SOFTWARE VERSION v1.0

WWW.PRG.COM

GroundControl™ Multi

Quick Start Guide (rev. A)

GroundControl™ Multi Quick Start Guide

Version as of: August 2, 2024 rev A

PRG part number:

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GroundControl™ Multi Quick Start Guide

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REVISION HISTORY

This manual has been revised as follows:

Version	Release Date	Notes
1.0 (revA)	August x, 2024	Initial Release

INTRODUCTION

About This Manual

This user manual provides necessary information regarding the operation of the GroundControl Multi software. This guide is provided to explain the features in the GroundControl Multi software in detail.

Additional Documentation

For more information about DMX512 and sACN protocols, refer to the following documents available from the American National Standards Institute (ANSI) at www.ansi.org:

+ ANSI E1.11 - 2008 (R2013): Entertainment Technology - USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories
+ ANSI E1.31 - 2009: Entertainment Technology - Lightweight streaming protocol for transport of DMX512 using ACN

The above documents are also available in electronic format free for PLASA members at www.plasa.org

For more information about Art-Net, refer to the following document available from Artistic Licence Engineering at www.artisticlicence.com:

+ Specification for the Art-Net Ethernet Protocol

Customer Service

For technical assistance, contact your nearest PRG office. Contact information for all PRG offices can be found on our website at: www.prg.com

For additional resources and documentation, please visit our website at: www.prg.com

GENERAL OPERATION

About GroundControl Multi

GroundControl Multi enables up to 16 fixtures from any manufacturer to be linked to an existing GroundControl system and follow a single target. Control over fixtures can be easily swapped between a lighting console and the GroundControl Multi system.

The GroundControl Multi System

A GroundControl Multi system contains:

+ A GroundControl controller linked to a MacOS computer running GroundControl Multi software
+ A GroundControl camera fixture
+ Up to 16 additional moving light fixtures of any kind on any sACN universe
+ Any lighting console (optional)

About Calibration

To link additional fixtures, GroundControl calibrates their location in 3D space using four custom Target Points.

Once the fixtures have been patched in the GroundControl Multi software, the system can take control to calibrate.

During calibration, each fixture is aimed at each of the Target Points, and the GroundControl Multi software stores and calculates their positions. This calibration can be completed from either a lighting console or the GroundControl controller itself.

Once calibrated, these fixtures will follow wherever the primary GroundControl fixture is aimed.

Single Controller System Drawing

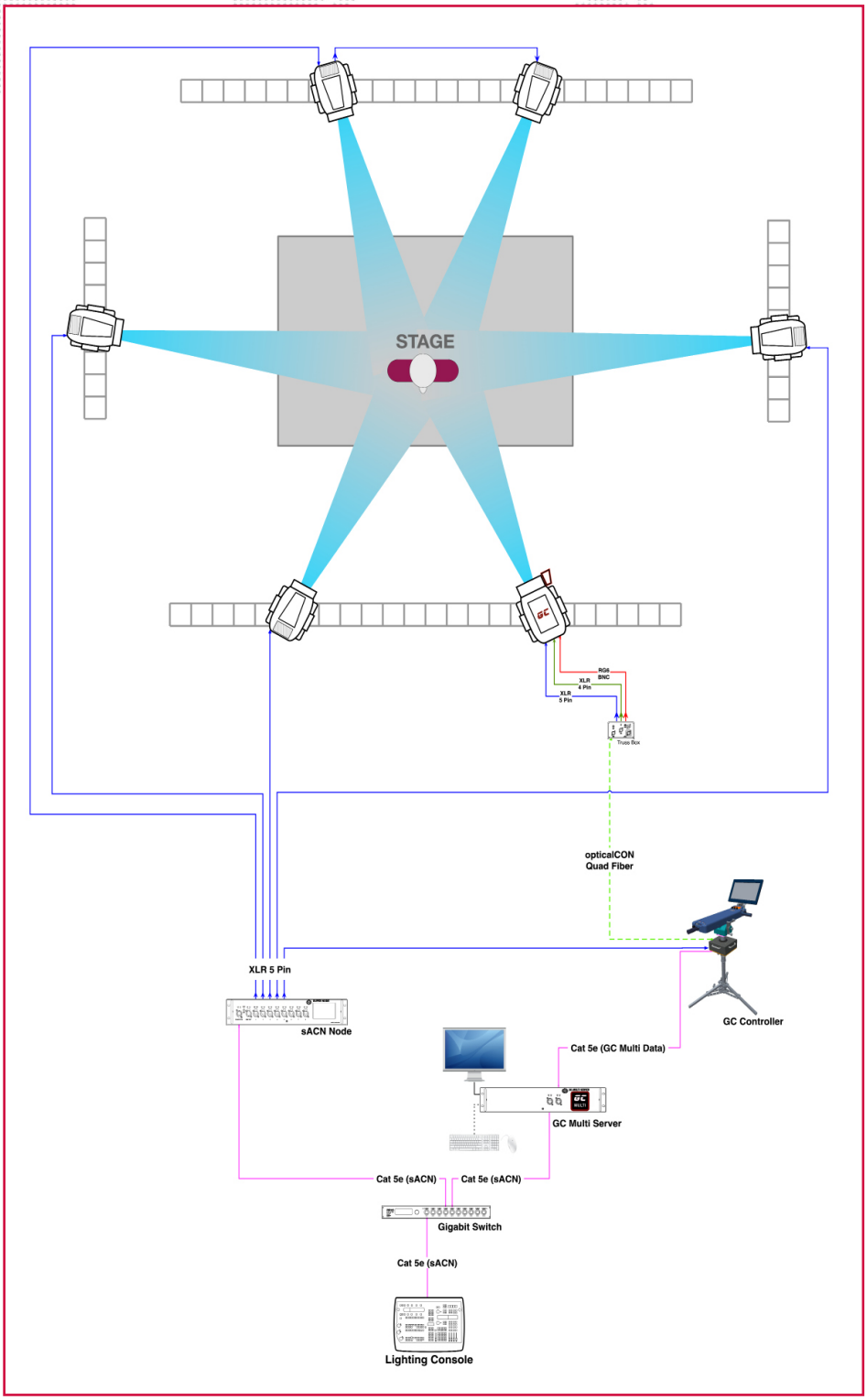


Figure 1: Single Controller System

Multiple Controller System Drawing

When creating a system using multiple GroundControl Multi servers over the same network, each controller and their corresponding fixtures must be assigned to sACN universes unique to that server. For example, as shown in Figure 2, Server 1 communicates over Universes 1, 3, and 5, while Server 2 communicates over universes 2, 4, and 6. As shown in Figure 3, the system will not work properly if fixtures controlled by separate servers are plugged into the same universe.

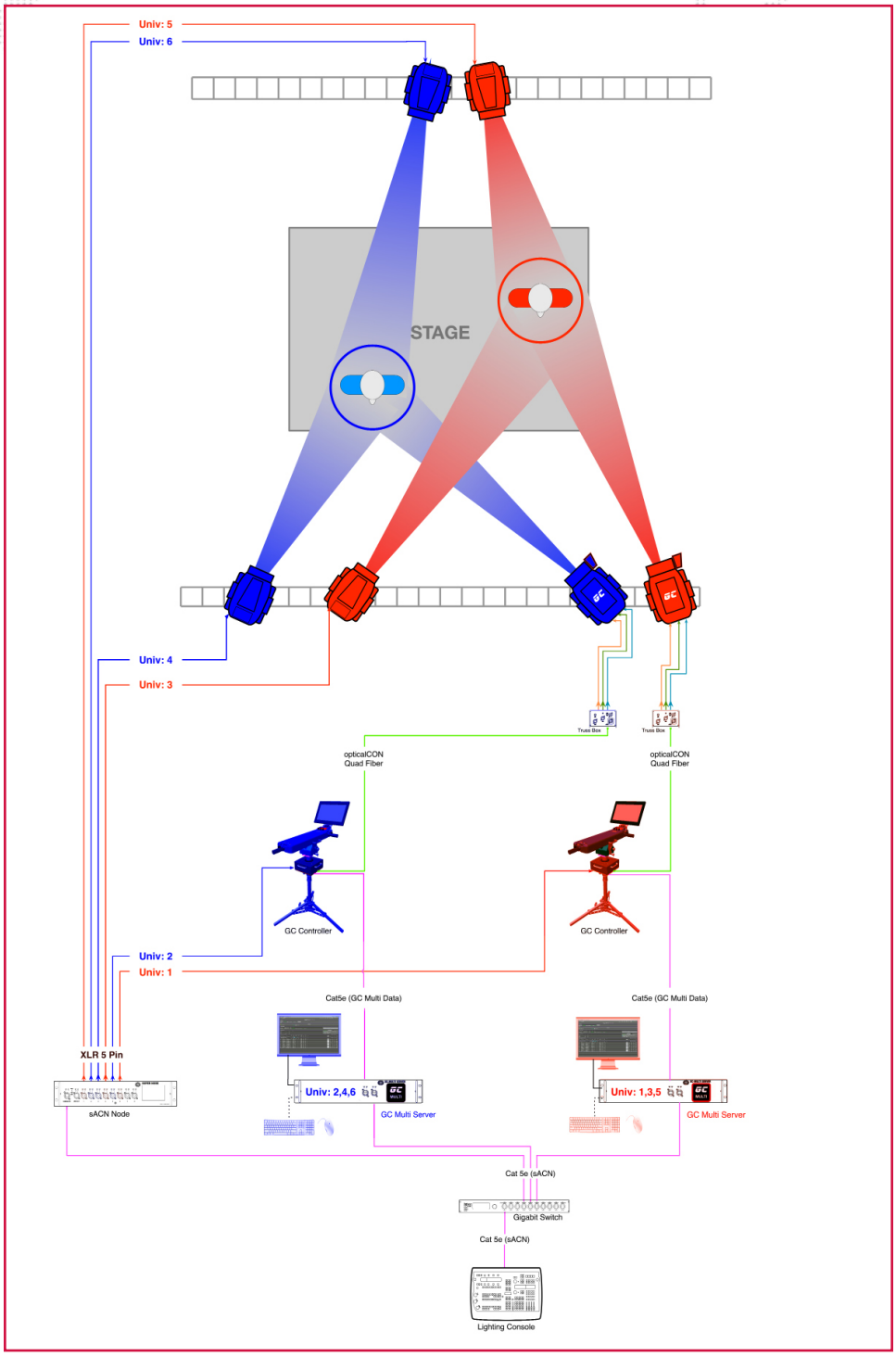


Figure 2: Successful System Configuration

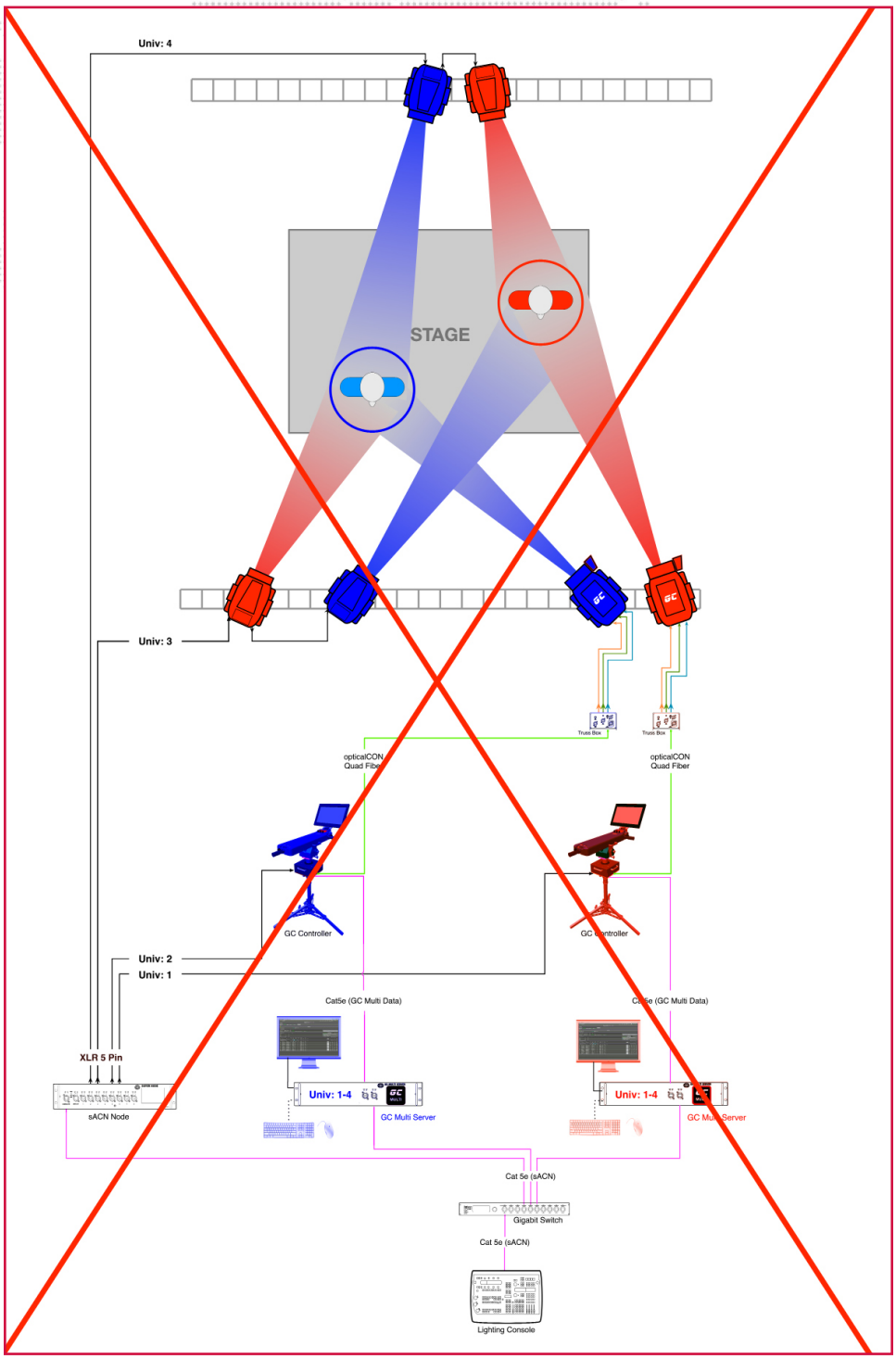
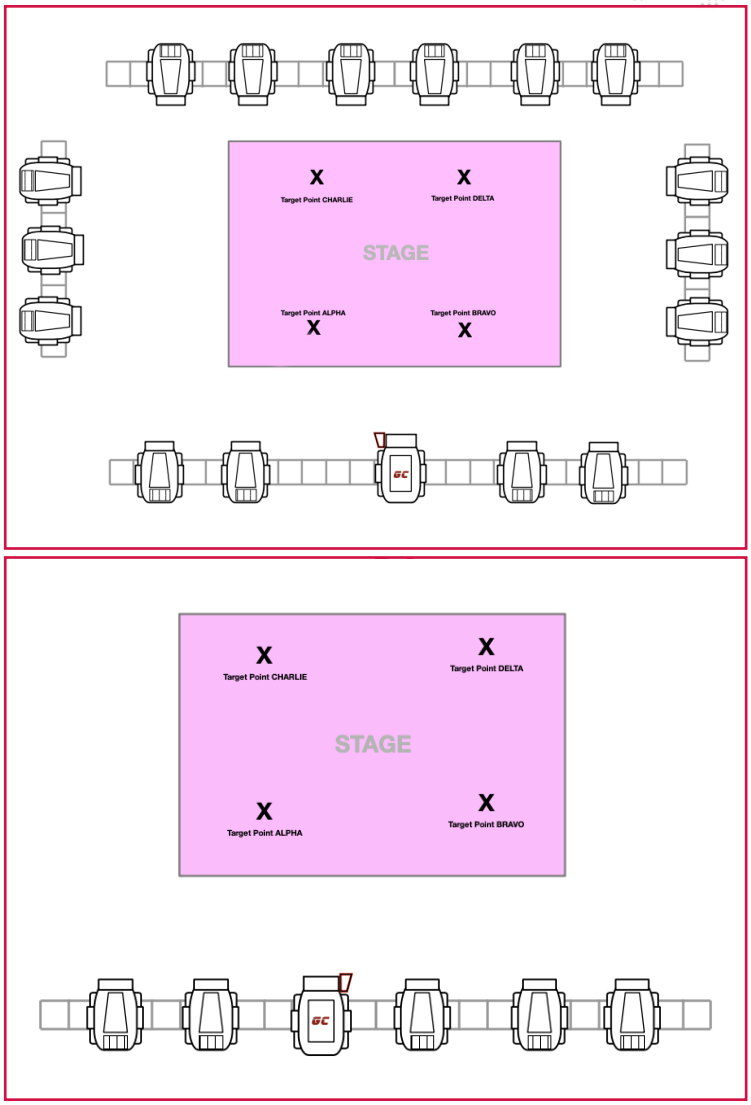


Figure 3: Unsuccessful System Configuration

Hanging Fixtures

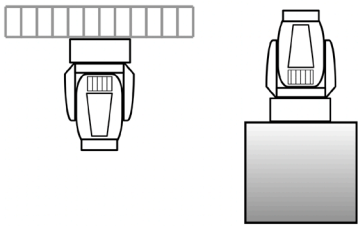
Fixture Layout

Fixtures must be hung outside of Target Point boundaries. See more on Target Point placement in the following section.



Fixture Orientation

Fixtures can only be hung conventionally (with the upper enclosure at the top) or sitting on its base and with the base level to the ground. The orientation of a fixture must be specified in the Patch section of the Configuration window.



Target Points

What is a Target Point?

A Target Point is a measured point of reference within the performance area used by the GroundControl Multi application to calibrate the location of fixtures. GroundControl Multi uses four Target Points to calibrate.

Choosing Target Points

The following steps should be considered prior to configuring your GroundControl Multi System.

Step 1. Select a Point of Origin within your Performance Area.

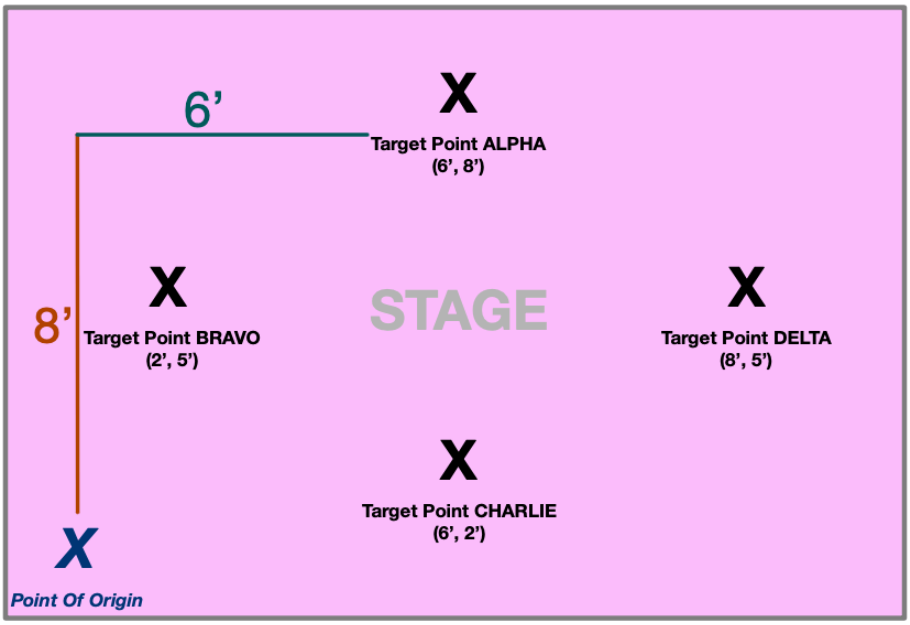
- The Point of Origin is an arbitrary reference point used by the GroundControl Multi Application to calibrate the 3D position of fixtures in the GroundControl Multi System.

Step 2. Select four Target Points within the boundaries of your Performance Area as described in the previous chapter.

- Note the X and Y distances of each Target Point from the Point of Origin. These dimensions will be crucial to the System's calibration.
- Ensure your Target Points are clearly marked.

Step 3. Assign each Target Point a label: 'Alpha,' 'Bravo,' 'Charlie,' or 'Delta.

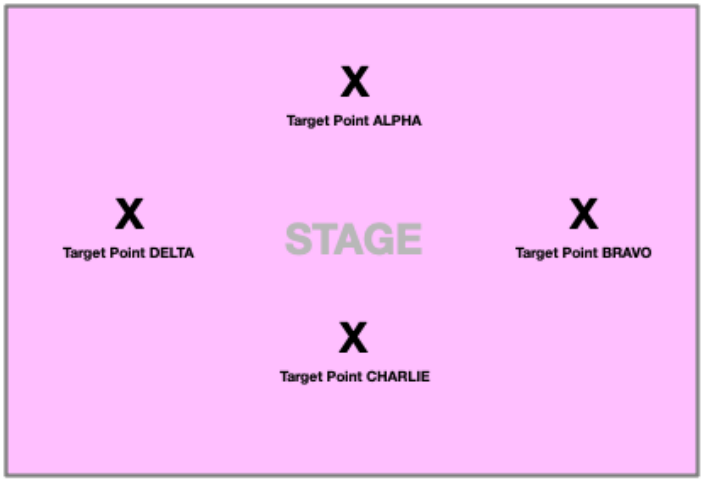
- The labels' order is arbitrary and should be assigned based on the preferences of the system's operators.

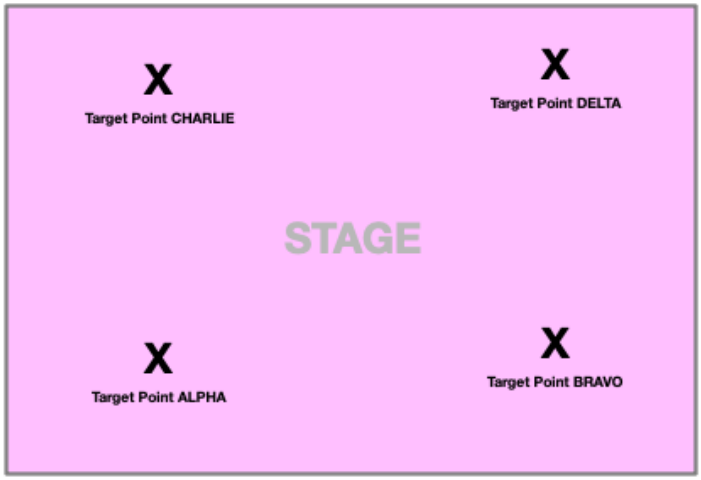


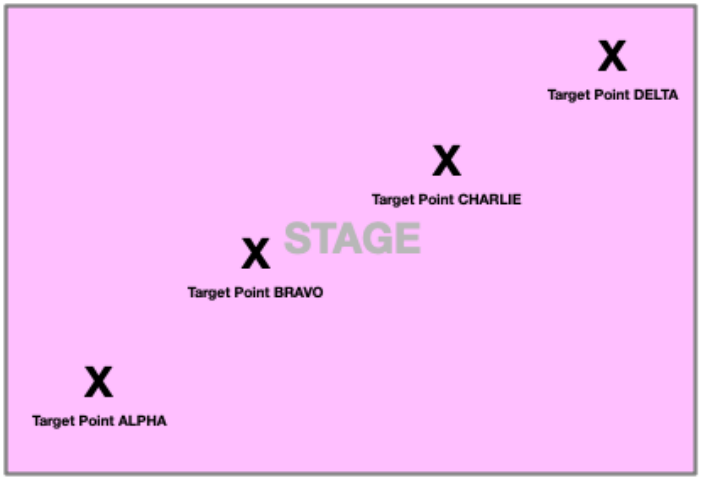
Correct Layouts

Target Points can be arranged anywhere within the boundaries of the GroundControl Multi Fixtures.

Please note that GroundControl Multi Fixtures must pan at least 1° between Target Points in order to avoid a failed calibration. Focus Points should therefore not be placed directly in-line, horizontally or vertically, with fixtures. Depending on the placement of your fixtures, any horizontal or vertical line of all four Focus Points may not be suitable.

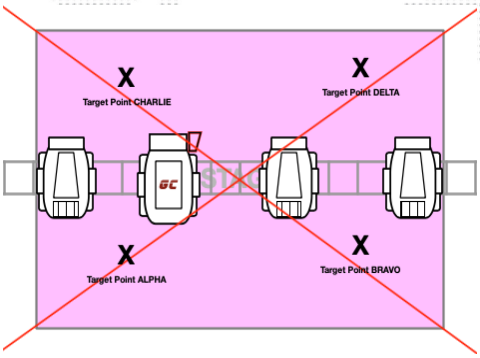




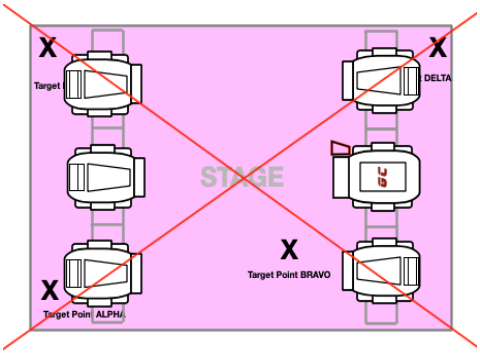


Incorrect Layouts

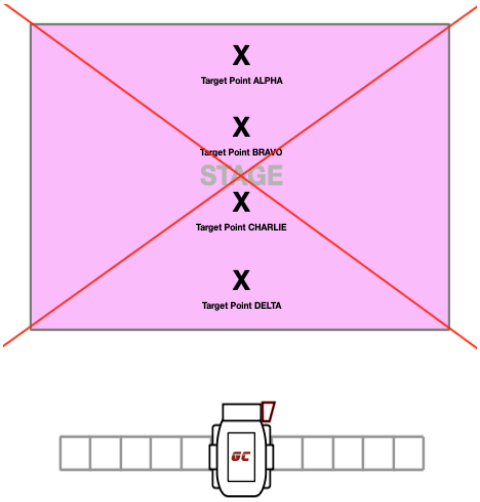
The layouts shown below are examples of improper Target Point layouts that will result in failed calibrations.



In the example above, Focus Points are placed on either side of a truss with GroundControl Multi Fixtures. Focus points must only be on a single side of each truss.



In the example above, Focus Points are placed on both the outside and inside of these trusses with GroundControl Multi Fixtures. Focus points must only be on a single side of each truss.



In the example above, multiple Focus Points are placed directly in line with a fixture GroundControl Multi Fixture. No pan data can be recognized by the GroundControl Multi application, resulting in a failed calibration.

CONFIGURATION

Configuring the GroundControl Multi Application

Please follow the steps below to configure your GroundControl Multi application and prepare for calibration.

Step 1. Set up a standard GroundControl Remote Followspot System. See the User Manual for more in-depth instructions.

Step 2. Load GroundControl Multi Firmware Version 1.0 onto your GroundControl Controller. See the User Manual for more in-depth instructions.

Step 3. Install the GroundControl Multi application onto a MacOS computer.

a. Ensure your computer at least meets the following requirements:

1) 2 Network Interface Cards:

- Your Mac's Native Ethernet Port
- An additional USB-C to Ethernet Interface

2) M1 Processing Unit

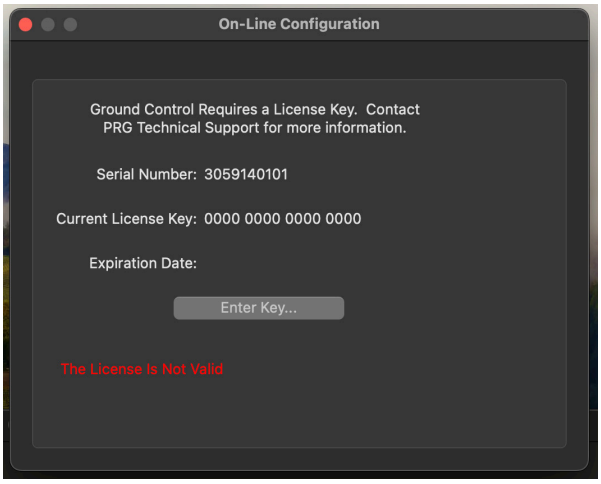
3) MacOS Sonoma Version 14.0

4) 16 GB of RAM

Step 4. Open the GroundControl Multi application.

Step 5. License your GroundControl Multi application.

a. Enter a Valid License Key in the "Licensing" Window.



- Please contact PRG if you are in need of a Valid License Key.

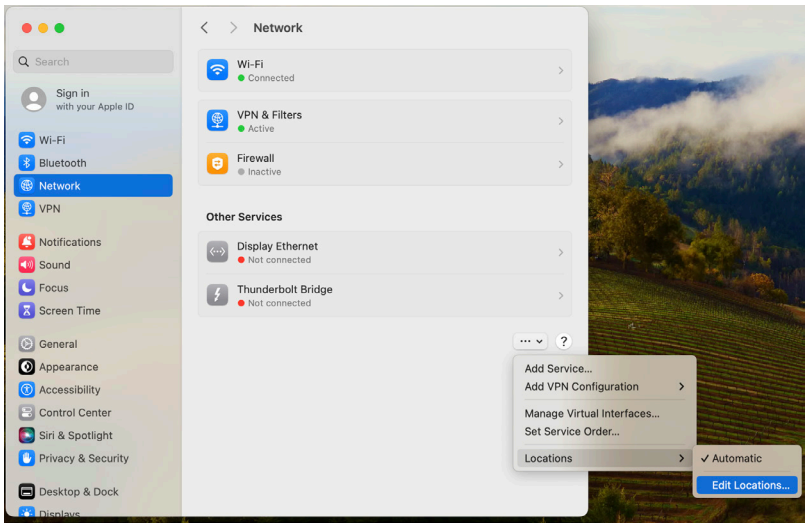
Step 6. Connect your GroundControl Multi application to the GroundControl Multi system.

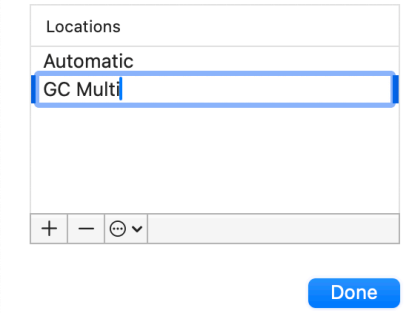
a. Use an Ethernet Cable to connect your computer from its Native Ethernet port to your Lighting System.

b. Use an Ethernet Cable to connect your computer from the USB-C Interface to your GroundControl Controller.

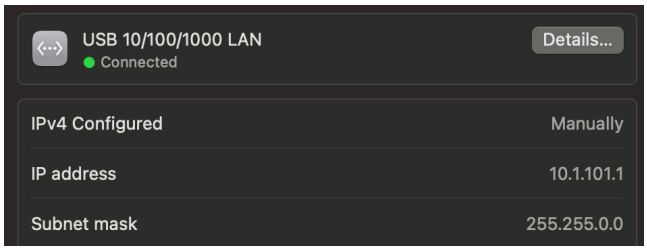
c. Open System Settings on your MacOS computer.

d. In the “Network” Menu of System Settings, create a new Network Location called “GC Multi.”

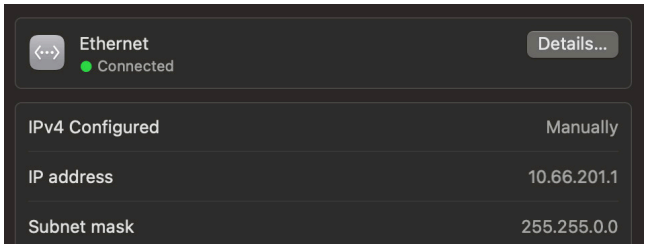




e. Manually configure the connection to your GroundControl Controller as shown below.

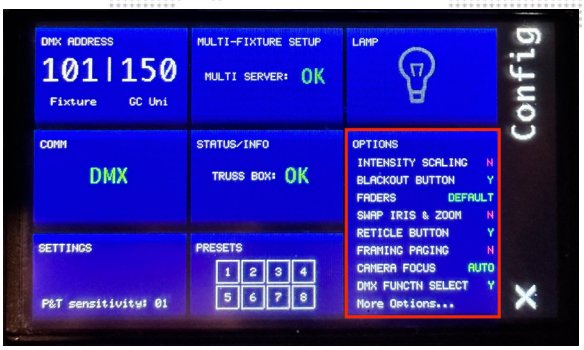


f. Manually configure the connection to your Lighting System as shown below.

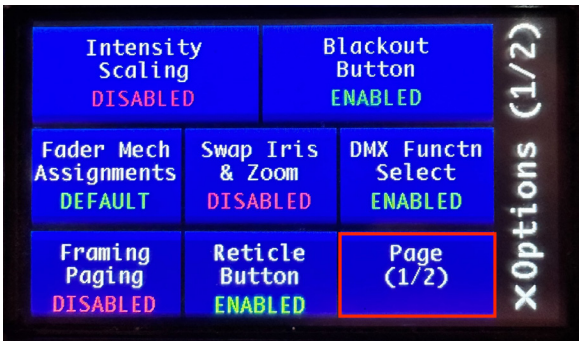


Step 7. Configure your GroundControl Controller's Network Settings.

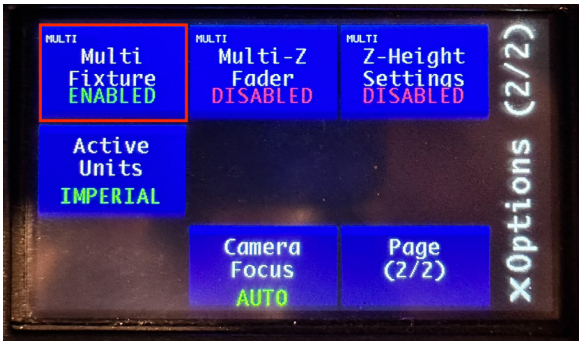
a. Using the display of your GroundControl Controller, open the "Options" menu in the "Configuration" window.



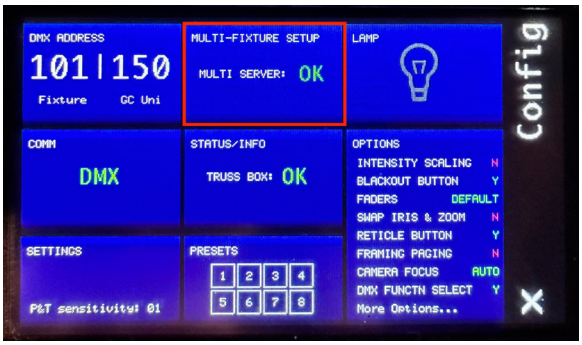
b. Navigate to the second page.



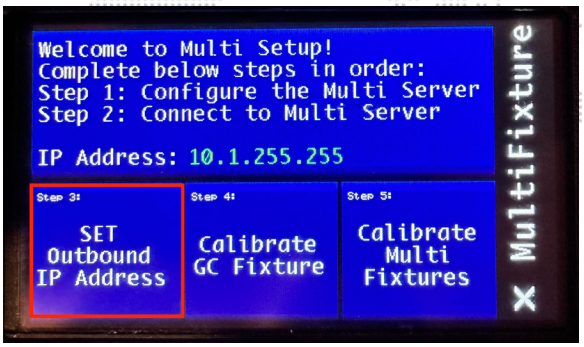
c. Enable the "Multi Fixture" option and return to the "Configuration" window.

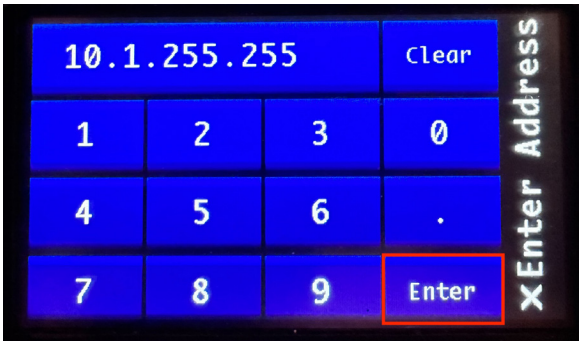


d. Enter the "Multi-Fixture Setup" menu.



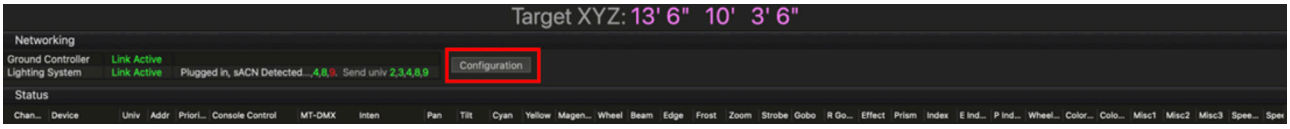
e. Set the “Outbound IP Address” to 10.1.255.255 and return to the Home Screen.



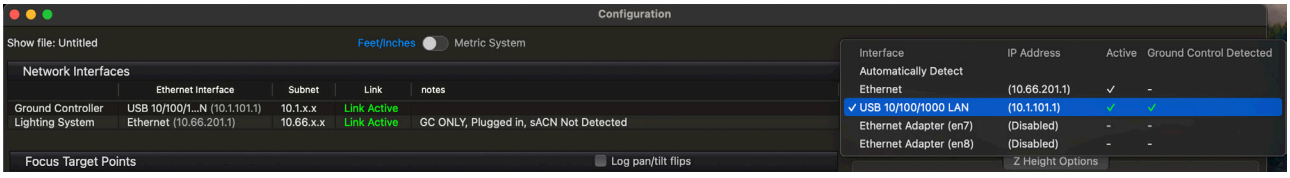


Step 8. Configure the Network Interfaces in the GroundControl Multi application.

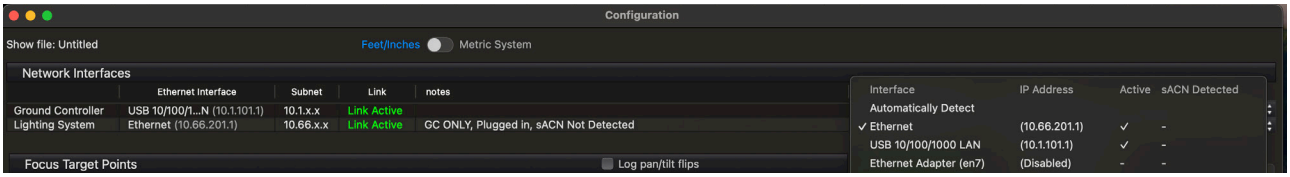
a. Open the “Configuration” window found on the main Status Screen of your GroundControl Multi application.



b. Set the “Ground Controller” network connection to your USB-C Interface (10.1.101.1).

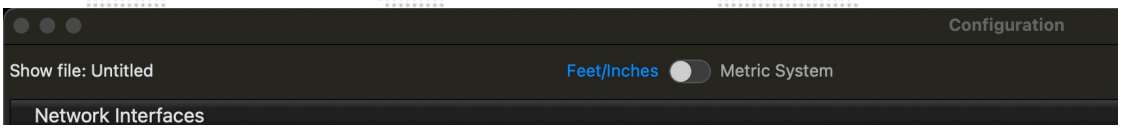


c. Set the “Lighting System” network connection to the native Ethernet port (10.66.201.1).

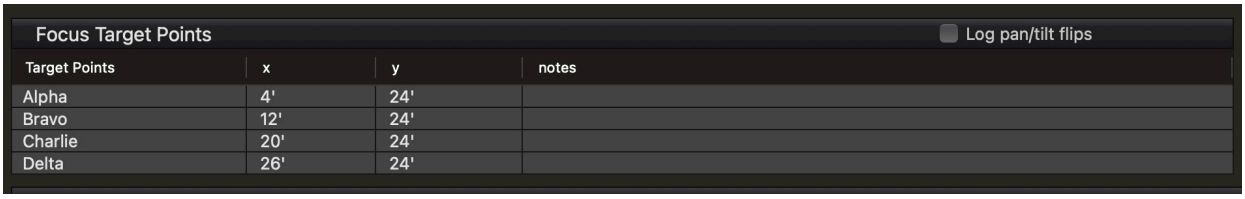


Step 9. Configure Target Points in the GroundControl Multi application.

a. Use the Measurement Toggle at the top of the “Configuration” window to specify if you will be using Imperial or Metric Units to define your Target Points.



b. Enter the X and Y coordinates of each of the four Target Points in the “Focus Target Point” section of the “Configuration” window.



c. Input the “Default Calibration Height” in the Z Height Options menu of the “Configuration” window.

- This dimension is the height of your Target Points from the floor of the Performance Area.

Configuring Lighting Console Control

The following section only applies if control of the GroundControl Multi system is to be shared with a lighting console.

Patching Your Lighting Console

Please follow the following steps to ensure full functionality of joint system control.

Step 1. Patch your GroundControl Camera Fixture into your Lighting Console.

a. Patch the fixture using its standard profile.

b. Assign the fixture a secondary channel number, and patch it as a ‘GC Universal 2’ fixture.

- The GC Universal 2 Profile can either be found at prg.com and Standard Fixture Share websites or be created using the DMX Maps below.

Chan	Function	Description	8-Bit Value	DMX %
1	Controller Configuration	Controller mechanism selection	Home:0	0%
		Refer to "GroundControl Controller Mechanism"	0-255	
2	Camera Exposure	Camera exposure control	Home:0	0%
		No charge	0	0%
3	Camera Zoom	Camera zoom control	Home:0	0%
		No change	0	0%
		Wide	1	1%
		Narrow	255	100%
4	Camera WB+ Reticle	Camera white balance + reticle	Home:0	0%
		No change	0	0%
		Automatic	1	1%
		3200K	2	1%
		5800K	3	2%
		ATW	4	2%
		One-Push WB	5	2%
		Reticle Off	127	49%
		Reticle On	128	50%
5	Control Selection	GC or Console Control	Home:0	0%
		GC Control	0	0%
		Console Control	10	3%
6	Store Target Points	Idle	Home:0	0%
	All values must be held for a minimum of 1 seconds followed by an immediate snap to DMX 0 to take effect	Idle	0	0%
		Store Target Point Alpha	56	21%
		Store Target Point Bravo	58	22%
		Store Target Point Charlie	60	23%
		Store Target Point Delta	62	24%
7	Reserved		Home:0	0%

GroundControl Controller Mechanism

DMX Range	Mech 1	Mech 2	Mech3	Mech 4	Mech 5
0	No Charge (leave mechanisms set as they are)				
1-5 (default)	Intensity	Iris	Edge	Zoom	Frost
6-10	Intensity	Iris	Edge	Zoom	
11-15	Intensity	Iris	Edge		
16-20	Intensity	Iris		Zoom	Frost
21-25	Intensity	Iris		Zoom	
26-30	Intensity	Iris			Frost
31-35	Intensity	Iris			
36-40	Intensity				
41-45	Intensity		Edge	Zoom	Frost
46-50	Intensity		Edge	Zoom	
51-55	Intensity		Edge		
56-60	Intensity			Zoom	Frost
61-65	Intensity			Zoom	
66-70	Intensity				Frost
71-75		Iris	Edge	Zoom	Frost
76-80		Iris	Edge	Zoom	
81-85		Iris	Edge		
86-90		Iris		Zoom	Frost
91-95		Iris		Zoom	
96-100		Iris			Frost
101-105		Iris			
106-110			Edge	Zoom	Frost
111-115			Edge	Zoom	
116-120			Edge		
121-125				Zoom	Frost
126-130				Zoom	
131-135					Frost
136-140	Console controls all FSC mechanisms EXCEPT Pan & Tilt				

Step 2. Patch all additional GroundControl Multi system fixtures into your Lighting Console.

a. Patch each fixture onto an individual channel using its standard profile.

b. Assign each fixture a secondary channel number, and patch it as a ‘GC-MT’ fixture.

- GC-MT is short for ‘Ground Control-Multi Toggle’.
- GC-MT Profiles enable your console to control the GroundControl Multi application in the following two ways:

1. Enables a user to toggle control of each fixture between the lighting console and the GroundControl Multi system.
2. Enables a user to focus to Target Points and store Pan/Tilt data into the application from the lighting console.

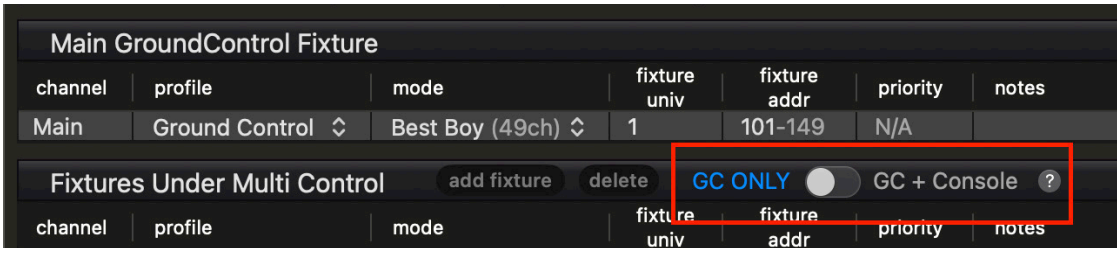
- The GC-MT Profile can either be found at prg.com and Standard Fixture Share websites or be created using the DMX Map below.

Chan	Function	Description	8-Bit Value	DMX %
1	Control Selection	GC or Console Control	Home:0	0%
		Console Control	0	0%
		GC Control	10	3%
2	Store Target Points	Idle	Home:0	0%
	All values must be held for a minimum of 1 seconds followed by an immediate snap to DMX 0 to take effect	Idle	0	0%
		Store Target Point Alpha	56	21%
		Store Target Point Bravo	58	22%
		Store Target Point Charlie	60	23%
		Store Target Point Delta	62	24%
3	Reserved		Home:0	0%

- GC-MT Fixtures can be patched in any sACN Universe, regardless of its corresponding fixture’s Patch.

Toggle Control from the GroundControl Multi Application

To enable control of the GroundControl Multi system from the Lighting Console, use the toggle in the Configuration window.



“GC + Console” must be selected to output control and calibrate the system using your lighting console.

“GC Only” will disable communication between your Lighting Console and the GroundControl Multi application.

Patching the GroundControl Multi Software

Please follow the following steps regardless of whether or not a Lighting Console is being used for control.

Step 1. Patch your GroundControl Camera Fixture to match your Lighting Console, in the case of Joint Control.

a. Enter the Channel number.

b. Select and choose the Fixture Profile.

c. Select the Fixture Control Mode.

d. Enter the Fixture's sACN Universe.

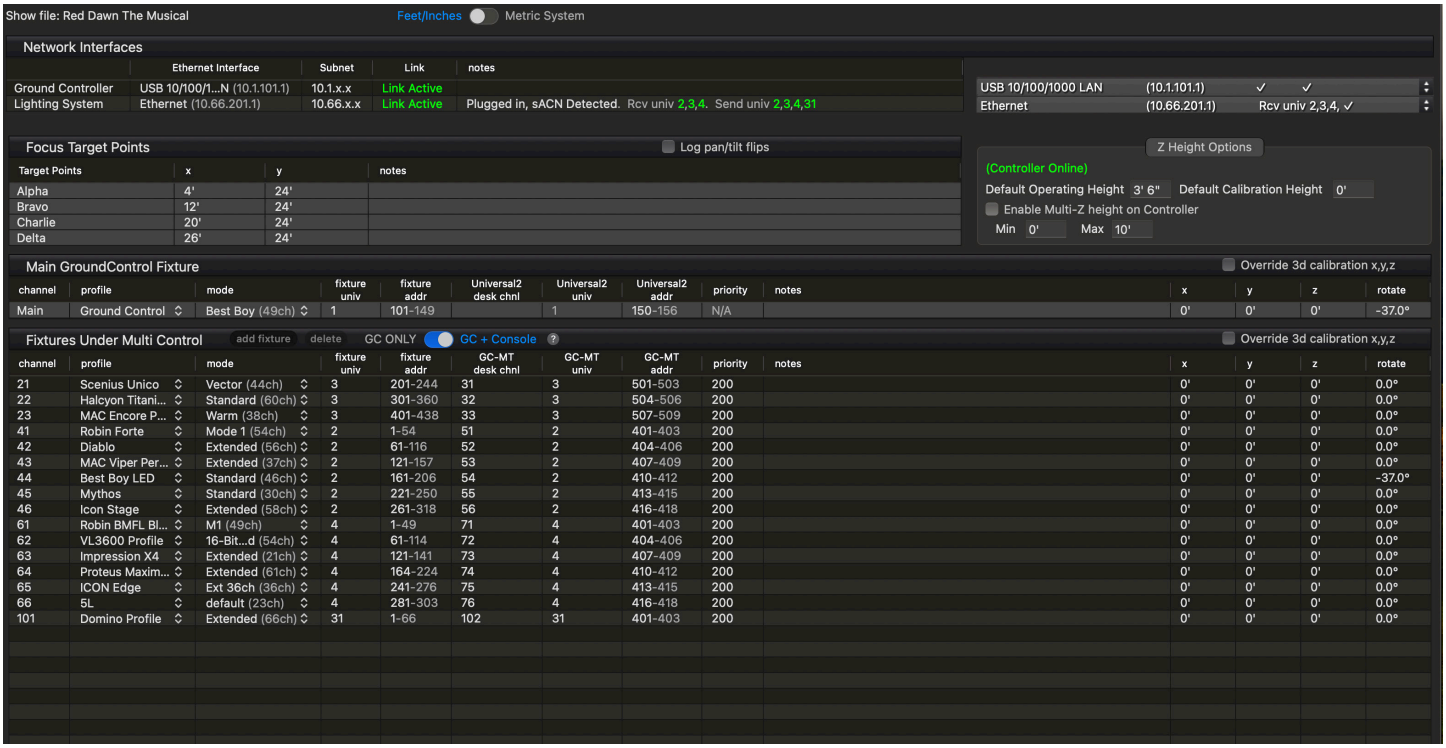
e. Enter the Fixture's Starting Address.

f. Enter the GC Universal2 Channel number, sACN Universe, and Starting Address.

g. Enter Notes as required.

Step 2. Patch all additional GroundControl Multi system fixtures to match your Lighting Console, in the case of Joint Control.

a. Repeat all steps above for each additional fixture, patching each Lighting Fixture with its corresponding GC-MT Fixture.



Step 3. SAVE THE FILE in the GroundControl Multi application. This is a required step to store all settings.

CALIBRATION

Calibration From Your Lighting Console

The following section only applies if control of the GroundControl Multi system is to be shared with a lighting console.

Please follow the following steps to calibrate your Lighting Fixtures 3D Positions.

Step 1. Calibrate the Main GroundControl Fixture.

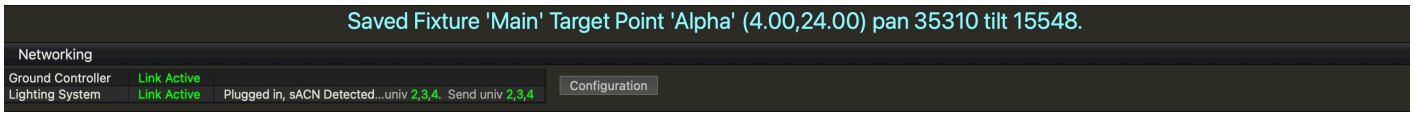
a. Make sure the GroundControl Multi Application Control Toggle is set to “GC + Console.”

b. On your console, select the GroundControl Fixture and its corresponding GC Universal 2 Fixture.

c. Set the GC Universal 2 Fixture to “Console Control” Mode.

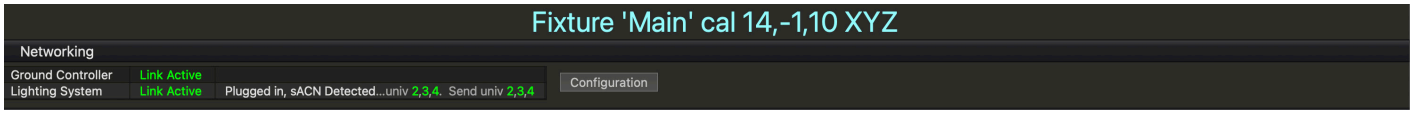
d. Focus the GroundControl Fixture directly on Target Point ‘Alpha.’

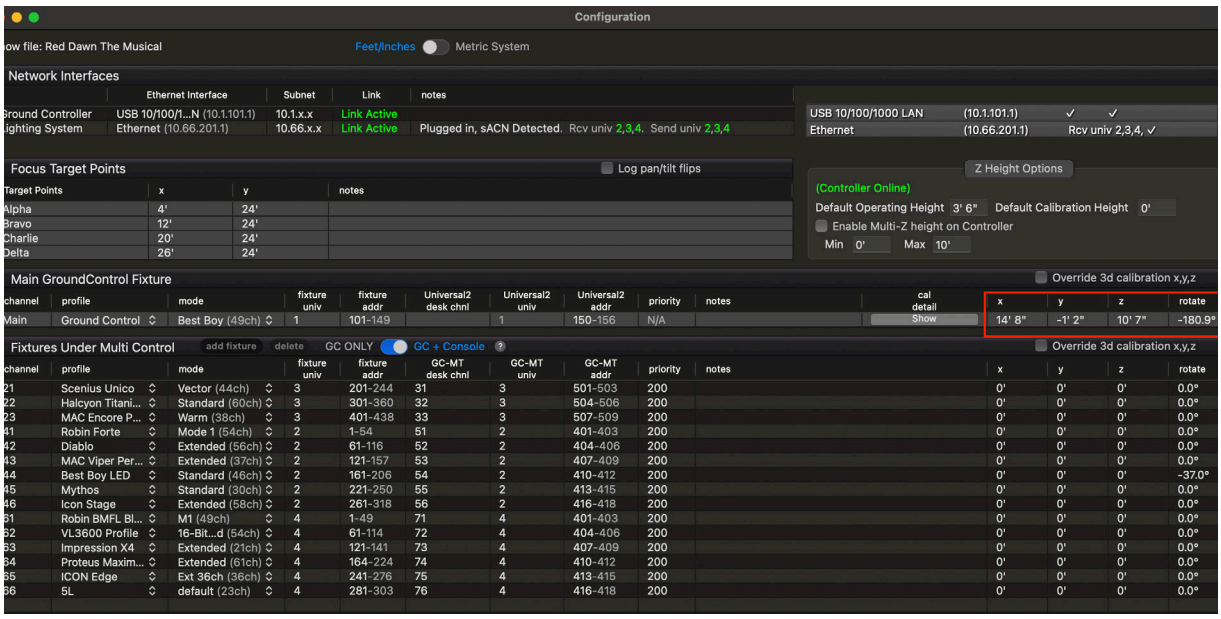
e. On the GC Universal2 fixture, select Store point ‘Alpha,’ wait for at least 1.5 seconds, and toggle back to ‘Idle.’



f. Repeat steps “d” and “e,” focusing to and storing data for Target Points ‘Bravo,’ ‘Charlie,’ and ‘Delta.’

- A successful calibration will result in the message shown below and the population of XYZ dimensions into the Patch controls.

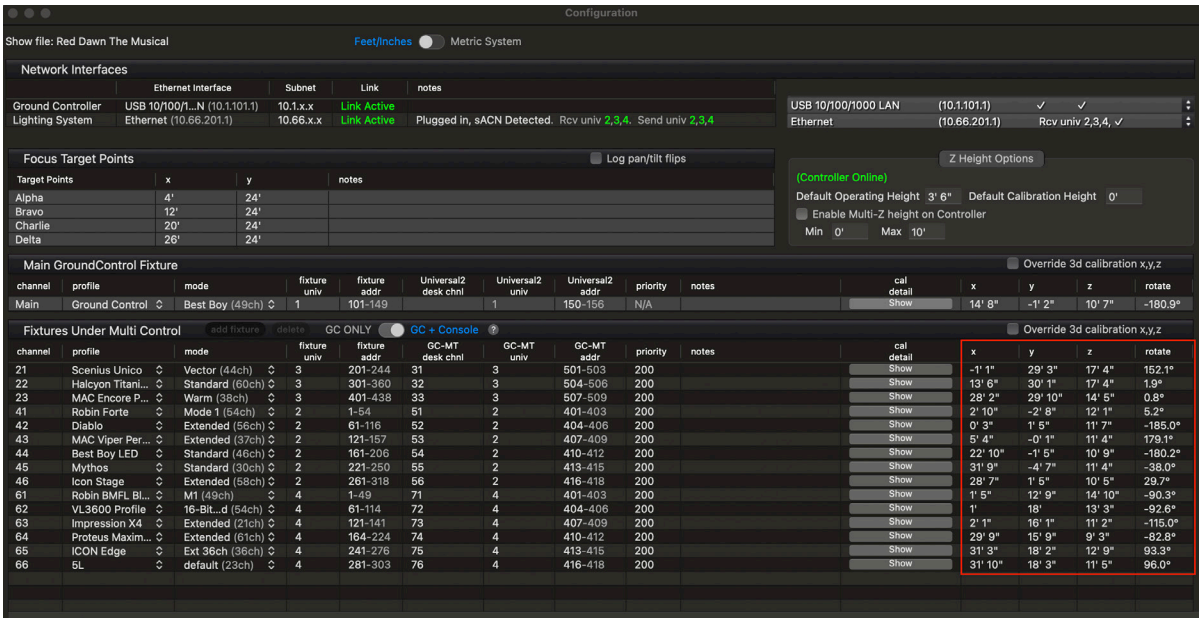




Step 2. Calibrate all additional GroundControl Multi system fixtures.

a. Repeat all steps from Main GroundControl Fixture calibration, selecting each Fixture and corresponding GC-MT Fixture you wish to calibrate.

- Fixtures can be calibrated individually or as a group.
- A successful calibration will result in the population of XYZ dimensions into the Patch controls.



Step 3. SAVE THE FILE in the GroundControl Multi application. This is a required step to store all settings.

Congratulations! The system is now calibrated.

On your console, set the GC-MT Fixtures to GC Control. The fixtures will now follow the Main GroundControl Fixture!

Calibration From the GroundControl Controller

The following section only applies if the GroundControl Multi System is to be operated without a Lighting Console.

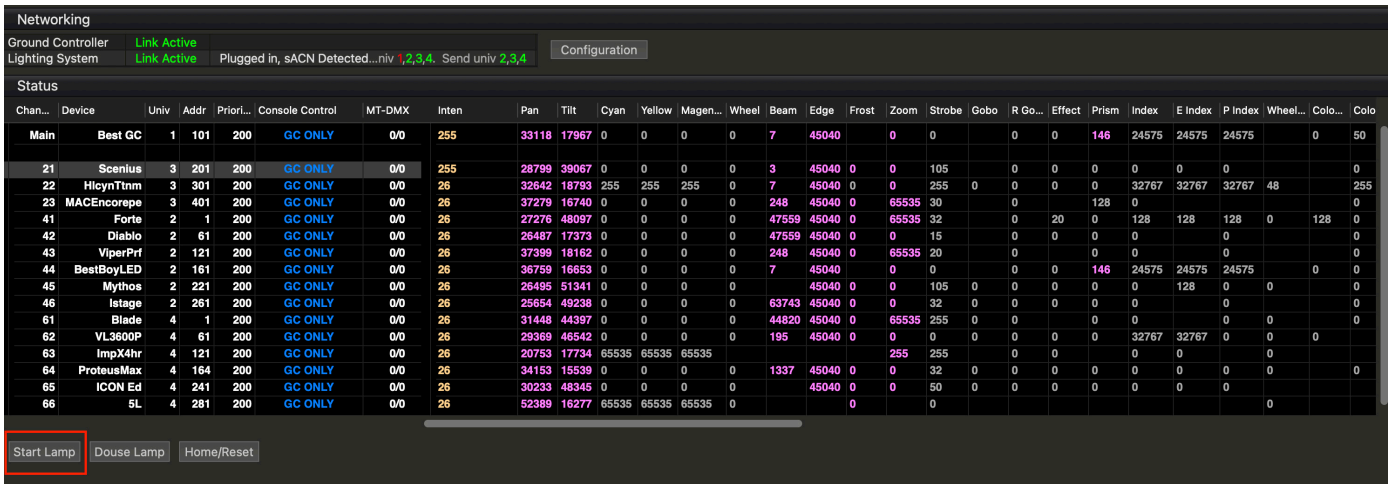
Please follow the following steps to calibrate your Lighting Fixtures 3D Positions.

Step 1. Prepare to Calibrate Fixtures.

a. Make sure the GroundControl Multi Application Control Toggle is set to “GC Only.”

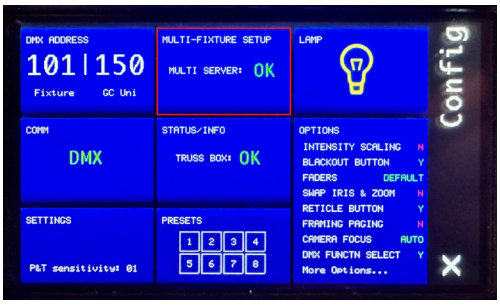
b. Lamp On Arc Fixtures.

- The “Start Lamp” button can be found on the main Status Screen of the GroundControl Multi Application.

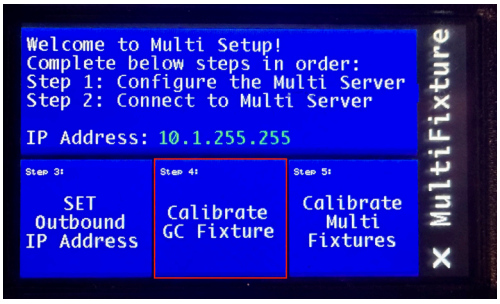


Step 2. Calibrate the Main GroundControl Camera Fixture.

a. Enter the “Multi-Fixture Setup” menu on your GroundControl Controller

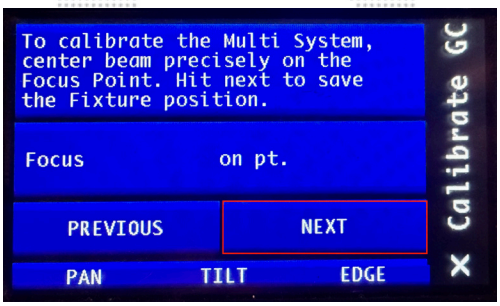


b. Select “Calibrate GC Fixture”



c. Using the Controller's Pan and Tilt, focus the Main GroundControl Camera Fixture on Target Point 'Alpha.'

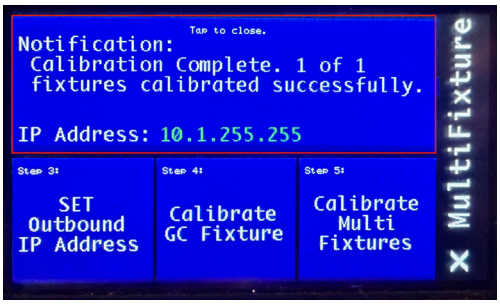
d. Either select "Next" on the Controller Display or press the "Blackout" button.



e. Repeat steps "c" and "d," focusing to and storing data for Target Points 'Bravo,' 'Charlie,' and 'Delta.'

- A successful calibration will result the message shown below in the "Multi-Fixture Setup" menu.

Step 3. Calibrate all additional GroundControl Multi system fixtures.



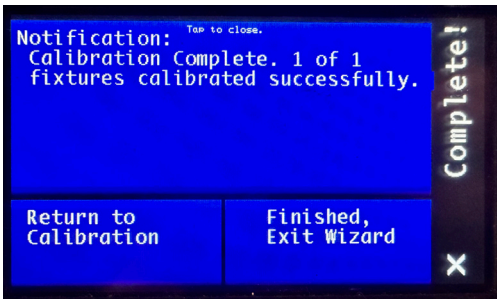
a. Select "Calibrate Multi Fixtures"

b. Repeat all steps from Main GroundControl Camera Fixture calibration, using the Controller's encoders to manipulate Pan and Tilt.

- After Target Point 'Delta' has been calibrated, the application will advance to the next fixture automatically.

c. Repeat this process for each fixture patched in the GroundControl Multi application.

d. Select "Return to Calibration" in the event of any errors, or else select "Finished, Exit Wizard".



Step 4. SAVE THE FILE in the GroundControl Multi application. This is a required step to store all settings.

Congratulations! The system is now calibrated. The fixtures will now follow the Main GroundControl Fixture!

GroundControl™ Multi Quick Start Guide

Version as of: August 2, 2024 rev A

PRG part number:

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