

4203 Series
International Digital Billboard

Installation Manual

DD2504593

Rev 01 – 23 February 2015



Copyright © 2013-2015

All rights reserved. While every precaution has been taken in the preparation of this manual, the publisher assumes no responsibility for errors or omissions. No part of this book covered by the copyrights hereon may be reproduced or copied in any form or by any means – graphic, electronic, or mechanical, including photocopying, taping, or information storage and retrieval systems – without written permission of the publisher.

Table of Contents

Section 1:	Introduction.....	1
1.1	Limitation of Liability	1
1.2	Important Contact Information.....	1
1.3	Display Identification	1
1.4	Terms Used in this Manual.....	2
1.5	Required Tools.....	3
1.6	Daktronics Digital Billboard Overview	4
Section 2:	Installation Preparation.....	5
2.1	Installation Planning.....	5
2.2	Support Ledger.....	5
2.3	Display Inspection.....	5
Section 3:	Display Installation.....	7
3.1	Display Installation.....	7
Section 4:	Section Splicing.....	11
4.1	Display Section Numbering.....	11
4.2	Horizontal Display Splicing	12
4.3	Vertical Display Splicing.....	13
Section 5:	Border Installation.....	17
	Bottom Border Installation	17
Section 6:	Multi-Direction Light Sensor Installation	19
6.1	Multi-Direction Light Sensor Installation.....	19
6.2	Temperature Sensor Installation.....	20
Section 7:	Webcam Installation.....	21
7.1	Mounting the Webcam to the Arm.....	21
7.2	Adjustable-Length Webcam Arm Installation.....	21
	Installation.....	22
	Retracting the Webcam Arm	23
7.3	Fixed Webcam Arm Installation	23
Section 8:	Electrical Installation.....	25

8.1	Display Disconnect Device	25
8.2	Electrical Installation for 120 and 240 VAC Displays	25
8.3	Display Grounding	26
Section 9:	Spare Parts Box Installation	27
9.1	Spare Parts Box Installation	27
Section 10:	Control System Overview	29
10.1	Fully Embedded Control System.....	29
	Opening the ISP Enclosure	30
Section 11:	First-Time Power Up.....	31
11.1	First-Time Power Up	31
Section 12:	Testing and Adjustment	33
12.1	Diagnostics Checks	33
12.2	Display Image Quality.....	33
12.3	Test the Light Sensor.....	33
Appendix A:	Reference Drawings	35
Appendix B:	Limitation of Liability	37

Section 1: Introduction

This manual provides the necessary information to install and fire-up a Daktronics digital billboard. Please read and understand all steps in this manual before beginning the installation process. Contact the Project Manager with any questions.

1.1 Limitation of Liability

Failure to perform the following may null and void any factory warranties:

- Install the digital billboard according to the steps in this manual.
- Provide proper electrical service.
- Ground the display properly.

For the full **Daktronics Warranty and Limitation of Liability**, refer to **Appendix B** at the end of this manual.

1.2 Important Contact Information

Daktronics Help Desk: 1-605-697-4000

Project Manager: _____

1.3 Display Identification

This section provides label information that is helpful in understanding a Daktronics digital billboard display label. Refer to the **Figure 1** while reading the table below.

Display Assembly Number	DB-4203 Modules High X Modules Wide
Display Serial Number	RMN: Daktronics - 0200 - 07 Manufactured in Sioux Falls, SD
Manufacture Month/Date/Year	220-440/315-415 VAC
	2 Wire + Neutral + Protective Earth Ground
	Total Amps (6.6/5.6) and Watts for Display Section (2684)



Figure 1: 4203 Series Display Label

1.4 Terms Used in this Manual

Lanyard Attachment Ring: a ring found on the back of each module and on the display doors that attaches to a lanyard and prevents the module from falling.

Latch Release: holds the module firmly to the display frame. There are two per module, one on the top and one on the bottom.

Light Emitting Diode (LED): low-energy, high-intensity lighting unit.

Line Filter: removes electromagnetic noise that might interfere with local communication channels from the power system.

Module: consists of a display board with LEDs, a driver board or logic card, housing, a module latch assembly, and a louver. Each module is individually removable from either the front or back of the display. Module part numbers vary by pixel pitch.

ProLink Router (PLR): the PLR takes data in and then routes that data to other areas in the sign. There is typically one PLR per display section.

Power Supply: a device that converts AC line voltage from the panel board to low DC voltage for driver boards. In the 4203 series, one power supply powers two modules, one controller, or a ProLink Router (PLR).

Serial Advanced Technology Attachment (SATA) Cable: allows high speed signal from flow from device to device. In digital billboards, they run signal from module to module and from the PLR to the modules.

Termination Block: an electrical connection point, usually used to connect internal power and signal wires of the same type coming into the display from an external source.

DMP-8065: digital billboard control card that sends content to the display. The DMP regulates content hold times.

1.5 Required Tools

The following table lists the minimum tool requirements Daktronics recommends having on site for each installation. Daktronics provides some specialized tools but it is the installer's responsibility to provide the majority of tools:

Daktronics-Provided Tools	<ul style="list-style-type: none">• Electrical tape• Black cable ties• Flat-head screwdriver• Phillips screwdriver• $\frac{3}{8}$" Nut driver• $\frac{5}{16}$" Nut driver• $\frac{7}{16}$" Nut driver• L-Handle Allen wrench: $\frac{1}{8}$"• Combination wrench: $\frac{1}{8}$"• Splice wrench• Torque stick• T-Handle Allen wrench: $\frac{1}{8}$"
Customer-Provided Tools	<ul style="list-style-type: none">• Allen wrenches: Various sizes• Bucket truck: Customer must provide until final proof of performance• Crane• Cordless drill• Drill bits• Hammers• Ladder: 6', 8', 10'• Laptop• Pry bar• Ratchet tie-downs/come along• Screw driver: Phillips and flat-head• Socket and open end wrench: $1\frac{1}{16}$"• Socket extension: 3"• Socket set• Tape measure• Torque Allen wrench: $\frac{1}{8}$"• Utility knife

1.6 Daktronics Digital Billboard Overview

Figure 2 provides a general overview of display components in a poster (11' x 22') display with an internal control system. Refer to display specific drawings to identify component locations as this can vary by display.

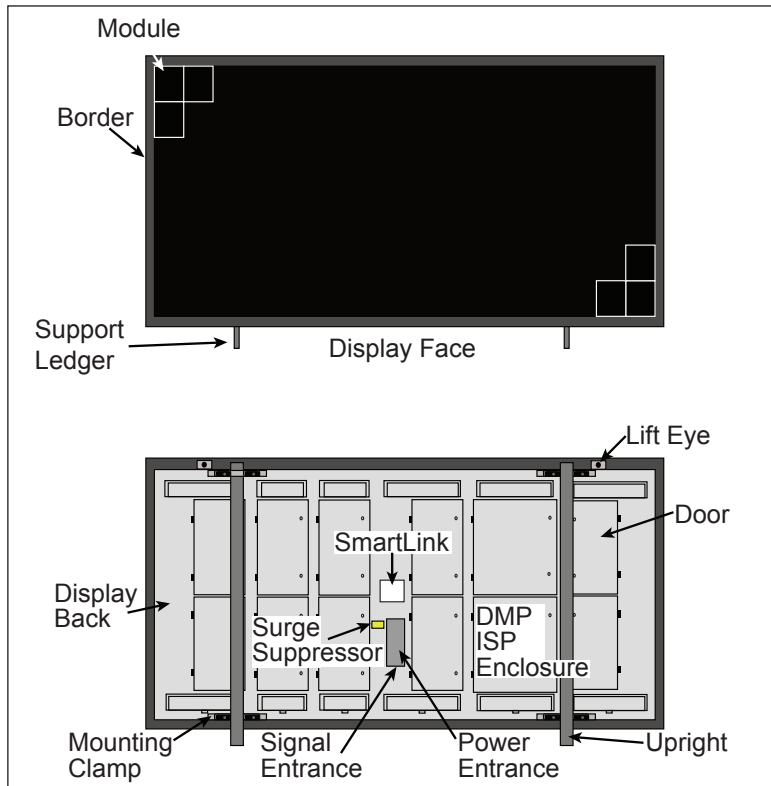


Figure 2: 4203 Series Display with Internal Control

Section 2: Installation Preparation

2.1 Installation Planning

Prior to the display arriving on site, review installation plans with the electrician, ISP provider, and members of the installation crew.

2.2 Support Ledger

Before the display arrives on site, ensure that the ledger brackets are mounted to the upright I-beam. All ledger brackets must be installed prior to lifting the display to the head. For ledger bracket details, refer to **DWG A-988359** in **Appendix A**.

2.3 Display Inspection

As soon as the display arrives on site, verify the packaging is in good condition. Inspect the display for damage and potential issues while unpacking.

Photograph any damage and contact your Project Manager immediately to report issues. Failure to report and document shipping damage may null and void any manufacturer's warranties.

Note: For displays that require a section splice, complete the steps in **Section 4** before continuing the installation process.

8. Measure the upright spacing on the display structure.
9. Locate the center-line label on the back of the display.
10. Starting from the center of the display, mark the upright locations on the back of the display. These marks indicate the offset extrusion mounting location. See **Figure 4**.

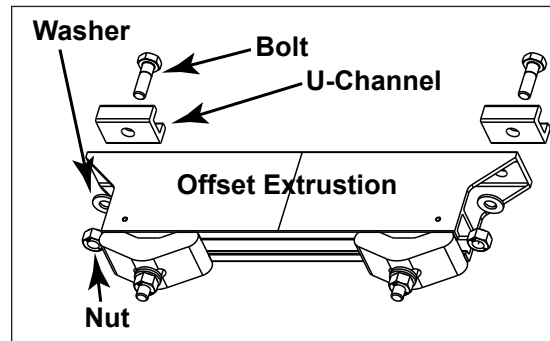


Figure 4: Offset Extrusion Assembly

11. Slide two bolt and U-Channel assemblies for each offset extrusion mounting clamp location.

Note: There will be an offset extrusion clamp on the top and bottom of each display section at the marked upright locations.

12. Insert an end of the bolt into the holes at on each end of the offset extrusion.
13. Place a washer and loosely attach a nut on each bolt.
14. Repeat **Steps 10 - 13** for at each offset extrusion location.
15. Lift the display off of the truck.
16. Slowly lift the display to the structure head and guide into place with tag lines.
17. Lower the display along the uprights until it rests on the ledger brackets.

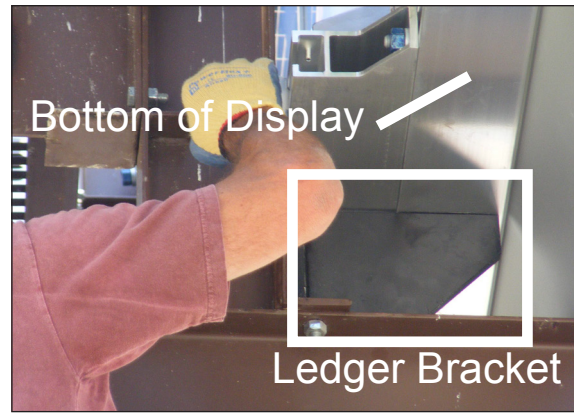


Figure 5: Display Resting on Ledger

Note: The support ledger is provided by the customer prior to display installation. Refer to **Figure 5**.

18. Verify the display is resting on all ledger brackets. If the display is not resting on all ledger brackets, shim the ledger bracket until it is in contact with the display. Refer to **Figure 5**.

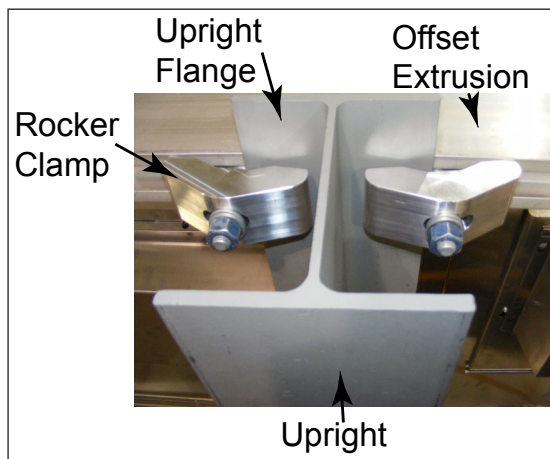


Figure 6: Rocker Clamps Engaging Uprights

19. On each end of the display, slide the pre-assembled offset extrusion and the rocker clamps over until they engage the upright flanges. Refer to **Figure 6**.
20. Use an impact wrench and the torque stick to tighten the nut on the rocker clamp bolt to 75 ft-lbs.

Note: If the U-Channel mounted to the offset extrusion bolt aligns with an opening in the mounting channel, shift the entire display left or right until the U-Channel is at least 1" from the opening.

21. Slide the right rocker mount into the end of the offset extrusion.
22. Use an impact wrench and the torque stick box to tighten the nut on the rocker clamp to 75 ft-lbs.
23. Tighten all of the nuts on the offset extrusion bolts to 75 ft-lbs with an impact wrench and the torque stick.
24. Place and tighten all remaining mounting assemblies to 75 ft-lbs.
25. Remove the crane support.
26. Disconnect the tag lines.

Section 4: Section Splicing

Depending on display size, the display may require a vertical splice, horizontal splice, or both. This section describes how display sections are labeled based on location and how to perform vertical and horizontal splices.

4.1 Display Section Numbering

For displays with multiple sections, each section is numbered for ease of installation. For a two-section display, the bottom section will be BX and the top section is TX. Refer to **Figure 7**.

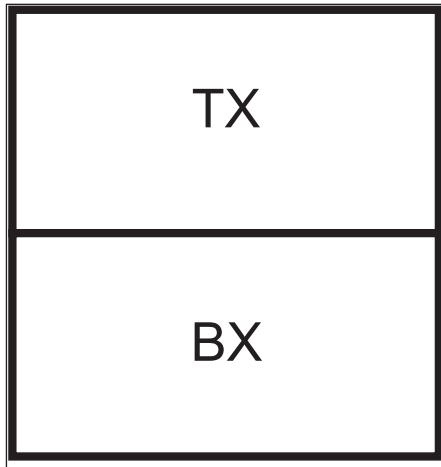


Figure 7: Two-Section Display Section Numbering

For four-section displays, when looking from the front, the lower-left display section would be BL and the section to the right would be BR; the second row of sections would be TL on the left and TR on the right. Refer to **Figure 8**.



Figure 8: Four-Section Display Section Numbering

4.2 Horizontal Display Splicing

1. Remove all display sections from the crating material. Leave the support braces, if applicable, attached to the each display section.
2. Locate the lower-left (BL) display section.
3. Ensure the splice key is in the side channel of the of the bottom-left display section.
4. Locate the U-Shaped splice plates. Refer to **Figure 9**.
5. Slide two bolt and U-Channel assemblies into the bottom of the vertical mounting channels on in the BL display section.

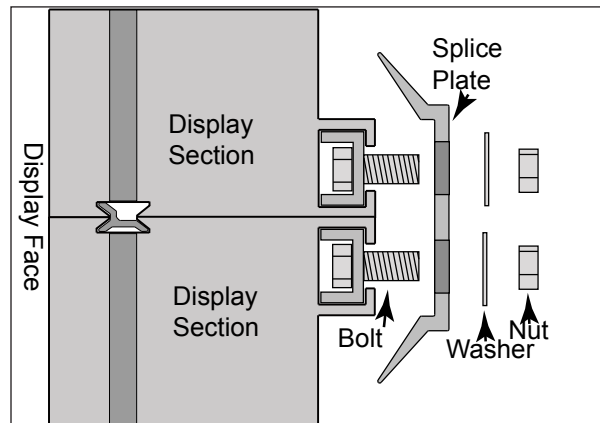


Figure 9: U-Shaped Splice Plate Installation

6. Mount the U-Shaped splice plate approximately 6" from the bottom of the display and so half of it is ready to engage the BR display section.
7. Place a washer and nut on both of the bolt assemblies and use the torque stick and an impact wrench to tighten to 75 ft-lb.
8. Repeat **Steps 5 - 7** on the top of the BL display section.
9. Slowly lower the lower-right (BR) display section until the top or the lower-left and lower-right display section.

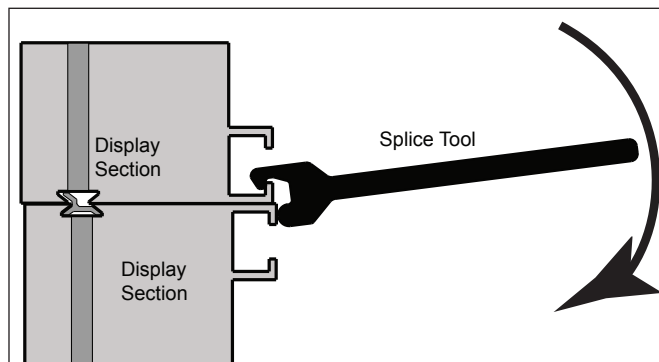


Figure 10: Aligning Display Sections with Splice Tool

10. Carefully move the lower-right display section until it contacts the lower-left section.
11. Pull the lower-right display section back until it engages the splice key in the lower-left display section.
12. Use the splice wrench to pull the display sections flush. Refer to **Figure 10**.
13. Slide the bolts in the lower-right display section in the vertical mounting channel until they engage in the U-Shaped mounting plate slots.
14. Use the provided torque stick provided to tighten all of the splice plate nuts to 75 ft-lb.
15. Verify the face of the display sections are flush.
16. Verify the LEDs between the display sections are aligned with each other.
17. Locate the 72" splice tube. Refer to **Figure 11**.

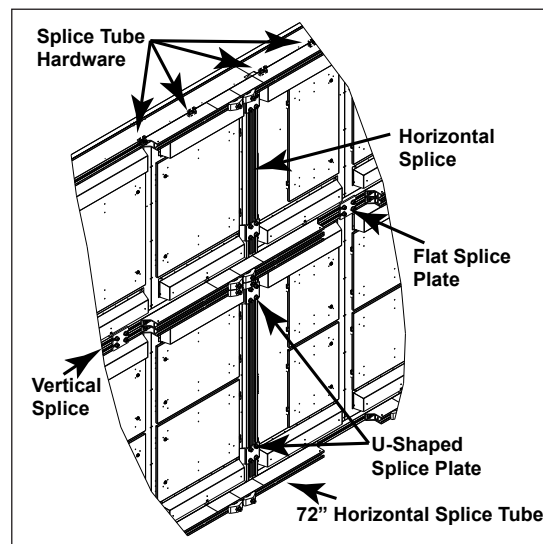


Figure 11: Horizontal Splice Assembly

18. Slide two U-Channel and bolt assemblies into the horizontal mounting channels each side of the horizontal splice.
19. Place the 72" splice tube over the four bolt assemblies.
20. Starting on the ends of the splice tube, place a washer and nut on the end of the bolt.
21. Use the torque stick and an impact wrench to tighten the nuts to 75 ft-lb.
22. Place a washer and nut on the middle two bolt assemblies of the splice tube assembly.
23. Use the torque stick and an impact wrench to tighten the nuts to 75 ft-lb.
24. Repeat **Steps 17 - 23** on the top and bottom splice locations.
25. Locate the bundle of power splice wires behind the display power entrance. This bundle will have three black wires and a green ground wire.
26. Feed the power splice cables from section to section through the holes in the display perimeter.
27. Connect the green ground wire to the ground lug in the term panel.
28. Connect the black wire to Line 1 on the term panel.
29. Connect the wire with the red tape to Line 2 on the Term Panel.
30. Connect the wire with the white tape to the neutral lug on the breaker panel.
31. Neatly secure any excess wire.
32. Locate the set of duplex fiber located to the left of the DMP in the display or in the power entrance bay.
33. Feed the duplex fiber from section to section through the holes in the display perimeter.
34. Connect the duplex fiber labeled "FIB_J B BL PRL1_IN BR" to PLR Port A.
35. Connect the duplex fiber labeled "PLR1_OBR CNTRL_SEC" to PLR Port B.
36. Neatly secure any excess fiber.
37. Repeat **Steps 2 - 36** for the top display sections.

4.3 Vertical Display Splicing

1. Ensure the splice key is in the splice channel and the alignment brackets are installed on the bottom display section. Refer to **Figure 12**.
2. Locate the U-Shaped splice plates.
3. Slide two bolt and U-Channel assemblies into the bottom of the horizontal mounting channels on in the bottom display section.
4. Mount the U-Shaped splice plate approximately 6" from the ends of the display and so half of it is ready to engage the top display section.
5. Place a washer and nut on both of the bolt assemblies and use the torque stick and an impact wrench to tighten to 75 ft-lb.

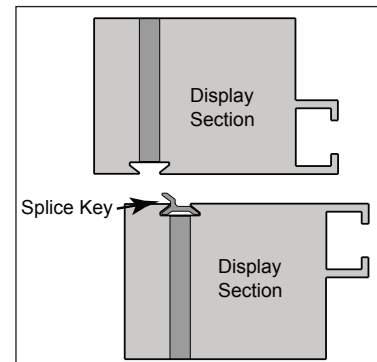


Figure 12: Installed Splice Key

6. Locate the flat splice plates. Refer to **Figure 13**.

7. Slide two bolt and U-Channel assemblies into the bottom of the horizontal mounting channels on in the bottom display section so the flat splice plates will be evenly distributed along the back of the display.

8. Slide the bolt assemblies into the notches on the bottom of the flat splice plates.

9. Place a washer and nut on each of the bolts.

10. Use the torque stick and an impact wrench to tighten the bolts to 75 ft-lb.

11. Repeat **Steps 7 - 10** for all flat splice plates.

12. Carefully lower the top display section until it contacts the bottom display section.

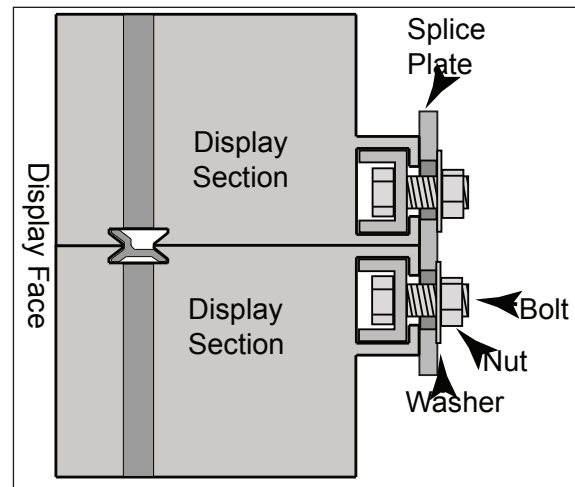


Figure 13: Installed Flat Splice Plate

13. Pull the top section back until it engages the splice key in the bottom display section.

14. Slide the bolts in the lower-right display section in the vertical mounting channel until they engage in the U-Shaped mounting plate slots.

15. Use the torque stick provided with the spare parts and an impact wrench to tighten all of the splice plate nuts to 75 ft-lb. Lift the display top section off of the trailer.

16. Slowly lower the display top section until it rests above the bottom section.

17. Continue lowering the display until it rests on the display bottom sections and the splice key is inside the display top section splice channel.

18. Starting at one end of the display, insert the top lip of the splice wrench into the top section mounting channel. Refer to **Figure 10**.

19. Rest the bottom lip of the splice wrench against the back of the bottom section mounting channel.

20. Firmly pull down on the splice wrench until the back of both display sections align and the splice key is fully engaged in the top and bottom section splice channels.

21. Repeat **Steps 19 - 20** approximately every foot along the back of the display.

22. Verify the LEDs in the display top section and the display bottom section align with each other.

23. Ensure the display sections align from front to back.

24. Starting at one end of the display, place the flat splice plates over the bolts and place a nut and washer on each bolt. Refer to **Figure 14**.

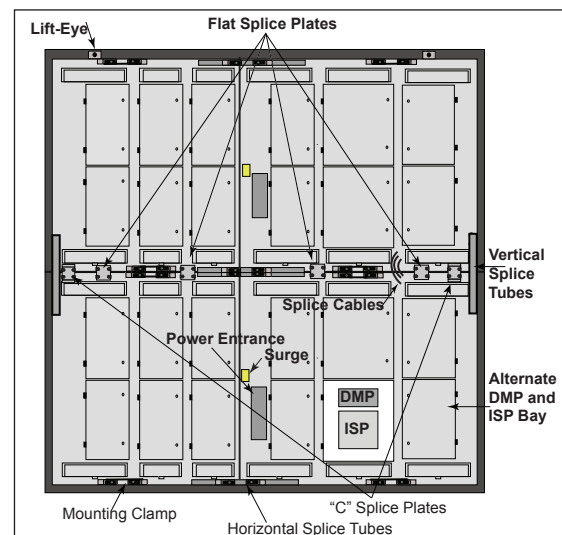


Figure 14: Splice Plate Installation Locations on Two Section Display

25. Using an impact wrench, tighten all of the nuts on the mounting plate.

26. Attach and secure all mounting plates along to the top section.

27. Remove the alignment bracket from the bottom display sections.

28. Locate the splice tubes and mounting hardware.

29. On one end of the display, slide a bolt and U-Channel assembly into the top of the mounting channel on the bottom section.

30. Slide a U-Channel assembly into the bottom of the top section mounting channel.

31. Place the splice tube so the bolts installed in **Step 29 - 30** are in the holes in the splice tube.

32. Install a nut and washer on each of the two bolts.

33. Align the splice tube so it is evenly distributed between the top and bottom display sections. Refer to **Figure 15**.

34. Use the torque stick and an impact wrench to tighten the nuts to 75 ft-lbs.

35. Repeat **Steps 29 - 34** on the other end of the display.

36. Locate the border splice plate. Slide the splice plates over the bolts on the top and bottom border section splice opening on each end of the display.

37. Complete the steps in **Section 3** to install the billboard.

38. Connect the signal splice cables, located in the spare parts box, from the display top section Signal A on the bottom section to Signal A on the top section and Signal B on the bottom section to Signal B on the top section.

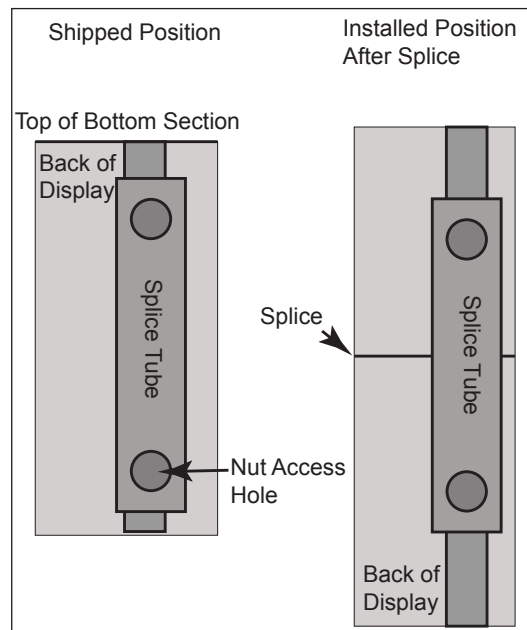


Figure 15: Aligning and Installing the Vertical Splice Tubes

Section 5: Border Installation

5.1 Border Installation

Top Border Installation

1. Place the top border to the display top section. Refer to **Drawing B-317987** in **Appendix A**.
2. Push the border T-bolts through the border T-bolt notch. Turn the bolt 90° to lock the bolt into the channel. Refer to **Figure 16** and **Figure 17**.
3. Slide the border bolt to one of the narrow ends of the border bolt notch.
4. Attach a $\frac{1}{2}$ " flat washer and $\frac{1}{2}$ " nut on the border bolt.
5. Ensure the bottom of the border aligns with the bottom of the display.
6. Tighten the border T-bolts. Refer to **Figure 17**.
7. Install the side borders on the display top section before lifting the display.
 - a. Place the side borders on the side of the display top section.
8. Push the border bolts through the border bolt notch.
9. Turn the bolt 90° to lock the bolt into the channel.
10. Slide the border bolt to one of the narrow ends of the border bolt notch.
11. Place a $\frac{1}{2}$ " flat washer and $\frac{1}{2}$ " nut on the border bolt.
12. Ensure the bottom of the border aligns with the bottom of the display.
13. Tighten the nuts on the T-bolts.

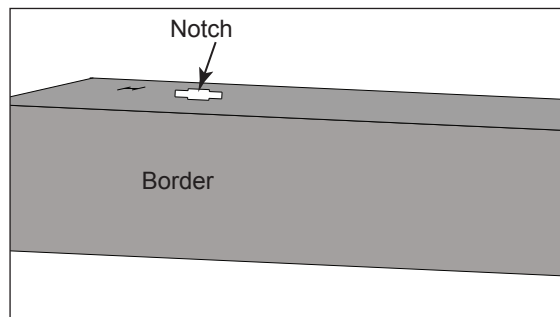


Figure 16: Border Notch

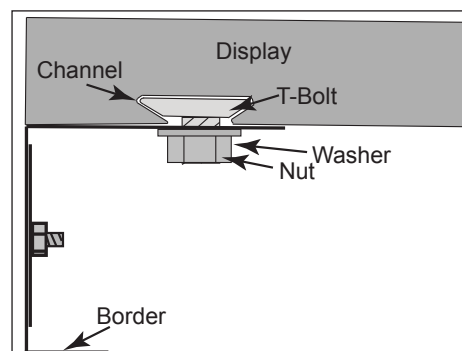


Figure 17: Border Installation Profile

Bottom Border Installation

1. Place the lower vertical borders against the side of the display.
2. Push the border bolt through the lower border bolt notch.
3. Turn the bolt 90° to lock the bolt into the channel.
4. Slide the border bolt to one of the narrow ends of the border bolt notch.
5. Place a $\frac{1}{2}$ " flat washer and $\frac{1}{2}$ " nut on the border bolt.
6. Ensure the bottom of the border aligns with the bottom of the display.
7. Tighten the nuts on the border T-bolts.
8. Insert and fasten border T-bolts in the remaining bolt notch locations.

9. If applicable, attach the second vertical border. Ensure the top of the second vertical border is flush with the top of the display.
10. Splice the vertical border sections together with border splice plates. Splice plates attach to the rear of the border with the provided nuts.
 - Do not drill holes out to make the border fit.
 - Adjust the border if needed.
11. Repeat **Steps 1 - 10** to attach the vertical border on the other end of the display.
12. Place the corder splice plate behind the vertical and horizontal borders.
13. Attach the front corner splice to the vertical and horizontal borders and the corner splice plate.
14. Place the bottom border to the display top section.
15. Push the border T-bolts through the border T-bolt notch. Turn the bolt 90° to lock the bolt into the channel.
16. Slide the border bolt to one of the narrow ends of the border bolt notch.
17. Attach a $\frac{1}{2}$ " flat washer and $\frac{1}{2}$ " nut on the border bolt.
18. Ensure the bottom of the border aligns with bottom of the display.
19. Tighten the nuts on the bottom border T-bolts.
20. Locate the flat splice plates and nuts used on border splice locations. Refer to **Figure 18**.
21. Slide the splice plate over the studs on the back of the border between the two border sections.
22. Attach and tighten the two nuts.
23. Repeat **Steps 21 - 22** on all splice seams.
24. Locate the corner splice plates, splice covers, and nuts for each corner. Refer to **Figure 19**.
25. Locate the corner splice plate over the stud on each border piece that creates a corner.
26. Slide the corner splice cover studs through the holes in the corner splice plate.
27. Attach and tighten the nuts that secure the corner splice plate to the border and secures the corner splice cover to the splice plate.
28. Repeat **Steps 25 - 27** on for each corner.

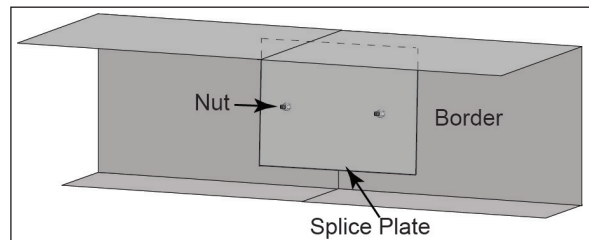


Figure 18: Flat Seam Splice Installation

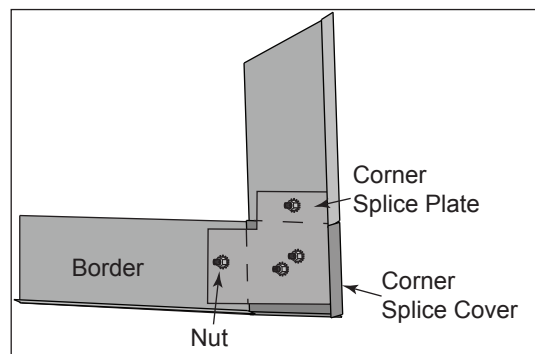


Figure 19: Border Corner Splice Detail

Section 6: Multi-Direction Light Sensor Installation

The Multi-Direction Light Sensor (MDLS) is shipped attached to the display borders in a location provided by the Project Manager. If needed, use the following steps to move the MDLS to a location that receives the same light as the display face.

6.1 Multi-Direction Light Sensor Installation

1. Before installing a photocell, verify that all of the mounting components were shipped. If you are missing any of the parts, immediately contact the project manager. There should be:

- 1 MDLS with attached 25' cable
- 2 Tek screws
- 30' or 100' cable (located in the spare parts box)

2. Determine the best location to mount the MDLS. Select an area not shaded by trees, buildings, or other structures that may affect the readings. This would typically be the side of the display closest to traffic. Ideally, the MDLS front is exposed to the exact same lighting conditions as the display face.

Note: The MDLS comes preassembled to mount to the right side of the display. If needed, loosen the attachment bolts and flip the MDLS assembly on the mounting arm. Refer to **Figure 20** or **Figure 21** or **DWG-1000019** for mounting and assembly details.

3. Using Tek screws, fasten the MDLS mounting arm to the side of the display border. Mount the arm as close to the bottom of the display as possible without interfering with the movement of the webcam arm (if applicable).
4. Route the 25' cable from the MDLS assembly to the connection below the display power entrance. If needed, attach the extension cable from the spare parts box.
5. Using zip ties, attach the cable to the zip tie anchor points along the back of the display.
6. After the display is running, test the MDLS by covering it with a heavy piece of fabric to dim the display. It may take a few minutes for the display to noticeably dim.

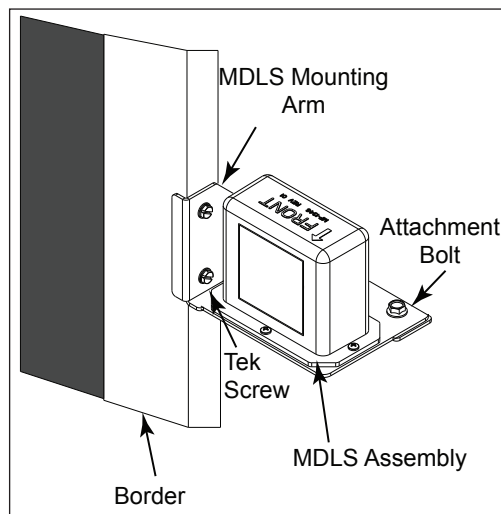


Figure 20: MDLS on Right Side of Display (From Front)

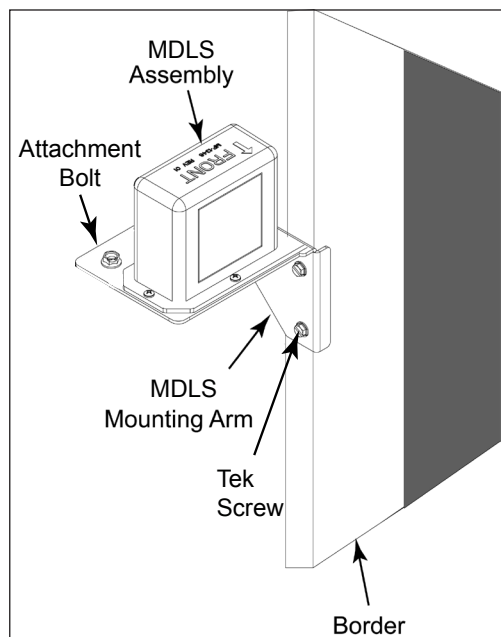


Figure 21: MDLS on Left Side of Display (From Front)

6.2 Temperature Sensor Installation

1. Locate A intake hood along the bottom row of the display and just to the left of the display center label. Refer to **Figure 22**.
2. Use the provided tek screws to secure the bracket to the side of the intake hood.
3. Connect the temperature sensor jack to the quick connect below the power entrance on the bottom section.
4. Neatly secure any excess cable.

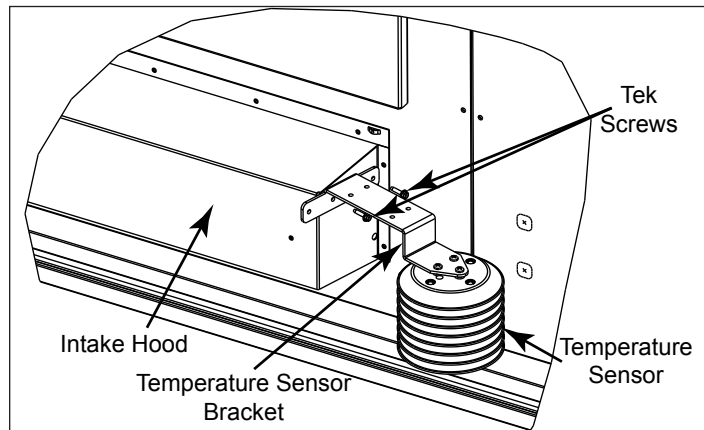


Figure 22: Photocell Installation

Section 7: Webcam Installation

This section provides instructions on mounting the optional webcam to a Daktronics digital billboard display. Depending on size, your display will either be shipped with a fixed length webcam arm or retractable webcam arm. For additional mounting or assembly details, refer to the arm-specific drawings located in **Appendix A**.

7.1 Mounting the Webcam to the Arm

1. Locate and identify all webcam mounting components.
2. Using the wire shipped in the webcam arm, pull the Ethernet and ground cables through the webcam arm.
3. Verify there is enough excess cable to allow the webcam arm to pivot if needed.
4. Slide the webcam between the top and bottom tube saddles until it is two inches from the end of the webcam arm. Refer to **Figure 23**.
5. Tighten all four saddle bolts.
6. If necessary, turn the webcam assembly until it will face the display when mounted.

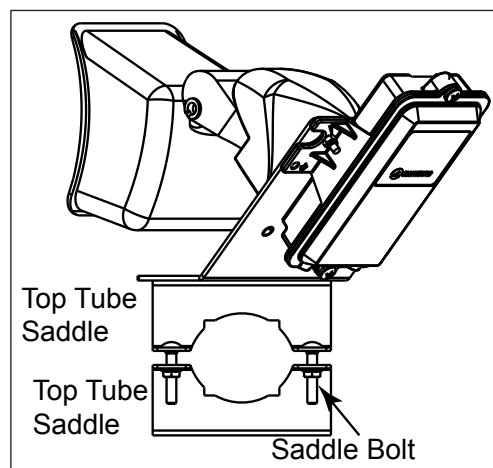


Figure 23: Mobotix Webcam Mounting

7.2 Adjustable-Length Webcam Arm Installation

Daktronics ships all displays less than 15' tall with a webcam with an adjustable-length arm. The maximum length for the adjustable webcam arm is between 10' and 15'. The reason for the adjustable length is that, for every foot of display height, the webcam must be an equal number of feet from the display face to be able to view all of the modules on the display face. For example, a display 14' tall must have the webcam approximately 14' from the display face. A 20' webcam arm is shipped with all displays taller than 15'. Refer to **DWG-1065544** and **DWG-1067554** in **Appendix A** while following the installation instructions.

Installation

1. Determine the side of the display to mount the arm. The webcam should be mounted on the side of the display away from oncoming traffic. This ensures the view of the display is not inhibited.
2. Remove the mounting bolts and the mounting channel from the assembly.
3. Slide two of the mounting channels and bolts into the horizontal mounting channel on the display back. Refer to **Figure 24**.
4. Slide the two remaining channels into the vertical mounting channel on the display back.
5. Place the bolting template over the bolts in the channel. The bolting template is important as it makes mounting the arm assembly easier. Refer to **Figure 24**.
6. Mount the elbow assembly to the back of the display by sliding the mounting bolts through the arm mounting assembly.
7. Place washers on all four mounting bolts.
8. Securely fasten a nut on each mounting bolt.
9. Fasten a second nut on each mounting bolt. The second nut serves as a lock nut to secure the first nut.
10. Slide the webcam arm into the lower part of the elbow arm assembly. The webcam arm slides 12" into the elbow assembly.
11. Ensure the webcam is on the top of the webcam arm and tighten the arm set bolts.
 - For a 10' arm, the webcam arm bolts must feed through the pivoting arm, the 6' arm section and the 10' arm section. This will set the webcam 10' from the display face.
 - For a 15' arm, insert one set of bolts through the pivoting arm and the 6' arm section. A second set of bolts is inserted on the end of the 6' arm section away from the display face and at the base of the 10' arm section. This will set the webcam 15' from the display face.
12. Tighten all mounting and webcam assembly bolts.
13. Insert the handle to the top of the vertical tube and fasten with a clevis pin.
14. Connect the webcam cable to the Webcam 1 connection below the power entrance box on the back of the display.

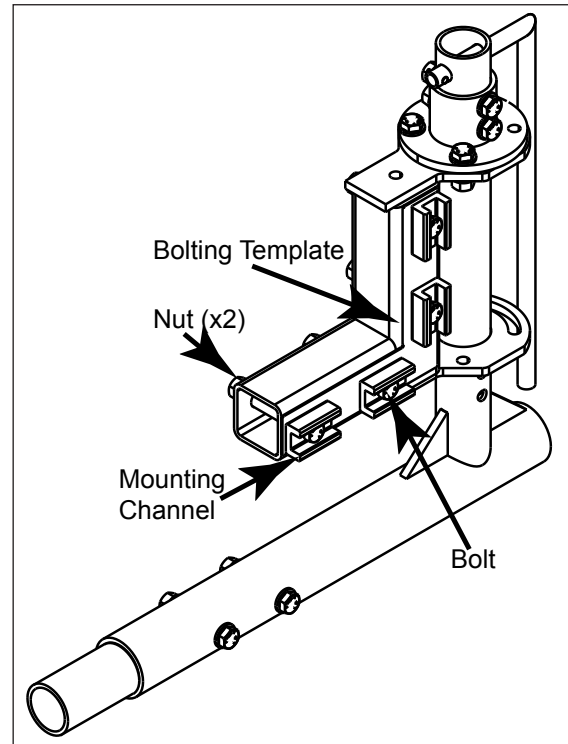


Figure 24: Pivoting Webcam Arm Base

15. Secure the green webcam grounding wire to the grounding lug along the perimeter of the display back. Refer to **Figure 25**.
16. Neatly secure excess grounding wire with cable ties.
17. Ensure all webcam and webcam mounting bolts are secure prior to hanging the display.
18. After hanging the display, connecting display power, and starting the display, call Daktronics Help Desk and have a technician verify they can detect the webcam. If the webcam is not detected, ensure the Ethernet cables are securely attached to the camera and display. Make sure the POE injector has power and is connected with Cat-5e cable to the network switch or the router.
19. Work with the Help Desk to ensure the camera is aligned properly. If adjustment is required, pivot the arm to the display face and adjust as needed.



Figure 25: Webcam Grounding Lug

Retracting the Webcam Arm

1. To retract the webcam arm, remove the three short bolts from the top of the elbow assembly.
Note: Do not remove the long bolts.
2. Use the handle to carefully pivot the webcam arm to the front catwalk.
Note: Verify that the power and signal cables do not get pinched when pivoting the webcam arm.
3. Return the webcam arm to the original position when done servicing the webcam arm.
4. Replace and tighten the three short bolts.
5. Work with Daktronics Help Desk to verify the webcam is focused and functioning properly.

7.3 Fixed Webcam Arm Installation

1. The webcam arm is shipped with all hardware and arm components. Remove the $\frac{5}{8}$ " nuts and washers from the arm assembly before installing the webcam arm. Refer to **Figure 26**.
2. Before hanging the display, slide both mounting channels with the bolts into the horizontal mounting channel.
3. Align and slide the webcam mounting assembly over the four mounting channel assembly bolts.

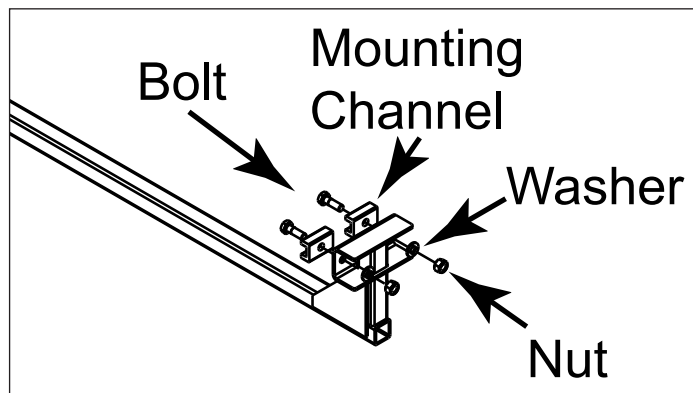


Figure 26: Fixed Webcam Arm Mounting

4. Place a washer on each $\frac{5}{8}$ " bolt.
5. Attach the $\frac{5}{8}$ " nuts to the bolts to secure the mounting assembly to the display.
6. Using fish tape, feed the webcam through the webcam arm tube.
7. Connect the webcam cable to the Webcam 1 connection below the power entrance box on the back of the display.
8. Secure the green webcam grounding wire to the grounding lug along the perimeter of the display back.
9. Neatly secure excess grounding wire with cable ties.

Section 8: Electrical Installation

This section provides general guidelines for connecting power to a 4203 series Daktronics digital billboard. For display-specific power requirements, refer to the display-specific riser diagram or contact the Project Manager. It is very important to provide the site-required power to the display as listed on the system riser drawing. Low or poor power can result in dim content, parts of the display out, module flickering, or display damage. It is also important to test the display ground to verify it is grounded to 10 ohms or less. Failure to properly ground the display can result in display damage and may null and void any warranties.

8.1 Display Disconnect Device

IEC requires that permanently connected equipment has a readily accessible disconnect external to the display. Daktronics recommends providing a display shut off at the base of the structure. It is the electricians responsibility to install a disconnect device that complies with all local and national codes.

8.2 Electrical Installation for 120 and 240 VAC Displays

Note: Daktronics ships the display with the proper equipment for 120 VAC or 240 VAC based on the display location and the order from the customer. In cases where it is a 240 VAC application, there is a step-down transformer for control equipment installed on the display by Daktronics.

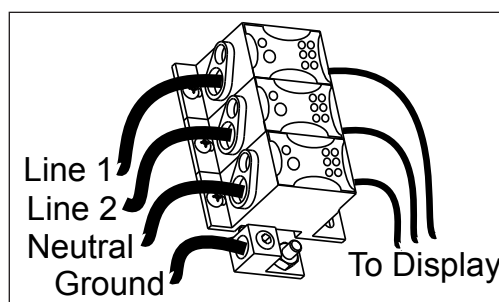


Figure 27: Power Distribution Block

1. Refer to the display riser diagram for site-required power.
2. Run conduit from the main distribution panel (provided by customer) to the display power entrance(s). On a single section display there is only one power entrance. On multiple-section displays, there is a power entrance for each level.
3. Loosen the six screws that secure the power entrance cover and lift the cover off of the power entrance. Refer to **Figure 27**.
4. Feed power cable through the conduit into the power entrance.
5. Connect the ground wire to the ground lug at the bottom of the power entrance box (green wire) and tighten to 45 in-lbs with a $\frac{3}{16}$ " Allen wrench. Refer to **Figure 28**.
6. Connect power line 1 (L1) to Line 1 of the tap and use a $\frac{3}{16}$ " Allen wrench to tighten to 57 in-lbs.
7. Connect power line 2 (L2) to Line 2 of the tap and use a $\frac{3}{16}$ " Allen wrench to tighten to 57 in-lbs.
8. Connect the neutral line to the neutral tap.
9. Verify the breakers for the control equipment and surge suppressor are on.
10. Verify the breaker for the Backlit ID is off unless there is a backlit ID installed.
11. Replace and secure the power entrance cover.

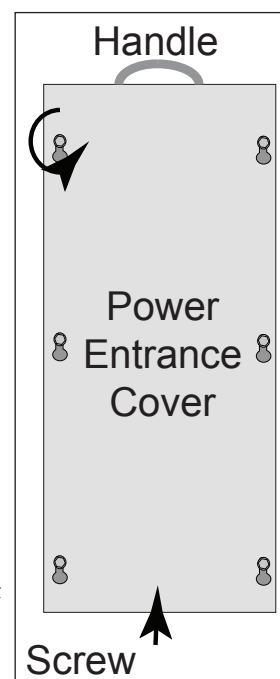


Figure 28: Power Entrance Access

8.3 Display Grounding

Daktronics recommends that the customer install a ground rod. Daktronics recommends 10 Ohms or less impedance. Multiple ground rods may be needed to achieve this. Refer to local and national codes on grounding and bonding methods.

Daktronics does not recommend using the support structure as an earth-ground electrode; concrete, primer, corrosion, and other factors make the support structure a poor ground.

Note: The support structure may be used as an earth-ground electrode only if designed to do so. A qualified inspector must approve the support structure and grounding methods.

Section 9: Spare Parts Box Installation

9.1 Spare Parts Box Installation

It is important to properly mount the spare parts box. To do so:

- do not mount the box in a location that inhibits maintenance personnel from accessing the display.
- ensure the lid is on top.
- ensure the lid latch is easily accessible.
- ensure the lid opens completely.
- mount the spare parts box by welding or bolting the feet to a catwalk.
- always lock the spare parts box when leaving site.



Figure 29: Billboard Spare Parts Box

Section 10: Control System Overview

For the 4203 series of displays, the control components are enclosed in the display.

10.1 Fully Embedded Control System

For the 4203 series of digital billboards, Daktronics has two major components. The ISP enclosure and the DMP-8065 are shipped in the same bay. Display backs are labeled with component locations to make finding components easy. The table below describes each the control system in more detail. Refer to **Figure 30** and **Figure 31** while reading the component descriptions below.

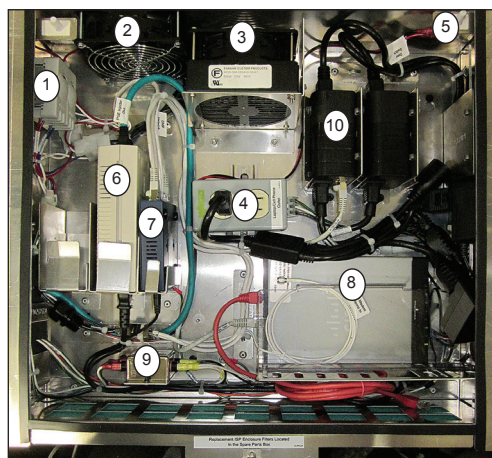


Figure 30: ISP Enclosure

	Component	Function
1	Thermostat	Measures the temperatures inside the ISP enclosure and turns on the fan or the heater as needed.
2	Fan	High heat can damage some electronics, the fan cools the ISP enclosure to keep the equipment in a safe functional range.
3	Heater	Since ISP equipment is affected by lower temperatures, a heater prevents the ISP enclosure from going below a functional range.
4	Laptop and Cell Phone Outlet	Can be used to charge laptop or cell phones. Do not plug drills or other power tools into this outlet.
5	Door Switch	Detects if the ISP enclosure door is open. If opened, an alert will be created and the content will switch to predetermined content.
6	POE Injector	This is optional. Supplies power through the webcam Ethernet cable.
7	Ethernet Switch	Connects network devices.
8	Router	Routes data coming in from the Internet.
9	Z-Filter	Suppresses electrical noise in the electrical line.
10	iBoot	Internet enabled power cycling device.
11	DMP-8065	Converts content data from the Internet into a format recognized by the display and sends it out to the ProLink Routers (PLRs) in the display.

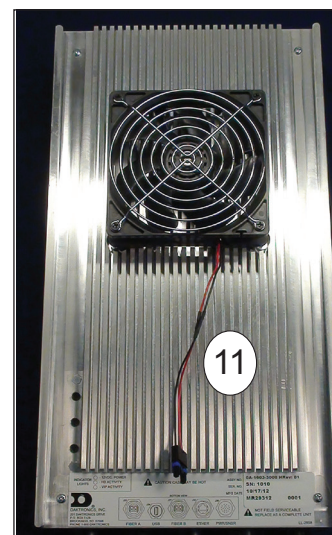


Figure 31: DMP-8065

Opening the ISP Enclosure

To access ISP enclosure components:

1. Access the ISP enclosure by opening the rear access door with the Control Equipment label.
2. Using a flat-head screwdriver, turn the two $\frac{3}{4}$ turn latches counter-clockwise.
3. For easier access to ISP components, the ISP enclosure door can be lifted off the hinges.

Section 11: First-Time Power Up

A laptop is required to communicate with the display. In the ISP enclosure, connect the red Ethernet cable with the Connect to Laptop tag to an Ethernet port on the laptop.

11.1 First-Time Power Up

1. Loosen the two $\frac{3}{4}$ turn latches that secure the Plexiglas ISP enclosure cover.
2. Open the ISP enclosure cover or, if desired, lift and remove the Plexiglas ISP enclosure cover off the hinges.
3. Install the modem and/or router according to the ISP schematic. Ensure the webcam (if applicable) is connected to the modem, the modem has power, and the modem is connected to the network switch.
4. Turn on site power at the main breaker at the structure base.
5. Verify the status lights on the surge suppressor are on.
6. Check the LED indicators on the equipment in the ISP enclosure to ensure they on.
7. Ensure the DMP-8065 LED indicators LEDs are on.
8. Connect a laptop to the red crossover cable in the ISP enclosure.
9. Call Daktronics help desk at 1-605-697-4000 to verify connectivity to the display, perform a diagnostics check, and perform several display setting checks.
10. After the help desk verifies the diagnostics is clean and has performed their tasks, disconnect the laptop from the cross-over cable and reinstall the Plexiglas ISP enclosure cover.

Section 12: Testing and Adjustment

This section provides procedures on how to perform some final tests and adjustments on the billboard and billboard components to verify they are functioning and adjusted properly.

12.1 Diagnostics Checks

After the display is connected to the Internet and running, Daktronics Help Desk will monitor the display and perform some checks to determine if there are any:

- Module issues
- Internet or connectivity issues
- Webcam issues
- Display temperature issues
- MDLS issues

12.2 Display Image Quality

After the display is showing content, visually inspect the display for:

- Inaccurate or off color
- Module edges
- The display is too dim or bright
- Modules out
- Abnormal flashing
- Modules stuck on
- Pixels stuck on or bright

Work with Daktronics Help Desk to address any visual issues.

12.3 Test the Light Sensor

Contact Daktronics Help Desk and perform these steps to verify the MDLS in functioning properly. To test the photocell:

1. Carefully cover the MDLS with a heavy piece of cloth.
2. Watch the display for a few minutes to verify the display dims.
3. Have a Help Desk technician verify the display is dimming properly.
4. Work closely with the Help Desk technician to correct any issues.
5. Remove the fabric from the MDLS.

Appendix A: Reference Drawings

Appendix A contains drawings and quick guides that are generic to Daktronics digital billboards. Project-specific drawings and documents take precedence over the documents in this section.

Ledger Assembly	DWG-988359
Billboard Catwalk Mounted Webcam Arm.....	DWG-1065545
Billboard Fixed 10' Webcam Arm	DWG-1067554
Multi-Direction Light Sensor Mounting Assembly.....	DWG-1000019

Appendix B: Limitation of Liability

Daktronics Warranty and Limitation of Liability **SL-02374**