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How to Use This Manual

This manual explains the installation, maintenance, and troubleshooting of this video display system. For additional information regarding the safety, installation, operation, or service of this system, refer to the telephone numbers listed in Daktronics Exchange and Repair & Return Programs (p.35).

Please read and understand all steps in this manual before beginning the installation process.

For a smooth installation, complete the steps in this manual in order. Contact Daktronics Technical Support with any questions before or during the installation process.

Limitation of Liability

The factory warranty will be nullified if:

The display is not installed according to the steps in this manual
Proper electrical service is not provided or the display is not grounded properly
Unauthorized modifications are made to the display, display cabinet, or the control system

Refer to Section C: Daktronics Warranty & Limitation of Liability (p.43) at the end of this manual for the full Daktronics Warranty and Limitation of Liability.

Contact Information

For assistance before, during, or after display installation, please contact Daktronics Technical Support: 800-DAKTRONICS (800-325-8766).

Numbering Conventions

Module Number

Figure 1 explains the module labeling method in more detail, and Figure 2 illustrates how Daktronics numbers modules on a video display.

Model Number

Each video display system has a model number that explains the display specifications.

<table>
<thead>
<tr>
<th>DVX-1830-15MN-HHHxWWWW</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVX = Product series</td>
</tr>
<tr>
<td>1830 = Product generation</td>
</tr>
<tr>
<td>10MN = Pixel pitch/layout</td>
</tr>
<tr>
<td>HHH = Matrix height</td>
</tr>
<tr>
<td>WWW = Matrix width</td>
</tr>
</tbody>
</table>

Figure 1: Module Numbering Breakdown

Figure 2: Module Numbering
Important Safeguards

- Read and understand the installation instructions before beginning the installation process.
- Do not drop the control equipment or allow it to get wet.
- Do not disassemble the control equipment or electronic controls of the display; failure to follow this safeguard will make the warranty null and void.
- Disconnect the display power when not in use or when servicing.
- Disconnect the display power before servicing the power supplies to avoid electrical shock. The power supplies run on high voltage and may cause physical injury if touched while powered.
2 Mechanical Installation

Daktronics engineering staff must approve any changes that may affect the protective integrity of the display enclosure. This includes, but is not limited to, the border shrouding, back sheets, ventilation, and filler panels. If any modifications are made to the protective integrity of the display enclosure, detailed drawings of the changes must be submitted to the Daktronics engineering staff for evaluation and approval, or the warranty will be null and void.

All decisions regarding display mounting must conform to the specifications and guidelines in this section. Read both the mechanical and electrical installation sections before beginning any installation procedures.

Support Structure Selection and Design

It is the installer’s responsibility to ensure the mounting structure and hardware are built per the stamped engineering drawings and are capable of supporting the display.

The deflection/curvature of the members directly behind the display must be limited to prevent structural damage to the cabinets and to ensure the image on the display is not affected. Only the members that will force the display to deform need to be taken into account. The deflection limits are as follows:

- The deflection limit for long-term loading is the span length (in inches) of the structure divided by 400 for both in-plane and out-plane deflection. Examples of long-term loading include dead loads, live loads expected while operating the display, etc.

  \[ \text{Deflection limit} = \frac{\text{Span length (in inches)}}{400} \]

  Examples of long-term loading include dead loads, live loads expected while operating the display, etc.

  \[ \text{Note: Long-term deflection in place before the display face is installed does not need to be considered.} \]

- The deflection limit for short-term loading is the span length (in inches) of the structure divided by 400 for in-plane deflection and the length (in inches) divided by 240 for out-plane deflection. Examples of short-term loading include wind, seismic activity, live loads expected while servicing the display, etc.

  \[ \text{Deflection limit} = \frac{\text{Span length (in inches)}}{400} \]

Refer to Figure 5 and Figure 6 for details. Daktronics is not responsible for mounting decisions made by others.

Border Type Confirmation

For most displays, Daktronics provides some form of border around the display face. These borders are typically painted metal pieces that will attach to their appropriate display sections to enclose the active area of the finished display. Prior to picking any sections, it is important to determine the border style for the finished display.

While each site is unique, Daktronics typically provides two standardized border designs that attach to the display sections: flange borders and clean-look borders. Flange
borders provide a main front flange to enclose the active area. This flange may be the only finish the customer requires, or it can provide a location for subcontractors to mechanically fasten extra flashing on-site. Clean-look borders are typically installed when an architect specifies that the sides of the display need to be clean in appearance and aesthetically pleasing with no extra work done on-site. These borders hide any mechanical fasteners from the front, sides, and bottom of the display. Figure 5 shows the difference in appearance between the standard flange and clean-look borders.

Figure 5: Standard Flange and Clean-Look Border Differences

For domestic contracts, standard flange borders may arrive factory-installed on crated display sections as noted on the Config Drawing. For international contracts, borders will be shipped in a separate crate. Daktronics recommends that flange borders be attached prior to installing display sections; however, if the installation subcontractor feels it would be easier to install loose flange borders after the entire display is hung, that option is available. If the borders are loose, refer to the Config Drawing to determine which borders belong to each section.

Clean-look borders will not arrive on-site attached to their appropriate display sections. It is critical that the clean-look borders be installed to each section prior to flying that display section into place. Due to interference issues, they cannot be fully installed when the display has been installed on the structure. Refer to the Config Drawing to determine which border parts belong to each section.

Refer to the DD3015838 DVX-11X2/1502/1801 Series Border Installation Guide for instructions.

Lift Display or Display Section

Lift points are incorporated into the top of each section. Take care not to exceed the rated load of the lift points.

Figure 6 illustrates both the standard and the alternate method of lifting a display or display section. It is recommended that displays be lifted with a spreader beam using every lift point provided; alternate arrangements can be made using Figure 6 as a guide. Do not attempt to lift the display when the lift angle is less than 45°, as this may damage the display.

Figure 6: Display Lifting

Mechanical Installation
Lift Display Without Spreader Beam (Standard Method)
Displays may be lifted without a spreader beam if they do not exceed the line angle and maximum capacity limits. Lines must be attached to the lifting lugs provided in the attached full-height support tubes by a clevis. Refer to the first image in Figure 6. Lifting from eyebolts is not acceptable, as it will damage the cabinets. Eyebolts may be installed in $\frac{1}{2}$" nutsert locations in display section sides for attaching tag lines.

Lift Display With Spreader Beam (Alternate Method: Lifting More Than 1,400 lbs)
The highest capacity lifting configuration uses a spreader beam attached to the lifting lugs provided in the full-height aluminum tubes. Larger display sections may be lifted in this configuration if they do not exceed the maximum capacity limit. The shipping crate weight must be included. Refer to the second image in Figure 6. Eyebolts may be installed in $\frac{1}{2}$" nutsert locations in display section sides for attaching tag lines.

Weight Approximations
The table below lists the weight approximations for the standard cabinet sizes.

<table>
<thead>
<tr>
<th>Section Size (Modules)</th>
<th>Section Weight (lbs)</th>
<th>Section Size (Modules)</th>
<th>Section Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x3</td>
<td>95.4</td>
<td>4x7</td>
<td>445.2</td>
</tr>
<tr>
<td>2x4</td>
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<td>4x8</td>
<td>508.8</td>
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<td>2x5</td>
<td>159.0</td>
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<td>572.4</td>
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<td>2x6</td>
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<td>2x8</td>
<td>254.4</td>
<td>5x4</td>
<td>318.0</td>
</tr>
<tr>
<td>2x9</td>
<td>286.2</td>
<td>5x5</td>
<td>397.5</td>
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<tr>
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<td>318.0</td>
<td>5x6</td>
<td>477.0</td>
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<tr>
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<td>143.1</td>
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<td>556.5</td>
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<td>3x4</td>
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<tr>
<td>3x8</td>
<td>381.6</td>
<td>6x4</td>
<td>381.6</td>
</tr>
<tr>
<td>3x9</td>
<td>429.3</td>
<td>6x5</td>
<td>477.0</td>
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<td>3x10</td>
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<tr>
<td>4x6</td>
<td>381.6</td>
<td>6x10</td>
<td>954.0</td>
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</table>

Mount Display
This manual covers only general mounting topics. Refer to the Shop Drawing for specific mounting instructions.

The installer must ensure the installation meets local codes and standards. All hardware installation processes must meet the approved, stamped drawings from a professional engineer. Carefully read all of the following bullet points before proceeding with
installation steps. Mounting and interconnect hardware is included in colored bags in the display sections. The bag color and storage locations are as follows:

- Interconnect hardware: blue bag in bottom of each stacked or single-high section
- Mounting hardware: red bag in one section of each crate
- Weldless hardware: green bag in bottom of each stacked or single-high section (if applicable)

**Display Section Basics**

**Figure 7** (single cabinet section) and **Figure 8** (vertical pair section) show the basic features of a typical DVX display section.
Figure 9 shows the basics of cabinet ventilation. Take note of the ventilation requirements later in this section and the minimum distance required from the vent panels to the stringer faces. Blocked vent panels may result in the display overheating, causing display failure.

Verify the following before beginning the installation process:

- Verify the mounting structure is square. Refer to Figure 10 and measure from the top corner of the top stringer to the opposite bottom corner of the bottom stringer, then repeat this process on the two remaining corners. Compare both measurements. If they differ by more than $\frac{1}{4}$", contact the project manager or mechanical systems engineer.

- Verify the width of the structure. Refer to Figure 11 and measure the length of each stringer. This also helps locate the center point of the structure, serving as a reference for where to install the first cabinet.

- Verify the stringer height is accurate based on the Shop Drawing. Refer to Figure 12 and measure from the top of steel (TOS) of each stringer to the TOS for each level. Always measure from the lowest stringer at each column location. Stringer spacing should not vary by more than $\pm \frac{1}{2}$" across the width of the stringers. If either of these variations is encountered, contact the project manager or mechanical systems engineer.

- Verify the plumbness of the stringer faces. Place a plumb bob against the front of the top stringer and drop the plumb bob down to the bottom stringer, measuring left to right down the length of each stringer and the middle. When installing sections, leave enough room between the full-height tubes and the
mounting structure to account for any variation in plumbness. Refer to Figure 13 and Figure 14 when it is time to hang the sections.

![Figure 13: Verifying Stringer Faces](image1)

A $\frac{1}{2}''$ minimum gap from the rear of the display’s full-height tubes to the stringer farthest out of tolerance to the display side is recommended. Contact the project manager or mechanical systems engineer if a variation of more than $\frac{1}{2}''$ in plumbness in stringers is encountered.

A 2'' maximum gap from the display rear to the stringer farthest away from the display side is permitted. A 1'' minimum clearance behind the vent panels is required if both the intake and exhaust panels are covered by the stringer face.

- Verify the stringer is straight. Refer to Figure 15 and use a string line.

Use a tape measure to measure back the same distance from the front of the stringer on both ends of the bottom stringer and mark those spots. Stretch a string line between the two marks and in 10’ intervals along the span of the stringer and measure from the front of the stringer to this string line.

This also helps set the bottom row of the display by measuring from the front of the stringer back to the string line and figuring out the variances needed in the clips across the stringers. If the variance is greater than ±$\frac{1}{2}''$, contact the project manager or mechanical systems engineer.

Keep these critical points in mind while installing:

- Ensure the sign installer and the structural engineer designing the sign structure determine the clips supporting the weight per the design of the structure as well as the installation method. Daktronics mounting clips are designed to support each individual sign section weight by either the top or bottom mounting clips (two clips total).

- Do not set the display sections directly on the ground if the display ships in sections that must be removed from the trailer or crates before installation. Place them on spacers at least 2'' high and not directly under the module to prevent module damage. Place
supports every 4 to 6’. Refer to the DD3016690 DVX-11X2/1502/1801 Series Shipping Frame Field Instructions.

• Ensure the sections’ bottom mounting angles and stabilizing blocks have been disconnected from the bottom of the crate when removing display sections from wooden crates prior to lifting. Once lifted, remove the countersunk bolt to remove the stabilizing blocks (where attached).

• Wipe any dust or debris off the top of the cabinet sections before lifting the display. This helps with water sealing and module registration. Be careful not to damage the light gasket.

• Use a clean rag to carefully brush any debris from the module faces before lifting the display and quickly inspect the display faces to ensure all modules are securely latched.

• Ensure the drain holes in the bottom of each section are not obstructed in any way. Inspect the mounting structure to ensure it does not obstruct the drain holes. If the drain holes are obscured, drill \( \frac{3}{8} \)" drain holes through the holes in the display cabinet and the mounting structure. Refer to Figure 16.

• Attach the clips permanently to the structure. Refer to the Shop Drawing for more details on welding or bolting requirements. If both are illustrated on the Shop Drawing, contact the project manager. Refer to Figure 17 for a typical welded attachment or to Figure 18 for a typical weldless attachment.

Welded attachment: Weld the clip angles on all three sides. It may be necessary to weld on the inside of the clip if two clips are adjacent.

Weldless attachment: Use a screw (located in the green weldless hardware bag) in the middle slot of the clip to allow for adjustment when hanging the section. Once the section is properly set in place, the screws must be securely fastened into the two outer holes of the clip to permanently secure the section to the structure. Refer to the DD1723952 Structural Self-Drilling Screws Installation Guide in Section B: Supplementary Documents (p.41).

• Ensure all light gaskets are in place (continuous between precision corner blocks on the top and the right of each cabinet when viewed from the front).
Recommended Section Installation Sequence for Matrix Displays

Review the Shop Drawing. On the front view, find the overall width of the display and determine the location of the center line of the overall display. This line will be the starting point of the installation.

1. Determine which section in the bottom row of the display lies in that center line.

2. If the center line falls somewhere within the width of a section, this section will be the first section installed. In Figure 19, Section 203 will be installed first.

3. If the center line falls at the intersection of two sections on the bottom row, the section to the left of the center line will be the first section installed.

4. Use the installation procedure explained in detail on the following page and install the first section on the bottom row. Refer to Figure 20.

5. Work to the left on the bottom row after the center section is installed until the left edge of the display is reached. As shown in Figure 21, install Section 202 and then Section 201 after Section 203 (the center section) is installed square and plumb.

6. Go back to the center and finish the bottom row to the right of the center section after the row has been installed from the center to the left. As shown in Figure 22, install Section 204 and then Section 205 to reach the far right end of the display and complete the bottom row of sections.

7. Begin installing the next row of sections above the center cabinet after the bottom row is completely installed. In Figure 23, Section 103 is the center cabinet.
8. Work to the left on the second row after the center section is installed until the left edge of the display is reached. As shown in Figure 24, install Section 102 and then Section 101 after Section 103 (the center section) is installed and plumb.

9. Go back to the center and finish the second row to the right of the center section after the row has been installed from the center to the left. As shown in Figure 25, install Section 104 and then Section 105 to reach the far right end of the display and complete the second row of sections.

10. Repeat Steps 6-8 until the remainder of the display is fully installed.

Installation
This section provides general guidance on mounting individual sections to a support structure. The display must mount directly to a non-combustible surface.

Seam tolerance is critical and must be maintained throughout the installation process. Measure seams to verify spacing. Refer to the DD3008872 DVX-11X2/1502/1801 Series Seam Measurement Field Instructions in Section B: Supplementary Documents (p. 41) for information on the measurement process and to the DD3016287 DVX-11X2/1502/1801 Series Cabinet Alignment Guide for information on proper seam alignment.

Refer to Figure 20, Figure 26, and Figure 27 while completing Steps 1-4 for placing the first section.

1. Use the mounting hardware (located in the red mounting hardware bag) to attach the clip angles to the cabinets. Use the dimensions on the Shop Drawing and set the bottom clip angles to the approximate correct height on the cabinet.

2. Loosen the top clip angles before flying the cabinet into place to easily adjust the clip angles on the structure. Using tag lines when lifting sections into place is recommended. A 1/2" eyebolt can be installed into the nutsert in the rear of the full-height tubes. Refer to Figure 26. Attach tag lines to these bolts and not to the clip angles, door handles, vent panels, or other areas of the cabinet, as this can damage the cabinet.
3. Fly the first section into position; adjust the clips accordingly. Ensure it is both vertically plumb and horizontally level, as other sections rely on this section’s position. Refer to Figure 27.

4. Set the clip angles and tighten them to the display after the section is in place; then permanently attach the section to the structure as per the Shop Drawing.

Refer to Figure 21, Figure 22, and Figure 28 while completing Steps 5-8 for placing the second section.

5. Loosen the top clip angles and ensure the bottom clip angles are set all the way up on the bolts before flying the cabinet into place to easily adjust the clip angle placement on the structure. Lift the section and position it beside the first section, ensuring the corner block alignment pyramids on the cabinets nest together.

6. Install all corner block interconnect bolts (located in the blue interconnect hardware bag) across the vertical seam immediately after positioning the section to ensure the display sections fit snugly together and the new section is plumb and level. Refer to Figure 28. Do not tighten the bolts until there is a bolt in every corner block location and the display modules are properly aligned. If installing from the rear, look down the module seams from the top or side of the cabinet when attaching sections together to ensure the modules align properly at the splice. After everything is in place, tighten all corner block splice bolts. If vertical misalignment occurs in the corners, loosen the bolts, attempt to adjust and move the section, and retighten the corner block splice bolts. If issues persist, contact the project manager.

7. Set the clip angles and tighten them to the display after the splice bolts are tightened. Permanently attach the clip angles to the structure as per the Shop Drawing.

8. Repeat Steps 5-7 for all remaining sections in the bottom row. Install the bottom and side borders as necessary if they are not already attached prior to flying the sections into place. Refer to Figure 21 and Figure 22.

Refer to Figure 23 and Figure 29 while completing Steps 9-11 for placing the first section on the second row.
9. Use the mounting hardware (located in the red mounting hardware bag) to attach the clip angles to the cabinet. Ensure the top clip angles are loose and the bottom clip angles are set all the way up on the bolts before flying the cabinet into place to easily adjust the clip angle placement on the structure. Lift the section and position it on top of the appropriate section, ensuring the corner block alignment pyramids on the cabinets nest together.

10. Install all corner block interconnect bolts (located in the blue interconnect hardware bag) across the horizontal seam immediately after positioning the section to ensure the display sections fit snugly together, and the new section is plumb and level. Refer to Figure 23 and Figure 29. Do not tighten the bolts until there is a bolt in every corner block location, and the display modules are properly aligned. If installing the display from the rear, look down the module seams from the top or side of the cabinet when attaching the sections together to ensure the modules align properly at the splice. After everything is in place, tighten all splice bolts. If horizontal misalignment occurs in the corners, loosen the bolts, attempt to adjust and move the section, and retighten the corner block splice bolts. If issues persist, contact the project manager.

11. Set the clip angles and tighten them to the display after the splice bolts are tightened. Permanently attach the section to the structure per the Shop Drawing.

Refer to Figure 24, Figure 25, Figure 28, and Figure 29 while completing Steps 12-15 for placing the remainder of the sections.

12. Use the mounting hardware (located in the red mounting hardware bag) to attach the clip angles to the remaining cabinets. Ensure the top clip angles are loose and the bottom clip angles are set all the way up on the bolts before flying the cabinet into place to easily adjust the clip angle placement on the structure. Lift the section and position it on top of the appropriate section, ensuring the corner block alignment pyramids on the cabinets nest together.

13. Install all corner block interconnect bolts (located in the blue interconnect hardware bag) through the vertical and horizontal seams immediately after positioning the section to ensure the display sections fit snugly together and the new section is plumb and level. Refer to Figure 24, Figure 28, and Figure 29. Do not tighten the corner block bolts until there is a bolt in every vertical and horizontal location and the display modules are properly aligned. If installing the display from the rear, look down the module seams from the top and side of the cabinet when attaching the sections together to ensure the modules align properly at the splice. After everything is in place, tighten all corner block splice bolts. If misalignment occurs, loosen the bolts, attempt to adjust and move the section, and retighten the corner block splice bolts. If issues persist, contact the project manager.

Set the clip angles and tighten them to the display after the splice bolts are tightened. Permanently attach the section to the structure as per the Shop Drawing.

Repeat Steps 12-14 for all remaining sections. Install the top and side borders as
necessary if they are not already attached prior to flying the sections into place. Refer to Figure 25.

**Center Adjustment**

Precision blocks provide proper spacing at the ends of section seams, but spacing may vary in the middle where the sections come together. Additional holes are provided along both the horizontal and vertical edges of the cabinet for additional adjustment if required. Install hardware in these locations only if further seam adjustment is required.

For wide center seams, install \( \frac{1}{4} \)" bolts (located in the blue interconnect hardware bag) through the holes behind the face sheets at the problem locations in the bottom of the top cabinet or the left side of the right cabinet and into the next cabinet’s nutsert. Tighten these bolts until the seam is within tolerance. Refer to the **DD3008872 Series DVX-11X2/1502/1801 Seam Measurement Field Instructions** in Section B: Supplementary Documents (p.41) for details on seam tolerance and to Figure 30 for details on seam adjustment.

For tight center seams, install \( \frac{1}{8} \)" bolts (located in the blue interconnect hardware bag) into the pre-installed nutserts behind the face sheet at the problem locations in the bottom of the top cabinet or the left side of the right cabinet. Tighten the bolts until the seam is within tolerance. Refer to the **DD3008872 DVX-11X2/1502/1801 Series Seam Measurement Field Instructions** in Section B: Supplementary Documents (p.41) for details on seam tolerance and to Figure 31 for details on seam adjustment.
3 Electrical Installation

Install the display in accordance with the requirements of Article 600 of the National Electrical Code and/or other applicable local codes. This includes proper grounding and bonding of the sign.

This display is suitable for wet locations. Daktronics engineering staff must approve any changes that may affect the weather tightness of the display. If any modifications are made to the weather tightness of the display, detailed drawings of the changes must be submitted to Daktronics engineering staff for evaluation and approval, or the warranty will be null and void.

Only qualified individuals should access the electrical components of this display and its associated equipment.

Power Summary

Power from the termination panel breaker routes to the Power In jack on the power supplies. From there, power routes to the individual modules. ProLink Routers (PLRs) are powered from the accessory jack of the closest module.

Refer to the DD3062200 DVX-11X2/1502/1801 Series Power Numbers in Section B: Supplementary Documents (p.41) for details.

Signal Summary

Figure 32, Figure 33, and the Block Diagrams and Layout Drawings in Section A: Drawings (p.39) illustrate the signal layout of each display section. The Config Drawing illustrates the signal connections from the DMP to the ProLink Routers (PLRs) in the display or from cabinet section to cabinet section. This is done to some extent in all DVX cabinet displays.

Refer to the appropriate System Riser Diagram and Config Drawing for more routing information. Refer to the Cabinet Fiber Routing Drawing and Power Entrance Drawings in Section A: Drawings (p.39) for fiber termination information.

The Cabinet Fiber Routing Drawing in Section A: Drawings (p.39) and the Config Drawing illustrate the fiber layout from section to section of the display.

The Block Diagrams and Layout Drawings in Section A: Drawings (p.39) also illustrate how data passes from one PLR to the modules and show power harnessing and component placement.

Figure 32: Signal Routing (Front View)

Figure 33: Two-Section Display Signal Routing (Front View)
Each PLR sends data to the modules within the display; refer to the Block Diagrams and Layout Drawings in Section A: Drawings (p.39) for further information. Signal exits from the PLR’s ProLink Out jack and routes to ProLink In on the next PLR via fiber-optic cable. Refer to Figure 34, as it illustrates a typical signal routing layout. Refer to the Config Drawing for further information.

![Figure 34: Signal Routing](image)

**Common Connectors**

When pulling a connector plug from a jack, do not pull the wire or cable; detach the jack itself. Pulling the wires may damage the connector. These connectors are not found in every display.

**Water-Tight SATA Cable Connector**

Daktronics uses a wide variety of SATA cables and SATA cable connectors. Figure 35 illustrates one of the most commonly used SATA cable connectors. To disconnect the SATA cable connector, squeeze the locking clips inward and pull the plug out of the jack.

**Fiber-Optic Connector**

LC connectors are square. To remove an LC connector, depress the small clip on the jack and gently remove. Refer to Figure 36.

**Control Cable**

Refer to the System Riser Diagram for specifications on signal and power cable runs. Refer to the DD2773152 VIP-5X6X Operator’s Manual for information on the Video Image Processor (VIP).

The minimum bend radius for this fiber-optic cable is 15 times the outside diameter of the cable or 7 inches. Refer to the System Riser Diagram for the outside diameter of the cable in this system. All fiber-optic runs must be continuous, except where noted on the System Riser Diagram.
Display Power
All display grounding, power routing, and termination must meet or exceed local codes and standards.

Correct power installation is imperative for display operation. These subsections give details on display power installation. Only qualified individuals should attempt the electrical installation; untrained personnel should not attempt to install the displays or any of the electrical components. Improper installation could result in serious equipment damage and could be hazardous to personnel.

Refer to size-specific documentation to determine who is responsible for providing conduit and pulling cable through the conduit.

Earth Ground Installation
Follow the steps below to connect the display to an earth-ground electrode.

1. Install an earth-ground electrode (ground rod, ground plate, etc.) near the base of the display. Refer to Figure 37 for guidelines.

2. Connect a copper wire from the grounding electrode to the ground lug on the back of the display.

3. Bury any copper cable or grounding electrodes so they are below grade.

Important Points About Grounding
- All components of a display system—including but not limited to displays, control equipment, and connected peripheral equipment—must be electrically grounded. Only qualified individuals may perform electrical work, including verification of ground resistance. Daktronics is not responsible for improper grounding or damage incurred as a result of improper grounding.
- Grounding methods must meet the provisions of all applicable local and national codes. Inspect and verify all grounding methods meet the provisions of all applicable local and national codes.
- Proper grounding is necessary for reliable equipment operation and general electrical safety. Failure to properly ground the display system may void the warranty, disrupt operation, damage equipment, and cause bodily harm or death.
Power Installation
To install power, follow the steps below:

1. Connect the grounding electrode cable at the local disconnect, never at the display termination panel.

2. Use a disconnect that opens all ungrounded phase conductors.

This display uses one of four power termination options. Refer to the Power Entrance Drawings in Section A: Drawings (p.39) and Figure 38 for installation details.

Main Disconnect
Refer to the System Riser Diagram to determine who must supply a fused main distribution/disconnect and the necessary wiring for power distribution to multiple display termination panels.

The disconnect mechanism must be located in direct line of sight from the display it controls. This allows workers to keep the disconnect mechanism in view while performing display maintenance.

Power disconnects capable of locking in the open position may be located in an out-of-sight location.

The customer or contractor is responsible for conduit and wire unless stated otherwise on the size-specific documentation.

Power Termination at the Termination Panel(s)
All power routing and termination must comply with local and national codes and standards. Display grounding must agree with local and national codes and standards.

The display allows water to enter, so incoming conduits should be pointed downward or have a fitting attached to prevent water from entering the conduit.

When terminating power at the termination panel, the individual power phases must balance as evenly as possible. Current draw per line, as noted on the System Riser Diagram, is stated as the high leg current draw.

Refer to the Power Entrance Drawings in Section A: Drawings (p.39) for power termination information.

Display Wiring

Power
After mounting the display and bolting all sections securely together, run power from one section to another. Route the interconnect power wire through the interconnect holes based on the Config Drawing, Power Interconnect Drawing, and System Riser Diagram.

Optional Conduit Whip
Refer to the System Riser Diagram to verify where conduit whips should route.
Signal
After mounting the display and bolting all sections securely together, run signal from one section to another. Route the fiber and SATA cables based on the Config Drawing, Signal Interconnect Drawing, and System Riser Diagram. Refer to the Cabinet Routing Drawing in Section A: Drawings (p.39) for fiber and SATA routing information.

Display Continuity Check
Before turning on power to the display, perform a continuity check to ensure no short circuits occurred due to shipping vibration.

Caution: Before performing these steps, ensure all breakers are off.

To perform a continuity check, follow the steps below:
1. Remove the cover from the termination panel.
2. Use an ohmmeter and place one probe on the neutral terminal and another probe to each of the taps on the breaker wire terminal. Repeat the same test for each breaker.
3. Place one probe to the earth ground and one to each of the breaker wire terminals and repeat for each breaker.

All tests should result in a reading of infinity or indicate an open circuit.

Display Power Up
To power up the display, follow the steps below:
1. Turn on the main disconnect to power up the display.
2. Power up the control system to ensure it is fully operational before proceeding.
3. Run an initialization/power up script or animation/logo on the display.

Optional Power Redundancy
When redundant power is included in the system, the display uses an N+1 power supply redundancy configuration for protection against module power failure. If a power supply fails, the redundant power supply provides backup power to the affected module. In regular conditions, the redundant power supply remains auxiliary. Refer to Figure 41.

---

**Figure 40:** Conduit End with Wire

**Figure 41:** Power Redundancy

Neutral: white or blue
Ground: green and yellow
Line: black or brown

---

Electrical Installation
19
Testing
To test the redundant power wiring scheme/setup, locate the last module(s) on the redundant harnessing bus system. Refer to the Block Diagrams and Layout Drawings in Section A: Drawings (p.39) for wiring information and component placement. Disconnect the three-pin AC power to the power supply on the module. Verify the LEDs or indicator lights on the module remain lit to ensure the module continues to work after the AC power is disconnected. Refer to Figure 42.

Signal Redundancy
There are two different levels of signal redundancy: module redundancy, which is part of the standard design, and full-data redundancy.

Standard Module Redundancy
Module redundancy provides a primary and redundant SATA connection throughout the entire display to protect the system from signal failure. If a module in the middle of a signal chain fails, the redundant signal path takes over and limits the signal failure to that single module.

Optional Full-Data Redundancy
Full-data redundancy provides primary and redundant Video Image Processors (VIPs), ProLink Routers (PLRs), and SATA connections throughout the entire display to protect the system from signal failure. If any signal component, cabling, or connection fails, its counterpart takes over and limits the signal failure to as little of the display as possible. Refer to Figure 43.

Test Full-Data Redundancy
To test the module redundancy wiring, locate the Signal Interconnect Drawing to verify where the ProLink Routers (PLRs) are located. The display needs to be powered and running content. Disconnect the SATA cable from Port A of each PLR individually and
verify all modules still display content correctly; reconnect the SATA cable. Disconnect the SATA cable from Port B of each PLR individually and verify all modules still display content correctly; reconnect the SATA cable.

To test the full-data redundancy wiring, locate the Signal Interconnect Drawing to verify where the PLRs are located. Disconnect the SATA cable from Port A of each PLR individually and verify all modules still display content correctly; reconnect the SATA cable. Disconnect the SATA cable from the redundant PLR and verify all modules still display content correctly; reconnect the SATA cable.

To test the PLR redundancy, locate the Signal Interconnect Drawing to verify where the PLRs are located. Disconnect the fiber cable from Port A of the first PLR and verify all modules still display content correctly; reconnect the fiber cable. Disconnect the fiber cable from Port B of the last PLR in the chain and verify all modules still display content correctly; reconnect the fiber cable. Another method is to ensure the Video Image Processors (VIPs) are powered on and then unplug the fiber cable from Port A on the primary VIP or from Port B on the backup VIP and verify all modules still display content correctly.

To test the VIP redundancy, log into the primary and redundant VIPs and make the primary inactive and the redundant active and verify all modules still display content correctly. For normal operation, the redundant VIP is set to inactive and only passes redundant signal from the primary VIP to the last PLR. Refer to the DD2773152 VIP-5X6X Operator’s Manual.

If available, Intelligent Device Management (IDM) can also verify the system is working as intended. Refer to the DD2097912 IDM User Manual.

**Display With Embedded Controller**

Displays with an embedded controller consist of the standard product with the DMP-8065 installed internally to the cabinet.

**System Startup**

The display shows a boot sequence shortly after the power is turned on. The information in this sequence is very useful when using Venus® Control Software to configure the display. Ensure all display communications and network connections are made before turning the display on.

**Boot Sequence**

The information in the boot sequence includes the following:

- Firmware name and version
- Display size (pixels high by pixels wide)
- Dynamic Host Configuration Protocol (DHCP)-assigned name
- IP address and state
- Media access control (MAC) address
- Configuration port
- Status port
- Management port to access configuration
- Description
Startup Checklist

• Confirm all communication equipment is installed according to the provided documentation.
• Confirm any necessary network connections have been made.
• Inspect the peripheral equipment (temperature sensor, light sensor, etc.) for proper installation.

Network and Communication Installation

This section explains the network settings of displays with an embedded controller and gives guidance for integrating a display with a customer's network. It also provides basic information about available standard communication options.

Daktronics is not responsible for setting up displays on a wide area network (WAN) but does assist with setting up communication on a local area network (LAN) or directly to a laptop.

Keep the following points in mind when installing network and communication:

• Do not turn on the display until all network and communication installation is complete.
• Have a laptop with internet access on-site.
• Work with a customer's IT professional for network integration (preferred).

Network Connection

Displays with an embedded controller use Dynamic Host Configuration Protocol (DHCP) by default, allowing the customer's network to configure the display and eliminating manual configuration of the player.

When the display is connected to a network that supports DHCP, a default DHCP name similar to "DAKXXXXXX," "XXXXXX" representing the last six digits of the player's media access control (MAC) address, is used. This information displays during the boot sequence.

Ports 4500-4525 must be open for communication on the switcher or router.

Computer Connection

When connecting the display directly to a computer, and Dynamic Host Configuration Protocol (DHCP) is not available, the display's AutoIP feature assigns an IP address. AutoIP addresses fall into the range of 169.254.0.0 to 169.254.255.255. The IP address displays during the boot sequence when the display first turns on.

Static IP Address Setting

Setting a static IP address on a display requires the following:

• Laptop with Java®, Silverlight®, DisplayFind, and Internet Explorer® applications installed
• Display IP address (provided by customer)
• Ethernet patch cable to connect the computer to the display

Work with Daktronics Technical Support when programming a static IP address on the player.
Standard Communication Options
Displays with an embedded controller can receive various forms of Ethernet communication. The standard communication options are listed below, along with communication-specific documentation numbers. For additional information, refer to these documents provided in the communication kits.

<table>
<thead>
<tr>
<th>Communication Type</th>
<th>Manual DD Number</th>
<th>Quick Guide DD Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet - wire</td>
<td>DD1417609</td>
<td>DD1417573</td>
</tr>
<tr>
<td>Ethernet - fiber</td>
<td>DD1417611</td>
<td>DD1417581</td>
</tr>
<tr>
<td>Ethernet bridge radio</td>
<td>DD1685027</td>
<td>DD1417586</td>
</tr>
</tbody>
</table>

These are the standard communication types, but each site is unique and may include additional equipment. Contact Daktronics Technical Support with any questions.

Other control software is available on a contract basis. Refer to that product's help file for system requirements, installation, and configuration information.

First-Time Venus Login
Before first-time login, ensure the Venus® Control Suite computer uses one of the following internet browsers:

- Chrome® – version 43.0.0.0 (or later)
- Firefox® – version 36.0 (or later)
- Internet Explorer® – version 11 (or later) with Windows® 7 operating system
- Safari® – version 8.0 (or later)

Log In - Daktronics Web-Hosted Server
2. Enter the user name and password provided by Daktronics into the Email and Password text boxes and click Login. Refer to Figure 44.
3. Change the password in the Update Password window. Refer to Figure 45. This step is required only for the first-time login to the Venus® Control Suite system.
4. Update the account information fields in the User Information and Additional Information sections and click Save.

Log In - Customer Local-Hosted Server
1. Navigate to https://ComputerName:44300 (entering the actual computer name for ComputerName).
2. Enter the user name and password provided by Daktronics into the Email and Password text boxes and click Login. Refer to Figure 44.
3. Change the system password in the Update Password window. Refer to Figure 45. This step is required only for the first-time login to the Venus® Control Suite system.
4. Update the account information fields in the User Information and Additional Information sections and click Save.

Venus Menu Overview

After initial login, the Dashboard window opens showing status tiles for each display in the system. Click the Show Menu button at the upper-left corner of the screen to open the main menu. Refer to Figure 46 and the table below.

<table>
<thead>
<tr>
<th>Menu Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dashboard</td>
<td>Shows status tiles for each display and any active, online, associated devices such as VIP-5X60s, DMP-8000s, and DMP-5000s</td>
</tr>
<tr>
<td>Media</td>
<td>Opens the Media Library where content media files are uploaded, created through the Content Studio application, tagged, stored, and assigned to an account</td>
</tr>
<tr>
<td>Playlists</td>
<td>Creates a playlist of content media files to play in a specified order on a selected display</td>
</tr>
<tr>
<td>Reports</td>
<td>Produces proof-of-play and scheduled content reports for displays at specified dates and times</td>
</tr>
<tr>
<td>Data</td>
<td>Loads installed data packages</td>
</tr>
<tr>
<td>Scripts</td>
<td>Opens the Script Library where display commands are created and stored</td>
</tr>
<tr>
<td>Accounts</td>
<td>Creates new accounts for advertisers</td>
</tr>
<tr>
<td>Users</td>
<td>Lists current user profiles and allows users to update passwords or add new users</td>
</tr>
<tr>
<td>Displays</td>
<td>Lists all available displays and provides basic management tools including Devices for linking DMP-8000s, DMP-5000s, and VIP-5X60s to a specific display</td>
</tr>
</tbody>
</table>

Contact Information and Where to Get Help

Daktronics contact information and Venus® Control Suite account information is available by clicking the user name at the upper-right corner. Refer to Figure 47. Select the About tab under the user name to open the contact information window. Refer to Figure 48.

Select Search our knowledge base to open the Daktronics knowledge base results in a new window.

Training videos that explain basic Venus® Control Suite functions are available online:

www.daktronics.com/venuslearning

Figure 46: Venus® Main Menu

Figure 47: Account Information

Figure 48: Contact Information
If further assistance is required, Daktronics Customer Service is available 7 a.m. to 7 p.m. CST, Monday to Friday via telephone or online connection.

**Telephone**

Domestic (U.S. and Canada): 1-800-DAKTRONICS (1-800-325-8766)

International: +1-605-697-4000

**Online**

www.daktronics.com/support

Display with Embedded Controller Light Sensor Mounting

Light detectors monitor the light levels around the display and adjust the LED intensity accordingly. Refer to **Figure 49**.

To mount the light sensor on the display border (if not previously factory-installed), refer to the instructions on the **Light Sensor Drawing** in **Section A: Drawings (p. 39)**. Connect the light sensor harness to the quick connect plate.

Optional Temperature Sensor Mounting

A temperature sensor mounts separately and requires a location away from chimneys, air conditioners, vents, tar roofs, concrete, and parking lots that can cause abnormal temperature fluctuations. Usually a separation of at least 20 to 30’ horizontally and 8’ vertically is required. Locations where air movement is restricted are also unsatisfactory.

The first choice for temperature sensor location is a north eave or northern exposure, away from direct sunlight and above grass. This location gives extra stability and accuracy to the sensor because of the added shading obtained on a northern exposure. Ensure at least one foot of space exists between the bottom of the eave and the top of the temperature sensor housing for accurate readings. Refer to **Figure 50**.

The second choice for temperature sensor location is on the display itself or on the display structure. The location of the sensor should be above, below, or on a northern edge to keep the sensor shaded. If mounting above the display, a minimum height of 6’ is required. Mounting a sensor below the display requires a minimum of 8’ above the ground and a minimum of 1’ between the sensor and the display. Refer to **Figure 51**. Greater accuracy is obtained with grass below the sign rather than concrete or another material.

**Figure 49:** Light Detector

**Figure 50:** Temperature Sensor Mounting

**Figure 51:** Temperature Sensor Mounting
4 Maintenance and Troubleshooting

Turn off display power before performing any repair or maintenance work.

Only qualified service personnel may access internal electronics.

Do not operate the display with the back sheets removed. The back sheets direct adequate airflow around the components. Display operation without the back sheets in place and fans running could cause damage to the display and will make the warranty null and void. Ensure the back sheets are securely fastened into place.

Dirt and contaminants may enter the display if it is operated without the fan filters in place. These contaminants may cause premature failure of the electronic components. Operating the display with dirty fans and filters will make the warranty null and void.

Daktronics product managers' engineering staff must approve any changes that may affect the display’s weather tightness. This includes, but is not limited to, border shrouding, back sheets, cooling fans, fan filters, and filler panels. If any changes are made to the display’s weather tightness, submit detailed drawings to Daktronics engineering staff for evaluation and approval, or the warranty will be null and void.

Recommended Tools

When performing maintenance work on the display, use the tools listed below and place them in a convenient, easy-to-access location.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Daktronics Part Number</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module safety lanyard</td>
<td>TH-1175-9000</td>
<td>Prevents modules from falling and breaking</td>
</tr>
<tr>
<td>5/16&quot; Nutdriver</td>
<td>TH-1156</td>
<td>Removes and attaches components</td>
</tr>
<tr>
<td>1/4&quot; Flathead screwdriver</td>
<td>TH-1171</td>
<td>Turns door latches</td>
</tr>
<tr>
<td>1/8&quot; Hex wrench</td>
<td>TH-1172</td>
<td>Removes modules in DVX-11X2/1502 displays</td>
</tr>
<tr>
<td>Module removal tool</td>
<td>TH-1212</td>
<td>Removes modules in DVX-1801 displays</td>
</tr>
<tr>
<td>3/8&quot; Socket set</td>
<td>TH-1244</td>
<td>Interconnects sections</td>
</tr>
</tbody>
</table>

These tools are found in the tool kit (Daktronics part number 0A-1730-0002) located behind the bottom row in the lower-left corner of the cabinet. Toolkits include other items not on this list, and additional replacement tools may be ordered directly from Daktronics; refer to Daktronics Exchange and Repair & Return Programs (p.35).
Display Access

Video displays are designed for either front or rear access, depending on site requirements and customer preference. While components in front-access displays are simply removed from the front, rear-access displays require removing the access doors from the rear of the display to reach the internal display components.

To remove the access doors, follow the steps below while referring to Figure 52:

1. Use a flathead screwdriver to turn both latches counterclockwise.
2. Slide the door upward to disengage the bottom locks on the door and rotate the bottom of the door out about 2" from the rear of the display.
3. Slide the door downward to disengage the top clamp on the door and pull the door away from the cabinet.

Display Components

For information on removing and replacing components, refer to Service & Diagnostics (p.28).

ProLink Router

Figure 53 illustrates a ProLink Router (PLR). The PLR is a display interface board that passes display data from the ProLink6 control system modules and other PLRs.

Refer to the DD1735784 ProLink Router 6X5X Installation & Maintenance Manual for further information.

Video Image Processor

Figure 54 illustrates a Video Image Processor (VIP). The VIP is an interface that drives video to the display while also dimming, providing gamma and color controls, and displaying test patterns.

Refer to the DD2773152 VIP-5X6X Operator’s Manual for further information.

Line Filter

Figure 55 illustrates a line filter. Line filters remove electromagnetic noise that might otherwise interfere with local communications channels from the power system. The line filter is mounted to the sectional termination panel.
Power Supply

Figure 56 illustrates a typical power supply, also referred to as a power module. The power harnesses connected to the unit vary depending on type and overall display application. The power LED (DS1) illuminates when the unit is receiving incoming power.

Caution: Disconnect display power before servicing the power supplies to avoid electrical shock. The power supplies run on high voltage and may cause physical injury if touched.

The power supply mounts to the display on a mounting plate.

If a power supply fails, send the module (with the power supply) in for repair. Refer to Daktronics Exchange and Repair & Return Programs (p.35) for details on the repair process.

Service & Diagnostics

Internal components for DVX displays, including ProLink Routers (PLRs), mount to a bracket with keyholes. Figure 57 shows a typical component layout.

Components

Front Access
To remove a component, follow the steps below while referring to the Layout Drawings in Section A: Drawings (p.39) and Figure 57:

1. Disconnect power to the display.
2. Position the module removal tool so the arrows on the handle are pointing up. Use slight thumb pressure to insert the tool into the module until it clicks. Refer to Figure 58.
3. Pull the module from the display just far enough to reach around to the back of the unit. Turn the tool so the arrows on the handle are pointing down and remove it from the module. Refer to Figure 59.

**Note:** When performing Step 4, take care not to damage the louver by tilting the module at too severe an angle.

4. Attach the safety lanyard to the rings on the top of the module to prevent the module from falling if dropped. Refer to Figure 60 and Figure 61.

5. Disconnect the power and signal cables from the rear of the module.

Reverse these steps to install a component, always disconnecting the power to the display first.

**Rear-Access**

To remove a component, follow the steps below while referring to the Layout Drawings in Section A: Drawings (p.39) and Figure 57:

1. Disconnect power to the display.

2. Loosen and remove the access door. Refer to Section Display Access (p.27).

3. Remove the power supply from the mounting brackets by pulling the finger tab and twisting the power supply out from under the mount arm. Refer to Figure 62.

4. Use a 5/16” nutdriver to loosen the set screw holding the mounting plate to the display.

5. Detach the cables and gently remove the component from the display.

Reverse these steps to install a new component, always disconnect power to the display first. Tighten the mounting screw securely.
Module

Figure 63 and Figure 64 show a front and rear view of the module.

Front Access

1. Disconnect power to the display.
2. Position the module removal tool so the arrows on the handle are pointing up. Refer to Figure 65. Use slight thumb pressure to insert the tool into the module until it clicks. Refer to Figure 58.
3. Pull on the handle to remove the module from the display just far enough to reach around to the back of the unit. Turn the tool so the arrows on the handle are pointing down and remove it from the module. Refer to Figure 58.

   Note: When performing Step 3, take care not to damage the louver by tilting the module at too severe an angle.

4. Attach one end of a safety lanyard to the rings on the top of the module and the other end to a secure location within the display to prevent the module from falling if dropped. Refer to Figure 60 and Figure 61.
5. Disconnect the power and signal cables from the rear of the module.

Reverse these steps to install a module in a display.

Rear Access

Depending on display configuration, a power supply and/or ProLink Router (PLR) board may need to be removed in order to access a module from the rear.

To remove a module from a display, follow the steps below:

1. Remove the access panels to open the display from the rear. Refer to Display Access (p.27).
2. Disconnect the power and signal cables from the rear of the module.
3. Attach one end of a safety lanyard to the rings on the top of the module and the other end to a secure location within the display to prevent the module from falling if dropped. Refer to Figure 60 and Figure 61.

4. Squeeze the orange latch release in the upper-left corner lightly until the latch clears the face sheet. Refer to Figure 66.

5. Maintain a firm grip on the module and carefully push it away from the front of the display. Lift the module up and away from the face sheet. Rotate it in a manner that allows it to be pulled back through its frame opening. Refer to Figure 67 and Figure 68 for details on proper handling.

Reverse these steps to install a module.

Ventilation Systems
This display is filterless. Inspect the display for excess dust or debris during scheduled maintenance. If there is excess dust or debris, filters can be added. If needed, contact Customer Support at 1-800-325-8766.

Ventilation Maintenance
Each section of the display has upper and lower openings for air circulation and vents. The fans are located behind the upper openings. They pull air into the cabinet and then force the air down and across the electronic components, then out through the bottom opening.

Fans should be checked during the pre-season inspection and during scheduled maintenance. To check the fan operation, hold a piece of lightweight paper up to the vent opening that incorporates the fan to detect air movement. If the fan does not rotate or does not operate smoothly, replace it.

After replacing 10 percent of the fans, Daktronics recommends replacing all cooling fans to reduce the associated maintenance costs that may incur with increased heat buildup from fan failure.

Filter Maintenance (If Applicable)
Shut off power to the display when not in use. If the power is left on when the display is not operating, the filters will need to be cleaned and replaced more often.

Check the display ventilation fans and filters after 1,500 hours of operation and every 2,000 hours of operation or every 12 months of operation.
1,500 hours after to ensure the display cools properly. Check the fans and filters more often if the display is located in a dusty or harsh weather environment (e.g. along a gravel road with dust-laden air).

- 1,500 hours is equivalent to 83 days if the display operates for 18 hours a day, and the power to the display is turned off when not in use.
- 1,500 hours is equivalent to 62 days if the display runs non-stop for 24 hours a day.

To check the fan operation, use the procedure above.

Filters are either disposable or cleanable. After one year or 1,500 hours of operation, remove the filter and replace it with a new filter or clean the existing filter. If the display has cleanable filters, clean the filters with water and a mild detergent, such as dish soap. Compressed air can also be used to clean the filters if these criteria are met:

- The nozzle is held at least 6” away from the filter.
- The pressure is no greater than 60 psi.
- The air is blown through the filter in the opposite direction from which air normally flows. The arrow on the filter indicates the downstream side of the filter.

The filter in the lower opening may not need to be changed or cleaned because the air moving through it has already been filtered. Please check this filter each year or every 1,500 hours of operation to ensure the filter does not need to be replaced or cleaned. For information on ordering replacement filters, refer to the replacement parts list in Replacement Parts List (p.34). Failure to change or clean the filters may cause the display to overheat, decreasing the display life.

If the display provides rear access only, remove the back panels to service the fans and filters.

**Structural Inspection**

Perform annual visual inspections of the display to facilitate problem repairs and to lengthen display life.

- Check for paint and possible corrosion, especially at structural tie points and on ground rods.
- Check, tighten, and replace the fasteners as required.
- Check the electronic components closely for signs of corrosion.
- Check the inside of the display at least once a year for signs of water intrusion (i.e. water stain marks). Water can enter a display where weather stripping has loosened or deteriorated, where fasteners have loosened, allowing gaps in the panels, or where moisture may enter around the hardware in the top of the display.

**Troubleshooting**

The table below lists problems that may be encountered while operating the display. Next to each problem are troubleshooting steps that may help to resolve it.
<table>
<thead>
<tr>
<th>Problem</th>
<th>Troubleshooting Steps</th>
</tr>
</thead>
</table>
| Module is blank or garbled.                   | • Check power status LEDs on all power supplies and modules connected to the module.  
• Check the SATA cable input into the module and the output from the previous module or ProLink Router (PLR).  
• Perform a module self-test.                                                                                   |
| Section of display is blank.                  | • Ensure the section is receiving power and all breakers are turned on.  
• Ensure the power status LEDs on the modules, power supplies, and PLRs in the blank section are on.  
• Ensure the connections to the PLR are secure. Change the connections with one another to test.  
• Ensure the fiber-optic signal is connected to the PLR or patch panel.  
• Perform a PLR loopback test to test the PLRs in the section. Refer to the DD1735784 PLR 6X6X Installation & Maintenance Manual for instructions. |
| Entire display is blank.                      | • Ensure the display is receiving power and all breakers are turned on. When power is applied to the display, power supply LEDs should turn on.  
• Ensure the Video Image Processor (VIP) is not blank.  
• Ensure the fiber-optic signal cable is connected to the VIP. The input signal should be locked. If the input signal is not locked, check the fiber connections. |
| Entire display is garbled or uncontrollable.  | • Use the test patterns to check the VIP status LEDs and ensure the board is receiving power. Refer to the DD2773152 VIP-5X6X Operator’s Manual for instructions.  
• Verify the controller/content player configuration and restart the display service.  
• Ensure the fiber-optic signal cable is connected to the VIP. The input signal should be locked. If the input signal is not locked, check the fiber connections. |
5 Replacement Parts

Most display components within this video display carry a white label that lists the part number. The component part number uses the following format: 0A-XXXX-XXXX (multi-component assembly) or 0P-XXXX-XXXX (display interface board). Section Replacement Parts List (p.34) contains the Daktronics Exchange Policy as well as the Repair & Return Program. Refer to these instructions if any display components need replacing or repairing. If an interface board or assembly is not found in the replacement parts list below, use the label to order a replacement. Figure 69 illustrates a typical label. The part number is in bold.

<table>
<thead>
<tr>
<th>Part Type</th>
<th>Part Example</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly</td>
<td>Display interface board and the plate or bracket to which it mounts</td>
<td>0A-XXXX-XXXX</td>
</tr>
<tr>
<td>Individual display interface board</td>
<td>ProLink Router (PLR)</td>
<td>0P-XXXX-XXXX</td>
</tr>
<tr>
<td>Wire or cable</td>
<td>SATA cable</td>
<td>W-XXXX</td>
</tr>
</tbody>
</table>

Replacement Parts List

<table>
<thead>
<tr>
<th>Part Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature sensor</td>
<td>0A-1151-0010</td>
</tr>
<tr>
<td>Photo sensor</td>
<td>0A-1327-3018</td>
</tr>
<tr>
<td>Vent panel</td>
<td>0A-1446-1998</td>
</tr>
<tr>
<td>Toolkit</td>
<td>0A-1730-0002</td>
</tr>
<tr>
<td>34-Piece interconnect kit</td>
<td>0A-1730-0010</td>
</tr>
<tr>
<td>ProLink Router (PLR)</td>
<td>0P-1525-0004</td>
</tr>
<tr>
<td>Fan</td>
<td>8-1072</td>
</tr>
<tr>
<td>Filter (if applicable)</td>
<td>EN-2345</td>
</tr>
<tr>
<td>Module</td>
<td>0A-1844-3253</td>
</tr>
</tbody>
</table>

Figure 69: Typical Label

0P-1195-0001
SN: 6343
05/19/99 REV.1
6 Daktronics Exchange and Repair & Return Programs

To serve customers’ repair and maintenance needs, Daktronics offers both an exchange program and a repair & return program.

Exchange Program

Daktronics unique Exchange Program is a quick service for replacing key parts in need of repair. If a part requires repair or replacement, Daktronics sends the customer a replacement, and the customer sends the defective part to Daktronics. This decreases display downtime.

Before Contacting Daktronics

Identify these important part numbers:

Display Serial Number: __________________________________________________________

Display Model Number: _________________________________________________________

Contract Number: ______________________________________________________________

Installation Date: ________________________________________________________________

Sign Location (Mile Marker Number): _____________________________________________

Daktronics Customer ID Number: ________________________________________________


<table>
<thead>
<tr>
<th>Market Description</th>
<th>Customer Service Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schools (primary through community/junior colleges), religious organizations, municipal clubs, and community centers</td>
<td>877-605-1115</td>
</tr>
<tr>
<td>Universities and professional sporting events, live events for auditoriums, and arenas</td>
<td>866-343-6018</td>
</tr>
<tr>
<td>Financial institutions, petroleum, sign companies, gaming, and wholesale/retail establishments</td>
<td>866-343-3122</td>
</tr>
<tr>
<td>Department of Transportation, mass transits, airports, and parking facilities</td>
<td>800-833-3157</td>
</tr>
</tbody>
</table>

2. After receiving the new exchange part, mail the old part to Daktronics.

If the replacement part fixes the problem, send in the problem part which is being replaced.

a. Package the old part in the same shipping materials in which the replacement part arrived.

b. Complete and attach the enclosed UPS shipping document.

c. Ship the part to Daktronics.

3. Daktronics will charge for the replacement part immediately, unless a qualifying service agreement is in place.

In most circumstances, the replacement part will be invoiced at the time it is shipped.
4. If the replacement part does not solve the problem, return the part within 30 working days, or Daktronics will charge the full purchase price.

   If, after the exchange is made, the equipment is still defective, please contact Customer Service immediately. Daktronics expects immediate return of an exchange part if it does not solve the problem. The company also reserves the right to refuse parts that have been damaged due to acts of nature or causes other than normal wear and tear.

**Repair & Return Program**

For items not subject to exchange, Daktronics offers a Repair & Return Program. To send a part for repair, follow these steps:

1. Call or fax Daktronics Customer Service.
   
   Refer to the appropriate market number in the chart listed on the previous page.
   
   Fax: 605-697-4444

2. Receive a Return Materials Authorization (RMA) number before shipping.
   
   This expedites repair of the part.

3. Package and pad the item carefully to prevent damage during shipping.

4. Electronic components, such as printed circuit boards, should be placed in an antistatic bag before boxing. Daktronics does not recommend packing peanuts when shipping.

5. Enclose the following:
   
   • Contact name
   • Address
   • Phone number
   • RMA number
   • Clear description of symptoms
   • Case number

**Shipping Address**

Daktronics Customer Service

P.O. Box 5128

201 Daktronics Dr.

Brookings, SD 57006

**Daktronics Warranty & Limitation of Liability**

The Daktronics Warranty & Limitation of Liability is located in Section C: Daktronics Warranty & Limitation of Liability (p.43). The warranty is independent of extended service agreements and is the authority in matters of service, repair, and display operation.
Glossary

**Lanyard Attachment Ring**: a ring found on the back of each module. The lanyard attaches to the ring to keep the module from falling to the ground.

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

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

**Line Filter**: a device that removes electromagnetic noise from the power system to avoid interference with local communications channels. Line filters sometimes mount on brackets with power supplies. Other times they may mount alone on a bracket.

**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 black plastic housing, and a module latch assembly. Each module is individually removable from either the front or the rear of the display.

**Module Latch**: an orange latch located in the upper-left corner from the rear 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 device that converts AC line voltage from the termination panel to low DC voltage for one or more module driver boards. One power supply may power multiple modules.

**ProLink Router (PLR)**: a display interface board that passes display data from the ProLink6 control system modules and other PLRs. The ratio of PLRs to modules varies with display application.

**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.

**Video Image Processor (VIP)**: an interface that drives video to the display while also dimming, providing gamma and color controls, and displaying test patterns.
### Drawings

Click the drawing numbers below to view drawings that offer general information pertaining to most DVX displays. Or go to [www.daktronics.com](http://www.daktronics.com) and enter DVX-1830 shop drawings in the search box at the top-right of the home page. Under Document Results on the right side of the page, find the DVX-1830 Display Series Shop Drawing spreadsheet which contains links to all DVX-1830 shop drawings.

#### Shop Drawings

<table>
<thead>
<tr>
<th>Description</th>
<th>Drawing Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shop Drawing, DVX-1830-108 X 216-10MN (3 x 6 Modules)</td>
<td>DWG-3280200</td>
</tr>
<tr>
<td>Shop Drawing, DVX-1830-144 X 252-10MN (4 x 7 Modules)</td>
<td>DWG-340495</td>
</tr>
<tr>
<td>Shop Drawing, DVX-1830-108X324-10MN (3x9 Modules)</td>
<td>DWG-3426168</td>
</tr>
<tr>
<td>Shop Drawing, DVX-1830-216X360-10MN (6x10 Modules)</td>
<td>DWG-3435940</td>
</tr>
<tr>
<td>Shop Drawing, DVX-1830-72X360-10MN (2x10 Modules)</td>
<td>DWG-3461535</td>
</tr>
<tr>
<td>Shop Drawing, DVX-1830-72X252-10MN (2x7 Modules)</td>
<td>DWG-3461536</td>
</tr>
<tr>
<td>Shop Drawing, DVX-1830-108X144-10MN (3x4 Modules)</td>
<td>DWG-3489094</td>
</tr>
<tr>
<td>Shop Drawing, DVX-1830-180X360-10MN (5x10 Modules)</td>
<td>DWG-3497092</td>
</tr>
<tr>
<td>Shop Drawing, DVX-1830-216X288-10MN (6x8 Modules)</td>
<td>DWG-3498482</td>
</tr>
<tr>
<td>Shop Drawing, DVX-1830-216X216-10MN (6x6 Modules)</td>
<td>DWG-3504809</td>
</tr>
</tbody>
</table>

#### Block Diagrams

<table>
<thead>
<tr>
<th>Description</th>
<th>Drawing Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block Diagram; Primary Harness</td>
<td>DWG-1195335</td>
</tr>
<tr>
<td>Block Diagram; Secondary Harness</td>
<td>DWG-1195343</td>
</tr>
<tr>
<td>Block Diagram; Redundant Harness</td>
<td>DWG-1195490</td>
</tr>
<tr>
<td>Block Diagram; VAC/VDC Harn, 4-High</td>
<td>DWG-1199976</td>
</tr>
<tr>
<td>Block Diagram; VAC/VDC Harn, 3-High</td>
<td>DWG-1199981</td>
</tr>
<tr>
<td>Block Diagram; VAC/VDC Harn, 2-High</td>
<td>DWG-1199983</td>
</tr>
</tbody>
</table>

#### Layout Drawings

<table>
<thead>
<tr>
<th>Description</th>
<th>Drawing Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layout; Component Placement, 1 of 2</td>
<td>DWG-1195294</td>
</tr>
<tr>
<td>Layout; Component Placement, 2 of 2</td>
<td>DWG-1196373</td>
</tr>
<tr>
<td>Layout; Component Placement &amp; Signal Harness, 4-High</td>
<td>DWG-1199958</td>
</tr>
<tr>
<td>Layout; Component Placement &amp; Signal Harness, 3-High</td>
<td>DWG-1199865</td>
</tr>
<tr>
<td>Layout; Component Placement &amp; Signal Harness, 2-High</td>
<td>DWG-1199954</td>
</tr>
</tbody>
</table>

#### Power Drawings

<table>
<thead>
<tr>
<th>Description</th>
<th>Drawing Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Entrance; Field Conduit Location</td>
<td>DWG-1123507</td>
</tr>
<tr>
<td>Power Entrance; Field Termination Detail</td>
<td>DWG-1202845</td>
</tr>
</tbody>
</table>

#### Other Drawings

<table>
<thead>
<tr>
<th>Description</th>
<th>Drawing Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Sensor Mount to Border, DVX</td>
<td>DWG-1094485</td>
</tr>
<tr>
<td>Cabinet Fiber Layout</td>
<td>DWG-1122479</td>
</tr>
</tbody>
</table>
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B Supplementary Documents

Click the document numbers below to view information pertaining to most DVX displays.

- **DD1723952** Structural Self-Drilling Screws Installation Guide
- **DD3008872** DVX-11X2/1502/1801 Series Seam Measurement Field Instructions
- **DD3396953** DVX-1830 Series Sectional Installation Quick Guide
- **DD3016287** DVX-11X2/1502/1801 Series Cabinet Alignment Guide
- **DD3062200** DVX-11X2/1502/1801 Series Power Numbers
- **ED-14158** Face Cleaning Procedures for Daktronics LED Matrix Displays
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C Daktronics Warranty & Limitation of Liability

Click here to view Warranty and Limitation of Liability information (SL-02374).
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