Passive CCTV Hub (500130, 500131)

Application Guide

Version 1.02

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Purpose

The purpose of this document is to explain how to apply the Passive CCTV Hub under different operating conditions and to discuss issues that are not necessarily covered in the Product Datasheet or Installation Guide.

Function of the Passive CCTV Hub

The function of the Passive CCTV Hub is to provide a centralized cabling solution that allows video, remote power and/or PTZ control to be managed via Cat5 twisted pair for more cost-efficient cabling in the DVR-based security video environment. The product is designed to work in conjunction with other MuxLab CCTV baluns for a more complete cabling solution.

Pre-Installation Check

In order to determine the feasibility of using the Passive CCTV Hub in a given installation, it is recommended to verify the overall security video configuration before proceeding with deployment. The issues that determine if and how the Passive CCTV Hub may be applied depend on the following key parameters:

1. **Cable length**: The cable length in conjunction with the camera wattage and power voltage determines whether remote power may be sent up the same Cat5 cable to the camera. Please see MuxLab's CCTV Balun Application Guide for more information.

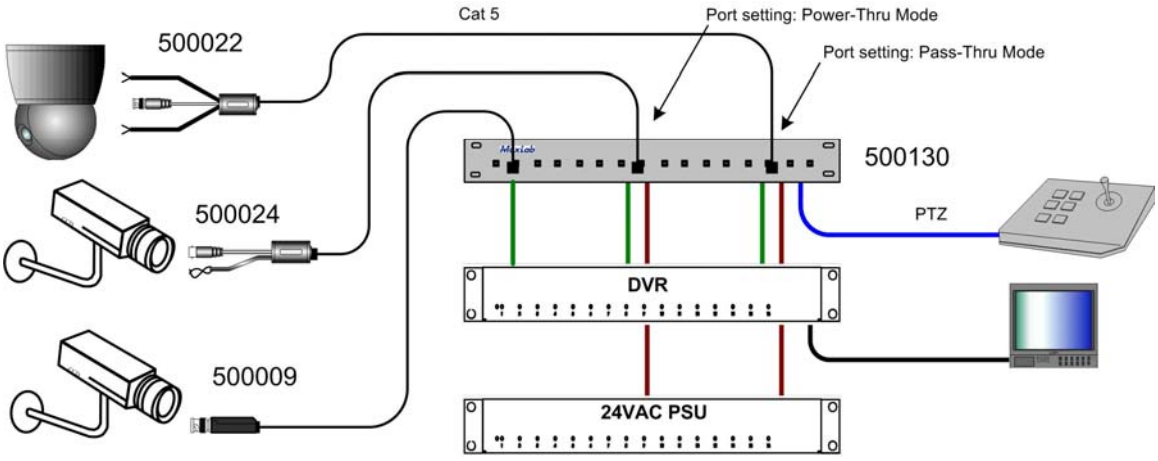
2. **Camera type (fixed or PTZ):** The type of camera to be deployed determines the number of twisted pairs needed between the hub and the camera.

3. **Camera wattage:** The camera wattage affects the maximum distance that remote may be transmitted over twisted pair. Please see MuxLab's CCTV Balun Application Guide for more information.

4. **Control protocol:** The product supports RS422, RS485 and bi-phase PTZ control protocols. Due to the internal design of the 500130, the product does not support "up-the-coax" systems and RS232 is not recommended due to the possibility of crosstalk.

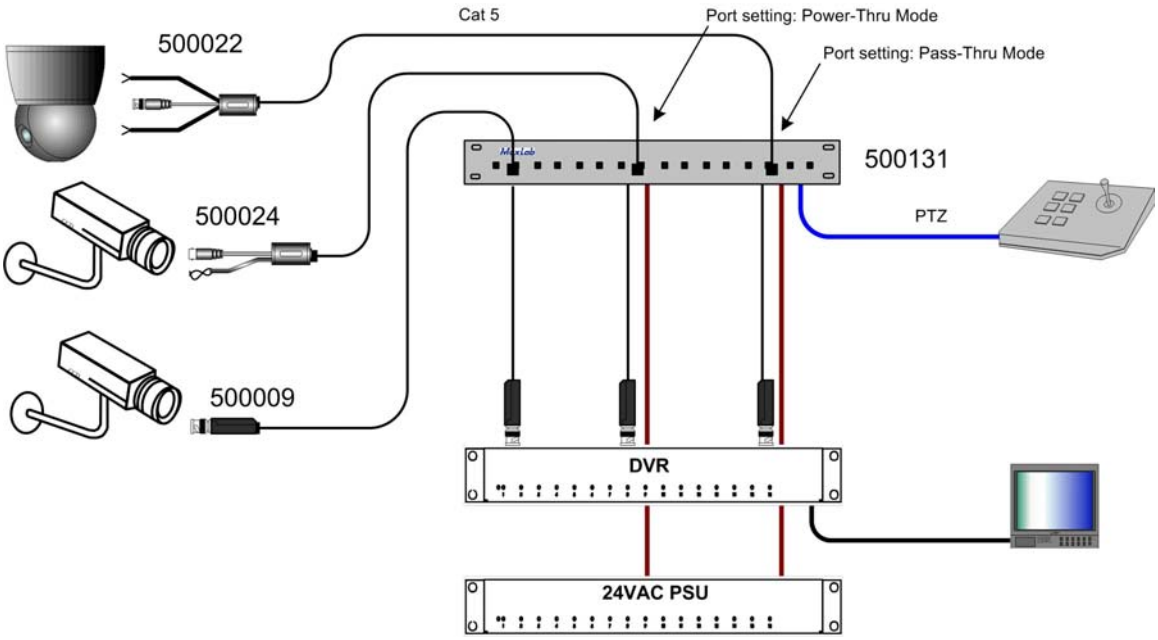
Short Distance Application – 500130

One of the basic applications for the hub is to use it at the DVR head end in order to combine video, remote power and/or PTZ control over Cat5. Each port is independently managed and therefore the cabling to each camera may be tailored to its particular configuration. For example, fixed cameras may require video and power. Other PTZ cameras may require video, power and control. Still other cameras may require video only since power is supplied at the camera. The advantage of using the 500130 in this application is that it replaces many individual baluns at the DVR for a neater and centralized cabling solution as shown in the following diagram.



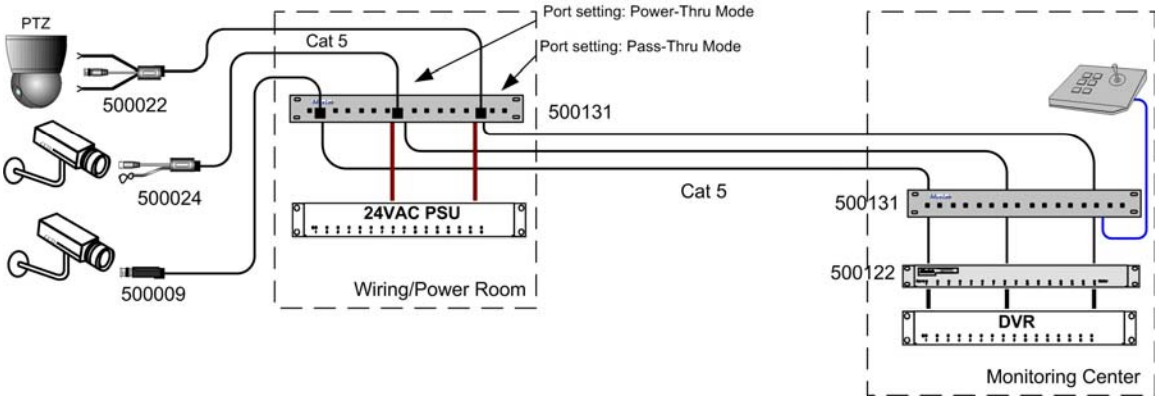
Short Distance Application – 500131 (Cat5 Breakout)

In applications that call for the total elimination of coaxial cable, the 500131 may be used to combine and breakout the various signal wires. Individual CCTV baluns may be used at the DVR head end to convert to Cat5 and then combined with remote power and PTZ control at the 500131. The advantage of this solution is that there is no coaxial cable to handle or purchase as shown in the following diagram.



Extended Distance Application – 500131 & 500120

In extended distance applications, cameras may be too far from the DVR to allow remote power to be inserted at the monitoring center. However, there may be remote telecom room that is closer to the cameras that could be used to distribute remote power and video to the cameras. In such an application, the 500131 could be installed in a room near the cameras. The video and PTZ control lines could be combined and connected back to a second 5000131 at the head-end. The video and PTZ control could be extracted at the head-end. The video would be transmitted via twisted pair to MuxLab's LongReach 16 Active CCTV Hub (500122) to support the extended distance. The PTZ control line would be connected to the PTZ controller.



Case Study – Retail Chain Environment

A major US retail chain is successfully streamlining its CCTV cabling system thanks to MuxLab's passive CCTV cabling solution. The project involves migrating from a pure analog CCTV system to an advanced IP-based system. The system includes fixed analog cameras that are connected to IP camera encoders located at intermediate distribution frames (IDF) throughout the store. At each IDF, the camera video feeds are digitized and transmitted to LAN switches and routers in the main distribution frame (MDF).

Each store has two (2) to five (5) IDF racks that are populated with the appropriate CCTV, power and cabling hardware. Each IDF contains a relay rack with IP camera encoders that stream video from up to 200 cameras back to the MDF. The MuxLab CCTV cabling components are installed between the CCTV cameras and the IP encoders to support power and video over Cat5. Each IDF rack contains the following components: MuxLab Passive CCTV Hubs (500130), IP camera encoders, 16-channel 24VAC power supplies, video distribution hub, LAN switch and power strips.

The customer chose MuxLab's passive CCTV cabling solution because it of several key benefits:

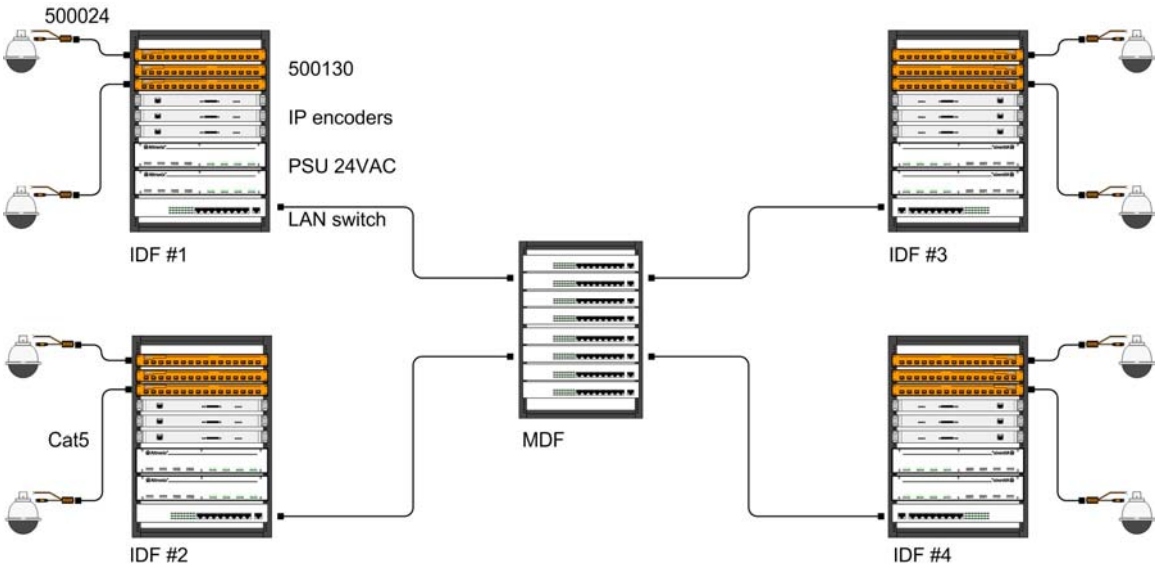
1. ***Minimum points of failure.*** The MuxLab cabling solution requires a CCTV Power-Thru Balun (500024) at each camera and a Passive CCTV Hub (500130) at the IDF for every sixteen (16) cameras.

2. ***Ease of installation.*** The baluns have built-in cable leads. The 500024 and 500130 adhere to the EIA 568 wiring standard thereby making cable preparation and termination straightforward.

3. ***Performance.*** The specification called for transmitting video from each camera and 24VAC remote power up to each camera over the same Cat5 cable. By supporting remote power over three (3) twisted pairs, the MuxLab solution had a built-in buffer to easily support the required maximum distance of 300 ft.

4. ***Hybrid solution.*** MuxLab's solution works in conjunction with third party equipment thereby allowing the customer to select the optimum IP encoders and power supplies for the system.

5. ***Migration.*** Ability to migrate eventually to a fully IP-based system.



Performance Issues

The performance of the Passive CCTV Hub is the same as that of MuxLab's standard passive CCTV Baluns (500000, 500009, 500022, 500024, and 500029). For more information, please consult MuxLab's CCTV Balun Application Guide and CCTV Balun installations Guides, available from the Support Section on MuxLab's website. A Distance Calculator for remote power is available from the MuxLab website under the Support/Applications section.

Port Switch Functions

The Passive CCTV Hub features a 2-position switch at each camera port. The purpose of the switch is to allow the particular camera port to be configured to support, video only, video & power or video, power and control over Cat5. The position of the switch sets the port to be compatible with the appropriate CCTV balun at the camera side. For more information about the port switches, please see the Passive CCTV Hub Installation Guide.

RS485 - Common Signal Ground.

In order for RS485 to be transmitted reliably, the specification calls for a common signal ground in addition to the two (2) signal wires. In short to medium distance applications, RS485 generally operates reliably even without an additional ground wire. However, in extended distance applications (i.e. over 700 ft), there is a greater possibility of ground

loop issues and therefore it may be necessary to provide an additional signal ground between the PTZ transmitter and receiver.

Low Voltage Power Supply Requirements

When using the CCTV Pass-Thru Balun (500022) or Power-Thru Balun (500024) to transmit remote low voltage power over two (2) or three (3) twisted pairs respectively, precautions should be taken to protect the twisted pairs from short circuits. It is recommended to use a **Class II** power supply. In this way, if there is a short circuit, the power supply's fuse/circuit protection will protect the cabling. The following photo and link shows an example.

Altronix 16-Port Rackmount Class II 24VAC Power Supply
http://www.altronix.com/index.php?pid=2&model_num=R2416600ULCB

Conclusion

The Passive CCTV Hub provides a simplified method to manage security video cabling over Cat5 twisted pair. Prior to deploying the product, it is recommended to verify the total configuration in order to ensure a trouble-free installation. Should you require additional information, please contact MuxLab Inside Sales or Customer Technical Support at 877-689-5228, ext 358 or at videoease@muxlab.com.

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