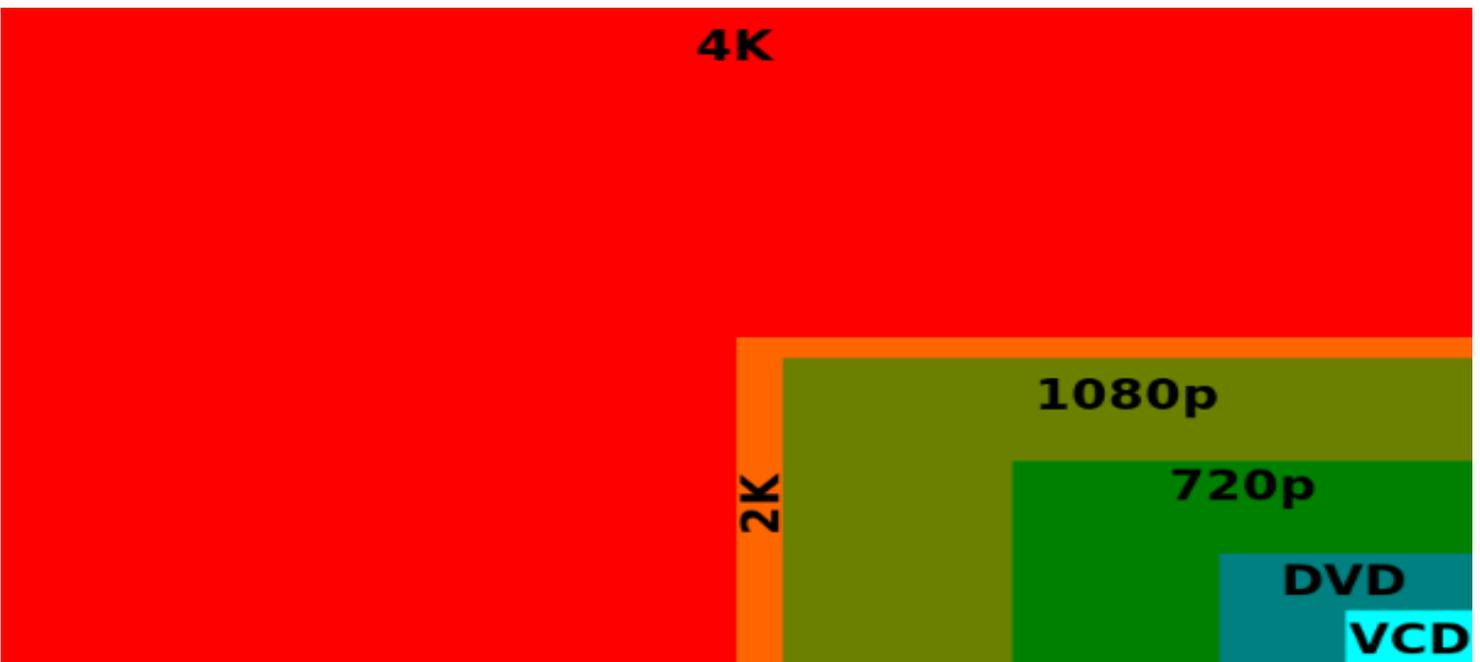
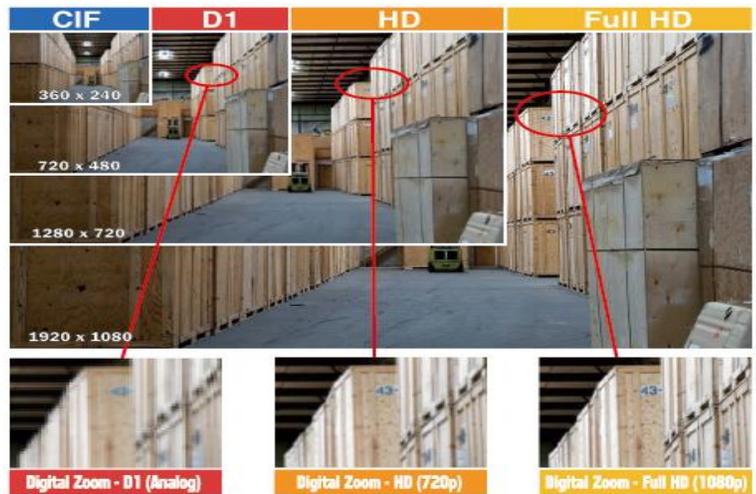
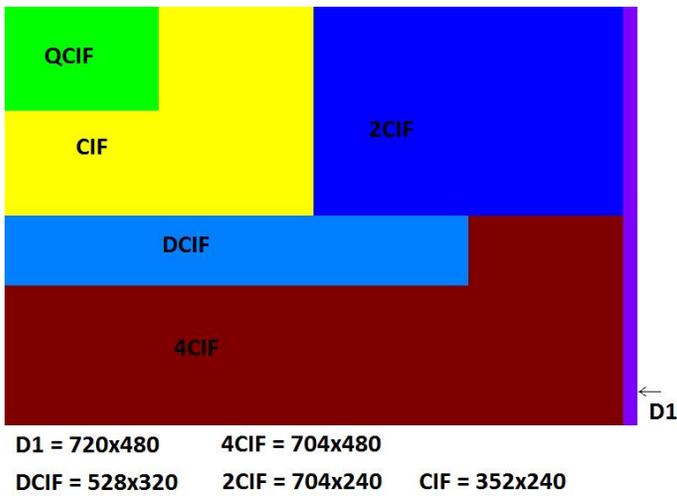


### Understanding DVRs and Resolution – From CIF to Full HD 1080P to Ultra HD 4K

CIF stands for Common Intermediate Format, and is used to represent the size of an image based on the number of horizontal and vertical pixels. The more pixels, the sharper the image, especially recognizable when you enlarge an image to fit your monitor or digitally zoom in. Some DVRs can only display and record at one specific level of resolution. Some DVRs will display at one level (ie. 4CIF) and record at a different level (ie. CIF) based on the hardware, software and processing power. Better quality DVRs are built with higher grade components and functionality, and can display at D1, 1080P or UHD4K, with the ability to set recordings for each camera.

Standard	Size	Pixels
CIF	352 x 240	84,480
4CIF / D1	720 x 480	345,600
960H / WD1	960 x 480	460,800
HD 720P	1280 x 720	921,600
UXGA	1600 x 1200	1,920,000
FULL HD 1080P	1920 x 1080	2,073,600
ULTRA HD 4K	3840 x 2160	8,294,400



Standard Analog cameras produce images based on their TV Lines (TVL) that are sent to the DVR directly, usually over coax wire paired with a power wire... camera > wire > DVR.. also know as a homerun. These standard DVRs typically display and record at CIF, D1 or WD1. The greater the camera's TVL, the sharper the image. TVLs range from 380 to 1000 TVL.

HD DVRs display images at HD 720P (1280 x 720) or Full HD 1080P (1920 x 1080), 6 times more pixels than D1. HD-SDI (High Definition Serial Digital Interface) DVRs require using only HD-SDI cameras, as do HD-CVI DVRs, limiting you to their respective proprietary technology. HD-TVI Tri-brid DVRs offer the latest video standard that is backwards compatible, supporting both Full HD 1080P as well as legacy analog cameras plus a limited number of IP Cameras. HD-SDI transmits over standard coax cable, while HD-TVI can support longer wire runs over coax or cat5 twisted pairs, both delivering remarkable, crystal-clear image quality, with no latency or network traffic issues. These Tri-brid HD TVI DVRs are designed and built with more processing power, larger hard drives and greater throughput capabilities to support HD remote viewing and playback, offering the greatest flexibility especially when upgrading legacy systems to HD or Full HD 1080P, so you can utilize pre-existing wiring, coax or cat5.

Ultra HD 4K (3840 x 2160) delivers the most remarkable images at 4 times 1080P and are built with even greater resources to support 8 Megapixel images!

IP Cameras are devices that act much like a computer or other device on your network, connected via cat5 wire and powered either by a Transformer or Power Over Ethernet (POE), a network device/switch that sends power to the camera through the cat5 wire, as well as transmits video through the network. Some NVRs have built-in POE so the IP camera can be plugged directly into the NVR. The camera is assigned an IP address on your network so your IP capable Network Video Recorder (NVR) recognizes this IP camera to incorporate it into its functionality. IP cameras do not require a homerun wire back to the DVR / NVR and offer a greater level of flexibility when it comes to wiring. You can install a camera hundreds of feet away, on the other side of your building or in another building, and wire it to a local switch, as long as it is network accessible.

IP cameras are smarter with analytic capabilities, and are able to produce a much higher resolution image than analog from 1.3 to 2, 3, 4, 5 and even 8 megapixels, but you must consider the DVR/NVR for processing power, hard drive, and bit rate throughput, as well as network bandwidth capabilities. IP capable NVRs and cameras usually cost more as compared to standard analog cameras or HD-SDI cameras.

#### Consider these most common scenarios when selecting a DVR and cameras.

- Live View at the DVR
- Playback at the DVR
- Remote Live View using Remote Management Software, Internet Browser (ie. Internet Explorer, Chrome, Safari, etc.) or smartphones / tablets
- Remote Playback using Remote Management Software, Internet Browser (ie. Internet Explorer, Chrome, Safari, etc.) or smartphones / tablets

When considering recordings and remote viewing, the greater the resolution and Frames Per Second (FPS), the more hard drive is needed to record these images and the more bandwidth is needed for streaming data as well, so if you remotely watch live or playback recordings at a higher resolution, you may recognize a choppy feed as it takes more time to stream more pixels.

All of our DVRs offer remote live viewing which can be set to a secondary rate also known as "dual stream". This means that in consideration of bandwidth limitations, you can set remote live viewing to a scaled down level of resolution, as well as a lower FPS rate. Since a greater resolution and FPS use more bandwidth, by having the ability to reduce these settings for remote live viewing, you can achieve a smoother, more fluid remote live view, while your recordings can be set to remain at a higher level.

Remote playback will stream video at the rate a camera is set to record at, so remotely playing back video recorded at a higher resolution will show clearer images, but may take longer to watch, depending on your DVR, your DVR location's upload bandwidth, your remote location's download bandwidth and your remote viewing device's capabilities.



The picture to the left was taken by a 550 TVL analog camera recorded at CIF. The picture below was recorded at 4CIF. The third is a 2 megapixel FULL HD 1920 x 1080

If you shrink the 4CIF or FULL HD image down to the smaller size, for example in a 4 split screen, it would look a little sharper, but not much different. But, if you Right Click on each image and Zoom to enlarge or stretch it to full screen, you will see the difference right away, the smaller CIF picture becomes less clear and the edges are choppy.

The larger images, having more pixels do not have to stretch as much and therefore maintains better clarity. The 2 Megapixel FULL HD images, which are 6X larger than D1 and 24X larger than CIF, and can be stretched or zoomed in even further while maintaining exceptional clarity.





The image above was taken from a 2 megapixel IP camera recorded at UXGA 1600 x 1200 viewing approx. 6 cars wide, zoomed in to be able to see the license plate, just about equivalent to an image of a single car width at D1.

Consider that if your image is a close-up, for example, an entry door or a cash register, where the camera is positioned close or right above it, or if it is installed at a distance and manually focused in, you may not necessarily need to record at HD or even 4CIF, as CIF may be good enough since the image is already a close-up, allowing you to save on the DVR resources including hard drive space. Larger overview images such as parking lots would be better viewed and recorded at higher resolutions, so if you need to enlarge the image, or zoom in, you still retain very good image clarity.

To sum it up, First Alliance offers a variety of DVRs and NVRs built with the latest H.264 and H.265 video compression technology that maximizes their resources for live view, recordings and remote access. Our DVRs and NVRs feature local display in real-time live view at 30 FPS from 4CIF to Full HD 1080P and Ultra HD 4K, with up to 8 Megapixel Cameras, and have the option of recording each camera at various resolution levels and FPS, continuously, by schedule, event or alarm, such as on-motion. They also offer audio capabilities for live and recording/playback - locally and remotely. With robust functionality such as dual stream (to call for a secondary, lower resolution in consideration of bandwidth), email alerts and other customizable settings, you can be assured that our selection of customizable, user-friendly systems will give you the flexibility to meet your specific needs and budget for Loss Prevention, Management, Safety and Security.

**For more information or to discuss your specific needs, contact First Alliance at (800) 258-8028.**

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