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CAMERA BASICS

Camera type, tech, and terminology

Learning More About Your Security Camera Install

This document covers the different types of camera technology in use or available, along with the advantages and disadvantages of them.

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Camera Technologies

Thank you for your interest in learning more about the differences in security camera technologies. This pamphlet is designed to give a general overview of the differences in camera and recording technologies available, without getting too technical. The goal is to help the average customer understand what they are investing in and allow them to narrow down the choices in the security camera choices.

Type of camera system

The first thing you will notice and should decide is what type of security system you want to invest in. The security camera world loves to throw a lot of acronyms around, which does not help in clearly understanding what it is you are investing in. To keep it simple, there are basically two technologies in use: *analog* and *digital*.

<u>Analog</u>

Acronyms typically associated with it:

- AHD, HDCVI, CVI, HDTVI, TVI and DVR

This is the older of the two technologies. It still uses cabling that is co-axial (the same type of cable that the cable company uses for TV, the round black cable [RG-59 or RG-6]). The camera systems for these are typically less expensive (due to they will eventually be phased out and they have been around for a longer period of time) and require a cable that supplies the video and power for the camera via two separate cables. These systems are typically easier to connect due to less technical knowledge is needed to get them up and running. At the same time the cables and connectors are larger and require a larger hole to be drilled for the cable to pass through. The systems listed above that have "HD" included in the acronym are typically available in resolutions up to 1080 (like your TV comes in standard, 1080 HD, and now 4k).

These are pictures of the type of cable used. One is a less expensive one and one is a professional type. The less expensive one is easy to spot just by noticing the size of the cable compared to the connector (small cable = cheaper cable).

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When connecting these up to your recording device, which is typically going to be called a DVR (Digital Video Recorder), each camera will have to be connected. This is the back of a 16 camera DVR. You would then need to connect the power cable of each camera to a power supply. Yes, it can get messy fast.

Digital

Acronyms typically associated with these systems:

- IP, NVR, PoE, P2P, ONVIF

This is the newer of the two technologies and is evolving quickly, which has led to a couple of variations available in the technology.

Some key items to note with digital

- The cabling used is network cable (looks like an oversized phone plug)
- Multiple variations of powering the camera exist (although the trend is standardizing on the use of a single network cable per camera)
- Higher resolutions of cameras are available (12MP+ cameras are available – for perspective a 1080p camera is 2MP)
- A higher technical knowledge is needed to setup system
- Due to cameras having such high resolution, the video that is stored uses a lot more space and your network usage will be high
- Very easy to upgrade system once in place and it is where the camera technology is going to transition to
- Higher upfront cost

As I stated earlier, due to the rapid development of digital technology, a couple different standards have been introduced. The key difference between them all is basically how the manufacturer chose to power the camera. At first the camera was similar to the analog cameras in the sense it required a separate power connector and the camera's voltage could vary. This created an interesting situation when first introduced. Below is a picture of the connector those cameras had. As you can see, it had a power and network cable.

The work around for this was to use an adapter that would allow you to run a single network cable and inject the power into the cable. The technical term for this is PoE (Power Over Ethernet) which has been around in the IT world for a while. The initial issue they ran into was that the IT standard of PoE sent 48V versus the 12V that most cameras used. So, until the camera technology caught up (which it has) to allow it to use 48V, they had some work abounds. The first was to send 12V over the Ethernet cable via an injector. They would come in pairs, one side to connect to the camera and the other side to connect to the NVR (Network Video Recorder – NOTE: digital used an NVR and not a DVR). This could still get messy quick due to each camera needing a power cable still.

The next development phase still would use a similar adapter above, but only on the camera side. They would then connect the other end of the cable into a network switch that had 48V being sent to the camera, but the adapter would knock it down to 12V as to not harm the camera. This is what one PoE switch looks like.

The current cameras that use the 48V PoE standard no longer need any adapter and only have a network cable ran to it. The adapter on those cameras look similar to this:

The second factor you will have to take into consideration when selecting a digital NVR system is if you wish to install a PoE switch (or multiple ones) yourself or if your wish to buy an NVR that has all of the PoE ports for the cameras built into it already. Below is a picture of an NVR with all of the ports built into it (top) and one that only needs one wire to be connected to the network and it will record all of the video.

As with all things there are good and bad to both options.

NVR with built in PoE ports

- Con: unless additional knowledge of system and some extra funds invested, all of the camera network cables must plug into the back of the NVR
- Pro: due to dedicated port for each camera, additional networking equipment will not be needed. You could place the NVR in a cabinet or closet to hide wires, or have the installer use a wall plate that the wires would connect to inside the wall, allowing you to use shorter cables going to/from wall and NVR to keep a clean look.

NVR with no PoE ports

- Con: due to the amount of traffic the cameras will use on your network (especially if you start to go over 6 cameras or so), the networking equipment that you will have to invest in will have to be high speed in order to handle the amount of traffic. On a side note, the price of that equipment is really starting to go down.
- Pro: this allows you to invest in PoE switches that only have a couple of ports (for example if you install 16 cameras, you could buy 4 inexpensive PoE switches). This allows you to only have to spread the switches around the building, closer to clusters of cameras. This allows you to run shorter cables to

each camera and the switch. You then only have to run one longer cable between each of the switches. When you connect the NVR up, you only have one cable going to it. A very clean looking setup.

Hopefully that helps clear up the differences in technology and some of the choices that you have available to you. This page did not delve into all of the technical aspects of the security camera systems, which there is a lot more than was covered here, but hopefully it helped you understand the basics between the type of systems. I will continue to work on individual pages that will simply layout the basics regarding each of the different parts of the system. If you see an area that you would like to have covered or wish to ask very detailed technical questions, please do not hesitate to email or call us and we would be happy to help.

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