

### Welcome!

Everyone at Altinex greatly appreciates your purchase of the MUSE Receiver. We are confident you will find it reliable and simple to use. If you need support, please do not hesitate to call us at 714-990-2300.

We are committed to developing unique and state of the art Signal Management Solutions® for demanding audiovisual installations. Welcome to the Altinex family of satisfied customers around the world.

### 1. Precautions and Safety Warnings

Please read this manual entirely before using your MU501-112 Receiver. You can download a full version of this manual on [www.altinex.com](http://www.altinex.com). These safety instructions are to ensure the reliable operation of your MU501-112 Receiver and to prevent fire and shock hazards. Please read them carefully and heed all warnings.

#### 1.1 General

- The MU501-112 Receiver does not contain any user serviceable parts. Only qualified ALTINEX service personnel may perform product service.
- The MU501-112 Receiver is safety tested and is ETL listed.
- The MU501-112 Receiver incorporates a proprietary technology for transmission of display power and IP over a low voltage CAT-6 cable.

#### 1.2 Installation Precautions

- To prevent fire and shock, do not expose this unit to water or moisture. Do not place the MU501-112 receiver in direct sunlight, near heaters or heat-radiating appliances, or near any liquid. Exposure to direct sunlight, smoke, or steam can harm internal components
- Handle the MU501-112 Receiver carefully. Dropping or jarring can cause damage.

- Do not pull any cables that are attached to the MU501-112 Transmitter.
- For optimal safety, apply AC power only after the system is installed with all wires connected.

#### 1.3 Cleaning

- Clean the MU501-112 with a dry cloth. Never use detergents or solvents such as alcohol or thinner. Do not use a wet cloth or water to clean.

#### 1.4 FCC Notice

- This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions found herein, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- Any changes or modifications to the unit not expressly approved by ALTINEX, Inc. could void the user's authority to operate the equipment.

### 2. Installation Procedures

Note: The CAT-6 type cable is a critical component to the functionality of the unit. Use only the recommended cable, as described in Table 4 of the online manual, for optimum performance.

#### Warnings

Air vents MUST be installed facing up or perpendicular to the ground (never facing down) as this presents a safety hazard in the event of fire.

The minimum cable length required between the MU401-111 and MU501-112 is 25 ft. (8 m).

Use the MU501-112 Receiver only with the MU401-111 Transmitter.

- Step 1 For detailed information, download and read the entire manual at [www.altinex.com](http://www.altinex.com).
- Step 2 Connect the IP source to the input of the MU401-111 using a CAT-6 type cable.
- Step 3 Connect the MU401-111 Transmitter to the MU501-112 Receiver using unshielded CAT-6 cable. The required cable gauge for full power is AWG23.
- Step 4 Connect AC power to the MU401-111 Transmitter. As soon as the MU401-111 Transmitter confirms the presence of the MU501-112 Receiver, full power is provided to the MU501-112 Receiver. At this time, the IP signal can pass through MUSE pair.
- Step 5 The MU501-112 Receiver is now ready for operation

### 3. Warranty and Return Policies

Please visit the ALTINEX website at [www.altinex.com](http://www.altinex.com) for details on warranty and return policies. In the case of a unit needing repair, please fill out the RMA (return material authorization) form located on the bottom left hand corner of the Altinex homepage. Once filled out, please email the form to [support@altinex.com](mailto:support@altinex.com).

### 4. About MUSE Transmitter

- Deliver Power, IP, and control 300 ft. (91m) over a single cable
- Power 42"-52" displays with up to 150 W of clean power
- Bidirectional pass through RS232 communication (9600 baud rate)
- Gives integrators greater control over their AV projects
- Easy low voltage installation is safe and reliable

The IP MUSE line of products allow users to transmit TCP/IP, display AC power, and control up to 300 ft (91 m) over a single unshielded CAT-6 cable. The IP MUSE is powerful enough to power a 150 watt LCD display and can extend power up to 300 ft. away from a signal and power source. Advanced features of the MU501-112 Receiver provide a safe and reliable way of sending both signal and power over a single unshielded CAT-6 cable as well as RS232 control of third party devices.

IP MUSE allows full-duplex pass-through IP communication through the transmitter and receiver pair operating in a store and forward mode. You can send or stream content right to the media player or display on the same cable that provides power to the display. IP MUSE is totally transparent on a network and does not require its own IP address. Simplicity of installation makes it a "no brainer" for your next AV system design.

Output of the transmitter unit is monitored for power consumption and when power is exceeded, the output is turned off to protect all components. The IP MUSE can power a 46" to 52" display with a maximum continuous power consumption of 150 watts. The MU501-112 Receiver provides constant power and voltage to the display. When the cable length increases, the system automatically adjusts itself to provide the maximum possible power to the display. Since CAT type cables have resistance associated with them, care must be taken to use the smallest possible cable length to maximize power transfer.

The MU501-112 Receiver has many advanced features to safely transmit power to a display. These features include: current monitoring, auto shutdown and an auto receiver detector. Each unit has a durable metal enclosure with built-in ball bearing cooling fans to provide years of trouble free operation. Every Muse IP product comes with a 3 year ALTINEX Warranty.

### CONTENTS

#### English

Power Calculations	6-7
Technical Specifications	8
Application Diagram	9
Internal View/ Dimension Diagrams	10
Recommended Components/ Operation	11
Troubleshooting Guide	12

#### German

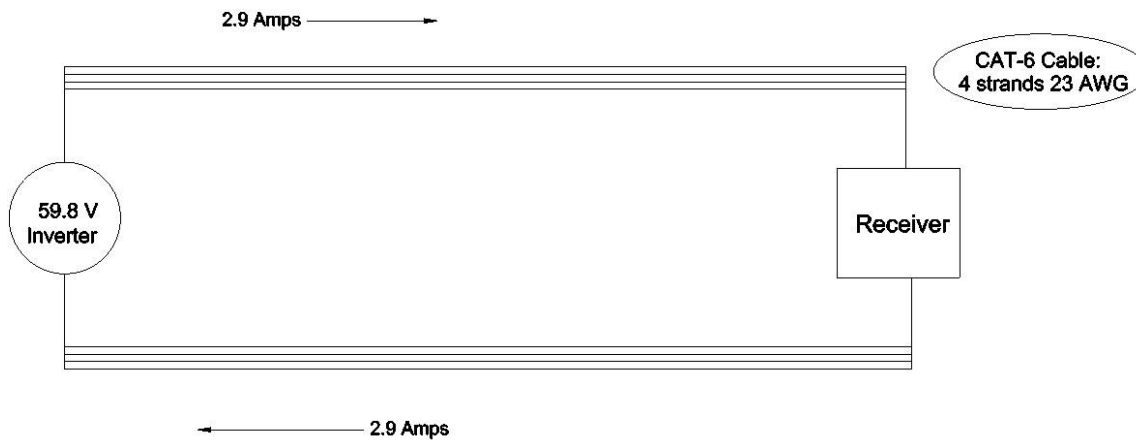
Power Calculations	13-14
Technical Specifications	15
Application Diagram	16
Internal View/ Dimension Diagrams	17
Recommended Components/Operation	18
Troubleshooting Guide	19



## Available Power

Distance (ft)	Distance (meters)	Available Power	Available Surge Power (10 Seconds)
		AWG23	
25	8	150	254
50	15	150	249
75	23	150	244
100	30	150	238
125	38	150	233
150	46	150	228
175	53	148	223
200	61	146	218
225	69	144	213
250	76	142	208
275	84	140	202
300	91	138	197

## Available Power Calculations (Example Calculations for 300 ft. or 90 m Cable)



### 1. Resistance

Resistance of a single strand of CAT-6 Cable:  $20\Omega$  per 1000 ft. (300 m)

Resistance of the 4 strands in a CAT-6 Cable:  $5\Omega$  per 1000 ft. (300 m)

Example:

$(5\Omega \times 300\text{ft} \times 2) / 1000\text{ft} = 3\Omega$  [NOTE: x2 because cable travels 2 ways (from inverter to receiver and vice versa)]

## 2. Voltage

Current across CAT-6 Cable: 2.9A (max)

Inverter Voltage: 60V

Current x Resistance = Voltage Drop

Example:

$$2.9A \times 3\Omega = 9V$$

Inverter Voltage – Voltage Drop = Voltage on Inverter

Example:

$$60V - 9V = 51V$$

## 3. Power

Voltage on Inverter x Current = Power to Receiver

Example:

$$51V \times 2.9A = 148W$$

Power to Receiver - Power Used by Receiver = Available Power

Example:

$$148W - 10W = 138W$$

## Available Surge Power Calculations (Example Calculations for 300ft Cable)

### 1. Voltage

Surge Current: 4.5 A

Surge Current x Resistance = Surge Voltage Drop

Example:

$$4.5A \times 3\Omega = 14V$$

Inverter Voltage – Surge Voltage Drop = Surge Voltage on Inverter

Example:

$$60V - 14V = 46V$$

### 2. Power

Surge Voltage x Surge Current = Surge Power

Example:

$$46V \times 4.5A = 207W$$

Surge Power to Receiver – Power Used by Receiver = Available Surge Power

Example:

$$207W - 10W = 197W$$

## 4. Technical Specifications

Specifications are subject to change. See [www.altinex.com](http://www.altinex.com) for up-to-date information.

Features/Description	Specification
MU501-112 Receiver	
<b>Input Connectors</b>	
IP + Power	RJ-45 F (1)
<b>Output Connectors</b>	
AC Power	NEMA 5-15R (1)
IP (Internet Protocol)	RJ-45 F (1)
RS-232	3 POS TB (1)
<b>Compatibility</b>	
Signal types	Ethernet 10/100
Use with	MU401-111

Table 1. IP MUSE Receiver General

Electrical	Specification
MU501-112 Receiver	
<b>Ethernet</b>	
IP Output Signal Format	TCP/IP
IP Input	TCP/IP
<b>Control</b>	
RS-232	
<b>Power</b>	
Receiver (from MU401-111 Transmitter)	172 W (max)
Receiver to load power	150 W (max)
Receiver Output Voltage	120 VAC (sine wave)

Table 3. IP MUSE Electrical

Mechanical	Specification
MU501-112 Receiver	
Material	0.031" Steel
Color	Clear Zinc
MTBF (calc.)	38,000 hrs.
Transmitter: Height	1.7 in (43 mm)
Width (no mounting ears)	4.3 in (109 mm)
Depth	8.7in (221 mm)
Weight	2.0 lb. (0.9 kg)
T° Operating	10°C-50°C
T° Maximum	75°C
Humidity	90% non-condensing

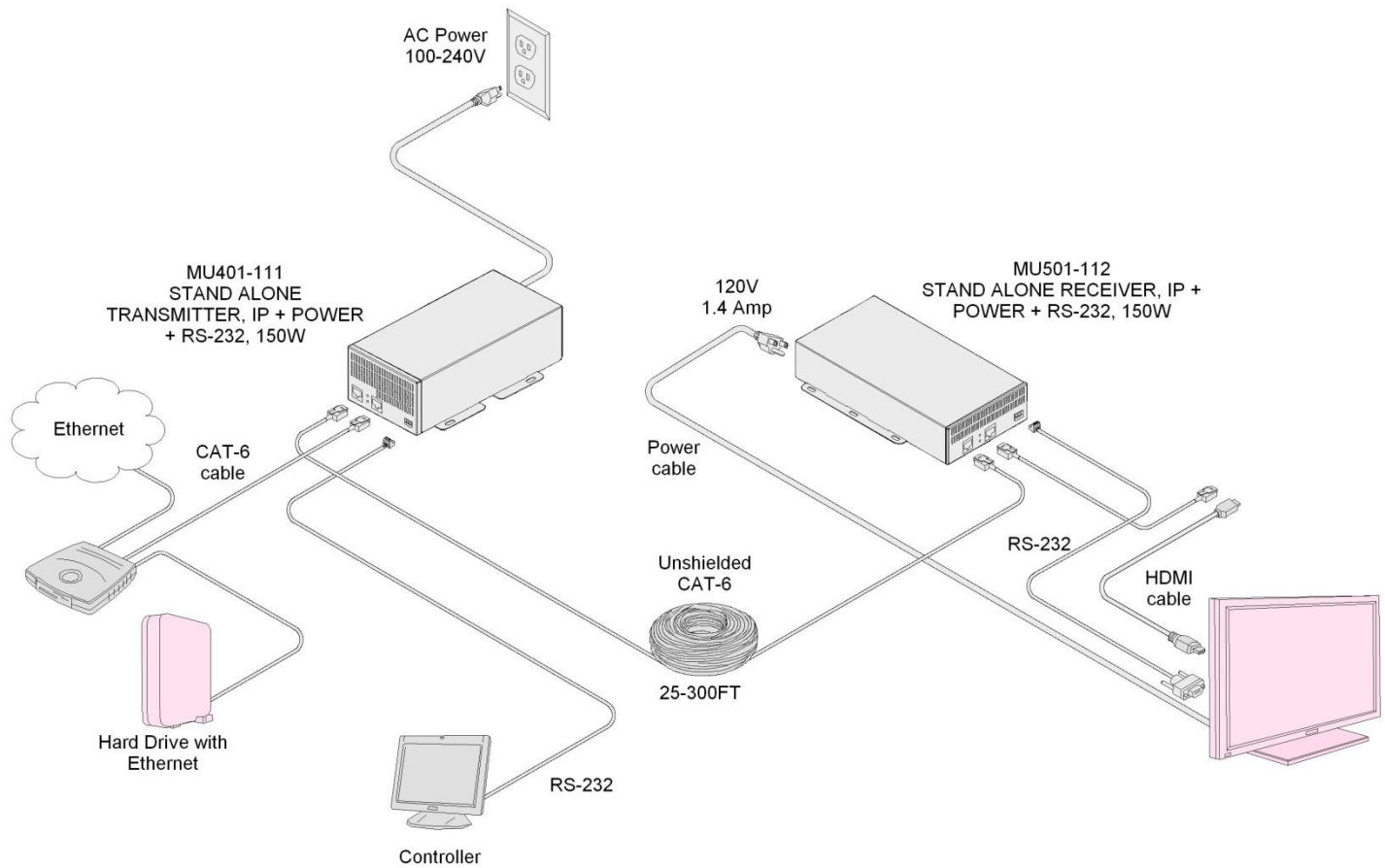
Table 2. IP MUSE Receiver Mechanical

CAT-6 Cable	Minimum Cable Specifications
Conductor Material/Size/Quantity:	Bare Copper/ 23 AWG / 8
Conductor Construction:	Solid + Unshielded
Color Code:	Per TIA/EIA 568-B
Cable length	25 ft
Flammability Rating:	IEC 60332-1, UL 1581 VW-1
Frequency Range:	1~550 MHz
Voltage:	300 V
Operating Temperature:	-20 °C to +60 °C
HDBT Certified	UTP, CAT-6 or CAT6a
Recommended Cable Type	See Diagram 6

Table 4. CAT-6 Cable Minimum Specification

## 6. Application Diagrams

Diagram 1: Typical Setup



TX STATUS	POWER	PAIR
NORMAL	ON	ON
IDLE	ON	SLOW BLINKING

Table 5: Status of MU501-112 Receiver

Diagram 2: Receiver Internal View

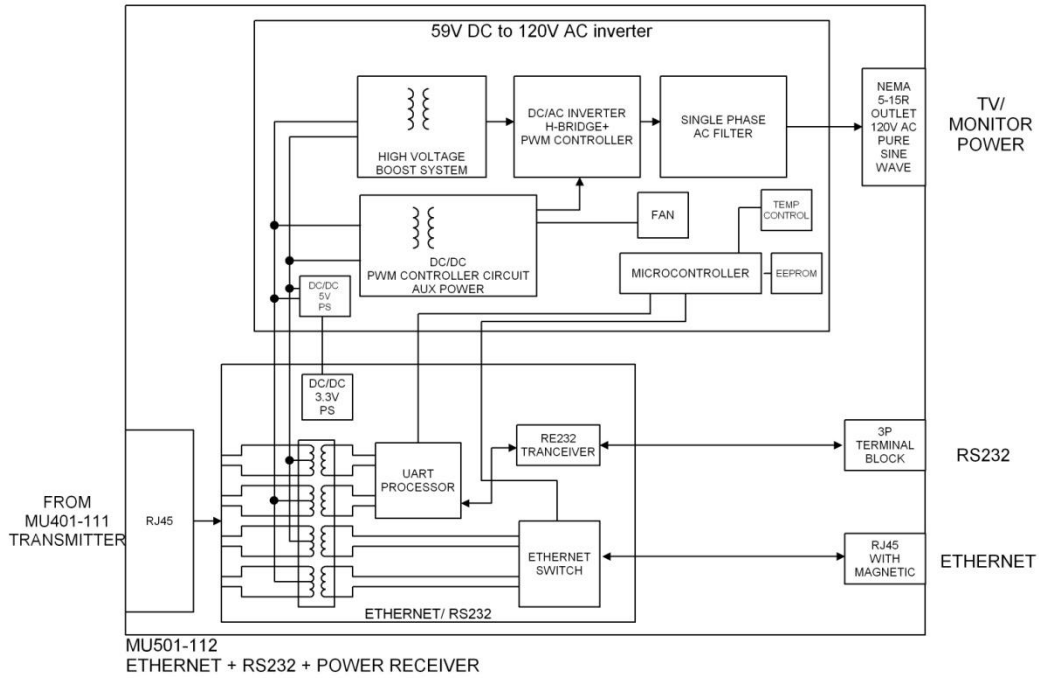
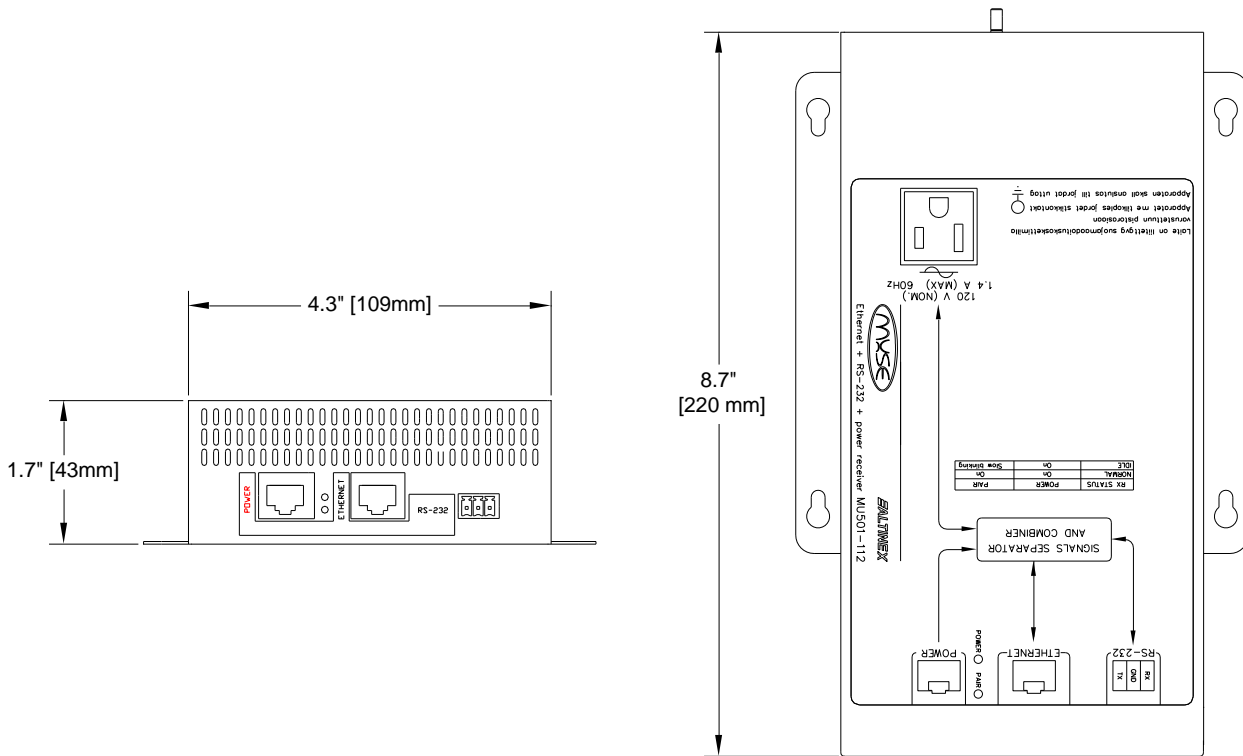


Diagram 3: Receiver Dimensions





## Recommended Components

Supplier	Designator	Part Number	Description	Supplier Website
Firefold	Crimp tool	100004C	Modular Crimping Tool	<a href="http://www.firefold.com">www.firefold.com</a>
	RJ-45 Connector	CAT6-RJ-45-23AWG-SOL	RJ-45 Connector	<a href="http://www.firefold.com">www.firefold.com</a>
	CAT6 cable	1 KCMR-BLU	CAT 6 cable	<a href="http://www.firefold.com">www.firefold.com</a>
	CAT6 cable	CAT6-1KSOL-BLU	CAT 6 cable	<a href="http://www.firefold.com">www.firefold.com</a>
Teldor	CAT6 cable	750AZ04129	CAT 6 cable	<a href="http://www.teldor.com">www.teldor.com</a>

## 7. Operation

The MU501-112 Receiver requires no adjustments for performance. Once set-up, the MU501-112 Receiver will work trouble-free without user intervention. For technical support please call 1-800-ALTINEX(258-4639).

There are few things that need to be done right to assure trouble-free operation:

1. Assure that the correct cable and connector are used. Use the recommended cable and connectors as they were tested with the MUSE products. Patch cables should not be used for connection between MU401-111 and MU501-112 because they do not have the current capacity to provide sufficient power to a display.
2. Terminate RJ-45 connectors using proper tools. Many plastic termination tools do not have the strength to make good termination. Use the recommended tools to avoid damaging IP MUSE RJ-45 connectors. In our experience, the most damage occurs when connectors are not properly terminated.
3. Use only as much cable as needed to get from a source to display. Do not coil and leave extra cable "just in case". Every foot of cable takes little bit of power away from the receiver (Typically 5W per 25ft of cable). Making the cable as short as possible maximizes the power available to the display.
4. Understand your monitor power consumption. Most monitors 42"-50" screen size can be powered by MUSE. There are however some exceptions for monitors that have very large initial current requirements. These are typically Plasma displays or low cost, non-Energy Star compliant displays. If you have difficulty powering up a display, adjust the settings to Eco mode (which will maximize power consumption).
5. The MUSE can power multiple displays and other equipment. The only limitation is the initial startup current value. This can be minimized by turning each display ON separately about 5-10 seconds apart.
6. Many monitors have a built in audio amplifier. This amplifier can consume a lot of power when set to maximum volume. Make sure to adjust the volume to the level that will actually be used. It is not unusual for an audio amplifier to consume 20-50W of peak power and be listed at 15W RMS power.
7. In addition to displays, the MUSE products can power any other equipment compatible with 120V outputs. This includes lights, small motors, computers, laptops and many more accessories. Since these accessories have a smaller initial current (compared to monitors), it will be possible to load the output of the MUSE to its limit.
8. To fully understand your monitor profile, it is advisable to purchase a low cost Watt meter that will display the power consumption of a display. This will eliminate the hassle of trial and error when selecting the right monitor.

### 7. Troubleshooting Guide

MUSE	
Symptom	Resolution
LEDs Are OFF	<ol style="list-style-type: none"> <li>1. Make sure the transmitter unit is plugged into a working AC outlet.</li> <li>2. Disconnect the MU501-112 Receiver and verify that the LEDs show Idle mode on the MU401-111 Transmitter. If the MU501-112 Receiver is causing the problem, the MU401-111 Transmitter will still show normal operation.</li> <li>3. Verify that the cable is properly terminated. For proper pin-out, check the cable with a cable checker.</li> </ol>
Always Idle Mode	<ol style="list-style-type: none"> <li>1. Verify that the display is connected to the MU501-112 Receiver.</li> <li>2. Check the CAT-6 cable specifications. The CAT-6 cable is critical to proper operation and power transfer.</li> </ol>
Fault LED is ON	<ol style="list-style-type: none"> <li>1. Disconnect the display from the MU501-112 Receiver and see if the problem is fixed.</li> <li>2. Disconnect the MU501-112 Receiver from the MU401-111 Transmitter. If the problem is fixed, wait 10 seconds and then reconnect the MU501-112 Receiver.</li> <li>3. Reconnect the display; if the problem returns, check the display power requirements.</li> </ol> <p>Note: There is sufficient power for displays rated at 150 W or less. If the display is rated above 150 W the MUSE will not be able to power the unit. Try another display.</p>
No IP Signal	<ol style="list-style-type: none"> <li>1. Check the source and make sure there is a signal present.</li> <li>2. Make sure that LEDs on RJ-45 connector are flashing.</li> </ol>