6000 SERIES DIGITAL BILLBOARD

SERVICE MANUAL

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DAKTRONICS



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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

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



Figure 1: *6000 Series Display Label*

Display Assembly Number Display Serial Number Manufacture Month/Date Year	DB-6000 Modules High X Modules Wide RMN: Daktronics - 0200 - 11 Manufactured in Sioux Falls, SD 120/240 VAC, Single Phase, 60 HZ AMPS (L1/L2) = 25.5/24.4 Total Total Watts = 5,979

Terms Used in this Manual

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 and bottom of the module.

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

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

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 and product family.

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

Power Supply: A device that converts AC line voltage from the panel board to DC voltage for driver boards. In the 6000 series, one power supply powers two 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.

DMP-8065: Digital billboard controller that receives content from a Content Management Server and controls output to the display.

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 shown in **Figure 2**. Refer to the spare parts inventory list contained in the bag in the spare parts rack for a list of the parts. Contact the Account Service Manager (ASM) to order additional spare parts.

Description	Daktronics Part Number
Module	0A-1842-5000
28" SATA Cable	W-2885
72" SATA Cable	W-2889
4-Pin Mate N Lok Plug	P-1439
Air Filter	EN-2242

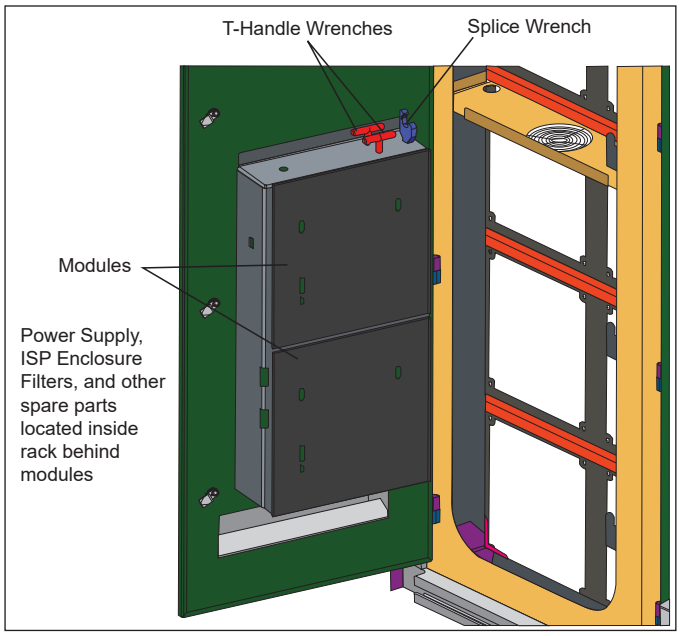


Figure 2: *Spare Parts in Spare Parts Rack*

Locating the Spare Parts Rack

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

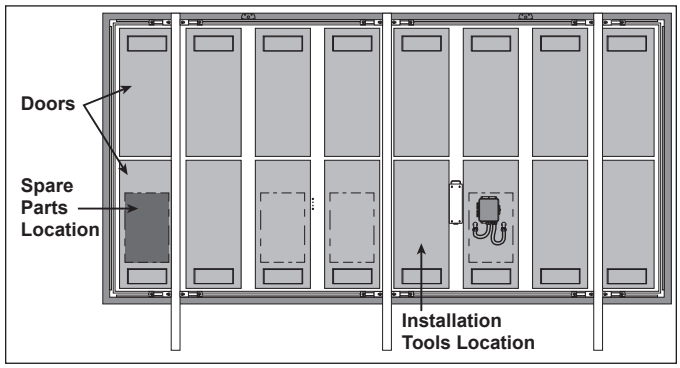


Figure 3: *Spare Parts Rack in Display*

Remove Module From Spare Parts Rack

1. With one hand on the module face, insert the $^{1}/_{8}$" hex head wrench into the bottom access hole.
2. Turn the latch release approximately a quarter-turn counterclockwise.
3. Insert the $^{1}/_{8}$" hex head wrench into the top access hole.
4. Turn the latch release approximately a quarter-turn counterclockwise. You should feel the module release from the display face.
5. Disconnect the SATA cables from the back of the module.
6. Remove the plug inserted into the power jack. Refer to **Figure 4**. Store the plug and cable in an area free of debris for future use with replacement modules.

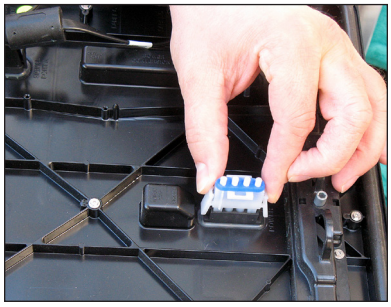


Figure 4: *Remove Plug From Power Jack on Spare Module*

Field Replaceable Units

The table below lists component 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.

Display FRUs		Control System FRUs	
Description	**Daktronics Part Number**	**Description**	**Daktronics Part Number**
Module	Varies by pixel pitch	**Meraki Router**	A-3665
Surge Suppressor	A-3677	**DMP-8065.2**	0A-1603-8201
Power Supply	A-3143	**Light Sensor**	0A-1690-4000
3 Pole Contactor	A-3157	**Ethernet Switch POE**	A-2249
Axial Fan .4 A	B-1045	**500 W Heater**	A-1819
Axial Fan .17 A	B-1094	**Mobotix Webcam**	A-3127
12 VDC Relay	K-1040	**SmartLink™**	Varies by location
28" SATA Cable	W-2885	**60 V POE Surge Protector**	A-3159
72" SATA Cable	W2889	**Axial Fan .16 A**	B-1053
Line Filter	Z-1002	**Axial Fan .13 A**	B-1071
20 Amp Single Pole Breaker	S-1045	**Filter**	EN-2242
15 Amp Tandem Breaker	S-1199		
120 VAC Relay	K-1044		
120 VAC 16 A Relay	A-3812		
ProLink Router	0A-1487-6009		

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 5 shows the location of the ISP enclosure, DMP-8065, 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.

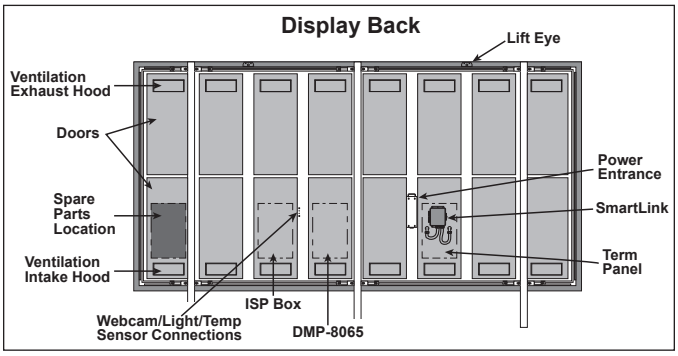


Figure 5: *6000 Series Control Components*

Display Power Overview

The power system for the 6000 series is significantly different than any previous series of Daktronics digital billboards. Each 65 Watt power supply powers two modules. In most cases, the module power path follows the signal path. **Figure 6** shows a basic overview of the power system in an individual display section. 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.

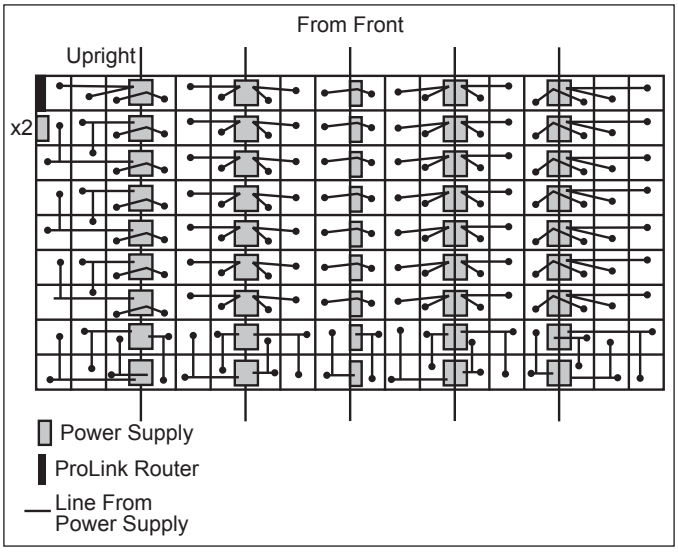


Figure 6: *Poster Power Example*

Display Signal Overview

This section provides generic signal path illustrations for even tall height, **Figure 7**, and odd tall height, **Figure 8**.

Signal is sent from the DMP-8065 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

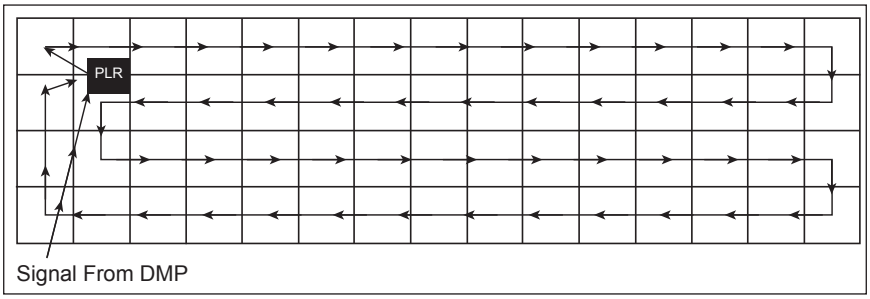


Figure 7: *Even Tall Height Signal Path Example*

Odd Module High Section Signal Path

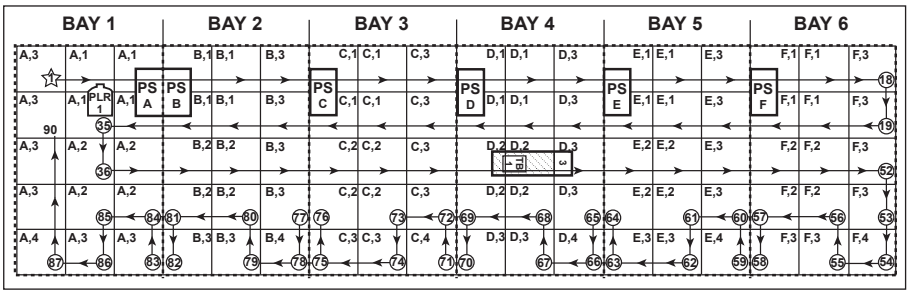


Figure 8: *Odd Tall Height Signal Routing Example*

3 Display Troubleshooting

Remotely Cycling Power

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-8065 monitors equipment on the network and attempts recovery via communication between it and the SmartLink™. Refer to **Figure 9** while reading the relay function table below:

Relay	Component
R1	ISP Enclosure
R2	DMP-8065
R3	Display
R4	Auxiliary Power

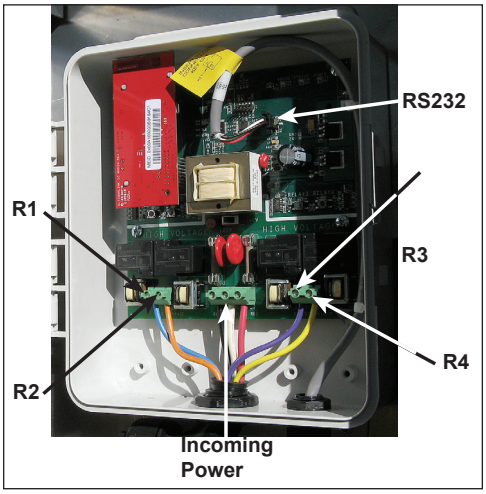


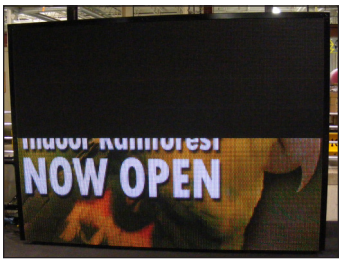
Figure 9: *SmartLink™*

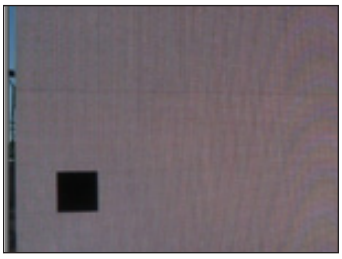
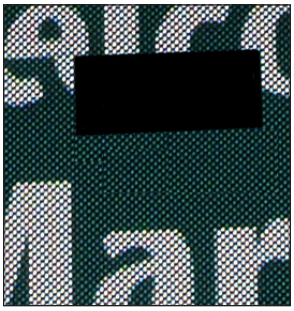
If remote troubleshooting is desired, call Daktronics help desk at 1-877-DAK-HELP and they can assist. Do not press the buttons in the SmartLink™ to cycle power to the components because it can take as long as an hour to reset the relays.

Display Troubleshooting

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

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 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.

Issue	Issue Image	Troubleshooting Steps
Content switched between display sections		**1.** Check the fiber interconnect cables between 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.
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 sections term panel. **7.** Check that the contactors in each display section are closed which means that section should be receiving power.
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.

Issue	Issue Image	Troubleshooting Steps
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 status indicators on the back of the modules. If indicators are off, check the power indicator on the power supply for 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.
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.
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.

Issue	Issue Image	Troubleshooting Steps
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.

4 Accessing Internal Components

Rear Access

Required Tools: Flathead screwdriver

6000 series digital billboards have hinged doors that are secured with quarter-turn latches. If the doors are obstructed, they can be lifted off the hinges for easy access. Refer to **Figure 10**.

Use caution when removing doors with attached components.

To access components from the back of the display:

1. With a flathead screwdriver, turn the quarter-turn latches counterclockwise.
2. If the door is obstructed, lift the door off the hinges.
   a. Pull the bottom of the display door away from the back of the display.
   b. Carefully place the access door out of the way.

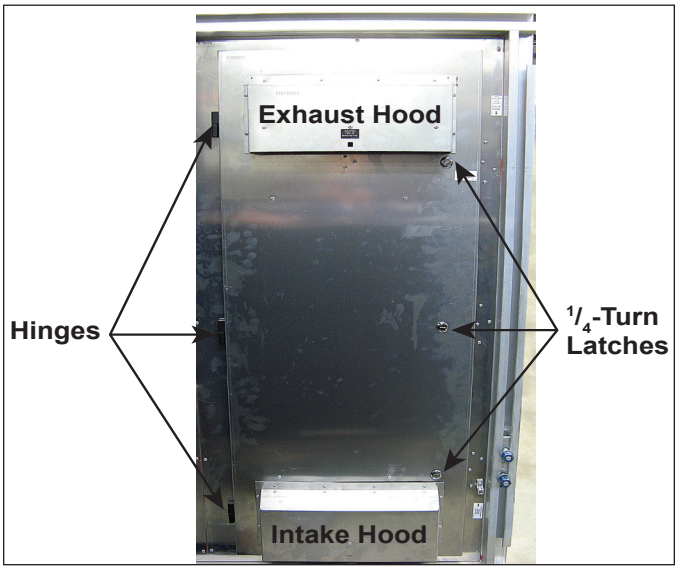


Figure 10: *Labeled Rear Access Door*

Front Access

Front access is completed by removing modules from the display front. Refer to the steps in **Removing a Module from the Display Face (Front Access) (p. 11)** to remove a module from the front of the display to access internal components.

5 Module Testing and Removal

Module Lanyard Attachment

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

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

Removing a Module from the Display Face (Front Access)

Required Tools: $^{1}/_{8}$" 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 $^{1}/_{8}$" hex head wrench into the bottom access hole.
2. Turn the latch release approximately a quarter-turn counterclockwise.
3. Insert the $^{1}/_{8}$" hex head wrench into the top access hole.
4. Turn the latch release approximately a quarter-turn counterclockwise. You should feel the module release from the display face.

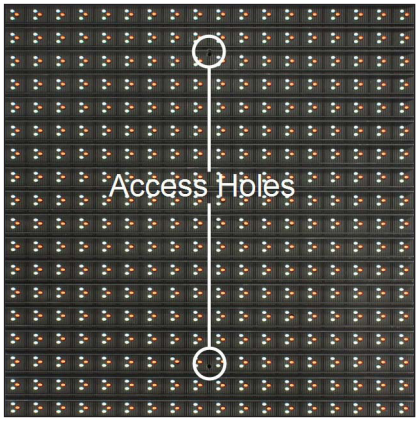


Figure 11: *Module Access Holes*

5. Pull the module from the display face just far enough to reach the back of the module.
6. Disconnect the power and SATA cables from the back of the module.
7. 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.

Reinstalling 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 insert the module into the opening while verifying that SATA and power cables are not being pinched between the module and display face.

4. Firmly press the lower half of the module against the display face.
5. Insert the $^1/_8$" hex head wrench into the bottom access hole and turn approximately a quarter-turn clockwise or until you feel it latch in place.
6. 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.
7. Gently pull on the module to verify it is properly seated.

Removing a Module (Rear Access)

Sometimes, when removing a module from the back of the display, certain display components may inhibit module removal. If that occurs, remove the component according to the instructions provided in **Section 6: Testing and Replacing Display Components (p. 14)** and then remove the module. Replace all components when done servicing the module.

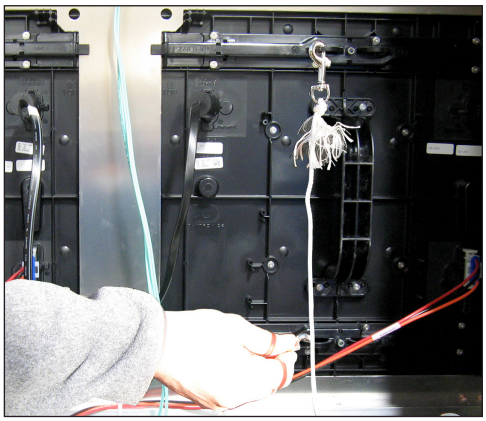


Figure 12: *Attach Safety Lanyard to Modules*

Required Tools: $^1/_8$" hex head wrench, module lanyard (from the spare parts rack)

To remove a module from the back of the display, complete the following steps:

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, as shown in **Figure 12**.
4. Disconnect the SATA and power cables from the back of the module.
5. With a $^1/_8$" hex head wrench, turn the bottom latch gear approximately a quarter-turn clockwise to disengage the latch.

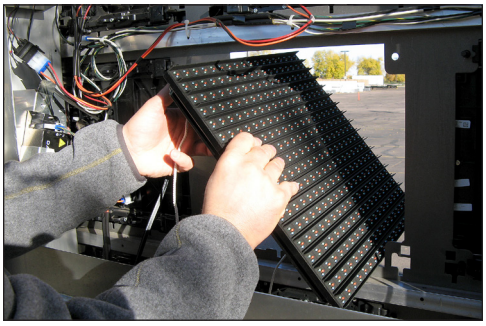


Figure 13: *Proper Module Removal From Back*

6. With a $^1/_8$" hex head wrench, turn the top latch gear approximately a quarter-turn clockwise to disengage the latch.

> **Note:** Always maintain a firm grip on the module while removing it from the face sheet.

7. 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 back. **Figure 14** shows improper module removal from the back.

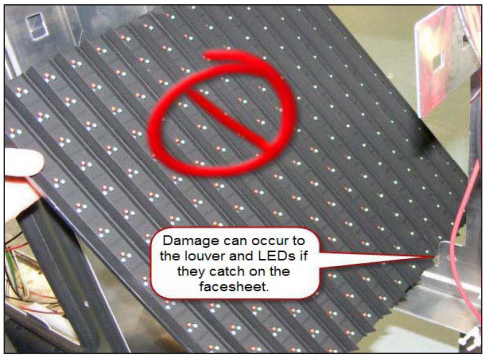


Figure 14: *Improper Module Removal From Back*

Reinstalling 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, as shown in **Figure 15**.

> **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, 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 bottom 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 bottom latch gear approximately a quarter-turn counter-clockwise to engage the latch.
5. Use the top module lanyard rings or the lanyard to pull the module firmly against the face sheet.
6. With a $^{1}/_{8}$" hex head wrench, turn the bottom latch gear approximately a quarter-turn counterclockwise to engage the latch.

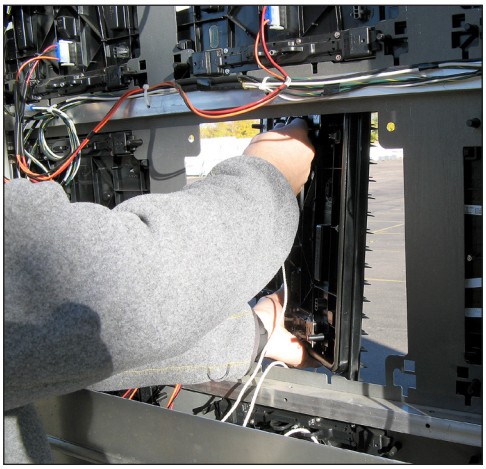


Figure 15: *Rotate Module To Clear Face Sheet*

7. Use the top module lanyard rings or the lanyard to pull the module firmly against the face sheet.
8. With a $^{1}/_{8}$" hex head wrench, turn the top latch gear approximately a quarter-turn counterclockwise to engage the latch.
9. Connect the SATA and power cables to the back of the module.

6 Testing and Replacing Display Components

Testing 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 16**.

> **Note:** When troubleshooting, it is important to know that the module may take up to eight seconds to change the pattern.

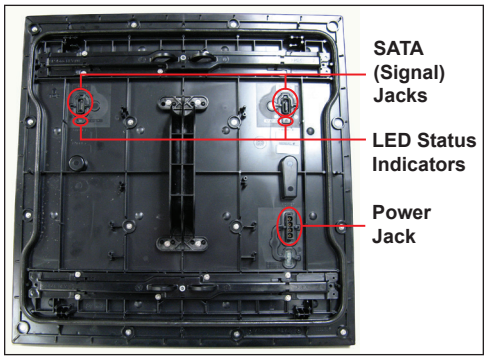


Figure 16: *Labeled Module Back*

Performing 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 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, as shown in **Figure 17**.
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.
5. Remove the SATA cable and cycle power to the module to stop the self-test.

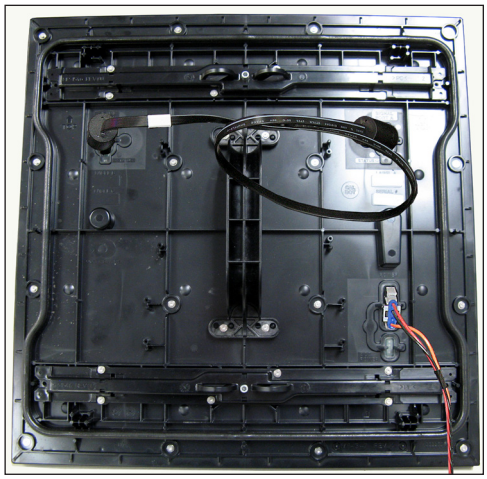


Figure 17: *Module Self-Test*

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

Replacing Module Power Supplies

The power supply provides power from the term panel to the module. For the 6000 series of digital billboards, the module power supply is located on the uprights. Each power supply typically controls two 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 18**.
3. Pull the power supply assembly release tab.
4. Gently lift the power supply assembly off the upright.
5. Pull the power supply tab to release the power supply from the mounting bracket.



Figure 18: *Power Supply Mounted to Upright*

Testing and Replacing a ProLink Router

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

Click here to view a video about testing and replacing a ProLink Router.

Testing a PLR

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

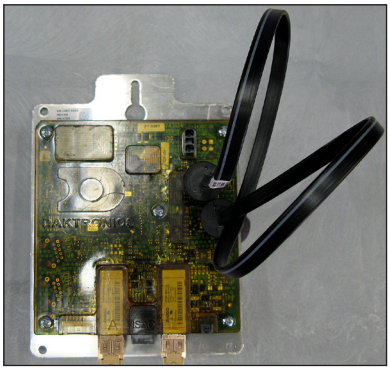


Figure 19: *ProLink Router Connected For Self-Test*

1. Connect a duplex fiber cable from Fiber Port A to Fiber Port B. Refer to **Figure 19**.
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.

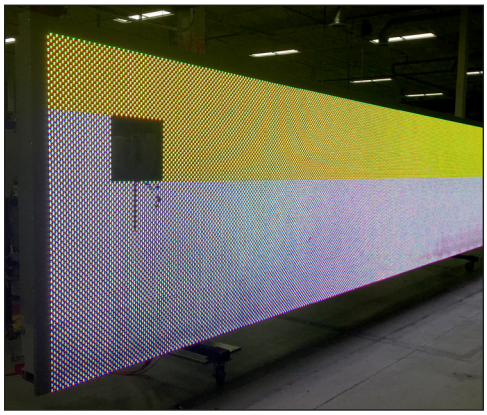


Figure 20: *ProLink Router Port A Test*

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, as shown in **Figure 20**. 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.

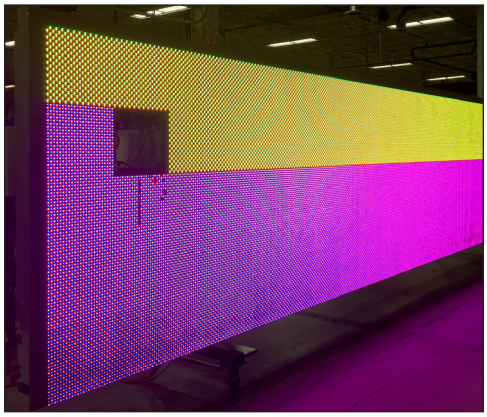


Figure 21: *ProLink Router Port B Test*

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, as shown in **Figure 21**. 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

> **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.

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

Replacing a ProLink Router

Required Tools: Phillips screwdriver

1. Access the interior of the display by using the steps provided in **Section 4: Accessing Internal Components (p. 10)**.
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.

Replacing 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. Pull the power supply tab. Refer to **Figure 18**.
3. Rotate the power supply forward and lift it off of the pegs.
4. Reverse Steps 1 - 3 to install a replacement power supply.

Replacing 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 22**.
3. Remove the fan from the display.
4. Reverse Steps 1 - 3 to install the new fan.

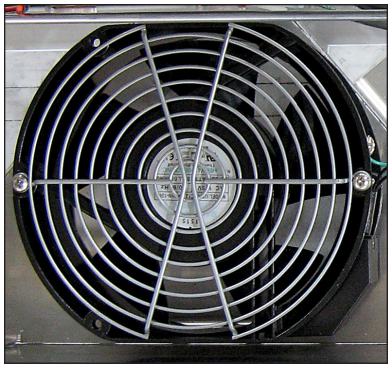


Figure 22: *Display Fan*

7 Control Equipment Overview, Service, and Replacement

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 23** shows the equipment and the equipment location within the ISP enclosure.

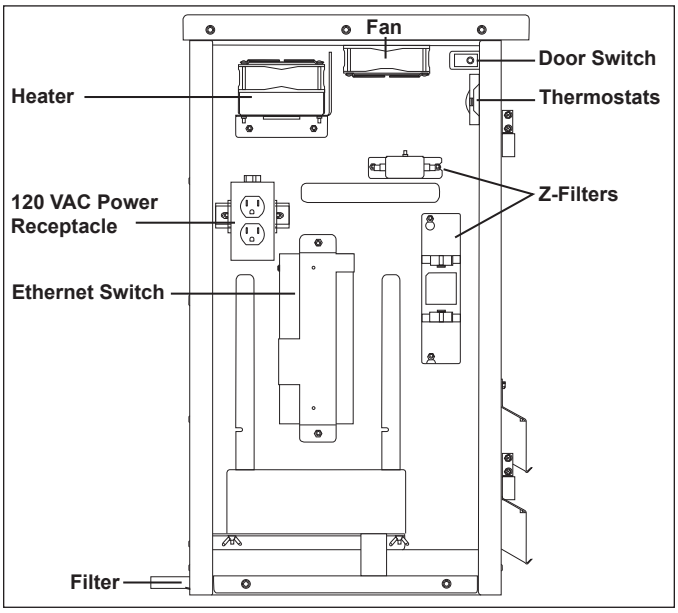


Figure 23: *ISP Enclosure Layout*

DMP-8065

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 25**.

SmartLink™

The SmartLink™ performs power loss detection and remote power cycling for the 6000 series. **Figure 28** shows the SmartLink™ configuration.

Opening the ISP Enclosure

To access ISP box components, complete the following steps:

1. Access the ISP enclosure by opening the rear access door with the control equipment label.
2. Using a flathead screwdriver, turn the two three-quarter turn latches counterclockwise. Refer to **Figure 24**.
3. For easier access to ISP components, the ISP enclosure door can be lifted off the hinges.

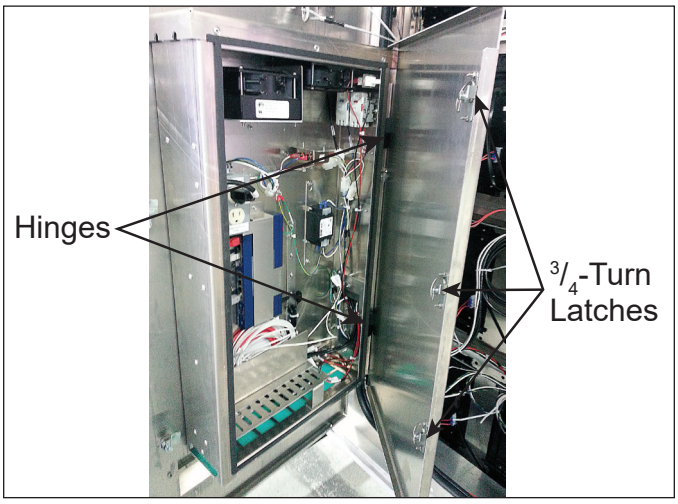


Figure 24: *ISP Enclosure Cover Removal*

Connecting 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.

Replacing Control Equipment

Replacing the DMP-8065

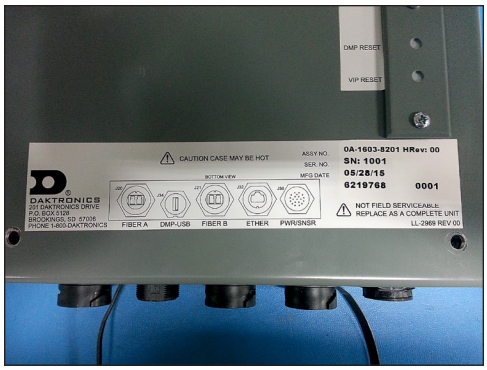


Figure 25: *DMP-8065 Jacks*

1. Disconnect the incoming power to the DMP-8065.
2. Disconnect the duplex fiber to PLR port A from the DMP-8065. Refer to **Figure 25**.
3. Disconnect the duplex fiber to PLR port B from the DMP-8065.
4. Disconnect the network communication cable.
5. Pull the DMP-8065 release tab and carefully lift the DMP off of the DMP mounting plate.
6. Reverse Steps 1 - 7 to reinstall the DMP-8065.

Replacing DMP Power Supplies

Each DMP has a power supply. To replace a failed DMP-8065 power supply, complete the following steps:

1. Disconnect any power cables to the power supply and from that power supply to the DMP-8065.
2. Pull the power supply tab. Refer to **Figure 18**.
3. Rotate the power supply forward and lift it off of the pegs.
4. Reverse Steps 1 - 3 to install a replacement power supply.

Replacing 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, complete the following steps:

1. Pull the filter out from the right side of the enclosure. Refer to **Figure 26**.
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.

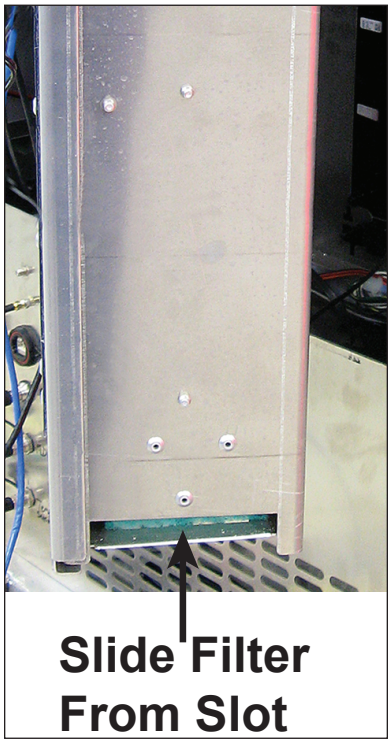


Figure 26: *ISP Enclosure Filter Location*

Replacing 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.

Replacing 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.



Figure 27: *Router and Network Switch in ISP Enclosure*

Replacing 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 29**.



Figure 28: *SmartLink*

Replacing 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.

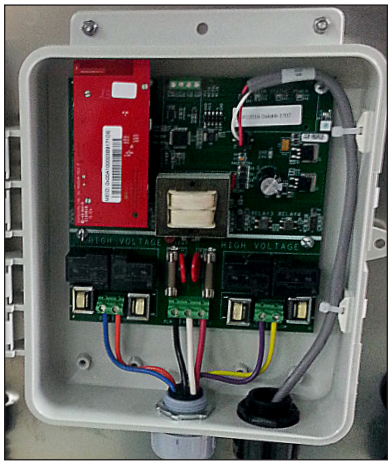


Figure 29: *SmartLink MEID Number*

5. Reverse Steps 1 - 4 to install the new Z-filter.

Replacing 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 30**.
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 - 4 to install the new heater.

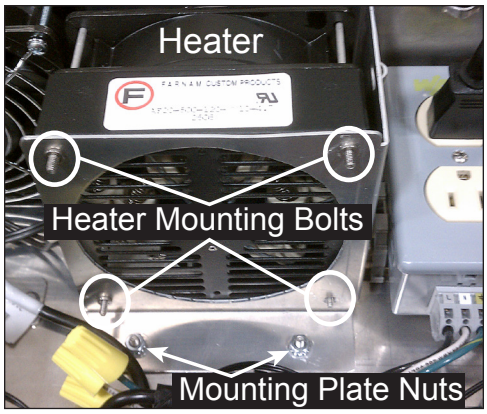


Figure 30: *ISP Enclosure Heater Assembly*

Replacing 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. Reverse Steps 1 - 2 to install the new fan.

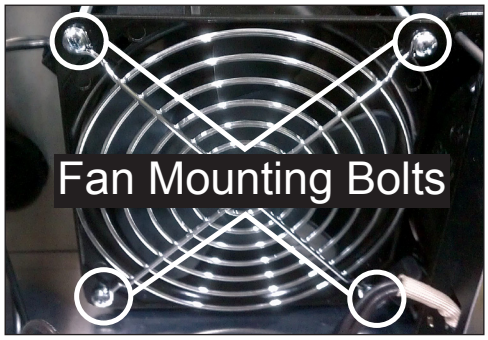
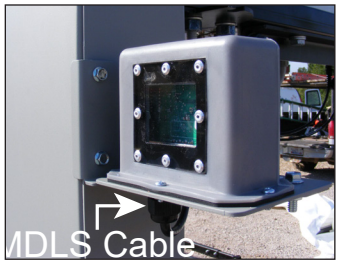


Figure 31: *ISP Enclosure Fan Assembly*

8 Test and Replace the Multi-Direction Light Sensor

Troubleshoot a Multi-Direction Light Sensor (MDLS) Issues

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

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

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:** There may be 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 back of 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.

9 Webcam Access and Troubleshooting

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.

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

1. Remove the three short bolts from the elbow assembly. Refer to **Figure 32**.

   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 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.

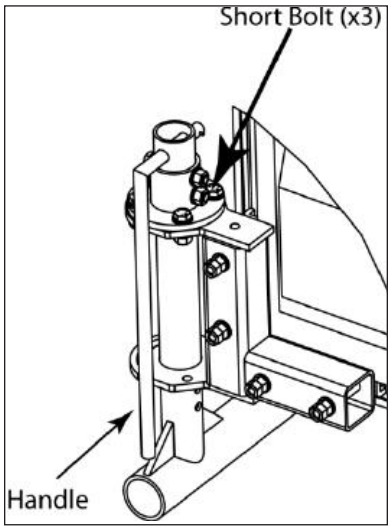


Figure 32: *Webcam Arm Bolts*

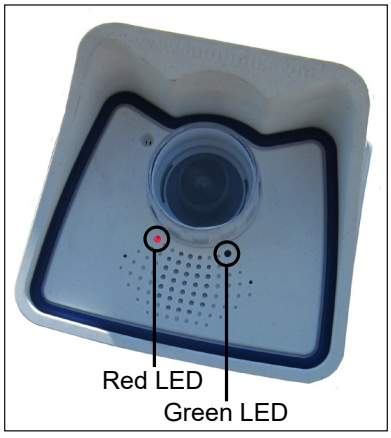


Figure 33: *Webcam LED Status Indicators*

Troubleshoot the Webcam

This section provides some basic power troubleshooting steps to perform if the webcam is not functioning properly. Refer to **Figure 33** while reading the table below.

Issue	Troubleshooting Steps
Both LED indicators on the webcam are off.	**1.** Check the Cat5 connections inside the surge protector to ensure they are secure **2.** Verify the M12 connection for the camera on the back of the display is securely fastened **3.** 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. **4.** Verify the power connection to the POE switch and AC adapter are securely fastened. **5.** If all connections are securely fastened but the indicators are off, work with the help desk to further troubleshoot the issue. **6.** The POE surge may be damaged. Use a RJ45 coupler to bypass.

Issue	Troubleshooting Steps
The help desk can not see a webcam image and the POE switch is functioning properly.	**1.** Verify the POE switch located in the ISP box is connected and the LED indicators are on. **2.** 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. **3.** The POE surge may be damaged. Use a RJ45 coupler to bypass. **4.** 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 visits 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 (DD3059470) to record inspection findings.

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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 **DD1944805**
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 (SL-02374) information. This template contains a few basic elements:

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