Espedeo 3D Active System
Model No. AL-1000P

Installation &
User Manual

Please read the Manual carefully before installation.

Thank you for purchasing an Espedeo AL-1000P 3D Active System.

To ensure proper operation and to maximize value of the AL-1000P, please review this Manual. It will guide you through all the features and benefits of the AL-1000P 3D Active System.

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FCC COMPLIANCE STATEMENT

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.

NOTE: 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 instruction manual, 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.

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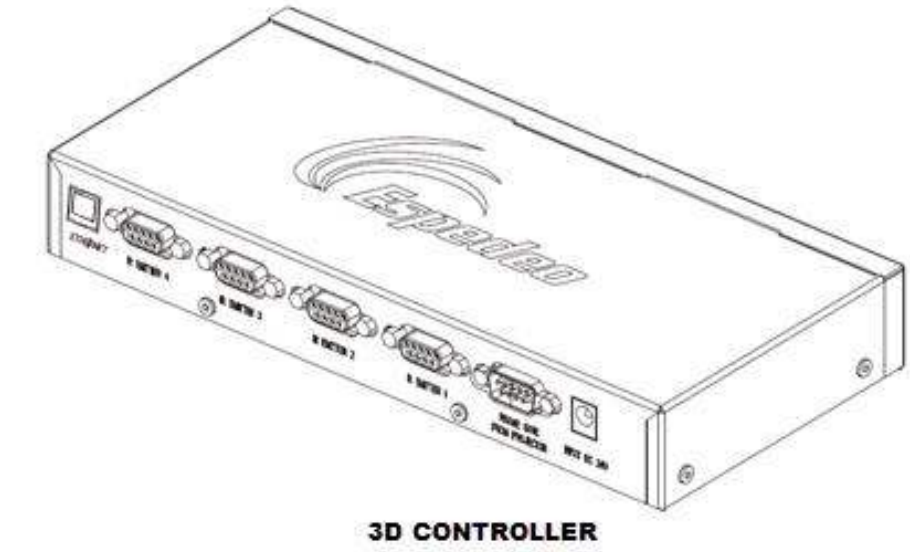
1. Introduction to Espedeo Active 3D System (Model No. AL-1000P)

1.1. Product Description

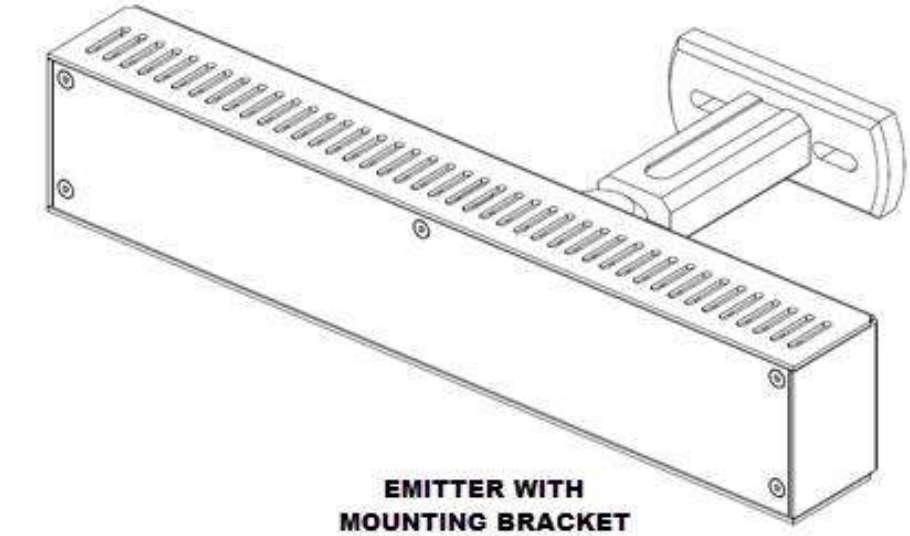
The **AL-1000P** Active 3D system is specially designed for 3D on LED Cinema screen. When connected to the Samsung Cinema LED screen, it emits infrared 3D synchronization signal for the active shutter glasses which create the separation of left and right eye images to achieve 3D imaging.

2. Package Contents

Item Name	Quantity
3D Controller	x 1
Emitter	x 2
Mounting Bracket	x 2
24V/5A/120W Power Adapter	x 1
DB9P-DB9P Signal Cable (10m)	x 3
Power Cable	x 1
M10x80mm Expansion Screw	x 4
No. 4 Wrench	x 1
Test Box	x 1
Network Switch	x 1
Network Cable (10m)	x 1



3D CONTROLLER



EMITTER WITH
MOUNTING BRACKET

Figure 1:Espedeo Active 3D System (Model No. AL-1000P) Controller & Emitter

2.1. Safety Instructions

- Please read this manual carefully before installation.
- Do not disassemble or attempt to repair the equipment. Failure to do so may result in electric shock or damage to the equipment.
- Do not operate the device with wet hands. Otherwise, it may cause electric shock.
- Do not expose the device to direct sunlight or heat for prolonged periods of time. Prolonged exposure to direct sunlight or extreme temperatures can cause permanent damage to the inside of the equipment.
- Do not scratch or wipe the 3D Emitters with hard objects. Otherwise, the surface of the 3D Emitters may be damaged and the transmitted signal may be affected.
- All instructions for operating and maintaining the AL-1000P must be followed closely.

2.2. Electrical parameters

- Input: 100-240V AC 50 / 60Hz 1A Max.
- Synchronization signal: 3.3V+/-10%
- Power consumption: < 50W
- Maximum length of the cable from the LED Screen to 3D Controller: 10m
- Maximum length of the cable from 3D Controller to Emitter: 10m

3. Installation of the Espedeo Active 3D System

3.1. Equipment required for installation

Item	Quantity
3D Controller (CL-100P)	x 1
Emitter (EL-100P)	x 2
Samsung Cinema LED Screen with 3D support	x 1
GDC LPU-1000 LED Player Unit	x 1
GDC Enterprise Storage Unit	x 1
Cable between 3D Controller and Emitter [DB9P-DB9P signal cable - 10m]	x 2
Cable from LED Screen to 3D Controller [DB9P-DB9P signal cable - 10m]	x 1
Mounting Brackets for Emitters	x 2
Windows PC/Laptop with setup software for 3D Controller	x 1
Network Switch (Required to connect the LPU-1000 & 3D Controller)	x1
Network Cable (10m) (Required to connect the LPU-1000 & 3D Controller)	x1
Power Cables	-
Tools required to mount the Emitters	-

3.2. Installation procedure

3.2.1. Determining the position of the Emitters

- It is recommended to work with the architectural drawings of the cinema auditorium and the LED screen frame drawings to determine the best position for the Emitters.

- The Emitters emit an infrared signal which must cover the entire seating area of the auditorium so that the infrared signal reaches the sensor on the 3D Active Glasses worn by the audience.

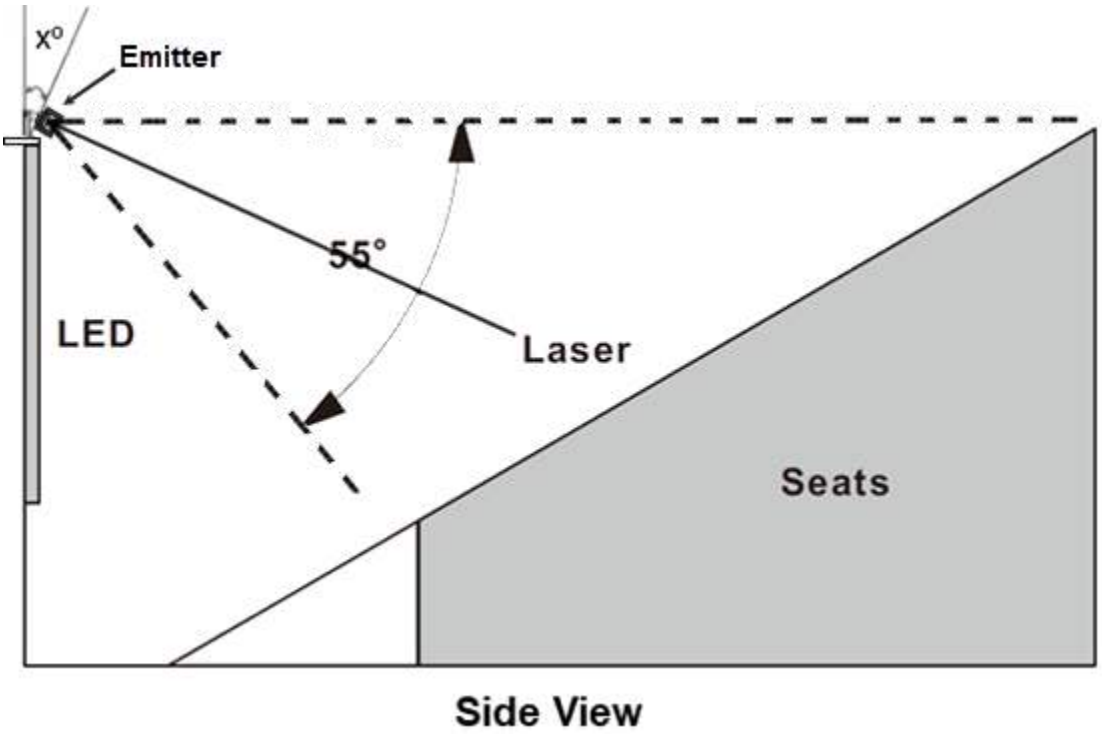


Figure 2: Placement of Emitters – Side View

- As seen in the sectional view representation in the **Figure 2** , the Emitters should be placed above the LED screen, just behind the acoustically transparent masking. Please check with GDC for recommendations on approved acoustically transparent masking that allows the infrared beam to pass through.

- Note that the Emitters have an infrared signal coverage of **55^0** in both the horizontal and vertical planes.

- As seen in the top view representation in **Figure 3,** the two Emitters should be placed equidistant from the right & left edges of the LED screen respectively. Please take into account the positioning of the Left, Centre, Right screen speakers.

- They can be adjusted vertically (as indicated by **x^0**) in such a way that the signal from the Emitters covers the entire seating area in the vertical plane.

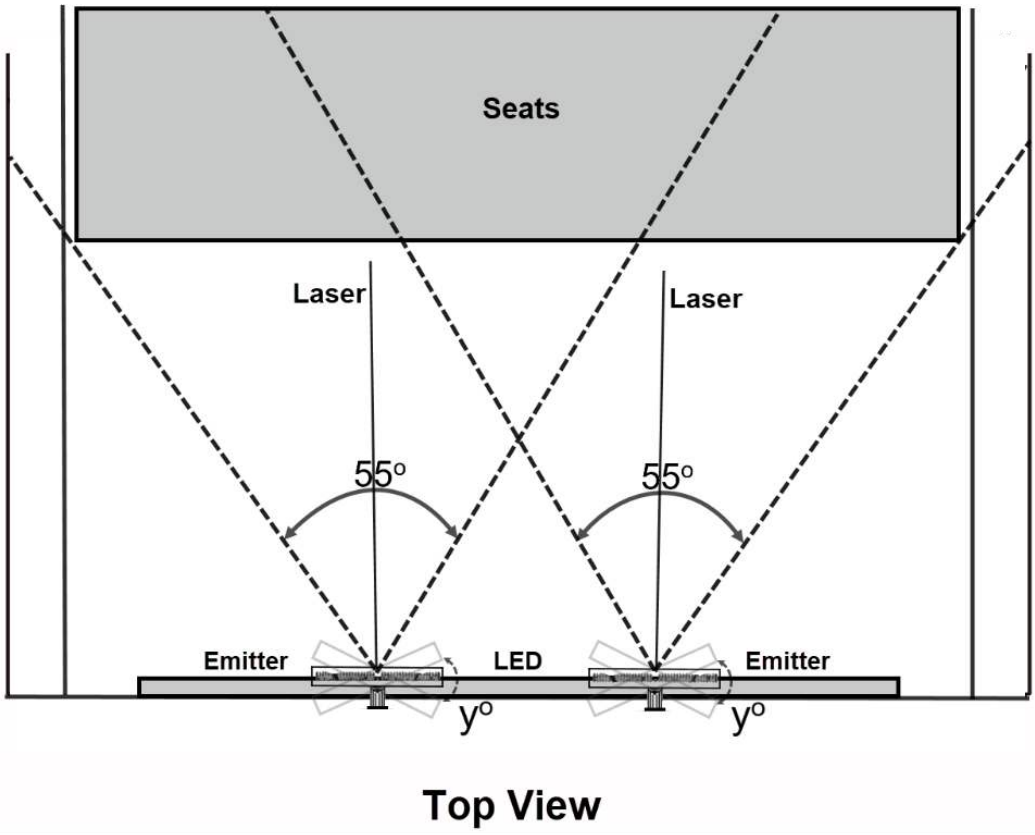


Figure 3: Placement of Emitters – Top View

- Each of the Emitters can also be adjusted horizontally (as indicated by **y^0**) to ensure maximum coverage in the horizontal plane.

- Once the position for the Emitters has been determined, please refer to **Sections 3.2.3** & **3.2.4** on how to physically mount/adjust the Emitter brackets and fine tune the tilt angles.

3.2.2. Mounting the 3D Controller

The **3D Controller** should be mounted securely near the LED Screen cabinet with the 3D Sync signal output port. This port is usually located on one of the top row side cabinets. Please make provision for a power outlet close to the 3D Controller position. **Figure 4** illustrates the rear view of the LED Screen cabinets & the approximate placement of the 3D Controller.

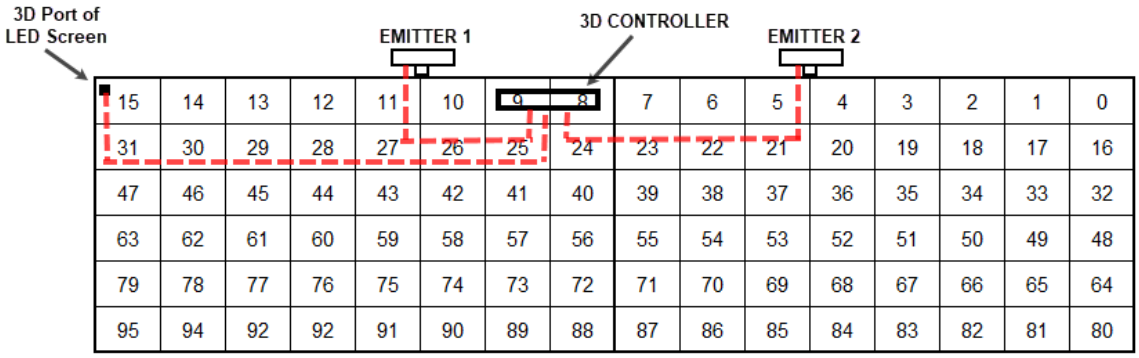


Figure 4: Placement of 3D Controller

Some examples of mounting spots for the 3D Controller are:

- Top walkway of the LED Screen frame.
- Frame beam behind cabinets- ***08/09*** (as seen in the **Figure 5** below)

Figure 5: Mounting the 3D Controller

3.2.3. Installing the bracket & Emitters

The mounting brackets are provided to mount the Emitters on top of the LED screen, at the desired angles. The horizontal & vertical angles of the bracket can be adjusted as shown in **Figure 8**. The Emitter can be fixed to the mounting bracket as shown in **Figure 9**.

Figure 6: Emitter mounting bracket: Front View

Figure 7: Emitter mounting bracket - Top View

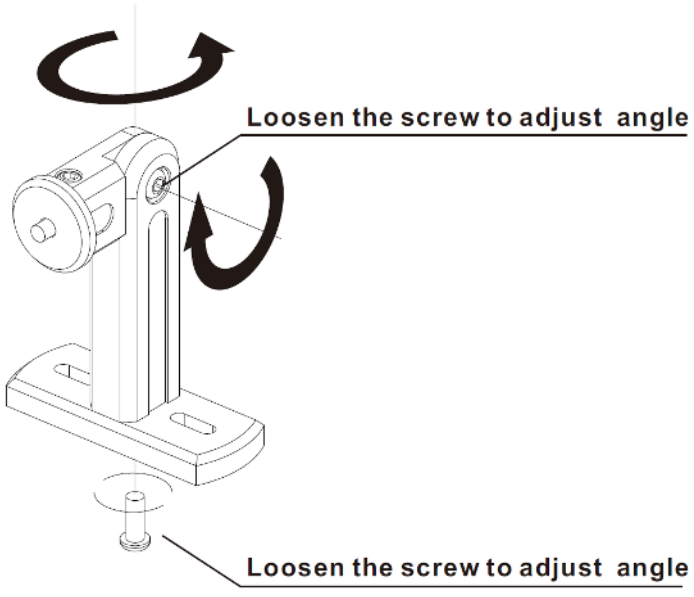


Figure 8: Adjusting the mounting bracket

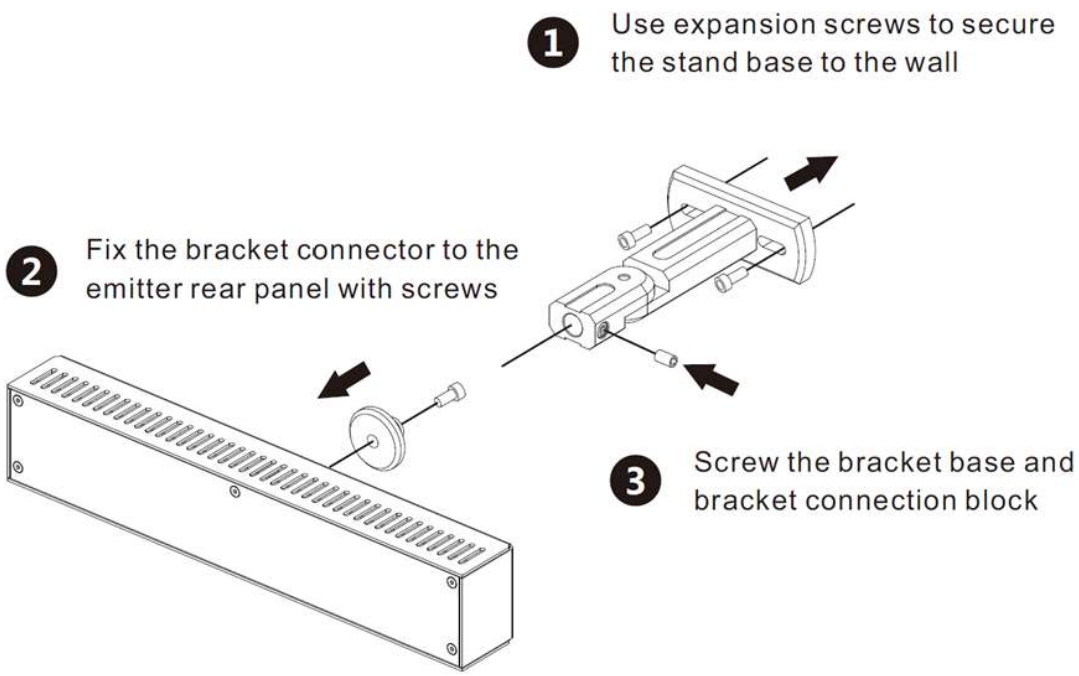


Figure 9: Fixing the Emitter to the mounting bracket

3.2.4. Adjusting the Emitters

Once the Emitter(s) have been mounted as per the design, the horizontal & vertical angles of the Emitters need to be adjusted. This adjustment can be performed by following the steps mentioned below:

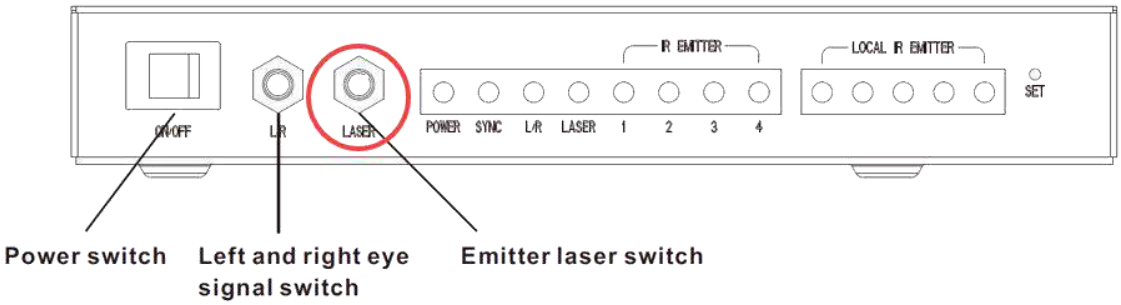


Figure 10: Laser switch on 3D Controller front panel

- Push the 'Laser' button on the front panel of 3D Controller.
- Confirm that each of the Emitters emits a beam of laser light
- Based on the laser light beam, adjust the Emitter angle until the laser light beam is directed to the designated position.
- Please make sure to turn OFF the LASER after the alignment is complete.
- The 3D signal coverage specifications for one Emitter, are mentioned below:

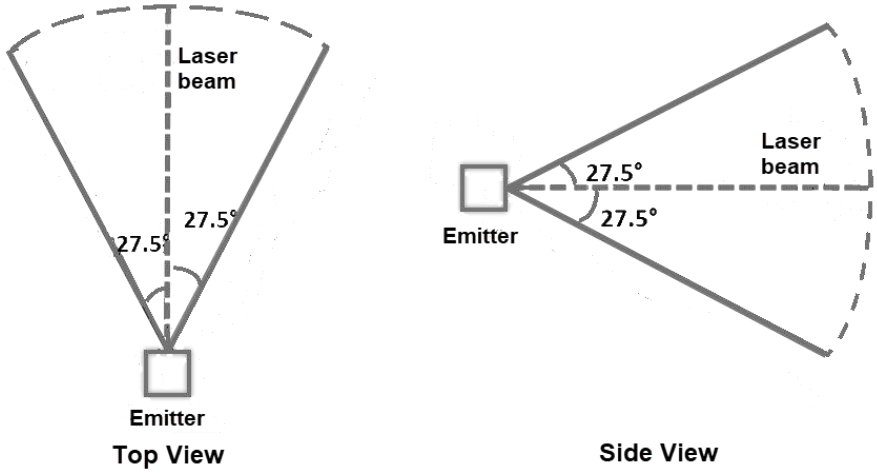


Figure 11: 3D Signal coverage - Top & Side View

- 3D Emitter coverage angle :
  - 27.5^0 to the left and to the right (55^0 totally)
  - 27.5^0 to the top and to the bottom (55^0 totally)
- 3D Emitter coverage distance:
  - 45 meters

3.2.5. Cable connections between LED Screen equipment & 3D system

Setup the connections as shown in the network diagram provided below & confirm that all the mentioned cables are connected properly.

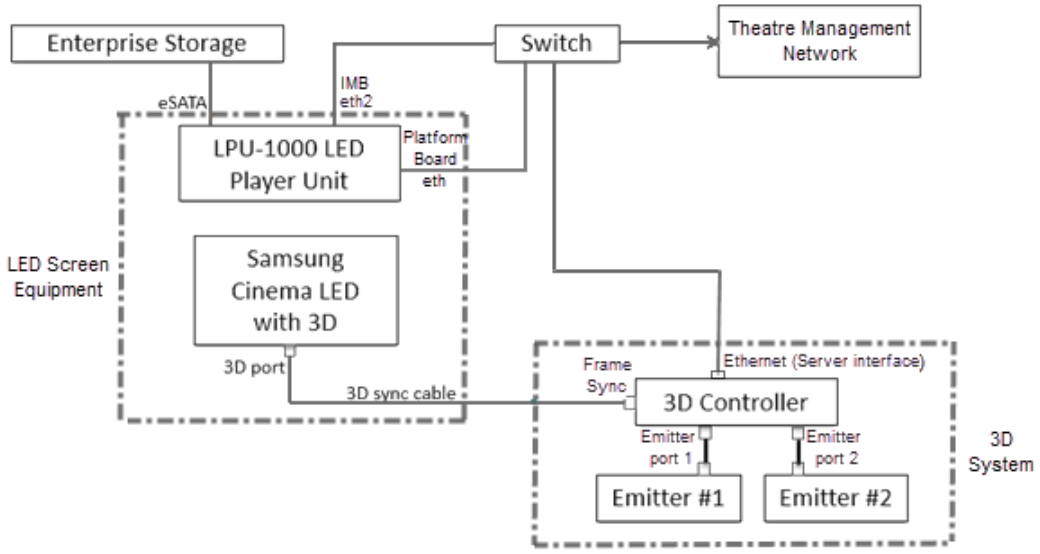


Figure 12: Cable connections between LED Screen equipment & 3D system

3.2.6. Description of 3D Controller

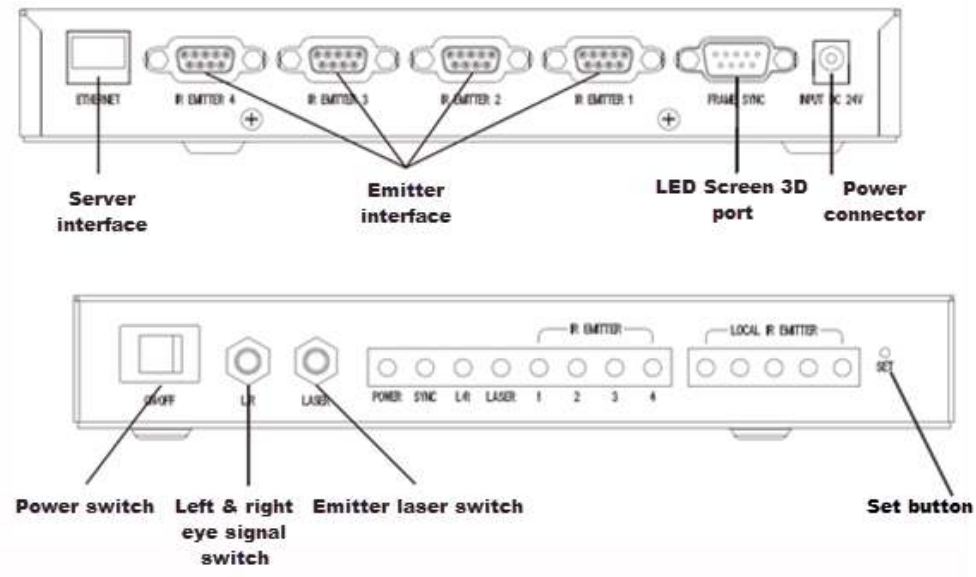


Figure 13: 3D Controller front & back panel

- Front panel of 3D Controller

1. **LED indicators**
    a. IR EMITTER: LED is lit when an Emitter is connected to the corresponding IR EMITTER port on the back panel
    b. LASER: LED is lit when the 'LASER' switch is pressed to indicate that the Laser beam is ON
    c. L/R: LED is lit when the L/R switch is pressed. This indicates that the L/R polarity is reversed
    d. SYNC: LED is lit when there is an incoming SYNC signal from the LED screen 3D port
    e. Power: LED is lit when the power to the 3D controller is turned ON
2. **LOCAL IR EMITTER**: Emits an infrared signal (not used for regular operation)
3. **LASER**: Pressing this switch emits a laser beam from the Emitters to aid in alignment
4. **L/R**: Pressing this switch reverses the L/R polarity of the SYNC signal from the Emitters
5. **ON/OFF**: Power switch for the 3D controller
6. **SET**: This button can be used to reset the 3D Controller IP's to default values. Refer to **Section 4.4.3** for details regarding use of Set button.

- Back panel of 3D Controller

1. **ETHERNET (Server Interface)**: Network port to connect to the LPU-1000 network
2. **IR EMITTER (1-4) (Emitter interface)**: DB9 connectors to connect to the Emitters via the supplied DB9P-DB9P signal cables
3. **FRAME SYNC (LED Screen 3D port)**: DB9 connector to connect to the LED Screen 3D port via the supplied DB9P-DB9P signal cable
4. **INPUT DC 24V (Power connector)**: Connect the supplied external 24V/5A/120W power adapter to this connector

4. Configuration & Settings

4.1. LED Screen 3D Mode and Configuration

Please confirm the following capabilities of the LED screen, which are necessary for 3D playback:

- 3D mode is supported
- 3D mode is ON
- 3D configuration is correct
- 3D configuration is loaded by default

4.2. LED Screen software versions

Please ensure that the LED screen supports the minimum software versions listed in the table below:

TCON FPGA	01151-34812
Platform FPGA	v01711-00000
N.AP/S.AP Software Application	1.4.0 (20190117)
TCON Hardware	CODE: BN41-02633A OR CODE: BN41-02633B
Platform Board H/W	DATE: 2017.11.02
3D Interface Card on LED H/W	v1751
3D automation mode programmed on the LED **(TCON EEPROM Data should have 3D mode)**	-- NA --

4.3. LPU-1000 Software version & Configuration

The 3D System supports ***SecureLink*** between the 3D Controller & LPU-1000. The LPU-1000 must be upgraded to a minimum SMS version of **10.0-build84v3.**

An additional software configuration needs to be done before 3D playback is possible on the LED screen. Please contact your nearest GDC office to complete this configuration.

4.4. 3D Controller IP Configuration

In order for the 3D System to function, the 3D Controller must be able to communicate with the LPU-1000 over the network. For this, the 3D Controller Ethernet (Server interface) port and the ETH2 network port on the LPU-1000 must be connected to the same network

Since the 3D Controller needs to be on the same subnet as the LPU-1000, the IP configuration of the 3D Controller's network interface must be changed from its default (to match the Theatre Management network).

The following sub-sections describe the requirements & procedure to set the 3D Controller IP's:

4.4.1. Tools Required

- 3D Controller
- Laptop or PC (Refer to **Section 4.4.2** for software requirements)
- Needle-pin tool
- Network cable

4.4.2. Software Requirements

- Windows 7 (32/64-bit) OR Windows 7 SP1 (32/64-bit)
- Windows 10 (32/64-bit)
- Windows Internet Explorer (IE) web browser.

4.4.3. IP Setting Procedure

First of all, the 3D Controller IPs must be reset to the default values to ensure it can communicate with the Windows PC/Laptop.

Step 1: Restore 3D Controller default settings

- Connect the 3D Controller to a recommended power supply, using the provided power adapter.

- When the 3D Controller is powered OFF, press and hold the **Set** button on the front panel of the Controller using a needle-pin tool (not provided). Then, turn ON the power switch of the 3D Controller and wait for at least 5 seconds before releasing the **Set** button.

- After waiting about 1~2 seconds, press and hold the **Set** button on the front panel of the 3D Controller again. After waiting for at least 5 seconds and releasing it, the 3D Controller's default settings are restored.

- This process will reset the 3D Controller's IP settings to the default values mentioned below:

    - IP: **192.168.0.229**
    - Subnet Mask: **255.255.255.0**
    - Gateway: **192.168.0.1**

Step 2: 3D Controller IP Setting procedure

- To begin with the procedure, the 3D Controller expects an incoming connection from a Windows PC/Laptop with the IP Address: 192.168.0.248.

- Open the Network Adapter settings for the Windows PC/Laptop (as shown in Error! Reference source not found.) & change the IPv4 properties to the values mentioned below:

    - IP: **192.168.0.248**
    - Subnet Mask: **255.255.255.0**
    - Gateway: **192.168.0.1**

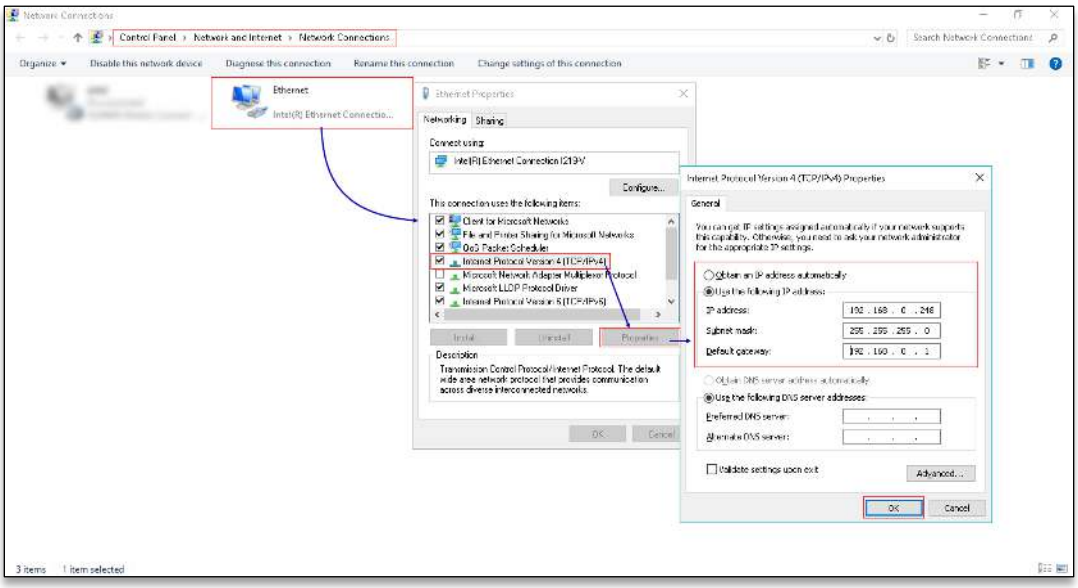


Figure 14:Changing Network Adapter Settings

- Connect the 3D Controller & the Windows PC/Laptop using a network cable.

- When the 3D Controller is powered OFF, press and hold the **Set** button on the front panel of the Controller using a needle-pin tool (not supplied). Then, turn ON the power switch of the 3D Controller and wait for at least 5 seconds before release the button.

- On the Windows PC/Laptop, open Internet Explorer web browser & type-in the URL http://192.168.0.229/. Press Enter.

- Once the connection is successfully established between the Windows PC/Laptop & 3D Controller, the webpage shown in Error! Reference source not found. will be displayed.

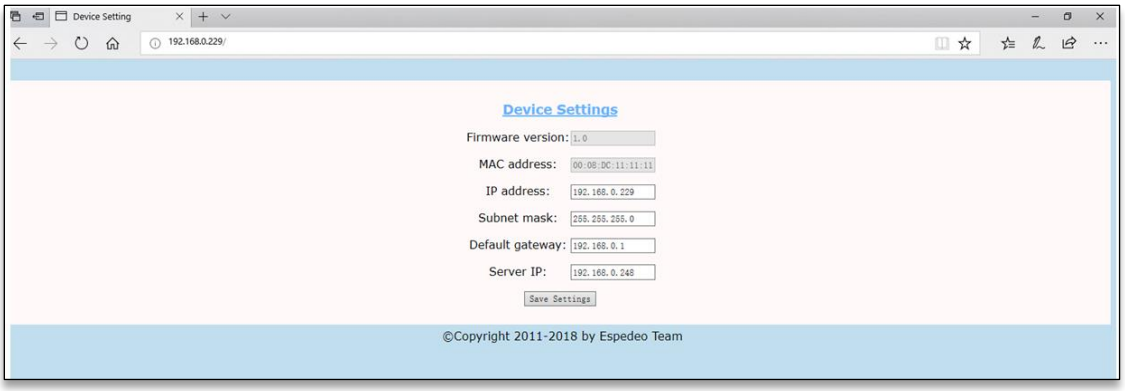


Figure 15: 3D Controller Device Setting Webpage

- You may edit the default values for the *IP address, Subnet mask, Default gateway & Server IP* parameters to the actual required values, to match the Theater Management network.

  For example, as shown Error! Reference source not found. in the *IP Address* of the 3D Controller has been modified to 192.168.0.228.

- Click on the **Save Settings** button to save the changes.

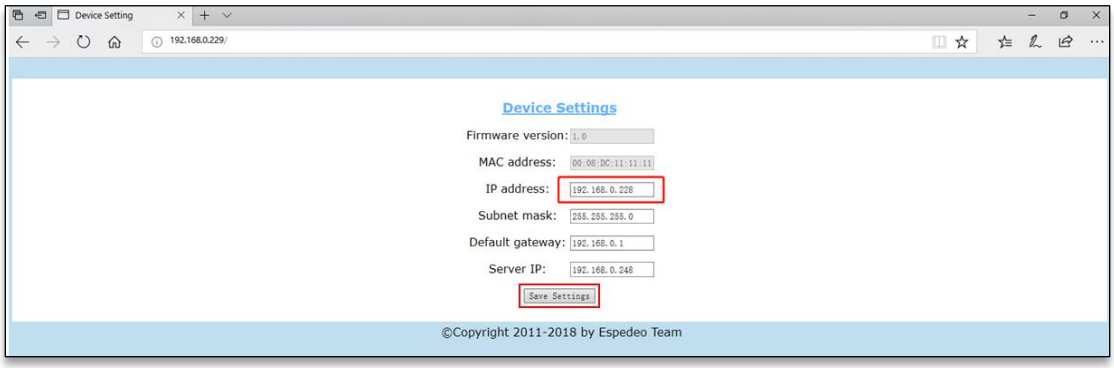


Figure 16: Changing Device Settings

- Changes to the Device Settings will be saved & a pop-up message (as shown in **Figure 17**Error! Reference source not found.**)** will be displayed. Once done, reboot the 3D Controller.

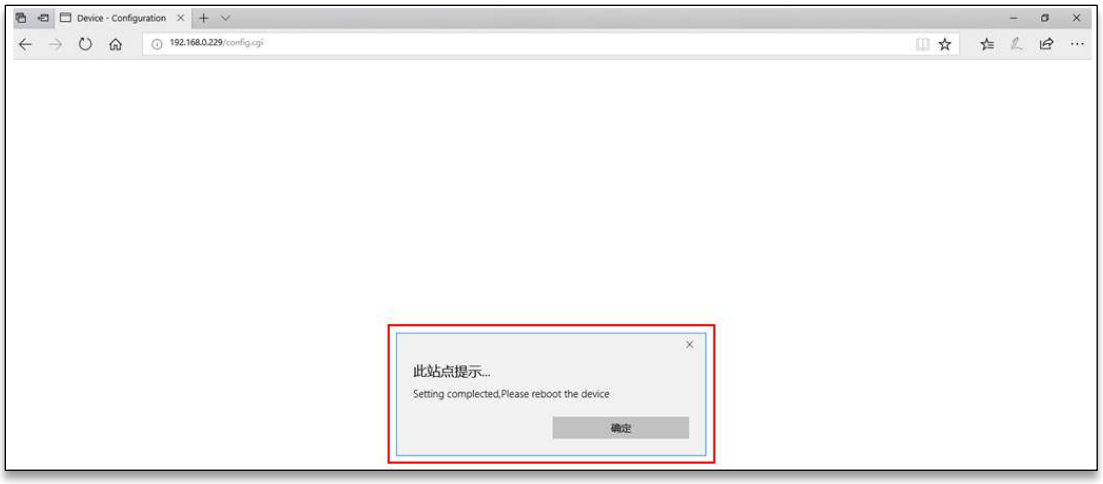


Figure 17: Settings Saved Successfully

Step 3: Verify whether IP Settings have been changed

- Connect the 3D Controller & the Windows PC/Laptop using a network cable.
- On the Windows PC/Laptop, open the Internet Explorer web browser & type-in the URL with the new IP address of the 3D Controllder i:e http://192.168.0.228/. Press Enter.
- If the Device Settings webpage shows the updated IP Address of the 3D Controller (as seen in **Figure 18**Error! Reference source not found.), it indicates that the IP Settings have changed successfully.

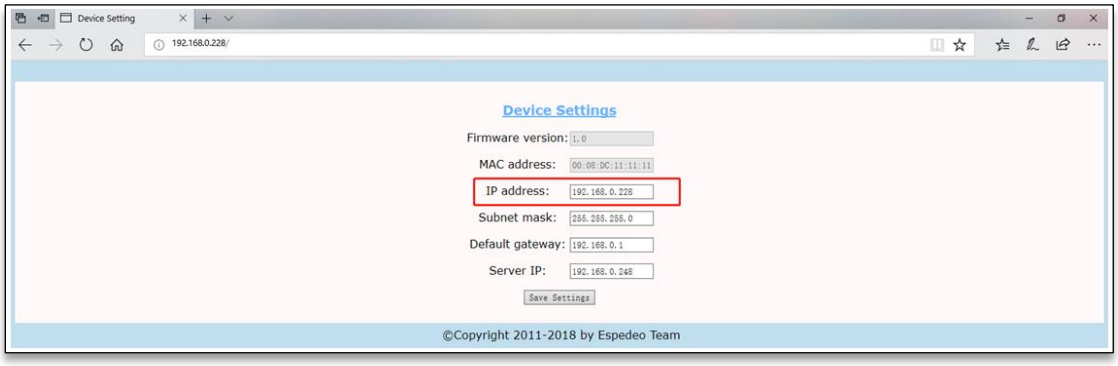


Figure 18: Verify whether IP Address has changed successfully

- If the changes to IP Settings are unsuccessful, repeat **Step 1** & **Step 2**.

4.4.4. Precautions to follow while performing IP Setting Procedure

- Ensure that only Windows Internet Explorer is used for the IP Setting procedure. Using other web-browsers may cause issues.

- Ensure that network cable between the Windows PC/Laptop & 3D Controller is connected properly, if the LED indicators are ON at the ports (Green LED always on, Yellow LED blinks when data is available) and Network Adapter settings on the Windows PC/Laptop are done correctly.

- Strictly follow the order of instructions specified under **Steps 1 to 3** for setting & testing of the 3D Controller Device Settings.

4.5. Samsung Cinema LED Screen Touch Panel UI Settings

The availability of 3D configuration settings such as **3D SYNC WIDTH CONTROL** & **3D DELAY SYNC** indicate that the LED Screen supports 3D function. These parameters can be adjusted from the Samsung Cinema LED Screen Touch Panel UI, in order to achieve proper 3D effect.

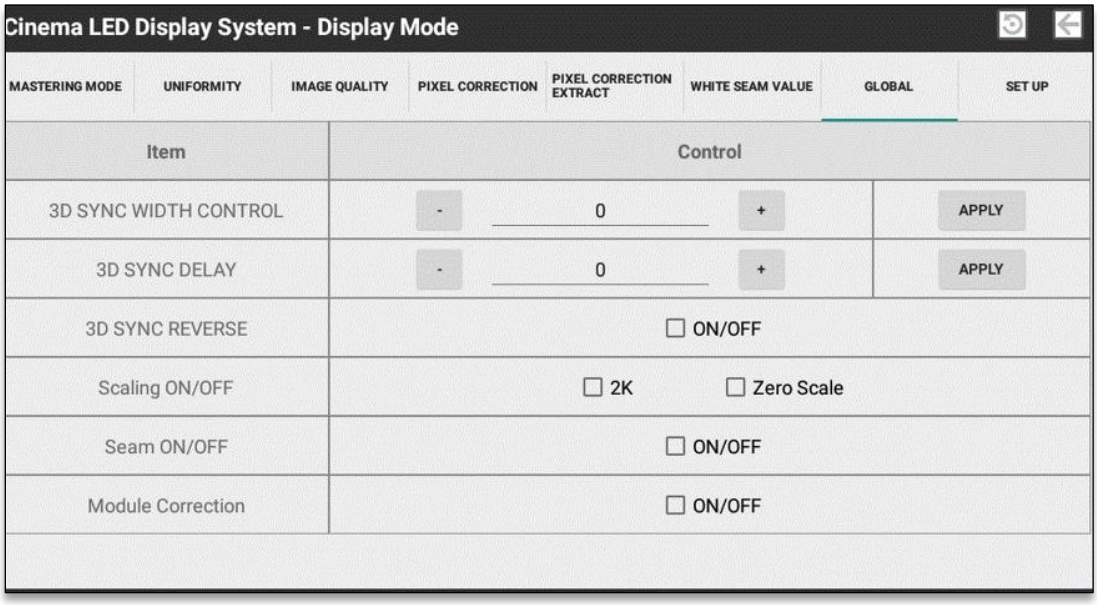


Figure 19: 3D Settings on LED Screen Touch Panel UI

4.5.1. Touch Panel UI Setup

- Confirm whether 2D and 3D display modes are available on the LED Screen Touch Panel Main UI.
- Set up the Platform board and IMB IP addresses on the Touch Panel UI and confirm the IMB status is *PASS* on the Touch Panel UI Diagnostic page
- Confirm N.AP Version **1.4.0 (20190117)** or higher & make sure "**3D Mode**" is enabled on the Touch Panel Display Mode UI.
- Set up the 3D Options on the Touch Panel Display Mode UI. Current known values are as follows:
    - 3D WIDTH CONTROL : **121**
    - 3D SYNC DELAY : **88**
    - 3D SYNC REVERSE : **ON**
- Set up the LED Screen automation on the IMB and create cues to remote control display modes (Please refer to the LPU-1000 manual for details).

5. Prepping the 3D Active Glasses (Model No. GL-110P)

Before using 3D Active glasses, make sure that the insulation spacer is removed from the button battery (as shown in **Figure 20**). Refer to **Section 9** for information regarding maintenance of 3D Active Glasses.

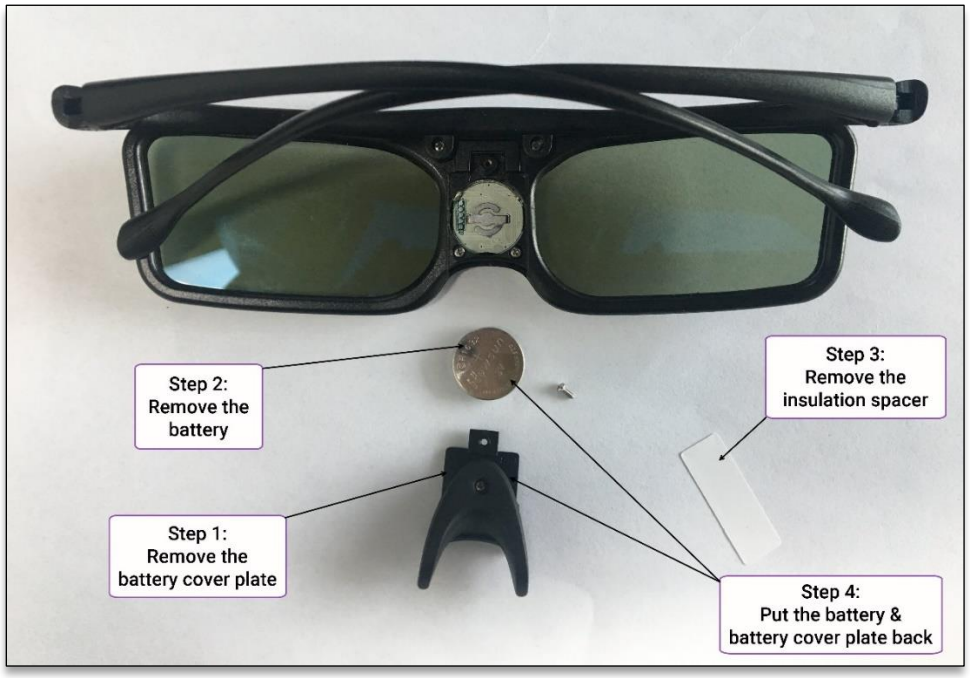


Figure 20: 3D Active Glasses (Model No. GL-110P)

6. Power-Up Sequence

The System power-up sequence should be in the order mentioned below.

Please make sure that all the above installation, setup & configuration requirements are done properly before powering ON the system for testing.

1. Power on the Enterprise Storage
2. Power on the Samsung Cinema Screen LED
3. Power on the LPU-1000
4. Power on the 3D Controller

7. Testing

7.1. 3D Effect Testing

To proceed with the testing procedure; assemble a playlist 3D DCP (with 24fps Flat/Scope 3D JPEG content) on the LPU-1000.

Make sure the LED Screen is in 3D mode. This can be done automatically via LPU-1000 automation (please refer to LPU-1000 manual) or from the LED Screen Touch Panel UI.

Once playback is initiated on the LPU-1000, check the 3D sync signal coverage throughout the auditorium by observing the 3D effect from different seating positions in the auditorium wearing 3D Active Glasses especially positions on the periphery of the seating area.

7.2. Testing 3D Active Glasses using Test Box

The Test Box provided along with the 3D System package can be used to check whether the 3D Active Glasses are functioning properly. The Test Box is equipped with two No. 5 AA batteries. The below mentioned steps need to be followed in order to proceed with this testing:

1. Set the power switch on the Test Box to ON position. The red light and Green lights should be on at the same time. Both lights work at intervals of two seconds.
2. The pair of 3D Active Glasses which need to be tested, should be placed within **50 cm**. (approximately **19 inches**) in front of the Test Box.
3. Observe the lights of the Test Box from of the lenses of the 3D Glass.
    a. From the left eye lens, only the Green light should be visible to the wearer.
    b. From the right eye lens, only the Red light should be visible to the wearer.
4. Observe the interval twice. If the results are positive in both cases, then the test is successfully. This means the chosen pair of 3D Active Glasses is functioning as expected. However, if the results are inconsistent, then the test is unsuccessful. This means the chosen pair of 3D Active Glasses is not functioning correctly.
5. Once the testing is complete, set the power switch on the Test Box to OFF position.

    Please Note: If the Test Box is not going to be used for a long period of time, then the batteries should be removed in order to avoid battery leakage.

8. Troubleshooting

- Issue observed: No 3D Effect

  Case1

  The Power indicator on the 3D Controller is not ON. → Check if the power cable of the 3D Controller is connected and the power switch is turned ON.

  Case 2

  The Sync indicator on the 3D Controller is flashing or not ON →This indicates that there is no 3D Signal from the LED Screen. Check if the playlist contains 3D content and LED Screen is switched to the proper 3D display mode.

- Issue observed: 3D Active Glasses not working

The Test Box can be used to test if a pair of 3D Active Glasses is functioning as expected. Please refer to **Section 7.2** for details regarding how to use the Test Box.

Case1

Both Red & Green light can be seen from right as well as left eye lenses →This could indicate that the 3D Active Glasses battery is either flat or faulty and it needs to be replaced.

Case 2

Both lenses flash every 0.5 seconds at the same time →This indicates that the battery power is low & it needs to be replaced.

Case 3

Only Green light can be seen from the left eye lens, however both Red & Green light can be seen from the right eye lens or vice-versa →This indicates a hardware fault in the liquid crystal lens or internal connections or driving electronics.

9. Maintenance of 3D Active Glasses (Model No. GL-110P)

9.1. Accessories required for cleaning & sanitizing 3D Active Glasses

1. **Microfiber** or **lens cloth**, which should be soft so as to avoid damage to lenses.
2. **75% rubbing alcohol** and **degreasing cotton pads**.
3. **Cleaning solution**, which can be prepared by adding 5% detergent to two parts absolute alcohol and one part ether. This volatile mixture can remove oils quickly.
4. A **specialized 3D-glasses cleaning solution** used for wiping frames and lens (evaporates easily without leaving water stains).
5. Individually packed **3D-glasses sanitizing wipes**, which can be distributed to users for self-cleaning when necessary.

9.2. Tips for cleaning & sanitizing 3D Active Glasses

- Common sanitizing agents that can be used are alcohol, a cleaning solution and 3D-glasses sanitizing wipes
- **Cleaning the frame** → Use a damp cloth or an alcohol pad to remove fingerprints, stains and dust before wiping the frame clean with a dry cloth. After cleaning, the frame should be spotless and odorless, with no stains visible to the naked eye.
- **Cleaning the lenses** → Moisten a microfiber cloth with the specialized 3D-glasses cleaning solution and gently wipe lenses with the cloth in a circular motion. Use this cleaning solution sparingly. After wiping, moisture on the lenses will evaporate within seconds. Check the lenses under light to ensure they are free from fingerprints, moisture and oils. Also check the rim for residue.
- After daily use of 3D Active Glasses, use degreasing cotton pads moistened with 75% rubbing alcohol to clean the surface. Store in sealed containers to keep clean and to avoid secondary pollution.
- It is recommended that the 3D Active Glasses are not washed using any liquid or solution, other than the ones mentioned above.
- The reusable 3D Active Glasses may result in cross-contamination and eye infections. To ensure the safety of users as well as to adhere to health regulations, glasses should be cleaned and sanitized on a daily basis.

9.3. Precautionary measures to be taken while using 3D Active Glasses

- Before replacing batteries, press on the sharper tip of the nose pads and slide them away from the frame to remove. Do not use excessive force to remove the nose pads. Align properly and press hard to return the nose pads to original positions.
- Due to the lightweight design of the glasses the areas highlighted in **Figure 21** are fragile. Do not exert excessive force during use or during battery replacement.

Figure 21: Fragile areas on 3D Active Glasses

- It is the responsibility of the movie theater staff to remind users not to bend or break the temples of the 3D Active Glasses, in order to prevent them from getting damaged.
- Before distributing 3D Active Glasses, movie theater staff must perform function checks with a Test Box. If both lenses flicker every 0.5 seconds at the same time, the 3D Active Glasses battery is low and should be replaced immediately. Refer to **Section 7.2** for details regarding how to use the Test Box.
- The 3D Active Glasses lenses are made up of an acrylic material, which stains and breaks easily like glass. Take extra care during maintenance/repair, cleaning, transport and storage. Excessive pressure exerted during transport is prohibited. Do not stack glasses during transport or storage to avoid scratching the lenses.
- Users should be properly guided on how to wear the glasses. Hold both temples, pull them outwards gently and put on the glasses. Do not touch the lenses, as it may affect the viewing experience. Excessive force applied to the front portion of the temples can damage the power unit.
- The 3D Active Glasses should be stored in a dry and dark place, away from direct sunlight.