



# 3G-SDI ST2110 Over IP Gateway Converter

## Operation Manual 500767



**Copyright Notice:**

Copyright © 2019 MuxLab Inc. All rights reserved.

Printed in Canada. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without prior written permission of the author.

**Trademarks:**

MuxLab Broadcast is a registered trademark of MuxLab Inc.

**Table of Contents**

- 1. Product Overview ..... 4**
  - 1.1 Introduction ..... 4
  - 1.2 Applications..... 5
- 2. Managing the 500767 ..... 6**
  - 2.1 Web interface..... 6
    - 2.1.1 Configuring the 500767 TX ..... 6
    - 2.1.2 Media Page ..... 6
    - 2.1.3 System Info Page ..... 8
    - 2.1.4 Upgrade Page ..... 8
    - 2.1.5 Settings Page ..... 10
    - 2.1.6 Configuring the 500767 RX ..... 11
    - 2.1.7 Media Page ..... 11
    - 2.1.8 System Info Page ..... 14
    - 2.1.9 Upgrade Page ..... 14
    - 2.1.10 Settings Page ..... 16
  - 2.2 500767 API ..... 17
- 3. Frequently Asked Questions ..... 20**
- 4. Product Warranty Policy..... 22**

# 1. Product Overview

## 1.1 Introduction

The 3G-SDI/ST2110 over IP Uncompressed Gateway Converter allows HD-SDI and 3G-SDI equipment to be extended up to 100ft (30m) via UTP Cat 6a/7 cable or up to 1300ft (400m) via duplex multimode OM4 fiber with LC connectors, at up to 1080p resolution @ 60Hz uncompressed, in a point-to-point configuration.

Point-to-multipoint and multipoint-to-multipoint configurations are also possible by connecting several units to a 10G Ethernet network. The unit provides a 1G Ethernet Switch port to connect additional network devices, and an RS232 port for remote control of end devices (future feature).

The following diagram illustrates a typical point-to-multipoint LAN configuration.

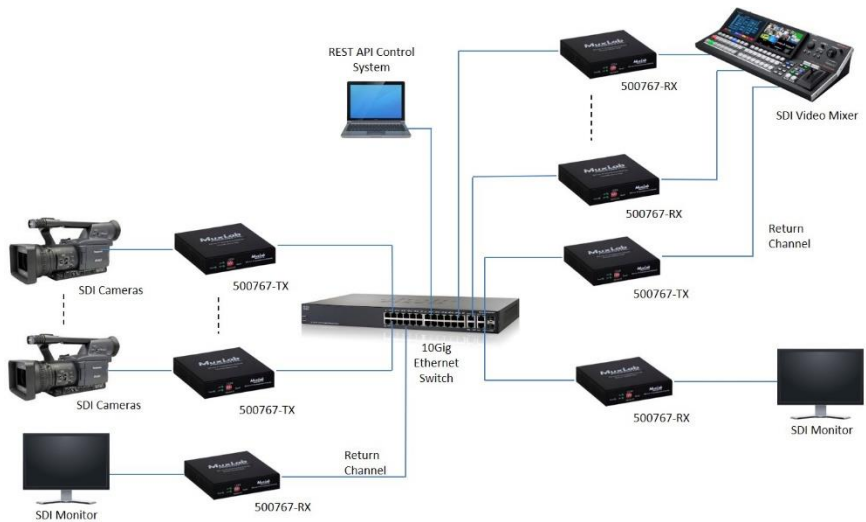


Figure 1: Application Diagram

## 1.2 Applications

The 500767 is an ideal solution for SDI/IP hybrid environments. It allows broadcasters the ability to have a single IP infrastructure rather than two different ones. The 500767 applications include commercial broadcast AV systems, news/sports/TV stations and movie networks.

## 2. Managing the 500767

The 3G-SDI/ST2110 over IP Uncompressed Gateway can be managed through its Web interface and API. This section describes how to set up the 500767 parameters using both the Web interface and the API.

### 2.1 Web interface

Configuring the 500767 from the Web interface requires a TCP/IP connection from the unit Ethernet port to your network. The 500767 default IP address is set to DHCP. If no DHCP is available on your network, both the TX and RX will default to 192.168.168.64 and 192.168.168.65 addresses respectively. **To be able to log in to the 500767 Web interface, your computer has to be in the same subnet.**

#### 2.1.1 Configuring the 500767 TX

This section will describe how to configure the unit using the Web interface.

#### 2.1.2 Media Page

To connect in to the TX, you may open a Web browser and type its IP address. Once connected, the Media page opens. This page contains both the video and audio settings. See example below:

Media	System Info	Upgrade	Settings
<b>VIDEO/AUDIO SETTINGS</b>			
SDP Video:	http://192.168.168.67/video.sdp		
SDP Audio:	http://192.168.168.67/audio.sdp		
Name:	500767-TX1		
Video Address:	239.100.1.1		
Audio Address:	239.100.1.2		
ANC Address:	239.100.1.3		
Video Port:	48000		
Audio Port:	48010		
ANC Port:	48020		
Media:	1080i59.94		
Color Depth:	10		
Color Space:	YCbCr-4:2:2		
Audio Channels:	16		
Audio Rate:	48000		
Audio PKT Size:	125us		
<input type="button" value="Submit"/> <input type="button" value="Cancel"/>			

Figure 2: 500767-TX Media Settings

**Clicking on the Submit button will allow you to apply the new changes while clicking on Cancel will discard any changes.**

The following table describes the Media settings

<b>Settings</b>	<b>Description</b>
SDP Video	SDP File for Video
SDP Audio	SDP File for Audio
Name	Host Name
Video Address	Multicast address for video
Audio Address	Multicast address for audio
ANC Address	Multicast address for ancillary data
Video port	Port number for video
Audio port	Port number for audio
ANC port	Port number for ancillary data
Media	Detected video resolution
Color depth	Detected color depth
Color space	Detected color space
Audio channels	Number of audio channels detected
Audio rate	Detected audio rate
Audio PKT size	Audio packet size detected

## 2.1.3 System Info Page

The System Info page displays general product information such model number, firmware and FPGA version, MAC and IP address, RS232 settings, etc.,

500767-TX 3G-SDI/ST2110 over IP Uncompressed Gateway TX

Media	System Info	Upgrade	Settings
<b>DEVICE</b>			
Product Name:	SdiOverIP-767		
Model:	500767-TX		
Custom Name:	500767-TX1		
Firmware Version:	0.1.1(Build Jan 31 2019 13:13:52)		
FPGA Version:	TX, Ver.01.02, (Build 01 31 19 14:30)		
Security Check:	PASS		
<b>SETTINGS</b>			
MAC Address:	"00:0b:78:00:77:bd".		
IP Address:	192.168.168.67		
Subnet Mask:	255.255.255.0		
Gateway:	192.168.168.1		
DHCP:	NO		
<b>RS232</b>			
Baudrate:	9600		
Datatabits:	7		
Parity:	none		
Stopbits:	1		

Figure 3: 500767-TX System Info Page

## 2.1.4 Upgrade Page

The 500767 comes with the firmware preinstalled, but please check the MuxLab Web site to verify if a newer version is available. You may go to our support software/firmware page of our Web site to download the required files:

<https://muxlab.com/support?section=software-and-firmware>

The 500767 upgrade requires two different files. The FPGA file will upgrade the IC components while the MCU one will do the same with the remaining components.



To perform a firmware upgrade, please follow these steps:

1. Download the upgrade files from our Web site.
2. Unzip both files.
3. Go to the Upgrade page on the unit Web interface.
4. In the Upgrade FPGA Firmware section select the FPGA file and click on the Submit button, it may take 1-2 minutes to complete the upgrade.
5. In the Upgrade MCU Firmware section select the MCU file and click on the Submit button. It may take 10-20 seconds to install the new version.

Here is an example of the Upgrade page

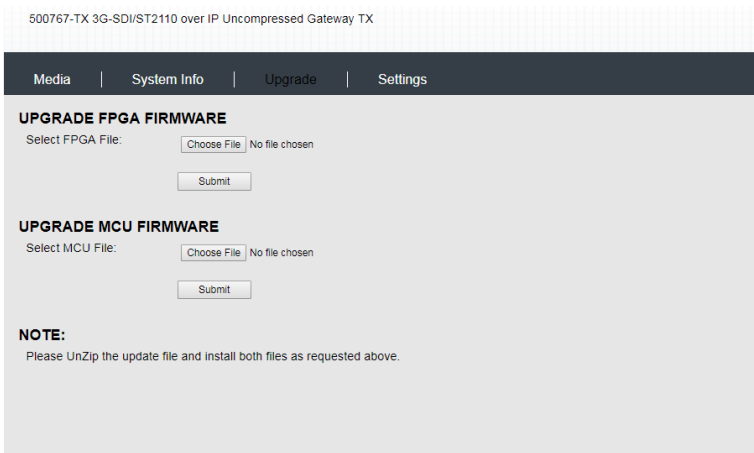


Figure 4: 500767-TX Upgrade Page

## 2.1.5 Settings Page

The Settings page allows the user to configure both the network and the RS232 settings. Additionally, you may load the factory configuration by clicking on the Reset button while the Reboot button will reboot the unit. **Note that performing a Reset will overwrite the unit settings to their factory default, while performing a Reboot will interrupt any active connection.**

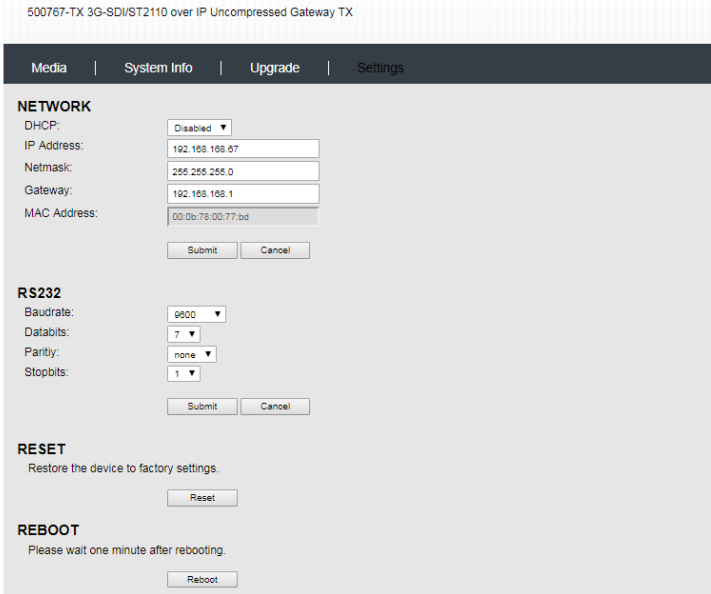


Figure 5: 500767-TX Settings Page

## 2.1.6 Configuring the 500767 RX

The following will explain how to configure the 500767 RX from the Web interface.

### 2.1.7 Media Page

To connect in to the RX, you may open a Web browser and type its IP address. Once connected, the Media page appears. This page contains the main settings to properly receive audio, video and ANC data signals from the 500767 TX. **There are two different ways of configuring the unit: Manual and SDP. Additionally, when using Manual configuration the Media settings can be either ANC Data or Manual.**

The following example shows settings for Manual input type and ANC Data Media Settings.

The screenshot shows a web browser window with the title "500767-RX 3G-SDI/ST2110 over IP Uncompressed Gateway RX". The interface has a dark header with navigation tabs: "Media", "System Info", "Upgrade", and "Settings". The "Media" tab is selected. Below the header, the section "VIDEO/AUDIO SETTINGS" is displayed. It contains the following fields and controls:

- Input Type: A dropdown menu set to "Manual".
- Name: A text input field containing "500767-TX1".
- Video Address: A text input field containing "239.100.1.1".
- Audio Address: A text input field containing "239.100.1.2".
- ANC Address: A text input field containing "239.100.1.3".
- Video Port: A text input field containing "48000".
- Audio Port: A text input field containing "48010".
- ANC Port: A text input field containing "48020".
- Media Settings: A dropdown menu set to "ANC Data".
- At the bottom, there are "Submit" and "Cancel" buttons.

**Figure 6: 500767-RX Manual Input Type and ANC Data Settings**

Manual Input Type and Manual Media settings are showed here:

500767-RX 3G-SDI/ST2110 over IP Uncompressed Gateway RX

Media | System Info | Upgrade | Settings

**VIDEO/AUDIO SETTINGS**

Input Type:

Name:

Video Address:

Audio Address:

ANC Address:

Video Port:

Audio Port:

ANC Port:

Media Settings:

Media:

Color Depth:

Color Space:

Audio Channels:

Audio Rate:

Audio PKT Size:

Figure 7: 500767-RX Manual Input Type and Manual Settings

SDP input type settings are showed here

500767-RX 3G-SDI/ST2110 over IP Uncompressed Gateway RX

Media | System Info | Upgrade | Settings

**VIDEO/AUDIO SETTINGS**

Input Type:

SDP Video:

SDP Audio:

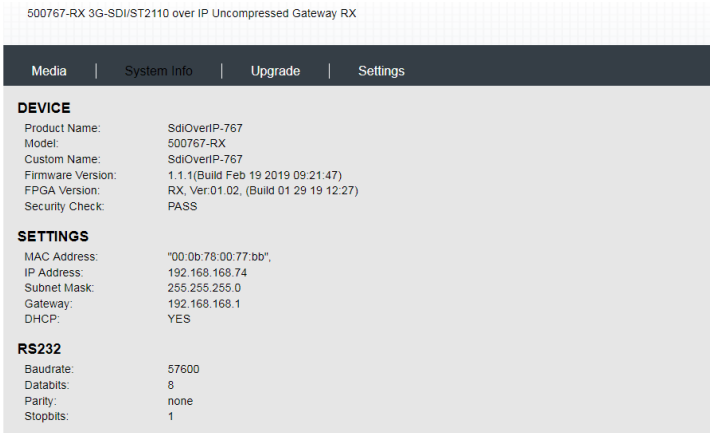
Figure 8: 500767-RX SDP Input Type Settings

The following table shows the media settings of the 500767 RX

Settings	Description
Input Type	<ul style="list-style-type: none"> <li>Manual: Audio, video and ANC data settings values are entered manually</li> <li>SDP: File containing Audio, video and ANC data information</li> </ul>
Name	Host Name
Video Address	Multicast address for video
Audio Address	Multicast address for audio
ANC Address	Multicast address for ancillary data
Video port	Port number for video
Audio port	Port number for audio
ANC port	Port number for ancillary data
Media Settings	<ul style="list-style-type: none"> <li>ANC Data: Media information is set automatically</li> <li>Manual: Media information is entered manually</li> </ul>
Media	Force the RX to specific Video resolution [1920x1080p, 1920x1080i and 1280x720p]
Color depth	Force the RX to specific color depth value [8,10,12 and 16]
Color space	Force the RX to specific color space value [YCbCr4:2:2, YCbCr4:4:4 and RGB]
Audio channels	Force the RX to specific number of audio channels [4, 8,12 and 16]
Audio rate	Force the RX to specific audio rate [44100, 48000 and 96000]
Audio PKT size	Force the RX to specific audio packet size [125us and 1ms]
SDP Video	SDP file for video
SDP Audio	SDP file for audio

## 2.1.8 System Info Page

The System Info page of the RX displays information such model number, firmware and FPGA version, MAC and IP address, RS232 settings. etc.,



500767-RX 3G-SDI/ST2110 over IP Uncompressed Gateway RX

Media | System Info | Upgrade | Settings

**DEVICE**

Product Name: SdiOverIP-767  
 Model: 500767-RX  
 Custom Name: SdiOverIP-767  
 Firmware Version: 1.1.1 (Build Feb 19 2019 09:21:47)  
 FPGA Version: RX, Ver:01.02, (Build 01 29 19 12:27)  
 Security Check: PASS

**SETTINGS**

MAC Address: "00:0b:78:00:77:bb"  
 IP Address: 192.168.168.74  
 Subnet Mask: 255.255.255.0  
 Gateway: 192.168.168.1  
 DHCP: YES

**RS232**

Baudrate: 57600  
 Databits: 8  
 Parity: none  
 Stopbits: 1

Figure 9: 500767-RX System Info page

## 2.1.9 Upgrade Page

Similar to the TX, the 500767 RX comes with preinstalled firmware. A newer version may be available on the support software/firmware page of our Web site. Please upgrade to the latest version at:

<https://muxlab.com/support?section=software-and-firmware>

**The 500767 RX upgrade requires both the FPGA and MCU files.**

To perform a firmware upgrade, please follow these steps:

1. Download the upgrade files from our Web site.
2. Unzip both files.
3. Go to the Upgrade page on the unit Web interface.
4. In the Upgrade FPGA Firmware section select the FPGA file and click on the Submit button, it may take 1-2 minutes to complete the upgrade.
5. In the Upgrade MCU Firmware section select the MCU file and click on the Submit button. It may take 10-20 seconds to install the new version.

Here is an example of the RX Upgrade page

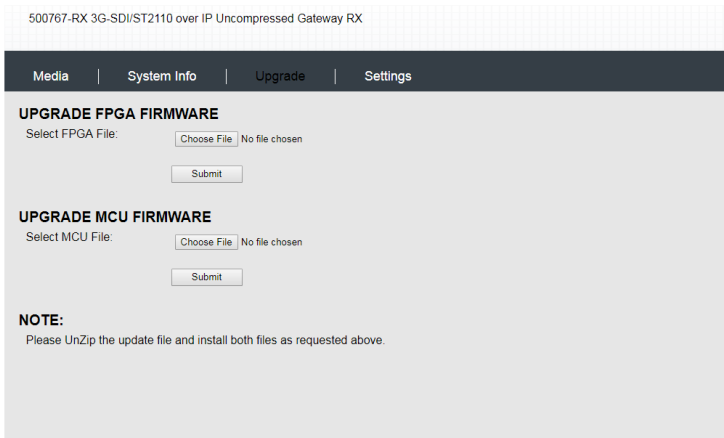


Figure 10: 500767-RX Upgrade page

## 2.1.10 Settings Page

The Settings page of the RX allows you to configure both the network and the RS232 settings. Additionally, factory reset is possible by clicking on the Reset button. The Reboot button will reboot the unit. **Note that performing a Reset will overwrite the unit settings to their factory default, while performing a Reboot will interrupt any active connection.**

500767-RX 3G-SDI/ST2110 over IP Uncompressed Gateway RX

Media | System Info | Upgrade | Settings

**NETWORK**

DHCP:

IP Address:

Netmask:

Gateway:

MAC Address:

**RS232**

Baudrate:

Databits:

Parity:

Stopbits:

**RESET**

Restore the device to factory settings.

**REBOOT**

Please wait one minute after rebooting.

Figure 11: 500767-RX Settings page



## 2.2 500767 API

In addition to the Web interface, the 500767 can also be managed through a RestAPI. This section describes the API commands supported on the 500767. It is intended for users with a programming background.

The following table lists the RestAPI commands for both TX and RX

Command	Example	Description
model	"500767-RX"	Read only
name	"SdiOverIP-767"	Read/Write
version	"00.01-01"	Read only
address	"192.168.168.101"	Current status
gateway	"192.168.168.1"	Current status
netmask	"255.255.255.0"	Current status
reset	0	1: Reset 0: Ignore
reboot	0	1: Reset 0: Ignore
blink_led	0	1: Blink 0: Ignore
isDHCP	1	1: dhcp 0: Static IP Current status
MAC	"4e:9e:6a:33:da:c2"	Read only
sdpVideoIp	"192.168.168.103"	Read only for TX / Read/Write for RX
sdpVideoPort	80	Read only for TX / Read/Write for RX
sdpAudioIp	"192.168.168.103"	Read only for TX / Read/Write for RX
sdpAudioPort	80	Read only for TX / Read/Write for RX
sdpAncIp	"192.168.168.103"	Read only for TX / Read/Write for RX
sdpAncPort	80	Read only for TX / Read/Write for RX
sdpVideoUri	"video.sdp"	Read only for TX / Read/Write for RX
sdpAudioUri	"audio.sdp"	Read only for TX / Read/Write for RX
sdpAncUri	"anc.sdp"	Read only for TX / Read/Write for RX
ipVideo	"239.100.1.1"	Multicast address for video stream
ipAudio	"239.100.1.2"	Multicast address for audio stream
ipAnc	"239.100.1.3"	Multicast address for ancillary stream
portVideo	"48000"	Port number for video stream
portAudio	"48010"	Port number for audio stream

portData	"48020"	Port number for ancillary stream
mediaSet	"SDP"	Only necessary for RX SDP: configured by sdp client Auto: Configure IP/port of every stream automatically Manual: configure media parameters manually
videoHeight	720	720/1080
videoWidth	1280	1280/1920
videoFps	60	Read only for TX; 23.98/24/25/ 29.97/30/50/ 59.94/60
colorSpace	"YCbCr-4:2:2"	Read only for TX; YCbCr-4:2:2/ YCbCr-4:4:4/RGB
colorDepth	10	Read only for TX 8/10/12/16
videoIsIntlce	3	Read only for TX 3/1
audioSampRate	"48000"	Read only for TX 48000/44100/96000
audioChannels	8	Read only for TX 4/8/12/16
audioDepth	24	Read only for TX 16/24
audioPktSize	"1ms"	1ms/125us
rsData	"1234567890A9B1"	String of numbers in hexadecimal format. For example "123456abcdef" means 0x12, 0x34, 0x56, 0xab, 0xcd, 0xef;
rs232Baudrate	57600	9600/19200/38400/57600/115200
rs232DataBit	8	7/8
rs232Parity	"none"	none/odd/even
rs232StopBit	1	1/2

The following screenshots show an example of the RestAPI. **Note that we used Insomnia as a tool for this purpose**

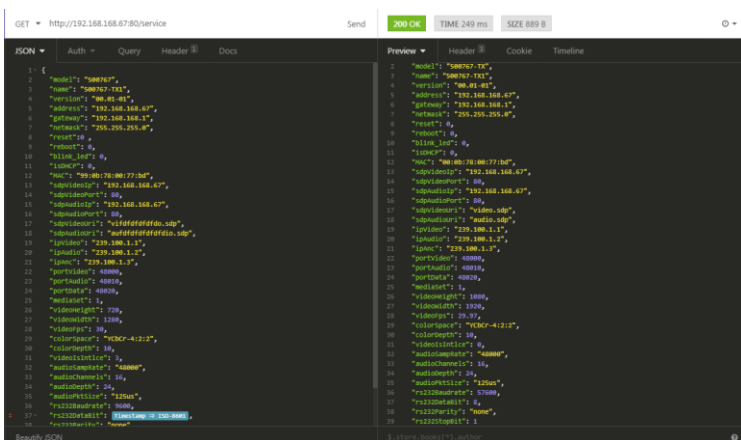


Figure 12: 500767-TX APIs

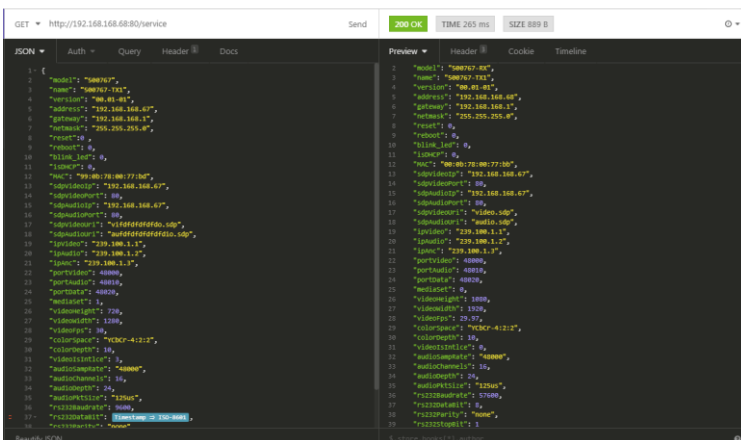


Figure 13: 500767-RX APIs

## 3. Frequently Asked Questions

The following FAQ section provides answers to the most frequent questions you may have regarding the configuration of the 500767.

### What is the default IP address of the 500767?

By default the 500767 is configured in DHCP mode. If no DHCP server is available the unit will fall back to its default static IP address:

500767-TX: 192.168.168.64/255.255.255.0

500767-RX: 192.168.168.65/255.255.255.0

### How to find the 500767 IP address?

You can check the unit's IP address by using either Wireshark or going to your network switch Web interface.

### Why I cannot connect to the 500767 GUI?

Ensure that your computer is on same subnet. For instance, if the TX's IP address is 192.168.168.64/255.255.255.0 your computer must be configured as follows: 192.168.168.x/255.255.255.0, where x may be 70 or something similar.

### How do I find the software version of the 500767?

From the Web interface you may go to the System Info page.

### Why is the RX not displaying video?

First, ensure your video source is valid. If using manual configuration, make sure the Multicast addresses for both audio and video matches the one from the TX. Second, validate your network supports multicast. Double check your wiring as well as UTP cable length.

**What is SDP?**

SDP stands for Session Description Protocol which describes the parameters for both audio and video.

**I am using SDP input type but the RX is not displaying video?**

Ensure you are entering the right information for each field. Please refer to section number 2 for details on the TX SDP file.

**The 500767 RX does not display video from another ST2110 manufacturer?**

Check media parameters and ensure you are entering the right SDP information if using this input type. If it is still not working, email the SDP file to Muxlab support.

**12G-SDI (4K/60) does not work on the 500767?**

The maximum supported resolution on the 500767 is 3G-SDI (1080p60).

If the above does not help you to find a solution to the issue you are experiencing please contact MuxLab Technical Support at 877-689-5228 (toll free in North America) or (+1) 514-905-0588 (International) or email to [info@muxlab.com](mailto:info@muxlab.com). Please have the following information ready:

- Unit model number.
- Cabling layout. Please include the model of the SDI source and sink devices, cable length and type (e.g.: 20m of Cat 6a UTP, etc.).
- Description of problem.
- List of tests performed.

## 4. 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 the 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 an 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, along with a dated proof of purchase. 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 AUTHORIZED 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**

*This product is under warranty for a period of three (3) years.*

*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. All R.M.A.'s issued are subject to inspection by MuxLab, and will be returned to the customer if not properly packaged – units must be returned in the original container or equivalent. MuxLab will not accept any such product for repair without an authorization from its Technical Support department and without a return authorization number issued by the MuxLab Customer Service department. For a credit & replace R.M.A., the customer will be liable to pay replacement invoice if defective products are not returned.*

For Products 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. Customers 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.*



MuxLab Inc.  
2321 Cohen Street  
Montreal, Quebec  
Canada H4R 2N7  
Tel.: +1 (514) 905-0588 Fax: +1 (514) 905-0589  
Toll Free (North America): 877 689-5228  
URL: [www.muxlab.com](http://www.muxlab.com)  
E-mail: [info@muxlab.com](mailto:info@muxlab.com)