

## **LongReach 16 Active CCTV Receiver Hub (500120, 500121, 500122, 500123)**



## **Application Guide**

*Version 1.03*

**MuxLab**

*April 2006*

## **Purpose**

The purpose of this document is to explain how to apply the LongReach 16 Active CCTV Receiver Hub under different operating conditions and to discuss issues that are not necessarily covered in the product Datasheet, Installation Guide or CCTV Balun Application Guide.

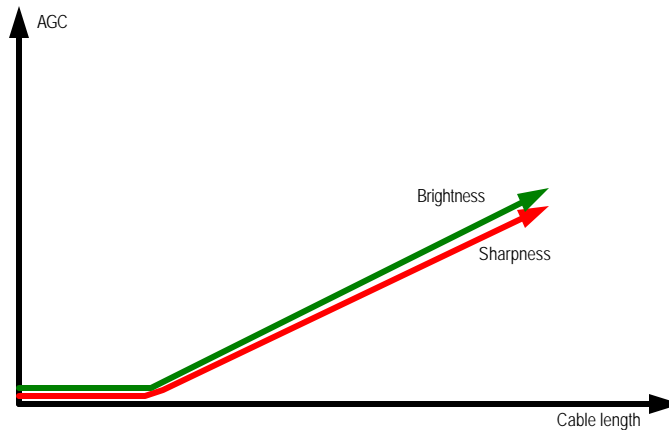
## **Function**

The function of the LongReach 16 Active CCTV Receiver Hub is to provide a “plug-and-forget” Cat 5 cabling solution for in the CCTV environment. Applications include:

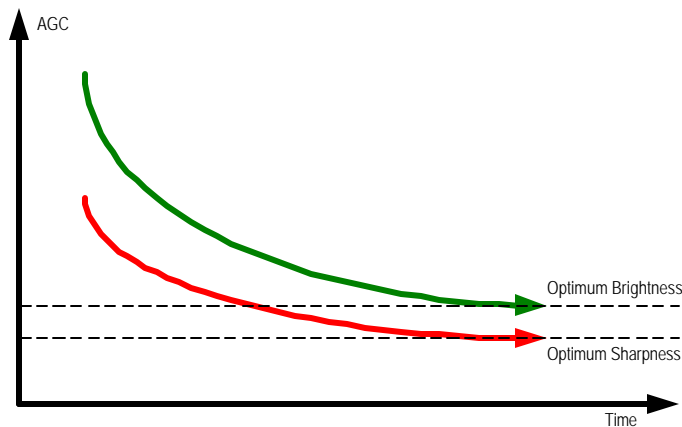
- Industrial and Corporate Security
- Banks
- Schools
- Prison and Correctional Institutions
- Traffic Monitoring
- Shopping Malls
- Airports
- Car dealerships
- Parks and public venues
- Manufacturing complexes
- Hospitals
- Government
- Retail stores
- Casinos
- Parking lots
- Underwater camera systems

## Automatic Image Adjustment (AGC)

The LongReach 16 has auto-gain control (AGC) that automatically optimizes the video output signal according to the cable length and other factors that affect signal transmission such as temperature and cable grade. The AGC optimizes the brightness and sharpness levels of the video signal so that the image is as good as if the adjustments were performed manually. As cable length increase, AGC compensation increases as illustrated below.



Due to the real time processing of the signal, there is brief time delay before the image is stabilized. This may take a two to five seconds. Once the image has stabilized it remains locked to that setting even if the camera is disconnected from the CCTV hub as shown in the following diagram.



However, if the hub is powered off and on, or a hub port is connected to a different camera, then the AGC will readjust again. AGC re-adjusts when the signal input levels and/or cable length changes.

## Adding Cameras in an Existing Hub Installation

In an existing installation, it may be necessary to add or change cameras on a LongReach 16 Hub. In order to ensure proper functioning of the hub after the new cameras are connected, it is necessary to first “reset” the hub before bringing the new cameras on-line. This may be achieved by performing one of the following procedures:

Procedure A:

1. Connect the new cameras to the hub while the hub is powered on.
2. Power off the hub for one minute in order to allow the hub to reset.
3. Power on the hub and allow one (1) minute for the auto-gain to stabilize.

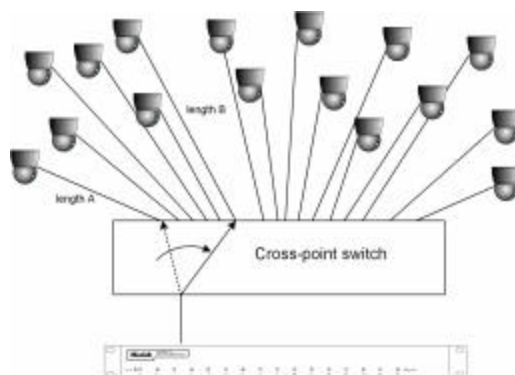
Procedure B:

1. Power off the hub.
2. Connect the new cameras to the hub while the hub is powered off.
3. Power on the hub and allow one (1) minute for the auto-gain to stabilize.

Please note that if the above procedure is not followed, then the hub may not properly perform auto-gain compensation resulting in poor image quality.

## Switching Camera Connections

Each port on the LongReach 16 is independently controlled and optimized for the camera and cable that is connected to it. When a LongReach port is switched to a different camera, either manually or via a video cross-point switch, the AGC control for that port will automatically recalculate the optimum settings. This may take up to two or three seconds. The greater the difference in cable length or signal level between the first camera and the second camera, the greater will be AGC time delay. When the cable length and signal input level of the switched ports are similar, the time delay for the image to stabilize will be minimal. Therefore the time necessary for AGC compensation to stabilize is related to the change in cable length and/or input signal levels.

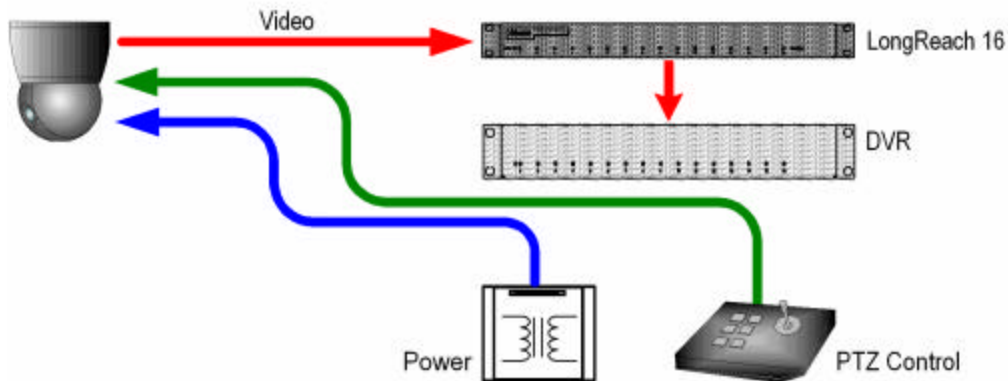


## Cabling Topologies

The LongReach 16 may be deployed in various cabling topologies depending on the type of CCTV system and the architectural layout of the site. There are three basic layouts shown in the following diagrams.

### Camera to Head End – Short Distance

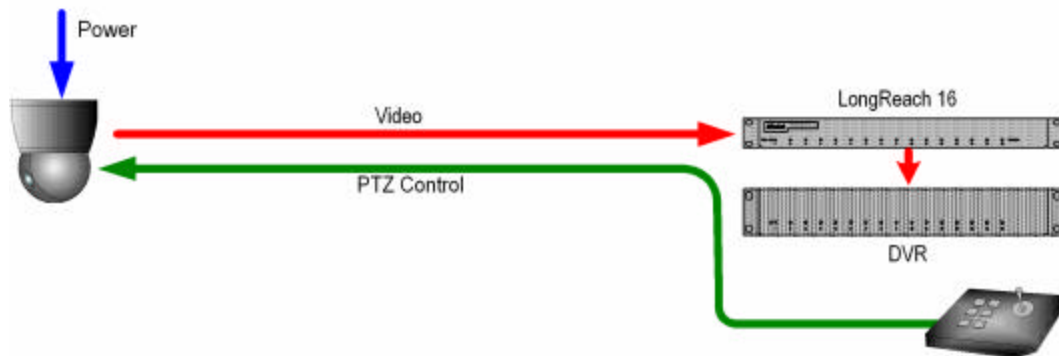
In this scenario, the LongReach 16, central monitoring equipment and remote power are all co-located.



In regard to the cabling, siamese cables for video, power and control may be installed between the central monitoring room. Alternatively, Cat5 cables may be used to transport video, power and control to the camera. It is important to note that if remote power is transmitted via Cat5 cable, a Class II power supply must be used.

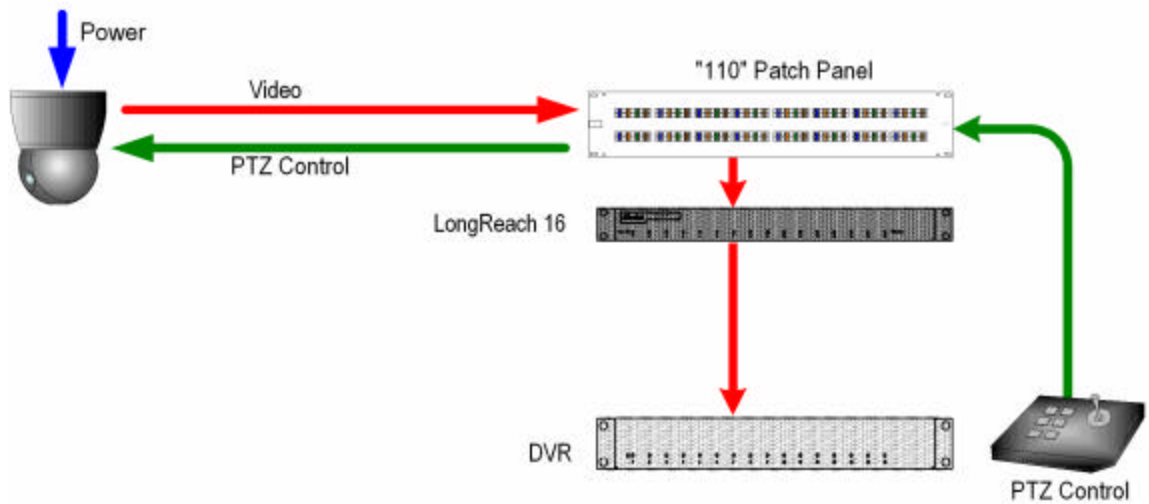
### Camera to Head End – Extended Distance

In this layout the LongReach 16 and the central monitoring equipment are co-located and due to the distance, remote power to the camera is supplied locally.



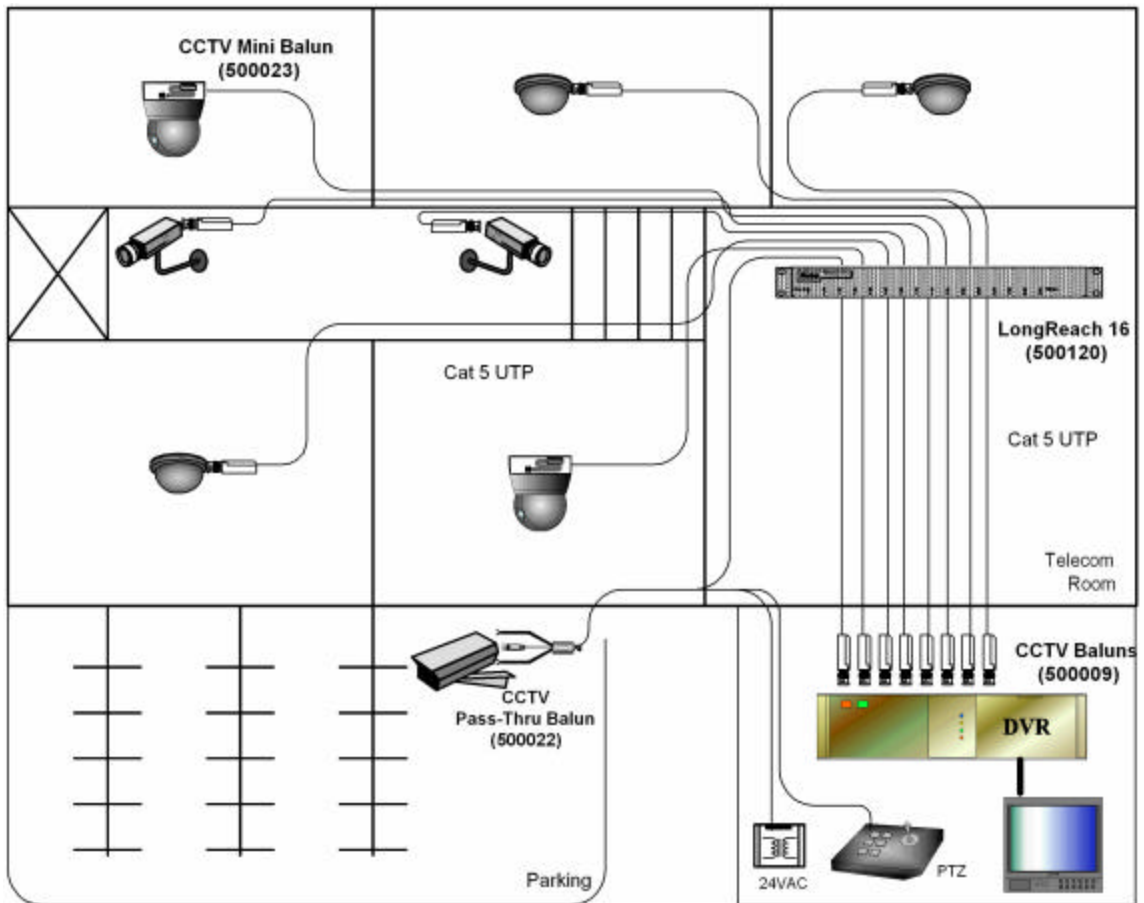
## Camera to Remote Telecom Room – Extended Distance

In some installations, it is more practical to install the cabling hardware in a remote telecom room and insert remote power and control if necessary at this point. Here too, siamese cables may be used between the telecom room and the cameras. Alternatively, Category 5 cables may be used to carry all three signals. A Cat5 “110” style patch panel may be used to concentrate all three signals over one Cat5 cable. It is important to note that if remote power is transmitted via Cat5 cable, a Class II power supply must be used.

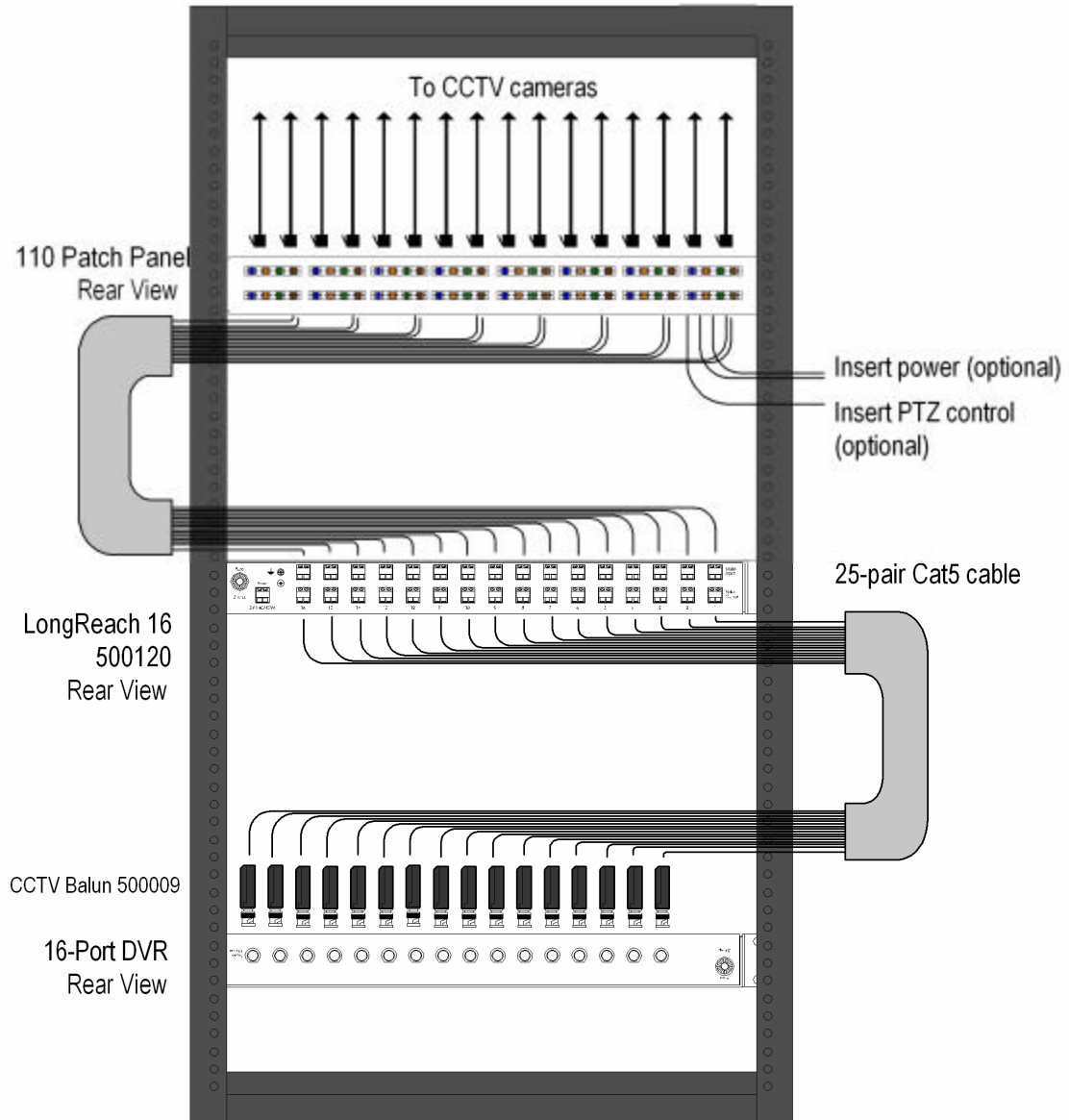


## Integration into a Structured Cabling System

One of the benefits of the LongReach 16 - Model 500120 is its ability to integrate easily into a structured cabling system. In this scenario CCTV baluns convert all CCTV equipment ports to twisted pair and then Category 5 interconnect hardware can be used to manage the physical camera connections without the need to install additional costly and bulky coaxial cable. The following diagram shows a typical configuration where the CCTV Hub is installed in a remote equipment or telecom room away from the central monitoring equipment.



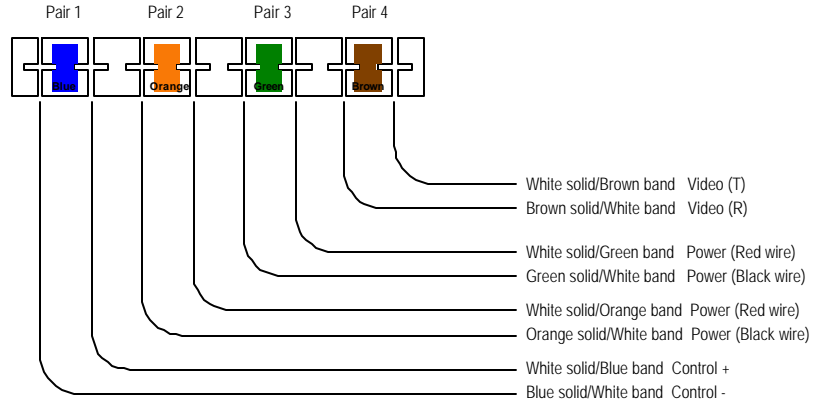
The hub may be installed up to 500 ft from the receiver (DVR, mux), thereby allowing the hub to be installed in a remote wiring or equipment room for greater cabling flexibility. The following diagram shows how the hub works in conjunction with a “110” patch panel system. The patch panel features RJ45 modular jacks in front and “110” style punchdown connectors on the rear panel.



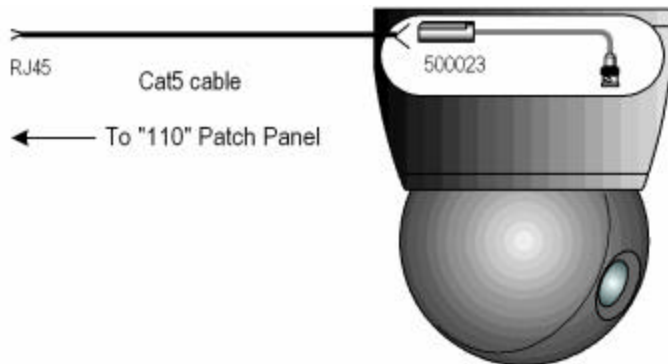
The camera inputs arrive at the RJ45 side of the patch panel. On the rear panel, the individual twisted pairs from the CCTV hub are terminated on punch down connectors. Remote power and/or PTZ control may be inserted into the Cat5 cable at the “110” panel. From the CCTV hub, bulk Cat5 cables transmit the camera signals to the DVR or mux where they terminate on CCTV Screw Terminal Baluns (500009).



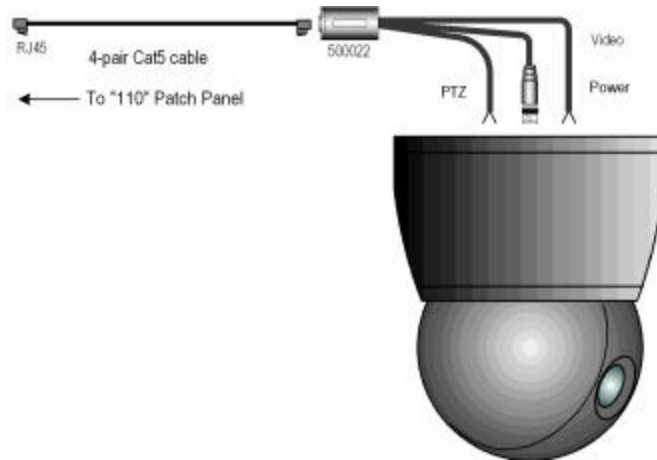
The following diagram shows how remote power and PTZ control may be inserted at a "110" style punch-down block. A similar procedure could be used for 66, BIX and Krone interconnect hardware. The diagram shows MuxLab's recommended convention to work in conjunction with the CCTV Pass-Thru Balun (500022).



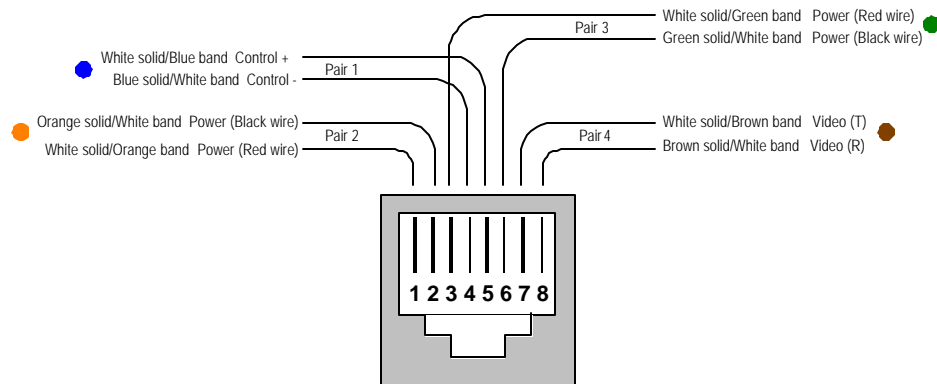
At the camera end, Cat5 4-pair cables carry video and/or power and control to each camera. If only video is required, the connections terminate on the CCTV Modular Balun (500000), CCTV Screw Terminal Balun (500009) or CCTV Mini Balun (500023) as shown below.



Some CCTV systems integrators are specifying that remote power, PTZ control and video be transmitted via one 4-pair Cat5 cable. In this application, the Cat5 cable may be terminated on the CCTV Pass-Thru Balun. In order to determine the maximum distances for remote power, please refer to the CCTV Balun Application Guide available in pdf format at [http://www.muxlab.com/assets/files/application\\_guides/VE\\_CCTV\\_Balun.pdf](http://www.muxlab.com/assets/files/application_guides/VE_CCTV_Balun.pdf), or download the MuxLab Distance Calculator (20MB) by clicking on the following link: [http://www.muxlab.com/assets/files/application\\_notes/DistanceCalculator.zip](http://www.muxlab.com/assets/files/application_notes/DistanceCalculator.zip)



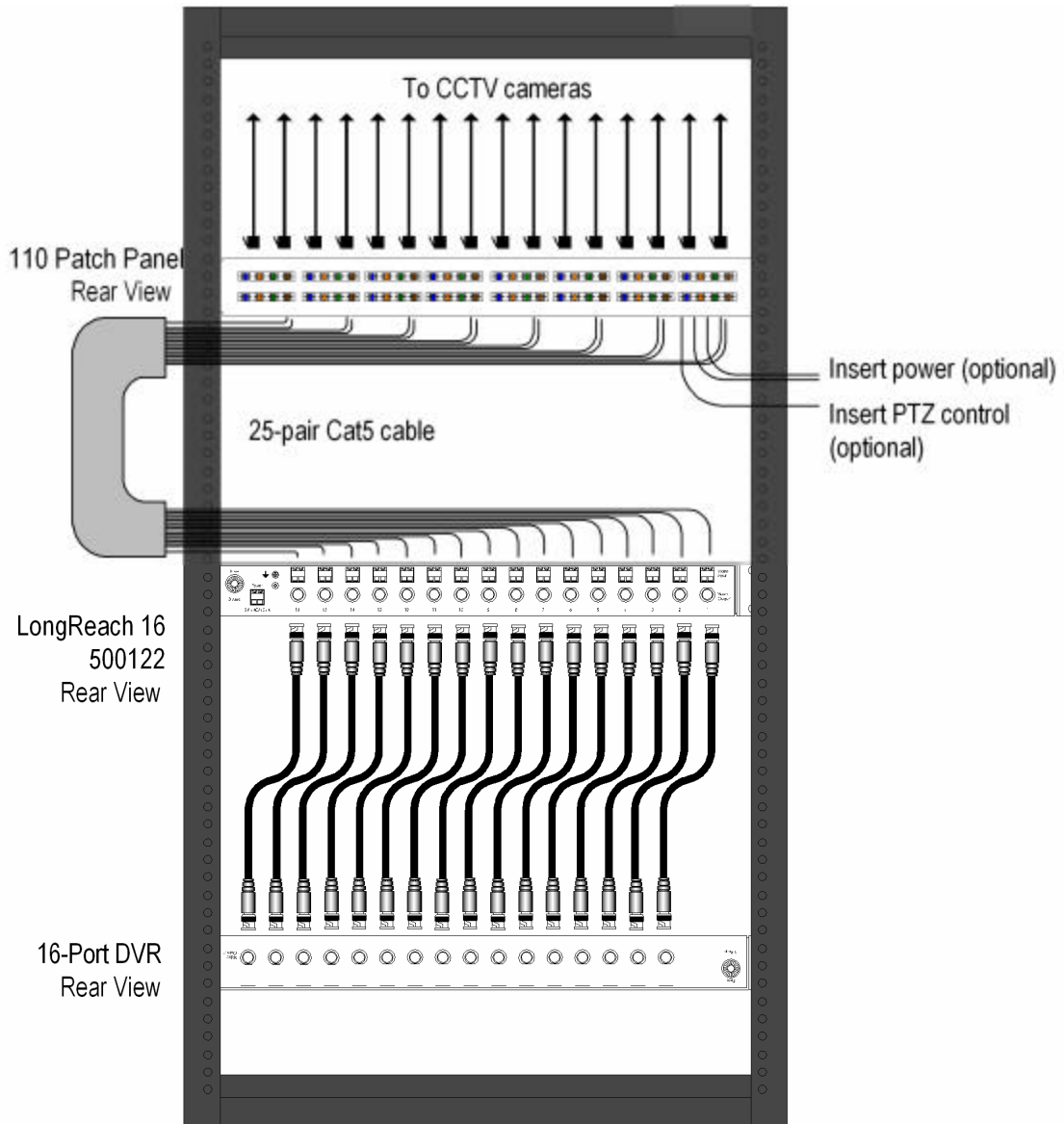
The RJ45 pin configuration of the CCTV Pass-Thru Balun (500022) follows the EIA/TIA 568B standard as shown in the following diagram and is compatible with the wiring described above for the hub.



CCTV Pass-Thru Balun (500022)  
RJ45 Jack EIA/TIA 568B

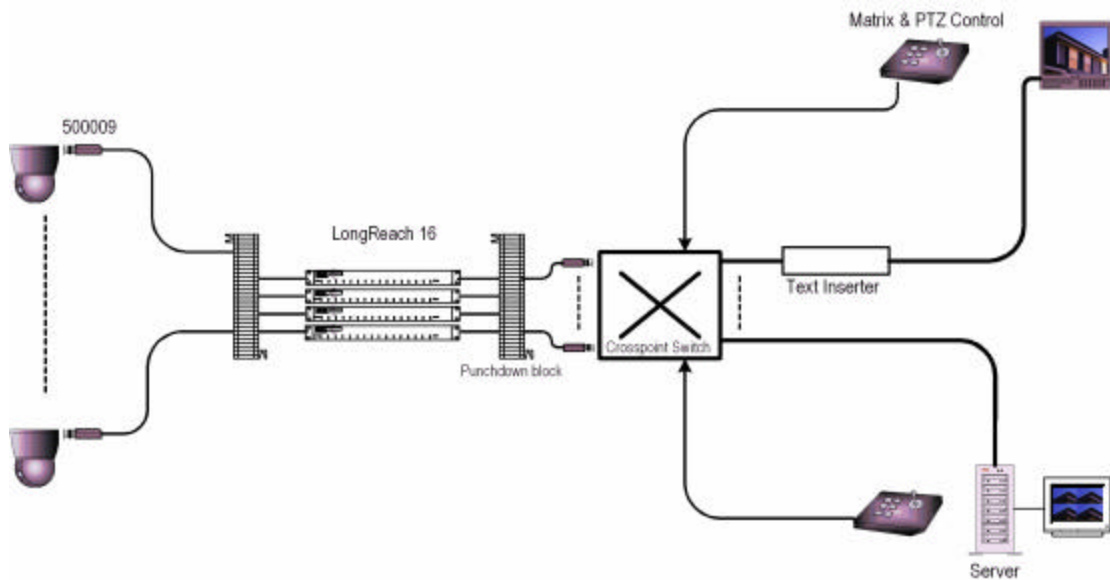
## Terminating on Coaxial Cable at the DVR

If the LongReach 16 is installed near the DVR or mux and coaxial cable is preferred, the 500122 may be used for this application. The 500122 are fitted with BNC output for this purpose.



## Large Installations

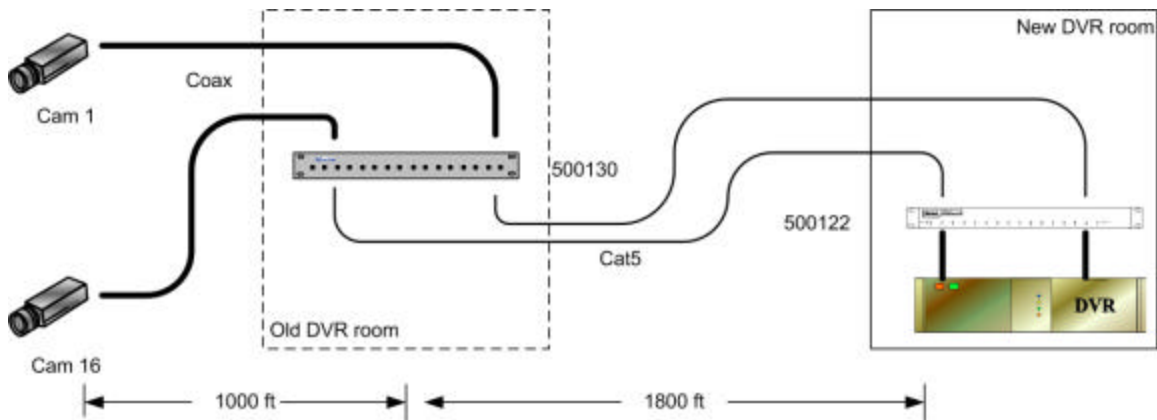
In large installations that have hundreds or thousands of cameras, it is often necessary to allow many security personnel to access each camera in full-motion video on demand. This usually requires an analog video cross-point matrix switch that is in turn connected to several analog video monitors as well as to digital video storage hardware. The following diagram illustrates the use of the LongReach 16 in such a configuration.



In the above configuration, the UTP/UTP version (500120) is used in conjunction with the CCTV Screw Terminal Balun (500009) to provide a total UTP cabling solution between the matrix switch and the cameras.

## Relocation of DVR Head-end

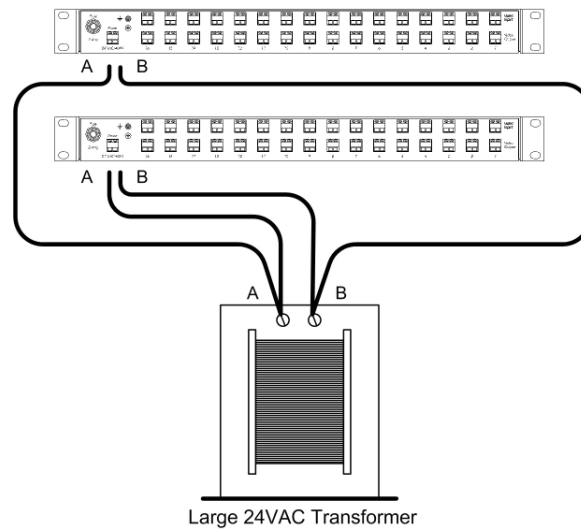
In some older installations, it is necessary to relocate the DVR head end while preserving the original camera cabling intact. In the original installation, coax cables were fed to a DVR room. The DVR equipment was subsequently moved to a new location further away and new Cat5 cabling was installed. MuxLab's Passive CCTV Hub (500130) may be used to convert the original sixteen (16) coaxial cables at the old location to Cat5. The LongReach 16 Active Hub (500122) is used to restore the signals to coax and compensate for the extended distance at the new DVR location. The following diagram illustrates.



## Using with Large Power Transformers

The LongReach 16 comes with its own 24VAC power transformer. The product also works in conjunction with large central power transformers. When using the product with large power transformers, in order to ensure correct operation, the following guidelines must be respected:

1. When the power transformer is powering several hubs, power leads going to each hub *must have the same phase*. If the power connections on each hub have a different phase, then there will be intermittent problems.



2. Ensure that the total amperage of the power transformer is sufficient to drive each hub. The power transformer must be able to supply up to 2.5A @ 24VAC (60VA) to each hub. Therefore if one power transformer is used to power four hubs, the power transformer must be able to supply at least 10A. In Europe the power transformer should be 70VA.

## Maximum Distance

The maximum distance achievable with LongReach 16 from the camera to DVR is 4,500 feet. The hub may be placed up to 4,000 feet from the camera and up to 500 feet from the DVR. As the maximum distance is approached, there may be noticeable loss of color, brightness and sharpness. To a certain degree, the image may be adjusted at the DVR, PC or monitor. However, as a guideline, it is recommended to perform a pilot test with the hub under worst case conditions to ensure user acceptable image results. This would involve testing a camera in extreme bright or dark surroundings and connecting it the furthest distance from the hub.

## **Performance with different CCTV equipment**

The image results of a CCTV system are partly due to the proper combination of CCTV equipment. Besides the LongReach 16 itself, the main components that play a role in the image quality include; the CCTV camera, DVR cross-point switch and cabling. Before embarking on an installation, it is recommended to perform a pilot test using the LongReach 16 together with the CCTV surveillance equipment to be deployed.

## **Compatibility with Third Party Baluns**

The LongReach 16 is functionally compatible with other third party twisted pair devices for CCTV video transmission. This includes other twisted pair hubs, baluns and cameras with integrated twisted pair transmitters. This allows the LongReach 16 to be integrated into any new or existing hybrid CCTV cabling system. A list of camera vendors that support twisted pair may be found in MuxLab's CCTV Balun Application Guide located in the Support section of MuxLab's website.

The main issues when using the LongReach 16 with third twisted pair baluns is the need to ensure that the pin configuration and signal polarity of the third party balun is compatible with the hub. When using the LongReach 16 in conjunction with a third party balun, verify that the signal polarity is straight through and not reversed.

Before using the LongReach 16 in conjunction with third party twisted pair baluns, it is recommended to perform a pilot test under worst case conditions to validate the application.

## **Up-The-Coax Systems**

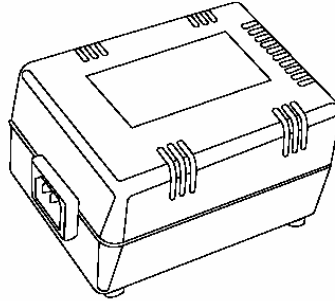
The LongReach 16 is designed for use with standard point-to-point video-only connections. They will not work with PTZ "up-the-coax" systems such as Pelco's Coaxitron.

## **Power Supply Surge Protection**

Some installations require surge protection at the input of the power supply. The external power transformer that is shipped with the CCTV Hub does not have surge protection. If surge protection is required, it is recommended to use a CCTV power supply that has surge protection. These can be purchased from vendors such as Altronix (<http://www.altronix.com/>) or Alarm Saf (<http://www.alarmsaf.com/>)

## **Spare Power Supply**

In the event that a spare power supply is required for the LongReach 16, it is recommended to purchase a replacement supply from a local CCTV distributor. In North America, the power supply must be rated at minimum 60VA (24VAC/2.5A). The following link shows an



acceptable power supply available from Altronix.

Altronix Model DVT1 – 115V/24VAC/80VA

[http://www.altronix.com/p\\_pdf/DVT1.pdf](http://www.altronix.com/p_pdf/DVT1.pdf)

## **Useful Links**

CCTV Labs (Australia) sells a CCTV test chart that may be used to check the performance of CCTV equipment. <http://www.cctvlabs.com/TestChart/testchart.html>

## **Conclusion**

The LongReach 16 is designed to facilitate CCTV cabling by further integrating it into the structured cabling system. In order to ensure reliable operation, it is important to verify the type of equipment being used, the type of cable, and the distance required before proceeding with an installation. If additional information is required, please contact MuxLab Sales or Customer Technical Support for assistance.



**MuxLab Inc.**  
8114 Trans Canada Hwy,  
St. Laurent (Quebec)  
Canada H4S 1M5

Telephone : ..... +1 514-905-0588  
Toll-free (North America) : ..... 1-877-689-5228  
Fax : ..... +1 514-905-0589  
E-mail: [videoease@muxlab.com](mailto:videoease@muxlab.com)  
URL: [www.muxlab.com](http://www.muxlab.com)