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1 Introduction

Important Contact Information
Daktronics Help Desk: 1-877-DAK-HELP
Project Manager: ____________________ Phone Number: ____________________
Email: Billboardservice@daktronics.com

Display Identification
Refer to Figure 1 and the table below to understand helpful information found on the Daktronics billboard display label.

<table>
<thead>
<tr>
<th>Display Assembly Number</th>
<th>DB-5100 Modules High X Modules Wide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display Serial Number</td>
<td>RMN: Daktronics - 0200 - 08 Manufactured in Sioux Falls, SD</td>
</tr>
<tr>
<td>Manufacture Month/Date Year</td>
<td>120/208/240 VAC, 1 Phase, 60 HZ</td>
</tr>
<tr>
<td></td>
<td>AMPS (L1/L2) = 31.9/29.3 Total</td>
</tr>
<tr>
<td></td>
<td>Total Watts = 7,824</td>
</tr>
</tbody>
</table>

Figure 1: 5100 Series Display Label

Terms Used in this Manual
DMP-8000: Digital billboard player that sends content to the VIP.

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

Latch Release: Releases the latch that holds the module firmly in the display. The latch is centered near the top of the module.

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 5100 series, one power supply powers 12 modules, one controller, or a ProLink Router (PLR).

Serial Advanced Technology Attachment (SATA) Cable: Allows high speed signal 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.

VIP-5160: Video processor that sends video to the display and controls dimming, color settings, and test patterns.
Spare Parts

Every Daktronics digital billboard ships with spare parts that include commonly replaced components. The table lists some of the components included in the spare parts rack shown in Figure 2. Refer to the spare parts inventory list in the bag in the spare parts rack for a list of parts. Contact the Account Service Manager (ASM) to order additional spare parts.

<table>
<thead>
<tr>
<th>Description</th>
<th>Daktronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module</td>
<td>Varies by pixel pitch</td>
</tr>
<tr>
<td>PLR-6050 W/Hook Mount</td>
<td>0A-1487-6009</td>
</tr>
<tr>
<td>28” SATA Cable</td>
<td>W-2410</td>
</tr>
<tr>
<td>Power Supply</td>
<td>A-3448678</td>
</tr>
<tr>
<td>LC-LC Duplex Fiber Cable</td>
<td>W-1767</td>
</tr>
<tr>
<td>30’ 4 Pin Male to 4 Pin Female Cable</td>
<td>W-1820</td>
</tr>
<tr>
<td>3’ 3 Pin Male to 3 Pin Female Cable</td>
<td>W-2510</td>
</tr>
</tbody>
</table>

Remove the Spare Parts Rack

Spare parts are located inside the display cabinet behind the bottom-left doors. Refer to Figure 3.

To access modules located behind spare parts, remove the spare parts rack.

1. Remove the two wing nuts that secure the spare parts rack to the display cabinet. Refer to Figure 4.
2. Lift the spare parts rack off of the mounting studs, as shown in Figure 5. A second set of mounting studs is located near the bottom of the display.

**Note:** After performing service or completing connections, replace the display door and ensure it is attached to the safety lanyard and secured.

**Remove Module From Spare Parts Rack**

1. Insert the \(\frac{1}{8}"\) hex head wrench into the top access hole.

2. Turn the latch release approximately a quarter-turn counterclockwise. You should feel the module release from the display face.

3. Disconnect the SATA cables from the back of the module.

4. Remove the plug inserted into the power jack. Refer to Figure 6.

**Field Replaceable Units**

The table below lists names and part numbers 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 ASM to order components when needed.

<table>
<thead>
<tr>
<th>Display FRUs</th>
<th>Control System FRUs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td><strong>Part Number</strong></td>
</tr>
<tr>
<td>13OT Module</td>
<td>0A-1908-5001</td>
</tr>
<tr>
<td>Surge Suppressor</td>
<td>A-3732</td>
</tr>
<tr>
<td>480 Watt Power Supply</td>
<td>A-3448678</td>
</tr>
<tr>
<td>3 Pole Contactor</td>
<td>A-3157</td>
</tr>
<tr>
<td>Axial Fan .4A 115 Volt</td>
<td>B-3505432</td>
</tr>
<tr>
<td>Axial Fan .12A 230 Volt</td>
<td>B-3514943</td>
</tr>
<tr>
<td>12 VDC Relay</td>
<td>K-1040</td>
</tr>
<tr>
<td>28&quot; SATA Cable</td>
<td>W-2885</td>
</tr>
<tr>
<td>72&quot; SATA Cable</td>
<td>W-2889</td>
</tr>
<tr>
<td>50UM 10GIG LC-LC 33' Fiber</td>
<td>W-1685</td>
</tr>
<tr>
<td>Line Filter</td>
<td>Z-1007</td>
</tr>
<tr>
<td>20 Amp Single Pole Breaker</td>
<td>S-1045</td>
</tr>
<tr>
<td>15 Amp Breaker</td>
<td>S-1035</td>
</tr>
<tr>
<td>Display FRUs</td>
<td>Control System FRUs</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>Part Number</strong></td>
<td><strong>Part Number</strong></td>
</tr>
<tr>
<td>15 Amp 1P Breaker</td>
<td>Axial Fan 0.16A</td>
</tr>
<tr>
<td>S-1187</td>
<td></td>
</tr>
<tr>
<td>20 Amp 2P Breaker</td>
<td>Axial Fan 0.13A</td>
</tr>
<tr>
<td>S-1243</td>
<td></td>
</tr>
<tr>
<td>6 Amp 1P Breaker</td>
<td>Air Filter</td>
</tr>
<tr>
<td>S-1244</td>
<td></td>
</tr>
<tr>
<td>120VAC 16A Relay</td>
<td>Transformer</td>
</tr>
<tr>
<td>A-3812</td>
<td></td>
</tr>
<tr>
<td>ProLink Router</td>
<td>Delay Timer</td>
</tr>
<tr>
<td>0A-1487-6009</td>
<td></td>
</tr>
</tbody>
</table>
Display and Control Overview

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

Display Control System Flow Overview

Figure 7 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.

Display Power Overview

The power system for the 5100 series is significantly different than any previous series of Daktronics digital billboards. Each 600 Watt power supply powers 12 modules. In most cases, the module power path follows the signal path.

Figure 8 shows a basic overview of the power system in an individual display section. Figure 9 shows a power supply mounted in the display. 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 sections, Figure 10, and odd tall sections, Figure 11 and Figure 12.

Signal is sent from the DMP-8065 and is sent to the ProLink Router (PLR) in the display section. The PLR then sends the signal to the first module in the section. From that module, the signal is then 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 10: Even Tall Height Signal Path Example

Odd x Even Module High Section Signal Path

Figure 11: Odd x Even Height Signal Routing Example
Odd x Odd Module High Section Signal Path

Figure 12: Odd x Odd Height Signal Routing Example
3 Troubleshoot the Display

Cycle Power Remotely

Daktronics DB 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 13 while reading the relay function table:

<table>
<thead>
<tr>
<th>Relay</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>ISP Enclosure</td>
</tr>
<tr>
<td>R2</td>
<td>DMP-8000/VIP-5160.2</td>
</tr>
<tr>
<td>R3</td>
<td>Display</td>
</tr>
<tr>
<td>R4</td>
<td>Auxiliary Power</td>
</tr>
</tbody>
</table>

If remote troubleshooting is desired, call the Daktronics help desk at 1-877-DAK-HELP 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.

Troubleshoot the Display

Work with Daktronics help desk or experienced technicians to address display issues.

See the following table for troubleshooting steps.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Issue Image</th>
<th>Troubleshooting Steps</th>
</tr>
</thead>
</table>
| Entire display blank | ![Issue Image] | 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 reestablish power to the PLR.  
4. Verify the fiber cables from the Digital Media Player (DMP) to the PLR are connected.  
5. Call Daktronics help desk at 1-877-DAK-HELP (325-4357) and have them verify the content that was supposed to play was successfully uploaded and sent to the display. |

Figure 13: SmartLink™

Figure 14: SmartLink™ Relay Bank
<table>
<thead>
<tr>
<th>Issue</th>
<th>Issue Image</th>
<th>Troubleshooting Steps</th>
</tr>
</thead>
</table>
| Content switched between display sections | ![Image](image1.png)                                                           | 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. |
<table>
<thead>
<tr>
<th>Issue</th>
<th>Issue Image</th>
<th>Troubleshooting Steps</th>
</tr>
</thead>
</table>
| Blank display section | ![Blank display section](image) | 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 sections term panel.  
7. Check that the contactors in each display section are closed which means that section should be receiving power. |
| 12 modules out | ![12 modules out](image) | 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. |
| 3 or more modules out in a line within the same PLR section | ![3 or more modules out in a line within the same PLR section](image) | 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
DB-5100 series digital billboards have lift-off doors that are secured with a tab in the top-right corner. Refer to Figure 15.

1. Place fingers in slot located at the top-right corner of the door. Refer to Figure 16.

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 backsheet. Refer to Figure 16.

3. Lift the door upward to disengage its tabs from the slots on the display's backsheet. Refer to Figure 17.

4. Lower door until its top lip is free of the backsheet.

To completely move the door out of the way, disconnect the lanyard connected to the 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 From the Display Face (Front Access) (p. 12).
Module Lanyard Attachment
Daktronics recommends attaching a module lanyard (located in the spare parts rack) whenever removing a module. To attach a module lanyard, complete the following steps:

1. Attach one end of the module lanyard to a lanyard attachment ring on the top of the module.
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 module lanyard to the lanyard attachment ring on the top of the module.

Remove a Module From the Display Face (Front Access)

Required Tools: $\frac{1}{8}$" hex head wrench, module lanyard (from the spare parts rack)

To remove a module from the front, complete the following steps:

1. With one hand on the module face, insert the $\frac{1}{8}$" hex head wrench into the top access hole. Refer to Figure 18.
2. Turn the latch release approximately a 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 back of the module.
4. Disconnect the power and SATA cables from the back of the module.
5. Gently place the module on a clean and dry surface.

Note: If there is no place to set the module, use a safety lanyard to hang the module from the back of 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 module into the mod sheet. Rotate the module top to the mod sheet. Verify that SATA and power cables are not 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 approximately a 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.

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 19.

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 a quarter-turn clockwise to disengage the latch.

   Note: Maintain a firm grip on the module as you remove it 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 20 shows improper module removal from the back.

Remove a Module from the Top Row of a Section (Rear Access)

Required Tools: 90-degree Allen wrench, module lanyard

To remove a module along the top row, complete the following steps:

1. Using the procedure outlined in Section Remove a Module (Rear Access) (p. 13), remove the module in the center of the bay directly below or at an angle of the target module, as shown in Figure 21. All modules are accessed from the rear through the center module.

2. Disconnect the power and SATA cables from the module.

3. Connect a module lanyard from a lanyard attachment ring on the module to a structural member inside the display.

4. Insert the 90-degree Allen wrench into the top module latch gear.
5. Turn a quarter-turn clockwise to disengage the module from the face sheet.

6. Remove the module by pushing it away from the display face, pivoting and rotating it 90 degrees and pulling it through the face sheet.

**Note:** Ensure the louver blades run lengthwise when pulling the module through the display face so they do not get damaged by the face sheet.

7. Repair or replace the module as needed.

8. Reverse Steps 1 - 8 to reinstall the module.

**Remove a Module from Behind the Term Panel (Rear Access)**

**Required Tools:** Flat-head screwdriver, \( \frac{1}{8} \)" Allen wrench, module lanyard

1. Turn the quarter-turn latch on the top-right side of the term panel using a flat-head screw driver. Refer to Figure 22.

2. While holding the term panel, allow it to slowly rotate open and out of the way. Refer to Figure 23.

3. Follow the steps in Section Remove a Module (Rear Access) (p. 13) to remove and reinstall a module.

4. Reverse Steps 1 - 3 to replace the term panel.

**Reinstall a Module (Rear Access)**

1. Rotate and carefully guide the module through the module opening. Refer to Figure 24.

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

2. Once the module is through the display face, hook the module into the face sheet at the bottom.

3. Rotate the module toward the face sheet.

4. Using a \( \frac{1}{8} \)" hex head wrench, turn the latch gear at the top of the module approximately a quarter-turn counterclockwise to engage the latch. Ensure the cables do not pinch between the module and the display.

5. Use the top module lanyard rings or the lanyard to pull the module firmly against the face sheet.

6. Connect the SATA and power cables to the back of the module.
Hinge and Remove the ISP Enclosure for Module Access

The ISP enclosure hinges out of the way for module access. It can also be lifted off of the hinges. To hinge the ISP enclosure out of the way and lift it off the hinges, complete the following steps:

1. Locate the quarter-turn latch at the top of the ISP enclosure.
2. Use a flathead screwdriver, turn the quarter-turn latch counterclockwise until the ISP enclosure disengages.
3. Pull the ISP enclosure from the right to hinge it out of the way. Refer to Figure 25.
4. If needed, carefully lift the ISP enclosure off of the hinges on and set aside while ensuring power and signal cables do not get pinched.

Hinge and Remove the DMP-8065 or SmartLink For Module Access

The DMP-8065 hinges out of the way for module access. It can also be lifted off of the hinges. To hinge the DMP-8065 out of the way and lift it off the hinges, complete the following steps:

1. Locate the quarter-turn latch at the top of the DMP-8065.
2. Use a flathead screwdriver, turn the quarter-turn latch counter-clockwise until the DMP-8065 disengages.
3. Pull the DMP-8065 from the right to hinge it out of the way. Refer to Figure 26.
4. If needed, carefully lift the DMP-8065 off of the hinges and set aside while ensuring power and signal cables do not get pinched.
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 27.

Note: When troubleshooting, it is important to know that 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, complete the steps below.

Click here 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 28.

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.

For more information, see DD1944805, Performing a Daktronics Module Self-Test, in Section A: Reference Documents (p. 27).

Replace Module Power Supplies

The power supply provides power from the term panel to the module. For the S100 series of digital billboards, the module power supply is located on the uprights. Each power supply typically controls 12 modules.

1. Disconnect the power coming from the term panel to the power supply.

2. Disconnect the power cable from the power supply to the modules. Refer to Figure 29.

3. While holding the power supply against the vertical, rotate the power supply bracket release tab counterclockwise off of the power supply.

4. Gently lift the power supply assembly off the upright.
Test and Replace a ProLink Router

A ProLink Router (PLR) sends the signal from the DMP-8065 to the modules via SATA cables.

Test a PLR

Before replacing a PLR, it may be beneficial to perform a self-test. To perform this test, complete the following steps:

1. Connect a duplex fiber cable from Fiber Port A to Fiber Port B. Refer to Figure 30.
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 has 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 6050 Manual in Section A: Reference Documents (p. 27) 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.

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 31. 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 percent.

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 32. 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 percent.

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.

5. Replace the PLR if the error persists after troubleshooting.

**Replace a ProLink Router**  
**Required Tools:** Phillips screwdriver

1. Access the interior of the display by using the steps provided in Section 4: Access Internal Components (p. 11).
2. Disconnect the PLR SATA and power cables.
3. Using a Phillips screwdriver, 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.

**Replace PLR Power Supplies**  
Each PLR has a power supply.

1. Disconnect any power cables to the power supply and from that power supply to the PLR.
2. While holding the power supply against the vertical, rotate the power supply bracket release tab counter-clockwise off of the power supply.
3. Gently lift the power supply assembly off the upright.
4. Reverse Steps 1 - 3 to install a replacement power supply.

**Replace a Display Fan**  
**Required Tools:** Phillips screwdriver, side cutter, cable ties

To replace a fan, complete the following steps:

1. Locate and disconnect the 3-pin Mate-N-Lok connector.
2. Use the Phillips head screwdriver to loosen the two fan mounting screws. Refer to Figure 33.
3. Remove the fan from the display.
4. Reverse Steps 1 - 3 to install the new fan.

![Figure 33: Display Fan](image-url)
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 34 shows the equipment and the equipment location within the ISP enclosure.

DMP-8000

The Digital Media Processor (DMP) receives the content from the Internet, 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 34.

SmartLink™

The SmartLink™ performs power loss detection and remote power cycling for the 5100 series. Figure 41 shows the SmartLink™ configuration.

Open the ISP Enclosure

To access ISP box components:

1. Access the ISP enclosure by opening the rear access door with the control equipment label.

2. Using a flathead screwdriver, turn the latch counterclockwise. Refer to Figure 35.

3. For easier access to ISP components, the ISP enclosure door can be rotated out or lifted off the hinges.

Connect a Laptop

Sometimes it is necessary to connect a laptop to the display for service. Locate the red cross-over 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 36.
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 - 6 to install the new DMP-8000.
7. Ensure all cables are installed in the same ports as on the old DMP-8000.

**Replace DMP/VIP Power Supply**
The VIP and DMP share a power supply. To replace a failed power supply:

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 37.
3. Remove the power supply from the enclosure.
4. Reverse Steps 1 - 3 to install a replacement power supply.

**Replace the ISP Enclosure Filter**
The 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. To replace an ISP enclosure filter:

1. Pull the filter out from the right side of the enclosure. Refer to Figure 38.
2. Remove the existing filter.
3. Replace the filter with a new filter from the spare parts rack.
4. Make sure the filter is securely in place before closing ISP enclosure door.

---

**Figure 36:** DMP-8000 Jacks and Bracket

**Figure 37:** DMP/VIP Power Supply Bracket

**Slide Filter From Slot**

**Figure 38:** ISP Enclosure Filter Location
Replace the Router
1. Disconnect the power cable from the router.
2. Disconnect the Cat-5 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 old router.

Replace the Network Switch
1. Disconnect the power cable from the network switch.
2. Disconnect the Cat-5 cables from the top of the network switch.
3. Lift the network switch out of the bracket.
4. Reverse Steps 2 - 3 to install the new network switch.
5. Ensure all cables are installed in the same ports as on the old network switch.

Replace the SmartLink™
1. Turn off 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).
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 42.
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.

Replace the Heater

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

1. Disconnect the power wire to the heater.

2. Using the nut driver, loosen and remove the mounting plate nuts. Refer to Figure 44.

3. Remove the heater assembly from the ISP enclosure.

4. Using a Phillips screwdriver, remove the four heater mounting bolts that secure the heater to the mounting plate.

5. Reverse Steps 1 - 4 to install the new heater.

Replace the Fan

**Required Tools:** Phillips screwdriver

1. Disconnect the power wire to the fan.

2. Using a Phillips screwdriver, 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.
Test and Replace the Multi-Direction Light Sensor

Troubleshoot Multi-Direction Light Sensor (MDLS) Issues

The table below lists the crucial items to check if there are issues with the MDLS.

<table>
<thead>
<tr>
<th>Item</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>If there is a splice cable attached, inspect the splice cable connection.</td>
<td></td>
</tr>
<tr>
<td>Inspect the MDLS windows for cleanliness.</td>
<td><img src="image" alt="Windows (x3)" /></td>
</tr>
<tr>
<td>Check the connections at the back of the display to ensure they are secure.</td>
<td></td>
</tr>
<tr>
<td>Inspect the cable from the back of the display to the MDLS for damage. If needed, order a replacement cable.</td>
<td><img src="image" alt="MDLS Cable" /></td>
</tr>
<tr>
<td>Inspect the cable going into the bottom of the MDLS to see if it was pulled loose.</td>
<td></td>
</tr>
</tbody>
</table>

Test the MDLS
To test a 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 back of the display.

   **Note:** If there is a splice in the cable between the MDLS and the display back, if so, 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 a MDLS.

5. Using cable ties, secure the MDLS cable to along the back of the display.

6. Work with the help desk to test the photocell and ensure it is functioning properly.
Troubleshoot and Access the Webcam

The information in 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.

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

1. Remove the three short bolts from the elbow assembly. Refer to Figure 46.
   
   **Note:** 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 any webcam cables are not getting pinched or pulled when pivoting the webcam arm.

3. Return the webcam arm to its original position when servicing.

4. Replace and tighten the three short bolts.

5. Work with Daktronics help desk to verify the webcam is focused and functioning properly.

Troubleshoot the Webcam

This section provides some basic power troubleshooting steps to perform if the webcam is not functioning properly. Refer to Figure 47 while reading the table below.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Troubleshooting Steps</th>
</tr>
</thead>
</table>
| Both LED indicators on the webcam are off. | • Check the Cat5 connections inside the surge protector to ensure they are secure  
• Verify the M12 connection for the camera on the back of the display is securely fastened  
• Inside the ISP box, verify the camera is connected to port 1 on the POE side of the POE switch and the LED indicators are on.  
• Verify the power connection to the POE switch and AC adapter are securely fastened.  
• If all connections are securely fastened but the 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. |
<table>
<thead>
<tr>
<th>Issue</th>
<th>Troubleshooting Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>The help desk can not see a webcam image and the POE switch is functioning properly.</td>
<td>• Verify the POE switch located in the ISP box is connected and the LED indicators are on.</td>
</tr>
<tr>
<td></td>
<td>• 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 back of the display and from the back of the display to the webcam. The Ethernet cable may be damaged or disconnected.</td>
</tr>
<tr>
<td></td>
<td>• The POE surge may be damaged. Use a RJ45 coupler to bypass.</td>
</tr>
<tr>
<td></td>
<td>• Request a new webcam.</td>
</tr>
</tbody>
</table>
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, complete the following items:

- Replace ISP enclosure filters.
- Inspect for loose modules.
- Inspect the display for excess dust or debris.
- Use the Digital Billboard Maintenance Checklist (DD3059470) to record inspection findings.
A Reference Documents

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

- Performing a Daktronics Module Self-Test .......................................................... DD1944806
- How to Perform a PLR-6050 Self-Test ................................................................. DD2268420
- ProLink Router 6050 Manual ............................................................................. DD1735784
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B Daktronics Warranty and Limitation of Liability

Click here to view Warranty and Limitation of Liability information.