Mechanical

Refer to the **NPN-4100 Series Border Installation Quick Guide (DD3838321)** before installing the first panel to determine when to install borders.

Install First Panel

1. Measure and mark the correct panel location. Refer to **Figure 1**.

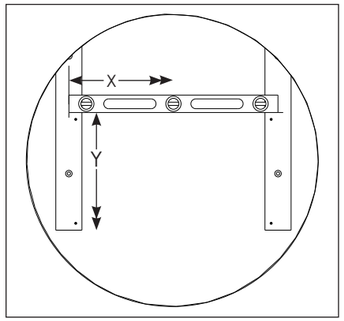

Figure 1: *Measure & Mark First Panel Location*

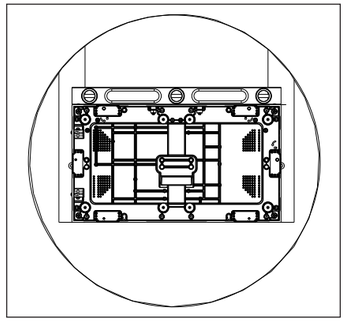

Figure 2: *Mark Mounting Hole Locations in First Panel*

2. Remove the panel from its packaging.
3. Mark the mounting holes in the first panel for pre-drilling. Refer to **Figure 2**.
   a. Lift the panel into place.
   b. Align the panel to the marked location and verify the panel is level.
   c. Hold the panel in place and mark the screw locations through the mounting screw holes.
   d. Remove the panel and return it to its packaging.
4. Pre-drill holes into the tube at the marked mounting locations. Refer to **Figure 3**.

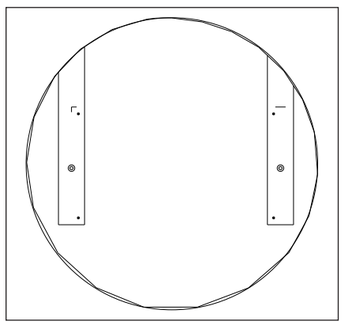

Figure 3: *Pre-Drill Holes into Tube*

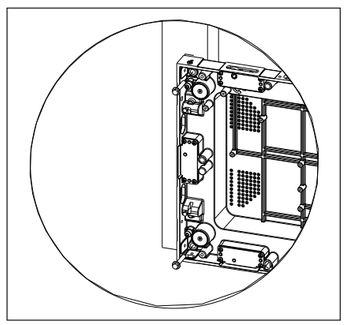

Figure 4: *Secure Panel to Tubes*

5. Secure the panel to the tubes through all four corner mounting locations. Refer to **Figure 4**.
6. Ensure the panel is level and vertically plumb. Refer to **Figure 5**. Adjust the jacking hardware to correct any plumbness issues. Refer to **Figure 6**.

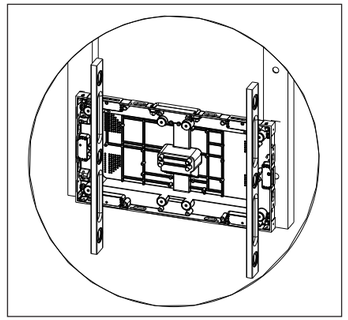

Figure 5: *Ensure Panel Is Level & Vertically Plumb*

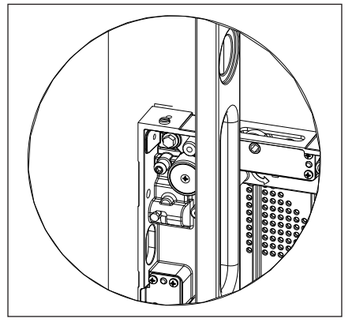

Figure 6: *Adjust Jacking Hardware*

Adjust Panel Hardware

Only make small adjustments to the jacking and securing hardware.

Pull Panel Corner to Structure

1. Loosen the jacking hardware. This may pull the panel closer to the structure.
2. Tighten the securing hardware. This pulls the panel closer to the structure until it contacts the panel adjustment screws or the rear of the panel.

Push Panel Corner from Structure

1. Loosen the securing hardware. This may push the panel away from the structure.
2. Tighten the jacking hardware. This pushes the panel away from the structure until it contacts the head of the securing hardware.

Secure Panel Corner Spacing

Secure the corner in place to prevent movement after the desired depth is achieved.

1. Tighten both bolts until they contact the panel or tube.

Connect Top-to-Bottom Panels

1. Remove the panel from its packaging.
2. Place the panel on top of the existing panel, fitting the alignment pins into the recesses. Refer to **Figure 7**.

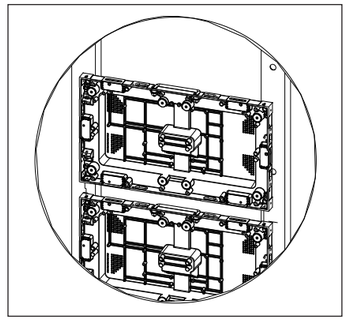

Figure 7: *Set Panel in Place*

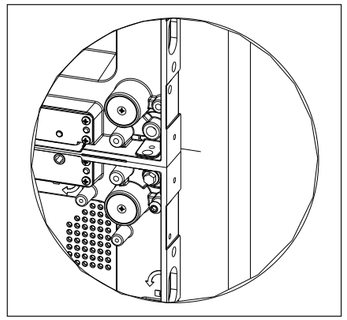

Figure 8: *Align Panel Faces*

3. Ensure the front edges of the panels align completely. Refer to **Figure 8**.
4. Clamp the panels together. Refer to **Figure 9**.

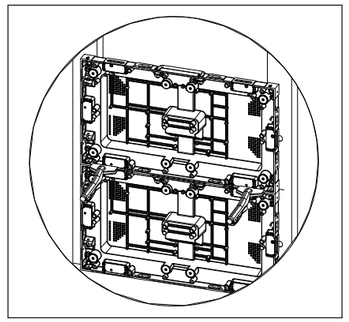

Figure 9: *Clamp Panels Together*

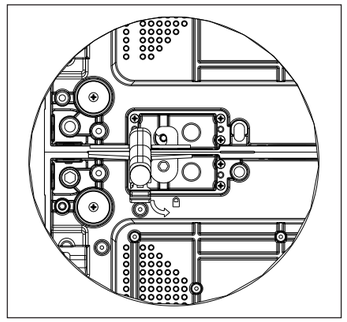

Figure 10: *Engage Draw Latches*

5. Engage the draw latches. Refer to **Figure 10**.
6. Tighten the jacking hardware next to the existing panel until the panel is firmly seated against the tube. Refer to **Figure 11**. Tighten the remaining adjustment hardware until it contacts the tube.

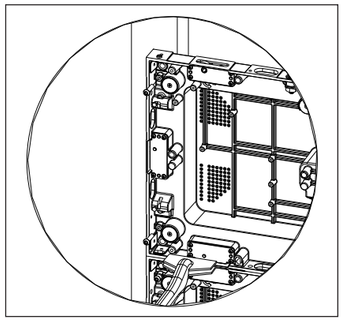

Figure 11: *Tighten Jacking Hardware*

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7. Secure the panel to the tubes through all four corner mounting locations. Refer to **Figure 12**.

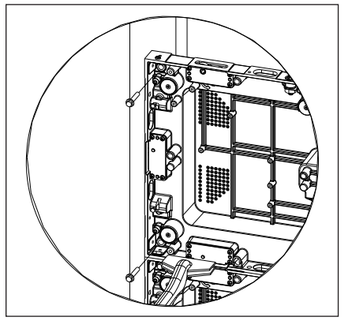


Figure 12: *Secure Panel to Tube*

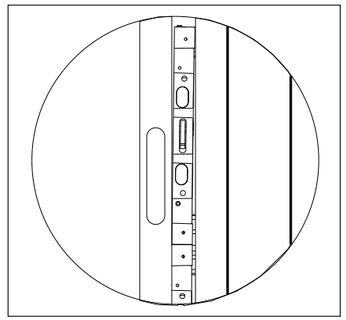


Figure 13: *Verify Flatness*

8. Ensure the panel is flush and flat to all adjacent panels.
   a. Verify flushness by checking the seams.
   b. Verify flatness by laying a 4' level across the face to ensure the combined face of both panels is straight and flat. Check both ends of the panel. Refer to **Figure 13**.
   c. Adjust the jacking hardware as needed to modify the depth on the four corners of the panel.

Connect Side-to-Side Panels

1. Remove the panel from its packaging.
2. Place the panel beside the existing panel. Refer to **Figure 14**.

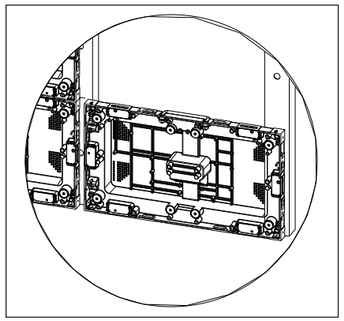


Figure 14: *Set Panel in Place*

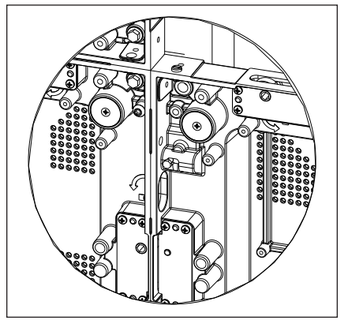


Figure 15: *Engage Alignment Pin*

3. Release the side alignment pins at connection and allow the pins to slide into the recesses of the other panel. Refer to **Figure 15**.
4. Ensure the front edges of the panels align completely. Refer to **Figure 16**.

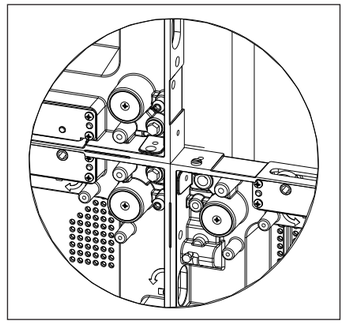


Figure 16: *Align Panel Faces*

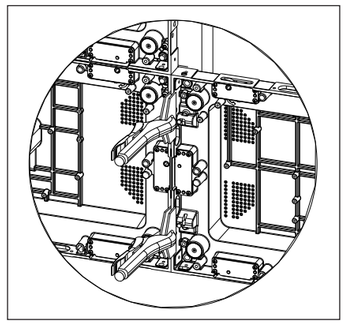


Figure 17: *Clamp Panels Together*

5. Clamp the panels together. Refer to **Figure 17**.
6. Engage the draw latches. Refer to **Figure 18**.

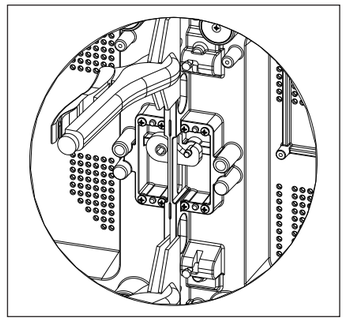


Figure 18: *Engage Draw Latches*

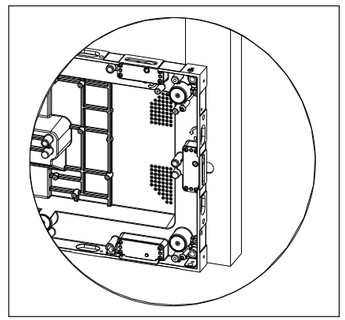


Figure 19: *Tighten Jacking Hardware*

7. Tighten the jacking hardware next to the existing panel until the panel is firmly seated against the tube. Refer to **Figure 19**. Tighten the remaining jacking hardware until it contacts the tubes.
8. Secure the panel to the tubes through all four corner mounting locations. Refer to **Figure 20**.

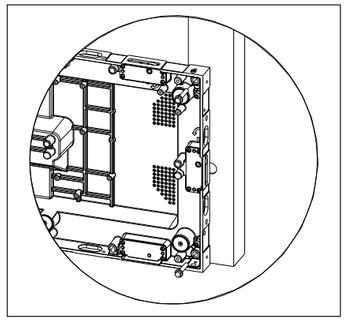


Figure 20: *Secure Panel to Tubes*

9. Ensure the panel is flush and flat to the lower panels.
   a. Verify flushness by checking the seams.
   b. Verify flatness by laying a 4' level across the face to ensure the combined face of both panels is straight and flat. Check both ends of the panel. Refer to **Figure 21**.
   c. Adjust the jacking hardware as needed to modify the four corners of panel depth.

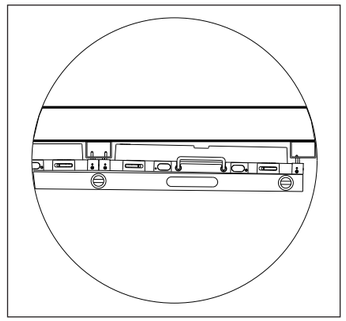


Figure 21: *Verify Flatness*

Electrical

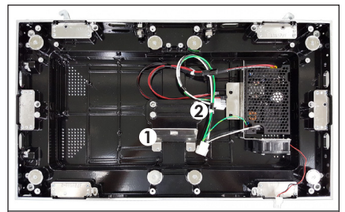
Land Field Power/Signal

There are two power entrance types: plug and terminal block. Refer to the contract-specific Riser Diagram to determine power entrance type.

Power Plug Entrance

1. Refer to the contract-specific Riser Diagram for field power and signal locations on the display.
2. Select a panel for field power connection. Use a Phillips screwdriver to remove the hardware in the power entrance plate and then remove the plate. Refer to **Figure 22**. When installing the panel onto the display, bring the field SJOOW flexible cable through the opening in the panel.

   If a panel also needs signal, bring field fiber through the panel opening with the SJOOW flexible cable.



1: Power entrance plate
2: Zip tie location

Figure 22: *Panel*

Figure 23: *Three-Pin Plug*

3. Terminate the three-pin plug (Daktronics part number P-1351) onto the field SJOOW flexible cable. Installation instructions are located on the plug package. Refer to **Figure 23**.
4. Cut the zip tie at the location in **Figure 22**.

Power Terminal Block Entrance

1. Refer to the contract-specific Riser Diagram for field power and signal locations on the display.
2. Select a panel for field power connection. Use a Phillips screwdriver to remove the hardware in the power entrance plate and then remove the plate. Refer to **Figure 22**. When installing the panel onto the display, bring the field power cable through the opening in the panel.

   If a panel also requires signal, bring field fiber through the panel opening with the field power cable.
3. Cut the zip tie at the location in **Figure 22**.

Install Z-Filter Assembly

Z-Filter Plug Assembly

1. Complete the steps in **Power Plug Entrance (p.2)**.
2. Use a Phillips screwdriver to attach the electrical component plate to the panel with the supplied hardware (Daktronics part number HC-1012 @ 3) at the locations shown in **Figure 25**. Hand-tighten to 5 in-lbs.
3. Connect the three-pin plug (P-1351) to the panel mount jack on the Z-filter assembly and push the plug through the panel opening.
4. Use a Phillips screwdriver to attach the power entrance plate to the panel with the supplied hardware (HC-1012 @ 2) at the locations shown in **Figure 25**. Hand-tighten to 5 in-lbs.

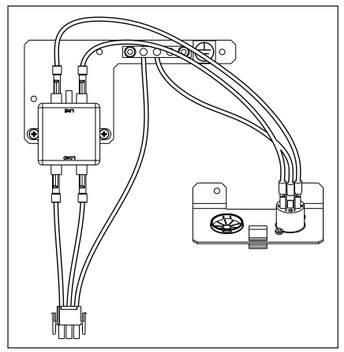
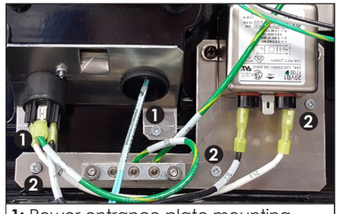


Figure 24: *Plug Z-Filter Assembly*

Z-Filter Terminal Block Assembly

1. Complete the steps in **Power Terminal Block Entrance (p.3)**.
2. Use a Phillips screwdriver to attach the power entrance plate to the panel with the supplied hardware (Daktronics part number HC-1012 @ 2). Hand-tighten to 5 in-lbs. Drill the PWR conduit hole to match the size of the fitting used. Refer to **Figure 25** and **Figure 26**.



1: Power entrance plate mounting locations
2: Electrical component plate mounting locations

Figure 25: *Plate Mounting Points*

Figure 26: *PWR Conduit Hole*

Note: MC (metal clad) cable with an MC fitting is recommended to connect AC power to the display. A straight-through or 90° fitting can be used to connect through the rear of the panel in the provided conduit hole. Refer to **Figure 27**, **Figure 28**, and **Figure 29**.

Figure 27: *Straight-Through MC Fitting*

Figure 28: *90° MC Fitting*

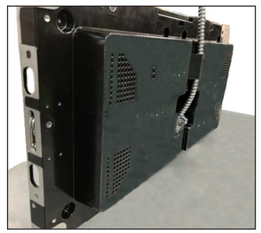


Figure 29: *AC Connection (Display Rear)*

3. Install the cable.
   a. Cut the metal protection ~3" to allow enough room for the wires to route to the terminals. Refer to **Figure 30**.
   b. Strip the wires ~$^{1}/_{4}$". Refer to **Figure 30**.
   c. Feed the MC wire through the rear of the fitting and into the case. When the MC wire is in the correct location, tighten the screw(s) on the MC fitting to secure the fitting.
   d. Terminate the white and black wires to the four-position plastic terminal block. Tighten the wires into place with a flathead screwdriver. Refer to **Figure 31**.
   e. Terminate the green (ground) wire to the three-position metal terminal block. Use a $^{1}/_{8}$" Allen wrench to tighten the wires into place. Refer to **Figure 31**.
   f. Tuck the wires so they do not press against the rear of the module when the panel is assembled.

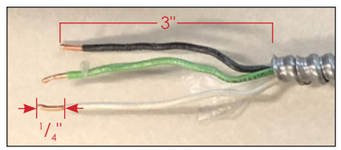
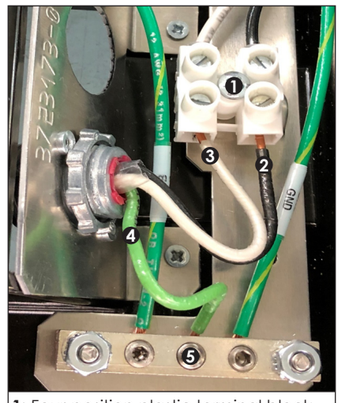


Figure 30: *MC Cable*



1: Four-position plastic terminal block
2: Black wire
3: White wire
4: Green (ground) wire
5: Three-position metal terminal block

Figure 31: *Power Entrance*

Interconnect Internal Power

Refer to the contract-specific Riser Diagram for potential horizontal interconnects.

1. Ensure power is disconnected from the display.
2. Connect the internal AC harness and route the harness vertically through the pass-through holes as shown in **Figure 32**. Power routes internally to the display after field power is landed. Refer to **Land Field Power/Signal (p.2)**. Interconnects should route horizontally.
3. Route horizontal interconnects where needed after internal vertical connections are complete.
4. Zip tie the cables in the panel to ensure the modules install flat.

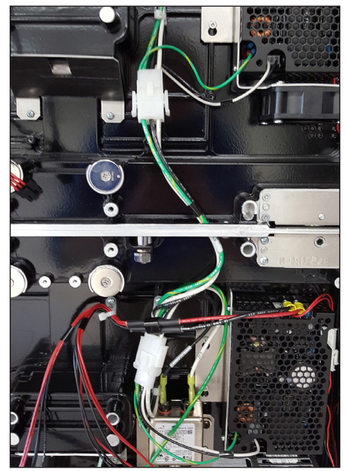


Figure 32: *Connect Vertical Power*

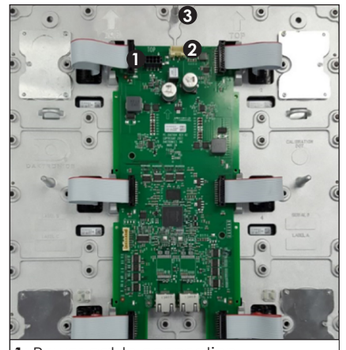
Install PLR

Refer to the contract-specific Signal Interconnect Drawing for ProLink Router (PLR) locations.

1. Use a Phillips screwdriver and the supplied hardware (Daktronics part number HC-1012 @ 3) to install the PLRs. Hand-tighten to 5 in-lbs. Refer to **Figure 33**.

1: Power cable connection

Figure 33: *Install PLR*



1: Power cable connection
2: Accessory cable connection
3: Top alignment pin

Figure 34: *Module Rear*

2. Connect the power cable (W-3758419) to the PLR. Refer to **Figure 33** and **Figure 34**.

Reverse these steps to remove a PLR.

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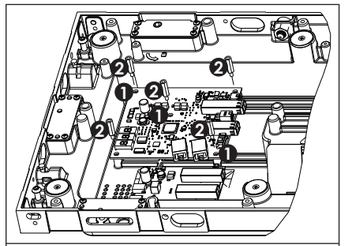
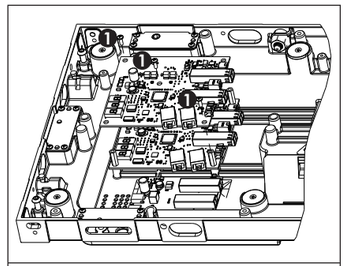
Dual PLRs are required at the end of fiber runs on 1.9 mm panels. Refer to **DWG-3903563** and the steps below for installation details.

1. Use a Phillips screwdriver to remove the hardware (Daktronics part number HC-1012 @ 3) securing the existing PLR and set the hardware aside for **Step 3**. Refer to **Figure 35**.



1: Hardware removed from existing PLR @ 3
2: Standoff @ 5

Figure 35: *Remove Hardware*



1: Hardware removed from existing PLR @ 3

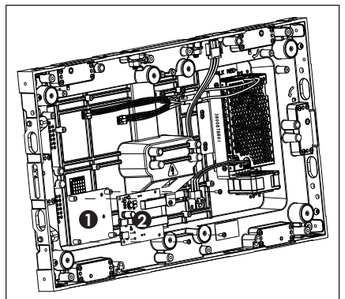
Figure 36: *Secure Second PLR*

2. Use a $^{1}/_{4}$" socket or nutdriver to secure the supplied standoffs (HE-1262) in the existing PLR. Hand-tighten to 5 in-lbs. Refer to **Figure 35**.
3. Position the second PLR on top of the existing PLR. Use a Phillips screwdriver to secure the hardware (HC-1012 @ 3) set aside from **Step 1** into the second PLR. Hand-tighten to 5 in-lbs. Refer to **Figure 36**.

Install Fiber Converter

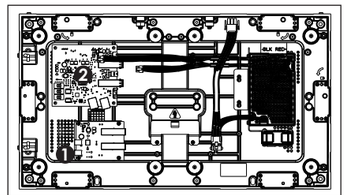
Refer to **DWG-3886297** and the steps below for installation details.

1. Use a Phillips screwdriver and the supplied hardware (Daktronics part number HC-1012 @ 2) to attach the fiber converter bracket (OS-3806526) to the panel. Refer to **Figure 37**. Hand-tighten to 5 in-lbs.



1: Fiber converter bracket
2: Fiber converter assembly

Figure 37: *Install Fiber Converter*



1: Power jack
2: PLR

Figure 38: *Connect Harness*

2. Use a Phillips screwdriver and the supplied hardware (HC-1012 @ 4) to attach the fiber converter assembly to the bracket. Refer to **Figure 37**. Hand-tighten to 5 in-lbs.
3. Connect the harness (W-3881316) to the fiber converter assembly and the PLR power jack (if a PLR is installed in the panel). Refer to **Figure 38**.

Interconnect Internal Fiber

Refer to the contract-specific Signal Interconnect Drawing and **Figure 39** for fiber routing locations.

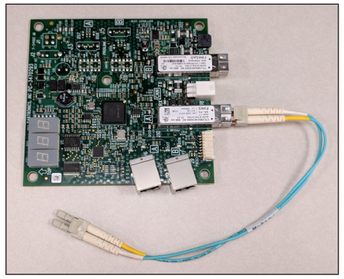


Figure 39: *PLR with Fiber*

Interconnect Internal Module Signal

Three signal cable assemblies are used: 18" cable assembly (Daktronics part number W-3768425) for signal connection from ProLink Router (PLR) to first module, 24" cable assembly (W-3768426) for horizontal signal connection from module to module, and 36" cable assembly (W-3768427) for vertical signal connection from module to module or module to PLR.

Refer to the contract-specific Signal Interconnect Drawing and **Figure 40** for signal routing locations.

1. Ensure power is disconnected from the display.

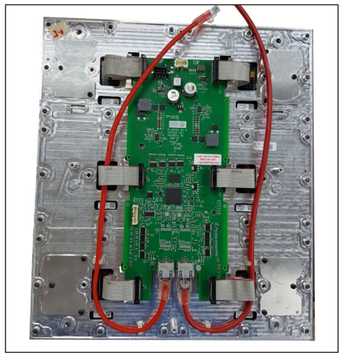
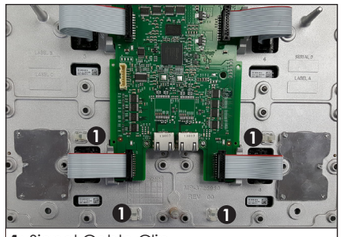


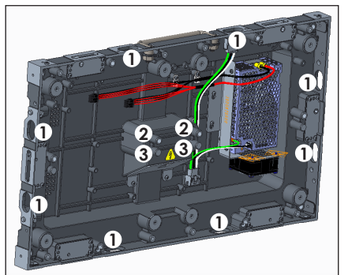
Figure 40: *Route Signal Cable*



1: Signal Cable Clip

Figure 41: *Clip Locations*

2. Insert the signal cable into the logic card and then attach the cable into the clips on the rear of the module. Refer to **Figure 41**.
3. Route the signal cable through the internal pass-through holes to the next module or within the panel. Refer to **Figure 42**. When routing the 24" cable assembly (W-3768426) horizontally from module to module, ensure the cable routes either between the top and bottom pegs or below the bottom pegs. Refer to **Figure 42**.



1: Signal Cable Pass-Through Hole
2: Top Peg
3: Bottom Peg

Figure 42: *Signal Cable*

Install Module

> **Note:** Handle the module with care. Ensure all four magnet switches on the module removal tool are disengaged before placing the tool on the module. If the tool is not properly attached prior to removing the module, the module can come free and drop.

The module removal tool is required for installation and removal of any module. Refer to **Figure 43**.

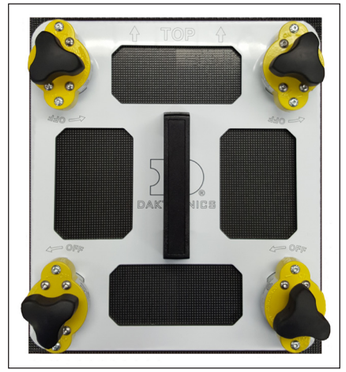


Figure 43: *Module Removal Tool*

Install horizontal signal cables onto the module before installation. Refer to **Interconnect Internal Module Signal (p.4)** and the contract-specific Signal Interconnect Drawing for signal routing locations.

1. Disconnect power from the display.
2. Place the module removal tool gently on the face of the LEDs with a single column of LEDs around the perimeter of the tool and TOP pointing toward the top of the module. Refer to **Figure 43**. Module orientation is visible on the rear of the module.
3. Turn each of the four magnet switches clockwise to engage the magnetic latches. An audible click sounds when the magnetic latches are engaged. If no click sounds, press and spin the switch counterclockwise, reposition, and then repeat. Ensure all four corners are engaged before installing the module.
4. Remove the masking tape from the magnets on the panel.
5. Connect the appropriate signal cables to the corresponding jacks on the rear of the module and push the signal cables into the clips on the rear of the module. Refer to the contract-specific Signal Interconnect Drawing and **Figure 41**.
6. Hold the module near the panel and connect and/or route the signal cables from the module:
   - For horizontal connections, route the cables horizontally through the notch in the center of the panel.
   - For vertical connections, route the cables vertically through the cutouts in the panel.
7. Connect the power cable to the power connector on the rear of the module:
   - If the module is on the left side of the panel, connect the longer cable from the power supply to the module.
   - If the module is on the right side of the panel, connect the shorter cable from the power supply to the module.

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8. Connect the ProLink Router (PLR) cable to the accessory jack on the rear of the module (if necessary) to provide power to the PLR.
9. Connect the fan power harness to the accessory cable connection when installing the right module (when viewed from the front). Refer to **Figure 34**.
10. Guide the module into position on the panel, aligning with the top and bottom pegs. Refer to **Figure 42**.
11. Verify the module is seated correctly on all sides and no cables interfere with the seating of the module before disengaging the module removal tool.
12. Turn each of the four magnet switches, one at a time, counterclockwise while the module is attached to the panel to disengage the magnetic latches.

Adjust Z-Axis Seam

1. Fire up the display to ensure it is functioning properly and the fiber and signal are routing correctly.
2. Mark which tiles need to be adjusted on a sheet of paper.
3. Disconnect power to the display and follow the steps in **Remove Tile (p.6)** to remove the tile from the module.
4. Turn the adjustment screw a $^1/_2$ turn counterclockwise with a $^3/_{32}$" Allen wrench until the screw touches the tile.

> **Note:** The adjustment screw breaks free from the thread lock patch on the initial turn and will stick until it releases from the patch.

5. Turn the adjustment screw in $^1/_8$-turn increments until the alignment is satisfactory. Each $^1/_8$ turn adjusts the screw 0.1 mm.
6. Reverse the steps in **Remove Tile (p.6)** to install the tile in the module.
7. Fire up the display and verify all seam issues are resolved. If further adjustment is needed, repeat **Steps 2-6**.

Adjust X/Y Axis Seam

1.9 mm X/Y Axis Seam

Jigs are used for X/Y axis seam adjustment on 1.9 mm displays.

1. Fire up the display to ensure it is functioning properly and the fiber and signal are routing correctly.
2. Disconnect power to the display.
3. Place the first supplied jig (Daktronics part number TH-3926637) two rows below the center line (CL) (starting point) on the left side of the display. Align the jig with the corners of the tiles to be adjusted and snap the jig into place on the display face. Refer to **Figure 44**.

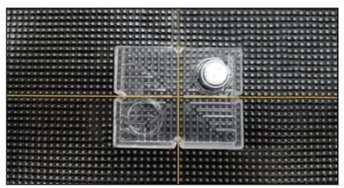


Figure 44: *Place Jig*

4. Install jigs in the first column from the starting point upward to the top of the display. Refer to **Figure 45**.

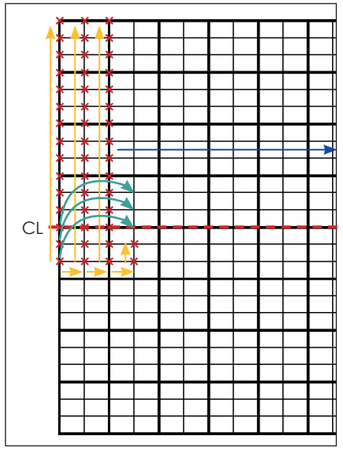


Figure 45: *Use Jigs for XY Axis Seam Adjustment*

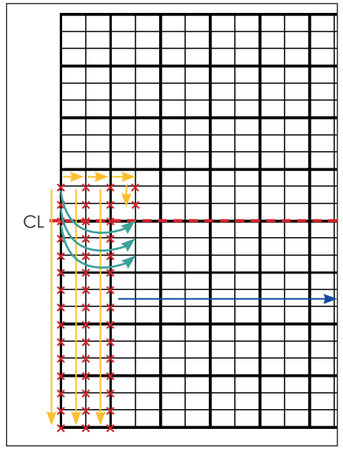


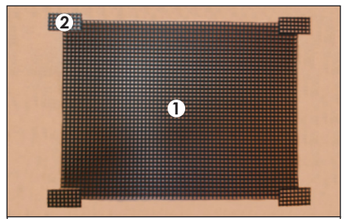
Figure 46: *Use Jigs for XY Axis Seam Adjustment*

5. Install a second column of jigs from the starting point upward to the top of the display. Refer to **Figure 45**.
6. Install a third column of jigs from the starting point upward to the top of the display. Refer to **Figure 45**.
7. Install two jigs in the fourth column of the display at the starting point. Refer to **Figure 45**.
8. Move the jigs from the first column to the fourth column, working from the starting point upward to the top of the display. Refer to **Figure 45**.
9. Use **Steps 4-8** to continue across the display. Refer to **Figure 45**.
10. Repeat **Steps 4-9**, working from two lines above the CL downward to the bottom of the display. Refer to **Figure 46**.

2.5 mm X/Y Axis Seam

Tile masks are used for X/Y axis seam adjustment on 2.5 mm displays.

1. Turn off power to the display.
2. Position a mask (Daktronics part number MP-4021294) over a tile. Refer to **Figure 47**. Ensure the mask does not span across a tile seam.
3. Press the mask onto the tile in all four corners, keeping the pressure uniform to minimize stress on the LEDs.



1: Mask
2: Mask jigging piece

Figure 47: *Tile Mask & Jigging Pieces*

> **Note:** Do not slide fingers across the mask, as this can transfer skin cells and oils and leave a white streak on the face of the display.

4. Place the supplied mask roller (TH-4063718) firmly against the tile and slowly and consistently roll across the tile at a 45° angle. Refer to **Figure 48**. If the tile bends or deflects, reduce the pressure. Work from left to right, reverse the angle by 90°, and roll back from right to left.

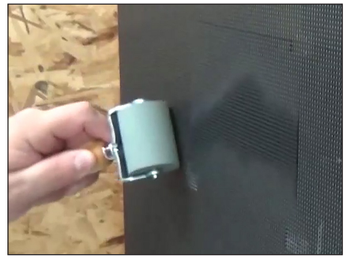


Figure 48: *Roll at 45° Angle*

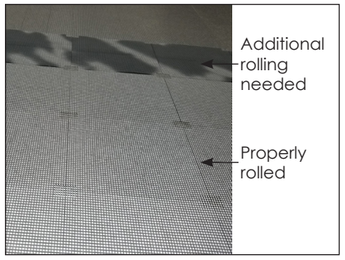


Figure 49: *Rolled Tile Mask*

5. Look at the display face from above or below the display and locate any bubbles in the mask. Refer to **Figure 49**. No bubbles should be visible when viewed from approximately a 10° angle. Roll out any bubbles.
6. Repeat **Steps 2-5** for each tile.
7. Power on the display and play standard content or a test pattern to check for any tile, module, or pixel issues.
8. Complete the steps in **Adjust Z-Axis Seam (p.5)**.
9. Locate the center of the display and visually divide the display into four quadrants. Refer to **Figure 50**.

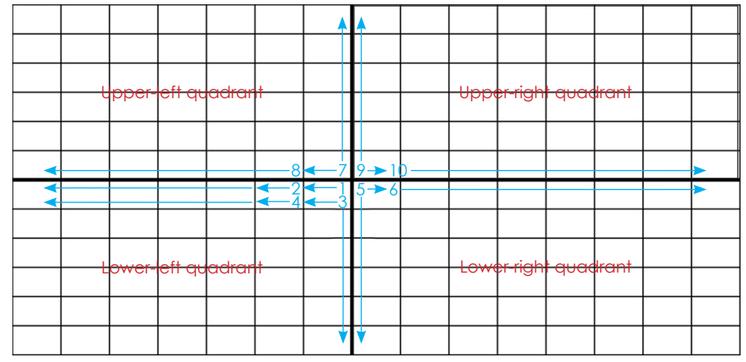


Figure 50: *Divide Display into Four Quadrants*

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10. Place mask jigging pieces (MP-4021293) in the corners of the tile spanning between four tiles. There should be a $^1/_2$ pixel space between the main mask and the jigging mask. Refer to **Figure 51**. Do not place jigging pieces around the perimeter of the display.

> **Note:** Do not use excessive force to apply the jigging pieces, as this can shear LEDs off if the tiles are not aligned enough.

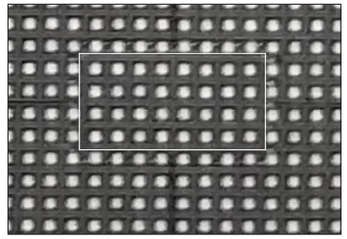


Figure 51: *Tile Mask Jigging Piece*

11. Place jigging pieces one by one from left to right in the lower-left quadrant. Refer to **Figure 50**.
12. Shift down a row and place jigging pieces one by one from left to right. Refer to **Figure 50**.
13. Repeat **Step 10** and **Step 11** for the other quadrants, always starting at the center of the display and working toward the left or right and then toward the top or bottom. Refer to **Figure 50**.
14. Cut a mask jigging piece (MP-4021293) in half horizontally or vertically with a scissors and remove the middle rib to create two top or bottom pieces. Repeat this step until there is a sufficient amount of pieces.
15. Cut a mask jigging piece (MP-4021293) in half horizontally and vertically with a scissors and then in half again horizontally and vertically to create four corner pieces.
16. Start at the vertical center seam and place the top perimeter jigging pieces. Repeat this step for the bottom perimeter jigging pieces.
17. Start at the horizontal center seam and place the left perimeter jigging pieces. Repeat this step for the right jigging pieces.
18. Place the corner jigging pieces.

Service

Remove Module

1.9 mm Module

Reverse the steps in **Install Module (p.4)** to remove a 1.9 mm module.

2.5 mm Module

1. Disconnect power to the display.
2. Locate the module to be removed and use the tile removal tool to remove the 10 mask jigging pieces between the tiles around the perimeter of the module. Refer to **Step 2** in **Remove Tile (p.6)**.

> **Note:** It might be necessary to rock the tile removal tool back and forth to disengage the jigging pieces.

3. Remove the tile with the tile mask from the display. Refer to **Remove Tile (p.6)**.
4. Reverse the steps in **Install Module (p.4)** to remove the module after all 10 jigging pieces are removed from the perimeter of the module.

Remove Tile

The tile removal tool is required for installation and removal of any tile. Each module has six tiles as shown in **Figure 52**. Ensure the tool is turned fully counterclockwise when not in use and when placing on the module face. Refrain from attaching the tile tool to any highly magnetic objects, as it is difficult to disengage the tool from these objects.

1. Disconnect power to the display.
2. Use the tile removal tool to remove the tile from the display.

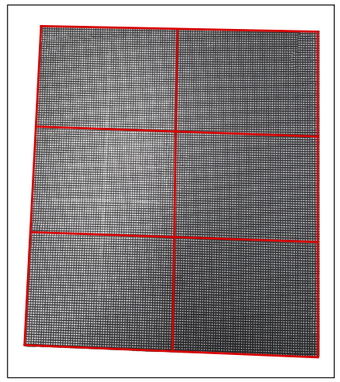


Figure 52: *Tiles on Module*

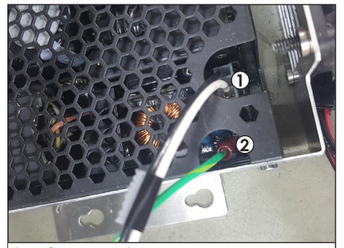
Figure 53: *Tile Removal Tool on Module*

   a. Place the disengaged tile tool flush on the tile to be removed and slowly turn the tool handle clockwise until fully depressed. Refer to **Figure 53**.
   b. Pull the tool straight off of the tile face slowly after the tool is fully engaged.
3. Remove the ribbon cable from the rear of the tile.

Reverse these steps to install a tile.

Remove Power Supply

1. Disconnect power to the display.
2. Remove the module on the right side of the panel (when viewed from the front) and disconnect the power and signal cables from the module. Refer to **Remove Module (p.6)**.
3. Pull the cables gently and rock the AC connector back and forth to disconnect the connector from the power supply. Refer to **Figure 54**.



1: AC connector
2: Female quick-disconnect connector

Figure 54: *Disconnect AC Connector & Female Quick-Disconnect Connector*

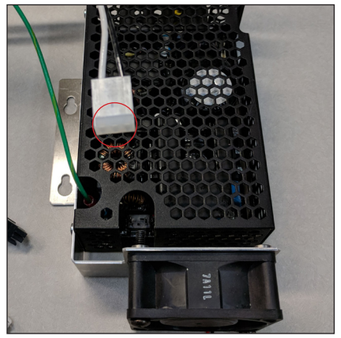
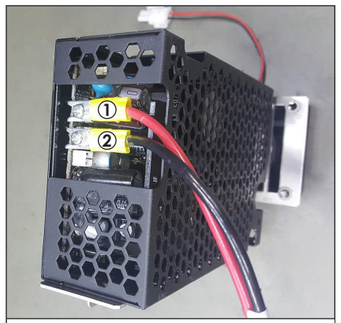


Figure 55: *Tab Orientation*

> **Note:** Take note of the tab orientation on the connector. The tab should be oriented toward the bottom of the power supply (when viewed from the front) during installation. Refer to **Figure 55**.

4. Disconnect the female quick-disconnect connector from the power supply. Refer to **Figure 54**.
5. Route the cabling away from the power supply.
6. Use a Phillips screwdriver to loosen the screws securing the power supply to the panel.
7. Slide the power supply assembly up on its keyed bracket to release from the panel. Lift the power supply slightly to access the terminal connectors.
8. Hold the power supply in place and use a Phillips screwdriver to loosen the terminal screws. Remove the terminal connectors and take note of the positive and negative connections. Refer to **Figure 56**.
9. Remove the power supply from the panel.
10. Use a Phillips screwdriver to remove the M3 screws securing the power supply to the bracket.



1: Positive 12 V
2: Negative 12 V

Figure 56: *Remove Terminal Connectors*

Reverse these steps to install a power supply.

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