Component Video Family Application Guide

Component Video/Digital Audio Balun (500050, 500051)

Component Video/Analog Audio Balun (500052, 500053, 500053-WP)

Component Video/IR Pass-Thru Balun (500054, 500055)

Component/Composite Video Balun (500056, 500057)

Component Video Hub (500250, 500252, 500252, 500253)

Component/Stereo Audio Balun (500058, 500058-WP)

MuxLab

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Purpose

The purpose of this document is to explain how to apply MuxLab's Component Video Solution in different operating scenarios and to discuss issues not covered in the Installation Guides that come with the products. The solution comprises the Component Video Balun and Component Video Hub.

Function of the Products

The function of the Component Video Baluns are to provide a cost-effective method to connect component video (RGB/YPbPr) equipment via Cat5E/6 twisted pair cable in a point-to-point connection. There are four (4) models; Component Video/Digital Audio Balun (500050, 500051), Component Video/Analog Audio Balun (500052, 500053), Component Video/IR Pass-Thru (500054, 500055) and Component Video/Composite Video Balun (500056, 500057). The function of the Component Video Hub (500250, 500251, 500252, 500253) is to distribute a single Component Video source to multiple screens.

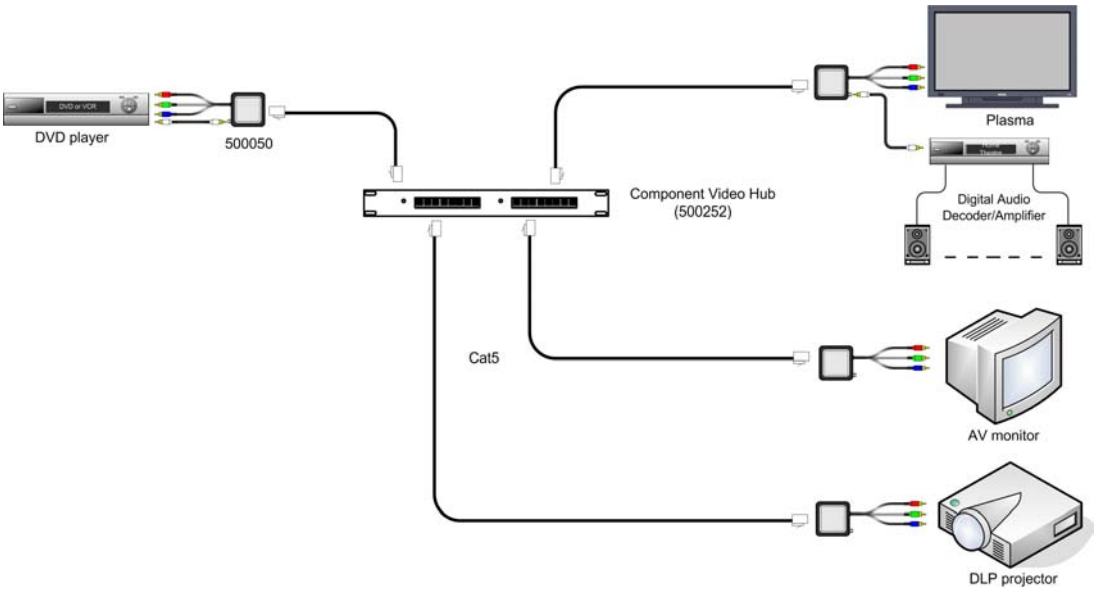
Equipment Supported

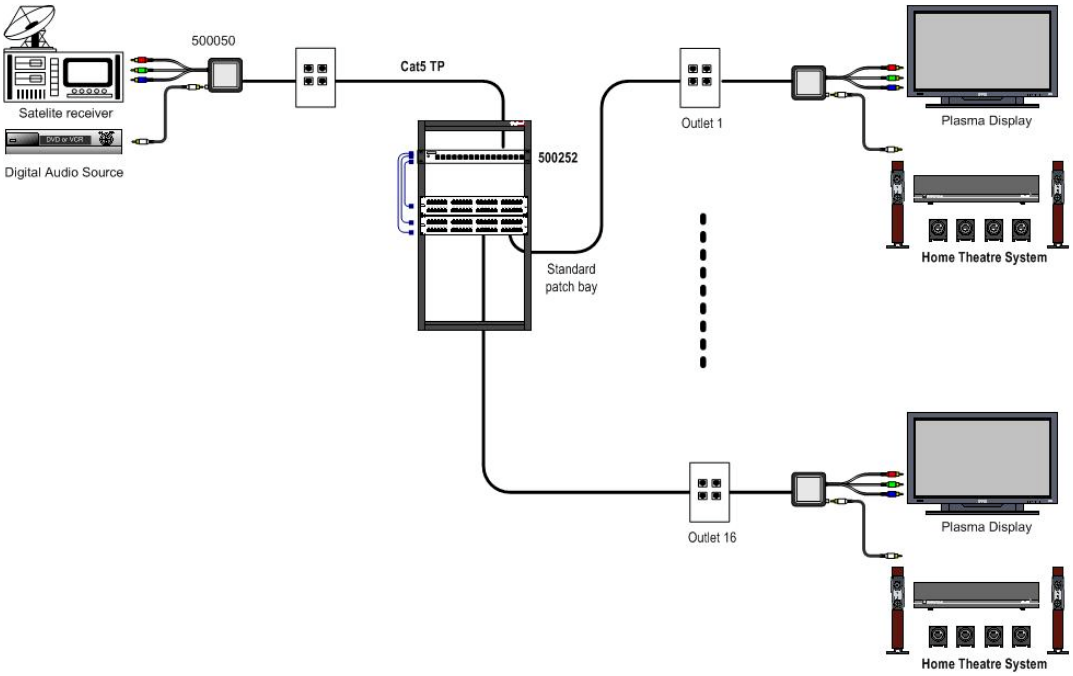
Used in pairs, the Component Video/Digital Audio Balun equipment work with any audio-video equipment that component video (RGB/YPbPr) and Digital Audio. The list includes equipment such as the following:

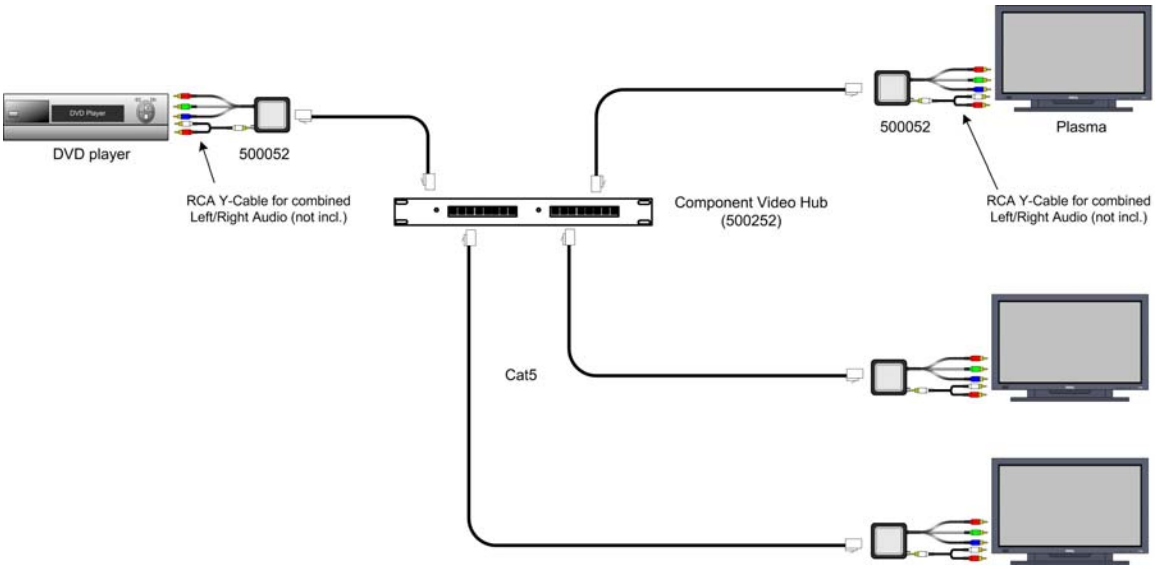
DVD players	Home theatre systems	Scan converters
VCR	Laptops	Video scalers
Cable boxes	PCs	Matrix switchers
Monitors	Game stations	1xN switchers
Projectors	Splitters	MPEG decoders
Plasma screens	Distribution amplifiers	Video servers

Component Video Distribution – MuxLab Solutions

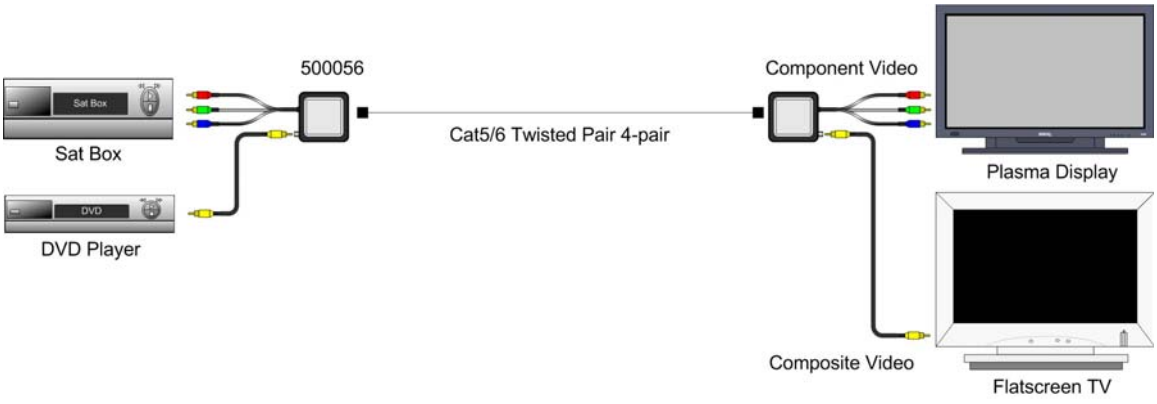
In applications that require a single source to be distributed to multiple displays, the Component Video/Audio Baluns may be used in conjunction with the Component Video Hub to provide a fully Cat5E/6 cabling solution. The following diagrams show several typical application scenarios:





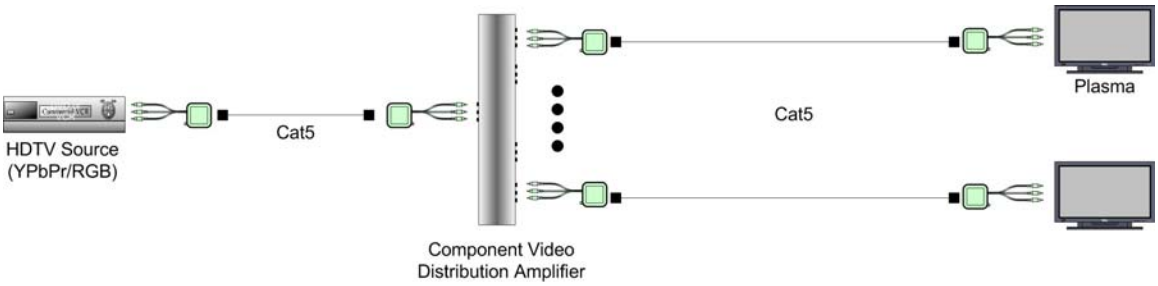

DVD player
500052
RCA Y-Cable for combined Left/Right Audio (not incl.)
Component Video Hub (500252)
500052
Plasma
RCA Y-Cable for combined Left/Right Audio (not incl.)
Cat5


IR Sensor (3rd party)
IR Control Module & PSU (3rd party)
IR Emitter Out
500054
Cat5 Unshielded Twisted Pair
500054
DVD Player
2-wire IR emitter (3rd party)
Integrated Video Screen


500056
Component Video
Sat Box
Cat5/6 Twisted Pair 4-pair
Plasma Display
DVD Player
Composite Video
Flatscreen TV

Component Video Distribution – Hybrid Solution

In applications where a hybrid approach is required, the Component Video/Audio Baluns work in conjunction with third party component video distribution amplifiers (DA). The following diagram shows a typical hybrid component video distribution application. In order to streamline the cabling, the DA could be installed in a remote telecom closet with the cabling in a star configuration to the various devices.



The following are a few typical component video DAs on the market:

http://www.celabs.net/images/specsheets/comp_amps.pdf

http://www.audioauthority.com/product_details/9851/Commercial_Component/5/1

Extron Component Video Distribution Amplifier
http://www.extron.com/product/product.asp?id=da6yuva&subtype=31

Kramer Electronics Component Video Distribution Amplifier
http://www.kramerelectronics.com/products/model.asp?pid=138&sf=5

http://www.altinex.com/Products/Dedicated_AV/Distribution_Amplifiers/DA1226AT/DA1226AT.htm

Skew

Skew occurs when the video color component signals arrive at different times at the display receiver. The effect is usually manifested by a slight shift in color at the vertical edges of a display object. The cause is linked to the disparate lengths of the individual twisted pairs in Cat5E/6e and Cat6 cable. Therefore the transmission path lengths of the different color signals are not the same and the colors arrive at the receiver at different times. Although generally more noticeable at higher resolutions, MuxLab has tested the 500050 for skew using Cat5E/6 and Cat6 cable and has found no noticeable effects due to skew at resolutions up to 1080i/p and at distances up to 500 ft (152m).

Toslink to SPDIF Converter

Some digital audio equipment only have a Toslink fiber-optic connector. In order to connect this equipment over Cat5E/6, it is first necessary to convert the Toslink interface to SPDIF (RCA coax). Once this is achieved, the 500050 (500020) may be used to connect the digital audio equipment via Cat5E/6 twisted pair cable. The following images and weblink shows typical Toslink-to-SPDIF converters.

Toslink to S/PDIF Converter

http://svideo.com/toslinkcoax1.html

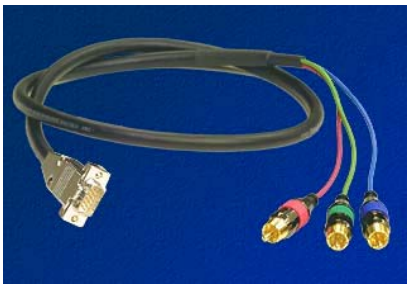
Toslink to S/PDIF Converter

http://www.hdtvsupply.com/difiopttodic.html

Displays with HD15 For Either VGA or YPbPr/RGB

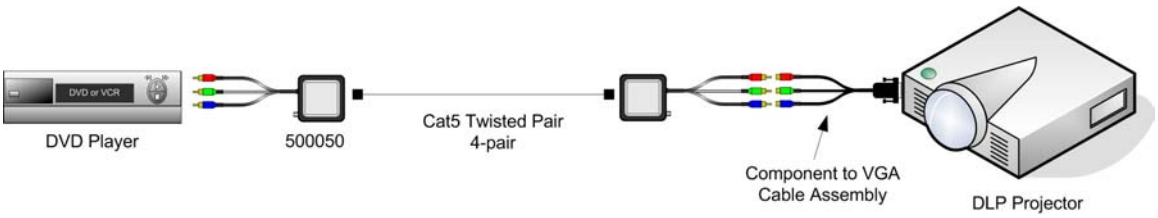
Some projectors or plasma displays feature one (1) HD15 connector to support either 5-component VGA or 3-component YPbPr/RGB. This saves the manufacturer the need to provide separate RCA connectors for component video. In order to connect the projector to a 3-component video source over Cat5E/6 using MuxLab's Component Video/Digital Audio Balun (500050), the projector's HD15 must first be adapted to present three (3) female RCA connectors to the balun. Some projector vendors supply a cable assembly for this purpose. Others do not. A number of companies offer component to VGA cabling adapters. The following is an example:

http://www.svideo.com/hd15frca.html



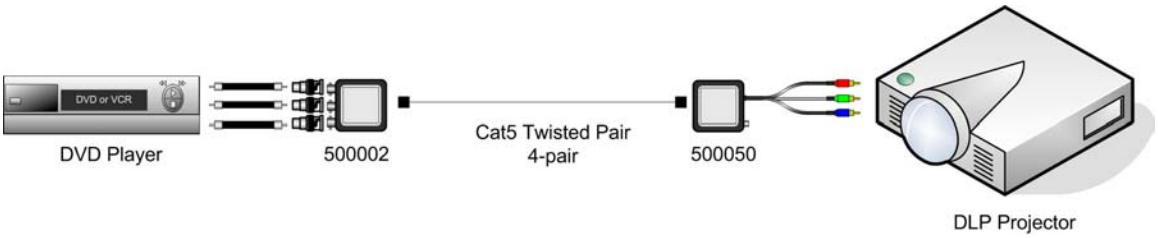
http://www.bluejeanscable.com/store/component/vgatocomponent.htm

The adapter is totally passive and maps the YPbPr/RGB signals to the correct pins on the HD15. The following diagram shows how the component-to-VGA adapter may be used in conjunction with the 500050.



Compatibility with RGB Balun (500002)

The video portion of the Component Video/Audio Baluns is functionally and pin compatible with the RGB Balun (500002).



Ground Loop Blocking

Video ground loop is caused by the video source and video display being connected to grounds that are sitting at difference voltage levels, giving rise to a difference ins voltage potential and consequently a current flow between the two devices. Ground loop problems manifest themselves visually by displaying horizontal or wavy bands ("hum" bars) that move up the screen.

In order to confirm that there is a ground loop, try temporarily isolating the video source or display from the building AC ground by plugging the equipment into the AC outlet using a 3-prong to 2-prong AC adapter. For safety reasons and according to the electrical code, it is not advisable to use this method as a permanent solution. A Ground Fault Circuit Interrupter (GFCI) may be used to permanently isolate the AC ground. However, a qualified electrician should be consulted about this. In regard to the video lines, the following third party devices provide ground loop correction for a single RGB/YPbPr component video channel.

Extron GLI 350 Ground Loop Isolator
http://www.extron.com/product/product.asp?id=gli350&version=print

Jensen Ground Loop Corrector
http://www.jensen-transformers.com/datashts/vbh3rr.pdf

Component Video Isolator
http://www.cablestogo.com/product.asp?cat_id=3110&sku=41147

Compatibility with Crestron CNXRMC and CNXRMCLV

MuxLab's Component Video/Digital Audio Balun (500050) may be used to send component video and digital audio to the Crestron CNXRMC and CNXRMCLV room solution boxes. The 500050 was tested internally by Crestron and may be used to send component video and digital audio over Cat-5 to Crestron's CNXRMC and CNXRMCLV. The pin out cross-references are as follows:

MuxLab p/n 500050	ML-SIG	ML-PIN #	C-PIN #	C-SIG	LEVEL
Blue (Pb): Pins 1 [R]	PB-	1	6	PB-	Level 2 -
Blue (Pb): Pins 2 [T]	PB+	2	3	PB+	Level 2 +
Green (Y): Pins 3 [R]	Y-	3	2	Y-	Level 1 -
Digital Audio: Pins 4 [R]	DA-	4	8	DA-	Level 4 -
Digital Audio: Pins 5 [T]	DA+	5	7	DA+	Level 4 +
Green (Y): Pins 6 [T]	Y+	6	1	Y+	Level 1 +
Red (Pr): Pins 7 [R]	PR-	7	5	PR-	Level 3 -
Red (Pr): Pins 8 [T]	PR+	8	4	PR+	Level 3 +

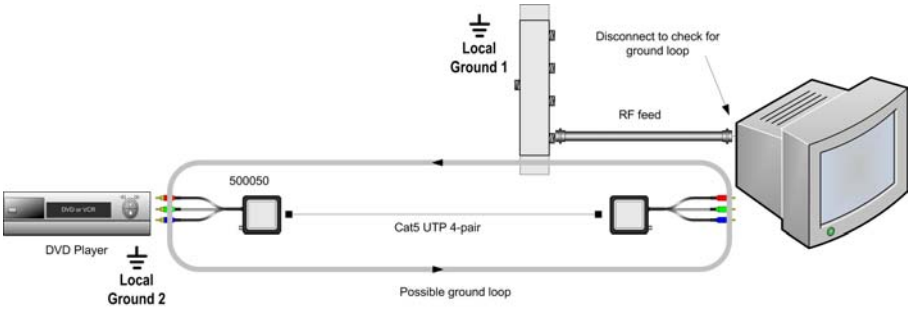
"ML" = MuxLab "C" = Crestron

The CNXRMC and CNXRMCLV have compensation adjustments for the video pairs that help to offset any level issues on long runs.

For more information about the Crestron pin configuration please refer to Crestron's Cat5E/6 Wiring Manual at
http://www.crestron.com/downloads/pdf/product_misc/rg_Cat5E/6.pdf

Grounding Issue with CATV Feed

It has been found in several cases where the 500050 was being used with a cable TV receiver, a noisy image was due to improper grounding of the CATV (Cable TV) feed before entering the cable box. In order to verify, disconnect the RF feed from the monitor. If the picture clears up, verify the grounding on the RF side to ensure it is at the same ground level as the video equipment. The following diagram illustrates the issue.

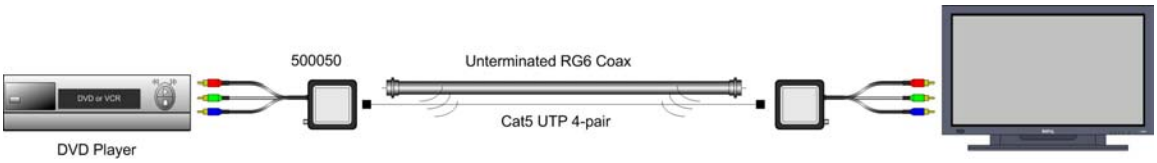


One solution is to isolate the CATV ground from the system by installing an RF ground loop isolator between CAVT cable feed and the cable box. The following are a couple of typical RF ground loop isolators.

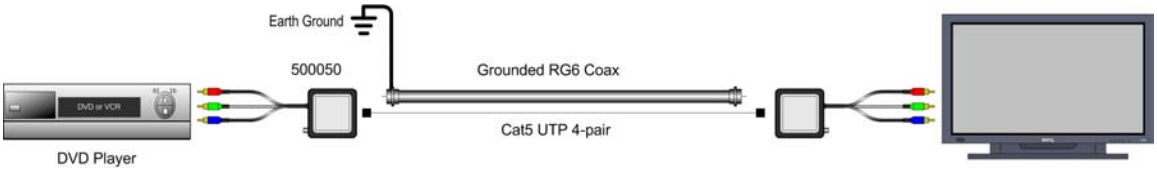
http://www.21best.com/21_best/electronic/security/video/filters/for_sale_.html - CATV

Unterminated RG6 Coax Cable in Same Conduit

It has been found some 500050 installations that unterminated RG6 coaxial cable in the same conduit as the Cat5E/6 cable was creating interference patterns on the screen. This was most likely due to the fact that the RG6 cable was acting like an antenna and was injecting noise into the Cat5E/6 cable. Image artifacts included multiple static horizontal lines running from the top of the screen to the bottom.



When the RG6 was terminated to a 75 ohm load or connected to ground, the problem was eliminated.



Interoperability with B&K™ HD6 Video Switcher

Based on information from MuxLab customers, the 500050 is being used in conjunction with B&K's HD6 Video Switcher. The 500050 is installed at the receiver side in place of the B&K LB10W and LB20F Component Video Conversion Modules. A Cat5E/6 cable is connected from the 500050 back to the Cat5E/6 outputs at the HD6. The pin configuration of the RJ45 is different from the RJ45 pin configuration of the HD6 and therefore the following pin assignment cross-reference must be applied to Cat5E/6 cables between the HD6 and the 500050. Although the 500050 is not an active device like the LB10W and LB20F, it is nevertheless used in applications where image quality meets with user acceptance criteria. Please note that MuxLab has not tested the configuration in its lab and therefore cannot guarantee performance. ™B&K is a registered trademark of B&K Components Ltd.

Rear of HD6 showing Cat5E/6 Output

HD6 RJ45 Pin	Signal	500050 RJ45 Pin
1	Red -	7
2	Red +	8
3	Green -	3
4	Blue -	1
5	Blue +	2
6	Green +	6
7	N/A	N/A
8	N/A	N/A

RJ45 Cross-Over Table for HD6 to 500050

VGA to Component Video Converters

The following are several links to VGA to Component Video Converters (VGA scan converters):

Startech:
http://www.startech.com/Product/ItemSpecs.aspx?productid=VGA2CPNT&c=CA

Magenta:
http://www.magenta-research.com/brochures/VGA_RGB.pdf

Compatibility Table

The following table specifies the compatibility between the Component Video Baluns and the Component Video Hub.

	Compatible Baluns with the Component Video Hub								
Distribute	**500050**	**500051**	**500052**	**500053**	**500054**	**500055**	**500056**	**500057**	**500058**
Component & Digital Audio	✸	✸							
Component & Analog Mono Audio			✸	✸					
Component Video Only	✸	✸	✸	✸	✸	✸	✸	✸	
Component Video & Stereo Audio									**Not compatible**

Compatibility With 3rd Party Baluns

The MuxLab Component Video Balun may be compatible with third party component video baluns. However, the pin and polarity configuration may not match up and therefore custom cable assemblies may be needed to connect a third party component

Component Video/Stereo Audio Balun (500058)

The MuxLab Component Video/Stereo Audio Balun (500058) is a unique passive balun that uses proprietary technology (US patent pending) to transmit component video and true stereo audio over one Cat5e/6 cable. The 500058 is not compatible with the 500050/51/52/53/54/55/56/57/250/252. The Rev B model now features a ground screw.

MuxLab CAV-CVB1 Active Component Video Balun

MuxLab manufactures the Active Component Video Balun (CAV-CVB1) for Sony Corporation on an exclusive basis and is available only through Sony Authorized Dealers. The balun is designed to work with the following Sony products:

- Sony Component Video Switcher (CAV-CVS-12ES)
http://sonybuilt-in.com/index.php?option=com_content&view=article&id=14&Itemid=16

- Sony ES Home Theatre Network Receiver (STR-DA6400ES)
http://www.sonystyle.com/webapp/wcs/stores/servlet/ProductDisplay?catalogId=10551&storeId=10151&langId=-1&productId=8198552921665532068#specifications

- Sony ES Home Theatre Network Receiver (STR-DA6400ES)
http://www.sonystyle.com/webapp/wcs/stores/servlet/ProductDisplay?catalogId=10551&storeId=10151&langId=-1&productId=8198552921665532067#specifications

The CAV-CVB1 is connected via Cat5e/6 cable to the proprietary RJ45 output(s) of the Sony base unit and is powered by the Sony base unit via the middle twisted pair (pins 4&5) of the base unit. In Feb 2010, the CAV-CVS-12Es was modified to correct a minimum distance issue with the CAV-CVB1. The product is available only through Sony and is not available from MuxLab. However, technical support questions about the CAV-CVB1 may also be directed to MuxLab. The following images show the Sony and MuxLab products.

For sales enquiries, please contact Sony at 201-930-1000. For more information please contact MuxLab Technical Support.

Compatability of 500250/252 with S-Video Balun (500016)

The Component Video Hub (500250/252) is compatible with the S-Video Balun (500016) providing the Cat5e/6 cables between the 500252 and the 500016 are modified as follows:

500016	→	**500250/252**
Pin 7(R)	→	Pin 3(R)
Pin 8(T)	→	Pin 6(T)
Pin 4(R)	→	Pin 1(R) [or Pin 7(R)]
Pin 5(T)	→	Pin 2(T) [or Pin 8(T)]

Conclusion

Should you require additional information, please contact MuxLab Customer Technical Support for assistance or visit MuxLab's website at www.muxlab.com.

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