



# B4000ES

## Sphere LED Controller

### Specification V4.0



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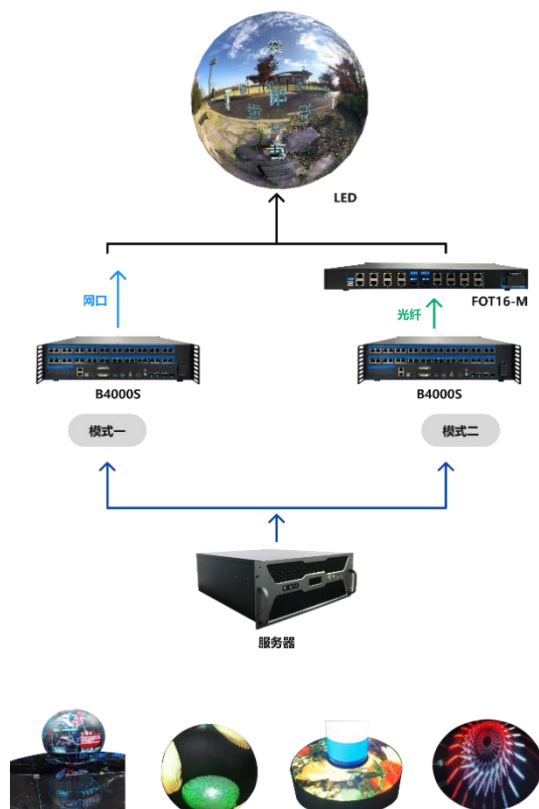
## 1 Update Records

| Document Version | Hardware Version | Release Time        | Update Record |
|------------------|------------------|---------------------|---------------|
| V4.0             | M40 (V1.0.0)     | August 4 (th), 2025 | First Release |

## 2 Product Introduction

The B4000ES Customized Controller is a dedicated, custom-designed 40-port Gigabit Ethernet output controller. It features versatile video signal reception capabilities, ultra-high-definition full 4K×2K@60Hz image processing and transmission capabilities, and can transmit processed video to LED displays via Ethernet ports. It delivers powerful processing capabilities, ultra-stable performance, and exceptional value for money.

The B4000ES is widely applicable in non-rectangular LED displays such as sphere LED screens and circular ring displays.



## 3 Product Features

### 3.1 Input/Output Interface

- Multiple input interfaces
  - 1×HDMI2.0
  - 1×DP1.2 (Choose 1 of the 2 options )
- Output Interface
  - 40 Gigabit Ethernet ports, supporting vertical and horizontal tiling in any configuration
  - 4-channel fiber optic bidirectional full-duplex transmission
- Control Interface
  - 1×USB interface for communication, enabling multiple sending cards to be controlled from a single PC
  - 1×LAN, 100Mbps Ethernet port for connecting to a host computer for debugging
  - 1×RS232 serial port for connecting to central control equipment
- Extended Control Interface (Optional)
  - 1×Genlock control interface, one input channel, one loop-out channel

### 3.2 Diverse Practical Functions

- Supports Ethernet loopback backup and dual-master backup
- Supports multiple preset resolutions and custom resolution settings
- Compatible with multiple input frame rates including 30Hz, 50Hz, 60Hz, and 120Hz
- Supports host software monitoring of sending card operating parameters and status
- Supports configuration parameter readback
- Supports Gigabit Ethernet error rate detection
- Supports 3D display, active 3D display

## 4 Product Appearance

Front Panel



\*Product images are for reference only. The actual product shall prevail upon purchase.

### 4.1 Data Interface Illustration

| # | Name                    | Illustration                                                                                                                                                                                                                                                                                                                                                                                                                    |                                  |
|---|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| 1 | Switch                  | Main Control Power Switch                                                                                                                                                                                                                                                                                                                                                                                                       |                                  |
| 2 | LCD                     | Used to display the device's current status and configure menu item parameters. LCD Resolution: 320×240                                                                                                                                                                                                                                                                                                                         |                                  |
| 3 | Rotate Button           | <p>1. On the main interface, press the knob to enter the menu operation interface;</p> <p>2. In the menu operation interface, rotate the knob to select menus; press the knob to select the current menu or enter submenus;</p> <p>3. After selecting a menu with parameters, rotate the knob to adjust values.</p> <p>Note: Press the knob again to confirm changes after adjustment;</p> <p>4. Long press to unlock menus</p> |                                  |
| 4 | Input Source Switch Key | DVI1 (Function disabled)                                                                                                                                                                                                                                                                                                                                                                                                        | DVI1 Input Port / Digital Key 1  |
|   |                         | DVI2 (Function disabled)                                                                                                                                                                                                                                                                                                                                                                                                        | DVI2 Input Port / Digital Key 2  |
|   |                         | HDMI1 (Function disabled)                                                                                                                                                                                                                                                                                                                                                                                                       | HDMI1 Input Port / Digital Key 3 |
|   |                         | HDMI2 (Function disabled)                                                                                                                                                                                                                                                                                                                                                                                                       | HDMI2 Input Port / Digital Key 6 |
|   |                         | HDMI3                                                                                                                                                                                                                                                                                                                                                                                                                           | HDMI3 Input Port / Digital Key 7 |
|   |                         | DisplayPort                                                                                                                                                                                                                                                                                                                                                                                                                     | DP Input Port / Digital Key 8    |

|   |                 |                                                   |                                         |
|---|-----------------|---------------------------------------------------|-----------------------------------------|
| 5 | Function Button | WIN (Function disabled)                           | Layer Selection / Num Key 4             |
|   |                 | PART (Function disabled)                          | Partial Fullscreen Shortcut / Num Key 5 |
|   |                 | TEMPLATE (Function disabled)                      | Multi-screen Template Shortcut Key      |
|   |                 | HDMI4 (Built-in HDMI port)<br>(Function disabled) | HDMI4 Input Port / Number Key 9         |
|   |                 | FREEZE (Function disabled)                        | Freeze Function Shortcut Key            |
|   |                 | MODE (Function disabled)                          | Load Scene Shortcut Key                 |

### Rear Panel



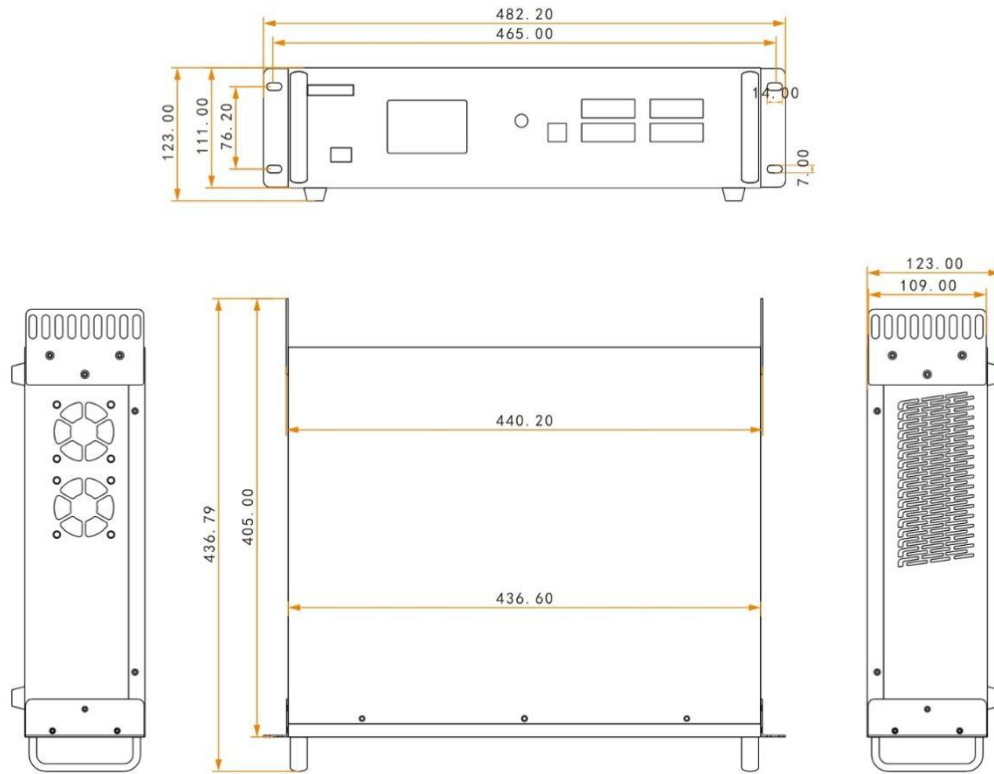
\*Product images are for reference only. The actual product shall prevail upon purchase.

| Rear Panel                                                            |     |                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Interface                                                       |     |                                                                                                                                                                                                                                                                                                                  |
| Interface                                                             | QTY | Illustration                                                                                                                                                                                                                                                                                                     |
| HDMI2.0<br>(HDMI3)                                                    | 1   | Dual-signal input (select one of two) functionality; only one signal can be input at a time.<br>Supports video input up to 3840×2160@60Hz resolution.<br>Supports custom resolutions.<br>Supports audio input and 10-bit audio.<br>Maximum width: 7680 (7680×1080@60Hz)<br>Maximum height: 7680 (1080×7680@60Hz) |
| HDMI 2.0<br>(Built-in HDMI port)<br>(HDMI 4) (Function not available) | 1   |                                                                                                                                                                                                                                                                                                                  |
| HDMI 1.3<br>(HDMI1, HDMI2)<br>(Function not available)                | 2   | Supports video source input up to 2304×1152@60Hz resolution.<br>Supports custom resolutions.<br>Does not support audio input.<br>Maximum width: 3840 (3840×640@60Hz)<br>Maximum height: 3840 (640×3840@60Hz)<br>Does not support interlaced signal input.                                                        |
| DVI<br>(DVI1, DVI2)<br>(Function disabled)                            | 2   | Supports video source input up to 1920×1200@60Hz resolution.<br>Supports custom resolutions.<br>Maximum width: 3840 (3840×640@60Hz)<br>Maximum height: 3840 (640×3840@60Hz)<br>Does not support interlaced signal input.                                                                                         |
| DP1.2                                                                 | 1   | Supports video source input up to 4096×2160@60Hz resolution.<br>Supports custom resolutions.<br>Supports audio input, supports 10-bit audio.<br>Maximum width: 7680 (7680×1080@60Hz)<br>Maximum height: 7680 (1080×7680@60Hz)                                                                                    |

| Output Interface      |                 |                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name                  | QTY             | Illustration                                                                                                                                                                                                                                                                                                                                                                                     |
| Gigabit Ethernet port | 40              | <ul style="list-style-type: none"> <li>Maximum load capacity: 8.84 million pixels, with a maximum width of 7680 pixels and a maximum height of 7680 pixels (special mode supports up to 16 million pixels for dual 4K graphics card stitching)</li> </ul>                                                                                                                                        |
| Optical Fiber         | 4               | <ul style="list-style-type: none"> <li>OPT1 corresponds to Ethernet ports 1-8; single fiber port bandwidth: 10Gbit/s</li> <li>OPT2 corresponds to ports 9-16; each fiber port supports 10Gbit/s bandwidth</li> <li>OPT3 corresponds to ports 17-24; each fiber port supports 10Gbit/s bandwidth</li> <li>OPT4 corresponds to ports 25-32; each fiber port supports 10Gbit/s bandwidth</li> </ul> |
| Audio Interface       |                 |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Name                  | QTY             | Illustration                                                                                                                                                                                                                                                                                                                                                                                     |
| AUDIO IN              | 1               | <ul style="list-style-type: none"> <li>External Audio Input Source</li> </ul>                                                                                                                                                                                                                                                                                                                    |
| AUDIO OUT             | 1               | <ul style="list-style-type: none"> <li>Audio Output: Can be configured to output audio from any windowed audio source or an external audio input source.</li> </ul>                                                                                                                                                                                                                              |
| Control Interface     |                 |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Name                  | QTY             | Illustration                                                                                                                                                                                                                                                                                                                                                                                     |
| LAN                   | 1               | 100Mbps Ethernet interface for connecting to host computer for debugging                                                                                                                                                                                                                                                                                                                         |
| USB (B-type)          | 1               | Connects to PC software for communication                                                                                                                                                                                                                                                                                                                                                        |
| RS232                 | 1               | 1×RS232 interface for connecting to central control equipment                                                                                                                                                                                                                                                                                                                                    |
| Extended Interface    |                 |                                                                                                                                                                                                                                                                                                                                                                                                  |
| #                     | QTY             | Illustration                                                                                                                                                                                                                                                                                                                                                                                     |
| 3D                    | 1               | Connect the 3D transmitter                                                                                                                                                                                                                                                                                                                                                                       |
| Genlock               | 1               | Genlock control interface, one input channel, one loop-through output channel                                                                                                                                                                                                                                                                                                                    |
| AC power interface    |                 |                                                                                                                                                                                                                                                                                                                                                                                                  |
| #                     | Name            | Illustration                                                                                                                                                                                                                                                                                                                                                                                     |
| 5                     | Power Interface | AC-100-240V-50/60HZ AC power interface                                                                                                                                                                                                                                                                                                                                                           |



## 4.2 Dimensions



Tolerance:  $\pm 0.3$  Unit: mm

## 5 Product Specification

### 5.1 Basic Parameters

|                                                                                                                       |               |                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Loading Capacity                                                                                                      | Single        | Maximum load capacity: 655,360 pixels                                                                                                                                     |
|                                                                                                                       | Ethernet Port | Network port load capacity (width × height): 1280 × 512                                                                                                                   |
|                                                                                                                       | Whole unit    | Maximum load capacity: 8.84 million pixels, with a maximum width and height of up to 7680 pixels.<br>(Special mode supports up to 16 million pixels for dual 4K graphics) |
| Loading Range                                                                                                         | Width         | 640—7680 pixels                                                                                                                                                           |
|                                                                                                                       | Height        | 480—4096 pixels                                                                                                                                                           |
| Sphere Loading Limit                                                                                                  | Width         | 8192                                                                                                                                                                      |
|                                                                                                                       | Height        | 4096                                                                                                                                                                      |
| Offset Range                                                                                                          | Width         | 0–8191 pixels                                                                                                                                                             |
|                                                                                                                       | Height        | 0–4095 pixels                                                                                                                                                             |
| Note: When enabled the F5, height input is limited to 4096; when disabled, it is limited to 8192. Enabled by default. |               |                                                                                                                                                                           |

### 5.2 Specification

|                       |                        |                                 |
|-----------------------|------------------------|---------------------------------|
| Electrical parameters | Rated voltage          | AC-100-240V-50/60HZ             |
|                       | Rated Power            | 70W                             |
| Working environment   | Working temperature    | -20°C~60°C                      |
|                       | Working humidity       | 5%RH~85%RH has no condensation. |
| Storage environment   | Temperature            | -20°C~70°C                      |
| Chassis size          | 482.2mmX436.79mmX123mm |                                 |
| Net weight            | 6.32 kg                |                                 |
| Outer packing size    | 565mm×445mm×185mm      |                                 |

|              |                                                                                                   |
|--------------|---------------------------------------------------------------------------------------------------|
| Gross weight | 8.24 Kg Description: Including wire, accessories                                                  |
| Packing mode | 1 PCS /box                                                                                        |
| Accessory    | 1 × power cord, 1 × USB cable, 1 × HDMI2.0 cable, 1*DP Cable, 1*DP to HDMI Cable, 1 × certificate |

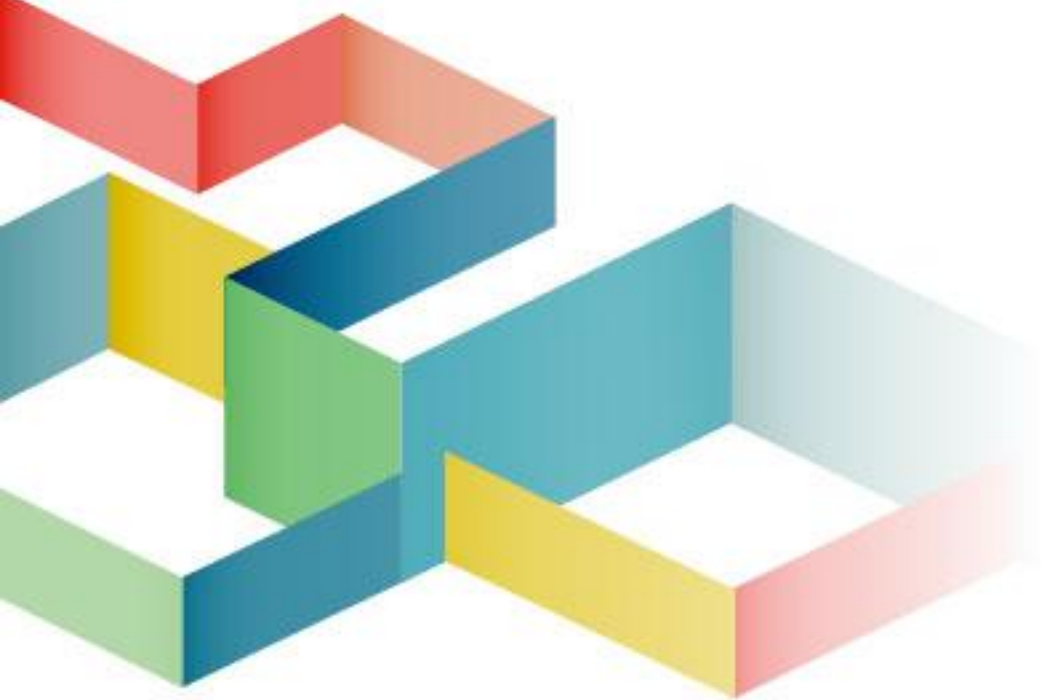
\*Current and power consumption may vary depending on factors such as product usage, environment, and settings.

### 5.3 Video Mode

| Mode                           | Illustration                                                                                                                                                                                                    |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Single 4K Input Normal Mode    | Supports HDMI3 input only, with overall 1-frame delay                                                                                                                                                           |
| Dual 4K Input Normal Mode      | Supports HDMI3 and DP inputs simultaneously only, with overall 1-frame delay (image splicing horizontally: HDMI3 on left, DP on right; single network port cannot support two input image areas simultaneously) |
| Synthetic Active 3D Mode       | Supports HDMI3 and DP simultaneously inputs for 3D@120Hz output synthesis only, with overall 1-frame delay                                                                                                      |
| Output Double Frequency Mode   | Supports HDMI3 input only, capable of doubling input source from 60Hz to 120Hz output, overall 1-frame delay                                                                                                    |
| Single 4K Input Low Delay Mode | Supports HDMI3 input only, capable of sub-frame delay                                                                                                                                                           |
| Dual 4K Input Low Delay Mode   | Supports HDMI3 and DP simultaneously inputs, capable of sub-frame delay (image split horizontally: HDMI3 on left, DP on right; single network port cannot support two input display areas simultaneously)       |

## 6 Precautions

- High voltage hazard: This product operates at AC 100V~240V.
- Do not allow liquids or metal fragments and other conductive materials to enter the device, to prevent safety accidents.
- Please use the device in a dry and clean environment.



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