LongReach II
Active CCTV Receiver Hub
500126 [8P], 500127 [16P]

Installation Guide

MuxLab

Table of Contents

1. Overview

1.1. Description

The LongReach II Active CCTV Receiver Hub (500126, 500127) allows analog CCTV video signals to be transmitted up to 1 mile (1.6 km) via a Category 5e/6 twisted pair cable when used in conjunction with MuxLab's passive CCTV baluns (i.e. 500000, 500009, 500022, 500024) at the camera end. The LongReach II Hub features Automatic Gain Control (AGC) and Ground Loop Isolation (GLI) for reliable and stable image quality. Once installed, no adjustments to the hub are needed. The hub automatically adjusts the brightness, sharpness and color intensity of the video signal based on the actual cable conditions such as cable grade, distance, environmental effects on the cable, etc. Once installed, there is no further need to go on-site to check the video signal. Any further enhancements to the image may be made at the camera, monitor or DVR. The product requires a 5VDC, 13 Watt power supply (included) and connects directly to the DVR, IP encoder or matrix switcher. The LongReach II Hub also allows video, remote power and 2-wire PTZ control to be combined over Cat5e/6 cable and features ground loop isolation (GLI) for optimum video transmission. The hub also features surge protection for more reliable operation.

1.2.   Features

- 8 (500126) or 16 (500127) channels

- Up to 1 mile via Cat 5e /6 UTP with passive CCTV Balun at camera

- Video, power and PTZ over one Cat5e/6

- Auto Polarity Correction

- Automatic Gain Control for brightness, sharpness and color

- Ground Loop Isolation

- Diagnostic LEDs

- Connects directly to CCTV receiver equipment

- Works with passive CCTV Baluns

- Supports MuxLab mounting accessories (500900/902/910/915)

- Requires floating 5V DC, 13 W power supply (included)

- 2-year warranty

2.
Technical Specifications

Specifications	
Environment	CCTV composite baseband video; NTSC, PAL, SECAM
Devices	CCTV cameras, monitors, DVR, switchers, IP encoders, and other CCTV equip.
Transmission	Transparent to the user
Video	
Bandwidth	20 Hz to 8 MHz.
Input	1.5 Vp-p max, 100Ω, balanced (RJ45)
Output	1.1 Vp-p, ± 1 dB, 75Ω, unbalanced (BNC)
Insertion Loss	-14 dB minimum for luma, -60 dB minimum for chroma. Determined by Automatic Gain Control.
Return Loss	Greater than 15 dB over the frequency range
Common Mode Rejection Ratio	Greater than 40 dB @ 3.85 MHz
Ground Loop Isolation	Up to +/-50VDC
Video Signal Polarity	Automatically adjusts for any polarity
Max. Distance via Cat5e/6	Passive interface balun: 5,000 ft (1.5 km)
	Active interface balun: 7,000 ft (2.1 km)
Max. Distance via coax RJ59	30' (9 m) between the unit and TV monitor
Diagnostics	LED 1: ON if power present, LED2: ON if video signal present
Video Controls	Automatically adjusts for gain, sharpness and luminosity

Remote Power (i.e.; 24 VAC, 28 VAC)	
Wiring	Remote low voltage power supported via two (2) twisted pairs. A Class II power supply is recommended.
Max. Current	2.5 A rms or DC
Max. Distance @ 24VAC via three twisted pairs. *Longer distances may be achieved @ 28 VAC.*	2 VA: 1,500 ft (457m)* 4 VA:745ft (227m)* 10 VA: 300 ft (91m)* 20 VA: 150 ft (46m)* *Based on 10% voltage drop at camera. Please consult your CCTV vendor for more info.*

2-Wire PTZ Control (i.e. RS-422, Manchester/Bi-Phase, half duplex RS485)	
Wiring	Remote 2-wire PTZ control supported via one (1) twisted pair.
Maximum Distance	Up to 4,000 ft (1.2 km) depending on the PTZ camera vendor
Maximum Input Voltage	48 Volts (AC RMS/DC)
Maximum Current Rating	2A (AC RMS/DC), no fuse

Mechanical & Environmental	
Cable – UTP	24 gauge or lower solid copper twisted pair wire. Impedance: 100 ohms at 1 MHz Maximum capacitance: 20 pf/foot. Attenuation: 6.6 dB/1000 ft at 1 MHz
Cable – Coax	RG59/U or RG6; Impedance: 75 Ω
Switch	Select between Power-Thru (500024/500029) and Pass-Thru (500022) Mode

Specifications (Cont'd)

RJ45 Pin Configuration	Signal	500022 Mode	500024/500029 Mode
Reverse polarity sensitive if 12DC camera is used	*Power A (+)	1, 3	1, 3, 5
	*Power B (-)	2, 6	2, 4, 6
	Control (+)	4	NA
	Control (-)	5	NA
	Video BNC Center (Tip)	7 [T] same as 500000R	7 [T] same as 500000R
	Video BNC Ground (Ring)	8 [R] same as 500000R	8 [R] same as 500000R
Connectors		Video Out: BNC-F (8 or 16)	
		Remote Power: 2-pole screw terminal block (8 or 16)	
		PTZ: 2-pole screw terminal block (8 or 16)	
		Cat5e/6 Link: RJ45S (8 or 16)	
		Power connector.GND screw terminal	
Power Supply (included) **Current drawn per unit**		5VDC 2.6 A max. Floating. Interchangeable blades	
		500126 (8-port): 0.79 A max.	
		500127 (16-port): 1.53 A max.	
Transient Voltage Protection		± 2.5V on the video line	
		± 48V on the power and control lines	
AC/DC power surge protection		Above 34VAC RMS or +/-48 VDC.	
Fuse Protection		Auto-resettable fuses on 5VDC input and Power A (+) upon power cycling.	
Temperature		Operating: 0° to 55°C. Storage:-20° to 85°C. Humidity: up to 95%	

Specifications (Cont'd)	
Enclosure	Aluminium
Dimensions	500126 (8-port):
	8.4" x 5.15" x 1.65" (21.4 x 13.1 x 4.2 cm)
	500127 (16-port):
	16.9" x 5.09" x 1.65" (42.9 x12.9 x 4.2 cm)
Weight	500126: 2.8 lb. (1.3 kg)
	500127: 4.6 lb. (2.1 kg)
Regulatory	FCC and CE.
Warranty	2 years
Order Information	500126 LongReach II Active CCTV Receiver Hub, 8-port
	500127 LongReach II Active CCTV Receiver Hub, 16-port

Compatibility	**Passive interface:** **Active interface:**	500000, 500000R, 500022, 500024/29 500100, 500101

3.
Installation Procedure

3.1.   Pre-Installation Checklist

The LongReach II Active CCTV Receiver Hub (500126, 500127) is used to provide extended distance via a copper twisted pair. Before installing the product, please verify the following checklist to ensure that installation takes place smoothly.

1. The LongReach II Hub is always connected to the receiver side of a CCTV installation. For example, it is connected directly to the video input ports of the CCTV DVR, IP encoder or matrix switcher at the central monitoring location.

2. The LongReach II Hub is used in conjunction with MuxLab's passive CCTV baluns (i.e.: 500009, 500022, 500024/29). The passive CCTV Balun is connected at the CCTV source, which is usually the CCTV camera.

3. For best image quality and operator safety, the DVR should be properly grounded. If this is not possible, then the LongReach II Hub should be properly grounded. Please ensure that there is a building ground available. Note: If more than one LongReach II Hub is connected to the same DVR, only one hub needs to be properly grounded.

4. The LongReach II Hub must be powered by a 5V DC, 13 W floating (non-grounded Ring of the PSU DC plug) power supply (supplied with the product).

5. The LongReach II Hub is calibrated to work with CCTV sources that conform to RS-343 (RS-170).

## 3.2.   Physical Installation (500127)

The 16-channel LongReach II Hub (500127) has three mounting options; desktop, 19" rackmount or wallmount. The product comes with **two (2) mounting brackets** and four (4) rubber stand-offs to allow it to be configured for either option. The product is factory set for rackmounting.

1. If the product is to be rackmounted in a relay rack or wallmounted, select the final destination for the product and install the unit using standard rackmount screws.
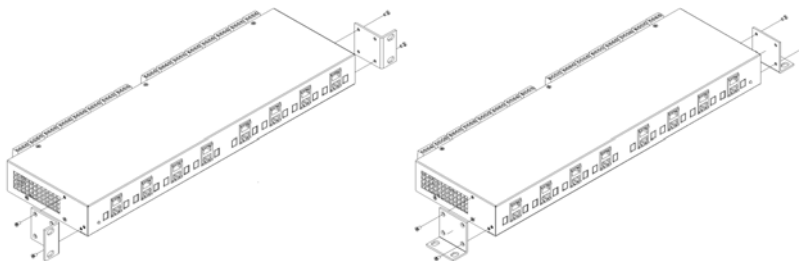

Mounting brackets

2. If the product is to be installed on a desk, then remove the rackmount brackets with a standard Philips screwdriver and store the brackets for future use. Peel the backing off the rubber standoffs and affix them to the corners underneath the base of the unit.

3. Please familiarize yourself with the connectors on the front and rear panel of the hub. The following diagrams show the front and rear views.
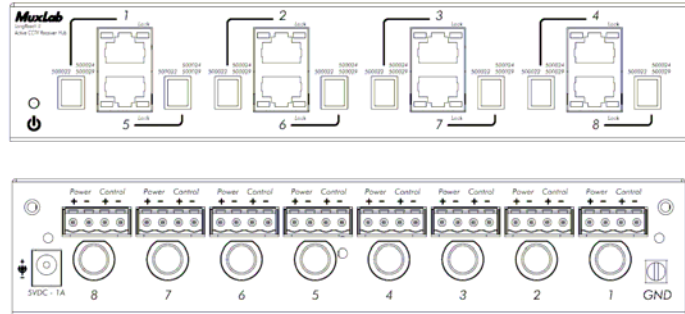
Front and rear views - 500126
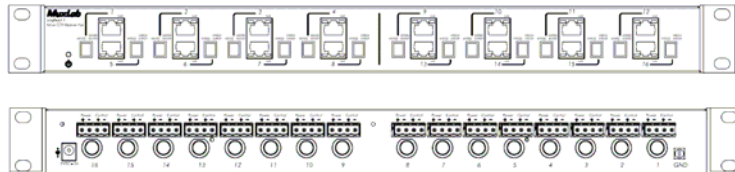
Front and rear views - 500127

3.3.   Installation Procedure

1. For video-only applications, connect the passive CCTV Balun (500000 or 500009) to the CCTV camera video output port.

2. Connect one twisted pair to the passive CCTV Balun. If the balun is the 500009, use a small flat-head screwdriver. If the balun is the 500000, crimp RJ45 modular plug to the end of the cable, ensuring that Pins 7 & 8 of the RJ45 are connected to a twisted pair.
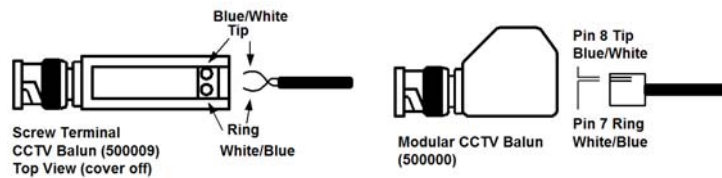
3. To transmit remote power and video, the 500024 balun may be used. Refer to specification table and respect distance limitations. Set the slide switch on the LongReach II Hub to "500024/29". Connect the outputs of the 3rd party CCTV power supply to the remote power terminals on the hub.
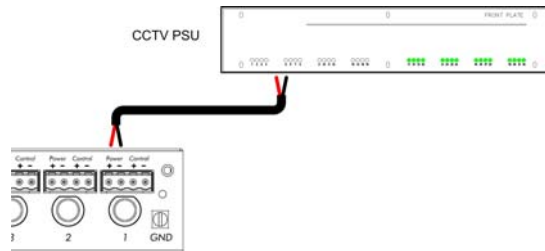
4. If remote power, video and PTZ control is to be transmitted, use 500022 balun. Refer to the specification table regarding maximum distances and set the slide switch on the LongReach II Hub to "500022". Connect the outputs of the 3rd party PTZ controller to the control terminals on the hub.
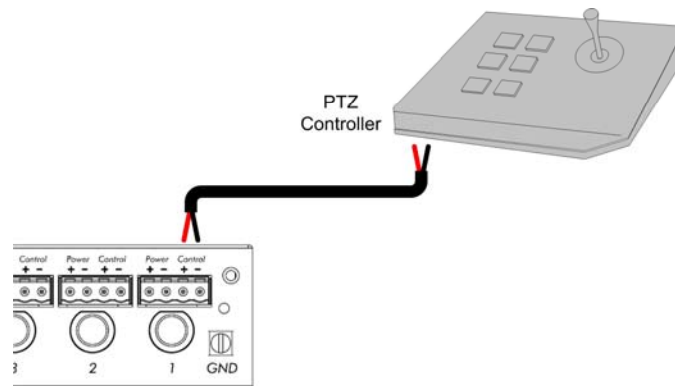
5. Ensure that the power is off on the DVR and then connect the LongReach II Hub to the appropriate video input port.

6. Connect the plug from the 5 VDC power supply. If power is present, then the green LED will be ON.

7. Connect one Cat5e cable to each RJ45 on the LongReach II Hub. Please note that the hub is not polarity sensitive.

8. Power on the CCTV system. When a video signal is detected, the AGC Lock LED on the LongReach II Hub will change from OFF to ON.

9. Due to the Automatic Gain Control, the camera image may take a few seconds to stabilize. This is normal. The LongReach II Hub automatically restores the video camera signal to its original quality, compensating for effects due to the presence of a UTP cable and electrical noise. Use the monitor's standard controls to fine tune the final picture.

10. Connect the ground wire of the LongReach II Hub to a true building ground in order to help ensure that harmful transient voltages do not damage the equipment.

11. If there is a severe ground loop problem in which the voltage differential between the camera and the LongReach II Hub exceeds +/-50 VDC, image distortions may appear. To correct the problem, additional ground loop blocking equipment must be installed or the voltage differential must be eliminated. If there is no image distortion, the LongReach II Hub will function normally and there is no need to take corrective action.

12. The following diagram illustrates a typical configuration.
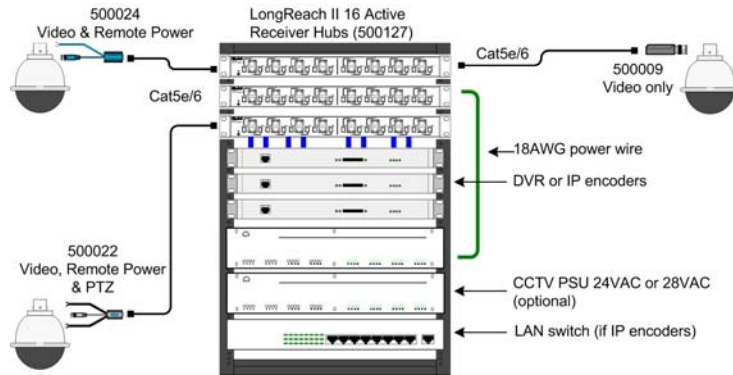
13. The LongReach II Hub is equipped with resettable fuses to protect the circuitry. In the event of a power surge, the fuse(s) will trip and the green LED will dim. In order for the fuse(s) to reset, the power to the LongReach II Hub must be turned OFF for 2-3 minutes. The fuse(s) will then reset and the power can be turned on again.

4.
Troubleshooting

The following table describes some of problem symptoms, probable causes, and possible solutions. If the information below does not solve the problem, the technical support contact information can be found at the end of this section.

Picture	Green LED	Red LED	Probable Cause	Possible Solutions
No image	OFF	OFF	• Power off	• Check power supplies of CCTV equipment.
	Dim	OFF	• Wrong pin configuration	• Check pin configuration and verify straight-thru wiring.
	Dim	OFF	• Fuse tripped due to power surge	• Turn power off. Wait 2-3 minutes. Turn power on. Investigate cause of power surge.
Picture distorted	Bright or blinking	OFF	• EMI interference • Split pair	• Check that wiring is not too close to transformers and lighting ballasts. • Make sure that the wires on the signal pair are not reversed on one side. • Check if the UTP pairs are correct (not split).
Picture loses color	Bright	OFF	• Exceeded distance specifications • Lower grade UTP cable is introducing high losses	• Check DC loop resistance and verify if distance spec is exceeded. • Reduce cable length or eliminate high-loss components • Replace cable by one of higher grade.
Picture contains low frequency background noise (wood grain pattern)	Bright	OFF	• Poor grounding	• Connect ground of LongReach II Hub to true building ground.
Image occasionally fading, synchronization not perfect	Bright	ON or blinking	• Ground Loop Fault (ground differential voltage between transmit & receive ends exceeds 2 VDC or AC)	• Isolate remote camera power entry and enclosure from local ground. • Ensure that camera is secured against static discharges (*i.e.*, is inside a metal, grounded cage).

4.1. Technical Support Information

When contacting your nearest MuxLab dealer or MuxLab Technical Support, please have the following information ready:

- Unit model number

- Cabling layout. Include camera and DVR/IP encoder used (with model numbers), estimated cable lengths (between the equipment), and type of cable used (UTP, STP, 4-pair, multipair, category)

- Description of problem

- List of tests performed

5.
Product Warranty Policy

Items Under Warranty - Company Policy
MuxLab guarantees its products to be free of defects in manufacturing and workmanship for the warranty period from the date of purchase. If this product fails to give satisfactory performance during this warranty period, MuxLab will either repair or replace this product at no additional charge, except as set forth below. Repair and replacement parts will be furnished on an exchange basis and will be either reconditioned or new. All replaced parts and products become the property of MuxLab. This limited warranty does not include repair services for damage to the product resulting from accident, disaster, misuse, abuse, or unauthorized modifications or normal decay of battery driven devices. Batteries, if included with the product, are not covered under this warranty.

Limited warranty service can be obtained by delivering the product during the warranty period to the authorized MuxLab dealer from whom you purchased the product, or by sending it to MuxLab. MuxLab will not accept any such product for repair without a Return Material Authorization number (RMA#) issued by its Customer Service Department and a proof of purchase date. If this product is delivered to MuxLab by mail, you agree to assume risk of loss or damage in transit, to prepay shipping charges to the warranty service location, and to use the original shipping container or equivalent.

THE ABOVE LIMITED WARRANTY IS THE ONLY WARRANTY COVERING YOUR MUXLAB PRODUCT. THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SOME STATES DO NOT ALLOW LIMITATIONS ON IMPLIED WARRANTIES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

IF THIS PRODUCT IS NOT IN GOOD WORKING ORDER, YOUR SOLE REMEDY SHALL BE REPAIR OR REPLACEMENT AS PROVIDED FOR ABOVE. IN NO EVENT SHALL MuxLab BE LIABLE TO YOU FOR ANY DAMAGES, INCLUDING ANY LOSS OF PROFITS, LOST SAVINGS, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF OR INABILITY TO USE THIS PRODUCT, EVEN IF MUXLAB OR AN AUTHORISED MuxLab DEALER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES; NOR WILL MUXLAB BE LIABLE FOR ANY CLAIM BY ANY OTHER PARTY. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR CONSUMER PRODUCTS, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY FROM STATE TO STATE.

Warranty Periods

Any product found to be defective within three (3) months of invoice, including one (1) month shelf life, may be returned for replacement by a new unit or a satisfactory repair within one (1) month of receiving any returned product. The customer must provide MuxLab with the serial number and proof of purchase of the defective unit being returned. <u>All R.M.A.'s issued are subject to inspection by MuxLab,</u> and will be returned to customer if not properly package – units must be returned in original container or equivalent. MuxLab will not accept any such product for repair without an authorization for its Technical Support department and without a return authorization number issued by MuxLab Customer Service department. For credit & replace R.M.A., customer will be liable to pay replacement invoice if defective products are not returned.

Product more than six months old, including shelf life.

The defective unit must be returned prepaid to MuxLab and then the unit will be repaired or if repair is not possible, replaced by an equivalent unit and returned to the customer within one (1) month of receiving any returned product. There is no charge for repair (parts and labor) during the full warranty period.

Items Defective and not under Warranty

For products which are no longer under warranty the policy is repair and return. An amount of 25% of the products published list price at the time of purchase will be charged. Customer must issue a purchase order to cover the cost of repair.

Each unit will be returned to the customer within one (1) month from receipt of the unit by MuxLab. The defective unit must be returned prepaid to MuxLab. The repaired unit will be returned to the customer FOB MuxLab. The repaired unit has a 90 day warranty.