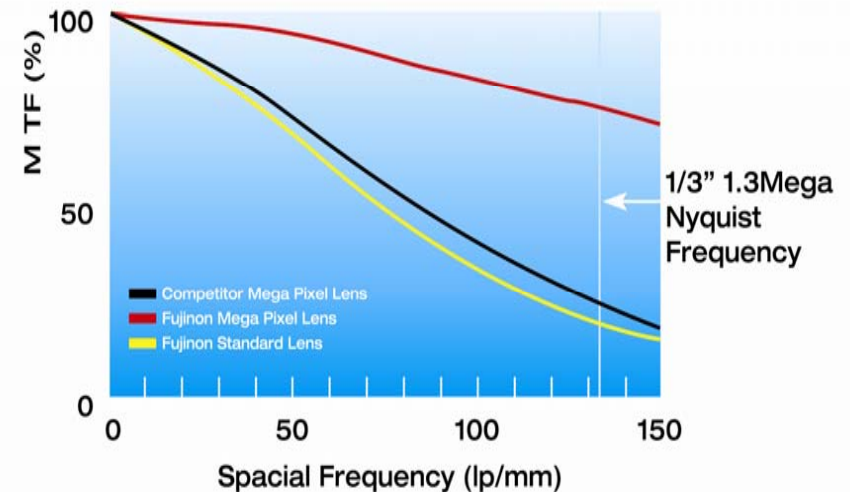
- Image details do not depend on lens (good lens is important...)
- Image details depends upon number of pixels available to cover the scene.
- to recognize license plate or face recognition 30 pixels/ft are needed.
- Surveillance camera usually has a 330,000 to 380,000 pixels CCD and produces a **640x480** or 704x480 image.
- SD security camera will cover an area anywhere from **336** to 368 Sq.ft. (**21** feet wide (**640/30**) and **16** feet high (**480/30**) totals 336 Sq.ft.)
- 1.3 MP camera with 1280 x 960 pixels will cover a 43' x 32' area or 1376 Sq.ft (4 times the coverage of a regular security camera).
- The lens simply determines how far away you want that level of detail. A wide angle lens can get the detail very close to the camera and a telephoto lens can get the detail at a great distance from the camera, but neither gets you megapixel area of coverage.

How to choose a MP lens?

- Knowing the area needed to be covered, select a lens with 21' wide field of view in order to obey the golden rule!. Choosing a wider lens on the camera will blur the image (less pixels per foot), choosing a telephoto lens will produce a sharper image with a reduced field of view.
- Choose quality lens usually design for higher megapixel number will help!

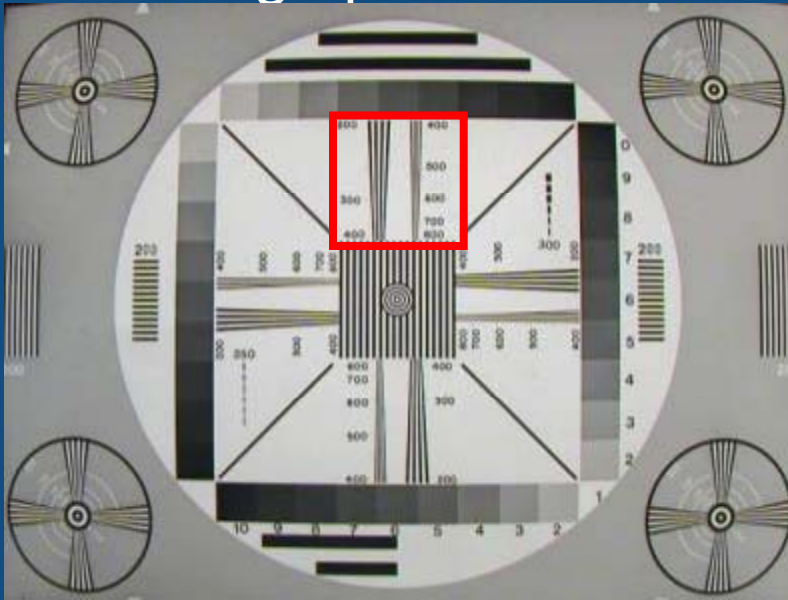


| Zone 1 | | Zone 2 | |
|----------------------------|---------|---------|---------|
| | | F:0open | F:2.8 |
| Competitor Mega Pixel Lens | 1.3Mega | 0.4Mega | 1.3Mega |
| Fujinon Mega Pixel Lens | 3Mega | 1.3Mega | 3Mega |

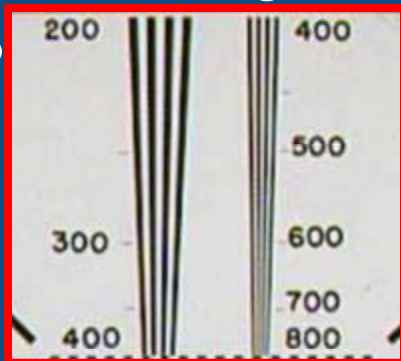


1.3M Pixel Progressive Scan CCD: Resolution comparison

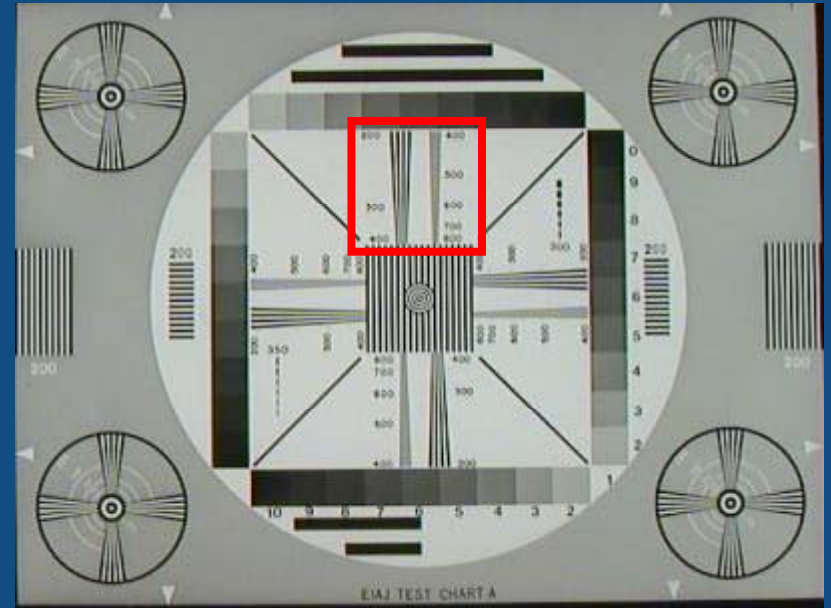
Mega pixel 1280x960 VGA 640x480



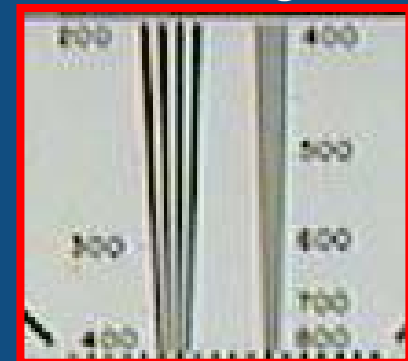
Captured JPEG image
size 120KB



More than 800 TVL!



Captured JPEG image
size 60KB



Drawbacks to Megapixel Camera

- In a general overview if the viewable area has multiple blind spots or corners due to walls, trees, etc. four network cameras would be better option than one megapixel camera.
- Bandwidth concerns – bandwidth consumption becomes four times as high in one megapixel camera can cause delays and problems in image.
- Hard drive space can be consumed quickly because of large file size of image to less than acceptable time period. (14 days or less in some situations)
- Cost of MP camera is higher than a regular camera.
- MP camera is usually less sensitive than the SD cousin.
- Need higher quality lens

Megapixel Camera Requirements

- Bandwidth=frame size KB x 8 (bits/Byte) x FPS
- 7.2 Mb/sec=30x8x30 SD camera 30 FPS
- 28.8 Mb/sec=120x8x30 1.3MP @30FPS

Storage and Bandwidth

Sample frame size per camera MJPEG medium compression:

- 0.4 MP – 640 x 480 – approx. 30 KB per frame.
- 1.3 MP – 1280 x 1024 – approx. 120 KB per frame.
- 2.0 MP – 1600 x 1200 – approx. 140 KB per frame.
- 3.1 MP – 2048 x 1536 – approx. 225 KB per frame.

Conclusion:

IP Cameras Provide Significant Benefit over analog cousins but look for:

- Image quality
- Low light performance
- Frame rate performance
- Reliability
- Ease of Install

IP Network Recorders have several options

- PC based servers require more setup and maintenance
- Embedded Network Video Recorders provide simpler setup and maintenance

Megapixel Cameras Benefits and Requirements



* Shown with optional lens

Thank you.

- **Carol Everett Oliver, RCDD**
 - carol.oliver@nexans.com
 - www.berktek.com
- **George Wojtan**
 - gwojtan@nvt.com
 - www.nvt.com
- **Adrian Parvulescu**
 - aparvulescu@jvc.com
 - www.jvc.com

