DXB SERIES DIGITAL BILLBOARD

SERVICE MANUAL

P2177

DD4140427
Rev 02
21 April 2025

201 Daktronics Drive
Brookings, SD 57006-5128
www.daktronics.com/support
800.325.8766

DAKTRONICS

FCC Statement

Supplier Declaration of Conformity (SDoC)

This product complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

Warning: The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

Industry Canada Regulatory Information

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Inquiries

Contact Daktronics with any questions regarding our product compliance.

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1 Introduction

Important Contact Information

Daktronics Customer Service: 1-800-DAK-TRON (325-8766)

Project Manager:_____ Phone Number:

Email: Billboardservice@daktronics.com

Display Identification

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

Figure 1: *DXB Series Display Label*

Display Assembly Number **Display Serial Number** **Manufacture Date (Day/Month/Year)**	DXB-0X00 Modules High X Modules Wide RMN: Daktronics - 0204 - 09 Manufactured in Sioux Falls, SD 120/208/240 VAC, Single Phase, 60 HZ AMPS (L1/L2) Total Watts

Spare Parts

Every Daktronics digital billboard is shipped with spare parts that include commonly replaced components. The table lists some of the components that may be included in the spare parts rack. Refer to the spare parts inventory list contained in the bag in the spare parts rack for a list of the parts. Contact the Region Service Specialist (RSS) to order additional spare parts.

Component Description
Power Supply
Module
Air Filter
4-Pin Mate N Lok Plug
Splice Tool (Sectional Displays Only)
72" SATA Cable
28" SATA Cable

Field Replaceable Units

The table below lists names of components that can be replaced in the display and the control system. Some of these components are located in the spare parts rack. Contact the RSS to order components when needed.

Display FRUs	Control System FRUs
ProLink Router	Temperature Sensor
Power Supply	VIP-5160.2
Module	Light Sensor - MDLS
Surge Suppressor	Ethernet Switch
120 VAC 16 A Relay	Mobotix Webcam
3 Pole Contactor	iBoot Bar
Axial Fan .4 A 115 Volt	500 W Heater
12 VDC Relay	DMP-8000 Player
15 Amp Breaker	60 V Surge Protector
20 Amp Single Pole Breaker	SmartLink™
15 Amp 1P Breaker	Meraki Router
20 Amp 2P Breaker	Axial Fan .16 A
6 Amp 1P Breaker	Filter
72" SATA Cable	
28" SATA Cable	
Line Filter	

2 Display and Control Overview

This section describes generic power and signal paths for Daktronics digital billboards. Refer to display-specific signal and riser drawings for component locations on your display.

Display Control System Flow Overview

Figure 2 shows the location of the ISP enclosure and the SmartLink™ power control device. The control system bay or components may vary slightly by display. Refer to project-specific drawings for display control location, signal path, and power path.

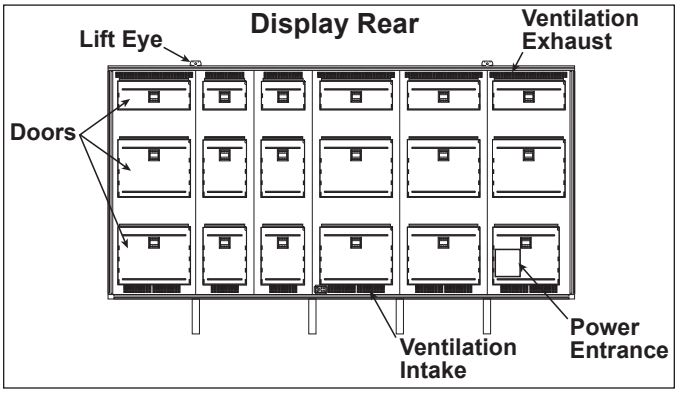


Figure 2: *DXB Series Control Components*

Display Power Overview

Each 400 W power supply powers four modules in DXB series billboards. In most cases, the module power path follows the signal path.

Power to the display section enters into the termination panel and is redistributed to the power supplies. Refer to the layout drawing for display-specific power distribution.

Display Signal Overview

This section provides generic signal path illustrations for even tall height, odd by even tall height, and odd by odd tall height.

Signal is sent from the DMP-8000 to the VIP-5160. The VIP-5160 sends signal to the PLR, which sends the signal to the first module in the section. From that module, the signal is sent to the other modules in the section. The PLR not only sends signal to the first module in the chain but also receives signal from the last module in the chain and creates a redundant signal path.

Even Module High Section Signal Path

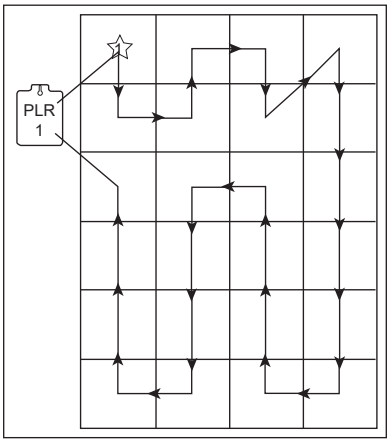


Figure 3: *Even Tall Height Signal Routing Example*

Odd x Even Module High Section Signal Path

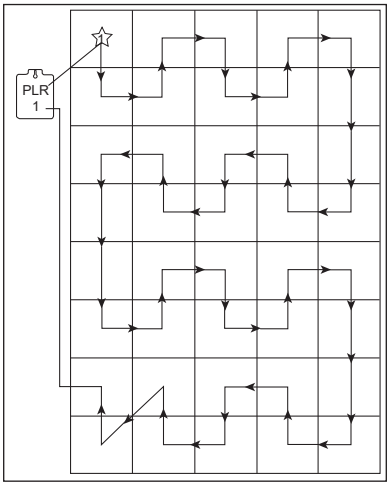


Figure 4: *Odd x Even Height Signal Routing Example*

Odd x Odd Module High Section Signal Path

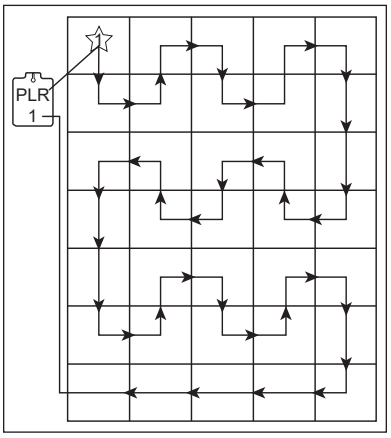


Figure 5: *Odd x Odd Height Signal Routing Example*

3 Troubleshoot the Display

Remotely Cycle Power

Daktronics DXB series displays ship with an integrated SmartLink™ for remote power control of display components. The SmartLink™ has four relays for independent control of various components as shown in the relay table. The DMP-8000 monitors equipment on the network and attempts recovery via communication between it and the SmartLink™. Refer to **Figure 6** while reading the relay function table:

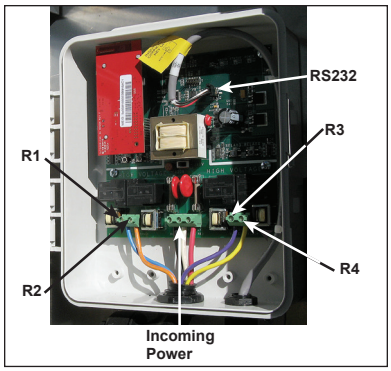


Figure 6: *SmartLink™*

Relay	Component
R1	ISP Enclosure
R2	DMP-8000/VIP-5160.2
R3	Display
R4	Auxiliary Power

If remote troubleshooting is desired, call Daktronics customer service at 1-800-DAK-TRON (325-8766) for assistance. Do not press the buttons in the SmartLink™ to cycle power to the components because it can take as long as an hour to reset the relays.

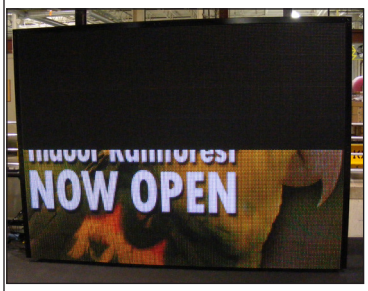
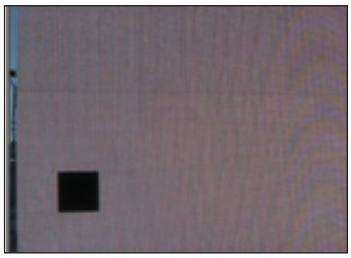
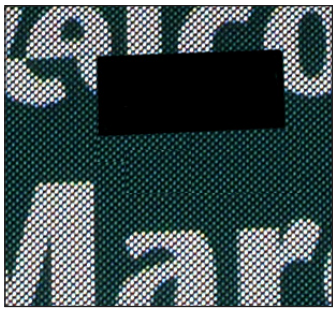
Figure 7: *SmartLink™ Relay Bank*

Troubleshoot the Display

Work with Daktronics help desk or experienced technicians to address display issues. Refer to the following table for troubleshooting steps.

Issue	Issue Image	Troubleshooting Steps
Entire display blank		1. Verify there is power to site by ensuring the power supply indicators are on. If they are on, there is power to site and it is most likely a signal issue. If there is site power, continue to **Step 3**. 2. Verify the contactors for each display section are closed and allowing power to the display and control system. 3. Verify the ProLink Router (PLR) is receiving power. If the LED indicator lights are on, unplug and re-establish power to the PLR. 4. Verify the fiber cables from the Digital Media Player (DMP) to the PLR are connected. 5. Call Daktronics customer service at 1-800-DAK-TRON (325-8766) and verify the content that was supposed to play was successfully uploaded / sent to the display.

Issue	Issue Image	Troubleshooting Steps
Content switched between display sections		1. Check the fiber interconnect cables between the display sections because they may be switched. Port A should be connected to Port A. Port B should be connected to Port B. 2. Check the fiber cables coming from the DMP because they may be switched.
Scattered or out of order content		1. The SATA cable and redundant SATA cable from the PLR to the modules may be switched. 2. Call Daktronics help desk to verify the translation table is correct.
Area of content mixed up - module ID out of order		Verify the SATA cable path in that area is correct by comparing it to the display signal drawing. If not, correct the signal path.
Display too bright		1. Immediately call Daktronics help desk and have them blank the display. 2. Verify the Multi-Direction Light Sensor (MDLS) is connected. 3. Inspect the area for a light source shining on the Multi-Direction Light Sensor (MDLS). This may cause incorrect readings. If necessary, relocate the MDLS to a different area. 4. Verify the MDLS is mounted correctly. If not, remount the MDLS. 5. Have the help desk verify that the MDLS is set to multi-direction and automatic.
Display too dim		1. Verify the MDLS is connected. 2. Verify the MDLS is mounted correctly. If not, remount the MDLS. 3. Verify there is no debris or excessive dirt buildup on the three MDLS windows. 4. Have the help desk verify that the MDLS is set to multi-direction and automatic. 5. Have the help desk verify the display is not experiencing thermal dimming due to excessive heat.

Issue	Issue Image	Troubleshooting Steps
Blank display section		1. If applicable, verify the fiber interconnects are installed. 2. On displays with multiple sections or power entrances, verify the power interconnect cables between the display sections are connected. 3. Check the modules at the beginning and end of the affected area. This issue can be caused by disconnected or bad SATA cables on both of those modules. If the module power indicator is on, there is most likely a SATA cable issue. If the module power indicator light is off, there is most likely a module issue. 4. Measure site power and verify it meets the requirements listed on the system riser. If this issue appears when there is white or light content, it is possible there is insufficient power to the display. If this is the case, work with an electrician to establish the correct site power. 5. Verify the PLR has power and is functioning. Disconnect and reconnect power to the PLR. 6. Verify there is power to that display section by checking module status indicators on multiple modules. If there is no power, check the breakers on that section's term panel. 7. Check that the contactors in each display section are closed which means that section should be receiving power.
1 module out		1. Ensure the SATA and power cables to the module are connected and secure. 2. A SATA cable may be damaged. Replace both SATA cables to the module to see if this addresses the issue. 3. It is likely a bad module. Swap the module with a replacement module and verify that the new module functions correctly.
2 modules out		1. Check the status indicators on the rear of the modules. If the indicators are off, check the power indicator on the power supply for the affected modules. If the power supply indicator is off and there is power connected to the power supply, replace the power supply. 2. If there is power to the power supply and the modules, check the SATA cables to the modules. It is possible the SATA cables at the beginning and end of the affected modules are disconnected or bad.

Issue	Issue Image	Troubleshooting Steps
3 or more modules out in a line within the same PLR section		1. Check the modules at the beginning and end of the affected area. This issue can be caused by disconnected or bad SATA cables on both of those modules. If the module power indicator is on, there is most likely a SATA cable issue. If the module power indicator light is off, check the power supplies for the modules at each end of the issue are on. If not power or signal, it is most likely a module issue. 2. Measure the site power to verify it meets Daktronics requirements. If this issue is only seen with white or light-colored content, there is most likely a power issue. If there is insufficient power, work with an electrician to establish proper site power.

4 Access Internal Components

Rear Access

DXB series digital billboards have lift-off doors that are secured with a tab in the top-right corner. Refer to **Figure 8**.

1. Place fingers in slot located at the top-right corner of the door, as shown in **Figure 8**.
2. While pulling up on the handle in the center of the door, pull the top-right corner of the door outward so it clears the tab located on the display back sheet, as shown in **Figure 9**.
3. Lift the door upward to disengage its tabs from the slots on the display's back sheet, as shown in **Figure 10**.
4. Lower door until its top lip is free of the back sheet.

To completely move the door out of the way, disconnect the lanyard connected to the door.

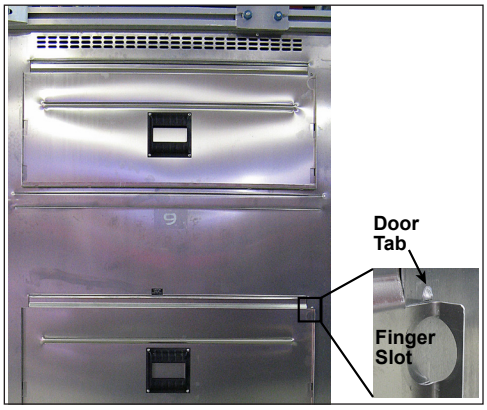


Figure 8: *Rear Access Door*

Figure 9: *Removing Door*

Front Access

Remove modules from the display front to gain access to the cabinet's interior. Refer to the steps in **Remove a Module (Front Access) (p.10)**.

Figure 10: *Removing Door*

5 Test and Remove Modules

Module Lanyard Attachment

Attach a module lanyard (located in the spare parts rack) whenever removing a module. To attach a module lanyard, follow these steps:

1. Attach one end of the lanyard to an attachment ring on the top of the of the module. Refer to **Figure 11**.
2. Feed the lanyard over a wire rod or through a nearby upright. Do not anchor the module to another module.
3. Attach the other end of the lanyard to the attachment ring on the top of the module.

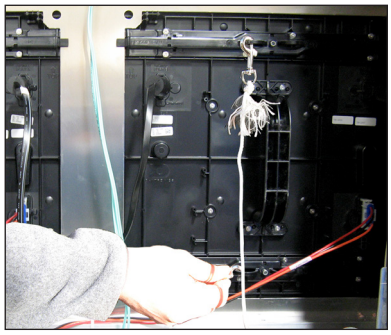


Figure 11: *Attach Safety Lanyard to Modules*

Remove a Module (Front Access)

Required Tools: 1/8" hex head wrench, module lanyard (from the spare parts rack)

1. Insert the 1/8" hex head wrench into the top access hole. Refer to **Figure 12**.
2. Turn the latch release one quarter turn counterclockwise. You should feel the module release from the display face.
3. Pull the module from the display face just far enough to reach the rear of the module.
4. Disconnect the power and SATA cables from the rear of the module.
5. Gently place the module on a clean and dry surface.

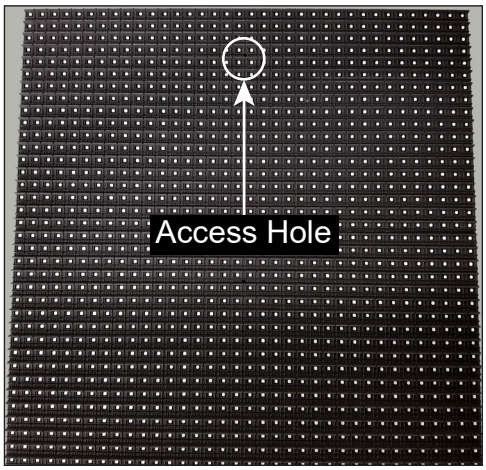


Figure 12: *Module Access Hole*

> **Note:** If there is no place to set the module, use a safety lanyard to hang the module from the display. Attach the safety lanyard in a way that takes up slack on the lanyard. Carefully let the module hang while ensuring it does not damage LEDs, louvers, or gasket.

Reinstall the Module (Front Access)

When installing new modules, place them in the outer ring of the display.

1. Reinstall the module by aligning it with the opening.
2. Reattach the power and SATA cables.
3. Carefully hook the bottom of the module into the module sheet and rotate the module top to the module sheet. Verify that SATA and power cables are not being pinched between the module and display face.
4. Firmly press the upper half of the module against the display face.
5. Insert the 1/8" hex head wrench into the top access hole and turn one quarter turn clockwise or until you feel it latch in place.
6. Gently pull on the module to verify it is properly seated.

Remove a Module (Rear Access)

Required Tools: 1/8" hex head wrench, or 1/8" L-handle hex head wrench for modules in the bottom or top rows of a section, module lanyard (from the spare parts rack)

1. Attach one end of the safety lanyard to a lanyard ring on the top of the module. Refer to **Figure 11**.
2. Feed the lanyard through the lanyard ring on the top of the display directly below the module that will be removed.
3. Attach the other end of the lanyard to the lanyard attachment ring on the bottom of the module that will be removed. Refer to **Figure 11**.
4. Disconnect the SATA and power cables from the back of the module.
5. With a 1/8" hex head wrench, turn the top latch gear approximately one quarter turn clockwise to disengage the latch.

> **Note:** Maintain a firm grip on the module as it is removed from the face sheet.

6. Rotate the module in a way that allows you to guide it through the frame opening without catching the louvers or LEDs on the cabinet. **Figure 13** shows proper module removal from the rear. **Figure 14** shows improper module removal from the rear.

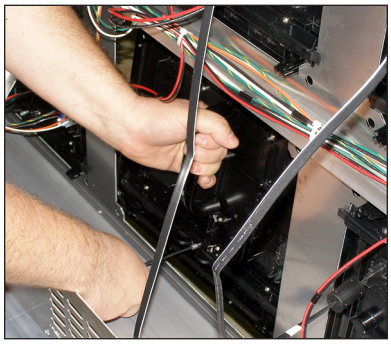


Figure 13: *Proper Module Removal From Back*

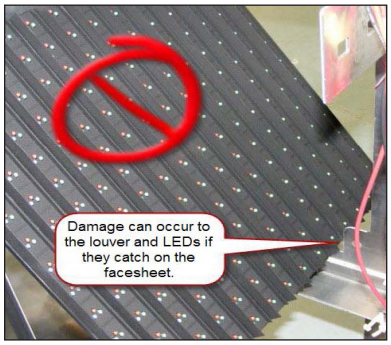


Figure 14: *Improper Module Removal From Back*

Remove a Fan Plenum

Fan plenums may need to be removed because they restrict access to modules in the bottom row of each section.

1. Disconnect the power harness attached to the fan. Refer to **Figure 15**.
2. Press inward on the bottom of each side of the fan plenum. Refer to **Figure 16**.
3. When the plenum tabs disengage, gently pull the plenum upward and remove it from the display. Refer to **Figure 17**.
4. Reverse **Steps 1–3** to reinstall the fan plenum.

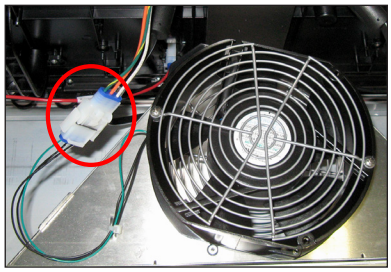


Figure 15: *Fan Power Harness*

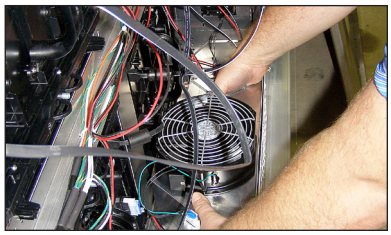


Figure 16: *Removing Fan Plenum*

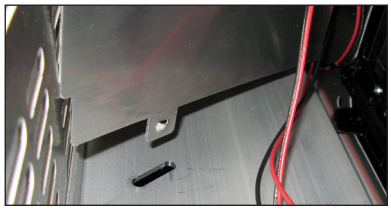


Figure 17: *Fan Plenum Tab*

Remove a Module from Behind a Term Panel or ISP Enclosure

Required Tools: Flathead screwdriver, 1/8" hex head wrench, module lanyard

1. Turn the quarter-turn latch on the right side of the term panel using a flathead screw driver.
2. While holding the term panel, allow it to slowly rotate open and out of the way. Refer to **Figure 18** and **Figure 19**.
3. Follow the steps in **Remove a Module (Rear Access) (p.11)** to remove a module and **Reinstall a Module (Rear Access) (p.13)** to reinstall a module.
4. If needed, carefully lift the ISP enclosure off of the hinges and set aside while ensuring power and signal cables do not get pinched.
5. Reverse **Steps 1–4** to replace the term panel or ISP enclosure.

Figure 18: *Swing Term Panel Out of Display*

Remove the SmartLink™ For Module Access

The SmartLink™ swings out of the way for module access. It can also be lifted off the of the hinges.

1. Locate the quarter-turn latch at the top-right of the SmartLink™.
2. Use a flathead screwdriver to turn the quarter-turn latch counter-clockwise until the SmartLink™ disengages.
3. Pull the SmartLink™ from the right to swing it out of the way. Refer to **Figure 20**.
4. If needed, carefully lift the SmartLink™ off of the hinges and set aside while ensuring power and signal cables do not get pinched.

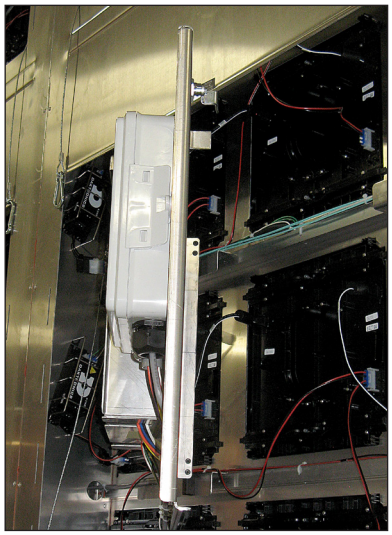


Figure 20: *Swing SmartLink™ Out of Display*

Figure 19: *Swing ISP Enclosure Out of Display*

Reinstall a Module (Rear Access)

When installing new modules, place them in the outer ring of the display.

1. Rotate and carefully guide the module through the module opening. Refer to **Figure 21**.

   Note: To ensure proper alignment, verify the word TOP printed on the back of the module is to the top left of the face sheet.

2. Once the module is through the display face, align the module with the face sheet. Ensure the lanyard or cables do not pinch between the module and the display.
3. After the module is in place, use the top module lanyard rings or the lanyard to pull the module firmly against the face sheet.
4. With a 1/8" hex head wrench, turn the top latch gear one quarter turn counterclockwise to engage the latch.

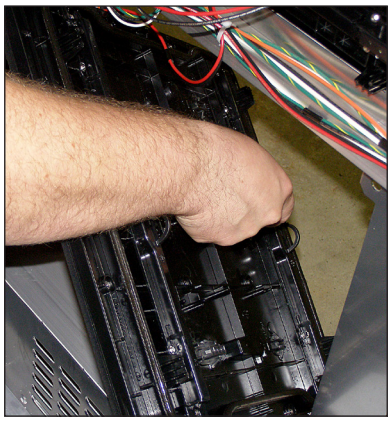


Figure 21: *Rotate Module To Clear Face Sheet*

5. Connect the SATA and power cables to the rear of the module.

6 Test and Replace Display Components

Test a Module

Module Status Indicators

Under normal operation, module indicator LEDs (one on each side on the back of the module) should flash once every two seconds. Refer to **Figure 22**.

> **Note:** When troubleshooting, the module may take up to eight seconds to change the pattern.

Perform a Module Self-Test

If a module is blank, but has power supplied to it, perform a module self-test to diagnose a module or SATA cable failure. To perform a self-test, follow these steps:

Visit youtu.be/M61KEMAOdaM to view a video about performing a module self-test.

1. Attach a SATA cable to Port A and Port B on the module. Refer to **Figure 22**.
2. Disconnect the power to the power supply for 10 seconds.
3. Reconnect the power to start the self-test.
4. Verify the module is running a self-test.

Remove the SATA cable and cycle power to the module to stop the self-test.

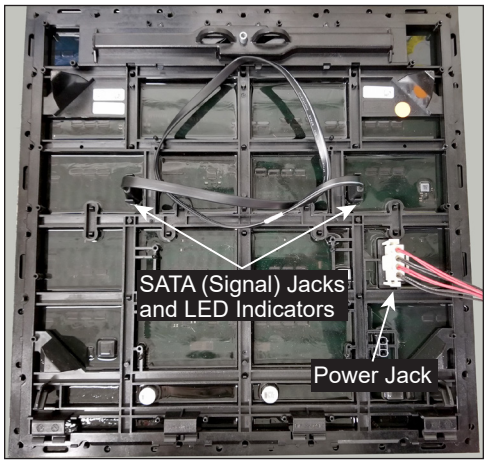


Figure 22: *Labeled Module Back/Module Self-Test Set Up*

For more information, refer to **Performing a Daktronics Digital Billboard Module Self Test (DD1944805)** in **Appendix A: Reference Documents (p.25)**.

Replace Module Power Supplies

The power supply provides power from the term panel to the module. For DXB series digital billboards, the module power supply is located on the uprights. Each power supply typically controls four modules.

1. Disconnect the power coming from the term panel to the power supply.
2. Disconnect the power cables from the power supply to the modules. Refer to **Figure 23** or **Figure 24**.
3. While holding the power supply against the upright, rotate the power supply bracket release tab counterclockwise off of the power supply.
4. Gently lift the power supply assembly off the upright.

Figure 23: *Mean Well Power Supply*

Figure 24: *Efore Power Supply*

Test and Replace a ProLink Router

A ProLink Router (PLR) sends the signal from the DMP-8000 to the modules via SATA cables.

Visit youtu.be/DnoPC1OYhv0 to view a video about testing and replacing a ProLink Router.

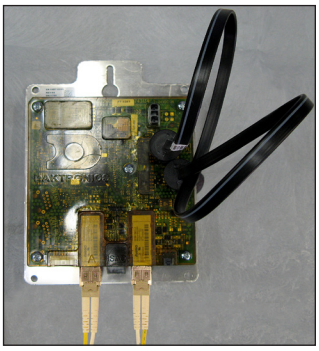


Figure 25: *ProLink Router Connected For Self-Test*

Test a PLR

Before replacing a PLR, it may be beneficial to perform a self-test. To test a PLR, follow these steps:

1. Connect a duplex fiber cable from Fiber Port A to Fiber Port B. Refer to **Figure 25**.
2. Connect a working SATA cable from SATA Port A to SATA Port B.
3. Connect the power cable to the PLR. This will start the PLR self-test.
4. Wait for the test to complete. This may take up to 90 seconds. If the PLR successfully sends and receives data through each of the ports, the letters P.A.S will appear on the Seven Segment Display. If the letters E.r.r appear, the Seven Segment Display will show the port numbers with issues. Refer to the **ProLink Router 6X5X Installation and Maintenance Manual (DD1735784)** in **Appendix A: Reference Documents (p.25)** for a full list of error codes.

   The PLR outputs test patterns in a specific order starting with Red, Green, Blue, and White. The PLR sends out these patterns with full redundancy (out both port A & B at the same time). If all of the modules change colors, it shows they all work and that visually the display is fine, but there could still be a signal failure that will not show up visually because of redundancy. The Amber/Yellow and Magenta test patterns provide a way to find the normally non-visual breaks.

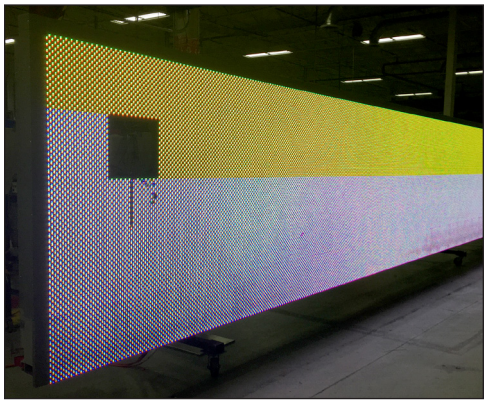
   

   Figure 26: *ProLink Router Port A Test*

   After it shows the White test pattern, the PLR shows a Yellow pattern, but it only sends the that pattern out on port A (no redundancy), any modules that receive that command will turn Yellow. However, if there is a signal break, the modules will not receive the command to turn Yellow and will remain at their previous color, which was probably White. Refer to **Figure 26**. The modules that turn Yellow are working correctly. Modules that are not Yellow indicate where the signal break is. If all of the modules turn Yellow, it indicates the signal path in the "A" direction is working 100%.

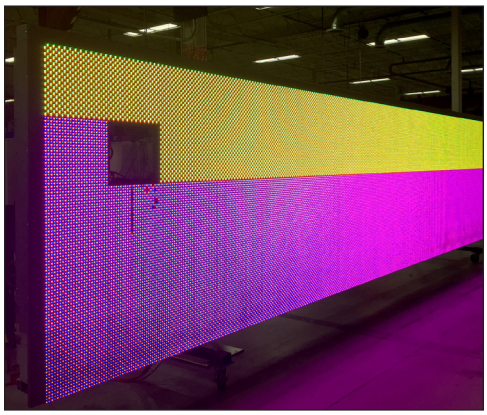
   

   Figure 27: *ProLink Router Port B Test*

   After showing the Yellow pattern, the PLR shows the Magenta pattern, but it only sends that pattern out on Port B. Any modules that do not receive the magenta command will remain at their previous color, which is probably Yellow. Refer to **Figure 27**. Wherever they do not turn magenta indicates a signal break. If they all turn Magenta, it means the signal path in the "B" direction is 100%.
5. Replace the PLR if the error persists after troubleshooting.

Note: It is possible to have a break in just one path. So for example, it is possible all of the modules may turn Yellow indicating "A" is healthy, but only some of them turn Magenta indicating a break in the "B" path that needs to be repaired.

Replace a ProLink Router

Required Tools: Phillips screwdriver

1. Access the interior of the display by following the steps provided in **Section 4: Access Internal Components (p.9)**.
2. Disconnect the PLR SATA and power cables.
3. Use a Phillips screwdriver to loosen the PLR assembly set screw.
4. Lift the PLR assembly to disengage it from the display.
5. Reverse **Steps 2–4** to install the new PLR.
6. Verify the cables are properly seated.

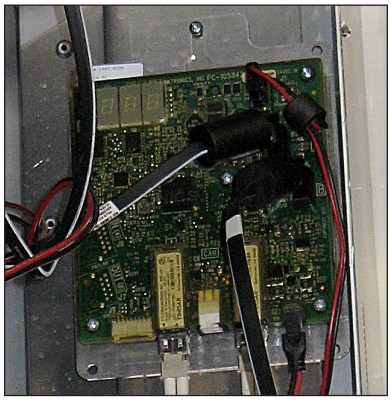


Figure 28: *ProLink Router Connected For Self-Test*

Replace PLR Power Supplies

1. Disconnect the power coming from the term panel to the power supply.
2. Disconnect any power cables to the power supply and from that power supply to the PLR.
3. Pull the power supply tab.
4. Rotate the power supply forward and lift it off of the pegs.
5. Reverse **Steps 1–3** to install a replacement power supply.

Replace a Display Fan

Required Tools: Phillips screwdriver, side cutter, cable ties

If needed, remove the fan plenum following the steps in **Remove a Fan Plenum (p.11).**

1. Locate and disconnect the 3-pin Mate-N-Lok connector.
2. Use the Phillips screwdriver to loosen the two fan mounting screws. Refer to **Figure 29**.
3. Cut the cable tie holding the harness to the plenum.
4. Remove the fan from the display.
5. Reverse **Steps 1–4** to install the new fan.
6. Attach harness to the fan plenum using a cable tie. Refer to **Figure 29**.

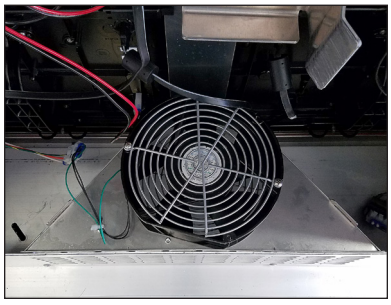


Figure 29: *Display Fan*

7 Control Equipment Overview, Service, and Replacement

Open the ISP Enclosure

To access ISP enclosure components, follow these steps:

1. Access the ISP enclosure by opening the rear access door with the control equipment label.
2. Use a Phillips screwdriver to loosen the four screws and lift the door from keyed slots. Refer to **Figure 30**.

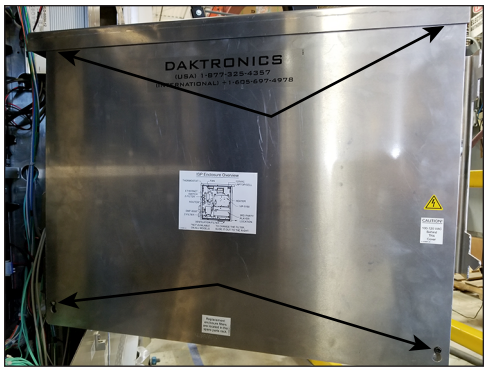


Figure 30: *ISP Enclosure Door*

Control Equipment Overview

ISP Enclosure

The ISP enclosure contains all of the necessary equipment for the display to communicate over the Internet and schedule content. **Figure 31** shows the equipment and the equipment location within the ISP enclosure.

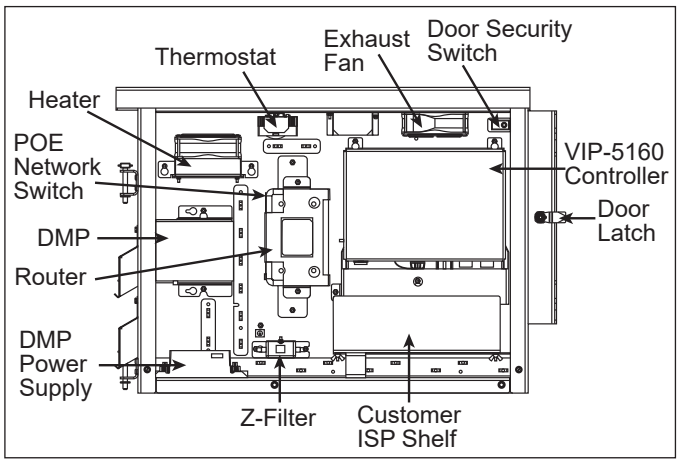


Figure 31: *ISP Enclosure Layout*

DMP-8000

The Digital Media Processor (DMP) receives the content from the Internet and sends it to the PLRs within the display and to the modules. All of the connections for the DMP are located on the bottom of the unit. Refer to **Figure 32**.

SmartLink™

The SmartLink™ performs power loss detection and remote power cycling for DXB series billboards. **Figure 37** shows the SmartLink™ configuration.

Connect a Laptop

Sometimes it is necessary to connect a laptop to the display for service. Locate the red crossover cable coming from out of the network switch.

Replace Control Equipment

Replace the DMP-8000

1. Disconnect the incoming power to the DMP-8000 by unscrewing the connector.
2. Disconnect the HDMI cable from the DMP-8000. Refer to **Figure 32**.
3. Disconnect the network communication cable.
4. Loosen the nuts holding the DMP-8000 bracket to the control enclosure.
5. Slide the DMP-8000 and bracket upward and outward to remove it.
6. Reverse **Steps 1–5** to install the new DMP-8000.
7. Ensure all cables are installed in the same ports as on the previous DMP-8000.

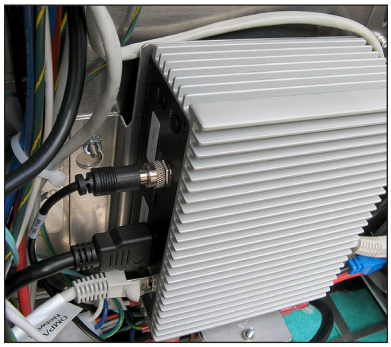


Figure 32: *DMP-8000 Jacks and Bracket*

Replace DMP/VIP Power Supply

The VIP and DMP share a power supply. To replace a failed power supply, follow these steps:

1. Disconnect any power cables to the power supply and from that power supply to the DMP/VIP.
2. Remove the nuts that hold the power supply in place. Refer to **Figure 33**.
3. Remove the power supply from the enclosure.
4. Reverse **Steps 1–3** to install a replacement power supply.

Figure 33: *DMP/VIP Power Supply Bracket*

Replace the ISP Enclosure Filter

The ventilation filter in the bottom of the ISP enclosure should be inspected and replaced if needed. Spare filters are located in the display spare parts enclosure.

1. Pull the filter out from the right side of the enclosure. Refer to **Figure 34**.
2. Replace the filter with a new filter from the spare parts rack.
3. Make sure the filter is securely in place before closing ISP enclosure door.

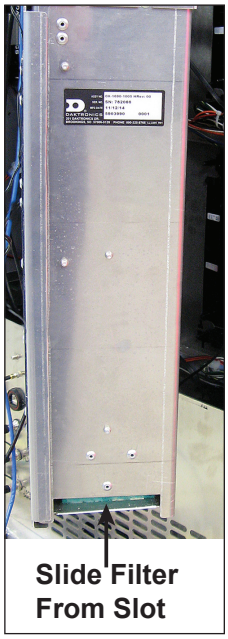


Figure 34: *ISP Enclosure Filter Location*

Replace the Router

1. Disconnect the power cable from the router.
2. Disconnect the Cat5e cables from the side of the router.
3. Remove nuts holding router bracket and remove bracket and router.
4. Reverse **Steps 1–3** to install the new router.
5. Ensure all cables are installed in the same ports as on the previous router.

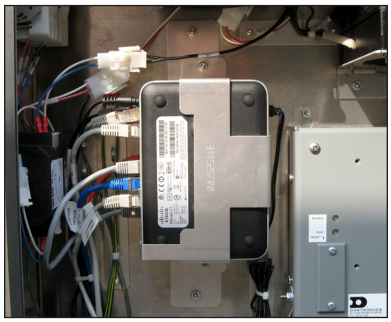


Figure 35: *Router and Network Switch in ISP Enclosure*

Replace the Network Switch

1. Disconnect the power cable from the network switch.
2. Disconnect the Cat5e cables from the top of the network switch.
3. Lift the network switch out of the bracket.
4. Reverse **Steps 1–3** to install the new network switch.
5. Ensure all cables are installed in the same ports as on the previous network switch.

Replace the SmartLink™

1. Turn off the SmartLink™ breaker in the power entrance box.
2. Wait for all LEDs in the SmartLink™ to turn off. This may take up to 8 minutes. The extended time is required to discharge components that typically send a notification to the data center in the event of a power outage.
3. Disconnect the incoming power wires in the SmartLink™.
4. Disconnect the outgoing power wires from the relays (R1, R2, R3, R4).

Figure 36: *SmartLink™ Relay Bank*

5. Disconnect the RS232 cable and remove any cable ties securing it within the SmartLink™.
6. Remove the four screws that secure the SmartLink™ to the mounting plate.
7. Reverse **Steps 1–6** to install the new SmartLink™.
8. Call Daktronics help desk and provide them with the new MEID number, circled in **Figure 37**.

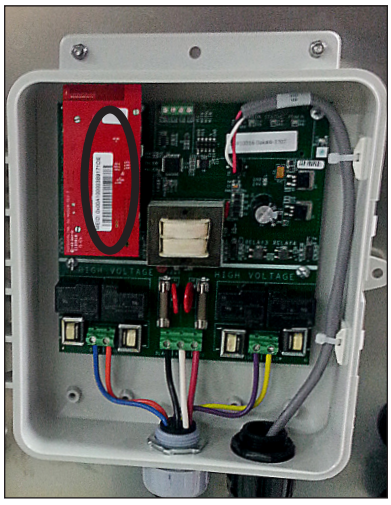


Figure 37: *SmartLink™ MEID Number*

Replace the Z-Filter

Required Tools: Phillips screwdriver

1. Unplug the 3-pin Mate-N-Lok power jack from the outside of the enclosure.
2. Disconnect the power cables from both sides of the Z-filter
3. Remove the screws that secure the Z-filter bracket to the back of the ISP enclosure.
4. Remove the two screws that secure the Z-filter to the Z-filter bracket.
5. Reverse **Steps 1–4** to install the new Z-filter.

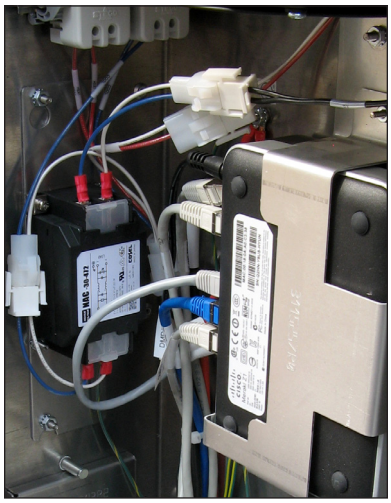


Figure 38: *SmartLink MEID Number*

Replace the Heater

Required Tools: Phillips screwdriver, 5/16" nut driver

1. Disconnect the power wire to the heater.
2. Use the 5/16" nut driver to loosen and remove the mounting plate nuts. Refer to **Figure 39**.
3. Remove the heater assembly from the ISP enclosure.
4. Use a Phillips screwdriver to remove the four heater mounting bolts that secure the heater to the mounting plate.
5. Reverse **Steps 1–4** to install the new heater.

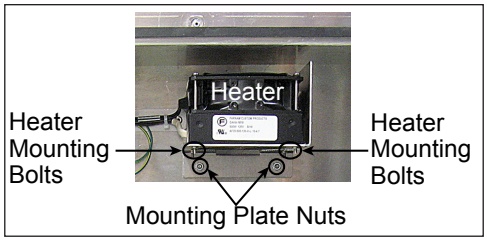


Figure 39: *ISP Enclosure Heater Assembly*

Replace the Fan

Required Tools: Phillips screwdriver

1. Disconnect the power wire to the fan.
2. Use a Phillips screwdriver to remove the four fan mounting bolts that secure the fan to the ISP enclosure.
3. Ensure the fan points upward and exhausts air out of the ISP enclosure.
4. Reverse **Steps 1–3** to install the new fan.

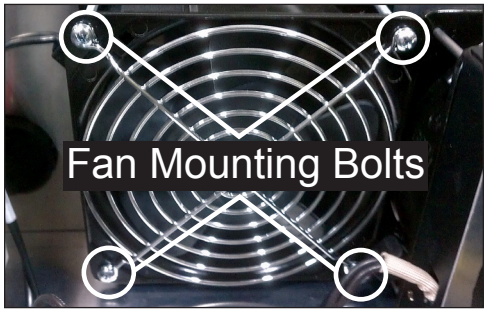


Figure 40: *ISP Enclosure Fan Assembly*

8 Test and Replace Multi-Direction Light Sensor

The table below lists important items to check if there are issues with the Multi-Direction Light Sensor (MDLS).

Item	Image
If there is a splice cable attached, inspect splice cable connection.	
Inspect the MDLS windows for cleanliness.	
Check connections at rear of display to make sure they are secure.	
Inspect the cable from the rear of the display to the MDLS for damage. If needed, order a replacement cable.	
Inspect cable going into bottom of MDLS to see if it was pulled loose.	

Test the MDLS

To test an MDLS, cover it with a piece of heavy cloth. The display should dim within a couple of minutes. Remove the fabric and verify the display returns to the brighter setting. If possible, work with the help desk and have them monitor the display IDM dimming levels.

Replace the MDLS

Required Tools: Pliers, side cutters

1. Disconnect the MDLS from the quick connect on the rear of the display.

   > **Note:** If there is a splice in the cable between the MDLS and the rear of the display, disconnect the MDLS cable at the splice point, not at the display.

2. Remove the cable that runs from the quick connect to the MDLS.
3. Remove the two attachment bolts that secure the MDLS assembly to the mounting arm.
4. Reverse **Steps 1–3** to reinstall an MDLS.
5. Using cable ties, secure the MDLS cable to along the rear of the display.
6. Work with the help desk to test the photocell and ensure it is functioning properly.

9 Access and Troubleshoot the Webcam

The information is this section describes how to retract the webcam to the display face for service and provides some basic troubleshooting steps. Work with the help desk to verify the camera is aligned and in focus after servicing or cleaning the webcam.

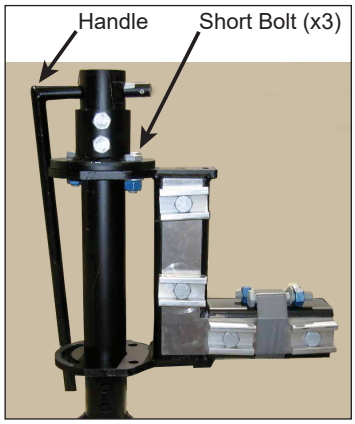


Figure 41: *Webcam Arm Bolts*

Retract the Webcam to the Display Face (Rotation Mount Only)

1. Remove the three short bolts from the elbow assembly. Refer to **Figure 41**.

   Do not remove the long bolts in the collar.

2. Use the handle to carefully pivot the webcam arm to the front of the catwalk.

   Note: Verify that webcam cables are not pinched or pulled when pivoting the webcam arm.

3. Return the webcam arm to the original position when servicing the webcam.
4. Replace and tighten the three short bolts.
5. Work with Daktronics help desk to verify the webcam is focused and functioning properly.

Figure 42: *Status LED Indicator*

Troubleshoot the Webcam

This section provides some basic power troubleshooting steps to perform if the webcam is not functioning properly. Refer to **Figure 42** and the table below.

Issue	Troubleshooting Steps
Status LED indicator(s) on the webcam are off.	• Check Cat5e connections inside surge protector to ensure they are secure. • Verify M12 connection for camera on rear of display is securely fastened. • Inside the ISP enclosure, verify camera is connected to port 1 on POE side of POE switch and LED indicators are on. • Verify power connection to POE switch and AC adapter are securely fastened. • If all connections are securely fastened but indicators are off, work with the help desk to further troubleshoot the issue. • The POE surge may be damaged. Use a RJ45 coupler to bypass.
The help desk can not see a webcam image, and the POE switch is functioning properly.	• Verify POE switch located in ISP enclosure is connected and LED indicators are on. • If the LED indicators on the POE switch are on, check the Ethernet connections from the router to the POE switch, from the POE switch to the rear of the display, and from the rear of the display to the webcam. The Ethernet cable may be damaged or disconnected. • The POE surge may be damaged. Use a RJ45 coupler to bypass. • Request a new webcam.

10 Display Maintenance

Service Calls

After addressing service issues on a service call, inspect the following items:

- Check for loose modules.
- Check for corrosion.
- Check the display for signs of damage.
- Check the control enclosure filters. Replace if needed. Replacement filters are located in the spare parts rack.
- Use a marker to write the last-replaced date on the filter before putting it in the enclosure.
- Inspect the control system for damage.
- Perform an inventory of the spare parts rack.
- Have the help desk run a diagnostics check of the display. Work with the help desk to repair any issues found during diagnostics.
- Diagnostics should be free of any errors prior to leaving the site.

Annual Inspection

It is important to schedule annual maintenance on a digital billboard. During the visit:

- Replace ISP enclosure filters.
- Inspect for loose modules.
- Inspect the display for excess dust or debris.
- Use the **Digital Billboard Maintenance Checklist (DD3444094)** in **Appendix A: Reference Documents (p.25)** to record inspection findings.

Glossary

DMP-8000: a Digital Media Player that sends display content to the Video Image Processor (VIP).

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.

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

Line filter: a device that removes electromagnetic noise from the power system to avoid interference with local communication channels.

Louver: a plastic shade positioned horizontally above each pixel row. Louvers increase the contrast level on the display face and direct LED light for easier viewing.

Module: a display board with LEDs, a driver board or logic card, a housing, a module latch assembly, and a louver. Each module is individually removable from either the front or rear of the display.

Module latch: a safety device that mechanically holds the module firmly in the display. The latches are centered near the top and bottom of the module.

Pixel: the smallest single point of light on a display that can be turned on and off. For LED displays, a pixel is the smallest block of light-emitting devices that can generate all available colors.

Power supply: a display component that converts incoming AC line voltage to low DC voltage. In the BLD series, one power supply powers multiple modules, one controller, or a ProLink Router (PLR).

ProLink Router (PLR): a data interface component that receives a signal from the display control system and converts and distributes the signal. There is typically one PLR per display section.

Remote power controller: a device capable of remotely controlling the display and components. Current billboards use either an iBoot PDU or optional SmartLink™.

Serial Advanced Technology Attachment (SATA): a type of cable that allows high speed signal from flow from device to device. In digital billboards, these cables run signal from module to module and from the PLR to the modules.

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

VIP-5160: a Video Image Processor that sends video signal to the display and controls dimming, color settings, and test patterns.

Webcam: a camera connected to the internet used to monitor the display. Current billboards use a Mobotix PoE camera.

A Reference Documents

This appendix contains drawings and documents that are generic to Daktronics digital billboards. Project-specific documents take precedence over those listed in this section.

Reference Documents:

ProLink Router 6X5X Installation and Maintenance Manual **DD1735784**
Performing a Daktronics Module Self-Test **DD1944805**
How to Perform a PLR-6050 Self-Test..... **DD2268420**

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