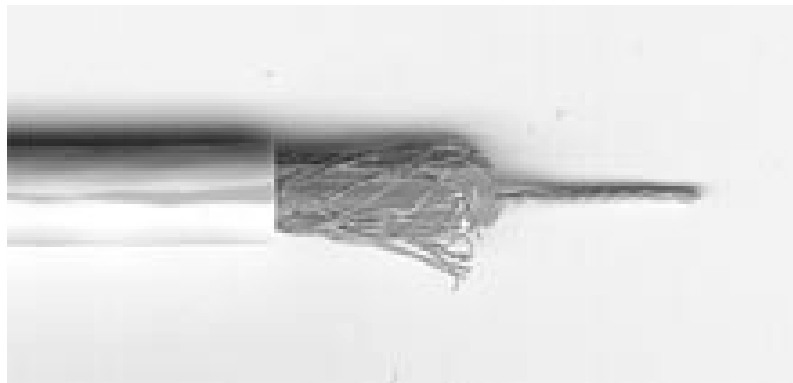


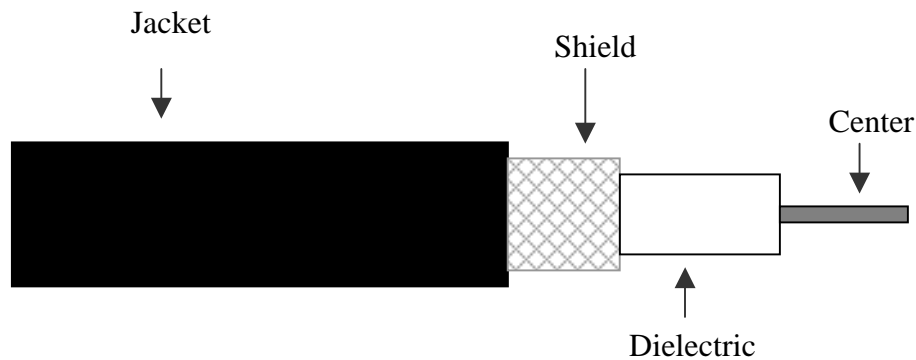
Cable

Cable has three main purposes in CCTV systems: transmission of video signal, supplying power to cameras and peripherals, and carrying control signals.

Coax Cable

Coax cable is the primary cable used for carrying video signals. Its physical construction consists of a center conductor, which carries the actual video signal. The center is surrounded by a dielectric insulating material. The dielectric spaces the center from the shield, and it determines the electrical characteristics of the cable. The shield protects the center from outside interference. It serves as an electrical ground between the camera and monitor. The jacket is the outer covering of the cable. It holds the cable together and protects the internal parts from physical damage.





Coax Cable For CCTV

The coax cable is the heart of your CCTV system. It is critical that you do not cut corners when selecting it. For CCTV, coax cable *must* be 75Ω impedance, with copper shielding of at least 95%, and a copper center conductor. Cable with aluminum braid, shield of less than 95%, and impedances other than 75Ω should *never* be used.

Aluminum Braid Cable

Some installers fall into the trap of aluminum braid cable. It's cheaper than copper braid, and it's still coax cable. Why not? Because it's not made to carry CCTV signals! Aluminum braid cable is for cable TV and RF signals. Due to the nature of these signals they do not require the level of protection from interference that a delicate 1 volt composite video signal. Aluminum braid cable may give satisfactory video for short runs (under 50'), but as the runs get longer the video quality degrades significantly.

The Rule of Cable

Cheap cable will cost you more in service calls than the money you saved in the initial installation. Using the wrong cable in your system to “save a buck” or “get rid of

that roll bouncing around in my truck” can cause unforeseen (and seemingly unrelated) problems in your entire system. You will be doing yourself, and your customer, a favor by using the right cable all the time.

Common Coax Cable Sizes and Distance

RG-59 is the most common cable size used, and is suitable for runs up to 500 feet. RG-6 is slightly larger than RG-59, and is suitable for runs up to 750 feet. RG-6 is also the common cable size for cable TV (CATV) cable, so you must be specific when requesting RG6 that is for CCTV and needs to be copper braid. RG-11 is the largest common cable size, and is suitable for runs up to 1500 feet. RG-11 is large, heavy, and difficult to work with. Consequently, for long runs that may require RG-11, other means of transmission are usually considered.

The cable runs discussed above are conservative figures. Very often, you will hear installers tell how they run RG-59 600 and 700 feet without a problem. This is very likely the case, however, this was probably accomplished using top quality cable under ideal conditions. The distances above will cover most applications, even those with less than perfect cable and/or conditions.

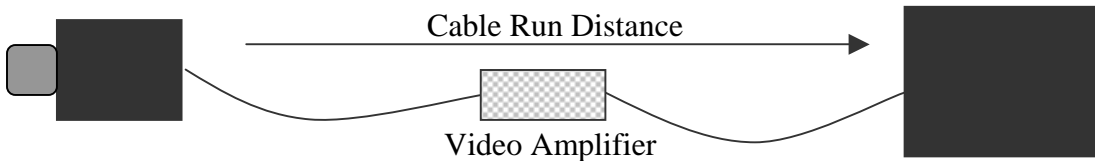
Cable Run

A cable run is defined as the cable length required to go from the camera to the last device viewing that camera. This includes all monitors and signal processors handling the video signal of that camera.



Video Amplifier

In cases where the required cable run exceeds the capability of the cable being used, a video amplifier can be used. A video amplifier accepts the signal from the camera and boosts it to a higher level so it can travel longer distances.



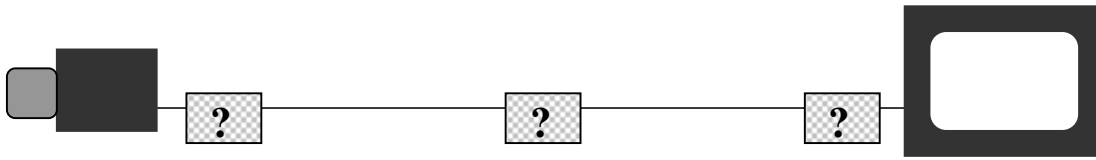
Typical Video Amplifier Distances

Coax	Without Amplifier	With Amplifier
RG-59	500 feet	3000 feet
RG-6	750 feet	4500 feet
RG-11	1500 feet	6000 feet

Amplifier Location

Ask three different vendors where to locate the video amplifier, and you'll probably get three different answers. There are advantages and disadvantages to each possible amplifier location. The choice depends on what is most practical for the installation.

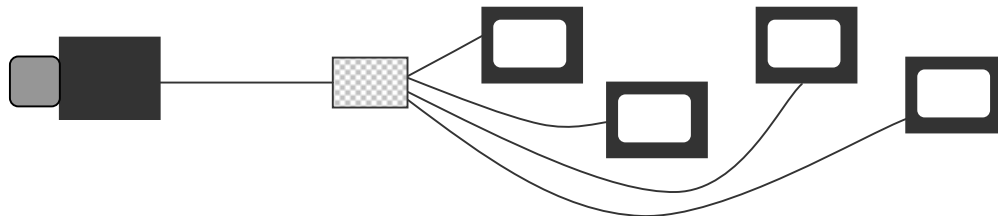
Which Location Is Best?



The signal quality is highest at the camera, but you are just boosting an already strong signal. Also, most amplifiers require 120VAC power; is 120VAC nearby? Putting the amplifier at the monitor boosts an already noisy and degraded signal. Most amplifiers have tuning adjustments, but you may just be amplifying static. Installing an amplifier in the middle, or where the signal first starts to degrade, may seem like a good idea, but is 120VAC power available?

Distribution Amplifiers

Unlike RF video signals, composite video signals cannot be split or T-tapped without consequences to the signal quality. For applications where looping a video signal to multiple devices is not practical, distribution amplifiers are available. Most are single input to multiple outputs (4 or 6), a few multiple input/output models are available.



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

By Charles Aulner and Bryan McLane
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