

# Galaxy AF-3400 12 mm

## Display Manual

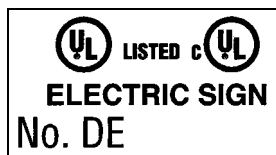
*ED-17998*

*Rev 1*

*23 March 2009*

# DAKTRONICS

ED-17998  
Product 1260  
Rev 1–23 March 2009



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# Section 1: Introduction

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This manual explains the installation, maintenance, and troubleshooting for the Galaxy® AF-3400 12 mm display. For questions regarding the safety, installation, operation, or service of this system, please refer to the telephone numbers listed on the cover page of this manual.

Drawings may be referenced by drawing number at the beginning of some sections. **Figure 1** illustrates the Daktronics drawing label. The drawing number is located in the lower-right corner of the drawing. The drawing number consists of the last set of digits and the letter preceding them. In the example below, the drawing would be referred to as **Drawing B-206146**. Reference drawings are inserted in **Appendix A**.

THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS, INCLUDING ELECTRONICALLY WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2004 DAKTRONICS, INC.			
DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: GALAXY, AF-3200 & AF-3400 SERIES			
TITLE: SCHEM, PRIMARY SIGNAL, INTERNAL, W/QC			
DES. BY: PGILK		DRAWN BY: LKERR	
		DATE: 11 MAR 04	
REVISION	APPR BY:	1229-R03	
00	SCALE: NONE	B-206146	

Drawing number

*Figure 1: Drawing Label*

## 1.1 Safety Precautions

### Important Safeguards:



- Read and understand these instructions before installing
- Be sure the display and external signal enclosures are properly grounded with an earth ground electrode at the display
- Disconnect power when servicing the display
- **Do not** modify the display structure or attach any panels or coverings to the display without the written consent of Daktronics.

## 1.2 Display Overview

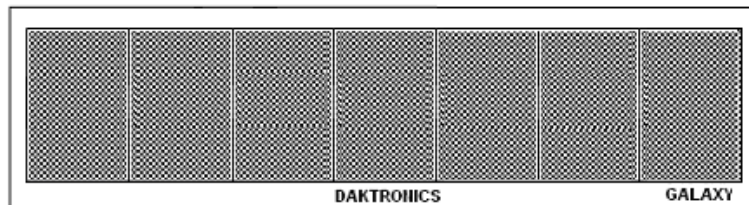
The Galaxy® AF-3400 12 mm displays are designed and manufactured for performance, reliability, easy maintenance, and long life. The pixels have a 12 mm center-to-center spacing and are lit using LEDs (light-emitting diodes). A light sensor on the front of the display is used for automatic dimming of the LEDs based on the ambient light levels.

The Galaxy® display number for these displays is described as follows:

**AF-3400-RxC-12-RGB**

<b>AF-3400</b>	=	Outdoor louvered Galaxy display
<b>R</b>	=	Number of rows high
<b>C</b>	=	Number of columns long
<b>12</b>	=	12 mm pixel to pixel spacing
<b>RGB</b>	=	LED color (Red, Green, and Blue)

A module is the building block of the Galaxy® display. Each module measures 24 pixels high by 16 pixels wide. By placing modules next to each other, a display of any size can be designed and built. Individual modules can be easily removed from the display if required. **Figure 2** shows a typical Galaxy® 12mm display.



**Figure 2:** Galaxy 12 mm 24 x 112



## Section 2: Mechanical Installation



- Daktronics engineering staff must approve **any** changes to the display. If any modifications are made, detailed drawings of the changes **must** be submitted to Daktronics for evaluation and approval, or the warranty may be void.
- **Daktronics is not responsible for installations or the structural integrity of support structures done by others.** The customer is responsible for ensuring that a qualified structural engineer approves the structure and any hardware.

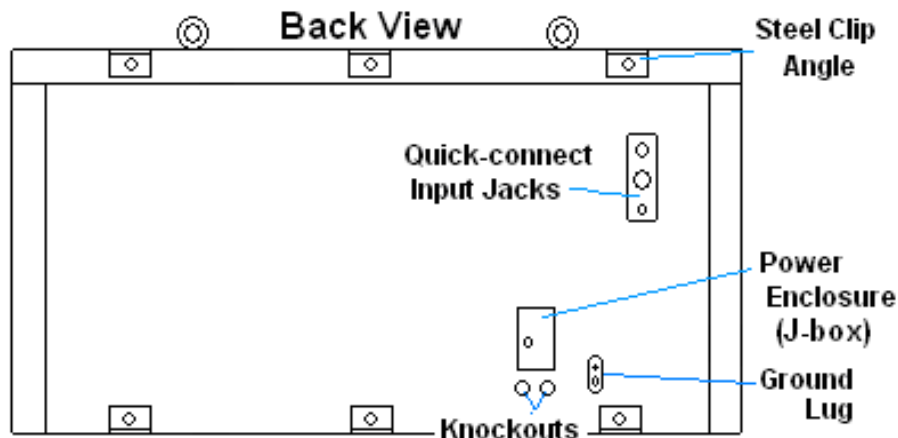
### 2.1 Support Structure Requirements

Because every installation site is unique, no single procedure is approved by Daktronics for mounting Galaxy® displays. The information contained in this section is general information only and may or may not be appropriate for this particular installation.

**A qualified individual must make all decisions regarding the mounting of this display.**

Support structure design depends on the mounting methods, display size, and weight. In general, the front of the display needs to be unobstructed to allow for air flow and internal access. The bottom of the display houses the fans so allowances will need to be made for their operation. Also keep in mind the location of the mounting clips and the power/signal termination box or knockouts on the back of the display. Display height and wind loading are also critical factors to be considered. This information can be found in the **Shop drawing** provided with the display.

The external components and their typical location are shown in **Figure 3**. Refer to the specific shop drawing for the actual dimensions and location of components in a particular display.



*Figure 3: Back View of Typical Display*

## Pre-installation Checklist

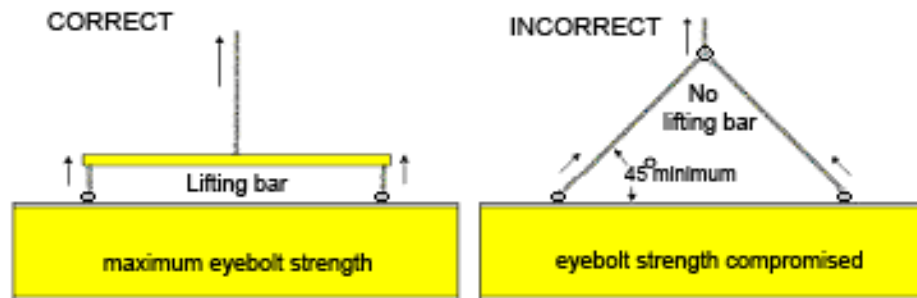
Verify the following before proceeding with installation:

- The display is in good condition after shipping and uncrating.
- All clip angles or mounting holes are attached to the support structure.
- A straight and square mounting frame is provided for the display.  
**Height variation in any four-foot horizontal section may not exceed 1/4-inch.**
- Adequate support is provided for the display so that the structure will not yield at any unsupported points after mounting.
- Clearance of 4" of unobstructed space above the top of the display is allowed to remove the eyebolt. **Note:** No clearance is required once the eyebolt is removed.
- Clearance in front of the display is maintained to allow unobstructed air flow through the vents and to allow access to internal components.

## 2.2 Lifting the Display

The top of the display is equipped with eyebolts that are used to lift the unit. Take special care to ensure that the rated load of the eyebolts is not exceeded. Refer to the information at the end of this section labeled **Eyebolts** to determine the allowable load of the eyebolts shipped with the display.

**Figure 4** illustrates both the correct (left example) and the incorrect (right example) method of lifting a display. Lift the display as shown on the left, with the lifting bar. Use every lifting point provided.



**Figure 4:** Lifting the Display

**Do not attempt to permanently support the display by the eyebolts.**

Eyebolts can be removed after mounting to eliminate the need for overhead clearance.

## 2.3 Display Mounting

The method used to mount displays can vary greatly from location to location. For this reason, only general mounting topics can be addressed in this manual.

The back of the display is equipped with 2" x 2" x 1/4" x 3" steel angles at the top and bottom as shown in **Figure 3**. **All angles must be used for display installation**. Remember to have **all** mounted displays inspected by a qualified structural engineer.

The number of attachment points needed and the mounting structure **must** be reviewed by a qualified structural engineer and meet all national and local codes. It is the customer's responsibility to determine the proper wall mounting method and location. Daktronics requires using bottom mounting angles or all mounting holes as attachment points.

1. Carefully uncrate the display and inspect each side of the display for possible damage that may have occurred during shipping.
2. Following the guidelines described in **Section 2.2** lift the display into position on the support structure.
3. Weld or use 1/2" Grade-5 bolts and hardware to secure the mounting angles to the support structure as shown in the **Shop Drawing**.
4. Refer to **Section 3** for information on routing power to the display.
5. After installation is complete, carefully inspect the display for any holes that may allow water to seep into the display and seal any openings with silicone. **If the eyebolts on the top of the display have been removed, plug the holes with bolts and the rubber-sealing washer that was removed with the eyebolt (unless prevented by an overhead structure).**

## 2.4 Temperature Sensor Mounting

Refer to **Appendix B** for instructions on mounting and connecting signal for the temperature sensor.



## Section 3: Power Installation

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**Only a qualified individual should terminate power and signal cable at this Daktronics display.**

The Daktronics engineering staff must approve **any** changes made to the display. Before altering the display, submit detailed drawings for the proposed modifications to the Daktronics engineering staff for evaluation and approval or the warranty will be rendered null and void.

Schematic, Power Term Panel, 2 Circuit-120/240VAC .....	<b>Drawing A-211947</b>
Schematic, Power Term Panel, 1 Circuit-120VAC .....	<b>Drawing A-211950</b>
Schematic, Power Term Panel, 2 Pole-240VAC .....	<b>Drawing A-218666</b>
Schematic, Power Term Panel, 1 Pole-240VAC .....	<b>Drawing A-220287</b>
Schematic, AF-3400-12-RGB-P, General .....	<b>Drawing A-253685</b>
Power Specs, AF-3400-(24x192-96-192-12-RGB).....	<b>Drawing A-254277</b>

### 3.1 Preparing for Power Connection

- A power termination box is provided on the back of the display. If the installation of the display does not allow for the use of this enclosure, refer to **Section 3.6** for information on the internal wiring for the power.
- Route power to the display through a fused disconnect switch capable of opening all ungrounded power conductors. Install this disconnect within the line-of-sight of any personnel performing maintenance on the display. If the disconnect is located out of sight of the display, it must be capable of being locked in the open position.

**Note:** Displays are equipped with supplemental protection devices that carry a **UL1077 (IEC 60947, VDE 660)** rating. These devices are only intended to protect the components within the display. Suitable devices must be used for the equipment and feeders supplying power to the display.

- Power conductors from the disconnect to the display should be routed through conduit in agreement with local code.
- Display power will terminate to the display at the external power termination J-box mounted to the back of the display.
- Connect the grounding electrode conductor at the grounding lug on the display at this time.

### 3.2 Conduit

Daktronics **does not** include the conduit. Separate conduit must be used to route:

- Power
- Signal IN wires to the display, when applicable

The power J-box on the back of the display is provided with 3/4" threaded holes for use with 3/4" conduit. If necessary, knockout/drill holes are provided in the display cabinet itself when not using the enclosure.

### 3.3 Power Requirements

Each display uses one 120 VAC or 120/240 VAC single phase power source. Proper power installation is imperative for proper display operation. Refer to **Drawing A-254277** for power specifications for the specific display size.

#### Main Disconnect

The National Electrical Code requires the use of a lockable power disconnect near the display. Provide a lockable disconnect switch (knife switch) at the display location so that all power lines can be completely disconnected. Use a 3-conductor disconnect so that both hot lines and the neutral can be disconnected. The main disconnect should be mounted at or near the point of power supply connection to the display. A main disconnect is to be provided for each supply circuit to the display.

The disconnecting means must be located in a direct line-of-sight from the display or outline lighting that it controls. This requirement provides protection by enabling a worker to keep the disconnecting means within view while working on the display.

**Exception:** Disconnecting means that are capable of being locked in the open position may be located elsewhere.

#### Grounding



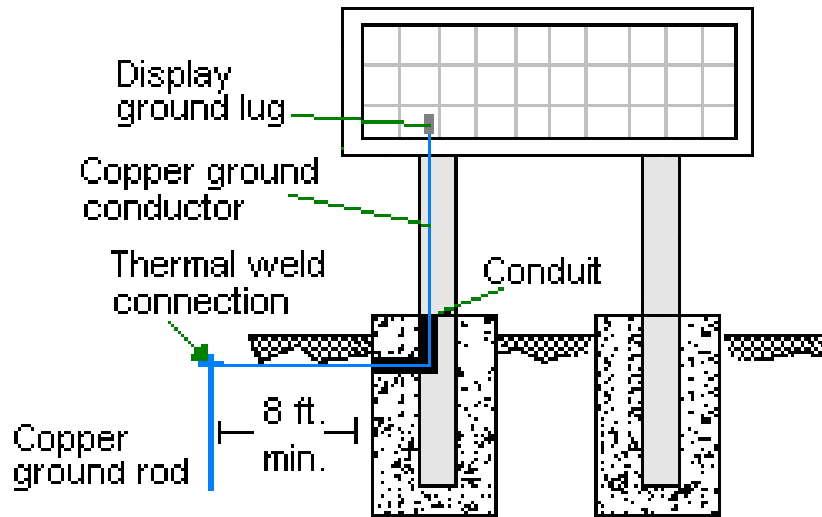
This sign is to be installed in accordance with the requirements of Article 600 of the National Electrical Code and/or other applicable local codes. This includes proper grounding and bonding of the sign.

For these displays, installation with ground and neutral conductors provided is used. The power cable **must** contain an isolated earth-ground conductor. Refer to **Figure 5** for the an overview of proper grounding.

Under this circumstance, **do not** connect neutral to ground at the disconnect or at the display. This would violate electrical codes and void the warranty. Use a disconnect so that all hot lines and neutral can be disconnected. The National Electrical Code requires the use of a lockable disconnect within sight of or at the display.

The display system **must** be connected to earth-ground. Proper grounding is necessary for reliable equipment operation. It also protects the equipment from damaging electrical disturbances and lightning.

**The display must be properly grounded, or the warranty will be void.**



**Figure 5:** Proper Grounding

#### Important points about grounding:

- Follow local and national codes: The material of an earth-ground electrode differs from region to region and from conditions present at the site. Consult the National Electrical Code and any local electrical codes that may apply.
- Support structure **cannot** be used as an earth-ground electrode: The support is generally embedded in concrete. If in earth, the steel is either primed or it corrodes, making it a poor ground.
- One grounding electrode for each display face: The grounding electrode is typically one grounding rod for each display face. Other grounding electrodes as described in Article 250 of the National Electric Code may be used.
- Resistance to ground 10 ohms or less: This is required by Daktronics for proper display performance. If the resistance to ground is higher than 10 ohms, it will be necessary to install additional grounding electrodes to reduce the resistance. The grounding electrode should be installed within 25 feet of the base of the display. The grounding electrode must be connected to the ground lug on the back of the display (**Figure 5**).

#### Power Connection

Two options are possible for terminating power to the display:

- terminating power to the J-box.
- terminating power directly to the power termination panel inside the display.

Installation instructions for both are provided in this section.

### Option 1: Terminating hot, neutral, and ground wires at the J-box

Display power is connected to the power termination enclosure on the back of the display. Complete the following steps to terminate the hot, neutral, and ground wires at the termination enclosure.

1. Route the power cable through  $\frac{1}{2}$ " conduit to the rear of the display and into the power termination enclosure.
2. The power termination enclosure will contain two wires plus a ground coming from the interior of the display – these wires are pre-terminated to the power termination panel inside the display.
3. Inside the external power termination J-box, connect the power wires to the wires coming from the display interior, using wire nuts. Refer to **Figure 6** for further information.

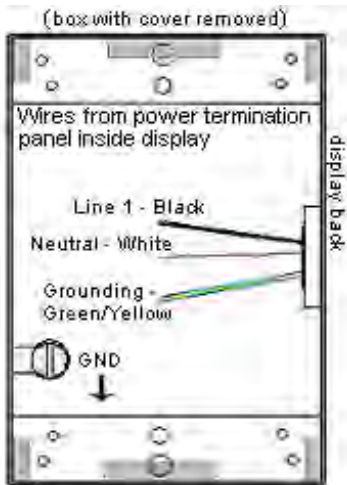
**Note** the following colors are used for the pre-terminated wires:

#### 120 VAC

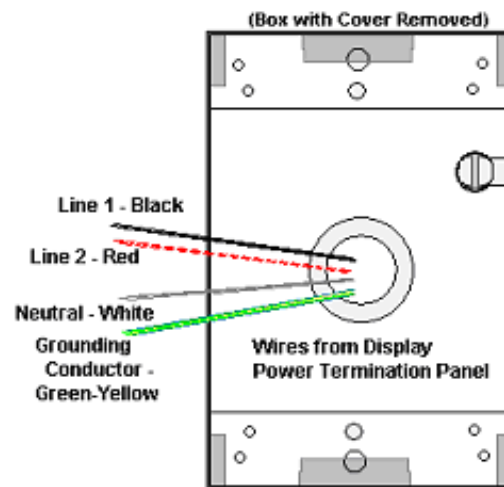
- Line 1 - Black
- Neutral - White
- Grounding Conductor - Green-Yellow

#### 120/240 VAC

- Line 1 - Black
- Line 2 - Red
- Neutral - White
- Grounding conductor - Green-yellow



**Figure 6:** 120 VAC Power Termination



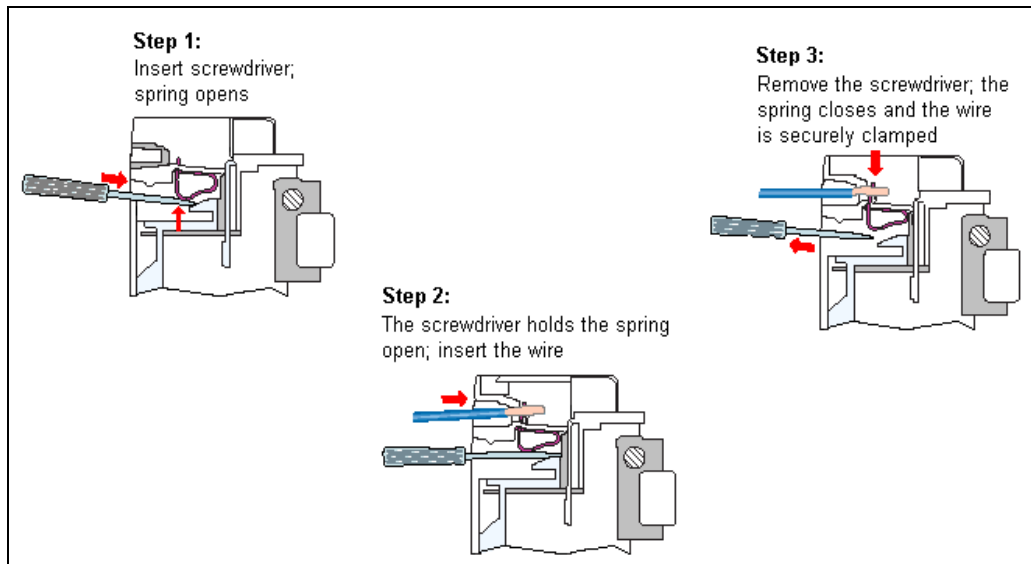
**Figure 7:** 120/240 VAC Power Termination



### Option 2: Terminating power through direct connections

If these power terminations cannot be made at the enclosure, they can be made directly to the power termination panel in the display. The following steps will need to be done to complete internal connections:

1. Open the display as explained in **Section 6.1** and locate the power termination panel.
2. Route the cable through conduit to the back of the display – use one of the 1/2" knockouts for access, being careful not to damage any internal components.
3. Disconnect the wires to the terminal block going to the external power J-box, and connect the wires from the direct cable.
4. Using a small flat screwdriver to open the cage clamps, release the jumper wires connected to the external wires going to the external power termination box.
5. Install the wires from the direct circuit into the cage clamps following the directions in **Figure 8**.

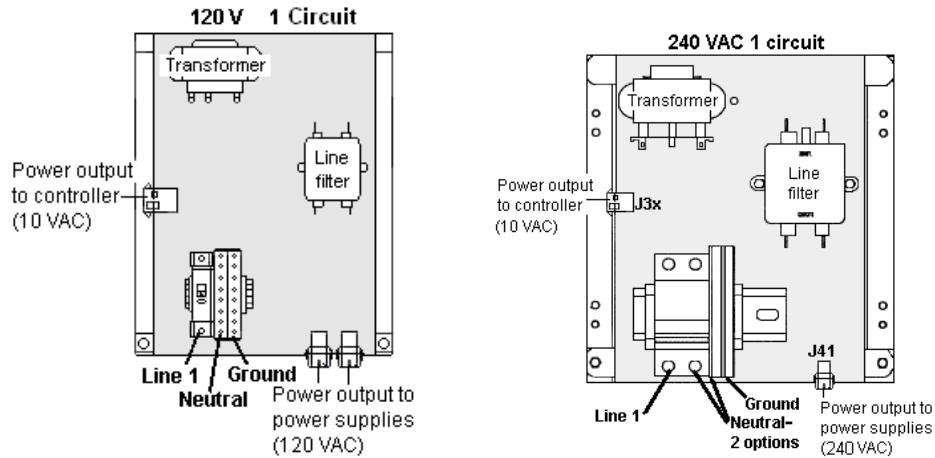


**Figure 8:** Making Cage Clamp Connections

6. Make the following connections as shown in **Figure 9**:

**1-circuit termination**

- Line 1 to circuit breaker 1 (line side)
- Neutral to gray terminal block (line side)
- Ground to green/green yellow terminal block

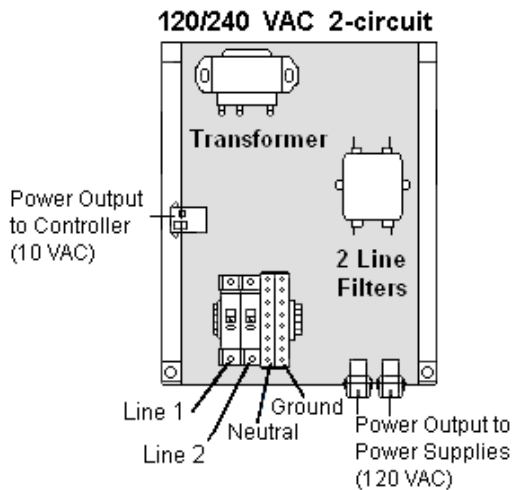


**Figure 9:** One-circuit 120 VAC Termination

One-circuit 240 VAC Termination

**2-circuit termination**

- Line 1 to circuit breaker 1 (line side)
- Line 2 to circuit breaker 2
- Neutral to gray terminal block (line side)
- Ground to green/green yellow terminal block



**Figure 10:** Two-circuit 120/240 VAC Termination

Refer to the **Schematic Drawings** in **Appendix A** for additional information.





## Section 4: Signal Overview

---

Daktronics Galaxy® displays are equipped to receive many types of communication signals. The following sections include a brief description of each available communication type. Also included is a list of troubleshooting tips to check that the display is connected and configured correctly.

For specific details on installing the signal, consult the quick guide and the manual. These were included in the shipment of the communications equipment. Each type is listed below with its manual number.

Communication Type	Communication Manual ED#
RS-422	ED-14742
Fiber	ED-14743
Radio	ED-13932
RS-232	ED-14739
Ethernet	ED-14745
Fiber Ethernet	ED-14746
Ethernet Radio	ED-16483
Modem	ED-14744

**Note:** These are the standard communication types. However, each site is unique and may include additional equipment. If problems arise, contact the display's seller, service company, or Daktronics Customer Service.

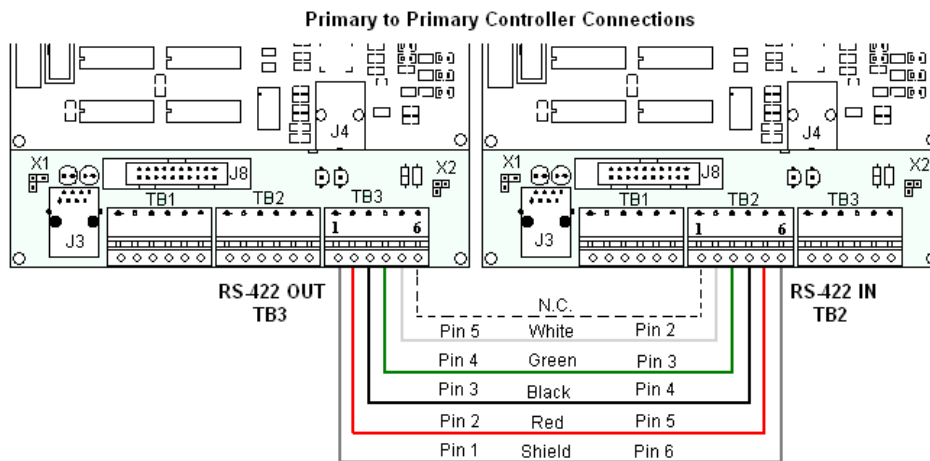
### 4.1 Primary to Primary Signal Connection

If this location requires multiple displays mounted back-to-back, two primary displays will be installed. In that case, the following connections need to be made:

- Remove the module from the bottom left corner of the display and locate the controller for this display.
- Route cable through conduit from the back of the first primary display to the back of the second primary display. Use the knockouts for access, being careful not to damage any internal components
- Use either a 4-pair signal cable or two 4-conductor, shielded cables to connect both the signal and the temperature sensor information between displays.
- The signal cable will connect from TB3 out on the first primary display to either:
  - A surge board at TB1 in a second primary display or
  - To TB2 on the controller in the second primary display.

**Note:** In either case the connections are flipped. Refer to the table following and to **Figure 11** for connections on both displays.

RS-422 Interconnection Wiring		
Primary RS422 OUT (TB3)	Field Cabling	Primary RS422 IN (TB2)
Pin 1 (GND)	Shield	Pin 6 (GND)
Pin 2 (D2OUT-N)	Red	Pin 5 (D1IN-N)
Pin 3 (D2OUT-P)	Black	Pin 4 (D1IN-P)
Pin 4 (D2IN-N)	Green	Pin 3 (D1OUT-N)
Pin 5 (D2IN-P)	White	Pin 2 (D1OUT-P)
Pin 6 (Shield)		Pin 1 (Shield)



**Figure 11:** RS-422 Interconnection from Primary to Primary Display

## 4.2 RS-422 Communication

If the communication system is RS-422, look for:

- a signal converter near the computer.
- wires from the signal converter connecting to an enclosure at the display.

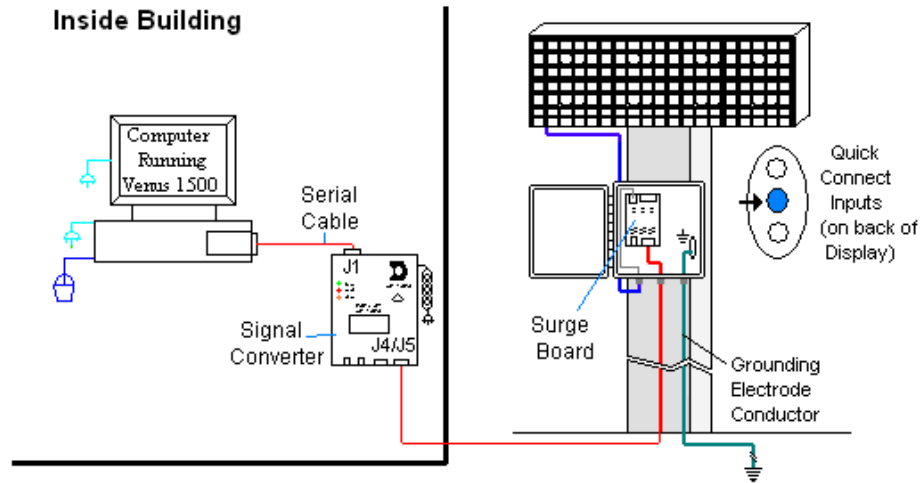


Figure 12: RS-422 Communication Layout

### Connections

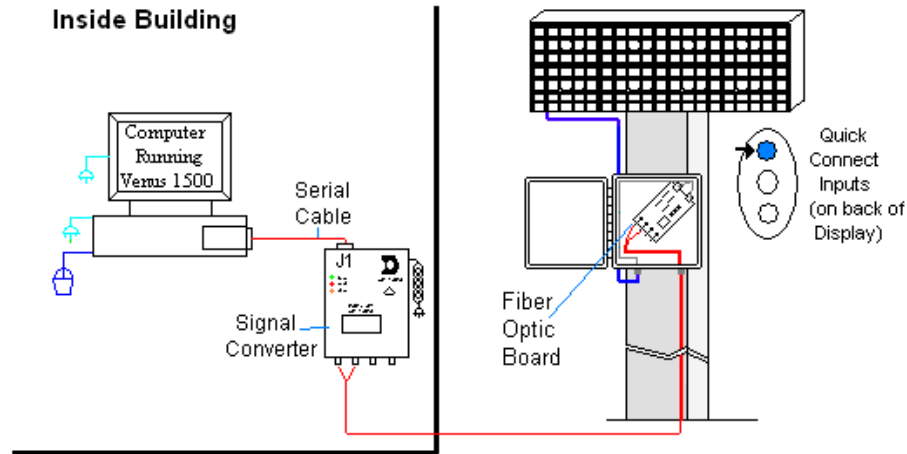
- Computer to signal converter – six-foot serial cable with 9-pin plug connecting to computer port or USB adaptor and 25-pin plug connecting to the signal converter at J1, RS232 IN.
- Signal converter plugged into a 120 volt AC outlet.
- Signal converter to surge board at display – four individual wires from green Phoenix plug at either J4 or J5 run to Phoenix plug on surge board.
- Surge board to display – quick-connect cable from enclosure to the center jack on display back.

Troubleshooting	
Component	Check
Cable Connections	<ul style="list-style-type: none"> <li>• The serial cable connects the computer to the signal converter.</li> <li>• All the wires are connected at the signal converter and the surge board. They need to be making good electrical contact with the metal, no interference.</li> <li>• The color sequence of the wires should be the same to both signal converter and surge board (e.g. black, white, red and black, white, red).</li> <li>• The quick-connect cable is connected from the enclosure to the center jack on the back of the display.</li> </ul>
Diagnostic LEDs	<ul style="list-style-type: none"> <li>• The green LED on the signal converter should be on when plugged into power.</li> <li>• The red transmit and amber receive LEDs will flash when sending and receiving signal from the display; otherwise they are off.</li> </ul>
Display Power	<ul style="list-style-type: none"> <li>• The display is either running a message or showing a single pixel flashing in the bottom right corner of the display when power is on.</li> </ul>
Software	<ul style="list-style-type: none"> <li>• The software and the display are set for the same network address.</li> <li>• Refer to the software manual for other possible conditions.</li> </ul>

## 4.3 Fiber Optic Communication

If the communication system is fiber optic, look for:

- a signal converter near the computer.
- fiber-optic cables connecting the signal converter to an enclosure at the display.



**Figure 13:** Fiber Serial Communication Layout

### Connections

- Computer to signal converter – six-foot serial cable with 9-pin plug connecting to computer port or USB adaptor; 25-pin plug connecting to the signal converter at J1, RS232 IN.
- Signal converter plugged into a 120 volt AC outlet.
- Signal converter to fiber optic board at display – two individual cables connect to signal converter at either J4 and J5 or J3 and J2; other end runs to fiber optic board at display.
- Fiber optic board to display – quick-connect cable from enclosure to the top jack on display back.

**DO NOT SHARPLY BEND fiber-optic cable at any point along the fiber cable.**

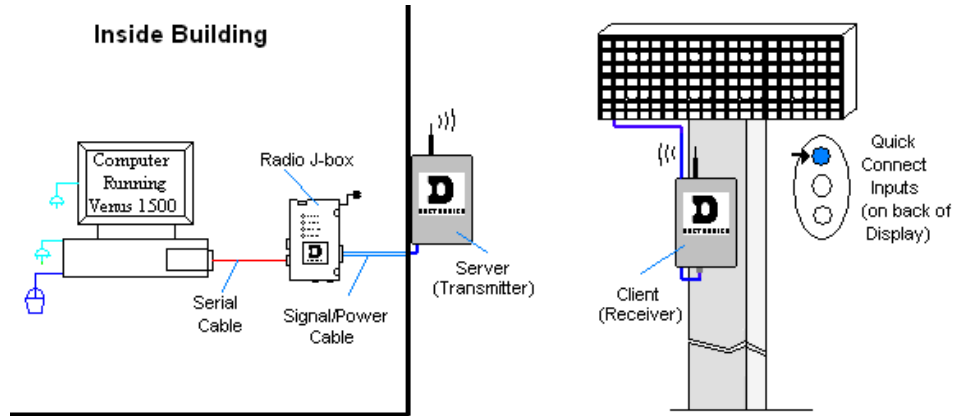
Troubleshooting	
Component	Check
Cable Connections	<ul style="list-style-type: none"> <li>• The serial cable is connected from the computer to the signal converter.</li> <li>• Both fiber optic cables are connected at the signal converter and the fiber board.</li> <li>• The cable from the enclosure is connected to the top jack on display back.</li> </ul>
Diagnostic LEDs	<ul style="list-style-type: none"> <li>• The green LEDs on the signal converter and the fiber optic board in the enclosure will be on when they have power.</li> <li>• The red transmit and amber receive LEDs on both components will flash when sending and receiving signal from the display; otherwise they are off.</li> </ul>
Display Power	<ul style="list-style-type: none"> <li>• The display is either running a message or showing a single pixel flashing in the bottom right corner of display when power is on.</li> </ul>
Software	<ul style="list-style-type: none"> <li>• The software and the display are set for the same network address.</li> <li>• Refer to the software manual for other possible conditions.</li> </ul>



## 4.4 Radio Communication

If the communication system is radio, look for:

- a radio j-box near the computer.
- a server radio outside the building and a second radio at the display.



**Figure 14:** Radio Communication Layout

### Connections

- Computer to radio j-box – six-foot serial cable with 9-pin plugs on both ends, one connecting to computer or USB adaptor and the other plug connecting to radio j-box at “DB9 Female V1500 PC Connect”.
- Radio j-box 12 volt power pack plugged into outlet.
- Radio j-box to radio transmitter on building – Phoenix plug on side of j-box to Phoenix plug inside radio transmitter.
- Radio signal between transmitter and receiver.
- Radio receiver to display – quick-connect cable from receiver to top jack on display back.

Troubleshooting	
Component	Check
Cable Connections	<ul style="list-style-type: none"> <li>• The serial cable connects the computer to the radio j-box.</li> <li>• All the wires are connected at the radio j-box and at the “server” radio; the wires make good electrical contact with the metal, no interference.</li> <li>• The color sequence of the wires should be the same to both the radio j-box and the server (e.g. black, white, red and black, white, red).</li> <li>• The cable is connected from the radio client to the top jack on back of display.</li> </ul>
Diagnostic LEDs	<ul style="list-style-type: none"> <li>• The green LED will be on when the radio j-box has power.</li> <li>• The amber LED is on when the computer is connected to the radio j-box.</li> <li>• The red and amber transmit and receive LEDs will flash when sending and receiving signal from the display; otherwise they are off.</li> </ul>
Display Power	<ul style="list-style-type: none"> <li>• The display is either running a message or showing a single pixel flashing in the bottom right corner of the display when power is on.</li> </ul>
Software	<ul style="list-style-type: none"> <li>• The software and the display are set for the same network address.</li> </ul>

	<ul style="list-style-type: none"> <li>Refer to the software manual for other possible conditions.</li> </ul>
--	---------------------------------------------------------------------------------------------------------------

### 4.5 RS-232 Communication

If the communication system is RS-232, look for:

- no indoor connectors.
- one enclosure at the display.

This communication type is designed to work over short distances and typically connects to an indoor display.

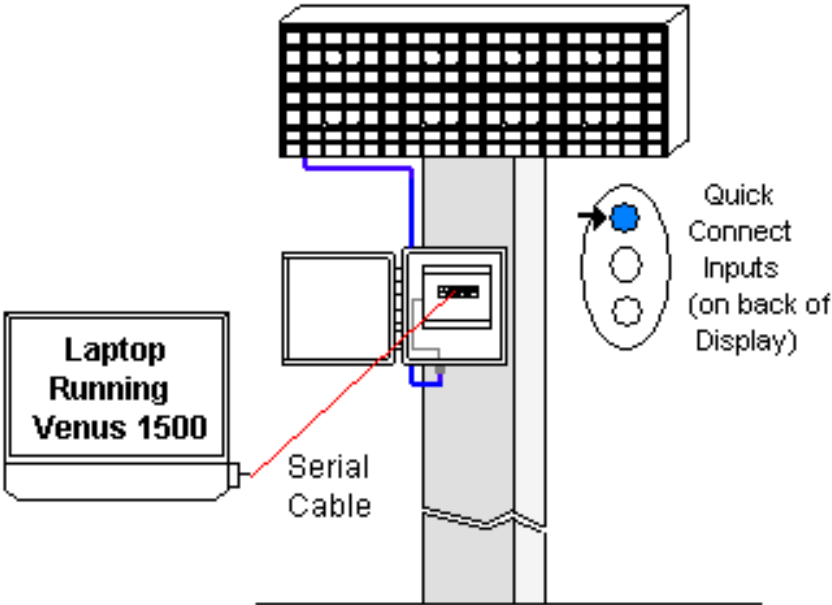


Figure 15: RS-232 Communication Layout

**Connections**

- Computer to display enclosure – six-foot serial cable with 9-pin plug into laptop computer or USB connector and a 25-pin jack into enclosure.
- Enclosure to display – quick-connect cable (maximum 25 feet) from back of enclosure to top jack on back of display.

Troubleshooting	
Component	Check
Cable Connections	<ul style="list-style-type: none"> <li>The serial cable is connected from the laptop to the enclosure.</li> <li>The cable is connected from the enclosure to the top jack on the back of the display.</li> </ul>
Display Power	<ul style="list-style-type: none"> <li>The display is either running a message or showing a single pixel flashing in the bottom right corner of the display when power is on.</li> </ul>
Software	<ul style="list-style-type: none"> <li>The software and the display are set for the same network address.</li> <li>Refer to software manual for other possible conditions.</li> </ul>

## 4.6 Ethernet Communication

If the communication system is Ethernet, look for:

- a network card in the computer connecting to a network jack on the wall.
- a network jack similar to an oversized phone jack.

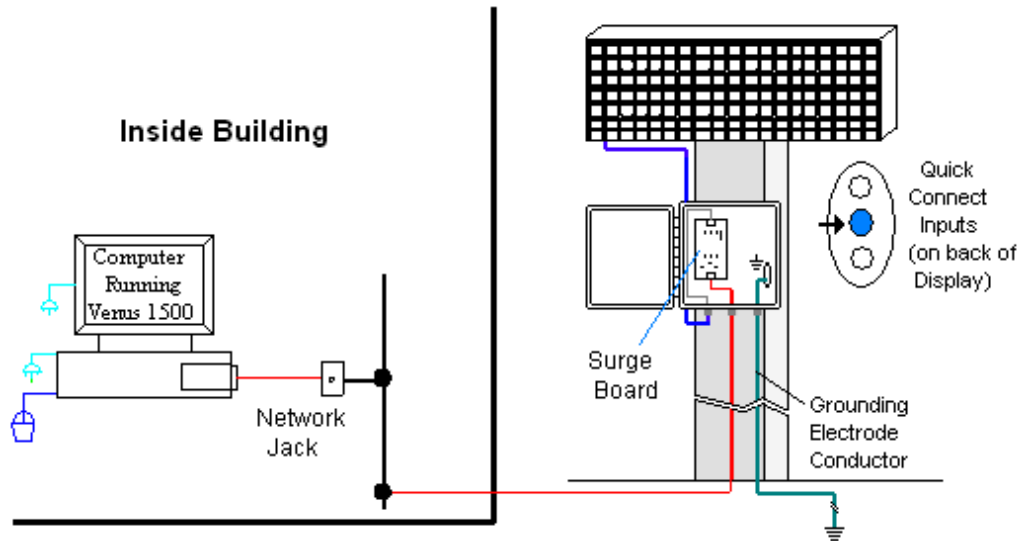


Figure 16: Ethernet Communication Layout

### Connections

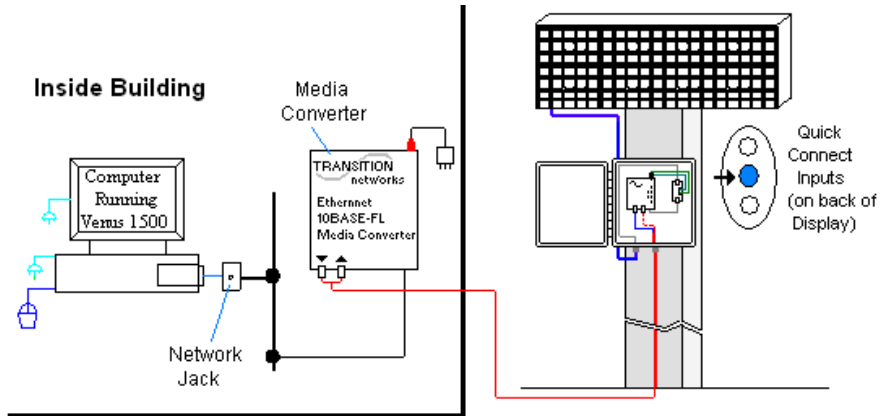
- Computer to network jack – RJ45 cable (similar to phone cable) from computer port to network server in building.
- Network to surge board – RJ45 cable from hub or router to surge board in enclosure at display.
- Enclosure at display to display – quick-connect cable from enclosure to middle jack on back of display.

Troubleshooting	
Component	Check
Cable Connections	<ul style="list-style-type: none"> <li>• The network cable connects the computer to the network port on the wall.</li> <li>• The wire from the server is connected to the input port on the Ethernet surge board.</li> <li>• The quick-connect cable runs from the enclosure to the middle jack on display back.</li> </ul>
Display Power	<ul style="list-style-type: none"> <li>• The display is either running a message or showing a single pixel flashing in the bottom right corner of the display when power is on.</li> </ul>
Software	<ul style="list-style-type: none"> <li>• The software is configured for TCP/IP communication.</li> <li>• The software and the display are set for the same network address.</li> <li>• Refer to the software manual for other possible conditions.</li> </ul>

## 4.7 Fiber Ethernet Communication

If the communication system is fiber Ethernet, look for:

- an indoor media converter connected to the network via Cat-5 cable and to fiber cable.
- a second media converter outdoors located in an enclosure at the display.



**Figure 17: Fiber Ethernet Communication Layout**

### Connections

- Computer to network – RJ45 cable (similar to phone cable) from computer port into network jack.
- Network to first media converter – RJ45 cable into media converter.
- Media converter’s 9-volt power packed plugged into outlet.
- Indoor media converter to outdoor media converter – two fiber-optic cables run from indoor media converter to second converter in the enclosure at display.
- Enclosure to display – quick-connect cable to the middle jack on display back.

**DO NOT SHARPLY BEND fiber-optic cable at any point along the fiber cable.**

Troubleshooting	
Component	Check
Cable Connections	<ul style="list-style-type: none"> <li>• The serial cable is connected from the computer to the network port at the wall.</li> <li>• The network cable connects to the media converter in building.</li> <li>• The indoor media converter power pack is plugged in.</li> <li>• The fiber cables connect from the first media converter to the second one at display. The “out” arrow on one will connect to an “in” arrow on the other.</li> <li>• The cable is connected from the enclosure to middle jack on display back.</li> </ul>
Diagnostic LEDs	<ul style="list-style-type: none"> <li>• Each media converter has a green power LED on, indicating power.</li> <li>• The “link” and RX LEDs on the media converter flash when transmitting data.</li> </ul>
Display Power	<ul style="list-style-type: none"> <li>• The display is either running a message or showing a single pixel flashing in the bottom right corner of the display when power is on.</li> </ul>
Software	<ul style="list-style-type: none"> <li>• The software is configured for TCP/IP communication.</li> <li>• The software and the display are set for the same network address.</li> </ul>

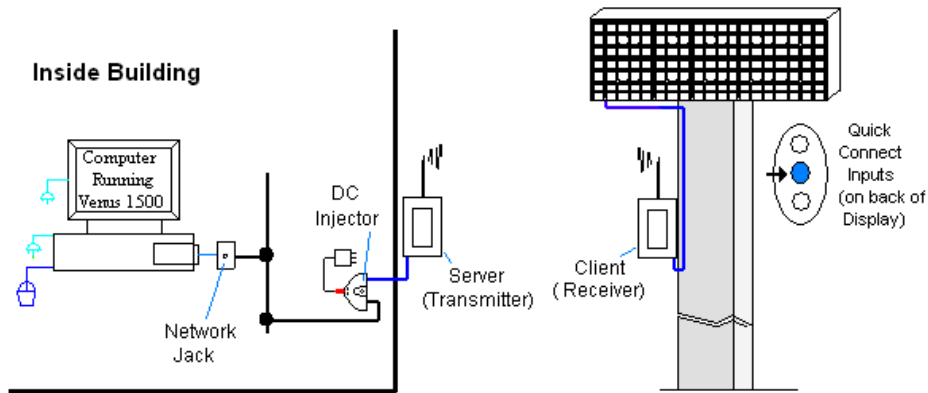
- Refer to the software manual for other possible conditions.

## 4.8 Ethernet Bridge Radio Communication

If the communication system is a wireless Ethernet radio, look for:

- a DC injector connected to the network, server radio, and DC power pack.
- a server (transmitter) radio mounted on the building and a client (receiver) radio at the display.

**Note:** This system is referred to as Ethernet "bridge" communication because it requires a pair of matched radios to create a signal connection or bridge.



**Figure 18:** Ethernet Bridge Radio Layout

### Connections

- Computer to network – RJ45 cable from computer port into network jack.
- Network jack to DC injector - RJ45 cable from network to "DATA IN" jack.
- Wall power pack - DC injector power pack to 120 VAC outlet.
- DC injector to server radio - RJ45 cable from "P+DATA OUT" to server radio.
- Server radio to client radio - clear line of sight for signal transmission.
- Client radio to display – quick-connect cable to the middle jack on display back.

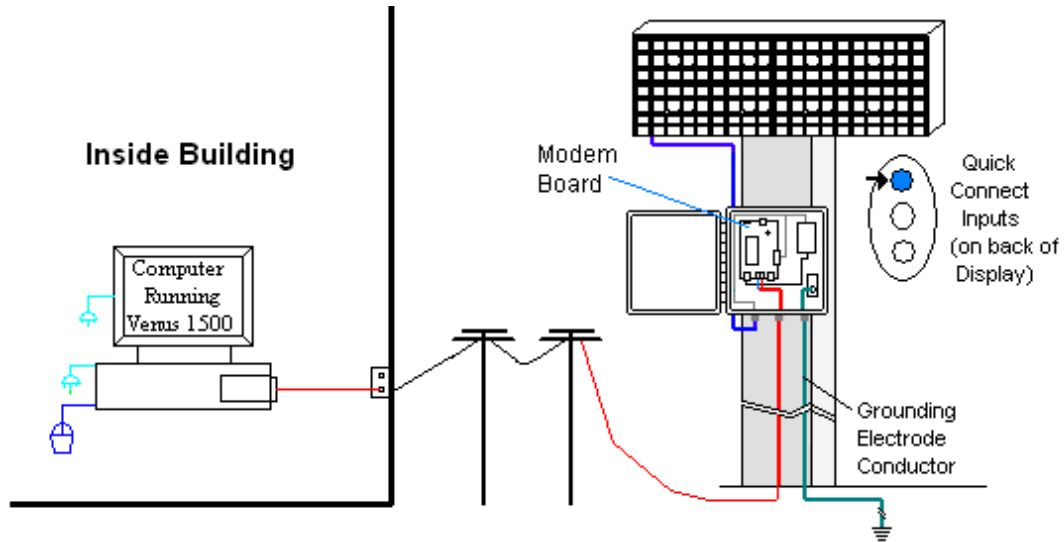
Troubleshooting	
Component	Check
Cable Connections	<ul style="list-style-type: none"> <li>• A cable connects the computer to the network port on the wall.</li> <li>• A cable runs from the network to the DC injector.</li> <li>• The DC injector power pack is plugged into a 120 VAC outlet.</li> <li>• A network cable runs from DC injector to server radio.</li> <li>• A cable is connected from the client radio to the top jack on back of display.</li> </ul>
Diagnostic LEDs	<ul style="list-style-type: none"> <li>• The DC injector's green LED should be on, indicating power.</li> <li>• Both radios have internal LEDs: red for power, green for RF link.</li> <li>• The RX and TX LEDs will flash when transmitting data.</li> <li>• The same channel LEDs will be on for both radios when locked together.</li> </ul>
Display Power	<ul style="list-style-type: none"> <li>• The display is either running a message or showing a single pixel flashing in the bottom right corner of the display when power is on.</li> </ul>
Software	<ul style="list-style-type: none"> <li>• The software is configured for TCP/IP communication.</li> <li>• The software and the display are set for the same network address.</li> </ul>

- Refer to the software manual for other possible conditions.

## 4.9 Modem Communication

If the communication system works with a modem, look for:

- a modem (internal or external) at the computer that connects to a phone jack.
- a phone line connects to the display enclosure.



**Figure 19: Modem Communication Layout**

### Connections

- Computer modem (internal or external) to phone jack on wall – phone cable plugs into both.
- Phone jack to modem at display – signal runs on local telephone lines.
- Modem board in enclosure to display – quick-connect cable from enclosure to top jack on display back.

Troubleshooting	
Components	Check
Cable Connections	<ul style="list-style-type: none"> <li>• The phone line is connected from the modem at the computer to the phone jack.</li> <li>• The two phone wires are connected at the modem board (Wire color is determined by the phone company.)</li> <li>• The wires are making good electrical contact with the metal, no interference.</li> <li>• The cable is connected from the enclosure to the top jack on the display back.</li> </ul>
Diagnostic LEDs	<ul style="list-style-type: none"> <li>• The modem in the enclosure has the green LED on, indicating power.</li> <li>• The bottom red LED (carrier detect) is on when the modems are connected.</li> <li>• Transmit and receive LEDs flash when sending and receiving signal over the telephone line; otherwise, they are off.</li> </ul>
Display Power	<ul style="list-style-type: none"> <li>• The display is either running a message or showing a single pixel flashing in the bottom right corner of the display when power is on.</li> </ul>
Software	<ul style="list-style-type: none"> <li>• The software and the display are configured for dial-up communication and the phone number is correct.</li> <li>• Refer to the software manual for other possible conditions.</li> </ul>

## 4.10 Temperature Sensor Installation

See **Appendix B** for mounting and signal connections.

Mount the temperature sensor to the display structure, preferably at least one foot away from the display. Terminate this to the primary display with a quick-connect cable. **DO NOT** mount the temperature sensor between displays or in any location where the airflow is restricted.





## Section 5: Start-up Procedure

---

Before starting up the display, go over this checklist to ensure that all parts are ready to operate correctly. **Figure 20** shows the basic display components referred to in each step.

### 5.1 Start-up Checklist

✔ **Is power connected to the display?**

The power conduit will leave the display from the rear and connect to a power source either on the display structure or inside a building. Refer to **Figure 20** for approximate location of the power cable or conduit.

✔ **If the display has two faces, are the two sides connected?**

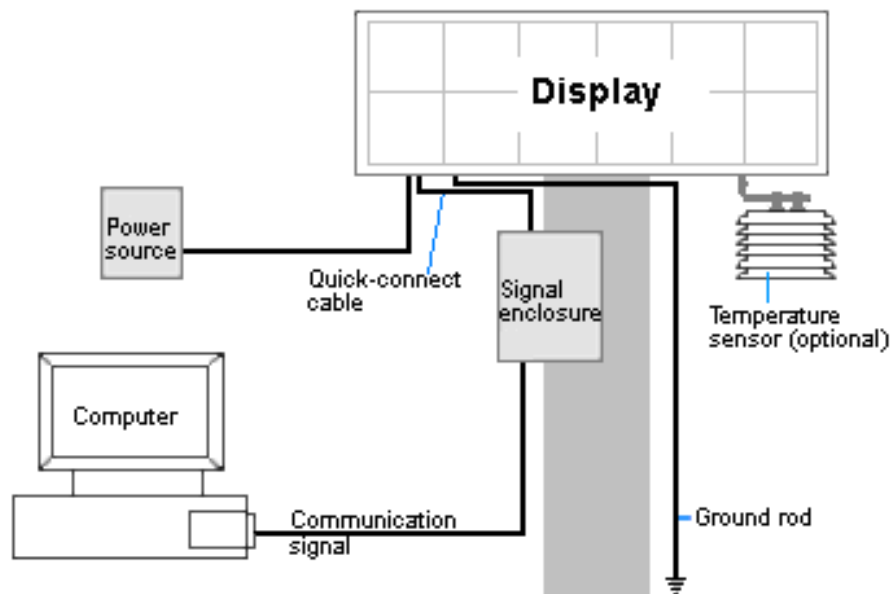
Check that a quick-connect cable runs between the back connections of the two display cabinets.

✔ **Is the control computer connected to the display?**

Some type of communication line or wireless device will send signal between the control computer and the display, depending on the communication method. Refer to **Section 4** for assistance with identifying the communication type.

✔ **Is the computer software set up to work with the display?**

The software manual provides the information necessary to allow the computer to communicate with this display. Follow the step-by-step directions in the **Configuration** section of the software manual for correct set-up.



*Figure 20: Basic Display Set-up*

## 5.2 Start-up Sequence

Each time the display is turned on, an initialization sequence will run. The information in the second column will then be shown on the display.

**Note:** The Xs refer to numbers that may vary for each display, such as the hardware address.

<b>Topic</b>	<b>Information shown</b>
1. Product Name	• Galaxy®
2. Display Size	• Row x Column
3. Shading	• RGB
4. Bootloader Version	• OS X.XX
5. Firmware Number	• <b>ED-13305</b>
6. Firmware Revision	• Rev X.XX
7. Hardware Address	• HW:XX
8. Software Address	• SW:XX
9. IP Address:	• (default: IP: 172.16.192.25)
10. Subnet Msk:	• (default) Msk: 255.255.0.0)
11. COM1 Configuration	• C1:V15 (modem: C1:V15 if a modem is present)
12. COM 2 Configuration	• C2: RTD
13. Socket 3001:	• IP 3001: V15
14. Socket 3002:	• IP 3002: RTD
15. Line Frequency	• CLK: AUTO (60)
16. Display Description	• Galaxy # rows x # columns

After this sequence is complete, the display will blank. A single pixel will flash in the lower right hand corner of the display to show that the display has power but no messages are currently running.

## Section 6: Maintenance and Parts Replacement

### Important Notes:

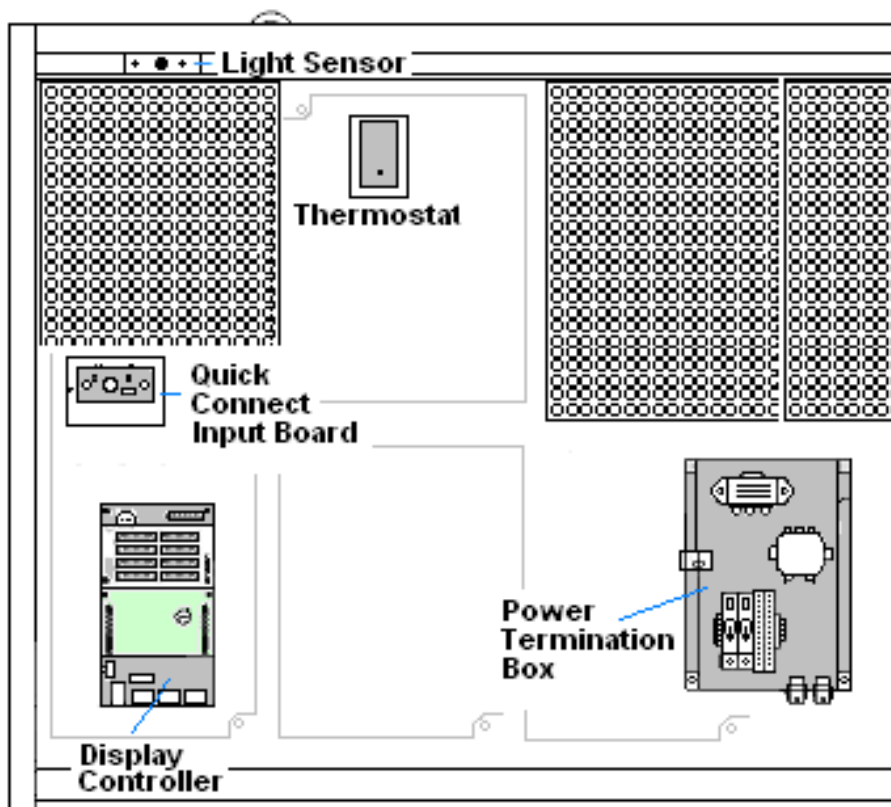


Power must be turned off before any repair or maintenance work is done on the display.

Qualified service personnel must make any access to internal display electronics.

The Daktronics engineering staff must approve ANY changes made to the display. Before altering the display, detailed drawings for the proposed modifications must be submitted to the Daktronics engineering staff for evaluation and approval or the warranty will be rendered null and void.

Daktronics Galaxy® AF-3400 12mm displays are front accessible, meaning that access to internal components is gained by removing the front modules of the display. The display may need to be opened to perform maintenance or for troubleshooting. The following diagram (**Figure 21**) shows the typical location of internal components. Component location may vary according to pixel matrix size. Refer to the **Layout Drawing** in **Appendix A** for the specific size for accurate location of components.



*Figure 21: Location of Internal Components*

## 6.1 Display Access

To gain access to the interior of a display, single modules are able to be removed. Refer to **Figure 22** to locate the internal components which may need to be accessed. In the case of fans, consult the **Shop Drawing** for the specific display. The module in front of the specific component may be removed to perform maintenance or for troubleshooting.

To access the interior of the display, perform the following steps:

1. **Turn off power to the display.**
2. Locate the latch access fasteners on the module. One is centered below the third row of pixels and one is centered above the bottom three rows.
3. With a  $\frac{1}{8}$ " hex wrench, turn the latch access fasteners a quarter turn – one latch turns counterclockwise to open and the other turns clockwise. Gently pull the module far enough forward to reach behind the back and disconnect the power and ribbon cables. Note the cable connections so they can later be reconnected correctly.
4. Disconnect the two ribbon cables from the module by spreading the tabs on the sides and then lifting the cable head from the jack. Note how they are connected to the back.
5. Unplug the power cable by squeezing the tabs on the sides of the plug head and pulling out.
6. When ready to reinstall the module, reconnect the cables to the module, making sure that the tabs are tightly pushed against the cable head. Carefully push the ribbon wires back into the cabinet so they are clear of the module edges.
7. Place the module into its proper location, checking that the weather stripping is in place. Latch the module both top and bottom using the hex wrench.



**Figure 22:** Opening Display

**Note:**

- The weather-stripping on the back edge of the module must be intact and in good condition if it is to prevent water from seeping into the display.
- The module latches must be fully engaged to create a watertight seal around the edge of the module. The module should be firmly seated against the display when the latches are fully engaged.

## 6.2 Maintenance

### Ventilation

Ventilation fans should be checked every time the display is opened or at least annually to ensure the display is being cooled properly. Fans should be checked more often if the display is located in a dusty or harsh weather environment (i.e. along a gravel road with dust laden air).

Each time a module is removed, for whatever reason, take a minute to inspect the fans. Spin the fan blades with a pen or pencil to ensure that the bearings are free and the fan is still in balance.

To check the operation of the fans, push the bypass button (momentary contact) on the thermostat enclosure to temporarily turn the fans on. (The thermostat is located behind module A102.)

- Hold your hand or a piece of light paper in front of the display to detect air movement.
- If the fan does not turn or does not operate smoothly, replace it.

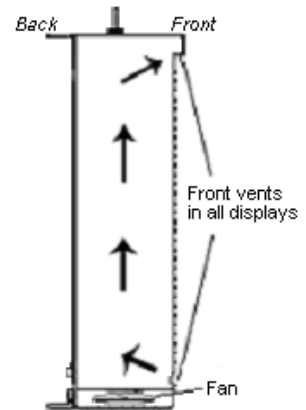
Make sure that the intake vents and exhaust vents on the front of the display are not blocked and are free of dust or other debris.

### Thermostats

A thermostat controls the operation of the ventilation fans in the display. The thermostat enclosure includes a bypass button, which will temporarily turn the fans on. The thermostat is generally located behind the top left module. The ventilation fans turn on when the inside of the display reaches 85° F (29° C), and turn off at 65° F (21° C).

### Weather Stripping

To ensure that the display is waterproof, weather stripping has been provided around the entire display and around each module. It is important that the weather stripping is installed properly at all times or water may leak into the display and damage the components.



**Figure 23:** Display fans

## Annual Maintenance

A yearly inspection should be completed to maintain safe and dependable display operation. This inspection should address the following issues:

Inspection item	Possible corrective measures
Loose bolts, screws, rivets	Tighten or replace, as required
Dust around fans, on cabinet bottom	Vacuum or carefully wipe away
Water intrusion or stains	<ul style="list-style-type: none"> <li>• Replace weather-stripping</li> <li>• Tighten module latches</li> <li>• Place silicon sealant around all locations where water might enter</li> <li>• Replace damaged electronic components</li> </ul>
Paint corrosion by footings, tie points, ground rods	<ul style="list-style-type: none"> <li>• Check the metal for structural integrity.</li> <li>• Replace and/or repaint as necessary.</li> </ul>

## 6.3 Troubleshooting

This sub-section contains some symptoms that may be encountered in the displays. This list does not include every possible symptom, but does represent common situations that may occur.

Symptom/Condition	Possible Cause/Remedy
One or more LEDs on a single module fail to light.	<ul style="list-style-type: none"> <li>• Replace/check ribbon cables on the module.</li> <li>• Replace the module.</li> </ul>
One or more LEDs on a single module fail to turn off.	<ul style="list-style-type: none"> <li>• Replace/check ribbon cables on module.</li> <li>• Replace the module.</li> </ul>
A section of the display is not working. The section extends all the way to the right side of the display.	<ul style="list-style-type: none"> <li>• Replace/check the ribbon cable.</li> <li>• Replace/move the first module/driver that is not working.</li> <li>• Replace/move the first module/driver on the left side of the module that is not working.</li> <li>• Check/replace the power supply assembly on the first module that is not working.</li> </ul>
One row of modules does not work or is distorted.	<ul style="list-style-type: none"> <li>• Replace/check ribbon cable to and from first non-working module.</li> <li>• Check for bent pins on module and controller.</li> <li>• Replace/move module that is distorted.</li> <li>• Replace/move the first module to the left of the one that is not working.</li> <li>• Replace controller.</li> </ul>
<b>A group of modules, (a</b>	<ul style="list-style-type: none"> <li>• Check the voltage to the module.</li> <li>• Check wire connections at power supply and at module.</li> </ul>

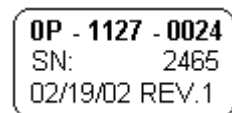
<b>column of block) which share the same power supply assembly, fail to work.</b>	<ul style="list-style-type: none"> <li>• Replace the power supply assembly.</li> </ul>
Entire display fails to work.	<ul style="list-style-type: none"> <li>• Check for proper line voltage to the power J-box.</li> <li>• Check for correct power at power termination panel.</li> <li>• Check for correct power to modules (12 VDC).</li> <li>• Check the breakers in the power termination panel.</li> <li>• Check/replace the ribbon cable from the controller to the modules.</li> <li>• Check the voltage settings on the power supplies.</li> <li>• Check the signal cable to the controller.</li> <li>• Replace the controller.</li> <li>• Verify proper use of the software in the operation manual on the CD (<b>ED-13530</b>).</li> </ul>
Temperature always reads –196F/-127C degrees F/0 degrees C.	<ul style="list-style-type: none"> <li>• Check temperature sensor cable connections at both displays.</li> <li>• Check for correct power on temperature sensor.</li> <li>• Check that the temperature sensor address is set to 1.</li> <li>• Replace the temperature sensor.</li> </ul>
Display is stuck on bright or dim.	<ul style="list-style-type: none"> <li>• Check Manual/Auto dimming in Venus 1500 software.</li> <li>• Check light detector cable/wiring.</li> <li>• Check light detector for obstructions.</li> <li>• Replace the light detector.</li> <li>• Replace the controller.</li> </ul>

## 6.4 Replacement Parts List

Daktronics displays are built for long life and require little maintenance. However, from time to time, certain display components will need replacing. The **Replacement Parts List** provides the names and numbers of components that may need to be ordered during the life of the display. Information on the **Daktronics Exchange and Repair & Return Programs** is located in **Section 5**. Refer to these instructions if any display component needs replacement or repair.

**Note:** A collection of circuit boards working as a single unit may carry an assembly label. Cables may also carry the assembly numbering format in certain circumstances. This is especially true of ribbon cables.

Most circuit boards and components within this display carry a label that lists the part number of the unit. If a circuit board or assembly is not listed in the **Replacement Parts List**, use the label to order a replacement. A typical label is shown in **Figure 24**. The part number is in bold.



To prevent theft, Daktronics recommends purchasing a lockable cabinet to store manuals and replacement/spare parts.

**Figure 24:** Typical Label

<b>Part Description</b>	<b>Part Number</b>
Controller II, Louvered Galaxy, 8-connector	0A-1229-0013
Module, AF-3400-24x16-12-1R1G1B	0A-1337-4551
Power Supply Assembly, A-1997, RGB Displays	0A-1327-0014
Power Supply Fuse, ATM15, 32V, 15A	F-1058
Digital Temp Sensor Board	0P-1247-0008
Light Level Detector Board	0P-1151-0002
Fan; 134 CFM, 120V @60Hz, 22 watt	B-1053
Fan; 134 CFM, 240V @60Hz, 22 watt	B-1011
Transformer; Pri 115V, Sec 10VCT@3A	T-1119
Transformer; Pri 240V, Sec 10VCT@3A	T-1121
Filter, RFI Line 20 AMP 120 VAC	Z-1007
<b>Ribbon Cables; 20 Position</b>	
Cable Assy; 20 pos Ribbon, 18", Dual Row	W-1387
Ribbon Assy; 20 Pos, 30"	0A-1000-0017
Ribbon Assy; 20 Pos, 42"	0A-1000-0019
Cable; 22 AWG, 2-pair, shielded (Light Sensor/Temp Sensor to Controller)	W-1234
Quick Connect Interface, Input, w/Ethernet	0P-1229-2004
Electrical Contact Cleaner Lubricant / Cal-Lube	CH-1019
Hex Wrench, T-Handle 1/8" RT	TH-1062



## 6.5 Replacing Parts

### Location of Internal Components

To replace components inside a display, only the module in front of the specific component will need to be removed. The components in a typical 12 mm Galaxy displays are located as shown in **Figure 21**.

### Module Replacement

To remove and replace a module, follow these steps:

1. Locate the latch access fasteners on the module. One is centered below the third row of pixels and one is centered above the bottom three rows.
2. With a  $\frac{1}{8}$ " hex wrench, turn both latch access fasteners a quarter turn – one latch turns counter-clockwise to open and the other clockwise to open. Refer to in **Figure 25** for a module being removed.
3. Gently pull the module far enough forward to reach behind the back and disconnect the power and ribbon cables.
4. Connect the power and signal cables to the new module.
5. Position the module in place, making sure that the cables are inside the display.
6. Close both latches using the hex wrench.



**Figure 25:** Removing a Module

### Important Notes

- The weather-stripping on the back edge of the module must be intact and in good condition if it is to prevent water from seeping into the display.
- The module latches must be fully engaged to create a watertight seal around the edge of the module. The module should be firmly seated against the display when the latches are fully engaged.

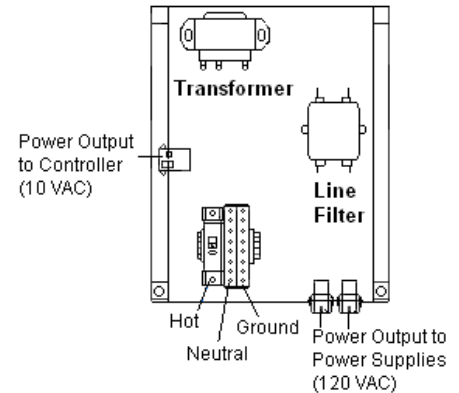
## Transformer and RFI Filter Replacement

### Transformer

The transformer is located in the upper portion of the display's power termination panel, as shown in **Figure 26**.

To replace the transformer:

1. Turn off power to the display before removing the wires.
2. Disconnect and label all the wires attached to the transformer.
3. Release the hardware securing it to the inside of the enclosure.
4. Position the new transformer in its place, and replace the fastening hardware.
5. Re-connect all the wires using the **Drawing A-253685** as a reference.



**Figure 26:** One-circuit Power Termination

### RFI Filter

The RFI electrical filters are inside of the power termination box. To replace an RFI (or Z) filter, follow these steps:

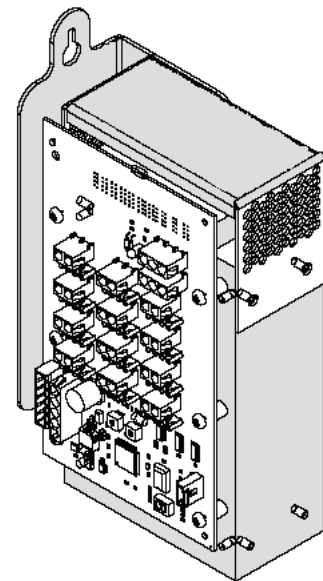
1. Like the transformer, label all connecting wires and then remove them.
2. Release the attachment hardware.
3. Install the new filter using **Drawing A-253685** as a reference.

## Power Supply Replacement

A power supply unit has 12 outputs on the power distribution board and controls up to twenty-four modules. Each power output jack is paired with an automotive grade fuse. Each output from the power supply assembly provides 12 VDC to the display modules.

To replace the power supply:

1. Turn off power to the display.
2. Remove the module in front of the power supply to be replaced. (Consult the **Shop Drawing** for its location.)
3. Disconnect the power and signal connectors from the power supply distribution board, labeling them for replacement.
4. Loosen the screw holding the power supply bracket to the display cabinet and lift it off the screw. Carefully pull it out of the cabinet.
5. Move the new power supply into place and tighten the screw on the support bracket.

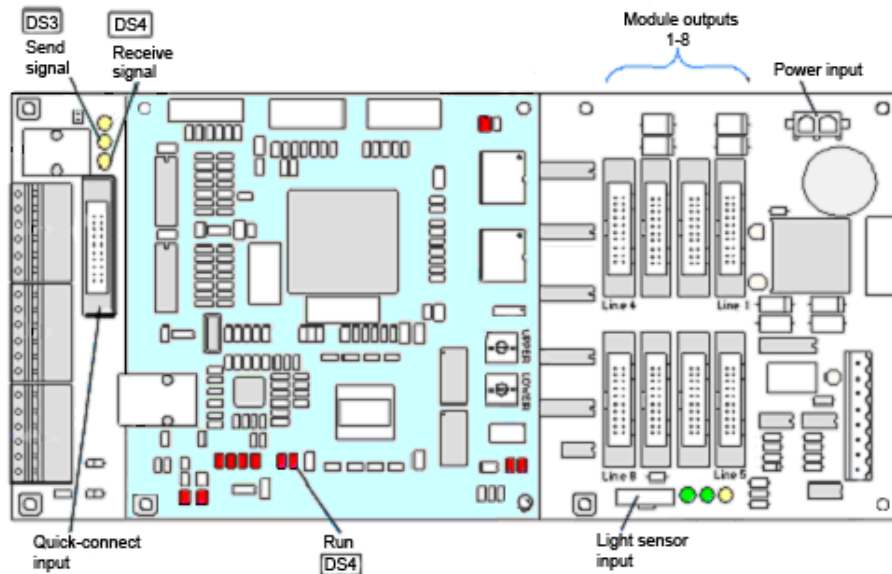


**Figure 27:** Power Supply

6. Reconnect using **Drawing A-253685** for reference.

## Controller

The controller's role is to send data to the modules. **Figure 28** illustrates a typical controller.



**Figure 28:** Controller Component Layout

Diagnostic LEDs are located on the controller. The table below tells what each LED denotes:

Figure/ label	LED #	Color	Operation
Run	DS4	Red	Steady FLASH about once per second indicates controller is working properly.
Send signal TX1	DS3	Yellow	OFF is the normal state. FLASH when transmitting communication from the computer.
Receive signal RX1	DS4	Yellow	OFF is the normal state. FLASH when receiving communication from the computer.

Complete the following steps to remove or replace the controller in the display:

1. Turn off power to the display.
2. Remove the module directly in front of the controller in the lower left corner of the display.
3. Disconnect the power plug from J5.
4. Remove all power and signal connections from the board, labeling the cables as they are disconnected.
5. Remove the six nuts holding the board in place using a 5/16" nut driver.
6. Take note of the address of the controller and ensure the address on the replacement board is the same.

Follow the previous steps in reverse order to install a new controller board.

The rotary switches set the hardware address which the software uses to identify that particular display. When replacing a controller board, be sure to set the rotary switches in the same address configuration as the defective controller. Each controller in a network needs a unique address.

**Note:** Set the switches by rotating them counter-clockwise until the arrow points to the desired number. Setting both rotary switches to address 0 can activate a test mode. The display's power must be turned off and then turned back on to notify the controller of any change of address.

Controller Address Settings					
Address	Upper	Lower	Address	Upper	Lower
<b>Test Mode</b>	0	0	<b>10</b>	0	A
<b>1</b>	0	1	<b>11</b>	0	B
<b>2</b>	0	2	<b>12</b>	0	C
<b>3</b>	0	3	<b>13</b>	0	D
<b>4</b>	0	4	<b>14</b>	0	E
<b>5</b>	0	5	<b>15</b>	0	F
<b>6</b>	0	6	<b>16</b>	1	0
<b>7</b>	0	7	<b>17</b>	1	1
<b>8</b>	0	8	...	...	...
<b>9</b>	0	9	<b>240</b>	F	0



# Section 7: Daktronics Exchange and Repair & Return Programs

---

To serve customers' repair and maintenance needs, Daktronics offers both an Exchange Program and a Repair & Return Program.

## Before Contacting Daktronics

Print any important part numbers here:

---

---

---

Fill in these numbers before calling Customer Service:

Display Serial Number: \_\_\_\_\_

Display Model Number: AF-3400 12 mm

Contract Number: \_\_\_\_\_

Date Installed: \_\_\_\_\_

Location of Display: \_\_\_\_\_

Daktronics Customer ID Number: \_\_\_\_\_

## 7.1 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 problem part to Daktronics. This decreases display downtime.

To participate in the Exchange Program, follow these steps.

- 1. Call Daktronics Customer Service: 866-343-3122.**
- 2. When the new exchange part is received, mail the old part to Daktronics.**

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

  - Package the old part in the same shipping materials in which the replacement part arrived.
  - Fill out and attach the enclosed UPS shipping document.
  - Ship the part to Daktronics.
- 3. A charge will be made 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 the full purchase price will be charged.**

If the equipment is still defective after the exchange is made, 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.

## 7.2 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:**  
Phone: 866-343-3122                      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 shipment.**  
Electronic components, such as printed circuit boards, should be placed in an antistatic bag before boxing.
4. **Enclose:**
  - your name
  - address
  - phone number
  - the RMA number
  - a clear description of symptoms

### ***Shipping Address***

Daktronics Customer Service  
PO Box 5128  
331 32nd Ave  
Brookings SD 57006

## 7.3 Daktronics Warranty and Limitation of Liability

Daktronics Warranty and Limitation of Liability is included in Appendix C. The Warranty is independent of Extended Service agreement and is the authority in matters of service, repair, and display operation.

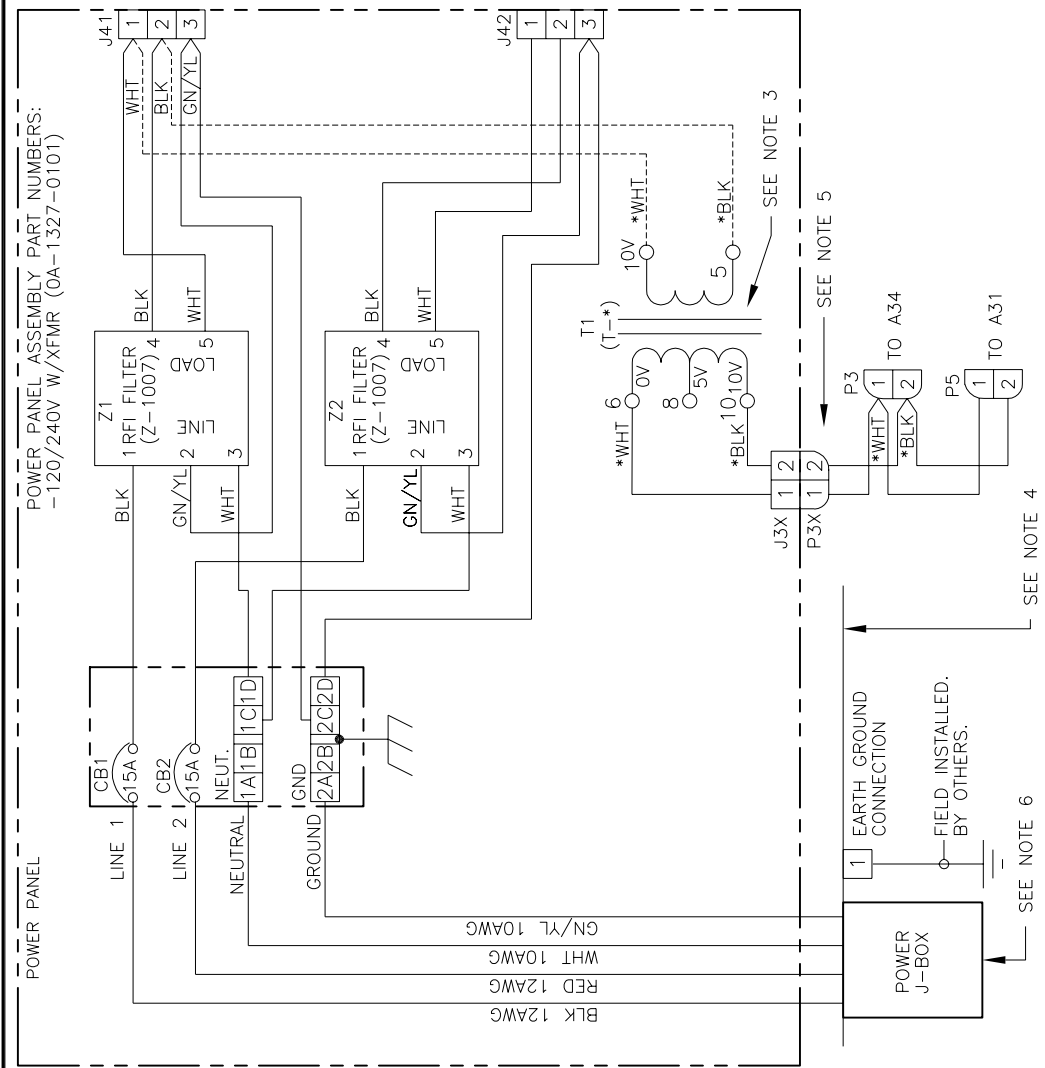


# Appendix A: Reference Drawings

---

Refer to **Section 1** for information on reading drawing numbers. The following drawings are listed in numerical order by size (A, B, etc.).

Schematic, Power Term Panel, 2 Circuit-120VAC .....	<b>Drawing A-211947</b>
Schematic, Power Term Panel, 1 Circuit-120VAC .....	<b>Drawing A-211950</b>
Schematic, Power Term Panel, 2 Pole-240VAC .....	<b>Drawing A-218666</b>
Schematic, Power Term Panel, 1 Pole-240VAC .....	<b>Drawing A-220287</b>
Schematic, AF-3400-12-RGB-P, General .....	<b>Drawing A-253685</b>
Power Specs, AF-3400-(24x192-96-192)-12-RGB .....	<b>Drawing A-254277</b>
Schem., Primary Signal, Internal, W/QC .....	<b>Drawing B-206146</b>
Elect Layout, AF-3400-24x***-12-RGB .....	<b>Drawing B-253856</b>
Elect Layout, AF-3400-48x***-12-RGB .....	<b>Drawing B-253858</b>
Elect Layout, AF-3400-72x***-12-RGB .....	<b>Drawing B-253860</b>
Elect Layout, AF-3400-96x***-12-RGB .....	<b>Drawing B-253861</b>



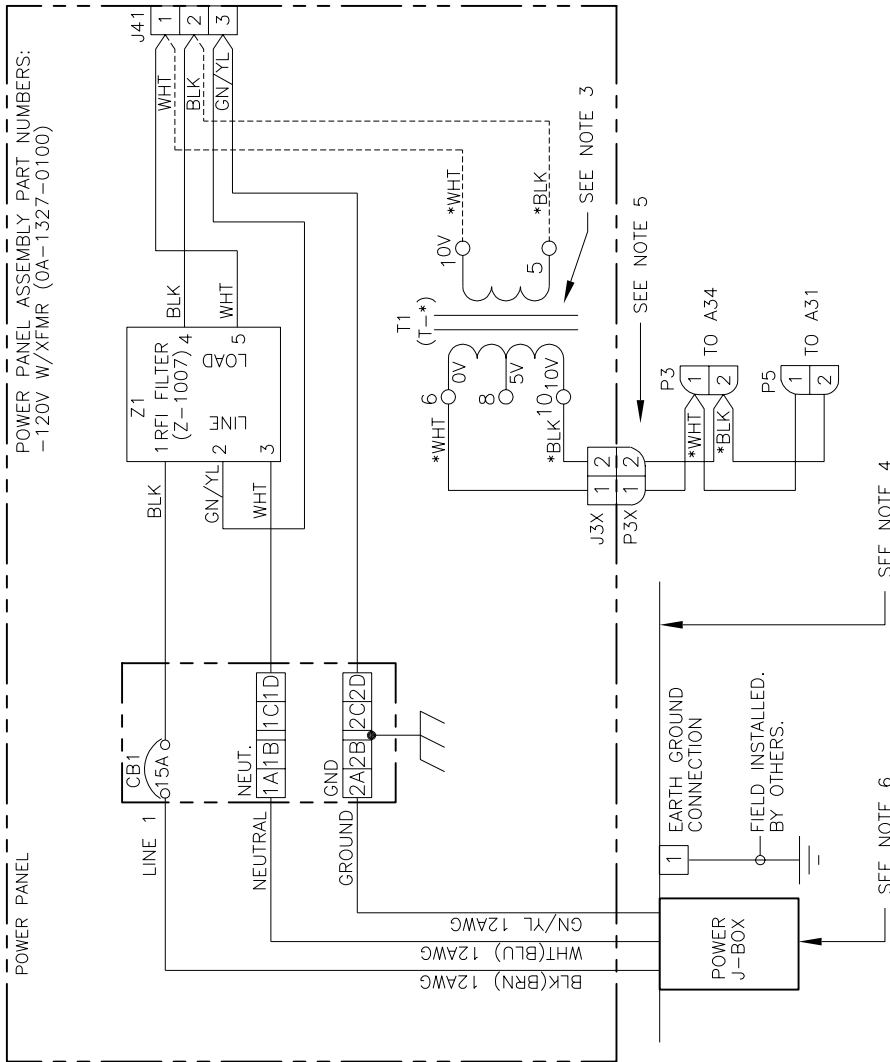
POWER PANEL ASSEMBLY PART NUMBERS:  
-120/240V W/XFMR (0A-1327-0101)

**NOTES:**

- 1) ALL WIRE IS 14 AWG EXCEPT \* IS 18 AWG, UNLESS OTHERWISE NOTED.
- 2) CB1 AND CB2 ARE 15AMP 277VAC BREAKERS. DAK. PART NUMBER (S-1187)
- 3) FOR 120VAC INPUT \* IS T-1119.
- 4) POWER J-BOX & EARTH GROUND CONNECTION ARE LOCATED ON DISPLAY REAR. THEY ARE NOT INCLUDED WITH POWER TERM PANEL ASSY.
- 5) INCLUDED WITH DISPLAY, WHEN REQUIRED. J3X IS FOR SIGNAL TERMINATIONS (10VAC).
- 6) 12 INCH COIL OF WIRE LOCATED INSIDE 120/240VAC LINE 1(BLK), LINE 2(RED), NEUT(WHT), GND(GN/YL)

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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: BUSINESS PRODUCTS DISPLAY COMPONENTS			
TITLE: SCHEMATIC, POWER TERM PANEL, 2 CIRCUIT			
DES. BY: DMATHER		DRAWN BY: DMATHER	
DATE: 14 MAY 04			
REVISION	APPR. BY:	1327-R01A-211947	
01	SCALE: 1=1		

REV.	DATE	DESCRIPTION	BY	APPR.
01	19OCT04	REMOVED MIRROR ASSEMBLY REMOVED DETAIL A OF TRANS. T-1121 MOVED FROM P1321 TO P1327	WRS	DJM



POWER PANEL ASSEMBLY PART NUMBERS:  
-120V W/XFMR (0A-1327-0100)

POWER PANEL

**NOTES:**

- 1) ALL WIRE IS 14 AWG EXCEPT \* IS 18 AWG, UNLESS OTHERWISE NOTED.
- 2) CB1 IS A 15AMP 277VAC BREAKER. DAK. PART NUMBER (S-1187)
- 3) FOR 120VAC INPUT \* IS T-1119.
- 4) POWER J-BOX & EARTH GROUND CONNECTION ARE LOCATED ON DISPLAY REAR. THEY ARE NOT INCLUDED WITH POWER TERM PANEL ASSY.
- 5) INCLUDED WITH DISPLAY, WHEN REQUIRED. J3X IS FOR SIGNAL TERMINATIONS (10VAC).
- 6) 12 INCH COIL OF WIRE LOCATED INSIDE 120VAC LINE 1(BLK), NEUT(WHT), GND(GN/YL) 240VAC LINE 1(BRN), NEUT(BLU), GND(GN/YL)

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DAKTRONICS, INC. BROOKINGS, SD 57006

02	19OCT04	REMOVED MIRROR ASSEMBLY REMOVED DETAIL A OF TRANS. T-1121 MOVED FROM P1321 TO P1327	WRS	DJM
01	29JUL04	CORRECTED THE PART NUMBER OF THE 240V PANEL W/O XFMR. 0A-1327-0122	DJM	
REV.	DATE	DESCRIPTION	BY	APPR.
02				

REVISION

APPR. BY:  
SCALE: 1=1

1327-R01A-211950

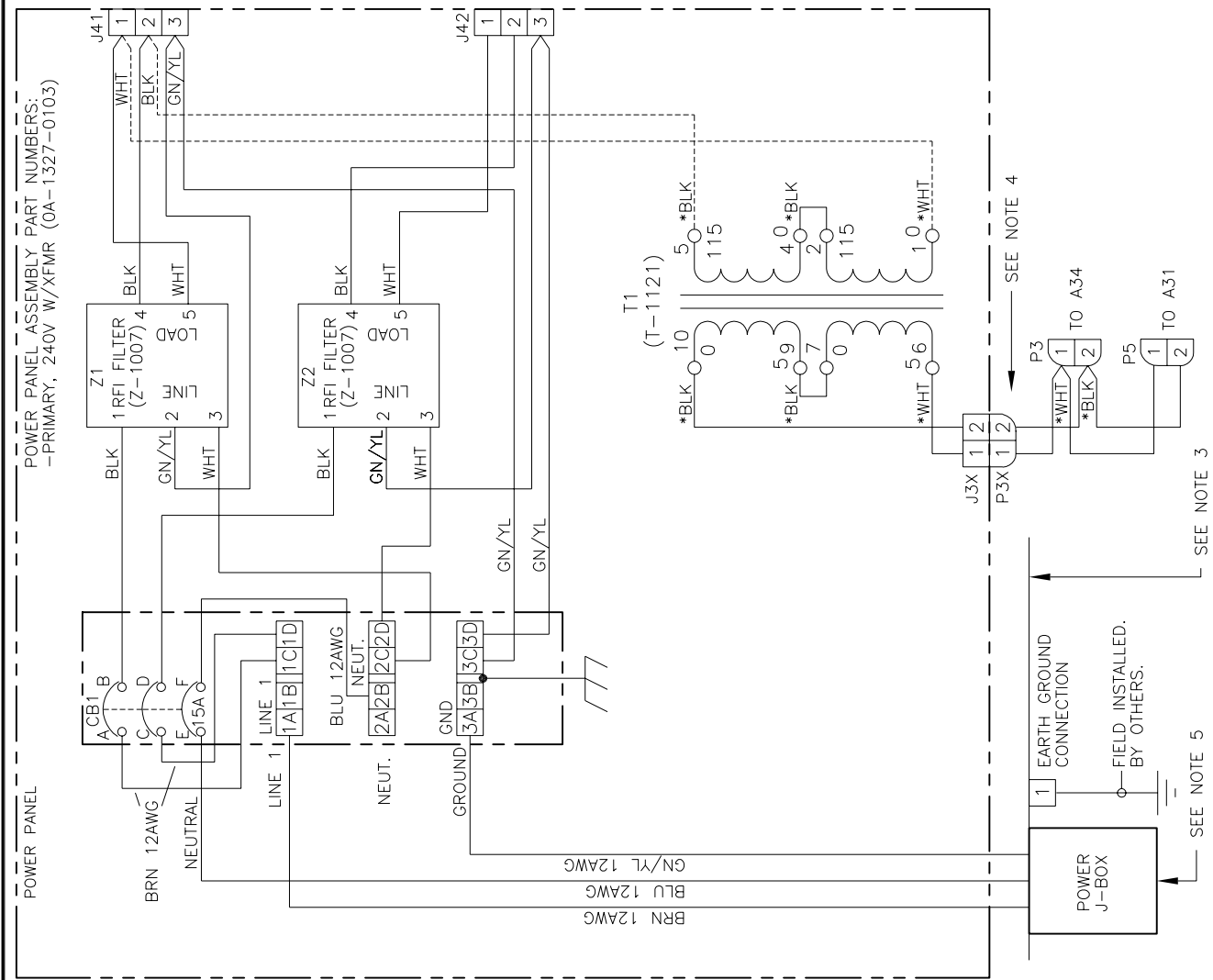
PROJ: BUSINESS PRODUCTS DISPLAY COMPONENTS

TITLE: SCHEMATIC, POWER TERM PANEL, 1 CIRCUIT

DES. BY: DMATHER

DRAWN BY: DMATHER

DATE: 14 MAY 04



NOTES:

- 1) ALL WIRE IS 14 AWG EXCEPT \* IS 18 AWG, UNLESS OTHERWISE NOTED.
- 2) CB1 IS A 3 POLE 15AMP 277VAC BREAKER. DAK. PART NUMBER (S-1197)
- 3) POWER J-BOX & EARTH GROUND CONNECTION ARE LOCATED ON DISPLAY REAR. THEY ARE NOT INCLUDED WITH POWER TERM PANEL ASSY.
- 4) INCLUDED WITH DISPLAY, WHEN REQUIRED. J3X IS FOR SIGNAL TERMINATIONS (10VAC).
- 5) 12 INCH COIL OF WIRE LOCATED INSIDE LINE 1(BRN), NEUT(BLU); GND(GN/YL).

POWER PANEL ASSEMBLY PART NUMBERS:  
-PRIMARY, 240V W/XFMR (0A-1327-0103)

POWER PANEL

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: BUSINESS PRODUCTS DISPLAY COMPONENTS

TITLE: SCHEMATIC, PWR TERM PANEL, 2 POLE + N, 1PH, 240V

DES. BY: DMATHER

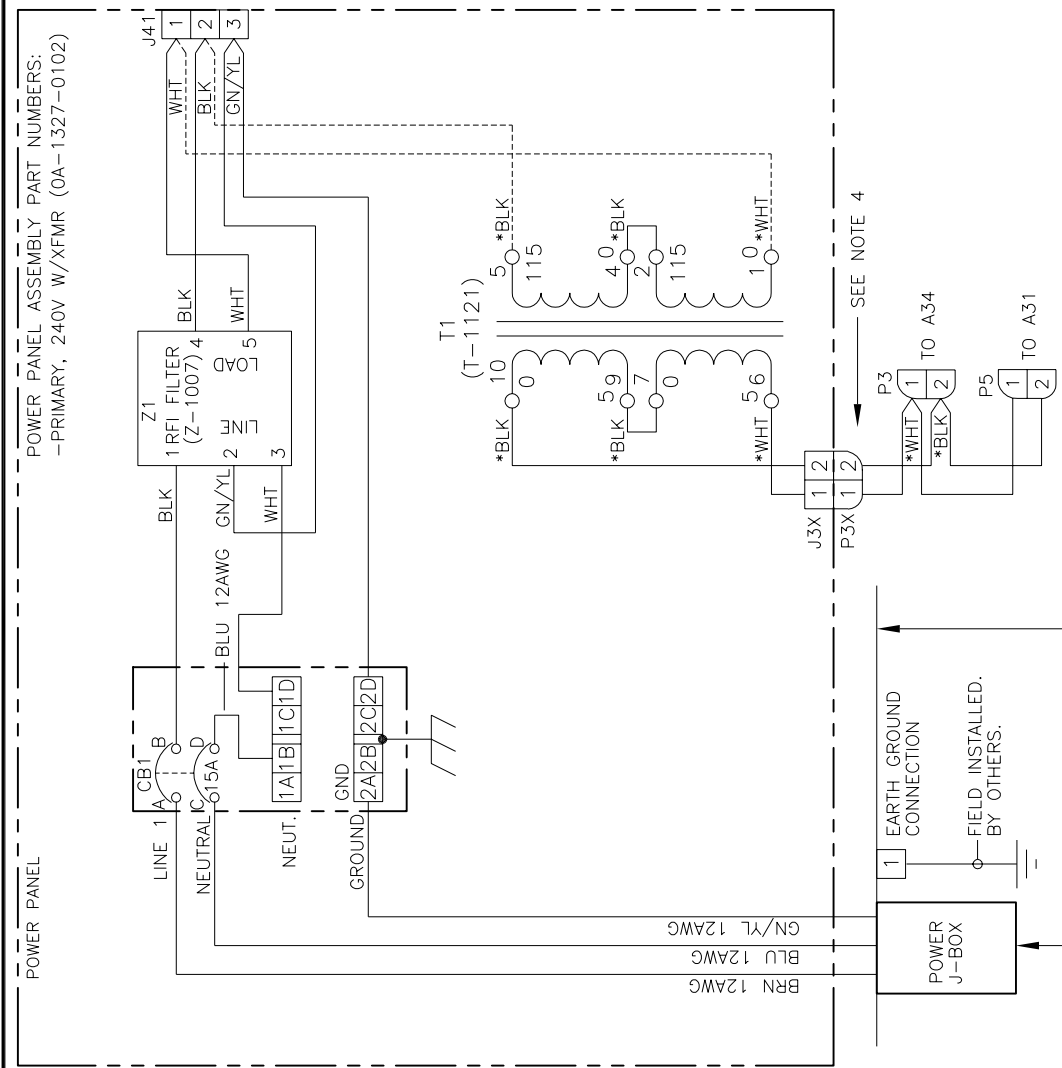
DRAWN BY: DMATHER

DATE: 14 JUL 04

REV.	DATE	DESCRIPTION	BY	APPR.
01	13SEP04	REPLACED 2 SINGLE BREAKERS WITH 1-3 POLE BREAKER. REMOVED MIRROR ASSEMBLY.	LLK	LLK

REVISION	APPR. BY:
01	SCALE: 1=1

1327-R01A-218666



POWER PANEL ASSEMBLY PART NUMBERS:  
 -PRIMARY, 240V W/XFMR (0A-1327-0102)

NOTES:

- 1) ALL WIRE IS 14-AWG EXCEPT \* IS 18-AWG, UNLESS OTHERWISE NOTED.
- 2) CB1 IS A 2-POLE 15AMP, 277VAC BREAKER. DAK. PART NUMBER (S-1190)
- 3) POWER J-BOX & EARTH GROUND CONNECTION ARE LOCATED ON DISPLAY REAR. THEY ARE NOT INCLUDED WITH POWER TERM PANEL ASSY.
- 4) INCLUDED WITH DISPLAY, WHEN REQUIRED. J3X IS FOR SIGNAL TERMINATIONS (10VAC).
- 5) 12 INCH COIL OF WIRE LOCATED INSIDE LINE 1 (BRN), NEUT(BLU), GND(GN/YL).

SEE NOTE 3

SEE NOTE 5

SEE NOTE 4

REV.	DATE	DESCRIPTION	BY	APPR.
01	13SEP04	ADDED TB NEUTRAL BLOCK. REMOVED MIRROR ASSEMBLY.	LLK	LLK

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: BUSINESS PRODUCTS DISPLAY COMPONENTS

TITLE: SCHEMATIC, PWR TERM PANEL, 1 POLE + N, 1PH, 240V

DES. BY: DMATHER      DRAWN BY: DMATHER      DATE: 03 AUG 04

REVISION	APPR. BY:	1327-R01A-220287
01	SCALE: 1=1	



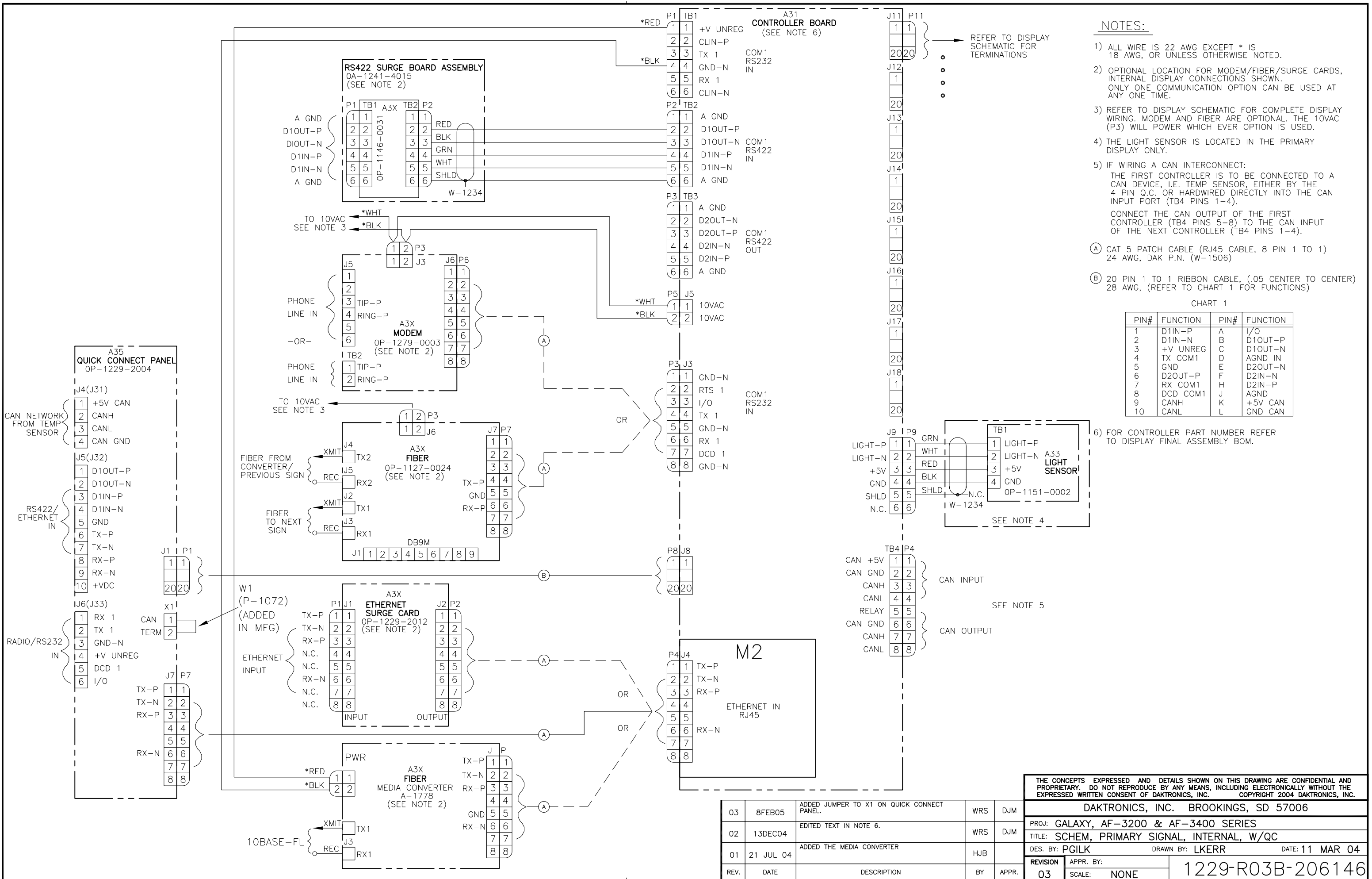
12mm RGB GALAXY DISPLAYS  
POWER SPECIFICATION CHART

MATRIX SIZE	TOTAL WATTS	120V AMPS	120/240 3, wire LINE 1      LINE 2 AMPS        AMPS		240V AMPS
24X80	325	2.71	120/240 VAC IS NOT AVAILABLE FOR SIZE		1.35
24X96	378	3.15			1.57
24X112	431	3.59			1.80
24X128	506	4.22			2.11
24X144	559	4.66			2.33
24X160	612	5.10			2.55
24X176	665	5.55			2.77
24X192	719	5.99			2.99
48X64	484	4.03			2.02
48X80	590	4.92			2.46
48X96	697	5.80			2.90
48X112	825	6.87			3.44
48X128	931	7.76			3.88
48X144	1037	8.64			4.32
48X160	1144	9.53	4.76		
48X176	1272	10.60	5.30		
48X192	1378	11.48	5.74		
72X64	697	5.80	2.90		
72X80	878	7.32	3.66		
72X96	1037	8.64	4.32		
72X112	1197	9.97	4.99		
72X128	1378	11.48	5.44	6.05	5.74
72X144	1538	12.81	6.77	6.05	6.41
72X160	1719	14.32	8.09	6.23	7.16
72X176	1878	15.65	9.42	6.23	7.83
72X192	2038	16.98	10.75	6.23	8.49
96X64	909	7.58			3.79
96X80	1144	9.53			4.76
96X96	1356	11.30	5.44	5.86	5.65
96X112	1591	13.26	8.09	5.16	6.63
96X128	1803	15.03	8.98	6.05	7.51
96X144	2038	16.98	10.75	6.23	8.49
96X160	2250	18.75	8.98	9.77	9.38
96X176	2485	20.71	9.87	10.84	10.35
96X192	2697	22.48	10.75	11.73	11.24

THE ABOVE DISPLAY SIZES CAN BE POWERED BY EITHER 120VAC (2 WIRE + GND),  
120/240 (3 WIRE + GND) OR 240VAC (2 WIRE + GND) SERVICES (EXCEPT WHERE NOTED).

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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: GALAXY; AF-3400-12MM FRONT VENTILATION			
TITLE: POWER SPECS, AF-3400-(24X192-96X192)-12-RGB			
DES. BY: LKERR		DRAWN BY: LKERR	
		DATE: 26 SEP 05	
REVISION	APPR. BY:	1360-R10A-254277	
00	SCALE:		

REV.	DATE	DESCRIPTION	BY	APPR.



**NOTES:**

- 1) ALL WIRE IS 22 AWG EXCEPT \* IS 18 AWG, OR UNLESS OTHERWISE NOTED.
  - 2) OPTIONAL LOCATION FOR MODEM/FIBER/SURGE CARDS, INTERNAL DISPLAY CONNECTIONS SHOWN. ONLY ONE COMMUNICATION OPTION CAN BE USED AT ANY ONE TIME.
  - 3) REFER TO DISPLAY SCHEMATIC FOR COMPLETE DISPLAY WIRING. MODEM AND FIBER ARE OPTIONAL. THE 10VAC (P3) WILL POWER WHICH EVER OPTION IS USED.
  - 4) THE LIGHT SENSOR IS LOCATED IN THE PRIMARY DISPLAY ONLY.
  - 5) IF WIRING A CAN INTERCONNECT: THE FIRST CONTROLLER IS TO BE CONNECTED TO A CAN DEVICE, I.E. TEMP SENSOR, EITHER BY THE 4 PIN Q.C. OR HARDWIRED DIRECTLY INTO THE CAN INPUT PORT (TB4 PINS 1-4).  
CONNECT THE CAN OUTPUT OF THE FIRST CONTROLLER (TB4 PINS 5-8) TO THE CAN INPUT OF THE NEXT CONTROLLER (TB4 PINS 1-4).
- (A) CAT 5 PATCH CABLE (RJ45 CABLE, 8 PIN 1 TO 1) 24 AWG, DAK P.N. (W-1506)
- (B) 20 PIN 1 TO 1 RIBBON CABLE, (.05 CENTER TO CENTER) 28 AWG. (REFER TO CHART 1 FOR FUNCTIONS)

CHART 1

PIN#	FUNCTION	PIN#	FUNCTION
1	D1IN-P	A	I/O
2	D1IN-N	B	D1OUT-P
3	+V UNREG	C	D1OUT-N
4	TX COM1	D	AGND IN
5	GND	E	D2OUT-N
6	D2OUT-P	F	D2IN-N
7	RX COM1	H	D2IN-P
8	DCD COM1	J	AGND
9	CANH	K	+5V CAN
10	CANL	L	GND CAN

6) FOR CONTROLLER PART NUMBER REFER TO DISPLAY FINAL ASSEMBLY BOM.

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03		8FEB05	ADDED JUMPER TO X1 ON QUICK CONNECT PANEL.	WRS	DJM
02		13DEC04	EDITED TEXT IN NOTE 6.	WRS	DJM
01		21 JUL 04	ADDED THE MEDIA CONVERTER	HJB	
REV.	DATE		DESCRIPTION	BY	APPR.

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, AF-3200 & AF-3400 SERIES

TITLE: SCHEM, PRIMARY SIGNAL, INTERNAL, W/QC

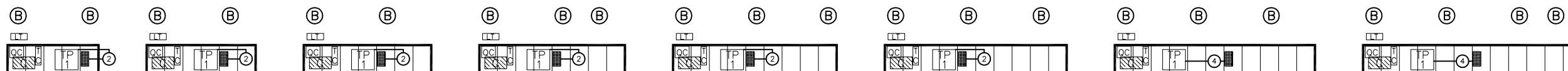
DES. BY: PGILK      DRAWN BY: LKERR      DATE: 11 MAR 04

REVISION: 03      APPR. BY:      SCALE: NONE

1229-R03B-206146



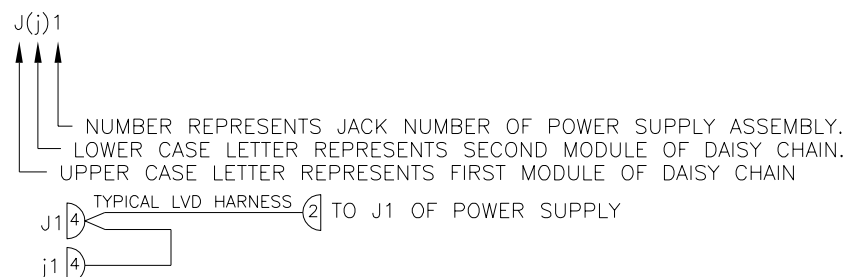
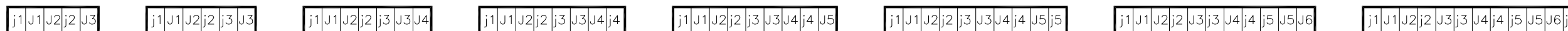
80 96 112 128 144 160 176 192



NOTES:  
REFER TO DETAIL "A" FOR  
LVD HARNESS ROUTING, TYPICAL.  
FANS ARE ON Z1.

DETAIL: A

NOTE: POWER SUPPLY MAY HAVE  
MULTIPLE LOCATIONS WITHIN GROUPING.  
REFER TO ABOVE LAYOUTS.



RIBBON CABLE CHART

PRIMARY	
LINE/P#	P.N.
1 (P11)	W-1387

NOTE: ALL RIBBON CABLES BETWEEN MODULES  
ARE W-1387.

- ② OA-1327-2061  
HARN, PWR INT. 3P TO 3P, 2 FT. (14AWG)
- ④ OA-1327-2062  
HARN, PWR INT. 3P TO 3P, 4 FT. (14AWG)
- ⑥ OA-1327-2010  
HARN, PWR INT. 3P TO 3P, 6 FT. (14AWG)
- ⑧ OA-1327-2011  
HARN, PWR INT. 3P TO 3P, 8 FT. (14AWG)

- FAN **B** B-1053 (120V)  
B-1011 (240V)
- THERMOSTAT **T** OA-1327-3101
- 1 POWER SUPPLY **PS** OA-1327-0014
- POWER TERM PANEL **TP #** OA-1327-0100 (1)CIRCUIT 120V  
OA-1327-0101 (2)CIRCUIT 120V  
OA-1327-0102 (1)CIRCUIT 240V  
OA-1327-0103 (2)CIRCUIT 240V
- CONTROLLER **CT** OA-1229-0013

- MODULE **M** 11.328" X 7.552"  
24 PIXEL X 16 PIXEL  
12MM C-C / .472" C-C
- D** DARK GRID LINES REPRESENT A GROUPING OF  
MODULES THAT ARE POWERED BY A SINGLE  
POWER SUPPLY.
- PRIMARY QUICK CONNECT LEFT  
LOWER LEFT CORNER CUTOUT **QC** OA-1327-1000
- LIGHT DETECTOR **LT** OA-1327-3000

- AREA POWERED BY Z1 (J41)
- ▨** AREA POWERED BY Z2 (J42)

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PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS, INCLUDING ELECTRONICALLY WITHOUT THE  
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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY AF-3400 12MM FRONT VENTILATION

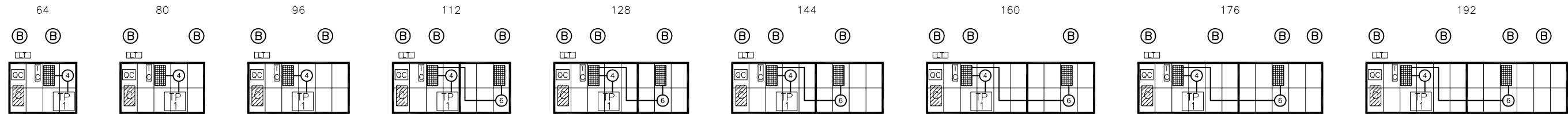
TITLE: ELECT LAYOUT, AF-3400-24X\*\*\*-12-RGB

DES. BY: DRAWN BY: RNICHO L DATE: 20 SEP 05

REV.	DATE	DESCRIPTION	BY	APPR.
01	05JAN07	ADDED 240V P.N. FOR FAN AND TERM PANEL. MOVED THERMOSTAT LOCATION.	REF	

REVISION 01 APPR. BY: LKERR  
SCALE: 1=50

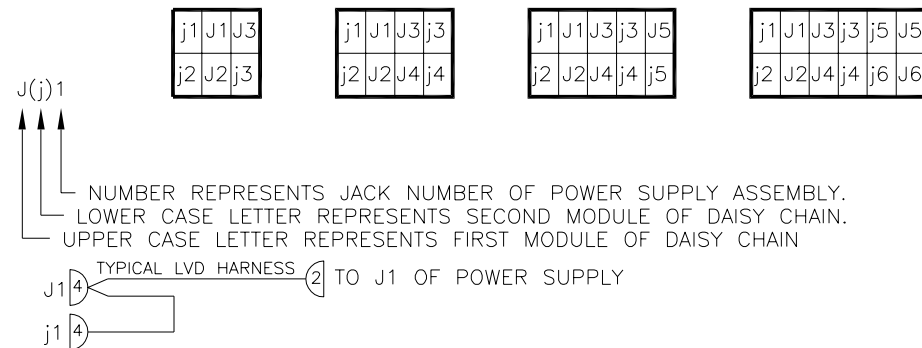
1360-E10B-253856



NOTES:  
REFER TO DETAIL "A" FOR  
LVD HARNESS ROUTING, TYPICAL.  
FANS ARE ON Z1.

DETAIL: A

NOTE: POWER SUPPLY MAY HAVE  
MULTIPLE LOCATIONS WITHIN GROUPING.  
REFER TO ABOVE LAYOUTS.



RIBBON CABLE CHART

PRIMARY	
LINE/P#	P.N.
1 (P11)	W-1387
2 (P12)	W-1387

( OA-1000-\*\*\*\* )

NOTE: ALL RIBBON CABLES BETWEEN MODULES  
ARE W-1387.

- ② OA-1327-2061  
HARN, PWR INTC. 3P TO 3P, 2 FT. (14AWG)
- ④ OA-1327-2062  
HARN, PWR INTC. 3P TO 3P, 4 FT. (14AWG)
- ⑥ OA-1327-2010  
HARN, PWR INTC. 3P TO 3P, 6 FT. (14AWG)
- ⑧ OA-1327-2011  
HARN, PWR INTC. 3P TO 3P, 8 FT. (14AWG)

- FAN **B** B-1053 (120V)  
B-1011 (240V)
- THERMOSTAT **T** OA-1327-3101
- 1 POWER SUPPLY **1** OA-1327-0014
- POWER TERM PANEL **TP** OA-1327-0100 (1)CIRCUIT 120V  
OA-1327-0101 (2)CIRCUIT 120V  
OA-1327-0102 (1)CIRCUIT 240V  
OA-1327-0103 (2)CIRCUIT 240V
- CONTROLLER **C** OA-1229-0013

- MODULE **M** 11.328" X 7.552"  
24 PIXEL X 16 PIXEL  
12MM C-C / .472" C-C
- D** DARK GRID LINES REPRESENT A GROUPING OF  
MODULES THAT ARE POWERED BY A SINGLE  
POWER SUPPLY.
- PRIMARY QUICK CONNECT LEFT  
LOWER LEFT CORNER CUTOUT **QC** OA-1327-1000
- LIGHT DETECTOR **LT** OA-1327-3000

- Z1** AREA POWERED BY Z1 (J41)
- Z2** AREA POWERED BY Z2 (J42)

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY AF-3400 12MM FRONT VENTILATION

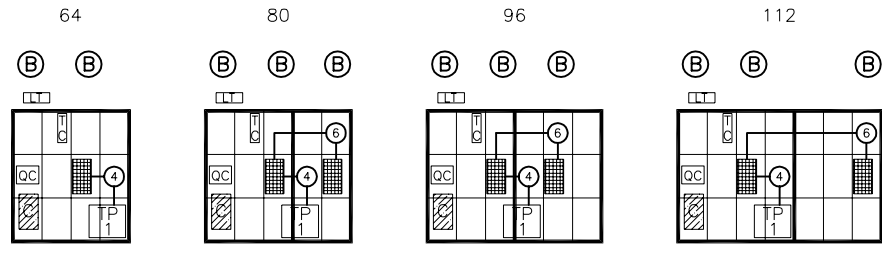
TITLE: ELECT LAYOUT, AF-3400-48X\*\*\*-12-RGB

DES. BY: DRAWN BY: RNICHO L DATE: 20 SEP 05

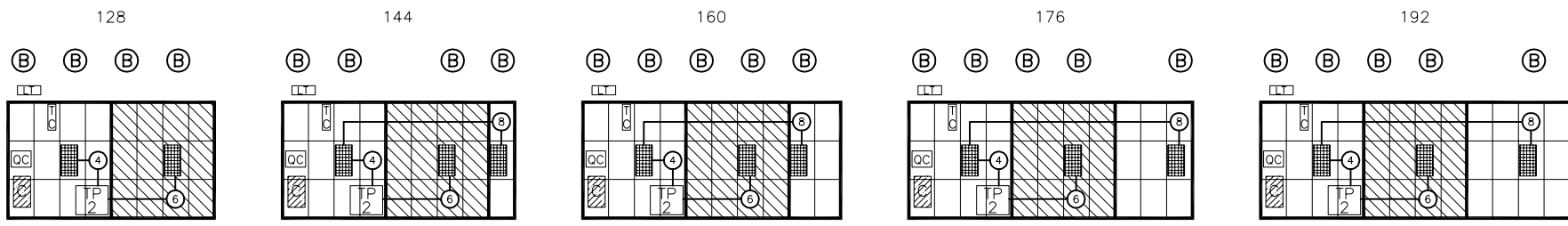
REV.	DATE	DESCRIPTION	BY	APPR.
01	05JAN07	ADDED 240V P.N. FOR FAN AND TERM PANEL. MOVED THERMOSTAT LOCATION.	REF	

REVISION 01 APPR. BY: LKERR  
SCALE: 1=50

1360-E10B-253858



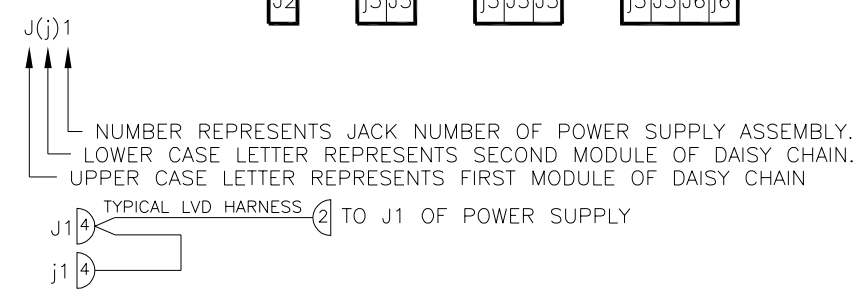
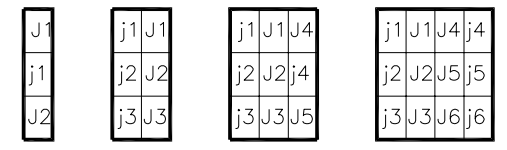
NOTES:  
REFER TO DETAIL "A" FOR  
LVD HARNESS ROUTING, TYPICAL.  
ONE CIRCUIT. FANS ARE ON Z1.



NOTES:  
REFER TO DETAIL "A" FOR  
LVD HARNESS ROUTING, TYPICAL.  
TWO CIRCUIT. FANS ARE ON Z2.

DETAIL: A

NOTE: POWER SUPPLY MAY HAVE  
MULTIPLE LOCATIONS WITHIN GROUPING.  
REFER TO ABOVE LAYOUTS.



- ② OA-1327-2061  
HARN, PWR INTC. 3P TO 3P, 2 FT. (14AWG)
- ④ OA-1327-2062  
HARN, PWR INTC. 3P TO 3P, 4 FT. (14AWG)
- ⑥ OA-1327-2010  
HARN, PWR INTC. 3P TO 3P, 6 FT. (14AWG)
- ⑧ OA-1327-2011  
HARN, PWR INTC. 3P TO 3P, 8 FT. (14AWG)

RIBBON CABLE CHART

PRIMARY	
LINE/P#	P.N.
1 (P11)	0017
2 (P12)	W-1387
3 (P13)	W-1387

( OA-1000-\*\*\*\* )

NOTE: ALL RIBBON CABLES BETWEEN MODULES  
ARE W-1387.

FAN THERMOSTAT 1 POWER SUPPLY POWER TERM PANEL CONTROLLER	<ul style="list-style-type: none"> <li>Ⓑ B-1053 (120V) B-1011 (240V)</li> <li>OA-1327-3101</li> <li>OA-1327-0014</li> <li>OA-1327-0100 (1)CIRCUIT 120V OA-1327-0101 (2)CIRCUIT 120V OA-1327-0102 (1)CIRCUIT 240V OA-1327-0103 (2)CIRCUIT 240V</li> <li>OA-1229-0013</li> </ul>	<ul style="list-style-type: none"> <li>MODULE 11.328" X 7.552" 24 PIXEL X 16 PIXEL 12MM C-C / .472" C-C</li> <li>DARK GRID LINES REPRESENT A GROUPING OF MODULES THAT ARE POWERED BY A SINGLE POWER SUPPLY.</li> <li>PRIMARY QUICK CONNECT LEFT LOWER LEFT CORNER CUTOUT</li> <li>LIGHT DETECTOR</li> </ul>	<ul style="list-style-type: none"> <li>□ AREA POWERED BY Z1 (J41)</li> <li>▨ AREA POWERED BY Z2 (J42)</li> <li>□ OA-1327-1000</li> <li>LT OA-1327-3000</li> </ul>
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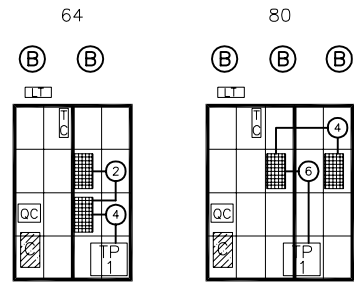
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DAKTRONICS, INC. BROOKINGS, SD 57006

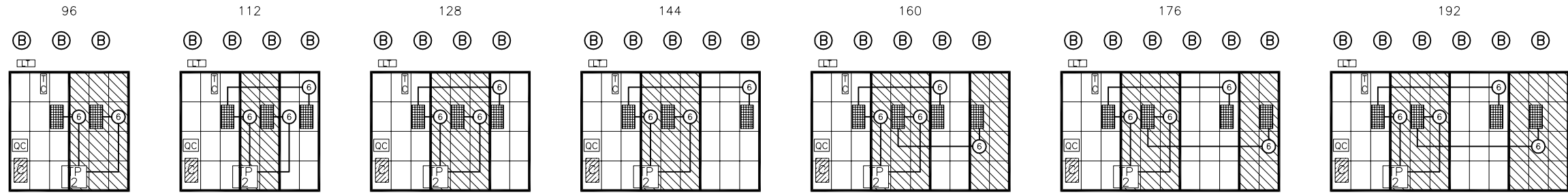
PROJ: GALAXY AF-3400 12MM FRONT VENTILATION  
TITLE: ELECT LAYOUT, AF-3400-72X\*\*\*-12-RGB

DES. BY:	DRAWN BY: RNICHO	DATE: 20 SEP 05
REVISION	APPR. BY: LKERR	1360-E10B-253860
01	SCALE: 1=50	

REV.	DATE	DESCRIPTION	BY	APPR.
01	05JAN07	ADDED 240V P.N. FOR FAN AND TERM PANEL. MOVED THERMOSTAT LOCATION.	REF	



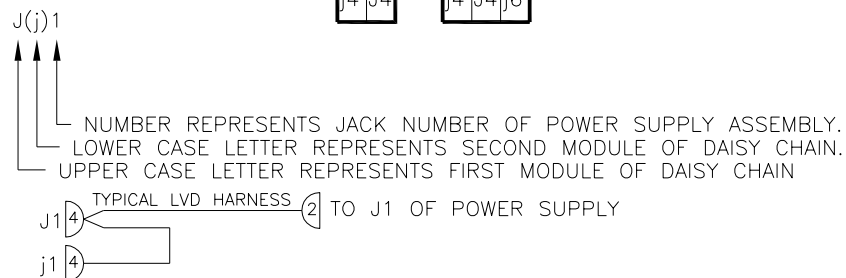
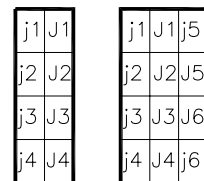
NOTES:  
REFER TO DETAIL "A" FOR  
LVD HARNESS ROUTING, TYPICAL.  
ONE CIRCUIT. FANS ARE ON Z1.



NOTES:  
REFER TO DETAIL "A" FOR  
LVD HARNESS ROUTING, TYPICAL.  
TWO CIRCUIT. FANS ARE ON Z2.

DETAIL: A

NOTE: POWER SUPPLY MAY HAVE  
MULTIPLE LOCATIONS WITHIN GROUPING.  
REFER TO ABOVE LAYOUTS.



- ② OA-1327-2061  
HARN, PWR INT. 3P TO 3P, 2 FT. (14AWG)
- ④ OA-1327-2062  
HARN, PWR INT. 3P TO 3P, 4 FT. (14AWG)
- ⑥ OA-1327-2010  
HARN, PWR INT. 3P TO 3P, 6 FT. (14AWG)
- ⑧ OA-1327-2011  
HARN, PWR INT. 3P TO 3P, 8 FT. (14AWG)

RIBBON CABLE CHART

PRIMARY	
LINE/P#	P.N.
1 (P11)	0019
2 (P12)	0017
3 (P13)	W-1387
4 (P14)	W-1387

( OA-1000-\*\*\*\* )

NOTE: ALL RIBBON CABLES BETWEEN MODULES  
ARE W-1387.

- FAN ⑧ B-1053 (120V)  
B-1011 (240V)
- THERMOSTAT ① OA-1327-3101
- 1 POWER SUPPLY ② OA-1327-0014
- POWER TERM PANEL ③ OA-1327-0100 (1)CIRCUIT 120V  
OA-1327-0101 (2)CIRCUIT 120V  
OA-1327-0102 (1)CIRCUIT 240V  
OA-1327-0103 (2)CIRCUIT 240V
- CONTROLLER ④ OA-1229-0013

MODULE ⑤ 11.328" X 7.552"  
24 PIXEL X 16 PIXEL  
12MM C-C / .472" C-C

⑥ DARK GRID LINES REPRESENT A GROUPING OF  
MODULES THAT ARE POWERED BY A SINGLE  
POWER SUPPLY.

⑦ AREA POWERED BY Z1 (J41)

⑧ AREA POWERED BY Z2 (J42)

⑨ PRIMARY QUICK CONNECT LEFT  
LOWER LEFT CORNER CUTOUT ⑩ OA-1327-1000

⑪ LIGHT DETECTOR ⑫ OA-1327-3000

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY AF-3400 12MM FRONT VENTILATION

TITLE: ELECT LAYOUT, AF-3400-96X\*\*\*-12-RGB

DES. BY: DRAWN BY: RNICHO L DATE: 20 SEP 05

REVISION APPR. BY: LKERR SCALE: 1=50

1360-E10B-253861

REV.	DATE	DESCRIPTION	BY	APPR.
01	05JAN07	ADDED 240V P.N. FOR FAN AND TERM PANEL. MOVED THERMOSTAT LOCATION.	REF	

# Appendix B: Temperature Sensor

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## For Galaxy displays only

### Reference Drawings:

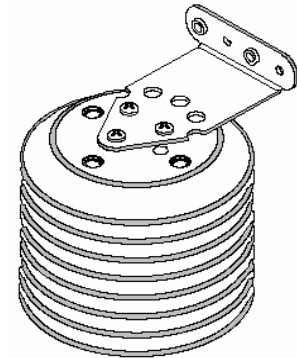
Temperature Sensor Cable Routing Schematic .....	Drawing A-197884
Exploded Temperature Housing Assembly.....	Drawing A-198371

## 1.1 Temperature Sensor Overview

The temperature sensor enclosure is made up of eight plastic disks, a metal mounting bracket, and a 25-foot weather resistant cable. Refer to **Figure 1**.

In most cases, the enclosure will be mounted using two screws. The cable will be plugged into the back of the display.

In certain cases, it may be necessary to disassemble the enclosure or rewire the temperature sensor board. Instructions are provided for those situations. If replacement or additional parts are needed, refer to the following chart for part numbers.



**Figure 1: Temperature Sensor**

Parts List	
Part description	Daktronics part number
Temperature sensor housing	0A-1151-0005
Temperature sensor	0P-1247-0008
4-pin Mal Conxall cable	W-1819
22 AWG 2-pair shielded cable	W-1234
30-foot extension cable	W-1820
100-foot extension cable	W-1821
200-foot extension cable	W-1822

## 1.2 Mounting Locations

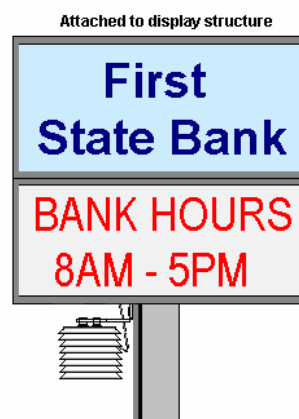
For greater accuracy of temperature, follow these mounting recommendations:

- An ideal location is under a north eave or on a northern exposure away from direct sunlight (**Figure 4**).
- Mount the sensor above grass or vegetation rather than concrete or other paving.
- Mount at least 20 feet away from chimneys, vents, air conditioners, or other items that would influence correct temperature readings.
- **Do not** mount between displays or in any location that restricts air movement.
- Mount the sensor so that the cable can be protected from weather and vandalism.

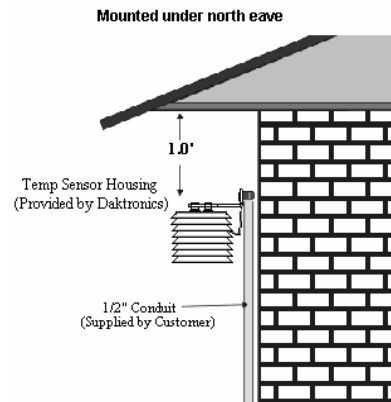
The most common locations for the temperature sensor are on the display cabinet (**Figure 2**), or on the display structure (**Figure 3**). A light-colored display is preferred in this location. Location of the sensor should be below or on a northern edge of the display to keep the sensor shaded.



**Figure 2:** Located on the Display



**Figure 3:** Located on Structure



**Figure 4:** Located on the North Eave

When exposed to outdoor conditions, it is necessary to route cable through conduit. In cases such as this, the quick-connect cable must be extended or replaced with four-conductor, 22-AWG, shielded cable. The maximum length of the cable should be no more than 500 feet.

## Mounting to a sheet metal surface

Follow these instructions when mounting the sensor to a sheet metal surface:

1. Drill two pilot holes using a 5/32" drill bit. Horizontally space the holes 1.5" apart.
2. Insert two self-drilling screws through the holes of the mounting bracket, and screw into the pilot holes.
3. Route cable up to the quick-connect jack on the back of the display and plug into J31. Refer to **Section 1.3** for an example of connection.

## 1.3 Temperature Signal Connection

Three options for signal connection are explained in this section:

- Using the 25-foot quick-connect cable.
- Using the quick-connect cable but less than 25 feet.
- Using more than 25-feet including extension cables or 22 AWG shielded cable.

### Using the provided 25-foot quick-connect cable

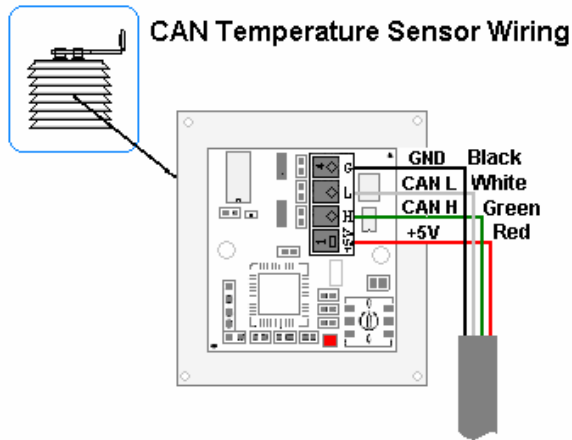
1. The temperature sensor is provided with a 25-foot weather-resistant cable. This cable does not need to be in conduit. The sensor connects to the display at J31. Refer to **Figure 5** for the location of the quick-connect plug.
2. Secure any excess cable to discourage vandalism.
3. Between displays, the quick-connect signal cable connects both communication and temperature signal, thus no additional wiring is required from display to display for the temperature sensor.



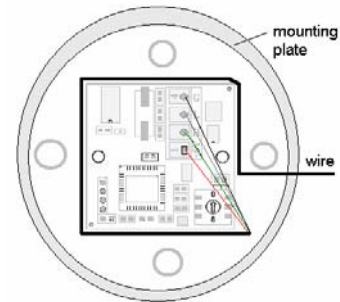
**Figure 5:** Quick-connect Cable

## Using the quick-connect cable and less than the 25-foot cable

1. Open the temperature sensor housing by removing the four nuts from the bottom and then removing the five bottom disks. Refer to **Drawing A-198371** for details on sensor housing disassembly.
2. Disconnect the quick-connect CAN temperature sensor cable from the temperature terminal block in the CAN temperature sensor housing.
3. Cut the cable to the desired length and reattach to the temperature sensor terminal block in the CAN temperature sensor housing. Refer to the table and **Figure 6** for the temperature sensor wiring.
4. Make sure to route cable around the sensor board as shown in **Figure 7** and **Drawing A-197884**.
5. Reconnect the cable and reassemble the sensor.



**Figure 6:** CAN Temperature Sensor Wiring



**Figure 7:** Wiring Around Sensor

Wire Color	Temperature Sensor Terminal Block (TB1)
Red	+5V CAN (Pin 1)
Green	CANH (Pin 2)
White	CANL (Pin 3)
Black	GND (Pin 4)
<b>*Note:</b> Do not terminate shield at this point.	



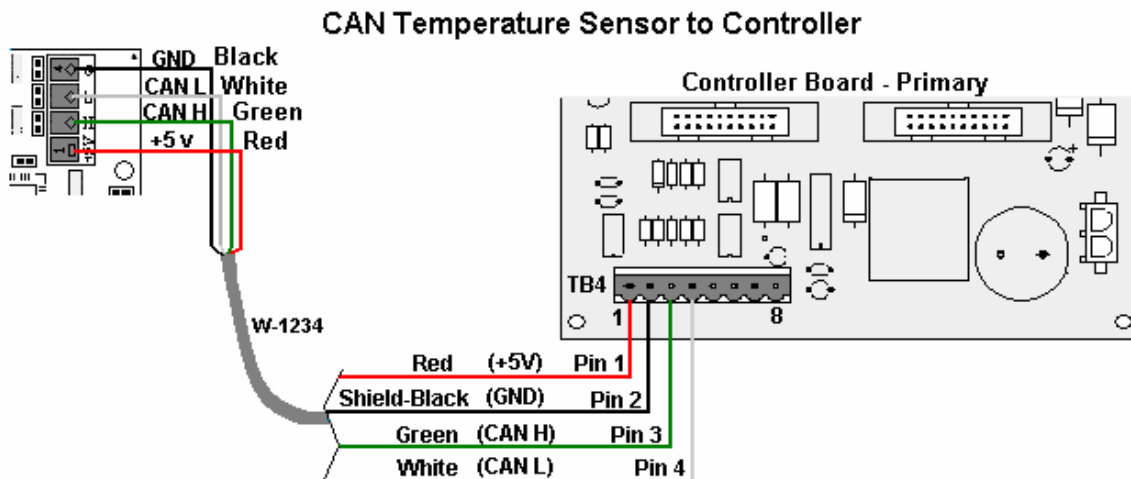
## Using more than 25-feet of cable

To meet customer needs, Daktronics has designed extension cables that allow extra length from the sensor to the display without separate rewiring. These cables contain the correct circular ends to be used with the quick-connect cable and quick-connect input. Refer to the parts list in **Section 1.1** for the cable options available.

If 22 AWG shielded cable is used instead of the cable extensions, follow these steps:

1. Run 1/2" conduit from the temperature sensor to a knockout on the back of the primary display. The cable must be routed through 1/2" metal conduit that should be earth-grounded to protect the sensor and controller from lightning damage.
2. Use a 2-pair 22 AWG individually shielded cable to connect the sensor to the 8-position terminal block in the display labeled "CAN US/DS" (A31/TB4). Connect to the controller as shown in **Figure 8**.
3. Open the temperature sensor housing by removing the four nuts from the bottom and then removing the five bottom disks. Refer to **Drawing A-198371** for details on sensor housing disassembly.
4. Disconnect the quick-connect temperature sensor cable from the terminal block in the temperature sensor housing.
5. Connect the cable coming from the display's terminal block to the temperature sensor board in the temperature sensor housing. Refer to **Figure 8** and table below for wiring locations at the sensor and to the controller.
6. Make sure to route cable around the sensor board as shown in **Drawing A-197884**. Connect the cable and reassemble the sensor. Refer to **Figure 8** and to the table below for the temperature sensor wiring.

**Note:** The cable length from the sensor to the display should not exceed 500 feet.



**Figure 8:** CAN Temperature Sensor Connection

CAN Temperature Sensor (TB1)	Field Cabling	Primary - Controller Board CAN US (A31-TB4)
Pin 1 (+5V CAN)	Red	Pin 1 (+5V CAN)
Pin 2 (CAN H)	Green	Pin 3 (CAN H)
Pin 3 (CAN L)	White	Pin 4 (CAN L)
Pin 4 (GND CAN)	Black	Pin 2 (GND CAN)
	Shield	Pin 2 (Shield)

## 1.4 Temperature Interconnection Between Displays

If the display uses the quick-connect interconnect cable, this connection is already complete.

If the interconnect cable was not used, a 4-conductor shielded cable is needed to terminate the temperature sensor from side one to side two. One end terminates at the “CAN US/DS” 8-position terminal block (A31-TB4) on the Primary display. The other end terminates at the “CAN US/DS” 8-position terminal block (A31-TB4) at the second Primary display. Refer to **Figure 9** and the table for correct interconnect locations.

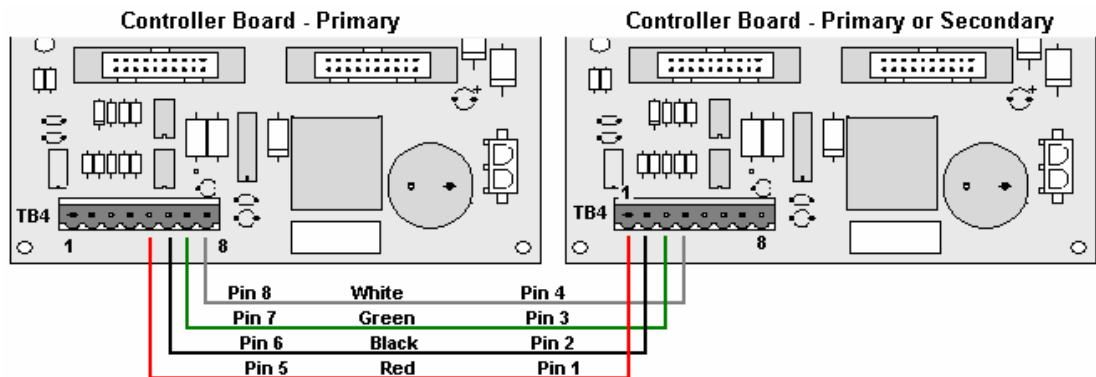


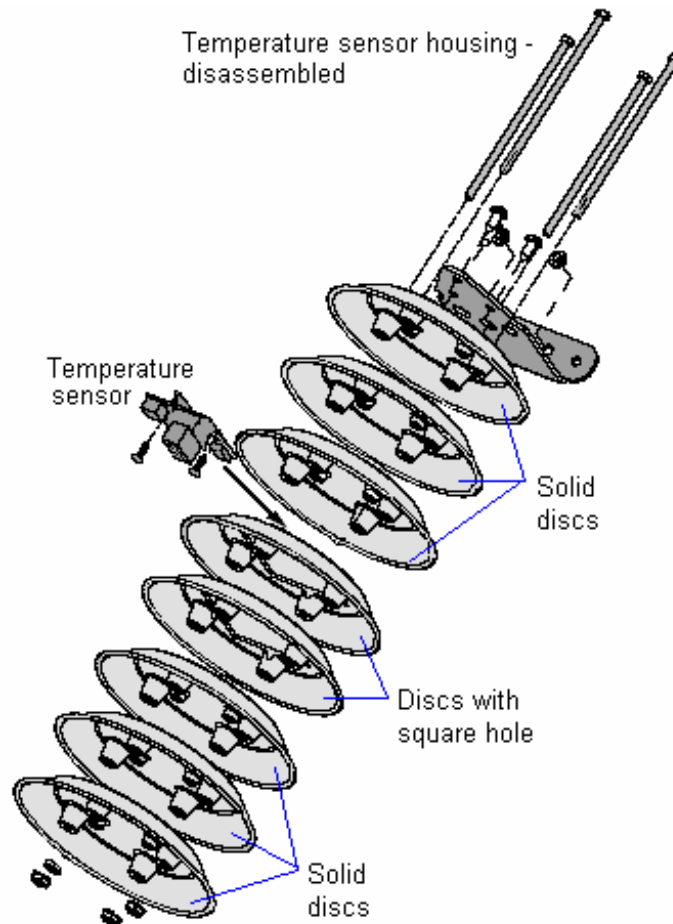
Figure 9: CAN Controller Interconnect

Primary - CAN DS (A31-TB4)	Field Cabling	Secondary - CAN US (A31-TB4)
Pin 7 (CAN H)	Green	Pin 3 (CAN H)
Pin 8 (CAN L)	White	Pin 4 (CAN L)
Pin 6 (GND CAN)	Black	Pin 2 (GND CAN)
Pin 5 (Relay)	Red	Pin 1 (CAN +5V)
	Shield	

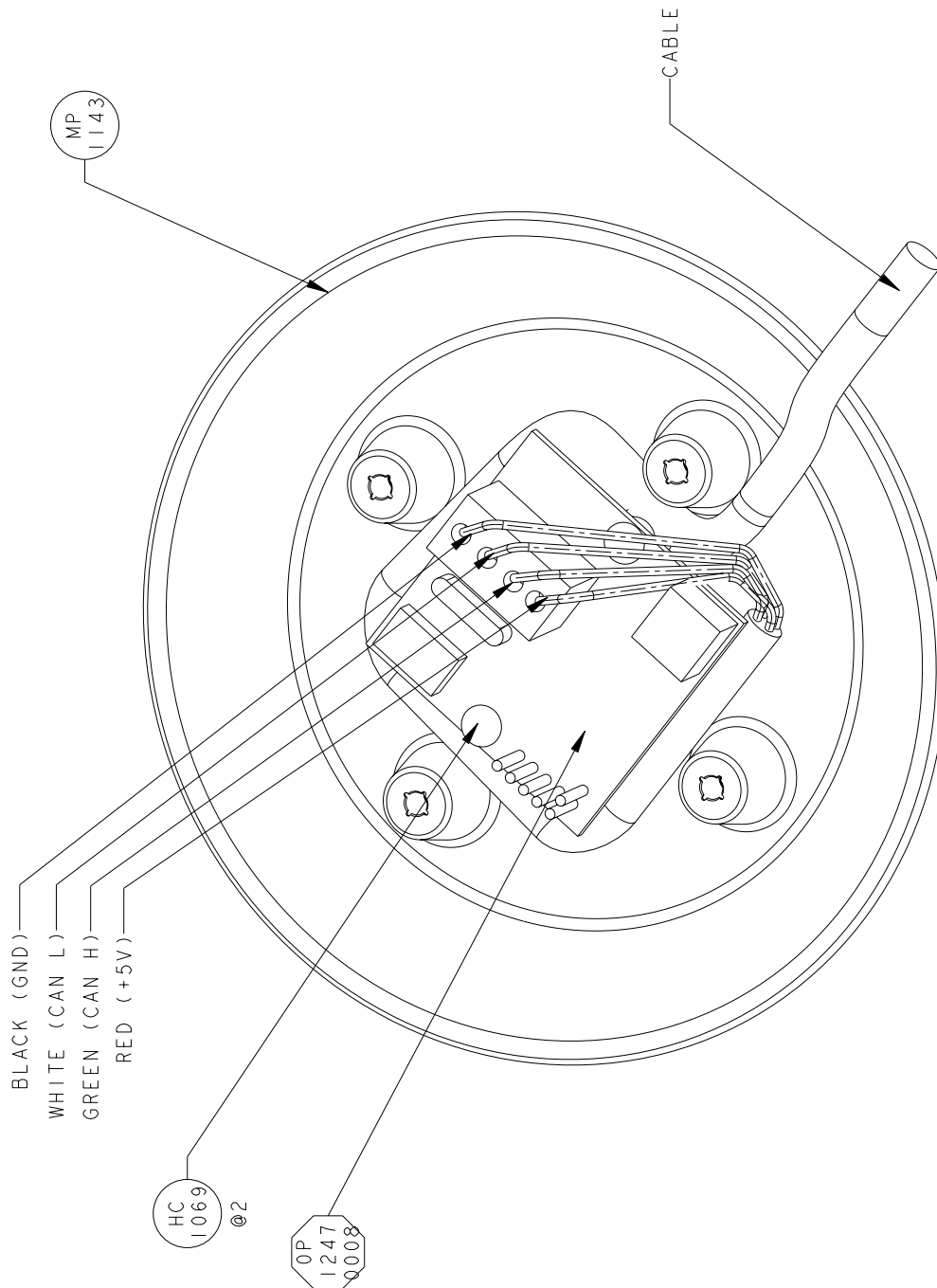
## 1.5 Sensor Board Replacement

If a problem occurs with the temperature sensor board or the wiring to the sensor, the board can be accessed in the following method:

1. Open the temperature sensor housing by removing the four nuts from the bottom, and removing the five bottom disks. Refer to **Figure 10** or **Drawing A-198371** for details on sensor housing disassembly.
2. Label the wires connected to the temperature sensor board and then disconnect the cable from the temperature sensor terminal block in the temperature sensor housing.
3. Remove the two screws holding the board to the plastic disk. Install the new board, and replace the two screws.
4. Reconnect the cable to the temperature sensor board, making sure all the wire make a good electrical connection.
5. Make sure to route cable around the sensor board as shown in **Drawing A-197884**, and reassemble the sensor enclosure.



**Figure 10:** *Temperature Sensor Housing Disassembled*



**ASSEMBLY INSTRUCTIONS:**  
 ATTACH PC BOARD TO MP-1143 W/ HC-1069.  
 STRIP JACKET OF W-1819 2". STRIP INSULATION  
 OF INDIVIDUAL WIRES APPROXIMATELY 1/4".  
 INSERT WIRES INTO TERMINALS AS SHOWN & TIGHTEN.  
 ROUTE CABLE AS SHOWN.

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**DAKTRONICS, INC. BROOKINGS, SD 57006**

PROJ: LIGHT & TEMP SENSORS

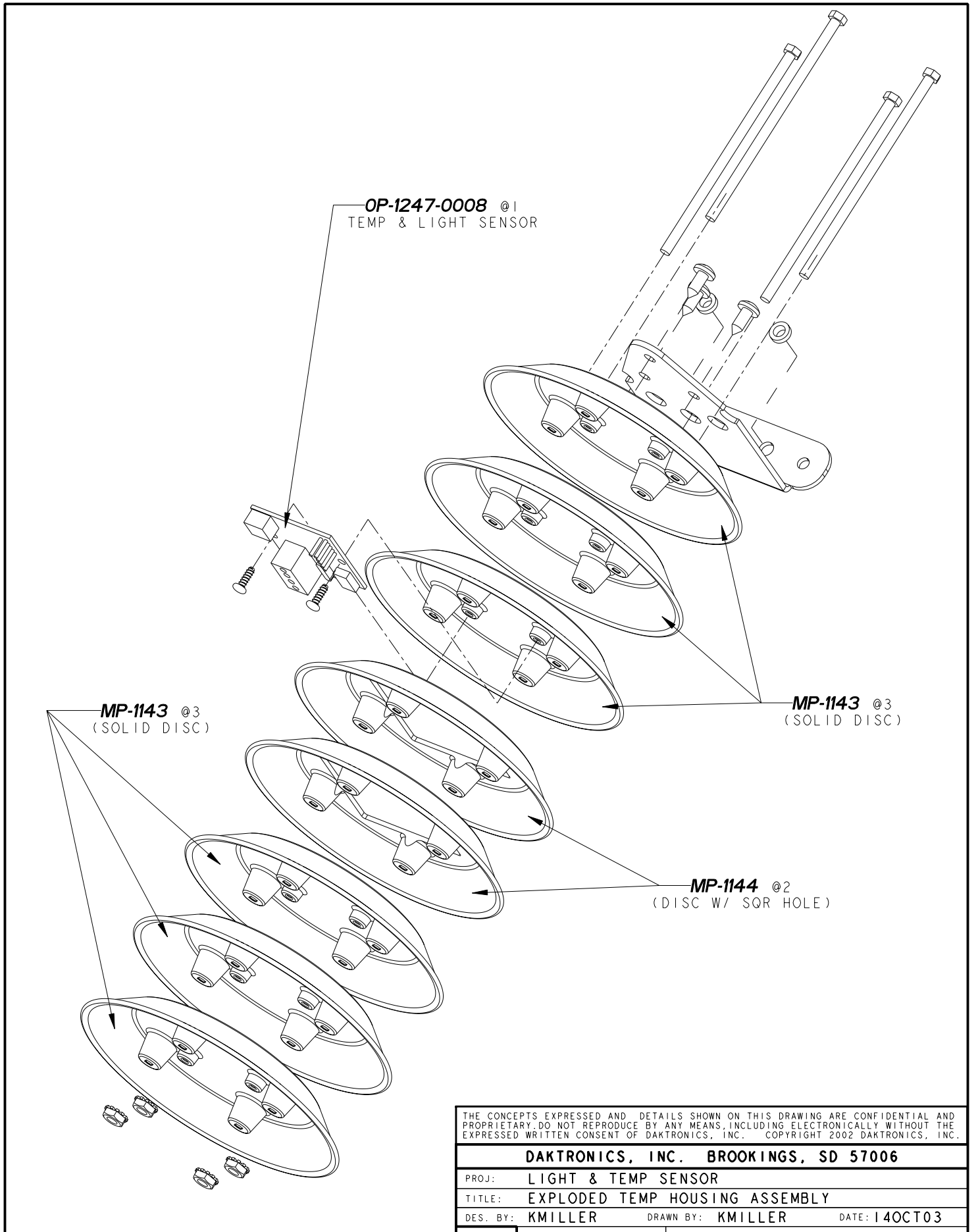
TITLE: TEMP SENSOR CABLE ROUTING SCHEMATIC

DES. BY: K MILLER DRAWN BY: K MILLER DATE: 03OCT03

REVISION SHEET 1 OF DWG 197884 SCALE: 1 = 1

1151 - E10A - 197884

REV.	DATE	DESCRIPTION	BY	APPR.



**OP-1247-0008** @1  
TEMP & LIGHT SENSOR

**MP-1143** @3  
(SOLID DISC)

**MP-1143** @3  
(SOLID DISC)

**MP-1144** @2  
(DISC W/ SQR HOLE)

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**DAKTRONICS, INC. BROOKINGS, SD 57006**

PROJ:	LIGHT & TEMP SENSOR		
TITLE:	EXPLODED TEMP HOUSING ASSEMBLY		
DES. BY:	KMILLER	DRAWN BY:	KMILLER
		DATE:	14OCT03

REVISION	SHEET 1 OF DWG 198371	1151-E10A-198371
	SCALE: 1=3	

REV.	DATE	DESCRIPTION	BY	APPR.



## **Appendix C: Daktronics Warranty and Limitation of Liability (SL-02374)**

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