

Tech Note - 13

Surveillance Systems that Work!™



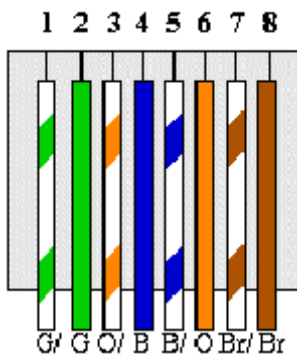
Wiring PT & PTZ Cameras Using CAT5/6 Cable

For a host of reasons it's often convenient to use UTP/STP (cables with multiple conductors) to wire Pan-Tilt or Pan-Tilt-Zoom cameras. In all instances, IP camera (PT, PTZ or fixed lens box) manufacturers built their products with RJ-45 receivers. In some instances, analog camera manufacturers are beginning to wire their products with these same inputs. For simplicity, we will choose to use UTP as a common designation for unshielded or shielded twisted pair cable – i.e. CAT5e or CAT6 wiring.

The trend in the industry is moving in the direction of using UTP cabling for much of the technology we work with on a daily basis. As such, we all should understand the correct (usually convenient) methods as well as we should understand why some methods are wrong (or perhaps less convenient).

This is an application oriented Tech Note written primarily for GuardDog Surveillance Systems internal technical use. We're writing with the understanding that the reader is fairly well versed in the common language of the CCTV and the IT industries.

T-568A

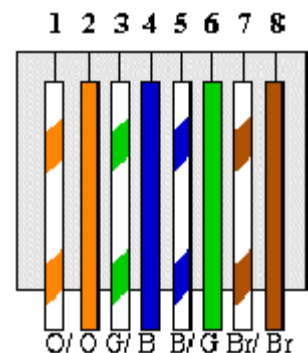


The two graphics (left and right) detail the color conventions used in typical CAT5e and typical CAT6 to RJ-45 terminations.

While color combinations when wiring cameras don't really have a functional value, it's generally good practice to pick a wiring convention and stick with it.

While T-568A is supposed to be the standard for new installations most off the shelf data cables are wired to the T-568B convention.

T-568B



NOTE: When wiring DVR IT connections it's always wise practice to ASK your IT contact what UTP convention their department has standardized on – then wire to that convention.

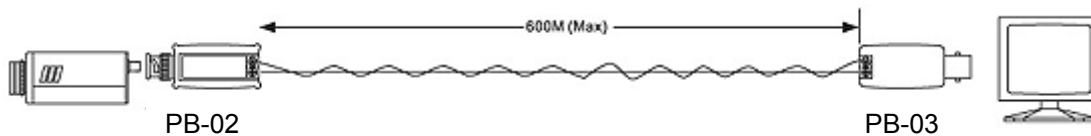
That said, regardless if wiring a LAN system or a camera, if both ends of the cable are wired the same, it really doesn't matter what color wires are put where. Conventions are adopted for

performance or for simplicity reasons. In this case, it appears simplicity was the order of the day.

While transmission distance issues (UTP cable will transmit video far more efficiently than coax) are the primary reasons behind the use of UTP cabling of cameras there are other reasons that might make UTP cabling more desirable. Multiple remote cameras that will be wired via underground conduit – for example – would likely be a lot simpler to wire via UTP because four (4) channels of video can be transmitted over a single UTP cable. Not to mention, pulling 4 coax cables through the same 3/4" or 1" conduit might rip the skin off the installers hands.

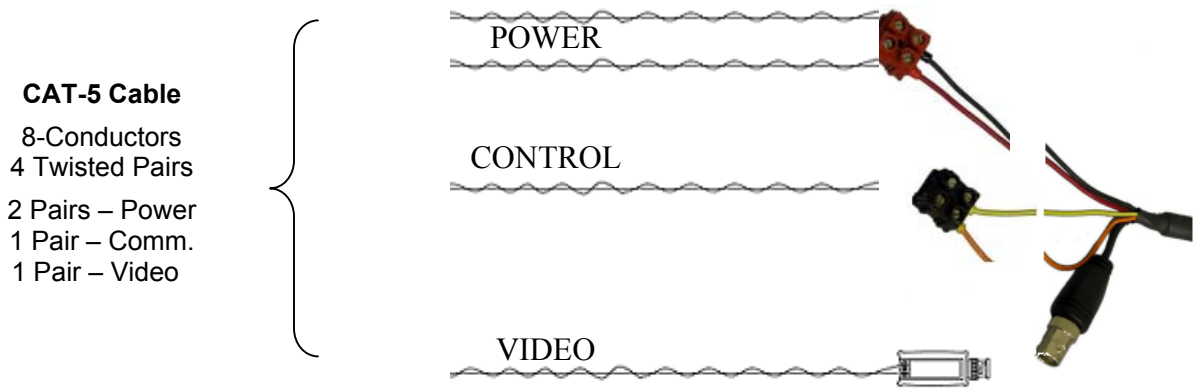
Unless your camera is equipped to receive RJ-45 termination, you're going to be faced with terminating the UTP cable. The simplest method is through the use of active or passive baluns. Balun is a term we're using in this article to designate any type of 3rd part termination device. Baluns can be configured to terminate single or multiple video signals or in many cases terminate video, audio, control and power.

The primary function of a balun is to change cable type from the relatively short distance capable coax wiring to the longer translation capable UTP wiring. **PB-02** and **PB-03** provide this kind of translation convenience.



PB-02 and PB-03's screw terminal connections provide a convenient means to connect whichever of the CAT-5's twisted pair - or more than one pair if additional continuity protection is desired. This practice allows for other of the CAT-5's conductors to be used for additional video transmission and/or perhaps camera power and/or perhaps data communication (in the case of PT or PTZ camera's RS-485 communication).

The drawing below details one possible scenario commonly used to wire analog PT or PTZ cameras.



In this example, we've suggested maintaining control and video on a single twisted pair of wires while doubling the power wiring on a four (4) conductors (two pair each). The reason for this is simple. Control and video are both very low voltage signals and as such, we do not want our installation to generate any cross-talk (or impedance generated noise) to either of these two signals. Additionally, since power is generally 12VDC or 24VAC this stronger signal can (when twisted around the two lower voltage signals) aid in protecting the lower voltage signals from outside generated noise.

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