Cirrus Systems, Inc.
INSTALLATION MANUAL
BLADE M LED DISPLAY SYSTEMS

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A. INTRODUCTION

1. Purpose

This manual explains how to mount and electrically connect a BLADE M LED Display System and is intended for licensed sign installers.

This manual covers the following models: Controller-U1, Blade-M

2. Safety Issues

HIGH VOLTAGE
Contact with high voltage from AC mains may cause death or serious injury. Always disconnect AC power to unit prior to servicing.

GROUNDING
It is essential to earth-ground the sign before connecting controller. Connecting signs that are not earth grounded may cause damage to the LED Display System and in severe cases cause death or injury.

OTHER
Other safety messages appear throughout this manual where appropriate.

3. Equipment Description

BLADE M LED Displays are modular signs consisting of these components:

• Aluminum Frame(s) measuring one foot by two feet. Each Frame mates with another via PEM screws to configure signs into any combination of one by two foot sections.

• Water-Proof LED Display Panels which lock into place on the aluminum frame. Each LED Panel has one input cable permanently affixed and a throughput connection to the input of the next daisy-chain connected Panel.

• Water-Proof Controller to manage single and dual-sided signs.

• Optional WiFi Connection
4. Safety Compliance

Cirrus LED components are UL Listed. File #E352796

5. Environmental Considerations

The LED Panels are fully encapsulated and water-proof. The Controller system is housed in a water- proofed aluminum enclosure.

The LED Panels are rated for an ambient operating temperature range of -40~+70° Celsius (-40 ~ +158° Fahrenheit) and are designed to withstand continuous direct sunlight. If the Panels experience an over- temperature condition, a signal will be sent to the controller to shut down the sign. Once the sign has cooled, it will automatically re-start.

The PC Controller is rated for an ambient operating temperature range of -10~+60°C (14~ +140°F) and should be protected from direct sunlight. Operation at colder temperatures is routinely and regularly accomplished, though starting the screen from a powered off state at temperatures below 14°F may not be possible. A controller which is in a powered on state produces ambient heat which can allow it to continuously run at temperatures as low as -30°F (-34°C).

All components and connections are sealed and water-tight for protection from the ingress of dust and water, though no components should be subjected to immersion in water.

6. Shipping/Receiving, Product Storage

All deliveries shall be FOB Cirrus Systems (Seller), Saco, ME. Methods and routes of shipment, unless Seller specifies in writing otherwise, shall be accepted as chosen by Seller at Seller's sole discretion. Purchaser shall pay all costs of shipment. Delivery to the carrier shall constitute delivery and passage of title to Purchaser, and risk of loss shall pass to Purchaser concurrently with passage of title. Seller will use reasonable diligence to meet scheduled shipment dates and times. Such dates and times are the best possible estimates, and not guarantees, of when goods will be shipped. In no event shall Seller be liable for any losses or damages of any kind due to delays in shipment, nor may Purchaser cancel its contract because of any such delay.

It is the responsibility of the Purchaser to check the product for visible damage prior to accepting delivery from the carrier. Any damage to the Product must be noted on the delivery slip with the carrier and immediately reported to Cirrus. Photographic evidence of damages will be required. Cirrus may assist in seeking remedy with the carrier for damaged goods but does not retain title and therefore is not legally responsible for said damages.

Delivered product should be stored in a cool dry place, out of the way of foot/motorized traffic.

It is the installer's responsibility to look over the product before installing to ensure there are no missing parts and there is no visible damage to any parts of the display. If there is any damage, Cirrus must be informed prior to install.
7. Warranty

Activation

The 5 year product warranty will go into effect upon the date of shipment and transfer of title. Warranty may not be exercised until the display has been installed, powered, connected to the internet and Cirrus has been called to verify the installation. Displays which are stored for extended periods of time and not installed within 90 days of shipment may not qualify for warranty coverage at the discretion of Cirrus Systems Inc.

Part Swap

The Blade M System comes complete with a five year limited part swap warranty on all components manufactured by Cirrus Systems, Inc. Replacement parts will be dispatched in the event of product failure and, upon replacement, defective parts will be shipped back to Cirrus for repair. Terms and conditions apply. Inquire for full warranty details.

Cirrus provides service and support for the lifespan of all Blade M products. Cirrus provides unlimited free software upgrades as they become available for all Blade M System displays.

In the event of a reported display outage or parts failure, contact Cirrus Technical Support immediately.

1. **DO NOT DISPATCH SERVICE PERSONNEL TO THE SIGN BEFORE CONTACTING CIRRUS.**

2. A Cirrus technician will perform remote diagnostics to determine the cause of the problem and will advise the installer as what steps to take. Cirrus may require an installer to go onsite to assist with additional troubleshooting.

3. If the technician determines it to be necessary, a replacement part will be shipped out.

4. Once the replacement part has been received and prior to swapping, contact Cirrus. A technician will provide further instruction on the procedure for swapping.

5. Cirrus will issue an RMA and a return shipping label for the return of the failed part. The failed part can be shipped back in the box the replacement arrived in.

6. Once the part is received at Cirrus, it will be inspected to determine the likely cause of the failure.

7. If it is determined the part failed due to misuse or abuse, or any other non-covered event, the customer agrees to pay for the replacement part and any freight charges associated with the non-covered parts replacement

In the event of defective diodes within the first 6 months, Cirrus will replace the panel under warranty once confirmed that the issue was caused by a warranty covered event. After 6 months of active use, Cirrus will replace the panel under warranty when at least 15% of the diodes are defective.
Returning Defective Parts
A functioning power cable needs to be intact upon return to Cirrus for warranty credit.

EnGenius Warranty
Cirrus will cover the first year of warranty of the EnGenius ENH 202 and its power supply. After the first year of use, client must work through the warranty with EnGenius directly.

FCC Information

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.

Changes or modifications to this device that are not expressly approved by Cirrus Systems, Inc. could void user’s authority to operate this device.
B. Installation

Cirrus is not responsible for installations or the structural integrity of support structures done by others. The customer is responsible for ensuring that a qualified structural engineer approves the structure and any additional hardware. The installer is responsible for ensuring that the mounting structure and hardware are capable of supporting the display, and the structure follows all local codes. Cirrus is unable to provide consultation or advice on structural design.

1. Basic Handling Instructions

1. Do not open Panels or Controllers unless instructed to do so by Cirrus as you risk voiding the warranty.

2. Do not carry Panels or Controllers by the electrical plugs or cables. This will cause stress on the internal wiring and could cause issues with performance including destroying hardware.

3. Do not drop or throw Panels, Frames or Controllers.

4. Do not drag Panels or Controllers across the ground.

5. If instructed to open Panels or Controllers, make sure they are on a clean, soft surface away from the elements (rain, snow, wind).

6. Avoid touching the internal motherboard and control cards.

7. Use caution when working with the internal power supply and do not make contact with power supplies or wiring while they are powered on.

8. When transporting product to installation site, be sure that product is properly secured to avoid damage.

9. Do not alter the enclosure of the Controller or Panels (painting, removing Controller/Panel tabs...
2. Aluminum Frame Installation

- Each side of the BLADE/SOLO LED Display Aluminum Frame has two screws and two PEM nut inserts for accepting the screws (hex head bolts) of its neighboring Frame. The top and face sides are marked on each frame to simplify integration *(see Figure 1).*

- Screw two Frames together via the hex head bolts (screws) and mating PEM nuts found on each frame. The end result being that each side of each frame has four screw connections for sturdy and reliable mounting *(see Figure 2).*

- Simply repeat this process to attain any combination of one by two foot (304.8 by 609.6mm) sections desired *(see Figure 3).*

- Secure the completed Frame assembly to mounting brackets. Brackets should be placed horizontally from left to right *(as depicted on Figure 4).* Four mounting holes are located on the back side of each Frame.

- One row of support mounting brackets must be attached for every four rows of Frames. Do not exceed four rows of Frames without attaching an additional mounting bracket.

- Do not apply lateral stress on the Frame system as gaps will form between the Panels.
3. Controller (Mechanical Installation)

One Controller is capable of supporting a single-sided or dual-sided sign.

The Controller needs to be placed within reach of the input cable affixed to the first LED Panel(s) it will be connected to. Do not mount within the client’s building. It can be mounted behind the Panels or outside the Frame system.

This first Panel connection should be in one of the four corners, though the exact connection is unimportant as LED Panel configuration is defined after mechanical integration.

The Controller has four mounting tabs for mounting.

The Controller contains power supplies, processors and memory devices which are sensitive to heat. The Controller should remain protected from direct sunlight to avoid heat related issues and extend the life of the Controller. It is the installer’s responsibility to install adequate ventilation to keep the space from exceeding the temperature rating of the controller, 60 °C (140°F).

The RJ45 connection is provided to connect the sign via direct Ethernet to a router or other network connection, enabling communication with the sign from any other network connected device.

Alternatively, the Controller has two black WiFi antennas to connect wirelessly with the provided EnGenius access point (see page 14).

If using the EnGenius, gently screw the wifi antennas (and extender cables if needed) into their corresponding ports on the controller. Do not force them into place as it can break the water-tight seal on the port.

Should the Controller be mounted within a thick structure (brick, .08 inch aluminum...) or between the Panels, it is advised to use the included extender cable for the Wi-Fi antenna (only if the display will be connecting via the EnGenius).

Avoid sharply bending or kinking the power cord from the Controller as it puts stress on the internal wiring and will eventually destroy the product.

The Controller should be mounted with the ports to the left, as indicated with the “This Side Up” sticker on the front of the controller. Make sure all unused ports are covered to prevent water damage.
4. Controller (Electrical Installation)

The Controller and power modules are rated for operation from Single-Phase AC rated 90-264VAC. All AC Power is routed through the Controller and then distributed via the harnesses affixed to each LED Panel. Connections are clearly labeled on both the Controller and LED Panels via circular connector.

It is the installer’s responsibility to ensure that the installation complies with all national and local codes. All power wiring must have proper protection with fuse / circuit breakers. The table and calculation below will help you to calculate the proper amperage rating to select the proper circuit breaker:

<table>
<thead>
<tr>
<th>LED PANEL</th>
<th>BLADE M 9mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Full Color (RGB Spectrum)</td>
</tr>
<tr>
<td>Resolution (Pitch)</td>
<td>9mm</td>
</tr>
<tr>
<td>Watts Per Panel</td>
<td>105W</td>
</tr>
</tbody>
</table>

\[
\left( \frac{\text{# of LED Panels} \times \text{Watts per Panel} + 100}{\text{Controller Watts}} \right) \div \text{VAC} = \text{Maximum Amperage}
\]

For example, consider a double sided, 2 by 6 foot Blade M display. This display will have a total of 12 panels.

**If connecting to 120 VAC then:**

Multiply the number of panels by the panel wattage for Blade M, then add 100 watts for the controller:

12 x 105 = 1260 Watts
1260 + 100 = 1360 Watts

Next, divide that wattage by our AC voltage:

1360 ÷ 120 = 11.33 Maximum Amperage

The breaker should be rated to handle at least 11.33 Amps.

**If connecting to 240 VAC then:**

Multiply the number of panels by the panel wattage for Blade M, then add 100 watts for the controller:

12 x 105 = 1260 Watts
1260 + 100 = 1360 Watts

Next, divide that wattage by our AC voltage:

1360 ÷ 240 = 5.66 Maximum Amperage

The breaker should be rated to handle at least 5.66 Amps.

Remember, an electrician will recommend that your maximum amperage does not exceed 80% of the breaker’s capacity.
Displays may also be powered from 208VAC off of a three-phase system, however, it is up to the installer to ensure a properly balanced load.

All power wiring must be from circuit breaker-protected lines. DO NOT connect the sign to a GFI-protected circuit. The sign must be properly grounded according to the applicable national and local electrical codes (for example, NEC Article 250 and 600, and IEEE 1100-1999). Use minimum 80° C copper wire only.

**ELECTRICAL REQUIREMENTS**

1. Displays must be properly grounded (at the breaker or at the display).
2. Displays of sufficient size will require the addition of a power splitter. Enquire with your Cirrus representative for product details and pricing.
3. Breaker usage should not exceed 80% of total breaker rating.
4. Cirrus is unable to provide, consult or advise on the electrical setup on the display. All electrical work must be done by a licensed electrician.
5. **IMPORTANT** - Improper electrical setup, unstable or inconsistent power, “dirty power”, harmonic feedback, and other abnormal electrical conditions may damage or destroy display hardware and are not the responsibility of Cirrus, nor will part repair or replacement due to such damage be covered under the Cirrus warranty.
6. Displays must be wired on its own dedicated circuit.
7. Displays are never to be run off of generators as it may damage Controller and Panel components.
8. Additional electrical hardware may be required in order for the display to operate (line conditioner, step-down transformer, surge protector...)

### MODULES PER OUTPUT

<table>
<thead>
<tr>
<th>MODULES PER OUTPUT</th>
<th>REQUISITE VOLTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-8</td>
<td>120V</td>
</tr>
<tr>
<td>9-16</td>
<td>240V</td>
</tr>
<tr>
<td>17+</td>
<td>240V w/Power Splitter(s)</td>
</tr>
</tbody>
</table>
ELECTRICAL WIRING
The power cord to the Controller will have one of two configurations of wire colors, noted below.

- Green = ground
- Black = hot
- White = neutral

Yellow/green = ground
- Brown = hot
- Blue = neutral

LIGHTNING STRIKE PROTECTION
A sign bonded to an earth ground has a means of dissipating the high voltage and current from a lightning strike. The resistance of the grounding electrode must be as low as possible. However, damage can still occur to a sign’s electronic equipment from lightning voltage transients. The earth ground must comply with NEC Article 250.

Though some surge protection is incorporated into a sign, to protect a sign from high-voltage lightning transients, surge protectors can be installed in accordance with NEC Articles 280 and 285 and local codes. The cirrus warranty cannot cover damaged caused by lightning transients.
5. Optional Long-Range Wireless Communication

The EnGenius Wireless Access Point uses 2.4GHz technology to avoid interference from cell phone and other wireless components.

Designed for outdoor deployments with an IP65 water-proof housing, these come with mounting hardware, power over Ethernet injector and a cable accessory kit to help protect against damage caused by moisture, rain and dew.

Each wireless antenna comes packaged with:
- Install & software configuration instructions
- EnGenius ENH 202 Wireless Access Point
- 24V/1.0A Power Adapter
- PoE Injector (EPE-24R)
- Mounting Kit with Mast-Mount Strap
- Special Screw Set
- CD (User Instructions)

Ethernet cables are not included. The device requires two cables, one must be 25 feet or less in length. The second must be under 300ft in length.

Wireless modules come pre-configured from Cirrus to match with Controllers. Controllers have corresponding WiFi antennas.

It is recommended to place the EnGenius less than 300ft from the Controller with a clear view. Even running the signal through a window will decrease the signal strength. If the Engenius is to be placed over 300ft from the display, please contact your Cirrus sales rep for an additional EnGenius unit.
To install the EnGenius Wi-Fi Unit, follow these steps:

1. Run an Ethernet cable 300ft or less from your router to the Power over Ethernet device. Plug the cable into the “LAN/Network” port on the Power over Ethernet device.

2. Plug the provided power cable into the Power over Ethernet device and then into a power outlet.

3. The bottom of the access point has a removable cover. Grab the tab at the bottom and push up slightly to release the cover downwards.

4. Use a second Ethernet cable to connect the PoE/AP/Bridge port on the Power over Ethernet device into the Main LAN port on the access point. This second cable must be less than 25 feet in length to avoid drop in signal.

5. Slide the cover back to seal the bottom of the unit.

6. Finally, mount the access point with clear line of sight to the WiFi antennas on the display’s Controller, pointing the smooth face of the access point at the LED display.

   The Controller’s WiFi antennas will automatically connect to the signal being broadcasted by the access point when the display is powered on.
Make sure that the Power over Ethernet device is in a dry and environmentally protected enclosure for the Access Point.

WARNING: Do not reset the EnGenius WiFi kit! Settings that allow communication to your Blade/Solo Controller will be removed and may need to be returned to Cirrus to be reprogrammed. Additional fees can occur for reprogramming. Do not log into EnGenius settings unless instructed to do so by Cirrus.

If you choose not to use the EnGenius provided by Cirrus, Cirrus will not be responsible for the connection to the Controller or troubleshooting any connectivity issues in the future.

When finished, the access point will resemble the following picture:

Verify the 3 lights (WLAN, LAN and PWR) are green behind the WiFi Unit as shown below. WLAN and LAN lights should be blinking. This indicates that the WiFi Unit is receiving internet.
BASIC NETWORK REQUIREMENTS

If there are any firewalls, content filters, etc. in place, they will have to be configured to allow the display to connect in. Any computer accessing the Cirrus LED Cloud (content management website) requires outbound access standard HTTP and HTTPS ports 80 and 443. The Controller also needs access to these ports, as well as unrestricted access to cirrusled.com, screenhub.com and their sub-domains. The display is set to run DHCP so if a static IP is required, please let Cirrus know prior to installation.

Cirrus is not responsible for the internet connectivity or network setup onsite. Performance issues arising from poor/inadequate bandwidth, intermittent or weak internet connectivity is not covered under warranty. Cirrus is unable to provide, consult or advise on the end user's network setup (firewall protocols/adjustments, content filters, proxy servers...).

INTERNET SPEEDS AND BANDWIDTH

The sign will use on average 100MB per month of bandwidth. If you are using a large number of LED Cloud apps or frequently updating your content, the bandwidth usage can exceed 400-500MB per month. A minimum download speed of 10Mb/sec and minimum upload speed of 2Mb/sec is required for the sign to operate as intended.
6. LED Panel Installation

**CAUTION!**

The LED Panels lock into place via a rotating front and rear-service locking arm system. From the rear, tiles may be unlocked by hand by turning the locking handle counterclockwise (see Figure 5). From the front, tiles may be unlocked by inserting the provided hex key into the two corresponding holes and rotating until the Panel is released (see Figure 6).

Panels are connected at four points to the Frame. Do not forcibly attempt to remove Panels. If locking arms have properly been disengaged, the Panels will easily slide out from the Frames (see Figure 7).

**INSTALLATION PATTERN:**

The electrical order of installation and connecting is not important to the function of the sign as the Panel order is defined by the controller after mechanical integration, HOWEVER: The affixed harnesses are about 28” long, designed only to reach a neighboring Panel. For this reason, you must follow a logical pattern to ensure all modules can connect in a daisy chain fashion (see Figure 8). It is advised to start in one of the four corners, then traverse horizontally one solid row, then shift to the next row and traverse in the opposite direction and repeat. At right is an example of this installation. Extension cables are available for non-standard configurations.

Avoid sharply bending or kinking the power cords on the Panels as it puts stress on the internal wiring and will eventually destroy them (Figure 9).

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**Fig. 5**

**Hex Key Locations**

**Fig. 6**

**Blade M port locations**

**Fig. 7**

**Fig. 8: Wiring Pattern**

**Fig. 9**
C. DISPLAY CONFIGURATION

ONCE YOUR SIGN IS INSTALLED AND CONNECTED TO THE NETWORK AND THE WORLD WIDE WEB, CALL CIRRUS AT 1.877.636.2331 TO MAP THE CONNECTION AND ENSURE ACCURATE SETUP OF YOUR DISPLAY.

We will need to know:

- The number of Panels installed
- Single or dual sided sign
- Their configuration (rows and columns)
- The order in which they are daisy-chain connected
- The installed time-zone.

With this information, we can map the connection to LED Cloud with all the appropriate settings for your sign.

Once the display has been created, you can log in to LED Cloud for management and control.
D. Display Care

To enhance the visibility and lifetime of your Cirrus System panels, the following steps are recommended:

1. Users must use diverse content that utilizes the whole screen as displaying the same, or similar messages for extended periods of time will cause LED’s to degrade in an unbalanced manner, impacting the visual quality of the display.

2. Wash the Panels with warm water and a sponge. This will help remove dirt/dust/sand/salt buildup and allow your content to shine through brightly. Do not use a power washer as it can damage the display.

3. LEDs do not last forever, it is standard for a small percentage of diodes to fail over time. After 6 months of usage, Cirrus will replace Panels under warranty that have 15% or more of non-working LEDs.