

# **Galaxyä Outdoor 89 mm Louvered LED Signs Series AF-3090**

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## **Installation, Maintenance & Troubleshooting Manual**

ED-13288

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Product 1259  
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# Section 1: Introduction

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## 1.1 How to Use This Manual

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This manual explains the installation, maintenance and troubleshooting of the 89 mm AF-3090 Galaxy signs. 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.

### Important Safeguards:

1. Read and understand these instructions before installing.
2. Properly ground the display with a ground rod for each face, at the display location.
3. *Disconnect power when servicing the display.*
4. Do not modify the display structure or attach any panels or coverings to the display without the written consent of Daktronics, Inc.

The manual contains four sections: Introduction, Mechanical Installation, Electrical Installation, and Maintenance & Troubleshooting.

- **Introduction** covers the basic information needed to make the most of the rest of this manual. Take time to read the entire introduction as it defines terms and explains concepts used throughout the manual.
- **Mechanical Installation** provides general guidance on sign mounting.
- **Electrical Installation** provides general guidance on terminating power and signal cable at the sign.
- **Maintenance & Troubleshooting** addresses such topics as removing basic sign components, troubleshooting the sign, performing general maintenance and exchanging sign components.

The end of this manual contains three appendices:

- **Appendix A** includes the drawings referenced in this manual
- **Appendix B** contains information on the signal converter

Daktronics identifies manuals by an ED number located on the cover page of each manual. For example, Daktronics refers to this manual as **ED-13288**.

Daktronics, commonly uses a number of drawing types, along with the information that each provides. This manual might not contain all these drawings.

- **System Riser Diagrams:** overall system layout from control computer to sign, power and phase requirements.
- **Shop Drawings:** fan locations, mounting information, power and signal entrance points and access method (front and rear).
- **Schematics:** power and signal wiring for various components.
- **Display Assembly:** locations of critical internal sign components such as power supply assemblies, controller boards, thermostats and light detectors.

**Figure 1** illustrates Daktronics drawing label. The lower-right corner of the drawing contains the drawing number. The manual identifies the drawings by listing the last set of digits and the letter preceding them. In the example below, the manual refers to the drawing as **Drawing A-69945**. **Appendix A** contains all reference drawings.

DAKTRONICS, INC. BROOKINGS, SD 57006		
PROJ:		
TITLE:		
DES. BY:	DRAWN BY: DOK	DATE: 04-20-95
APPR. BY:	7087-P08A-69945	
SCALE: 1=80		

**Figure 1: Drawing Label**

This manual shows all references to drawing numbers, appendices, figures or other manuals in **bold** typeface, as shown below.

“Refer to **Drawing A-69945** in **Appendix A** for the power supply location.”

Additionally, the manual lists drawings referenced in a particular section at the beginning of that section as seen in the following example:

**Reference Drawings:**

Component Placement Diagram .....**Drawing A-69945**

Daktronics builds displays for long life and that require little maintenance. However, from time to time, certain sign components need replacing. The **Replacement Parts List** in **Section 4.11** provides the names and part number of components that you may need to order during the life of the sign. Most sign components have a white label that lists the part number. The component part number is in the following format: OP-XXXX-XXXX (circuit board) or 0A-XXXX-XXXX (multi-component assembly).

Following the **Replacement Parts List** is the **Exchange/Replacement Procedure** in **Section 4.11**. Refer to these instructions if any sign component needs replacement or repair.

**1.2 Network Concepts**

---

The concept of using LED displays as cost effective, high impact method of communication is rapidly growing throughout many industries and businesses. The reasons for this growth are many, but the need for additional features and complexity of multiply display installations has emerged, and Daktronics display system have been designed to meet those needs.

The common thread to most client requests is a means of programming and controlling a group of displays from a central control point. Daktronics responded by developing a powerful system of interconnecting and controlling displays. Great care has been taken to design products that will satisfy a wide variety of installations. Some of the design goals of these systems include the following:

- Easy transfer of messages
- The ability to tell a display or group of displays in the network which message should run
- The ability to determine the status of any display on the network
- The ability to control multiple display technologies on the same network

Tools required for mounting the display depend on the location and size of the display. For some installations, it may be possible to by pre-terminated telephone cables for use with the displays.

There are four (4) network systems available: RS232, RS422, modem, and fiber. Up to 240 displays can exist one network.

### **RS232 Network**

RS232 (EIA/TIA-232-E) is a standard communication interface that employs a single-ended serial transmission scheme that uses a maximum cable length of 8 meters (25 Feet). This interface was designed for computer communication at short distances. Most computers have an RS232 communication port.

### **RS422 Network**

RS422 (EIA/TIA-422-B) is a standard communication interface that utilizes a differential balanced transmission scheme that uses a typical maximum cable length of 1.2 km (approximately 4000 feet). The main advantage to RS422 over RS232 is the longer cable length that is possible. A signal converter is needed to convert the computer's RS232 to RS422.

### **Modem Network**

The modem is a standard communication interface that utilizes standard phone transmission lines. The phone company assigns each phone line a number that the modem uses to communicate between controller and display.

### **Fiber Optic Network**

A fiber optic network is a standard communication method transmitting light (signal) through a glass fiber. Fiber optic cable has a maximum length of 2,000 feet. A signal converter is needed to convert the computer's RS232 signal to fiber optic signal; a minimum of two fibers is required.

## **1.3 Sign Overview**

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### **Reference Drawings:**

Power Specs, AF-3090, Amber LED's.....	<b>Drawing A-158396</b>
Power Specs, AF-3090, RED LEDs.....	<b>Drawing A-162439</b>
Shop Drawing, AF-3090, 8x**-24 Amber/Red.....	<b>Drawing B-160986</b>
Shop Drawing, AF-3090, 16x**-24 Amber/Red.....	<b>Drawing B-160987</b>
Shop Drawing, AF-3090, 24x**-24 Amber/Red.....	<b>Drawing B-160988</b>
Shop Drawing, AF-3090, 32x**-24 Amber/Red.....	<b>Drawing B-160989</b>

Daktronics designs and manufactures AF-3090 Galaxy signs for performance, reliability, easy maintenance and long life. The pixels have an 89 mm center-to-center spacing, and light using LEDs (light emitting diodes). Each sign section has minimum 24-inch character height. An optional remotely mounted light sensor can automatically dim the LEDs based on the ambient light levels. The configuration of pixels depends on the model of sign ordered.

Refer to the drawings referenced above for the approximate size, weight, and power requirements for your model of sign.

The following describes the Galaxy model numbers: **AF-3090-RRCCC-89-X**

<b>AF-3090</b>	=	Outdoor 89 mm Louvered Galaxy Sign
<b>RR</b>	=	Number of Rows High (8, 16, 24, and 32 are available)
<b>CCC</b>	=	Number of Columns Long (32, 48, 64, 80, 96, and 112 are available)
<b>89</b>	=	89 mm center-to-center pixel spacing
<b>X</b>	=	LED Color (monochrome red or monochrome amber are available)

A typical sign system consists of a Windows® based personal computer (PC) running Venus® 1500 software and one or more signs. Daktronics offers the signs as single-face units, which are single-



sided stand-alone signs. They can become double-faced by mounting them back-to-back with a second unit.

The Venus<sup>®</sup> 1500 software controls the AF-3090 Galaxy display system. Refer to **ED-12717** for operation of the Venus 1500 controller.

## 1.4 Component Identification

The following illustrations and definitions depict some of the more commonly accessed Galaxy sign components. Because Daktronics occasionally alters standard design to meet customer needs, the actual sign design may vary slightly from the illustrations below.

**This is only a brief overview. Refer to Section 4 for detailed information on maintaining and troubleshooting various sign components.**

**Com Port:** a connector on the back of the control computer. The COM port controls the sign through either a 9- or a 25-pin serial connector.

**Controller:** The display's controller is the "brains" of the display. The controller receives signal information from the control computer, translates it, and activates the appropriate pixels on the display accordingly.

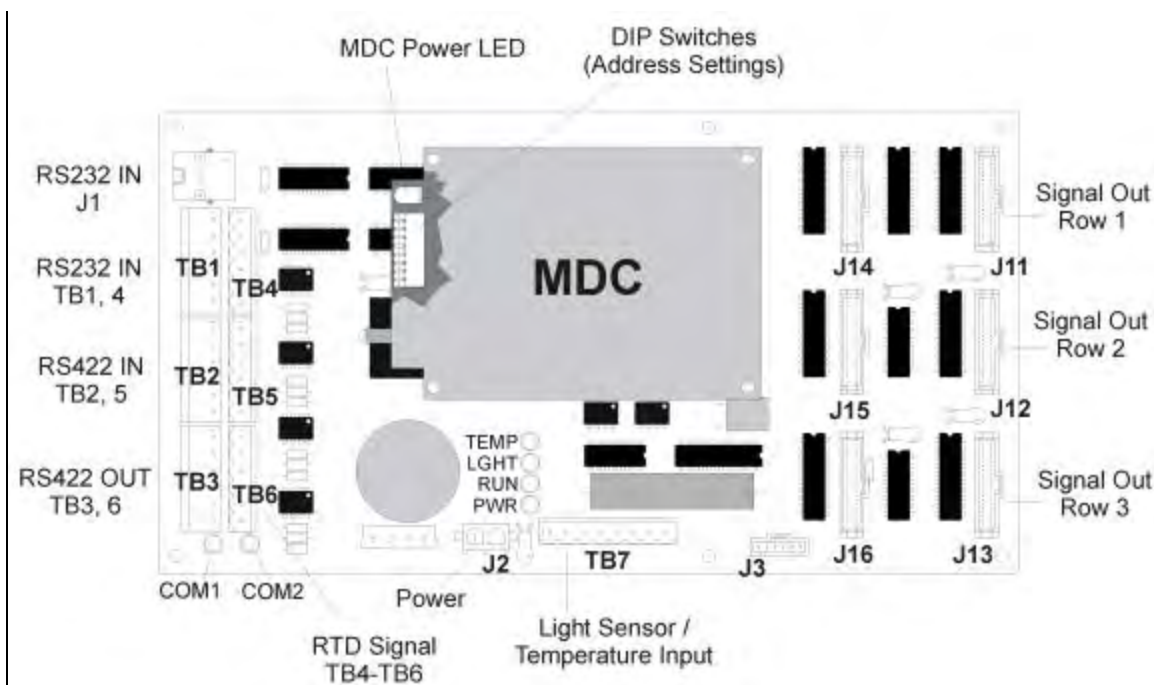


Figure 2: Controller

**Fiber Optic:** a technology that uses glass (or plastic) threads (fibers) to transmit data from the controller to the display. A fiber optic cable consists of a bundle of glass threads, each of which transmits messages modulated onto light waves.

**Galaxyä :** Daktronics trademarked name for LED monochrome or tri-colored matrix signs.

**Network:** consists of multiple signs connected to each other.

**Power Supply:** converts AC line voltage from the load center to low DC voltage for one or more module driver boards.

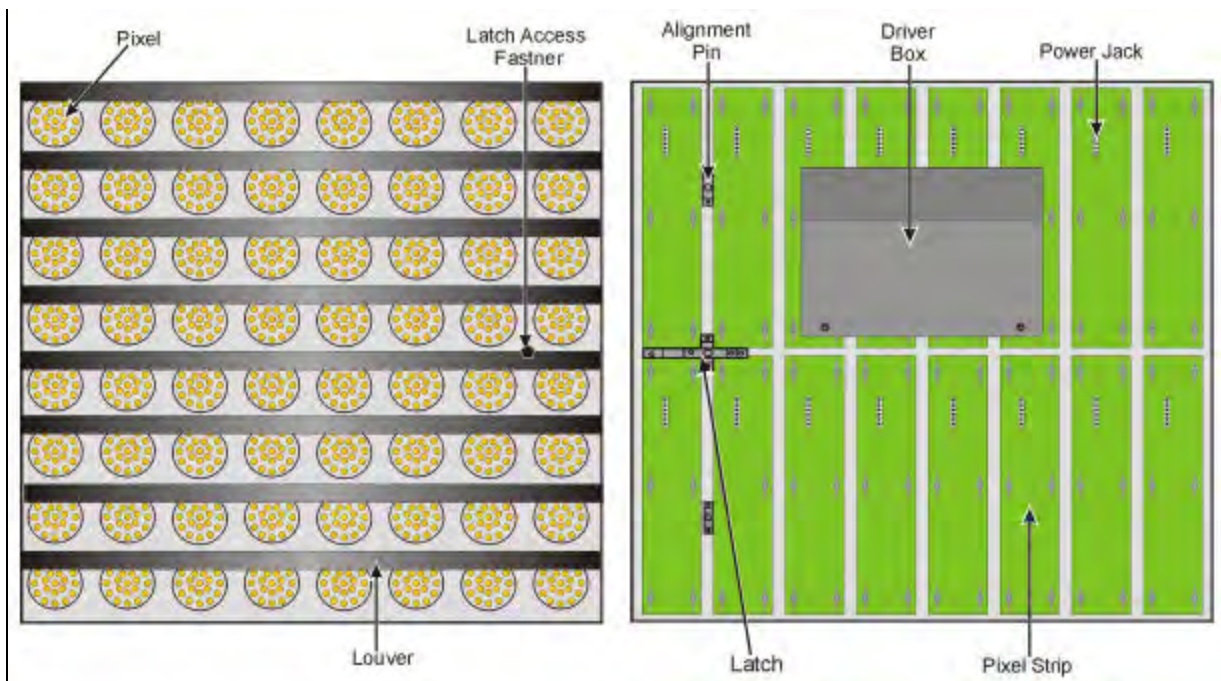
**RS232:** RS232 is a standard PC communication type with a maximum cable length of 25 feet (7.62 meters)

**RS422:** RS422 is a standard differential communication type with a maximum cable length of 4000 feet (1.2 kilometers)

**Sign Address:** The sign address is an identification number assigned to each display of a network. It is set by flipping DIP switches on the controller. The control software uses the address to locate and communicate with each display. Displays that are on the same network cannot have the same address.

**Venus<sup>®</sup> 1500:** a Daktronics designed, Windows based software used to create and edit messages on the display. Refer to **ED-12717** for more information.

Refer to **Figure 2** while reading the following component descriptions.



**Figure 3:** 8x8 Pixel Module (Front and Rear)

**Driver:** circuit board responsible for switching the intensity levels of the LEDs. The driver is located inside the driver box and mounts on the back of the module.

**Latch Access Fastener:** device utilizing a rotating retainer bar to hold the module firmly to the sign frame. There is one per module near the center of the module on the right side.

**LED (light emitting diode):** low energy, high intensity lighting units.

**Louver:** a black shade positioned horizontally above each pixel row. The louvers increase the level of contrast on the sign face and direct LED light.

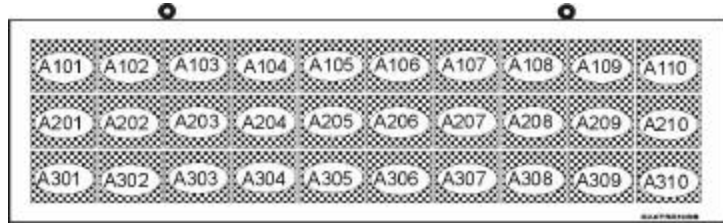
**Module:** 89 mm Galaxy modules are 8 pixels high by 8 pixels wide. They consist of pixel strips, louvers, and a driver.

**Pixel:** a cluster of LEDs. The number and color of the LEDs depends on sign application.

**Pixel Strip:** four LED pixels mount directly onto a pixel strip. Each pixel strip is removable from the module.

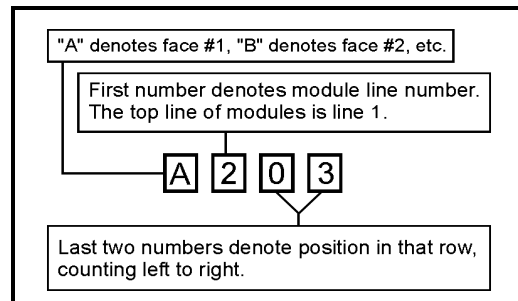
## 1.5 Daktronics Nomenclature

To fully understand some Daktronics drawings, such as schematics, it is necessary to know how those drawings label various components. This information is also useful when trying to communicate maintenance or troubleshooting efforts.



**Figure 3:** Module Numbering Example – 24x80 Front

A module is the building block of the Galaxy sign. Each module measures 8 pixels high by 8 pixels wide. By placing modules side-by-side and on top of one another, Daktronics can design and build signs of any size. A person can easily remove individual modules from the sign if required. **Figure 3** illustrates how Daktronics numbers modules on a Galaxy sign. **Figure 4** breaks down the module numbering method.



**Figure 4:** Module Numbering

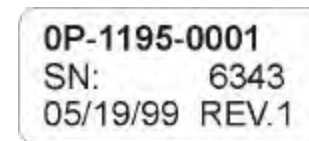
The label “A” on a drawing typically denotes an assembly. An assembly is a single circuit board or a collection of components that function together and usually mount on a single plate or in a single enclosure. Daktronics divides assemblies into two types, those that route signal and those that route power.

In addition, various Daktronics drawings may contain the following labeling formats:

- “TBXX” denotes a termination block for power or signal cable.
- “FXX” denotes a fuse.
- “EXX” denotes a grounding point.
- “JXX” denotes a power or signal jack.
- “PXX” denotes a power or signal plug for the opposite jack.

Finally, drawings commonly have Daktronics part numbers. You can use those part numbers when requesting replacement parts from Daktronics Customer Service. Take note of the following part number formats.

- “OP-XXXX-XXXX” denotes an individual circuit board, such as a line receiver.
- “OA-XXXX-XXXX” denotes an assembly, such as a circuit board and the plate or bracket to which it mounts. A collection of circuit boards working as a single unit may also carry an assembly label.
- “W-XXXX” denotes a wire or cable. Cables may also carry the assembly numbering format in certain circumstances. This is especially true of ribbon cables.
- “F-XXXX” denotes a fuse.



**Figure 5:** Typical Label

Most circuit boards and components within this sign carry a label that lists the part number of the unit. If the replacement parts list in **Section 4.15** does not list a circuit board or assembly, use the label to order a replacement. **Figure 5** illustrates a typical label. The part number is in bold.

# Section 2: Mechanical Installation

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**LNote:** *Daktronics does not guarantee the warranty in situations where the sign is not constantly in a stable environment.*

Daktronics engineering staff must approve *any* changes that may affect the weather-tightness of the sign. If you make any modifications, you must submit detailed drawings of the changes to Daktronics for evaluation and approval, or you may void the warranty.

*Daktronics is not responsible for installations or the structural integrity of support structures done by others.* The customer is responsible to ensure a qualified structural engineer approves the structure and any additional hardware.

## 2.1 Mechanical Installation Overview

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Because every installation site is unique, Daktronics has no single procedure for mounting Galaxy signs. This section contains general information only and may or may not be appropriate for your particular installation.

**A qualified installer must make all decisions regarding the mounting of this sign.**

**Read both the mechanical and electrical installation sections of this manual before beginning any installation procedures.**

## 2.2 Support Structure Design

---

Support structure design depends on the mounting methods, sign size and weight. The structure design is critical; only a qualified individual should mount the sign. Sign height and wind loading are also critical factors. It is the customer's responsibility to ensure that the structure and mounting hardware are adequate. *Daktronics is not responsible for the installations or the structural integrity of support structures done by others.*

**The installer is responsible to ensure the mounting structure and hardware are capable of supporting the sign and agrees with local codes.**

Before beginning the installation process, verify the following.

- The mounting structure provides a straight and square frame for the sign.
- The mounting structure supports the sign without yielding at any unsupported points after mounting.
- Clearance: 3" of unobstructed space is available below the sign for ventilation. 1 ¼" of unobstructed space is available above the top of the sign.

Correct any deficiencies before installation.

## 2.3 Ventilation Requirements

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### Reference Drawings:

Shop Drawing, AF-3090, 8x**-24 Amber/Red.....	<b>Drawing B-160986</b>
Shop Drawing, AF-3090, 16x**-24 Amber/Red.....	<b>Drawing B-160987</b>
Shop Drawing, AF-3090, 24x**-24 Amber/Red.....	<b>Drawing B-160988</b>
Shop Drawing, AF-3090, 32x**-24 Amber/Red.....	<b>Drawing B-160989</b>

Fans mounted in the backsheets toward the top of the display allow for ventilation. Maintain a minimum distance of 3" (7.62 cm) below the sign to maintain proper airflow. Refer to the appropriate shop drawing for additional information.

*If the sign cabinet is completely enclosed:*

- Provide 6 square inches of unobstructed opening per module to ensure adequate cooling.
- Make allowances to compensate for the percentage of material covering the openings in the structure.
- For adequate cooling, the cabinet may require forced ventilation. If the enclosed cabinet must use forced ventilation, it must ventilate at a rate of 10 cubic feet per minute per module (28" x 28" active area).

Failure to comply with these requirements voids the Galaxy sign warranty.

## 2.4 Lifting the Sign

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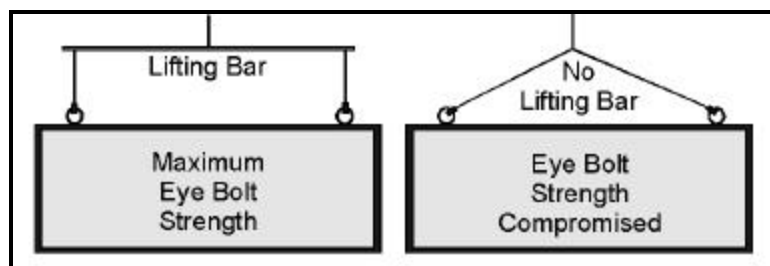
The top of the sign has eyebolts to lift the unit. Do not exceed the rated load of the eyebolts. Refer to the information at the end of this section labeled **Eyebolts** to determine the allowable load of the eyebolts shipped with the sign.

**Figure 6** illustrates both the correct (left example) and the incorrect (right example) method of lifting a sign. Lift the sign as shown on the left, *with the lifting bar*. **Use every lifting point provided!**

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

**If you remove the eyebolts, adequately seal the holes using 1/2-13 bolts and sealing washers.**

**Silicone along the threads to ensure water does not enter the sign.**



**Figure 6:** Lifting the Sign

## 2.5 Sign Mounting

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### Reference Drawings:

Shop Drawing, AF-3090, 8x**-24 Amber/Red.....	<b>Drawing B-160986</b>
Shop Drawing, AF-3090, 16x**-24 Amber/Red.....	<b>Drawing B-160987</b>
Shop Drawing, AF-3090, 24x**-24 Amber/Red.....	<b>Drawing B-160988</b>
Shop Drawing, AF-3090, 32x**-24 Amber/Red.....	<b>Drawing B-160989</b>

The method used to mount signs varies greatly from location to location. For this reason the manual covers only general mounting topics.

**The installer is responsible to ensure the installation will adequately meet local codes and standards. The installer is also responsible for the mounting method and hardware.**

Before beginning the installation process, verify the following items.

- The mounting structure will provide a straight and square frame for the sign. *Height variation in any four-foot horizontal section may not exceed 1/4- inch.*
- The mounting structure will not give way at any unsupported points after the sign is mounted.

The back of the sign uses 3x2x<sup>3</sup>/<sub>8</sub>" steel clip angles at the locations shown in **Drawings B-160986, B-160987, B-160988 and B-160989**. These angles assist in mounting the sign. Remember to have *all* mounted signs inspected by a qualified structural engineer.

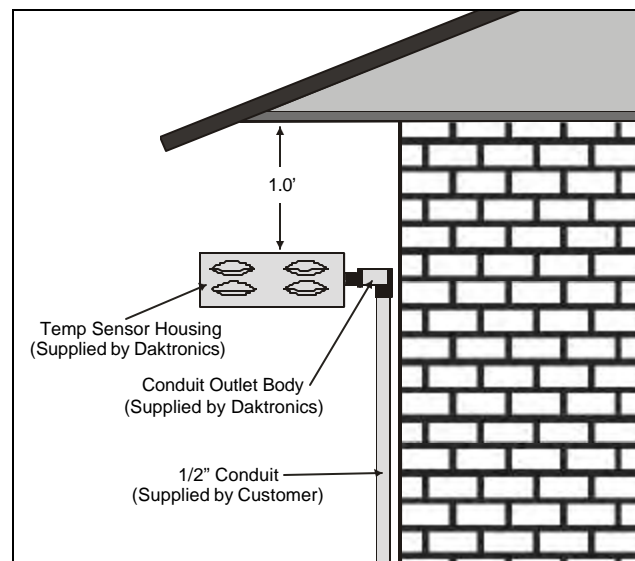
The customer *must* have a qualified structural engineer review the number of attachment points needed and the wall structure to ensure both meet all national and local codes. *Daktronics recommends using all clip angles as attachment points.*

1. Carefully uncrate the sign. Look each side of the sign over for damage during shipping.
2. Following the guidelines described in **Section 2.4**, lift the sign into position on the support structure using all provided eyebolts.
3. Weld or use 1/2" Grade-5 bolts and hardware to secure the clip angles to the support structure as shown in **Top View** in **Drawings B-160986, B-160987, B-160988 and B-160989**.
4. Refer to **Section 3** for information on routing power and signal.
5. **Upon completing the installation, carefully inspect the sign for any holes that may allow water to seep into the sign. Seal any openings with silicone. If you remove the eyebolts on the top of the sign, plug the holes with bolts and the rubber sealing washers that you removed with the eyebolts. Silicone the threads on the bolts.**

## 2.6 Optional Temperature Sensor Mounting

The Temperature Sensor mounts separately and requires a location away from the influence of chimneys, air conditioners, vents, tar roofs, concrete, and parking lots, which can cause abnormal temperature fluctuations. Usually, a separation of at least 20-30 feet horizontally and 8 feet vertically is required to achieve this. Locations where air movement is restricted are also unsatisfactory. Refer to **Drawing A-79767**.

The ideal sensor location is a north eaves or a northern exposure, above grass and away from direct sunlight. This location gives extra stability and accuracy to the sensor because of the added shading usually obtained on a northern exposure. See **Figure 7** for details.

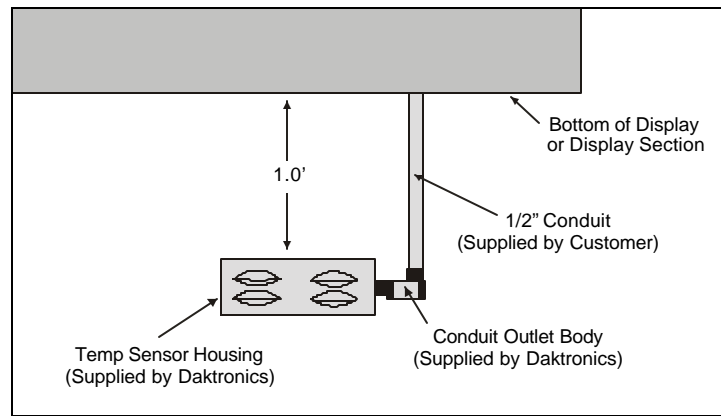


**Figure 7:** Temperature Sensor Eave/Wall Mount

The second choice for locating a temperature sensor is on the display itself, or somewhere on the display structure. A light-colored display is preferred in this application. Location of the sensor should be above, below, or on a northern edge of the display to keep the sensor shaded. If mounting above the

display, a minimum height of above 6 feet is required. If mounting below the display, a minimum of 8 feet above ground and a minimum of 1 foot between the sensor and the display is required, as seen in **Figure 8**.

Greater accuracy is obtained if grass is below the sign rather than concrete or some other material.



**Figure 8:** Temperature Sensor Mounting to Bottom of Display

Use a 2 pair, individually shielded cable (Belden 5594, Daktronics part number W-1234) to connect the sensor to the display controller. Maximum length is 1000 feet.

Follow these steps to mount the temperature sensor.

1. Run 1/2" conduit from the sensor location to the controller where the sensor cable is to be attached. The cable must be routed through 1/2" metal conduit which should be earth grounded to protect the sensor and controller from lightning damage.
2. Power down the controller where the sensor cable is to be attached.
3. Connect the cable to the temperature sensor terminal block as shown below. (Refer to **Drawing A-79410** for the location of the terminals.)

Black	=	GND
White	=	N
Green	=	P
Red	=	+V

4. Install the mesh screen with the four screws enclosed.
5. Connect the cable to the display controller as described in the controller installation manual. Power up the controller.

# Section 3: Electrical Installation

*Only a qualified individual should terminate power and signal cable within this Daktronics sign!*

The Daktronics engineering staff must approve ANY changes made to the sign. Before altering the sign, submit detailed drawings for the proposed modifications to the Daktronics engineering staff for evaluation and approval or you will render the warranty null and void.

## 3.1 Common Connectors in the Sign

The power and signal connections in the signs use many different types of connectors. Take special care when disengaging any connector so as not to damage the connector, the cable or the circuit board.

**When pulling a connector plug from a jack, do not pull on the wire or cable; pull on the jack itself. Pulling on the wires may damage the connector.**

The following information presents some common connectors encountered during sign installation and maintenance.

### 1. Ribbon Cable Connectors:

**Figure 9** illustrates a typical ribbon connector. To disconnect the ribbon cable, push the metal clips on the sides to unlock and remove the jack.

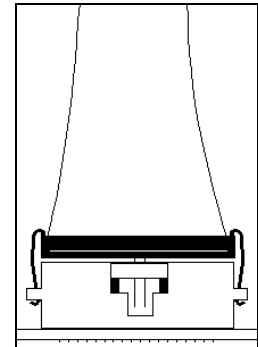
Before replacing a ribbon cable connector, spray it with DeoxIT<sup>J</sup> contact cleaner to remove any foreign matter that may cause signal problems. In addition, apply a generous amount of CaiLube<sup>J</sup> protector paste to the plug before inserting it into the jack. This paste protects both the plug and the jack from corrosion.

### 2. Termination Blocks:

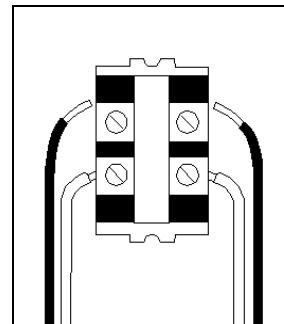
Termination blocks connect internal power and signal wires to wires of the same type coming into the sign from an external source. Most signal wires come with forked connectors crimped to the ends of the wire. Power wires need to have one-half inch of insulation stripped from the end of the wire prior to termination. Tighten all screws firmly to ensure a good electrical connection. Refer to **Figure 10**.

### 3. Phoenix<sup>TM</sup>-Style Connectors:

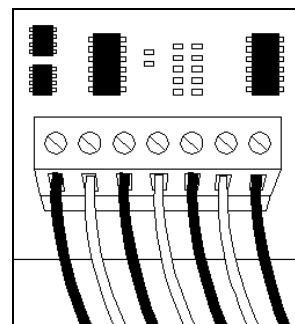
Phoenix-style connectors, usually green, allow for signal termination on circuit boards. Refer to **Figure 11**. Strip one-quarter inch of insulation from the wire prior to termination. To remove a wire, turn the above screw counter-clockwise to loosen the connectors grip on the wire. To insert a wire, push the bare wire into the connector and turn the above screw clockwise to lock the wire into place.



**Figure 9:** Ribbon Cable Connector

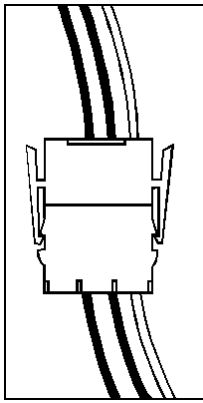


**Figure 10:** Termination Block



**Figure 11:** Phoenix Connector





**Figure 12:** Mate-n-Loc Connector

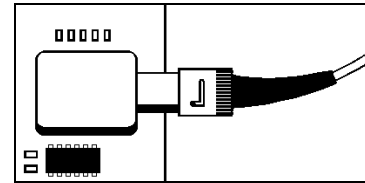
#### 4. Mate-n-Lok™ Connectors:

The white Mate-n-Lok connectors found in the signs come in a variety of sizes. **Figure 12** illustrates a five-pin Mate-n-Lok connector. To remove the plug from the jack, squeeze the plastic locking clasps on the side of the plug and pull it from the jack.

#### 5. Fiber Optic Connectors:

A fiber optic cable has a “twist-on” connector at each end. To remove the fiber plug, push it toward the board and twist it counter-clockwise until you can pull the plug from the jack.

**Figure 13** shows this connector.

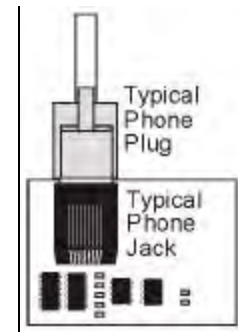


**Figure 13:** Fiber Optic Cable

#### 6. Phone Jacks (RJ11 Connectors):

RJ connectors, as seen in **Figure 14**, are similar to the telephone connectors found in homes. In order to remove this plug from the jack, depress the small clip on the underside of the plug.

Before replacing an RJ connector, spray it with DeoxIT™ contact cleaner to remove any foreign matter that may cause signal problems. In addition, apply a generous amount of CaiLube™ protector paste to the plug before inserting it into the jack. This paste will protect both the plug and the jack from corrosion.



**Figure 14:** RJ11 Connector

### 3.2 Control Cable Requirements

#### **RS232**

This cable is a 2-conductor shielded cable used to transmit an RS232 signal (Daktronics part number W-1117). This shielded cable should not be subjected to mechanical flexing after installation. This cable is not for direct burial and should be routed in a dedicated, grounded metallic conduit at the base of the sign structure. This cable has a maximum length of 25 feet.

#### **RS422**

This cable is a 6-conductor shielded cable used to transmit an RS422 signal (Daktronics part number W-1210). This shielded cable consists of unpaired wires. They should not be subjected to mechanical flexing after installation. This cable is not for direct burial and should have one of the following routings:

- In dedicated metallic conduit
- Inside buildings-if cable is not in conduit, keep away from interface signals

With interface signals (such as power conductors, intercom, etc.) typically a two-foot separation is required. The maximum length of an RS422 signal cable is 4,000 feet (1.22 km).

#### **Modem**

The modem option will use standard telephone cable routed through conduit. The local telephone company will need to assist in this installation.

Ask the telephone company which colors are used by the TIP and the RING for signal hook up.

**NOTE:** The telephone lines must be dedicated lines and not run through a switchboard system.

### Fiber Optic

This cable is a 4-fiber cable (Daktronics part number W-1376). Two fibers are used for display communications and the other two are saved for spares. The cable may be either direct burial or routed in conduit but should not be subjected to mechanical flexing. The maximum length of a fiber optic cable is 2,000 feet (611.6 meters).

## 3.3 RJ Connector Cables

The connector used for RS/232 input to the display is an industry standard, 6-pin RJ11. This connector can be found on many telephones and LANs.

The cable used in the network is a standard flat six conductor telephone cable (**standard flipped cable**). Refer to **Figure 15**. This cable has one end that is the mirror image of the other end (i.e. the cable is flipped). Refer to **Figure 16** for a standard flipped cable.

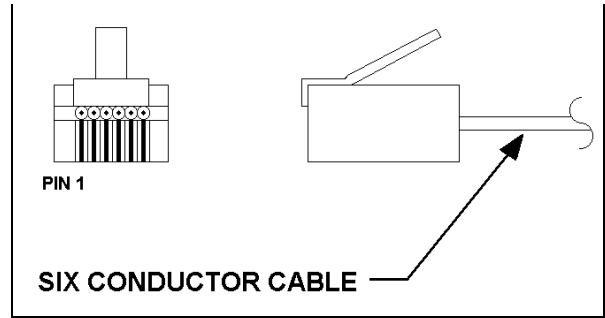


Figure 15: 6-Conductor RJ11 Connector and Cable

Notice in **Figure 16** that the color code on one connector must be made the opposite on the other connector. When installing a network, it is not easy to remember in which direction the previous end was oriented. One simple way to avoid confusion is to standardize the color code, having one color for the connector going into the output of a sign and the opposite color for a connector going into the input of a sign. This will help ensure correct cabling since cables are always installed from the output jack of one sign to the input jack of the next sign.

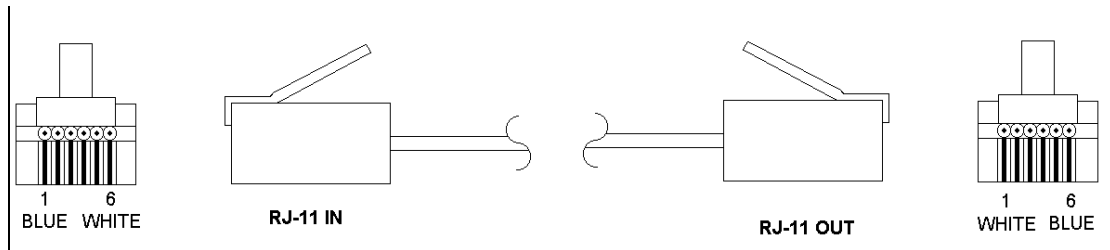


Figure 16: Flipped Cable with RJ Connectors

### Installing an RJ Connector

Installing an RJ connector on the end of the conductor cable is a simple task when the correct tools are used. The RJ crimping tool (Daktronics part number TH-1033) performs two separate steps

First, use the crimping tool to strip the outer insulation from the inner wires. This does not result in bare wires since only the gray outer jacket is removed. After correct stripping, the wire will appear as shown in **Figure 17**.

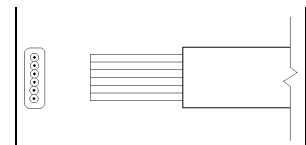


Figure 17: Wire with Outer Jacket Stripped

The crimping tool is then used to crimp the RJ connector onto the cable. The RJ connector is locked into a special socket in the tool. The stripped wire is inserted into the RJ connector. Finally, the tool is squeezed like pliers to crimp the connector onto the wire. This completes the installation of an RJ connector onto the wire.

### Pin Outs

The RS422 jack's pin out is as follows:

RJ11	Function
1	Ground
2	D1OUT-P
3	D1OUT-N

RJ11	Function
4	D1IN-P
5	D1IN-N
6	GROUND

## 3.4 Conduit

---

### Reference Drawings:

Shop Drawing, AF-3090, 8x**-24 Amber/Red.....	<b>Drawing B-160986</b>
Shop Drawing, AF-3090, 16x**-24 Amber/Red.....	<b>Drawing B-160987</b>
Shop Drawing, AF-3090, 24x**-24 Amber/Red.....	<b>Drawing B-160988</b>
Shop Drawing, AF-3090, 32x**-24 Amber/Red.....	<b>Drawing B-160989</b>

*Daktronics does not include the conduit. Refer to **Drawings B-160986, B-160987, B-160988 and B-160989** for approximate locations of power and signal conduit. You must use separate conduit to route:*

- Power
- Signal IN wires
- Signal OUT wires (if another sign requires signal)

Locate the conduit holes at the bottom right (rear view) of the back of the sign (refer to **Drawings B-160986, B-160987, B-160988 and B-160989**).

Punch or drill out the desired conduit openings. *Be careful not to damage any internal components.* Attach the conduit and route the power and signal cables. Refer to **Drawing A-129227** for a picture of the power and signal termination panels.

└ For signs with more than one face, signal and temperature sensor wiring between signs can route through the same conduit.

## 3.5 Preparing for Power/Signal Connection

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### Reference Drawings:

Shop Drawing, AF-3090, 8x**-24 Amber/Red.....	<b>Drawing B-160986</b>
Shop Drawing, AF-3090, 16x**-24 Amber/Red.....	<b>Drawing B-160987</b>
Shop Drawing, AF-3090, 24x**-24 Amber/Red.....	<b>Drawing B-160988</b>
Shop Drawing, AF-3090, 32x**-24 Amber/Red.....	<b>Drawing B-160989</b>
Schematic, AF-3090-8-32x***-24, Mono .....	<b>Drawing B-161855</b>
Display Assembly.....	<b>Appendix A</b>

1. If the display needs openings for the power and signal, punch out the knockouts in the lower right corner from the rear. Refer to **Drawings B-160986, B-160987, B-160988 and B-160989**.
2. With a 7/32" nutdriver, apply pressure to latch and turn it a quarter-turn counter-clockwise. The module door will swing open to the left.

3. Route power to the display through a fused disconnect switch capable of opening all ungrounded power conductors. Locate 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.
4. Power conductors from the disconnect to the display must route through conduit in agreement with local codes.
5. You may also route the signal cable from the control computer to the sign at this time. *Run the power and signal cables in a separate conduit.*

### 3.6 Power

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#### Reference Drawings:


AF-3090 Controller Assembly, RS232/422 .....	<b>Drawing A-158254</b>
Power Specs, AF-3090, Amber .....	<b>Drawing A-158396</b>
AF-3090 Controller Assembly Modem .....	<b>Drawing A-162098</b>
AF-3090 Controller Assembly Fiber .....	<b>Drawing A-162099</b>
Power Specs, AF-3090, Red LEDs .....	<b>Drawing A-162439</b>
Schematic, AF-3090-8-32x***-24, Mono .....	<b>Drawing B-161855</b>

Refer to **Drawings A-158396** and **A-162439** for voltage and current requirements for your sign size. Each uses a 120/240VAC single-phase or 120/208 three-phase power source.

*Do not connect the signs to any voltage other than that listed on the Daktronics product label.*

Proper power installation is imperative for proper display operation. The following sub-sections give details of display power installation. Electrical installations must be performed by qualified personnel. Unqualified personnel should not attempt to install the electrical equipment. Serious danger to equipment and personnel could occur if equipment is improperly installed.

#### **Grounding**

 *Displays MUST be grounded according to the provisions outlined in Article 250 of the National Electrical Code®. Daktronics recommends a resistance to ground of 10 ohms or less. Verification of ground resistance can be performed by the electrical contractor who is performing the electrical installation. Daktronics Sales and Service personnel can also perform this service*

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.**

A minimum of one grounding electrode must be installed 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. Daktronics recommends that the resistance to ground be 10 ohms or less. 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 terminal in the display panelboard.

This grounding electrode must be installed in addition to the equipment grounding conductor that should be part of the power installation. The material of an earth-ground electrode differs from region to region and from conditions present at the site. The support structure of the display cannot be used as an earth ground electrode. The support is generally embedded in concrete, and if in earth, the steel is either primed or it corrodes, making it a poor ground. The grounding

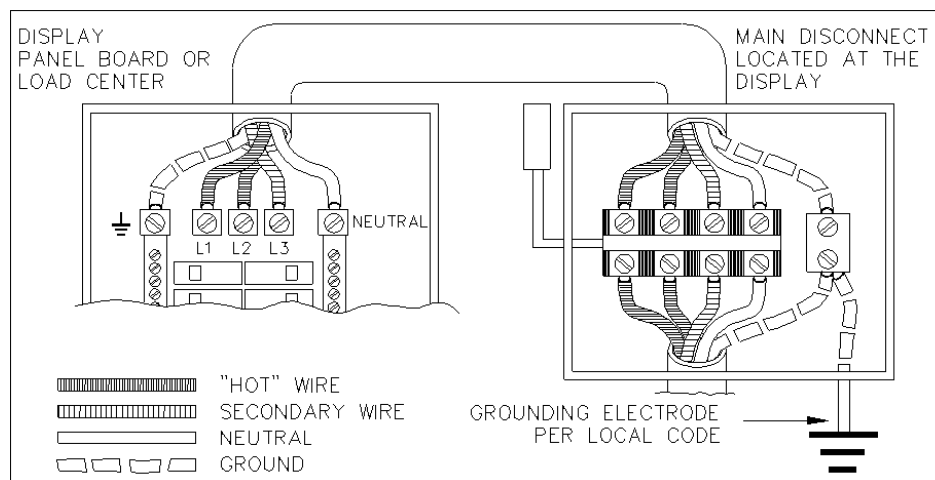
system and grounding electrodes must be installed according to Article 250 of the National Electrical Code and any applicable local codes.

### **Power Installation**

There are two considerations for power installation; installation with ground and neutral conductors provided and installation with only a neutral conductor provided. These two power installations differ slightly, as described in the following paragraphs:

#### **Installation with Ground and Neutral Conductors Provided**

For this type of installation, the power cable *must* contain an isolated earth-ground conductor. 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. Refer to **Figure 18** for installation details. The National Electrical Code requires the use of a lockable power disconnect within sight of or at the display.



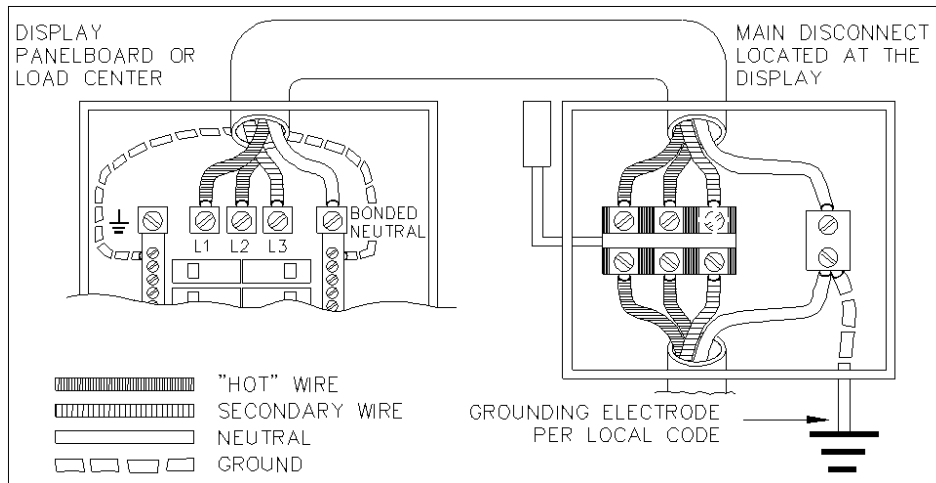
**Figure 18:** Installation with Ground and Neutral Conductor Provided

#### **Installation with Only a Neutral Conductor Provided**

Installations where no grounding conductor is provided must comply with article 250-32 of the National Electrical Code. If the installation in question meets all of the requirements of article 250-32, the following guidelines must be observed:

- Connect the grounding electrode cable at the local disconnect, never at the display panelboard.
- A disconnect that opens all of the ungrounded phase conductors should be used.
- The neutral and the ground conductors should be bonded in the display panelboard.

Refer to **Figure 19** for installation details.



**Figure 19:** Installation with only Neutral Conductor Provided

### 3.7 Main Disconnect

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

You must locate the means of disconnection in a direct line of sight from the sign 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 sign.

**Exception:** You may locate the disconnecting means that are *capable of being locked* in the open position elsewhere.

### 3.8 Signal Termination from Computer to Sign

#### Reference Drawings:

AF-3090 Controller Assembly, RS232/422 .....	<b>Drawing A-158254</b>
AF-3090 Controller Assembly Modem .....	<b>Drawing A-162098</b>
AF-3090 Controller Assembly Fiber .....	<b>Drawing A-162099</b>
Schematic, AF-3090-8-32x***-24, Mono .....	<b>Drawing B-161855</b>

#### **RS/232**

One end of the signal cable should be terminated to the 6-position terminal block on the controller labeled “RS232 IN” (TB1). The opposite end is terminated at the J-box near the display. The controlling computer connects to the J-box through the serial cable.

J-Box	Field Cabling	Terminal Block TB1 (RS232 IN)
		Pin 1 (RTS)
		Pin 2 (GND)
Pin 2 (RX-P)	Clear	Pin 3 (TX-P)
Pin 3 (GND)	Shield	Pin 4 (GND)
Pin 1 (TX-P)	Black	Pin 5 (RX-P)
		Pin 6 (DCD)

### **RS/422**

One end of the signal cable should be terminated to the 6-position terminal block in the display labeled “RS422 IN” (TB2). The opposite end is terminated at the signal converter (Daktronics part number 0A-1127-0237) in the control room.

**Note:** RS422 cable must be installed so that it is separated from any source of electrical interface. A minimum of a two foot separation between the signal cable and any power conductors is typically required, or the signal cable may be routed in grounded metallic conduit. The signal cable must **not** be routed in the same conduit as the power conductors.

<b>Signal Converter (J4/J5)</b>	<b>Field Cabling</b>	<b>Surge Suppressor, TB1 (RS422 IN)</b>
Pin 1 (GND)	Red	Pin 1 (GND)
Pin 2 (RX-P)	Black	Pin 2 (TX-P)
Pin 3 (RX-N)	Brown	Pin 3 (TX-N)
Pin 4 (TX-P)	White	Pin 4 (RX-P)
Pin 5 (TX-N)	Blue	Pin 5 (RX-N)
Pin 6 (GND)	Green/Bare (Shield)	N.C.

### **Modem**

In a display that uses a modem, **Signal In** routes first to a telecommunications connector and terminated per the table below. A 6-conductor phone cord with RJ11 connectors (part number 0A-1137-0160) relays the signal to the modem. A second phone cord (0A-1137-0160) transfers the data from the modem to J1 (RS232 IN) on the controller.

<b>Terminal Block TB31</b>	<b>Function</b>
Pin 1	
Pin 2	
Pin 3	TIP-P
Pin 4	Ring-P
Pin 5	
Pin 6	

### **Fiber Optic**

When the fiber optic cables are used, signal from the converter enters the fiber board (J4/J5). An adapter module (Daktronics part number 0A-1146-0029) allows the use of a 6-conductor-phone cord with RJ11 connectors (part number 0A-1137-0160) to relay the signal to J1 (RS232 IN) on the controller.

<b>Signal Converter</b>	<b>Field Cabling</b>	<b>Sign A Data In</b>
J2 (TX1)		J5 (RX2)
J3 (RX1)		J4 (TX2)

### 3.9 Optional Temperature Sensor Electrical Installation

**Reference Drawings:**

Temp Sensor Mounting .....	<b>Drawing A-79767</b>
Signal Input, Venus 1500.....	<b>Drawing A-129110</b>

After mounting the optional sensor, follow these steps to complete the electrical installation. A 2-pair, individually shielded cable (Belden 5594, Daktronics part number W-1234) is used to connect the sensor to the controller.

1. Run ½ " conduit from the sensor location to the controller within the display. The cable must be routed through one-foot of ½ " metal conduit that should be earth-grounded to protect the sensor and controller from lightning damage.
2. Connect the cable to the temperature sensor terminal block within the temperature sensor as follows:

Wire Color	Terminal Block
Red	V+
Green	P
Black	GND
White	N

3. Install the mesh screen with the four screws enclosed.
4. Disconnect power to the display before attaching the cable.
5. Connect the cable to the temperature sensor terminal block on the controller (TB7) per the following table:

Wire Color	Terminal Block TB7 (Temp In)
	Pin 1 (+5V)
	Pin 2 (GND)
	Pin 3 (Light +)
	Pin 4 (Light -)
Green	Pin 5 (Temp +)
White	Pin 6 (Temp -)
Red	Pin 7 (+5V)
Black & Shield	Pin 8 (GND)
Or Bare (Shield)	Pin 8 (GND)

To connect the temperature sensor to multiple displays (such as a double-face display):

Wire Color	Display 1 TB7	Display 2 TB7
Green	Pin 5 (Temp +)	Pin 5 (Temp +)
White	Pin 6 (Temp -)	Pin 6 (Temp -)
Red	NC	NC
Black	NC	NC

**Note: GND and +5V (Red and Black) are connected from the temp sensor to the first display only. The Red and Black wires must not be connected between controllers in additional displays.**



### **3.10 First Time Turn On**

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When first powered up, the display will run through an initialization in which it will display the following:

- 1.** Output Test (DDDs)
- 2.** Product Name (Galaxy)
- 3.** Display Size (Row x Column)
- 4.** Firmware Number (ED-10134)
- 5.** Firmware Revision (Rev X.XX)
- 6.** COM1 Configuration (C1: V15/RTD)
- 7.** COM Configuration (C2: None)
- 8.** Line Frequency
- 9.** Hardware Address (HW:XX)
- 10.** Software Address (SW:XX)
- 11.** Display Name
- 12.** Modem (If modem is present)

# Section 4: Maintenance & Troubleshooting

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## IMPORTANT NOTES:

1. **Disconnect power before performing any repairs or maintenance work on the sign!**
2. **Only qualified service personnel may access internal sign electronics.**
3. **The Daktronics engineering staff must approve ANY changes made to the sign. Before altering the sign, you must submit to the Daktronics engineering staff detailed drawings for the proposed modifications for evaluation and approval or you will void the warranty.**

## 4.1 Maintenance & Troubleshooting Overview

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Daktronics Galaxy series AF-3090 signs are front accessible, meaning you can only access the internal components from the front of the sign.

This section provides the following Galaxy sign information.

- **Recommended Tools List:** provides a listing of all tools needed in order to perform maintenance work on your display
- **Signal Routing Summaries:** provide a basic explanation of the signal travel through the sign.
- **Power Routing Summaries:** provide a basic explanation of the power travel through the sign.
- **Service and Diagnostics:** provides instructions for removing various sign components and explains the functions of circuit board connectors and the meanings of any diagnostic LEDs.
- **Maintenance:** lists a number of steps to take to keep this Galaxy sign in safe, working order.
- **Troubleshooting:** lists some possible sign malfunctions and provides a number of possible causes for that malfunction.
- **Replacement Parts Lists:** lists the part description and part number of sign components that could possibly need replacing during the life of this sign.
- **Daktronics Exchange/Repair & Return Programs:** explains the Daktronics component return policy.

## 4.2 Recommended Tools List

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When performing maintenance work on your display, Daktronics recommends using the following tools and placing them in a convenient, easy-access location.

- **7/32" Nut Driver:** removes modules in front access displays
- **7/16" Wrench:** removes support hardware for power supplies
- **#2 Phillips Screwdriver:** removes support hardware for power supplies and detaches power supplies

### 4.3 Signal Summary

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#### Reference Drawings:

AF-3090 Controller Assembly, RS232/422 .....	<b>Drawing A-158254</b>
AF-3090 Controller Assembly Modem .....	<b>Drawing A-162098</b>
AF-3090 Controller Assembly Fiber .....	<b>Drawing A-162099</b>
Schematic, AF-3090-8-32x***-24, Mono .....	<b>Drawing B-161855</b>

The signal routing for the display can be summarized as follows:

1. Data from the controller computer, which runs Venus1500 software, travels via RS232, RS422, modem or fiber optic cable into the display.
2. For multiple face display or a display network, an RS422 (most typical) or fiber cable relays signal between the controller of the first display and the controller in the second display.
3. From the controller, the signal then travels over a 40-conductor ribbon cables from the controller (J11 through J16 provides signal out) to J2 on the driver of the first column of modules in the display.
4. Data exists at J1 and is relayed to J2 of the next driver board and so on, traveling down the entire row of modules. The drivers use this display data to control the LEDs.

### 4.4 Power Summary

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#### Reference Drawing:

Schematic; Power Supply Configurations .....	<b>Drawing A-158225</b>
Power Specs, AF-3090, Amber .....	<b>Drawing A-158396</b>
Power Specs, AF-3090, Red LEDs .....	<b>Drawing A-162439</b>
Schematic, AF-3090-8-32x***-24, Mono .....	<b>Drawing B-161855</b>

The following describes the internal display power routing for the display.

1. Incoming power terminates at the panelboard.
2. +12VDC power supplies power the modules in a monochrome red display and +14.7VDC power supplies power the modules in a monochrome amber display.

### 4.5 Display Access

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Display access for all 89 mm displays is from the front. To open the sign:

1. Locate the latch access fastener on the module. It is centered on the right side of the module.
2. With a 7/32" nutdriver, apply pressure to latch and turn it a quarter-turn counter-clockwise. The module door will swing open to the left.
3. Interior display components may be accessed and the pixel strips may be removed.

When closing a display, reverse the previous steps and take note of the following points:

- The weather-stripping on the back edge of the module is intact and in good condition for preventing water from seeping into the sign.
- The module latches are fully engaged to create a water resistant seal around the edge of the module. The module must be firmly seated against the sign when the latches are fully engaged.

## 4.6 Service & Diagnostics

### Reference Drawings:

AF-3090 Controller Assembly, RS232/422 .....	<b>Drawing A-158254</b>
Z-Filter Assy 2, W/GND bar .....	<b>Drawing A-158472</b>
Assy, Pwr Sply, AF-3090 .....	<b>Drawing A-158580</b>
Schematic, Power Supply Configurations .....	<b>Drawing A-158225</b>
Driver Assembly, AF-3090, 8x8-24 .....	<b>Drawing A-161661</b>
AF-3090 Controller Assembly Modem .....	<b>Drawing A-162098</b>
AF-3090 Controller Assembly Fiber .....	<b>Drawing A-162099</b>
Panel Assembly, AF-3090, 8x8-24 .....	<b>Drawing B-161694</b>
Schematic, AF-3090-8-32x <sup>***</sup> -24, Mono .....	<b>Drawing B-161855</b>

The following sub-sections address servicing of the below display components:

- Line filter and ground bar
- Modules, drivers and power supplies

The sub-sections also address any diagnostic LEDs, fuses and signal/power connectors found on the components.

The **Display Assembly** drawings denote the components as follows.

Component...	Denoted As...	Location...
Line Filters & Ground Bar	0A-1259-4003	Left side, behind module AX02
Modules	0A-1259-3000 or 0A-1259-3001	Over entire face of the display
Power Supplies	0A-1259-4004	Behind the modules; refer to the <b>Display Assembly</b> drawings

### ***Line Filter***

You can replace the filter by first removing all connecting wires, and then releasing the attachment hardware. Refer to **Drawing A-158472**. Install the new filter and reference **Drawing B-161855** for correct wiring.

### ***Modules, Pixel Strips & Drivers***

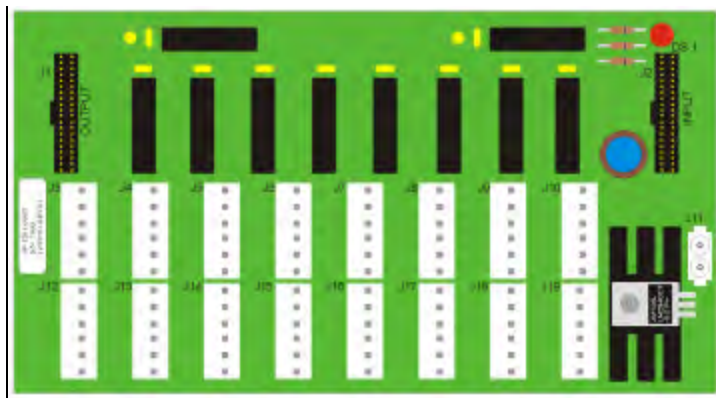
A module consists of louvers, several pixel strips and a driver board mounted to its back. Refer to **Section 4.5** to open a display via the modules and access the pixel strips and driver boards.

A pixel strip is a circuit board with four LED pixel clusters mounted directly on it. Each pixel strip is removable from the module. To remove a pixel strip from the module:

1. Open the display as described in **Section 4.5**.
2. Disconnect the power and signal connector from the strip you wish to replace.
3. If the pixel strip you wish to replace is located behind the driver assembly, unplug all signal and power connections on the driver assembly and remove the four corner screws. Refer to **Drawing A-161661**.
4. Remove the six wing nuts holding the pixel strip in place.
5. Gently lift the strip from the display.

- Reverse the above procedure to install a new pixel strip.

The driver is a circuit board responsible for switching the intensity levels of the LEDs. It is located inside the driver box and mounts on the back of the module. To remove a driver board:



**Figure 20:** Driver Board

- Open the display as described in **Section 4.5**.
- Remove the two #10 screws holding the driver cover in place. Lift the cover off from the assembly. Refer to **Drawing A-161661**.
- Disconnect all power and signal connections from the driver board.
- Remove the four #6 nuts holding the board in place.
- Gently lift the board from the display.
- Reverse the above procedure to install a new driver board.

The following connectors are found on each driver board; refer to **Figure 20**.

LED/Connector	Function
J1	Signal out to next driver board
J2	Signal in
J3-J10, J12-J19	Output to pixel strips
J11	Power
DS1	Power indicator

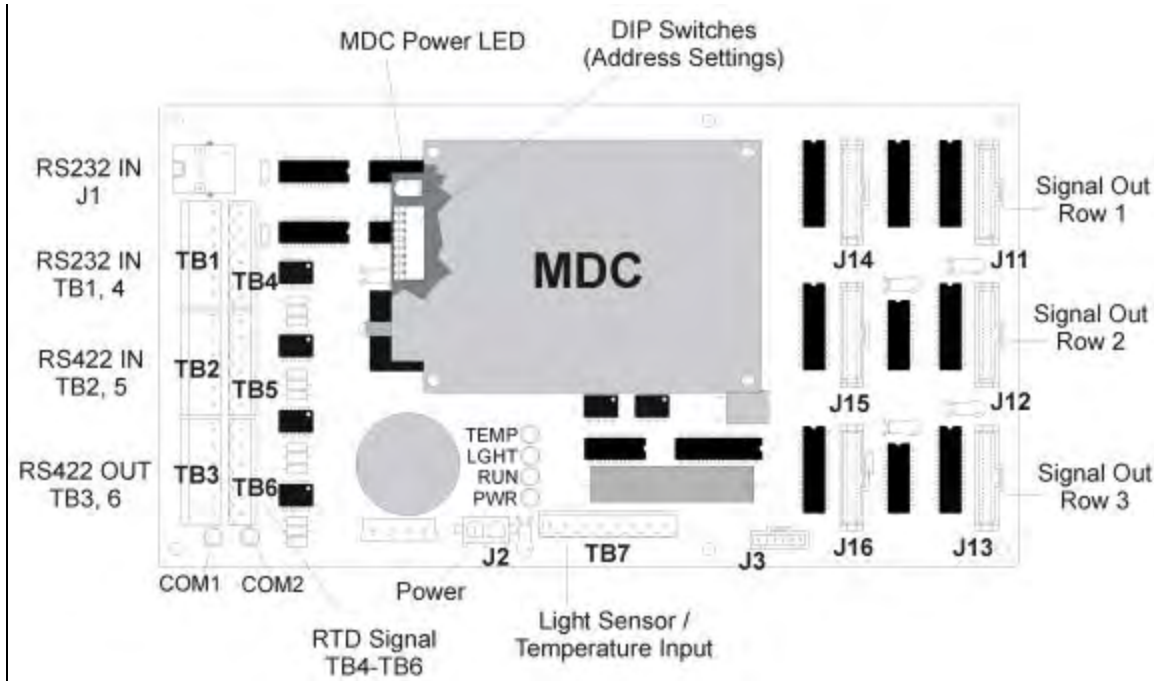
The connectors out to the pixel strips connect to the pixel strips in the following manner:

Connector	Pixel Strip Coordinates
J3	Top Row, Column 8
J4	Top Row, Column 7
J5	Top Row, Column 6
J6	Top Row, Column 5
J7	Top Row, Column 4
J8	Top Row, Column 3
J9	Top Row, Column 2
J10	Top Row, Column 1
J12	Bottom Row, Column 8
J13	Bottom Row, Column 7
J14	Bottom Row, Column 6
J15	Bottom Row, Column 5
J16	Bottom Row, Column 4
J17	Bottom Row, Column 3
J18	Bottom Row, Column 2
J19	Bottom Row, Column 1

## Controller

The controller sends data to the modules. Refer to the signal summary in **Section 4.3** for more information and to the component location drawings for the position of the controller board.

**Figure 21** illustrates a typical controller.



**Figure 21:**Controller

“DIP” switches are located on the controller’s MDC. The DIP switches set the hardware address, which the software uses to identify that particular display. When replacing a controller board, be sure to set the DIP switches in the same address configuration as the defective controller.

**NOTE:** Setting the DIP switches to address 0 (turn all the switches to OFF by flipping them toward the printed switch numbers) can activate a test mode. The display’s power must be turned off and then turned back on to run the test mode.

Switch 8	Switch 7	Switch 6	Switch 5	Switch 4	Switch 3	Switch 2	Switch 1	Address
Off	Off	Off	Off	Off	Off	Off	Off	Test Mode
Off	Off	Off	Off	Off	Off	Off	On	1
Off	Off	Off	Off	Off	Off	On	Off	2
Off	Off	Off	Off	Off	Off	On	On	3
Off	Off	Off	Off	Off	On	Off	Off	4
Off	Off	Off	Off	Off	On	Off	On	5
Off	Off	Off	Off	Off	On	On	Off	6
Off	Off	Off	Off	Off	On	On	On	7
...	...	...	...	...	...	...	...	...
On	On	On	On	Off	Off	Off	Off	240

Six diagnostic LEDs are located on the controller; the table below tells what each LED denotes.

LED	Color	Function	Operation	Summary
TEMP	Red	Temperature Level	Flashes	Flash rate is dependent upon the temperature. Flashes faster in high temperature and slows as the temperature decreases.
LGHT	Red	Photocell Light Level	Flashes	Flash rate is dependent on the light level. Flashes faster in bright light and slows as darkness descends.
RUN	Red	Controller	Steady Flash	A steady flash indicates the controller is running correctly. Normal flash rate is about once a second.
PWR	Green	Power	Always On	Power to the data input circuit when lit.
RX1	Yellow	Com 1	Flashes	Turns on and flashes when receiving information. Normal condition is off.
RX2	Yellow	Com 2	Flashes	Turns on and flashes when receiving information, typically used in custom applications. Normal condition is off.

The controller contains two jumpers (W1 and W2) for use with a modem system. *The jumpers must jump both pins for a modem system.*

Complete the following steps to remove the controller from the display.

1. Disconnect power from J2.
2. Remove all power and signal connections from the board. “Locked” connectors are released by squeezing together the tabs, then carefully pulling them from the jack. When replacing the board, it is helpful to have the cables labeled as to which was removed from which connector.
3. Remove each of the six screws holding the board in place.
4. Follow the previous steps in reverse order to install a new controller board.

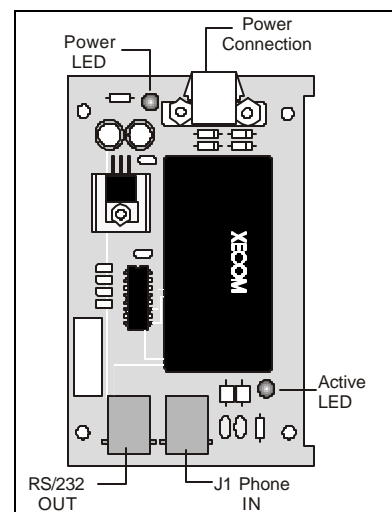
### Modem

If a modem was included with the display, it is located inside the display next to the controller board.

1. To replace a modem, first disconnect the power and signal connections (refer to **Figure 22** for the location of the power jack).
2. The modem is held in place with four screws. Remove the screws and lift the modem out of the display the display.
3. Attach the new modem using the same four screws removed in step 2, above.

The modem module has two LEDs. The Power LED should remain lit while power is applied to the modem. The Active LED will light when the modem is in the process of communicating.

A modem system requires jumpers to be set on the controller board. Refer to the **Controller** section in 4.6 for the jumper settings.



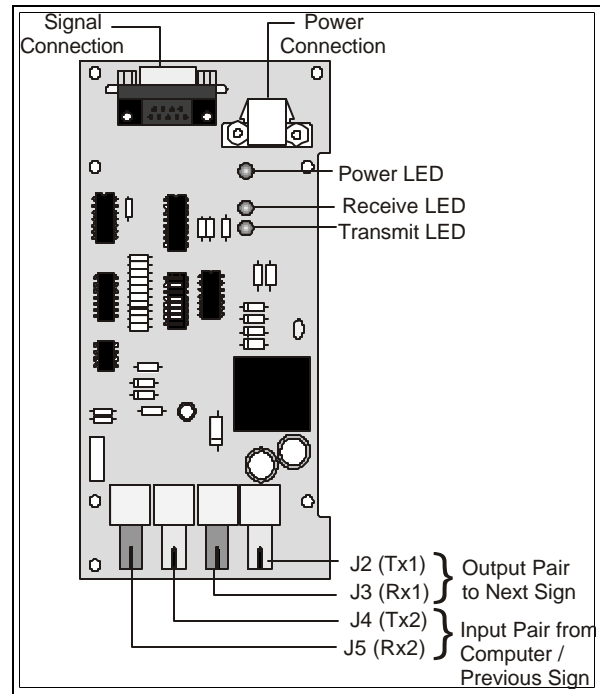
**Figure 22:** Modem Board

## Fiber Board

The fiber module has three LEDs. The power LED (DS1) should remain lit while power is applied to the module. The receive LED (DS2) will light when the display fiber board is accepting signal from the computer fiber board. The transmit LED (DS3) will light when the display fiber board is sending to the computer fiber board. In addition, the fiber module has two input fiber connectors, which the computer or the previous display connects to, and two output fiber connectors that connect to the next display. The fiber board connects to the controller board with a small DB9 adapter and straight through RJ11 cable.

To replace a fiber optic board:

1. Disconnect the power and signal connections (refer to **Figure 23** for disconnection of power).
2. The fiber optic board is held in place with four screws. Carefully remove them.
3. Install the new fiber optic board, replace the screws and reconnect power and signal cables.



**Figure 23:** Fiber Optic Board

## Power Supplies

The LED power supplies are identified as assemblies 0A-1259-4005 for amber displays and 0A-1259-4008 for red displays, in the **Display Assembly** drawings. Each power supply controls two modules.

Complete the following steps to remove a power supply from the sign:

1. Remove the module directly in front of the failed power supply.
2. Disconnect all the wires connected to the power supply.
3. Remove the hardware holding the power supply in place to free the unit.
4. Follow these steps in reverse order to install a new power supply.
5. Verify power supply voltage



## 4.7 Optional Temperature Sensor Electrical Installation

---

### Reference Drawings:

Temp Sensor Mounting .....	<b>Drawing A-79767</b>
Signal Input, Venus 1500.....	<b>Drawing A-129110</b>

After mounting the optional temp sensor, follow these steps to complete the electrical installation. A 2-pair, individually shielded cable (Belden 5594, Daktronics part number W-1234) is used to connect the sensor to the controller.

1. Run ½" conduit from the sensor location to the controller within the display. The cable must be routed through one-foot of ½" metal conduit that should be earth-grounded to protect the sensor and controller from lightning damage.
2. Connect the cable to the temperature sensor terminal block within the temperature sensor as follow:

Wire Color	Terminal Block
Red	V+
Green	P
Black	GND
White	N

3. Install the mesh screen with the four screws enclosed.
4. Disconnect power to the display before attaching the cable
5. Connect the cable to the temperature sensor terminal block on the controller (TB7) per the following table:

Wire Color	Terminal Block TB7 (Temp In)
	Pin 1 (+5)
	Pin 2 (GND)
	Pin 3 (Light +)
	Pin 4 (Light -)
Green	Pin 5 (Temp +)
White	Pin 6 (Temp -)
Red	Pin 7 (+5V)
Black & Shield	Pin 8 (GND)
OR Bare (shield)	Pin 8 (GND)

To connect the temperature sensor to multiple displays (such as a double-face display):

Wire Color	Display 1 TB7	Display 2 TB7
Green	Pin 5 (Temp+)	Pin 5 (Temp +)
White	Pin 6 (Temp -)	Pin 6 (Temp -)
Red	NC	NC
Black	NC	NC

## 4.8 Ventilation Systems

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Check ventilation fans after 1,500 hours of operation and every 1,500 hours after that to ensure the sign cools properly. Check fans more often if the sign is located in a dusty or harsh weather environment (i.e. along a gravel road with dust laden air).

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

**L Attention:** Shut off power to the sign when it is not in use. Leaving the power on when the sign is not operating exposes electrical components to excess condensation, which shortens their life.

Each time you open the display, for whatever reason, take a minute to inspect the fans.

- Check the fan blades for dirt and debris. If the fan blades have a large accumulation of dirt and debris, change the filters more often. Keep the fan blades clean to maintain fan efficiency and ensure proper cooling.
- 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:

- Hold your hand or a piece of light paper beneath the sign to detect air movement. If the operation of a fan is questionable, a fan-test should be performed
- Press button on the internal thermostat and ensure they run freely.
- If the fan does not turn or does not operate smoothly, replace it.

## 4.9 Thermostats

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### Reference Drawings:

Display Assembly.....**Appendix A**

A thermostat controls when the ventilation fans operate in the sign. Refer to the **Display Assembly** drawing for the location of the thermostat. The ventilation fans turn on when the inside of the fan reaches 85° F (29° C), and turn off at 70° F (21° C).

## 4.10 Sign Maintenance

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Perform a yearly inspection to maintain safe and dependable sign operation. This inspection should address the following issues:

- **Loose Hardware**  
Verify fasteners, such as bolts and rivets, have not come loose. Check, tighten, and replace fasteners as required.
- **Excessive Dust Buildup**  
Occasionally it may be necessary to vacuum the inside of the sign cabinet to remove dust/dirt buildup that may interfere with airflow.
- **Water Intrusion – Water Stain Marks**  
Water can enter the sign where weather stripping has come loose or deteriorated or where fasteners have come loose allowing gaps in the panels or where moisture may be entering around hardware. Check electronic components for signs of corrosion.

- **Corrosion**  
Check the paint; look for possible corrosion, especially at footings, structural tie points and ground rods.

**If you notice any of the above conditions, take action to correct the situation.**

#### **4.11 Weather Stripping**

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To ensure the sign is weather resistant, Daktronics provides weather stripping around the entire sign and around each module. The weather stripping must be properly installed at all times or water may leak into the sign, damaging the components.

## 4.12 Troubleshooting

This sub-section contains some symptoms that you may encounter in the signs. 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 pixel strip</li> <li>• Replace/check cables on the module.</li> <li>• Replace the driver.</li> </ul>
One or more LEDs on a single module fail to turn off.	<ul style="list-style-type: none"> <li>• Replace pixel strip</li> <li>• Replace/check cables on module.</li> <li>• Replace the driver.</li> </ul>
A section of the sign is not working. The section extends all the way to the right side of the sign.	<ul style="list-style-type: none"> <li>• Replace the first driver on the left side of the first module that is not working.</li> <li>• Replace the second driver that is not working.</li> <li>• Replace the power supply assembly on the first module that is not working.</li> <li>• Replace the ribbon cable.</li> </ul>
One row of modules does not work or is garbled.	<ul style="list-style-type: none"> <li>• Replace first driver.</li> <li>• Replace controller.</li> <li>• Check the fuses in the power termination box.</li> </ul>
A group of modules, which share the same power supply assembly, fail to work.	<ul style="list-style-type: none"> <li>• Replace the power supply assembly.</li> <li>• Check power supply voltage</li> </ul>
Entire sign fails to work.	<ul style="list-style-type: none"> <li>• Check for proper line voltage into the power termination panel.</li> <li>• Check/replace the signal cable to the controller.</li> <li>• Check/replace the ribbon cable from the controller to the driver.</li> <li>• Check the voltage settings on the power supplies.</li> <li>• Replace the controller.</li> <li>• Verify proper use of the software in the operation manual.</li> </ul>
Temperature always reads 32 degrees F/0 degrees C	<ul style="list-style-type: none"> <li>• Check temperature sensor connections.</li> <li>• Replace the temperature sensor.</li> <li>• Replace the controller.</li> </ul>
Sign 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.</li> <li>• Check light detector for obstructions.</li> <li>• Replace the light detector.</li> <li>• Replace the controller.</li> </ul>

### 4.13 Boot Up Initialization Information

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Every time the display is powered up, the display will run through an initialization in which it will display the following:

1. Output Test (DDD)
2. Product Name (Galaxy)
3. Display Size (Row x Column)
4. Firmware Number (**ED-10134**)
5. Firmware Revision (Rev X.XX)
6. COM1 Configuration (C1: V15/RTD)
7. COM2 Configuration (C2: None)
8. Line Frequency (60 Hz)
9. Hardware Address (HW: XX)
10. Software Address (SW: XX)
11. Display Name
12. Modem (If modem is present)

### 4.14 Replacement Parts List

---

The following table contains some of the items in this sign that you may need to replace over time. Many of the parts within the sign also list their part numbers on labels affixed to them.

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

Part Description	Part Number
Controller	0A-1146-0035
Signal Converter-wire	0A-1127-0237
Signal Converter-Fiber	0A-1127-0239
Modem in display	0P-1146-0003
Light Detector	0P-1151-0002
Digital Temp Sensor	0P-1151-0003
Fiber Board in Display	0P-1127-0024
422 Surge Protector	0P-1146-0031
Phone Surge Protector	A-1527
Thermostat Enclosure	0A-1213-4024
Cable, 40-pin ribbon, 66 inch, Dual Row	W-1439
Cable Assy, 6-pin to 6-pin harness	0A-1261-0001
Amber Pixel Strip	0P-1261-0003
Red Pixel Strip	0P-1261-0004
Driver Board	0P-1261-0002
Power Supply – Red	0A-1259-4008
Power supply – Amber	0A-1259-4005
Fan; 110CFM, 115VAC, 17W, 60Hz, 4.5"	B-1006
Line Filter Assembly	0A-1259-4003
Manual; Venus 1500 Operator's	ED-12717
Manual; Galaxy Outdoor 89 mm Louvered Signs	ED-13288

## 4.15 Daktronics Exchange/Repair & Return Programs

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To serve customers' repair and maintenance needs, Daktronics offers both an exchange and a repair and return program. The exchange program reduces down time by providing timely replacement of key components. Daktronics provides this service to qualified customers who follow the program guidelines explained below. We are pleased to provide this service to ensure you get the most from your Daktronics products. Please call our Help Desk (1-877 / 605-1114) if you have any questions regarding the exchange program or any other Daktronics service.

When you call the Daktronics Help Desk, a trained service technician will work with you to solve the equipment problem. You will work together to diagnose the problem and determine which exchange replacement part to ship. If, after you make the exchange, the equipment still causes problems, please contact our Help Desk immediately.

If the replacement part fixes the problem, package the defective part in the same packaging the replacement part arrived in, fill out and attach the enclosed UPS shipping document and **RETURN THE PART TO DAKTRONICS**. (You may use the same box and packing used to send the exchange part.) This will speed up the transaction and alleviate confusion when the failed component arrives at Daktronics. (Daktronics expects immediate return of the exchange part if it does not solve the problem.) For most equipment, we will invoice you for the replacement part at the time we ship it. This invoice is due when you receive it.

Daktronics reserves the right to refuse equipment damaged due to acts of nature or causes other than normal wear and tear.

*If you do not ship the defective equipment to Daktronics within 30 working days from the invoice date, we will assume you will purchase the replacement part and we will invoice you for it. This second invoice represents the difference between the exchange price and the purchase price of the equipment. This amount is due when you receive the second invoice. If you return the exchange equipment after 30 working days from invoice date, we will credit you for the amount on the second invoice minus a restocking fee.*

@To avoid a restocking charge, please return the defective equipment within 30 days from the invoice date.

Daktronics also offers a Repair and Return program for items not subject to exchange.

**Where to Send:** To return parts for service, contact your local representative prior to shipment to acquire a Return Material Authorization Number (RMA#). If you have no local representative, call the Daktronics Help Desk for the RMA#. This will expedite the receiving process.

**Packaging for Return:** Package and pad the item well so shipment does not damage it. You should either install electronic components such as printed circuit boards in an enclosure or put them in an anti-static bag before boxing. Please enclose your name, address, phone number and a clear description of symptoms.

**Mail:** Daktronics, Inc., Customer Service  
PO Box 5128  
331 32nd Avenue  
Brookings, SD 57006

**Phone:** Daktronics Help Desk: 1-877 / 605-1113 (toll free)  
Or 1-605 / 697-4034

**Customer Service Fax:** 1-605 / 697-4444

**E-mail:** [helpdesk@daktronics.com](mailto:helpdesk@daktronics.com)

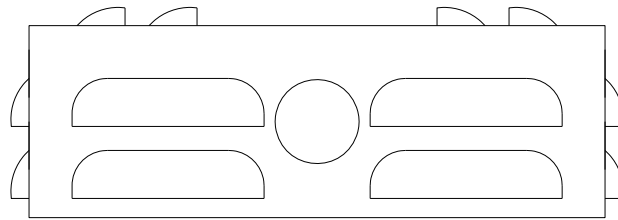
# Appendix A: Reference Drawings

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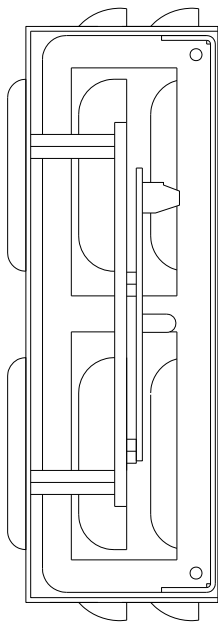
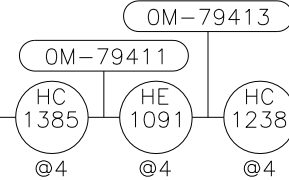
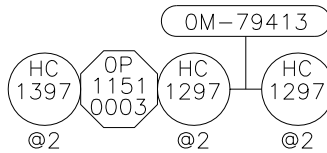
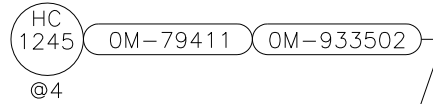
Refer to **Section 1.1** for information on reading drawing numbers. This appendix lists the following drawings in numerical order by size (A, B, etc.)

Assy, Digital Temp Sensor Housing.....	Drawing A-79410
Temp Sensor Mounting .....	Drawing A-79767
System Riser Diagram, Modem.....	Drawing A-88426
System Riser Diagram, RS422.....	Drawing A-92681
System Riser Diagram, RS232.....	Drawing A-96058
System Riser Diagram, Fiber.....	Drawing A-110559
Schematic; Fiber/Modem Input.....	Drawing A-125900
Signal Input, Venus 1500.....	Drawing A-129110
AF-3090 Controller Assembly, RS232/422 .....	Drawing A-158254
Power Specs, AF-3090, Amber .....	Drawing A-158396
Z-Filter Assy 2, W/GND Bar.....	Drawing A-158472
Assy, Pwr Sply, AF-3090 .....	Drawing A-158580
Driver Assembly, AF-3090, 8X8-24.....	Drawing A-161661
Layout, Panel Board, 8-32x48, 24", 30", 36", 3 PH.....	Drawing A-161874
AF-3090 Controller Assembly Modem .....	Drawing A-162098
AF-3090 Controller Assembly Fiber .....	Drawing A-162099
Power Specs, AF-3090, Red LEDs .....	Drawing A-162439
Shop Drawing, AF-3090, 8x**-24 Amber/Red.....	Drawing B-160986
Shop Drawing, AF-3090, 16x**-24 Amber/Red.....	Drawing B-160987
Shop Drawing, AF-3090, 24x**-24 Amber/Red.....	Drawing B-160988
Shop Drawing, AF-3090, 32x**-24 Amber/Red.....	Drawing B-160989
Schematic, AF-3090-8-32x***-24, Mono .....	Drawing B-161855
Face Panel, AF-3090, 8x8-24 Amber.....	Drawing C-160183
Face Panel, AF-3090, 8x8-24, Red .....	Drawing C-160825

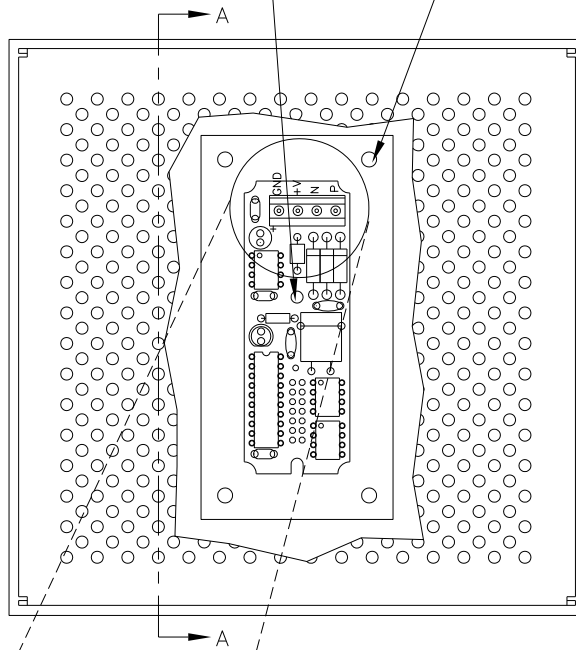




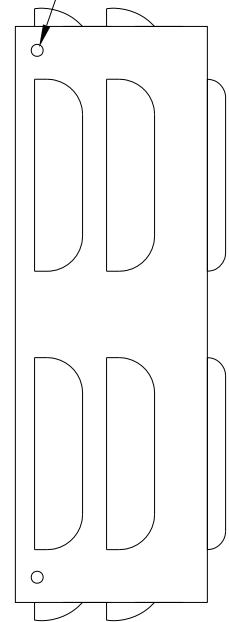
FRONT VIEW



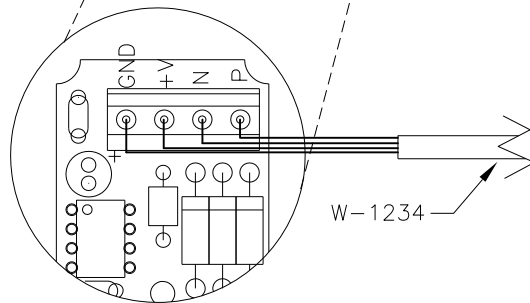
SECTION VIEW A-A



BOTTOM VIEW



RIGHT SIDE

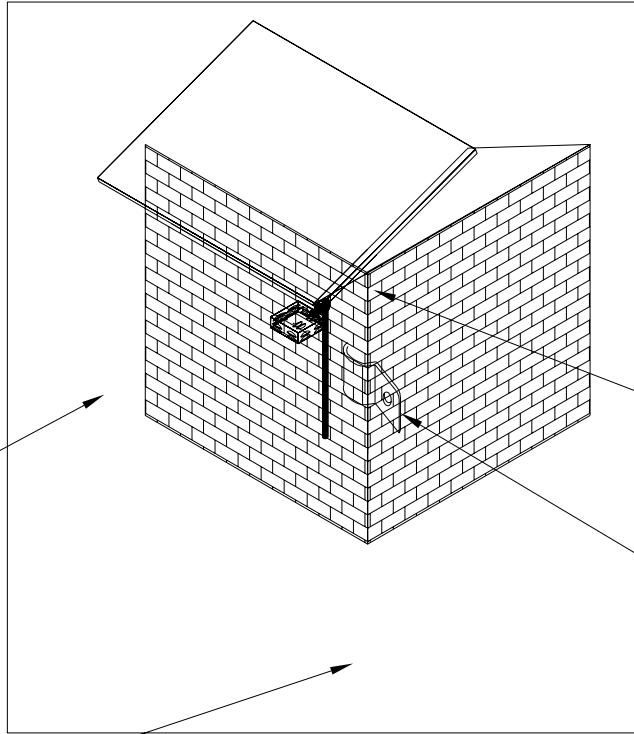


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<b>DAKTRONICS, INC. BROOKINGS, SD 57006</b>			
PROJ: LIGHT AND TEMP SENSORS			
TITLE: ASSY- DIGITAL TEMP SENSOR HOUSING			
DES. BY: CIVERSEN		DRAWN BY: CIVERSEN	
DATE: 26 FEB 96			
<b>REVISION</b>	APPR. BY:	<b>1151-E10A-79410</b>	
03	SCALE: 1=2		

REV.	DATE	DESCRIPTION	BY	APPR.
03	16 NOV 09	REPLACED OM-79412 WITH OM-933502	LJH	
2	06MAY97	ADDED W-1234 CABLE AND VIEW FOR WIRING CABLE WHEN INSTALLING TEMP SENSOR	RLONG	
1	9 APRIL 96	CHANGED HC-1141 TO HC-1385 PER ECO #7370.	MWM	

THERE SHOULD BE AT LEAST 1 FT BETWEEN THE BOTTOM OF THE EAVE AND THE TOP OF THE TEMP SENSOR HOUSING FOR ACCURATE READINGS.

TEMP SENSOR HOUSING  
(SUPPLIED BY DAKTRONICS)



CONDUIT OUTLET BODY  
(SUPPLIED BY DAKTRONICS)

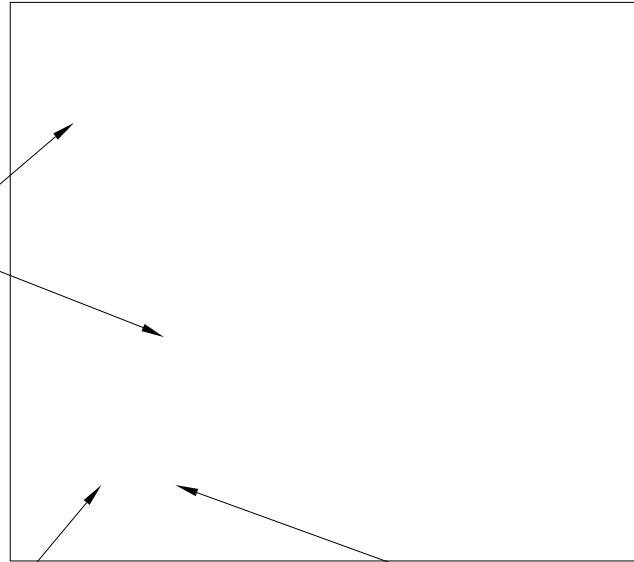
INSURE THAT CONDUIT IS SUPPORTED AT TOP END NEAR SENSOR.

1/2" CONDUIT  
(SUPPLIED BY CUSTOMER)

EAVE/WALL MOUNT

BOTTOM OF DISPLAY

1 FT OF 1/2" CONDUIT  
(SUPPLIED BY CUSTOMER)



MOUNTING TO THE TOP OF THE DISPLAY IS DONE IN THE SAME MANNER EXCEPT THE CONDUIT HAS TO BE 6 FT LONG.

TEMP SENSOR HOUSING  
(SUPPLIED BY DAKTRONICS)

CONDUIT OUTLET BODY  
(SUPPLIED BY DAKTRONICS)

MOUNTING TO BOTTOM OF DISPLAY

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ:

TITLE: TEMP SENSOR MOUNTING

DES. BY:

DRAWN BY: NJA

DATE: 20 MAR 96

REVISION

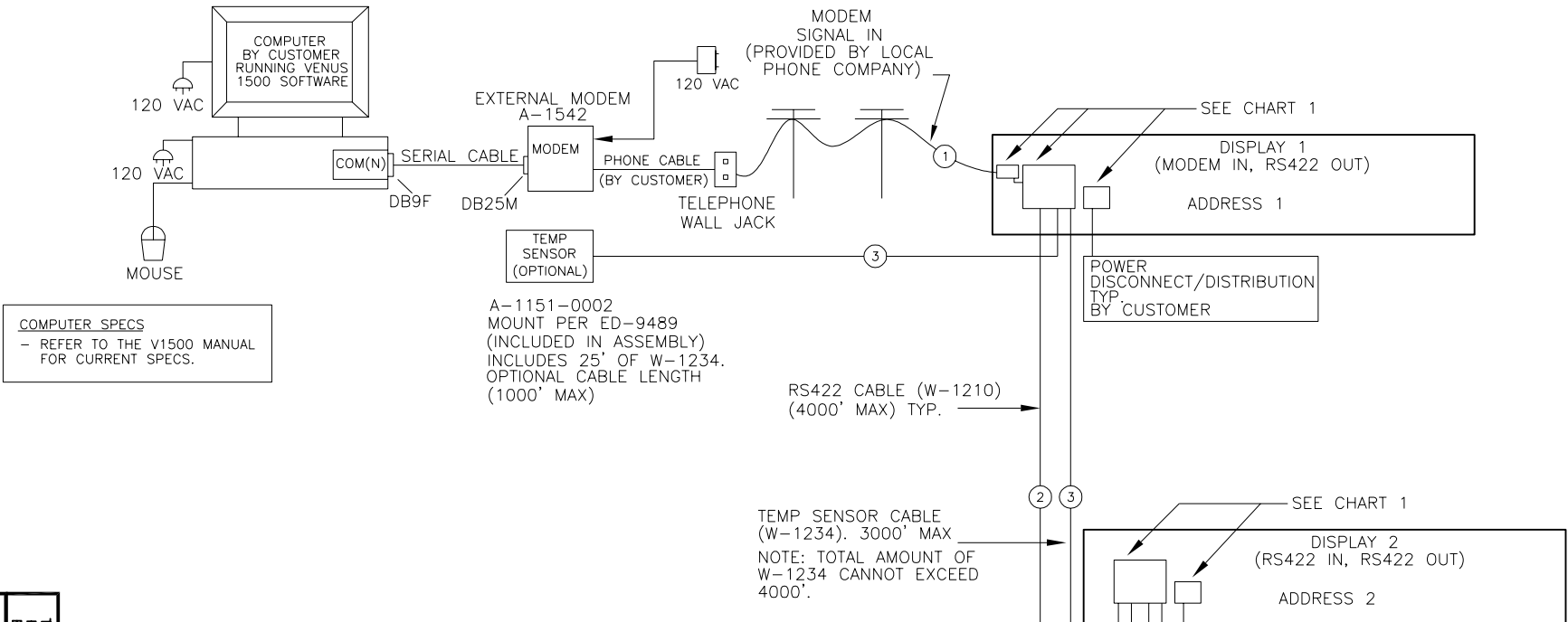
APPR. BY:

SCALE: NONE

1151-R11A-79767

REV.	DATE	DESCRIPTION	BY	APPR.
2	27DEC99	CLEANED UP DRAWING.	NJA	
1	19AUG98	ADDED CONDUIT CLAMP FOR EAVE/WALL MOUNT	JRT	

REV.	DATE	DESCRIPTION	BY	APPR.
8	23 FEB 07	ADDED REFERENCE TO MANUALS AND DETAIL A & B (OPENED CHANGE - REMOVED DB25F COM PORT REFERENCES. ADDED AF-3060 AND AF-3090 TO CHART 1)	MLG	
7	06MAY02		TJN	



- NOTES
- PHONE CABLE. BY CUSTOMER.
  - 6 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE. DAK. P.N. (W-1210). BELDON P.N. (9942) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE PHOENIX TERMINAL BLOCKS. REFER TO DISPLAY MANUAL FOR TERMINATION. FIELD CABLES ARE "FLIPPED" FROM ONE END TO THE OTHER.
  - 4 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE. DAK. P.N. (W-1234). MANHATTAN P.N. (M4473) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE PHOENIX TERMINAL BLOCKS. REFER TO DISPLAY MANUAL FOR TERMINATION. (OPTIONAL WITH TEMP SENSOR).
  - MODEM CONTROL EQUIPMENT KIT INCLUDES:  
W-1249.....SERIAL CABLE  
A-1542.....EXTERNAL MODEM
  - INPUT TO MODEM IS RS232.
  - ALL SIGNAL CABLES BY CUSTOMER. LABOR TO PULL CABLES BY CUSTOMER.
  - ALL POWER WIRES BY CUSTOMER. LABOR TO PULL WIRES BY CUSTOMER.
  - ALL WIRING TO MEET NEC AND LOCAL ELECTRICAL CODES. DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NATIONAL ELECTRICAL CODE.

DETAIL: A

FIELD CABLE	TB2 OF MODEM	MODEM TB2
COLOR	PIN	
TIP	1	
RING	2	

DETAIL: B

FIELD CABLE	J5 (RJ11) OF MODEM	MODEM J5
COLOR	PIN	
TIP	3	
RING	4	

CHART 1

DISPLAY TYPE	POWER CONN. DWG.#	SIGNAL CONN. DWG.#	POWER SPEC. DWG.#
AF-3020	A-140262	A-88427	A-154944
X-1000	A-140262	A-88427	A-154944

PROJ: OUTDOOR LED PRODUCT LINE

TITLE: SYSTEM RISER DIAGRAM, MODEM

DES. BY: JCOOK

APPR. BY: AMEYER

DRAWN BY: AMEYER

DATE: 21NOV96

DAKTRONICS, INC. BROOKINGS, SD 57006

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1	12DEC96	ADDED NOTES FOR ADDITIONAL DISPLAY WIRING	JHC
2	27 MAY 98	DELETED ED'S FROM LIST OF PART NO.'S DELETED G-1000 FROM DISPLAYS & TITLE BLOCK MOVED TERM PANELS TO LOWER LEFT CORNER	JEM
3	06APR00	REPLACED ENTIRE DRAWING TO INCLUDE ALL OUTDOOR DISPLAYS.	LLK
4	27 OCT 00	CHANGED POWER CONN. DWG# FROM B-98318 TO A-140262.	LMH
5	30JUL01	CHANGED TEMP SENSOR TO OPTIONAL	LLK
6	27 AUG 01	ADDED DRAWINGS, AF-3060-RG, AND AF-3065 TO CHART 1.	DJM

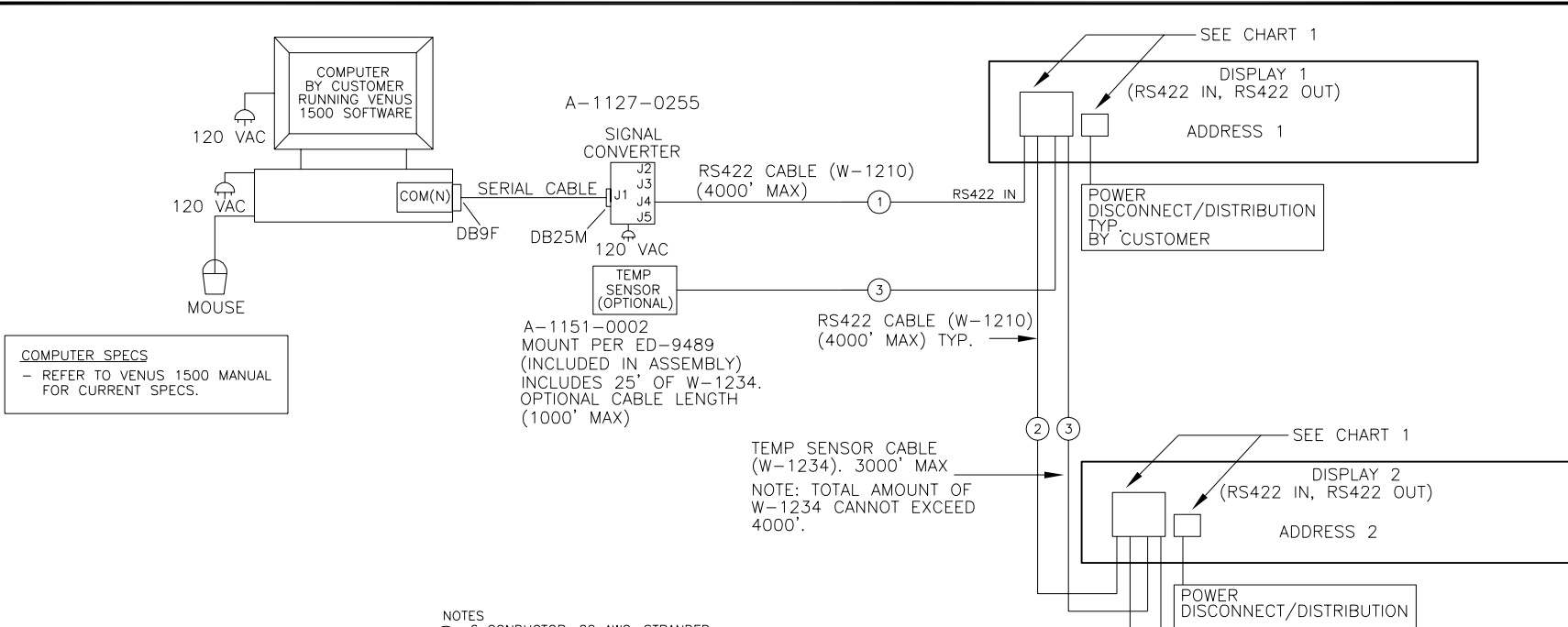
REVISION

APPR. BY: AMEYER

SCALE: NONE

1137-R01A-88426

REV.	DATE	DESCRIPTION	BY	APPR.
7	23 FEB 07	UPDATED CHART 1. REMOVED DB25F COM PORT REFERENCES & A-1127-0237 SIGNAL CONVERTER	MLG	
6	26 MAR 04	REPLACED 0A-1127-0237 WITH 0A-1127-0255 (INCLUDES SURGE PROTECTION)	SAI	DJM
5	06MAR02	ADDED AF-3080 AND AF-3090 TO CHART 1	TJN	



**COMPUTER SPECS**  
 - REFER TO VENUS 1500 MANUAL FOR CURRENT SPECS.

- NOTES
- 6 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE, DAK, P.N. (W-1210). BELDON P.N. (9942) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE PHOENIX TERMINAL BLOCKS. REFER TO DETAIL A FOR TERMINATION. FIELD CABLES ARE PINNED 1 TO 1 FROM ONE END TO THE OTHER.
  - 6 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE, DAK, P.N. (W-1210). BELDON P.N. (9942) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE PHOENIX TERMINAL BLOCKS. REFER TO DISPLAY MANUAL FOR TERMINATION. FIELD CABLES ARE "FLIPPED" FROM ONE END TO THE OTHER.
  - 4 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE, DAK, P.N. (W-1234). MANHATTAN P.N. (M4473) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE PHOENIX TERMINAL BLOCKS. REFER TO DISPLAY MANUAL FOR TERMINATION.
4. RS422 CONTROL EQUIPMENT KIT INCLUDES:  
 W-1249.....SERIAL CABLE  
 A-1127-0255.....SIGNAL CONVERTER
6. INPUT TO CONVERTER IS RS232, OUTPUTS RS422.
7. ALL SIGNAL CABLES BY CUSTOMER. LABOR TO PULL CABLES BY CUSTOMER.
8. ALL POWER WIRES BY CUSTOMER. LABOR TO PULL WIRES BY CUSTOMER.
9. ALL WIRING TO MEET NEC AND LOCAL ELECTRICAL CODES. DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NATIONAL ELECTRICAL CODE.

DETAIL: A

SIGNAL CONVERTER	J4 OR J5	FIELD CABLE	TB42 OF DISPLAY	TERMINAL BLOCK
	PIN	COLOR	PIN	
	1	RED	1	
	2	BLK	2	
	3	BRO	3	
	4	WHT	4	
	5	BLU	5	
	6	GRN	6	
		SHIELD	N.C	

CHART 1

DISPLAY TYPE	POWER CONN. DWG.#	SIGNAL CONN. DWG.#	POWER SPEC. DWG.#
AF-3020	A-140262	A-88427	A-154944
X-1000	A-140262	A-88427	A-154944

PROJ: OUTDOOR LED PRODUCT LINE  
 TITLE: SYSTEM RISER DIAGRAM, RS422  
 DES. BY: JCOOK  
 DRAWN BY: AMEYER  
 DATE: 30APR97

REVISION 07  
 APPR. BY: NONE  
 SCALE: NONE  
 1137-R01A-92681

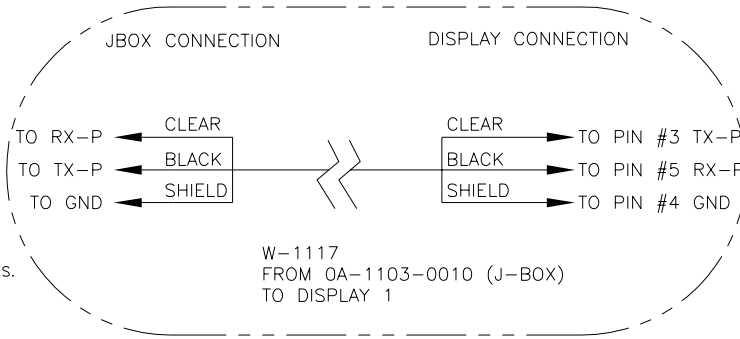
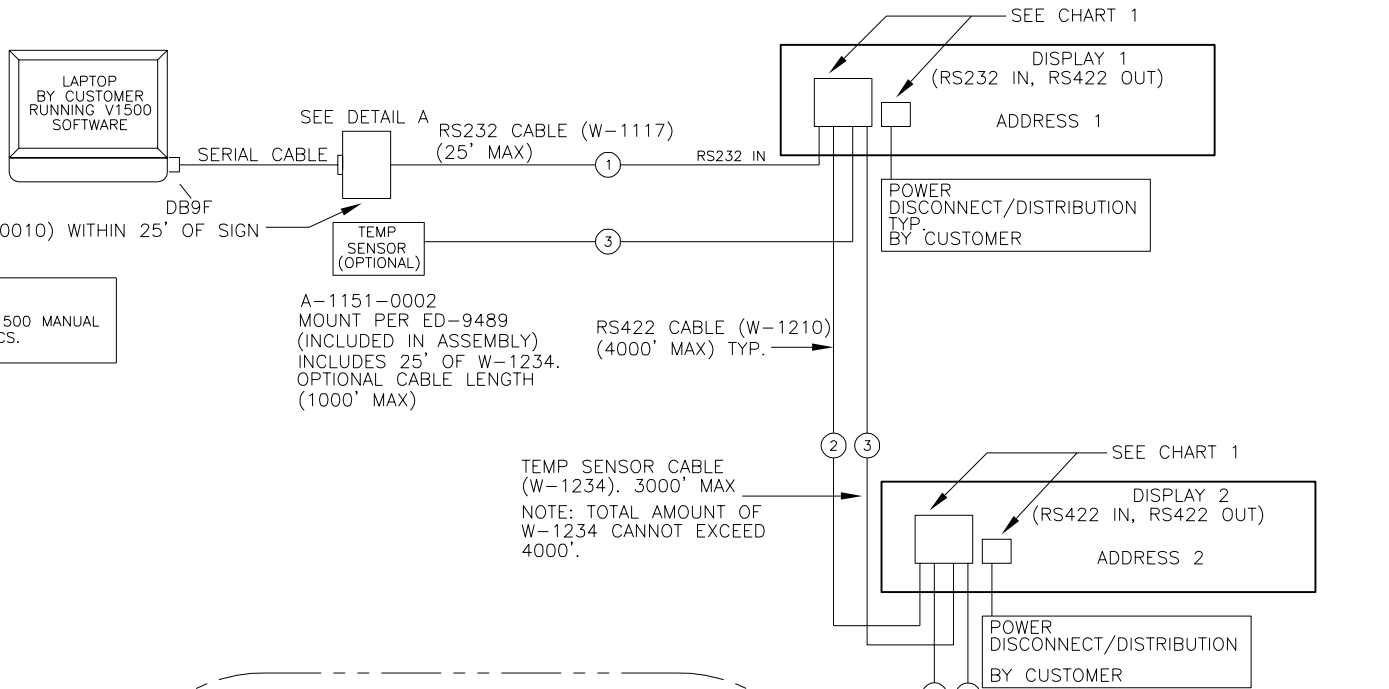
REV.	DATE	DESCRIPTION	BY	APPR.
4	27 AUG 01	REVISED COMPUTER SPEC BOX. ADDED DRAWINGS: AF-3060-RG, AND AF-3065 TO CHART 1.		DJM
3	27 OCT 00	CHANGED POWER CONN. DWG# FROM B-98318 TO A-140262. ADDED DISTRIBUTION TO DISCONNECT/DISTRIBUTION		LMH
2	06APR00	REPLACED ENTIRE DRAWING TO INCLUDE ALL OUTDOOR DISPLAYS		LLK
1	27 MAY 98	DELETED ED'S FROM LIST OF PART NO.'S. DELETED G-1000 FROM DISPLAYS. MOVED TERM PANELS TO LOWER LEFT CORNER		RK

DAKTRONICS, INC. BROOKINGS, SD 57006

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REV.	DATE	DESCRIPTION	BY	APPR.
1	27 MAY 98	DELETED ED'S FROM LIST OF PART NOS. & DELETED C-1000 FROM DISPLAYS & MOVED TERM PANELS TO LOWER LEFT CORNER	JEM	RK
2	06APR00	REPLACED ENTIRE DRAWING TO INCLUDE ALL OUTDOOR DISPLAYS.	LLK	
3	27 OCT 00	CHANGED POWER CONN. DWG# FROM B-98318 TO CHART 1	LMH	
4	27 AUG 01	REVISED COMPUTER SPEC BOX, ADDED DETAILS N-3000-1G, AND A-3009	DJM	
5	06 MAR 02	ADDED AF-3080 AND AF-3090 TO CHART 1	TJN	
6	23 FEB 07	UPDATED CHART 1 REFERENCES REMOVED DB25F COM PORT REFERENCES.	MLG	

**COMPUTER SPECS**  
 - REFER TO VENUS 1500 MANUAL FOR CURRENT SPECS.



**NOTES**

- 2 CONDUCTOR, 18 AWG, STRANDED SHIELDED CABLE. DAK. P.N. (W-1117). BELDON P.N. (8760) OR EQUIV.
- 6 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE. DAK. P.N. (W-1210). BELDON P.N. (9942) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE PHOENIX TERMINAL BLOCKS. REFER TO DISPLAY MANUAL FOR TERMINATION. FIELD CABLES ARE "FLIPPED" FROM ONE END TO THE OTHER.
- 4 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE. DAK. P.N. (W-1234). MANHATTAN P.N. (M4473) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE PHOENIX TERMINAL BLOCKS. REFER TO DISPLAY MANUAL FOR TERMINATION.
- RS/232 CONTROL EQUIPMENT KIT INCLUDES:  
 W-1249.....SERIAL CABLE  
 A-1103-0010.....J-BOX
- INPUT TO J-BOX IS RS232, OUTPUT IS RS232.
- ALL SIGNAL CABLES BY CUSTOMER. LABOR TO PULL CABLES BY CUSTOMER.
- ALL POWER WIRES BY CUSTOMER. LABOR TO PULL WIRES BY CUSTOMER.
- ALL WIRING TO MEET NEC AND LOCAL ELECTRICAL CODES. DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NATIONAL ELECTRICAL CODE.

CHART 1

DISPLAY TYPE	POWER CONN. DWG.#	SIGNAL CONN. DWG.#	POWER SPEC. DWG.#
AF-3020	A-140262	A-88427	A-154944
X-1000	A-140262	A-88427	A-154944

PROJ: OUTDOOR LED PRODUCT LINE

TITLE: SYSTEM RISER DIAGRAM, RS232

DES. BY: DRAWN BY: CIVERSEN DATE: 28 AUG 97

REVISION APPR. BY: SCALE: NONE

1137-R01A-96058

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DAKTRONICS, INC. BROOKINGS, SD 57006

REV.	DATE	DESCRIPTION	BY	APPR.
5	06MAR02	ADDED AF-3080 AND AF-3090 TO CHART 1	TJN	
6	26 MAR 04	REPLACED A-1127-0256 WITH 0A-1127-0256 (INCLUDES SURGE PROTECTION)	SAI	DJM
7	23 FEB 07	UPDATED CHART 1. REMOVED DB9F COM PORT REFERENCE & A-1127-0256 SERIAL CONVERTER AND MANUAL REFERENCES AND DETAIL A.	MLG	

**COMPUTER SPECS**  
- REFER TO VENUS 1500 MANUAL FOR CURRENT SPECS.

1	20JAN99	REVISED FIBER CABLE LENGTH FROM 3000' MAX TO 2000' MAX.	LLK
2	06APR00	REPLACED ENTIRE DRAWING TO INCLUDE ALL OUTDOOR DISPLAYS.	LLK
3	27 OCT 00	ADDED DISTRIBUTION TO DISCONNECT/DISTRIBUTION TO A-140262.	LMH
4	27 AUG 01	REVISED COMPUTER SPEC BOX AND ADDED DRAWINGS, AF-3060-RG, AF-3065 TO CHART 1.	DJM

PROJ: OUTDOOR LED PRODUCT LINE

TITLE: SYSTEM RISER DIAGRAM, FIBER

DES. BY:

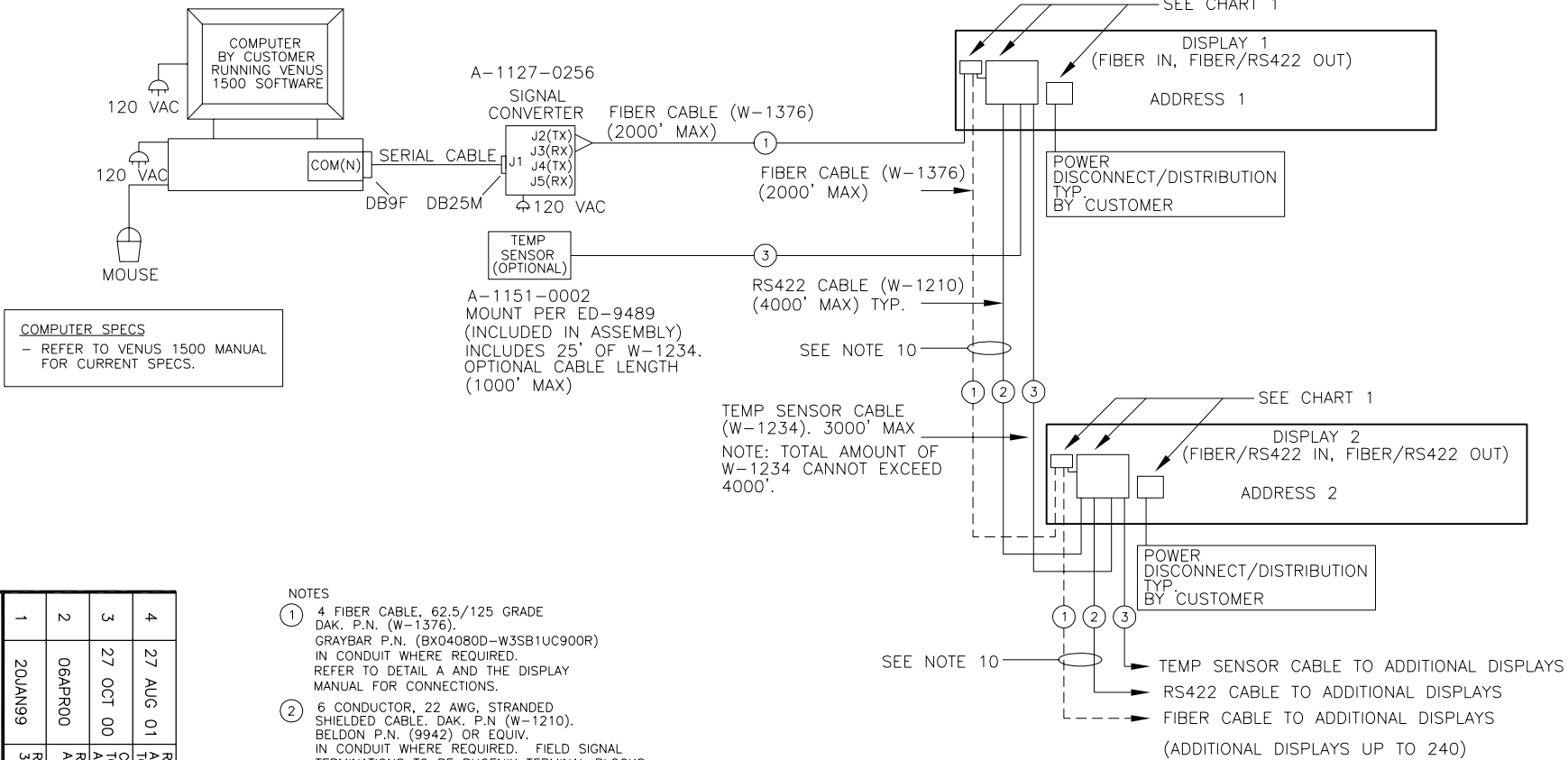
DRAWN BY: LKERR

DATE: 29DEC98

REVISION

APPR. BY:

1137-R01A-110559



**NOTES**

- 4 FIBER CABLE, 62.5/125 GRADE DAK. P.N. (W-1376). GRAYBAR P.N. (BX04080D-W3S1UC900R) IN CONDUIT WHERE REQUIRED. REFER TO DETAIL A AND THE DISPLAY MANUAL FOR CONNECTIONS.
- 6 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE, DAK. P.N. (W-1210). BELDON P.N. (9942) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE PHOENIX TERMINAL BLOCKS. REFER TO DISPLAY MANUAL FOR TERMINATION. FIELD CABLES ARE "FLIPPED" FROM ONE END TO THE OTHER.
- 4 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE, DAK. P.N. (W-1234). MANHATTAN P.N. (M4473) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE PHOENIX TERMINAL BLOCKS. REFER TO DISPLAY MANUAL FOR TERMINATION.
- FIBER CONTROL EQUIPMENT KIT INCLUDES:  
W-1249.....SERIAL CABLE  
A-1127-0256.....SIGNAL CONVERTER
- INPUT TO CONVERTER IS RS232.
- ALL SIGNAL CABLES BY CUSTOMER. LABOR TO PULL CABLES BY CUSTOMER.
- ALL POWER WIRES BY CUSTOMER. LABOR TO PULL WIRES BY CUSTOMER.
- ALL WIRING TO MEET NEC AND LOCAL ELECTRICAL CODES. DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NATIONAL ELECTRICAL CODE.
- DISPLAY OUTPUTS CAN BE EITHER FIBER OR RS422.

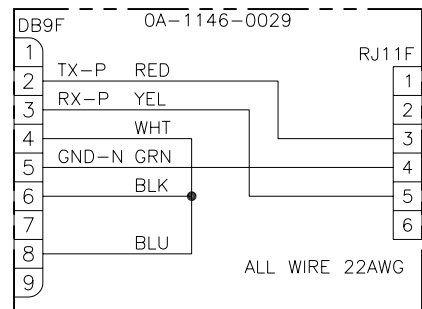
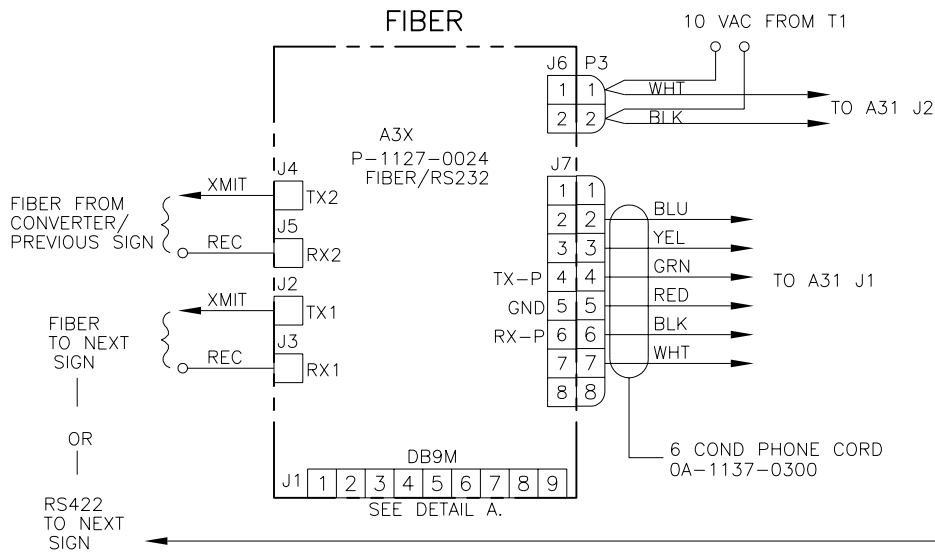
**DETAIL: A**

COMPUTER	SIGNAL CONVERTER	FIELD CABLE	FIBER BOARD	DISPLAY
	PIN		PIN	
	J2(TX)		J5(RX)	
	J3(RX)		J4(TX)	

CHART 1

DISPLAY TYPE	POWER CONN. DWG.#	SIGNAL CONN. DWG.#	POWER SPEC. DWG.#
AF-3020	A-140262	A-88427	A-154944
X-1000	A-140262	A-88427	A-154944

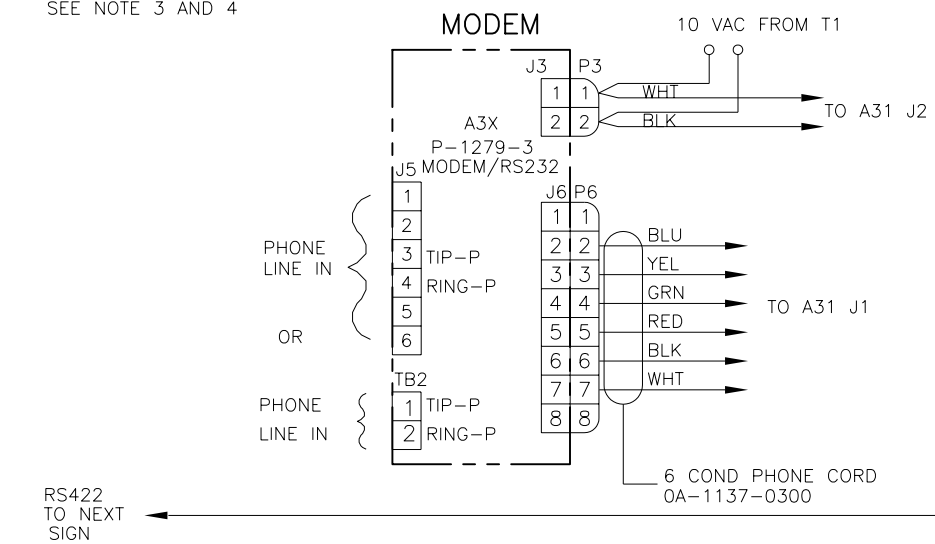
DETAIL: A



IF FIBER CARD IS BELOW REVISION 10, PC ADAPTOR(OA-1146-0029) IS REQUIRED TO CONNECT RJ11 CABLE FROM A31 J1 TO J1 OF FIBER CARD.

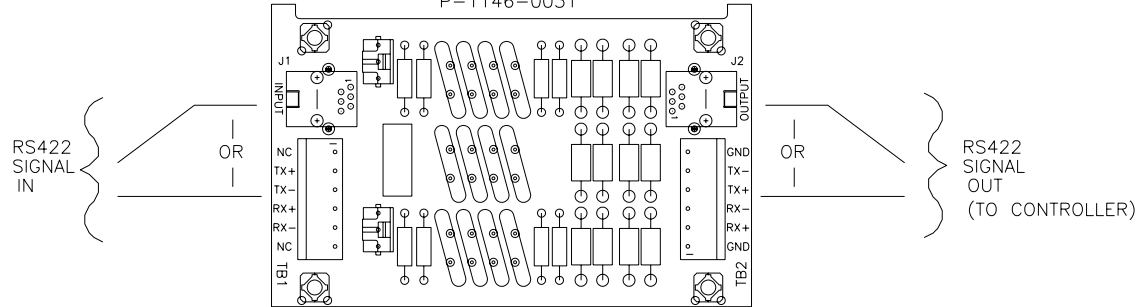
SEE NOTE 3 AND 4

COM1 RS422 OUT (FROM CONTROLLER)



SEE NOTE 3

RS422 SURGE PROTECTOR P-1146-0031



NOTES

- 1) ALL WIRE IS 18 AWG UNLESS OTHERWISE NOTED.
- 2) REFER TO DISPLAY SCHEMATICS FOR COMPLETE SIGN WIRING.
- 3) SURGE PROTECTOR AND MODEM CARDS MUST BE CONNECTED TO THE SIGN'S CHASSIS IN ORDER TO BE EFFECTIVE. THE MOUNTING HOLES (GROUND PADS) OR PIN 1 & 6 OF TB2 ARE USED FOR THIS GROUND CONNECTION.
- 4) AF-3010. TERMINATE TO TB42 PINS 3 (RED) & 4 (GRN).

05	27SEP06	REPLACED P-1146-3 MODEM WITH P-1279-3 REMOVED TELECOM CONNECTOR AND SURGE. REPLACED A-1137-160 WITH A-1137-300.	MLG	
04	09SEPT03	ADDED DETAIL A. J7 WAS ADDED ON REVISION 10 OF FIBER CARD. PC ADAPTOR IS NO LONGER REQUIRED FOR CONNECTION TO CONTROLLER.	DJM	
03	27FEB02	ADDED TELE. SURGE PROTECTOR	JHH	
02	12NOV01	ADDED SURGE PROTECTOR DETAIL	LLK	
01	13MAR00	REMOVED A31 LAYOUT	LLK	
REV.	DATE	DESCRIPTION	BY	APPR.

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: \_\_\_\_\_

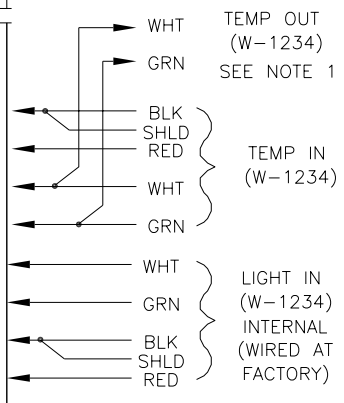
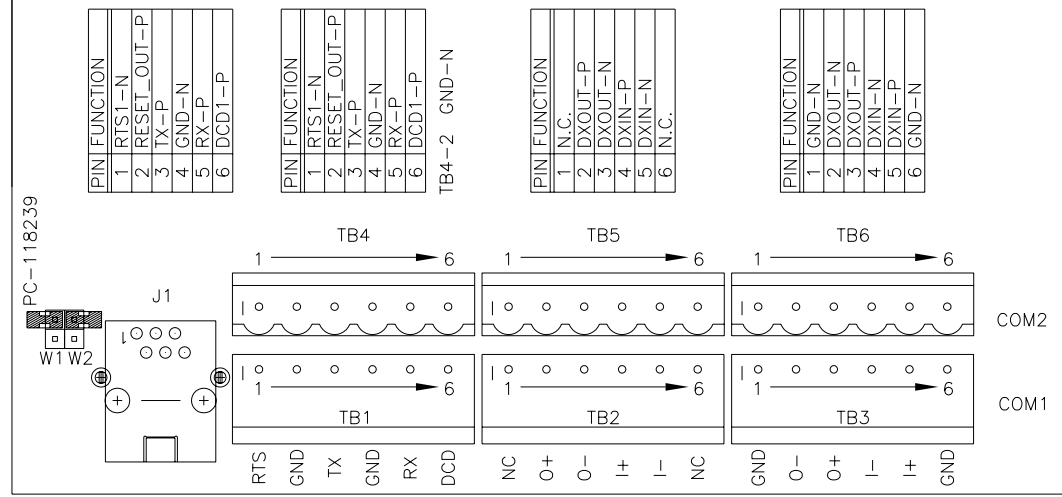
TITLE: SCHEM; FIBER, MODEM, RS422 SURGE PROTECTOR INPUT

DES. BY: \_\_\_\_\_ DRAWN BY: LKERR DATE: 14DEC99

REVISION 05 APPR. BY: \_\_\_\_\_ SCALE: \_\_\_\_\_

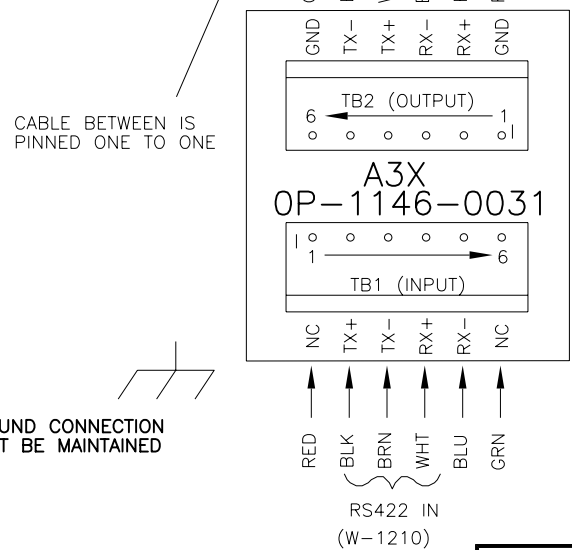
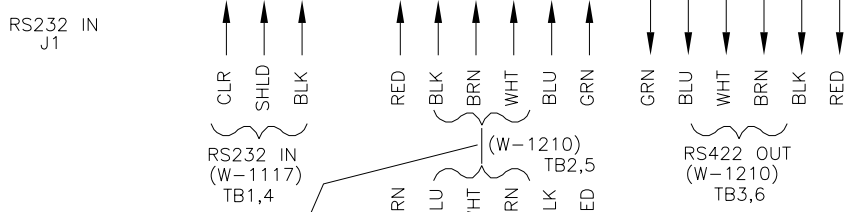
1146-R03A-125900

# A31 CONTROLLER CARD



**NOTES:**

- TO ADDITIONAL DISPLAYS WHEN USING A SINGLE TEMP SENSOR. (NOTE THAT THE RED AND BLK WIRES ARE NOT CONNECTED TO SUBSEQUENT CONTROLLER CARDS)



CABLE BETWEEN IS PINNED ONE TO ONE

GROUND CONNECTION MUST BE MAINTAINED

<b>DAKTRONICS, INC. BROOKINGS, SD 57006</b>			
PROJ:			
TITLE:	SIGNAL INPUT, OUTDOOR VENUS 1500		
DES. BY:	DRAWN BY: LKERR	DATE: 9MAR00	
REVISION	APPR. BY:	<b>1146-R01A-129110</b>	
	SCALE: NONE		

02	13DEC01	ADDED WIRE COLORS TO TB2 OF A3X	LLK	LLK
01	13NOV01	ADDED OP-1146-0031	LLK	
REV.	DATE	DESCRIPTION	BY	APPR.



REV.	DATE	DESCRIPTION	BY	APPR.
01	DEC 01	CORRECTED PART NUMBER CALLOUTS FOR HANDWAKE.	JAA	JMT
02	FEB 02	ADDED CABLE TIE ANCHORS AND WIRING LAYOUT.	JAA	JMT
01	DEC 01	UPDATED CONTROLLER GRAPHICS. ADDED COMPONENT LABELS.	JAA	JMT

DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ:	AF-3090 GALAXY LARGE CHARACTER
TITLE:	AF-3090 CONTROLLER ASSEMBLY, RS232/422
DES. BY:	JTELLIN
DRAWN BY:	JAMUNDS
DATE:	31 OCT 01
REVISION	APPR. BY:
SCALE:	1 = 3
1259-E10A-158254	

ENCLOSURE  
OM-158081  
@1

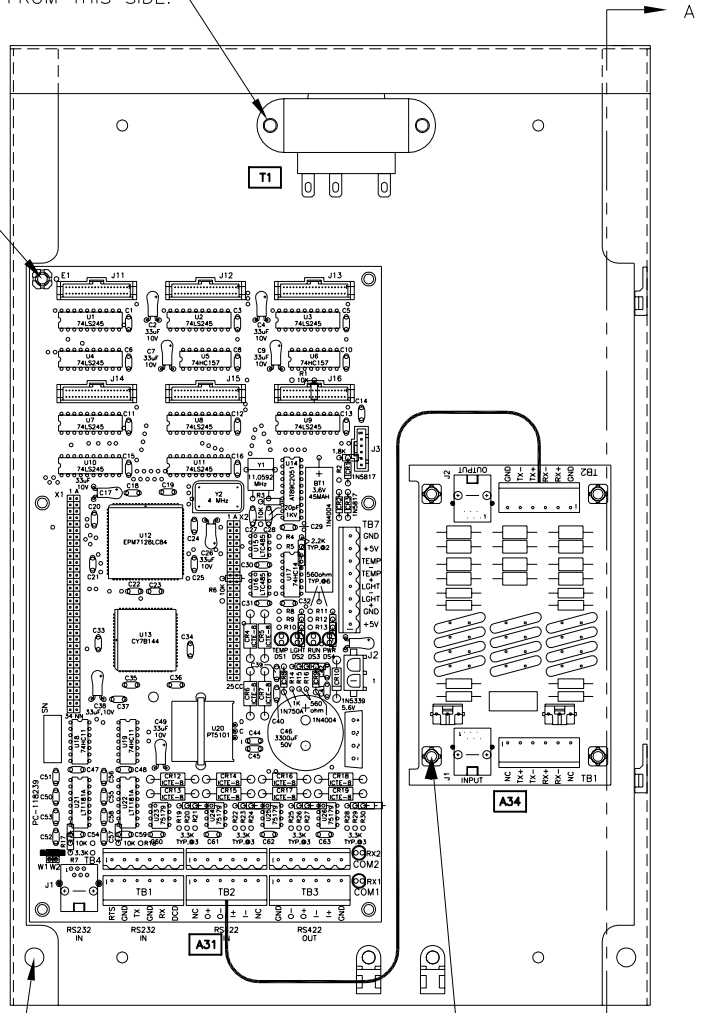
115 VAC  
HARNESS ONLY.

COVER  
OM-158094  
@1

ANCHOR RIVET  
HE 1087 HC 1125  
@4 @4

6-32 SCREW X-FR NUT-SERT  
HC 1179 T 1072 HS 1142  
@2 @1 @2  
INSERT NUTSERT FROM THIS SIDE.

6-32 SCREW CNTRLR NUT-SERT  
HC 1179 OA 1146 HS 1142  
@6 @1 @6  
INSERT NUTSERT FROM OTHER SIDE.



NUTSERT SCREW  
HS 1270 HC 1022  
@2 @2  
INSERT NUTSERT FROM THIS SIDE.

NUT-SERT SURGE CARD 6-32 SCREW  
HS 1142 OP 1146 HC 1179  
@4 @1 @4  
INSERT NUTSERT FROM OTHER SIDE.

SECTION: A-A

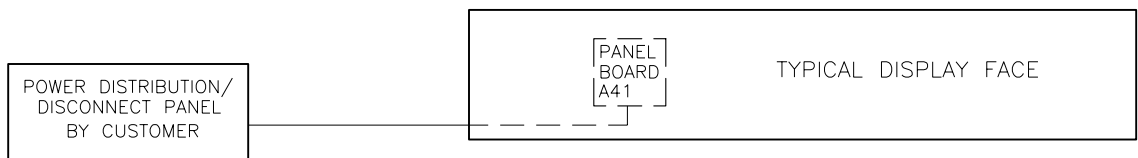
FRONT VIEW

## GALAXY, LARGE CHARACTER, AMBER LEDS POWER SPECIFICATION CHART

MATRIX SIZE	WATTS	120/208, 4 WIRE + GND			120/240, 3 WIRE + GND	
		PHASE A AMPS	PHASE B AMPS	PHASE C AMPS	LINE 1 AMPS	LINE 2 AMPS
8X32 24"/30"/36"	749	2.90	2.90	0.44	3.34	2.90
8X48 24"/30"/36"	1122	2.90	5.80	0.65	3.55	5.80
8X64 24"/30"/36"	1194	5.80	5.80	0.85	6.65	5.80
8X80 24"/30"/36"	1866	5.80	8.70	1.05	6.85	8.70
8X96 24"/30"/36"	2238	8.70	8.70	1.25	9.95	8.70
8X112 24"/30"/36"	2611	8.70	11.60	1.45	10.15	11.60
16X48 24"/30"/36"	2166	8.70	3.55	5.80	9.35	8.70
16X64 24"/30"/36"	2886	11.60	6.65	5.80	12.45	11.60
16X80 24"/30"/36"	3607	14.50	6.85	8.70	15.55	14.50
16X96 24"/30"/36"	4327	17.40	9.95	8.70	18.65	17.40
16X112 24"/30"/36"	5047	20.31	10.15	11.60	21.76	20.31
24X48 24"/30"/36"	3283	9.95	8.70	8.70	12.85	14.50
24X64 24"/30"/36"	4375	13.25	11.60	11.60	19.06	17.40
24X80 24"/30"/36"	5468	16.56	14.50	14.50	22.36	23.21
24X96 24"/30"/36"	6561	19.86	17.40	17.40	28.56	26.11
24X112 24"/30"/36"	7653	23.16	20.31	20.31	31.87	31.91
32X48 24"/30"/36"	4327	11.60	14.50	9.95	18.65	17.40
32X64 24"/30"/36"	5768	17.40	17.40	13.25	24.86	23.21
32X80 24"/30"/36"	7208	20.31	23.21	16.56	31.06	29.01
32X96 24"/30"/36"	8649	26.11	26.11	19.86	37.27	34.81
32X112 24"/30"/36"	10090	29.01	31.91	23.16	43.47	40.61

**NOTES:**

- SPECS LISTED ABOVE ARE FOR A SINGLE FACE DISPLAY.

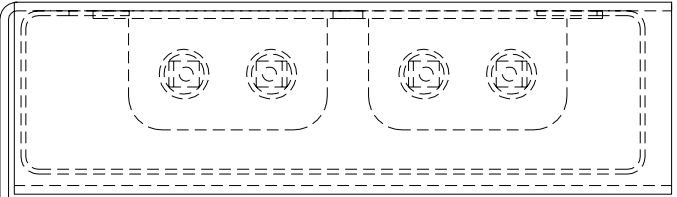


REV.	DATE	DESCRIPTION	BY	APPR.
2	15FEB02	REMOVED *X128 SIZES FROM CHART	TJN	
1	24JAN02	UPDATED SPECS	TJN	LK

<b>DAKTRONICS, INC. BROOKINGS, SD 57006</b>			
PROJ: GALAXY, LARGE CHARACTER			
TITLE: POWER SPECS, AF-3090, AMBER LEDS			
DES. BY:	DRAWN BY: LKERR	DATE: 05NOV01	
REVISION	APPR. BY:	1259-R10A-158396	
	SCALE: NONE		

REV.	02	05 FEB 01	ADDED LABELS AND GROUND HARNESS @2.	JAA	JMT
	01	21 DEC 01	REVISED LAYOUT FOR COVER.	JAA	JMT
DATE			DESCRIPTION	BY	APPR.

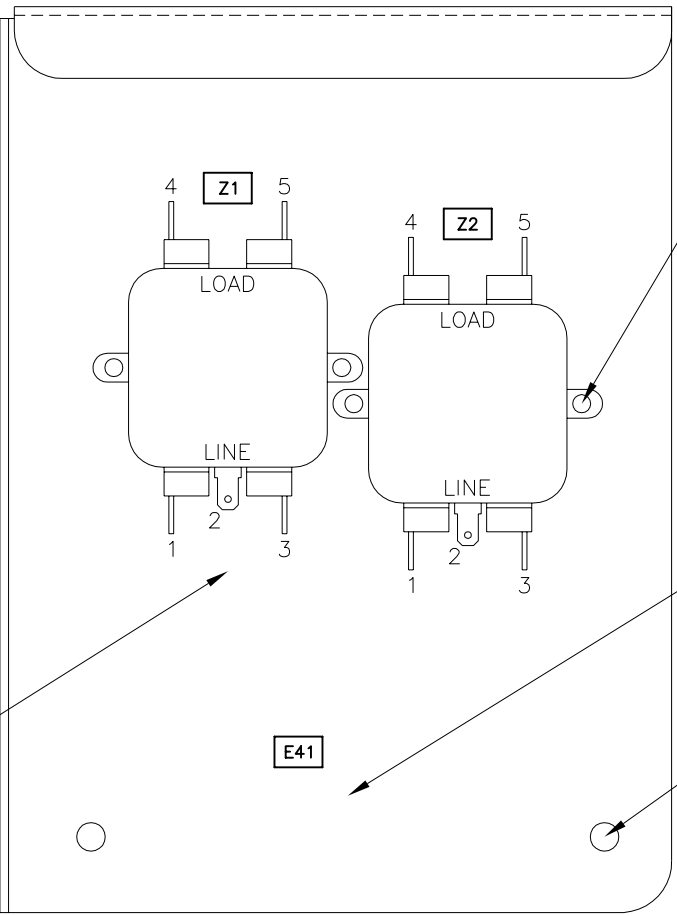


TOP VIEW

NOTES:

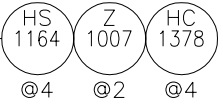
ORIENTATION OF LINE FILTERS IS CRITICAL.

OM-158471  
@1

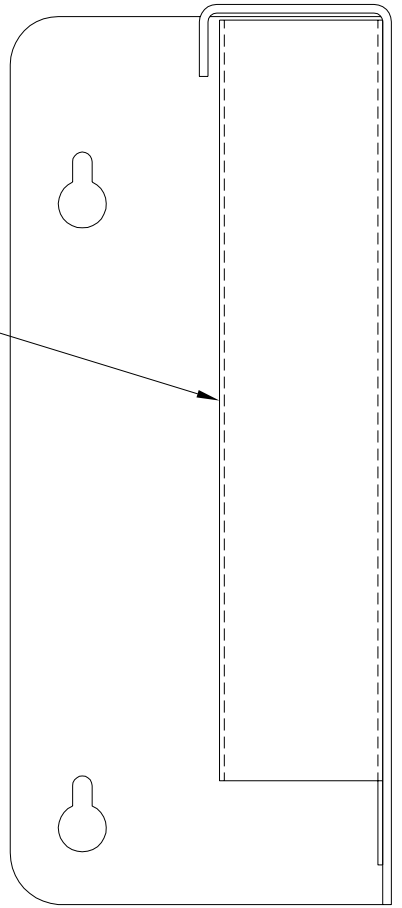
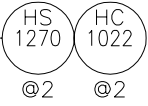
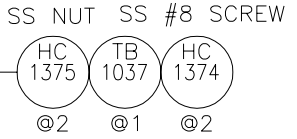


FRONT VIEW

COVER REMOVED FOR CLARITY.



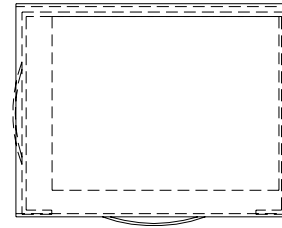
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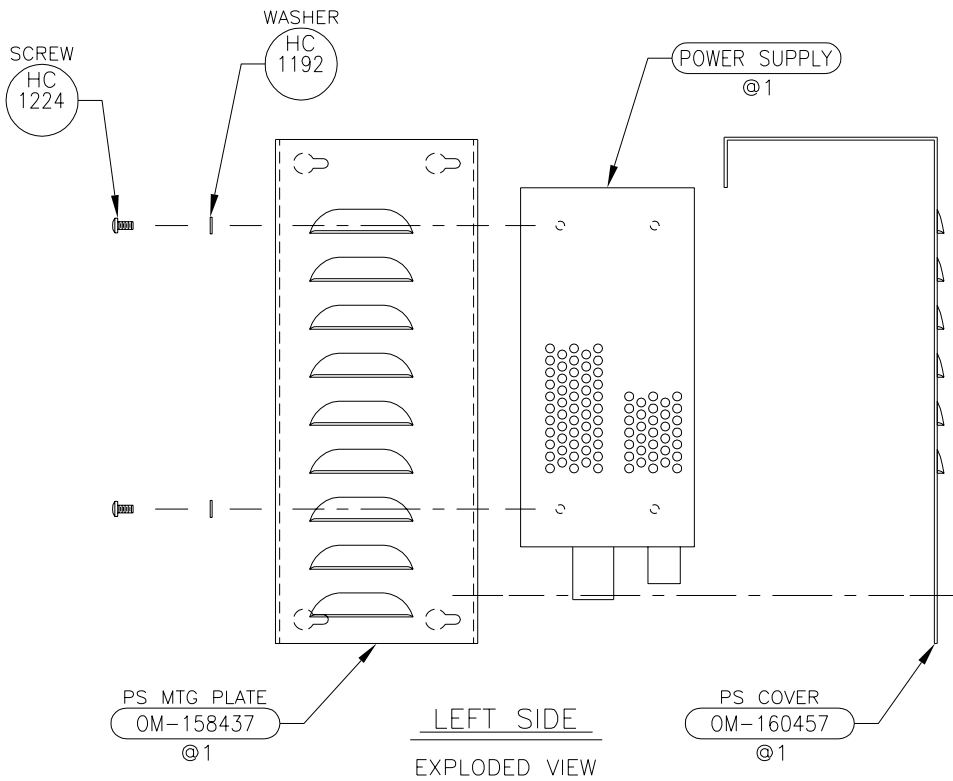
RIGHT SIDE



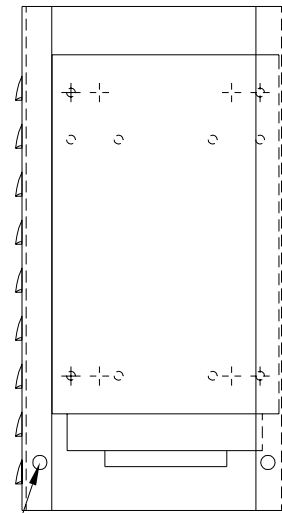
DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ:	AF-3090 GALAXY LARGE CHARACTER
TITLE:	Z-FILTER ASSY 2, W/GND BAR
DES. BY:	JTELLIN
DRAWN BY:	JAMUNDS
DATE:	06 NOV 01
REVISION	APPR. BY:
SCALE:	1=2
1259-E07A-158472	



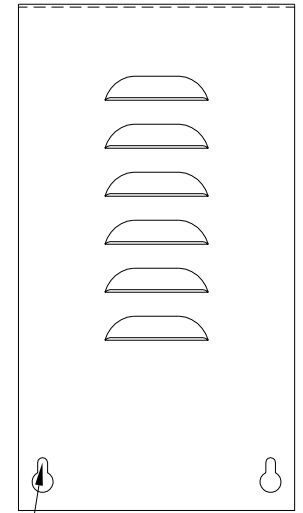
TOP VIEW



LEFT SIDE  
EXPLODED VIEW



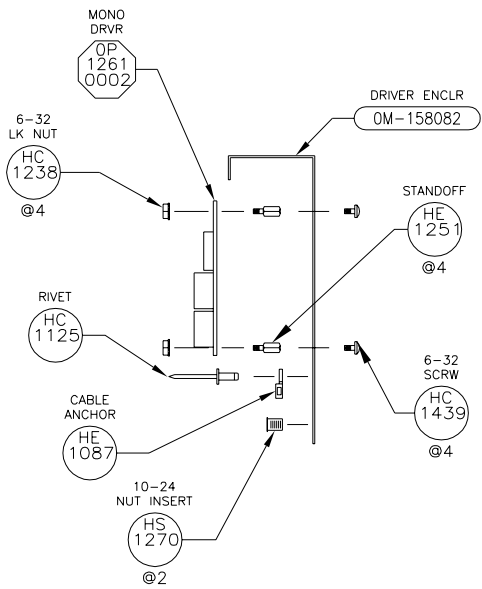
FRONT VIEW  
SHOWN WITHOUT COVER



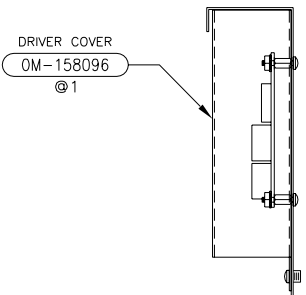
FRONT VIEW  
SHOWN WITH COVER

REV.	DATE	DESCRIPTION	BY	APPR.
03	13 SEP 04	GENERALIZED PS MTG SCREW AND WASHER QTY.	SMM	JMT
02	23 JAN 02	CORRECT PS AND PS COVER GRAPHICS.	JAA	JMT
01	17 JAN 02	UPDATED DRAWING FOR M-PART CHANGES.	JAA	JMT

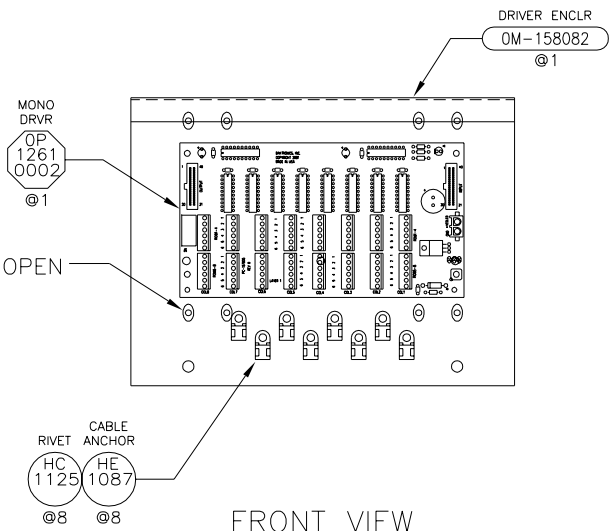
DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ:	AF-3090 GALAXY LARGE CHARACTER
TITLE:	ASSY, PWR SPLY MTG, AF-3090
DES. BY:	JTELLIN
DRAWN BY:	JAMUNDS
DATE:	07 NOV 01
REVISION	APPR. BY:
03	
SCALE:	1 = 4
1259-E10A-158580	



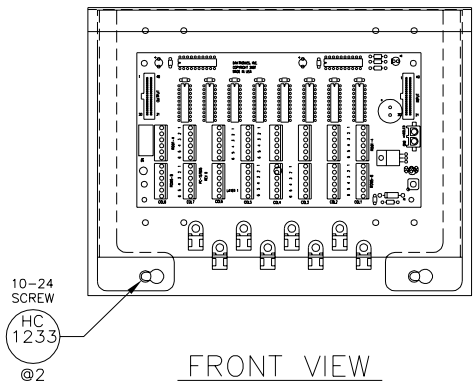
RIGHT SIDE



RIGHT SIDE  
(COMPLETED ASSEMBLY)



FRONT VIEW



FRONT VIEW  
(COMPLETED ASSEMBLY)

LEAVE OUTSIDE HOLES OPEN

06	31OCT02	REMOVED NOTE	BSCH	
05	19 JUL 02	REPLACED HC-1196 WITH HC-1439, REMOVED HC-1238 @8 WITH HE-1251 @4.	JMM	
04	14JUN 02	REPLACED HC-1022 @2 WITH HC-1233 @2.	KJB	
03	21 MAR 02	ADDED FOUR (4) Ø0.156" HOLES TO PART.	KJB	
02	12MAR02	CHANGED HC-1133 TO HC-1125, ADDED HC-1238 NUTS @4	BGB	
REV.	DATE	DESCRIPTION	BY	APPR.

01	08 FEB 02	UPDATED LAYOUT FOR METAL PART CHANGES.	JAA	JMT
DAKTRONICS, INC. BROOKINGS, SD 57006				
PROJ: GALAXY, LARGE CHARACTER				
TITLE: DRIVER ASSEMBLY, AF-3090, 8X8-24				
DES. BY: JMT		DRAWN BY: JMT		
APPR. BY:		DATE: 22 JAN 02		
REVISION		SCALE: 1=5		
		1259-E10A-161661		

8X32-128 (0A-1259-4024) EN-1236

PANEL BOARD

15A	1	Z1 A10X EVEN PS		2	
15A	3	Z2 A10X ODD PS		4	
15A	5	CNTRL/FANS		6	
	7			8	
	9			10	
	11			12	

16X48-128 (0A-1259-4025) EN-1236

PANEL BOARD

15A	1	Z1 A10X EVEN PS	Z2 A10X ODD PS	2	15A
15A	3	Z3 A20X EVEN PS	CNTRL/FANS	4	15A
15A	5	Z4 A20X ODD PS		6	
	7			8	
	9			10	
	11			12	

24X48-128 (0A-1259-4026) EN-1236

PANEL BOARD

15A	1	Z1 A10X EVEN PS	Z2 A10X ODD PS	2	15A
15A	3	Z3 A20X EVEN PS	Z4 A20X ODD PS	4	15A
15A	5	Z5 A30X EVEN PS	Z6 A30X ODD PS	6	15A
15A	7	CNTRL/FANS		8	
	9			10	
	11			12	

32X48-128 (0A-1259-4027) EN-1236

PANEL BOARD

15A	1	Z1 A10X EVEN PS	Z2 A10X ODD PS	2	15A
15A	3	Z3 A20X EVEN PS	Z4 A20X ODD PS	4	15A
15A	5	Z5 A30X EVEN PS	Z6 A30X ODD PS	6	15A
15A	7	Z7 A40X EVEN PS		8	
15A	9	Z8 A40X ODD PS		10	
15A	11	CNTRL/FANS		12	

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LARGE CHARACTER, 89MM, MONO

TITLE: LAYOUT, PANEL BOARD, 8-32X48-128, 24", 30", 36", 3PH

DES. BY: DRAWN BY: LKERR DATE: 25JAN02

REVISION

APPR. BY:

SCALE: 1=1

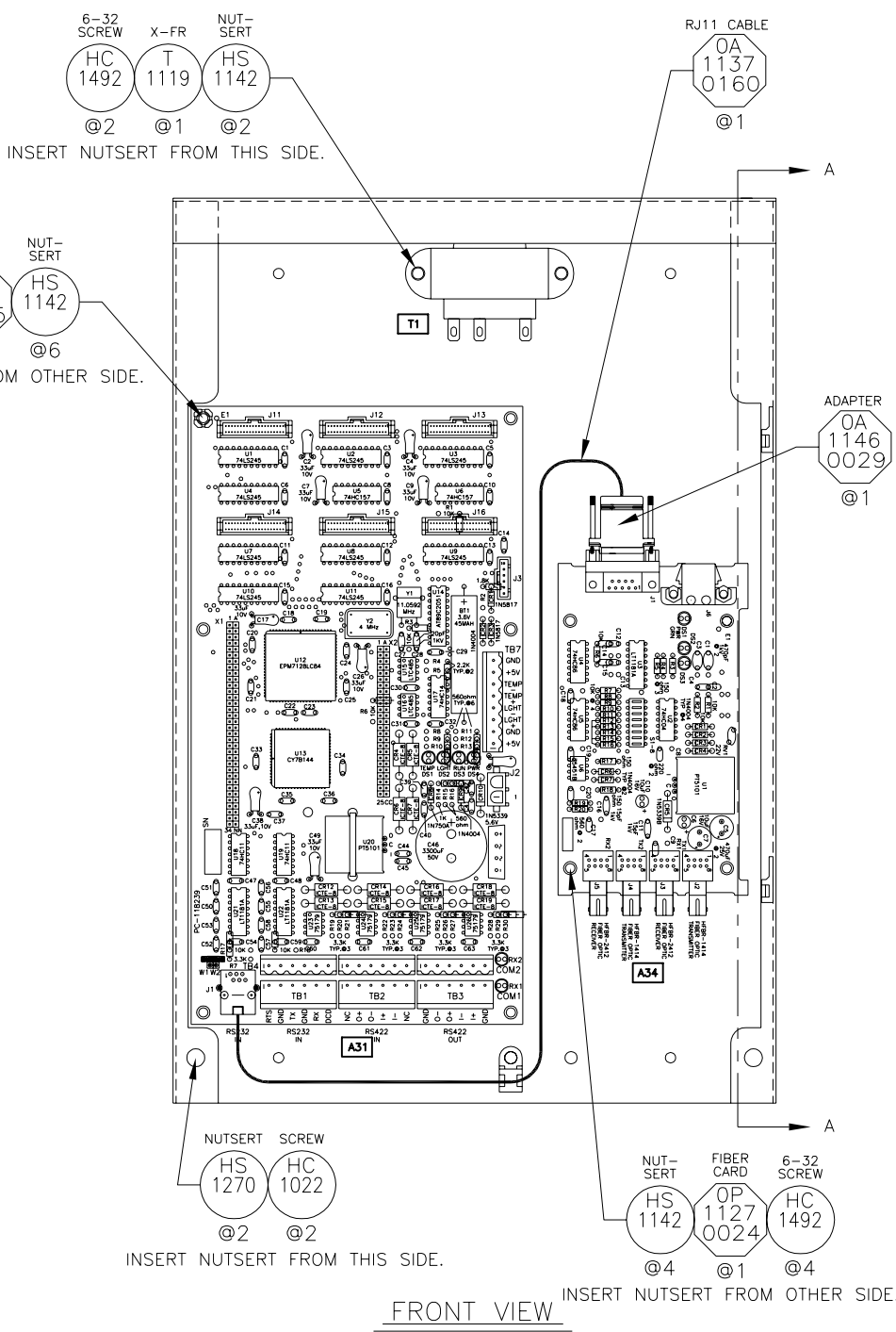
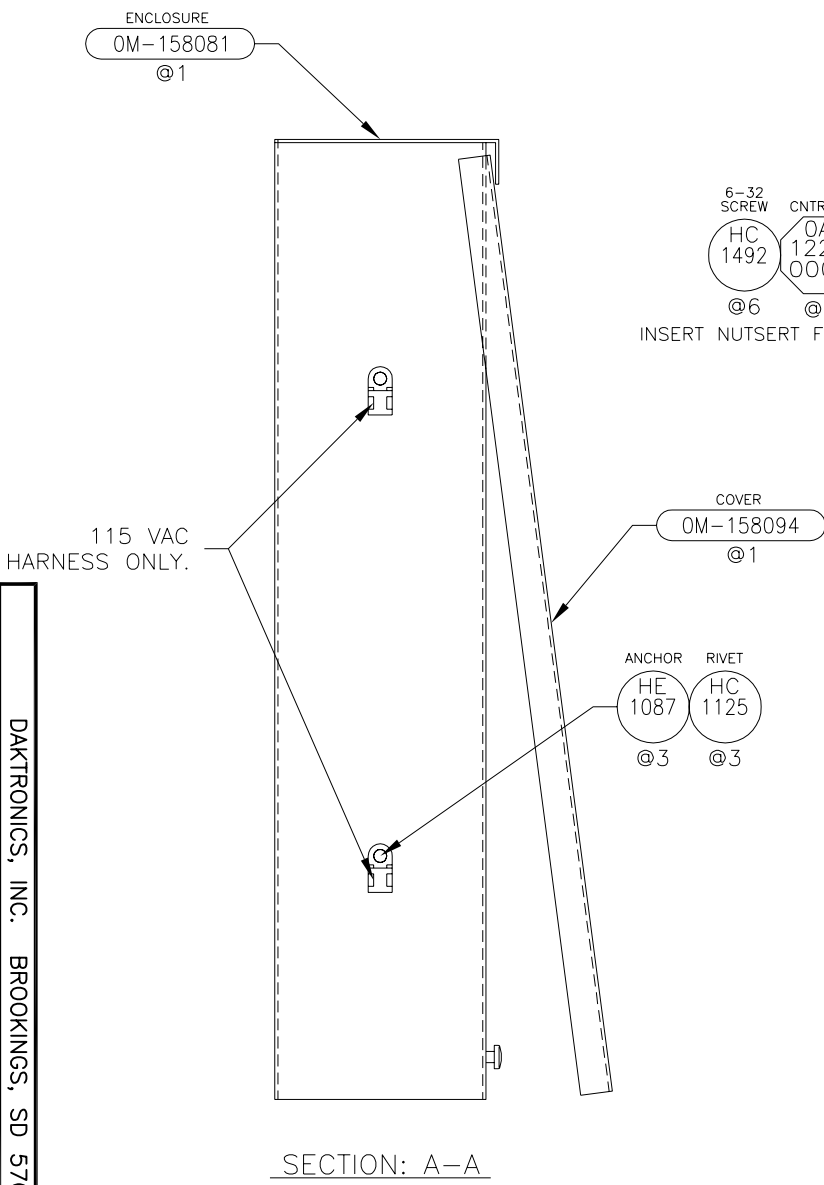
1259-R07A-161874

01	22MAR02	ADDED Z#'S TO BREAKER LOCATIONS	LLK	
REV.	DATE	DESCRIPTION	BY	APPR.



REV.	DATE	DESCRIPTION	BY	APPR.
02	09 MAY 03	REMOVED 0A-1146-0035 @1 AND T-1072 @1. ADDED 0A-1229-0005 @1 AND T-1119 @1.	RTV	
01	25 APR 03	REMOVED HE-1087 @1 AND HC-1125 @1. HC-1179 @12. ADDED HC-1492 @12.	RTV	

DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ:	AF-3090 GALAXY LARGE CHARACTER
TITLE:	AF-3090 CONTROLLER ASSEMBLY FIBER
DES. BY:	JTELLIN
DRAWN BY:	JAMUNDS
DATE:	01 FEB 02
REVISION	APPR. BY:
SCALE:	1 = 3
1259-E10A-162099	



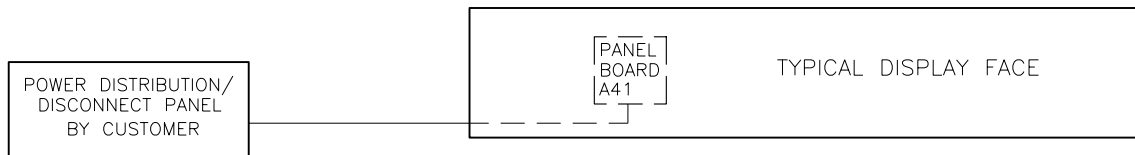


## GALAXY, LARGE CHARACTER, RED LEDS POWER SPECIFICATION CHART

MATRIX SIZE	WATTS	120/208, 4 WIRE + GND			120/240, 3 WIRE + GND	
		PHASE A AMPS	PHASE B AMPS	PHASE C AMPS	LINE 1 AMPS	LINE 2 AMPS
8X32 24"/30"/36"	336	1.18	1.18	0.44	1.62	1.18
8X48 24"/30"/36"	502	1.18	2.36	0.65	2.41	1.77
8X64 24"/30"/36"	667	2.36	2.36	0.85	3.20	2.36
8X80 24"/30"/36"	833	2.36	3.54	1.05	4.00	2.95
8X96 24"/30"/36"	999	3.54	3.54	1.25	4.79	3.54
8X112 24"/30"/36"	1164	3.54	4.72	1.45	5.58	4.13
16X48 24"/30"/36"	926	3.54	1.82	2.36	3.00	4.72
16X64 24"/30"/36"	1233	4.72	3.20	2.36	5.56	4.72
16X80 24"/30"/36"	1540	5.89	3.41	3.54	5.76	7.07
16X96 24"/30"/36"	1848	7.07	4.79	3.54	8.32	7.07
16X112 24"/30"/36"	2155	8.25	4.99	4.72	8.52	9.43
24X48 24"/30"/36"	1423	4.79	3.54	3.54	5.96	5.89
24X64 24"/30"/36"	1896	6.37	4.72	4.72	8.73	7.07
24X80 24"/30"/36"	2369	7.95	5.89	5.89	10.31	9.43
24X96 24"/30"/36"	2841	9.53	7.07	7.07	13.07	10.61
24X112 24"/30"/36"	3314	11.11	8.25	8.25	14.65	12.97
32X48 24"/30"/36"	1848	4.72	5.89	4.79	8.32	7.07
32X64 24"/30"/36"	2462	7.07	7.07	6.37	11.08	9.43
32X80 24"/30"/36"	3076	8.25	9.43	7.95	13.84	11.79
32X96 24"/30"/36"	3690	10.61	10.61	9.53	16.60	14.15
32X112 24"/30"/36"	4304	11.79	12.97	11.11	19.36	16.51

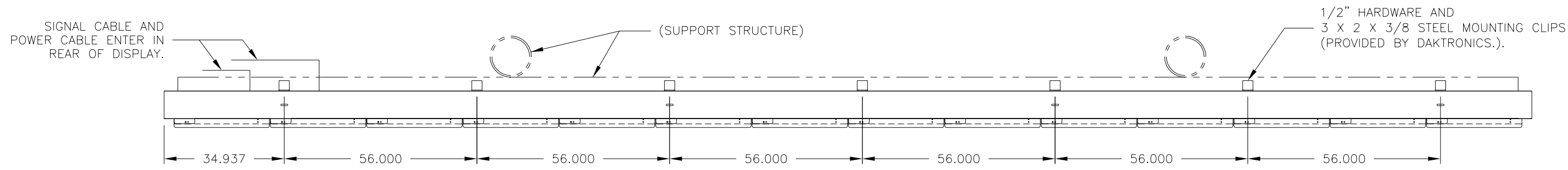
**NOTES:**

- SPECS LISTED ABOVE ARE FOR A SINGLE FACE DISPLAY.



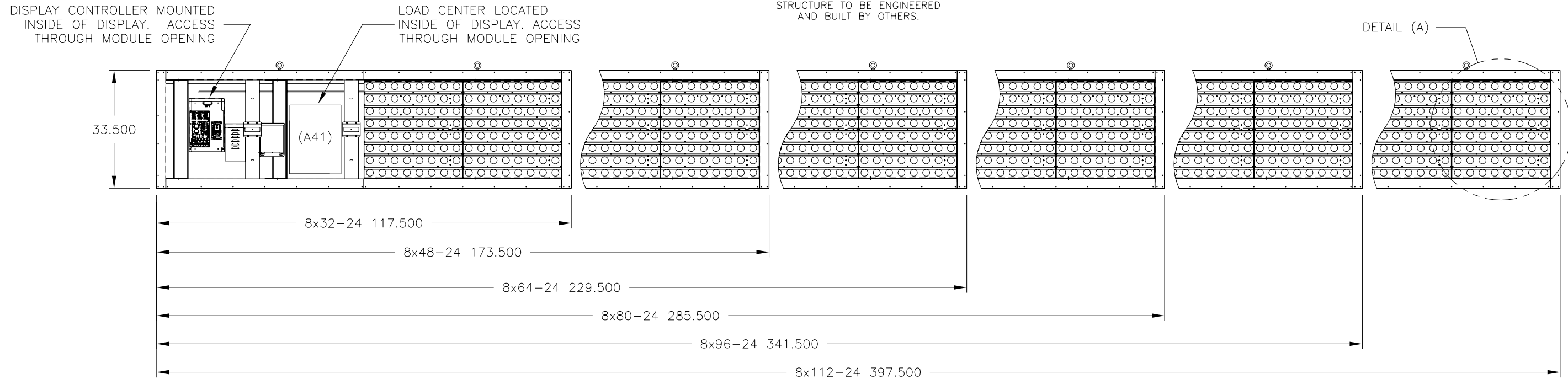
DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: GALAXY, LARGE CHARACTER			
TITLE: POWER SPECS, AF-3090, RED LEDS			
DES. BY:	DRAWN BY: TNYSTRO	DATE: 15FEB02	
REVISION	APPR. BY:	1259-R10A-162439	
	SCALE: NONE		

REV.	DATE	DESCRIPTION	BY	APPR.



TOP VIEW

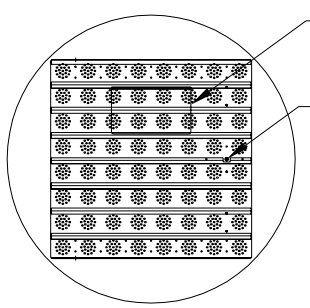
ALL SUPPORT STRUCTURE SHOWN IS FOR CONCEPT ONLY. SUPPORT STRUCTURE TO BE ENGINEERED AND BUILT BY OTHERS.



FRONT VIEW

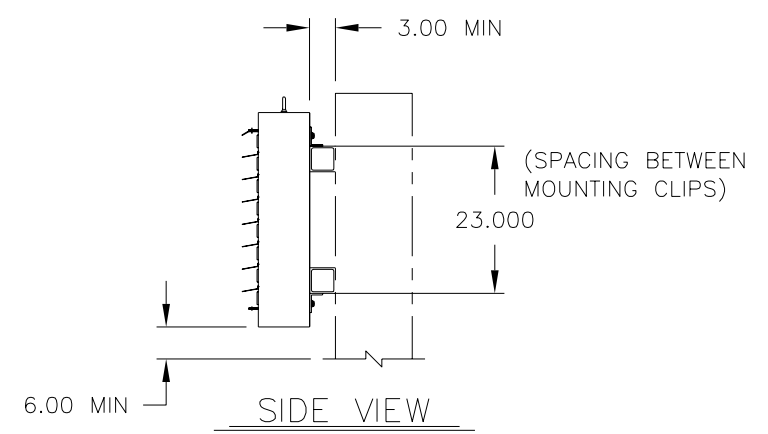
NOTES:

- 1) ALL DIMENSIONS ARE GIVEN IN INCHES
- 2) DISPLAY IS OF ALL ALUMINUM CONSTRUCTION WITH STEEL MOUNTING CLIP ANGLES / HARDWARE.
- 3) DISPLAY IS PAINTED FLAT BLACK
- 4) SERVICE ACCESS FOR ALL DRIVERS AND ELECTRONICS IS FROM THE FRONT.
- 5) LIFT EYES WILL BE PROVIDED IN EACH SECTION FOR INSTALLATION PURPOSES. HOLES IN TOP OF THE TOP SECTIONS MUST BE FILLED AND SEALED TO PREVENT EXCESS WATER FROM ENTERING CABINET.
- 6) DISPLAY CONTROLLER AND LOAD CENTERS SUPPLIED BY DAKTRONICS AND MOUNTED INTERNALLY. SIGNAL TO BE RAN IN CONDUIT OR RACEWAY FROM COMPUTER LOCATION TO SIGNAL ENTRANCE IN BACK OF DISPLAY.
- 7) POWER CABLE / SIGNAL CABLE, ALL CONDUIT, AND ALL LABOR TO BE PROVIDED BY CUSTOMERS ELECTRICAL CONTRACTOR.
- 8) REFER TO RISER DIAGRAM FOR ELECTRICAL SPECIFICATIONS AND SIGNAL HOOK UPS.



DETAIL: A  
( 8 X 8 MODULE PANEL )

DRIVER ATTACHED TO REAR OF EACH 8 X 8 MODULE PANEL  
FRONT ACCESS FOR SERVICING. (7/32 NUT DRIVER REQUIRED)



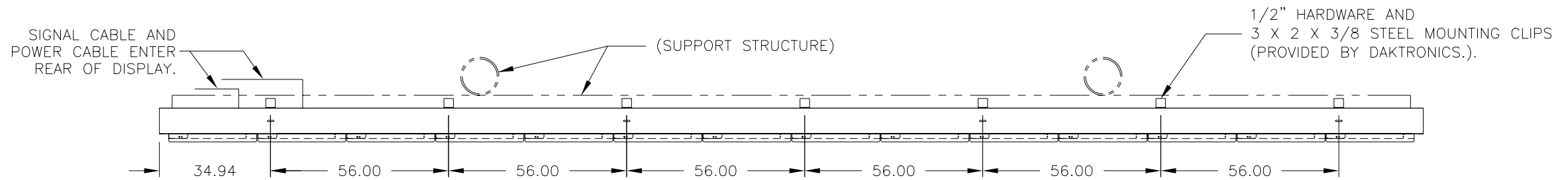
SIDE VIEW

MINIMUMS SHOWN ARE FOR VENTILATION REQUIREMENTS.

NOTE:  
ALL SUPPORT STRUCTURE SHOWN IS FOR CONCEPT ONLY. SUPPORT STRUCTURE TO BE ENGINEERED AND BUILT BY OTHERS.

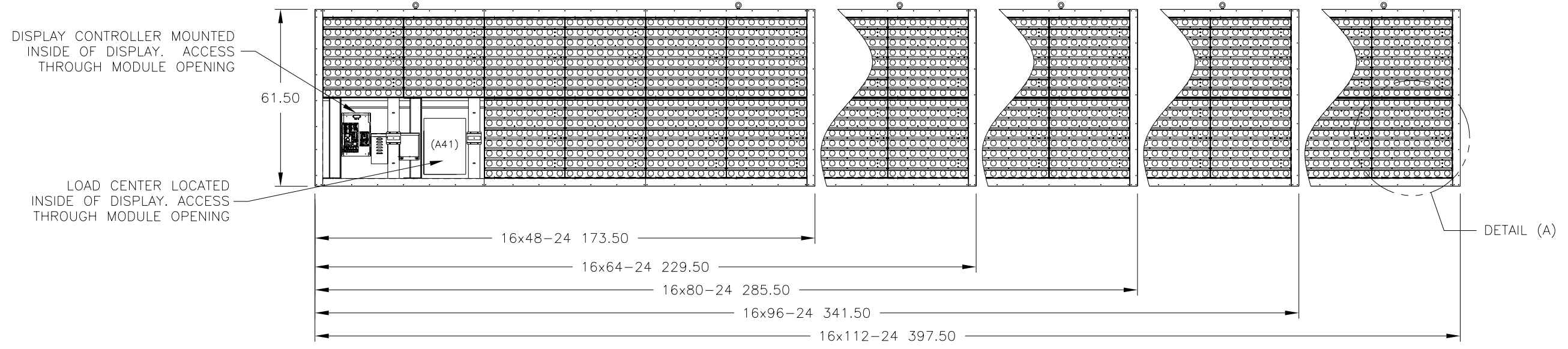
REV.	DATE	DESCRIPTION	BY	APPR.
02	17 JUL 02	ADDED VENTILATION REQUIREMENTS	JMT	
01	29 MAR 02	CHANGED MOUNTING CLIP SPACING FROM: 27.00 , TO: 23.00	JMT	

DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ: GALAXY, AF-3090 LARGE CHARACTER	DATE: 09 JAN 02
TITLE: SHOP DRAWING, AF-3090, 8X**-24 AMBER / RED	
DES. BY: JMT	DRAWN BY: JMT
REVISION	APPR. BY:
SCALE: 1 = 30	1259-E10B-160986



TOP VIEW

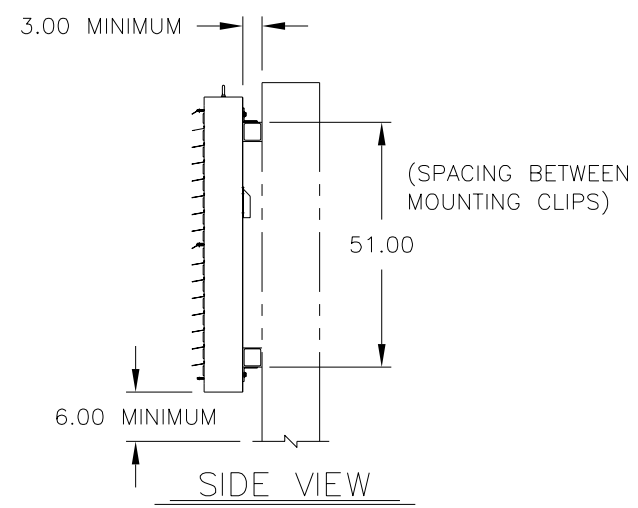
ALL SUPPORT STRUCTURE SHOWN IS FOR CONCEPT ONLY. SUPPORT STRUCTURE TO BE ENGINEERED AND BUILT BY OTHERS.



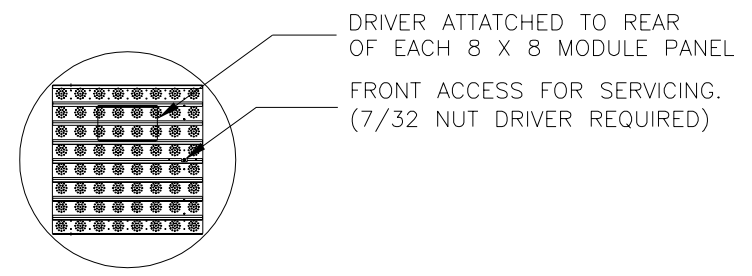
FRONT VIEW

NOTES:

- 1) ALL DIMENSIONS ARE GIVEN IN INCHES
- 2) DISPLAY IS OF ALL ALUMINUM CONSTRUCTION WITH STEEL MOUNTING CLIP ANGLES / HARDWARE.
- 3) DISPLAY IS PAINTED FLAT BLACK
- 4) SERVICE ACCESS FOR ALL DRIVERS AND ELECTRONICS IS FROM THE FRONT.
- 5) LIFT EYES WILL BE PROVIDED IN EACH SECTION FOR INSTALLATION PURPOSES. HOLES IN TOP OF THE TOP SECTIONS MUST BE FILLED AND SEALED TO PREVENT EXCESS WATER FROM ENTERING CABINET.
- 6) DISPLAY CONTROLLER AND LOAD CENTERS SUPPLIED BY DAKTRONICS AND MOUNTED INTERNALLY. SIGNAL TO BE RAN IN CONDUIT OR RACEWAY FROM COMPUTER LOCATION TO SIGNAL ENTRANCE IN BACK OF DISPLAY.
- 7) POWER CABLE / SIGNAL CABLE, ALL CONDUIT, AND ALL LABOR TO BE PROVIDED BY CUSTOMERS ELECTRICAL CONTRACTOR.
- 8) REFER TO RISER DIAGRAM FOR ELECTRICAL SPECIFICATIONS AND SIGNAL HOOK UPS.



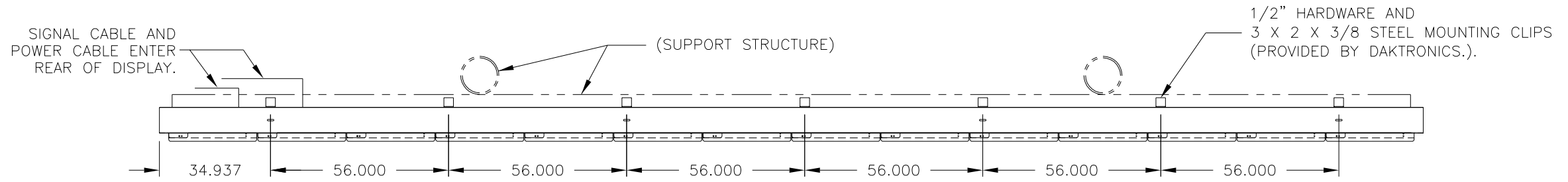
MINIMUMS SHOWN ARE FOR VENTILATION REQUIREMENTS.



DETAIL: A ( 8 X 8 MODULE PANEL )

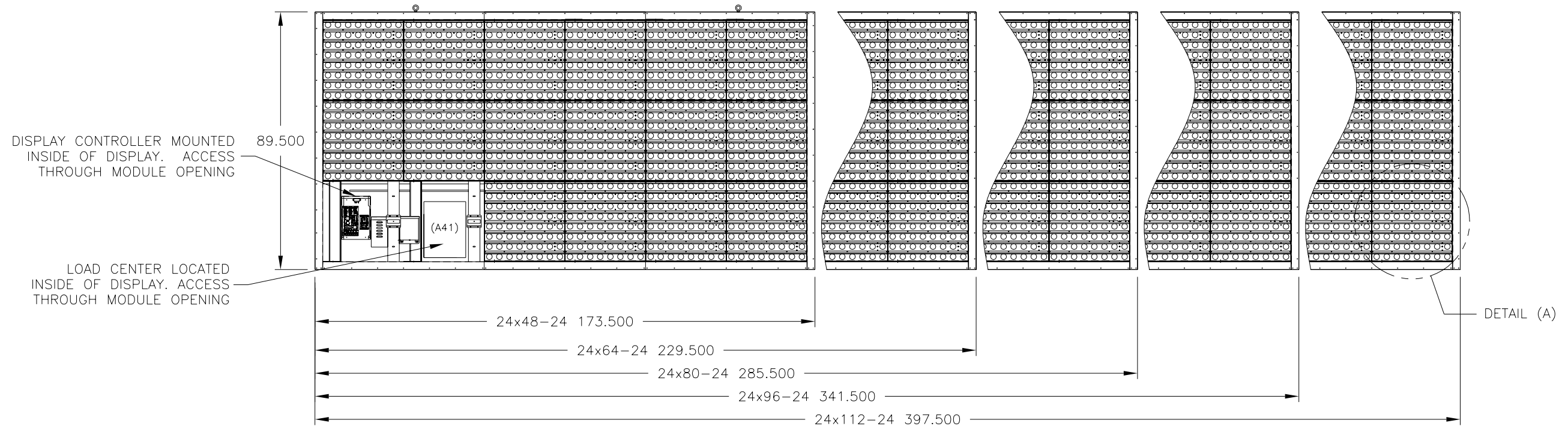
NOTE: ALL SUPPORT STRUCTURE SHOWN IS FOR CONCEPT ONLY. SUPPORT STRUCTURE TO BE ENGINEERED AND BUILT BY OTHERS.

DAKTRONICS, INC. BROOKINGS, SD 57006				
PROJ: GALAXY, AF-3090 LARGE CHARACTER				
TITLE: SHOP DRAWING, AF-3090, 16X**-24 AMBER / RED				
DES. BY: JTPELLIN		DRAWN BY: JAMUNDS		DATE: 09 JAN 02
REVISION	APPR. BY:	1259-E10B-160987		
	SCALE: 1 = 40			
02	17 JUL 02	ADDED VENTILATION REQUIREMENTS	JMT	
01	29 MAR 02	CHANGED MOUNTING CLIP SPACING FROM: 55.50 , TO: 51.00	JMT	
REV.	DATE	DESCRIPTION	BY	APPR.



TOP VIEW

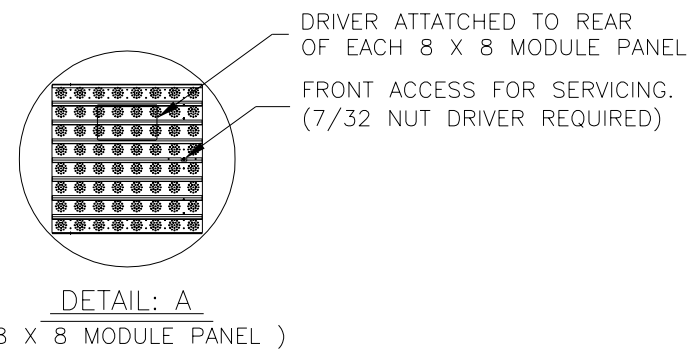
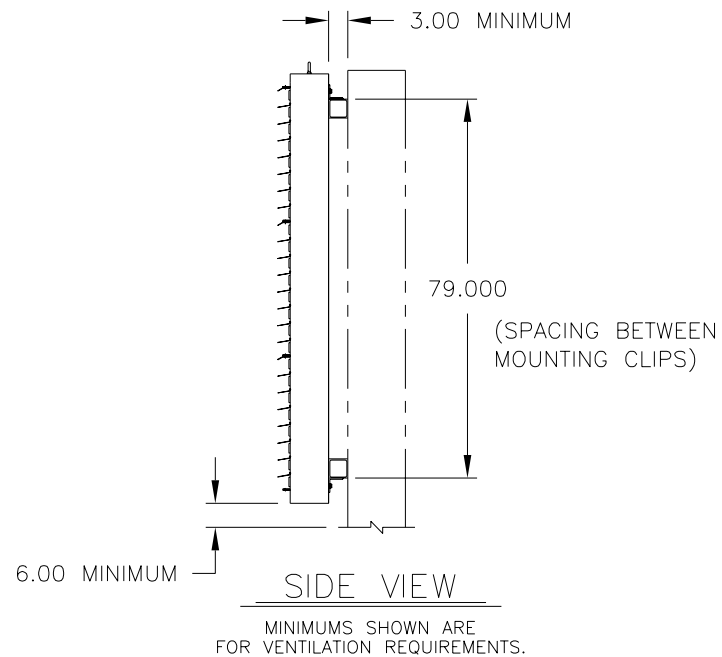
ALL SUPPORT STRUCTURE SHOWN IS FOR CONCEPT ONLY. SUPPORT STRUCTURE TO BE ENGINEERED AND BUILT BY OTHERS.



FRONT VIEW

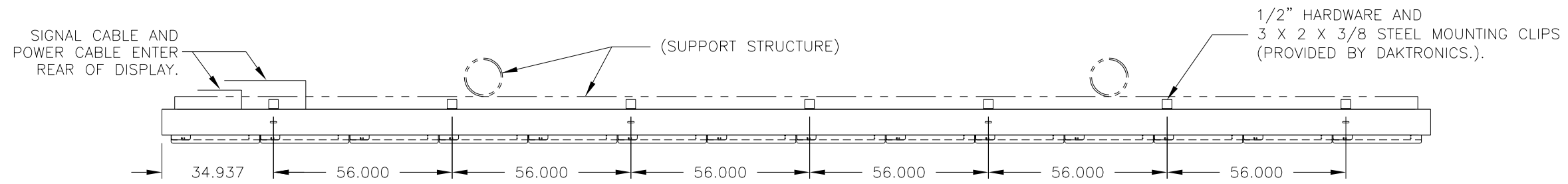
NOTES:

- 1) ALL DIMENSIONS ARE GIVEN IN INCHES
- 2) DISPLAY IS OF ALL ALUMINUM CONSTRUCTION WITH STEEL MOUNTING CLIP ANGLES / HARDWARE.
- 3) DISPLAY IS PAINTED FLAT BLACK
- 4) SERVICE ACCESS FOR ALL DRIVERS AND ELECTRONICS IS FROM THE FRONT.
- 5) LIFT EYES WILL BE PROVIDED IN EACH SECTION FOR INSTALLATION PURPOSES. HOLES IN TOP OF THE TOP SECTIONS MUST BE FILLED AND SEALED TO PREVENT EXCESS WATER FROM ENTERING CABINET.
- 6) DISPLAY CONTROLLER AND LOAD CENTERS SUPPLIED BY DAKTRONICS AND MOUNTED INTERNALLY. SIGNAL TO BE RAN IN CONDUIT OR RACEWAY FROM COMPUTER LOCATION TO SIGNAL ENTRANCE IN BACK OF DISPLAY.
- 7) POWER CABLE / SIGNAL CABLE, ALL CONDUIT, AND ALL LABOR TO BE PROVIDED BY CUSTOMERS ELECTRICAL CONTRACTOR.
- 8) REFER TO RISER DIAGRAM FOR ELECTRICAL SPECIFICATIONS AND SIGNAL HOOK UPS.



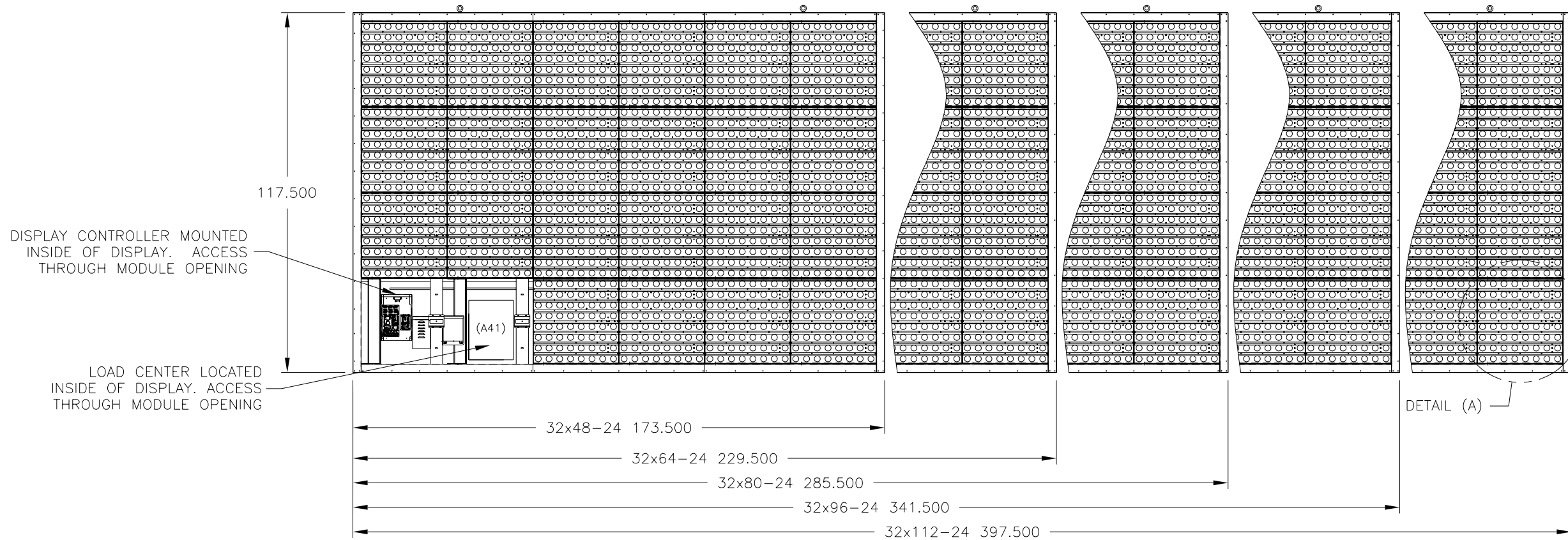
NOTE:  
ALL SUPPORT STRUCTURE SHOWN IS FOR CONCEPT ONLY. SUPPORT STRUCTURE TO BE ENGINEERED AND BUILT BY OTHERS.

DAKTRONICS, INC. BROOKINGS, SD 57006				
PROJ: GALAXY, AF-3090 LARGE CHARACTER				
TITLE: SHOP DRAWING, AF-3090, 24X**-24 AMBER / RED				
DES. BY: JTELLIN		DRAWN BY: JAMUNDS		DATE: 09 JAN 02
REVISION	APPR. BY:	1259-E10B-160988		
	SCALE: 1 = 40			
02	17 JUL 02	ADDED VENTILATION REQUIREMENTS	JMT	
01	29 MAR 02	CHANGED MOUNTING CLIP LOCATION FROM: 83.50 , TO: 79.00	JMT	
REV.	DATE	DESCRIPTION	BY	APPR.

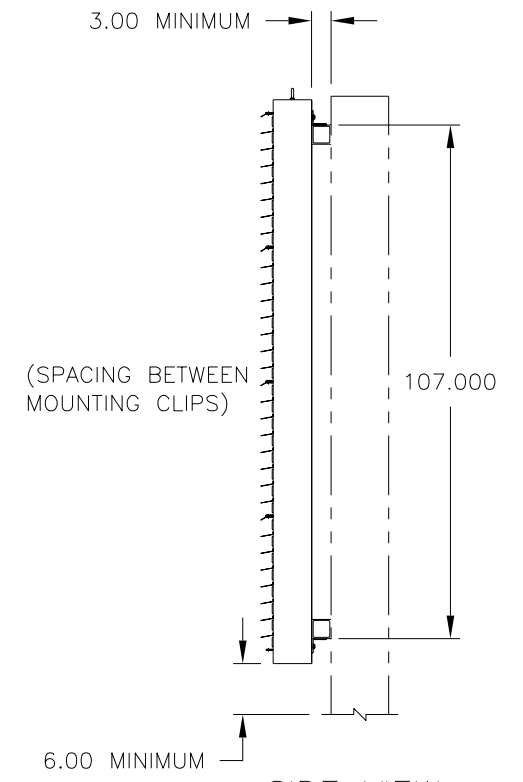


TOP VIEW

ALL SUPPORT STRUCTURE SHOWN IS FOR CONCEPT ONLY. SUPPORT STRUCTURE TO BE ENGINEERED AND BUILT BY OTHERS.



FRONT VIEW

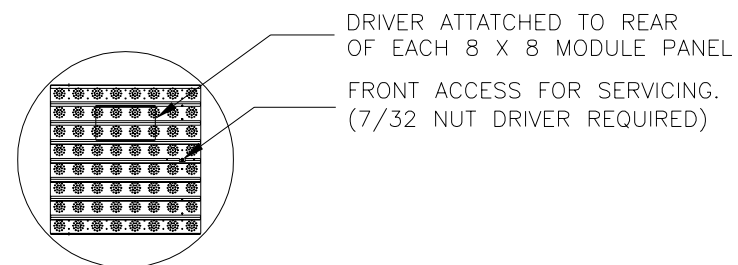


NOTES:

- 1) ALL DIMENSIONS ARE GIVEN IN INCHES
- 2) DISPLAY IS OF ALL ALUMINUM CONSTRUCTION WITH STEEL MOUNTING CLIP ANGLES / HARDWARE.
- 3) DISPLAY IS PAINTED FLAT BLACK
- 4) SERVICE ACCESS FOR ALL DRIVERS AND ELECTRONICS IS FROM THE FRONT.
- 5) LIFT EYES WILL BE PROVIDED IN EACH SECTION FOR INSTALLATION PURPOSES. HOLES IN TOP OF THE TOP SECTIONS MUST BE FILLED AND SEALED TO PREVENT EXCESS WATER FROM ENTERING CABINET.

NOTES:

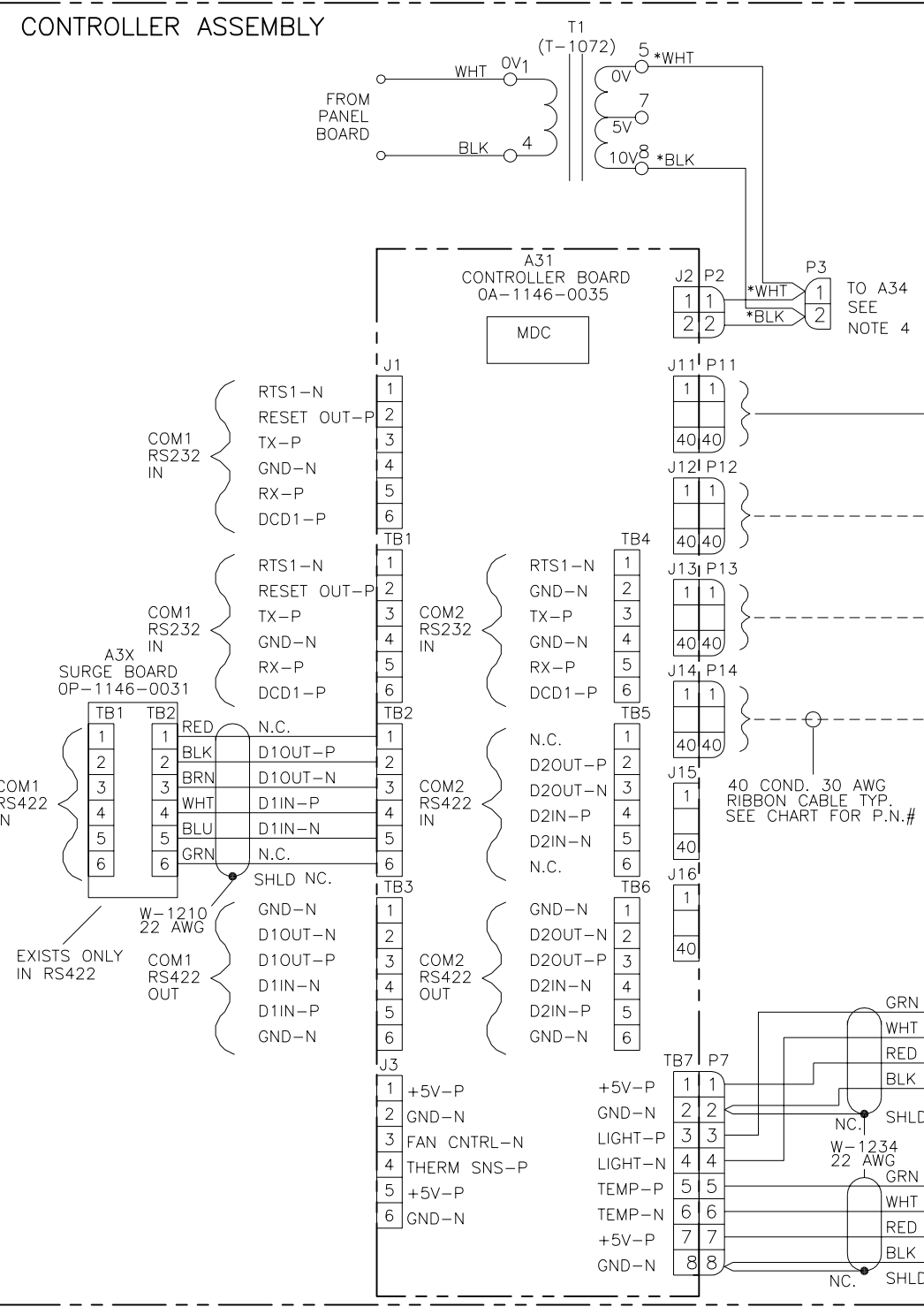
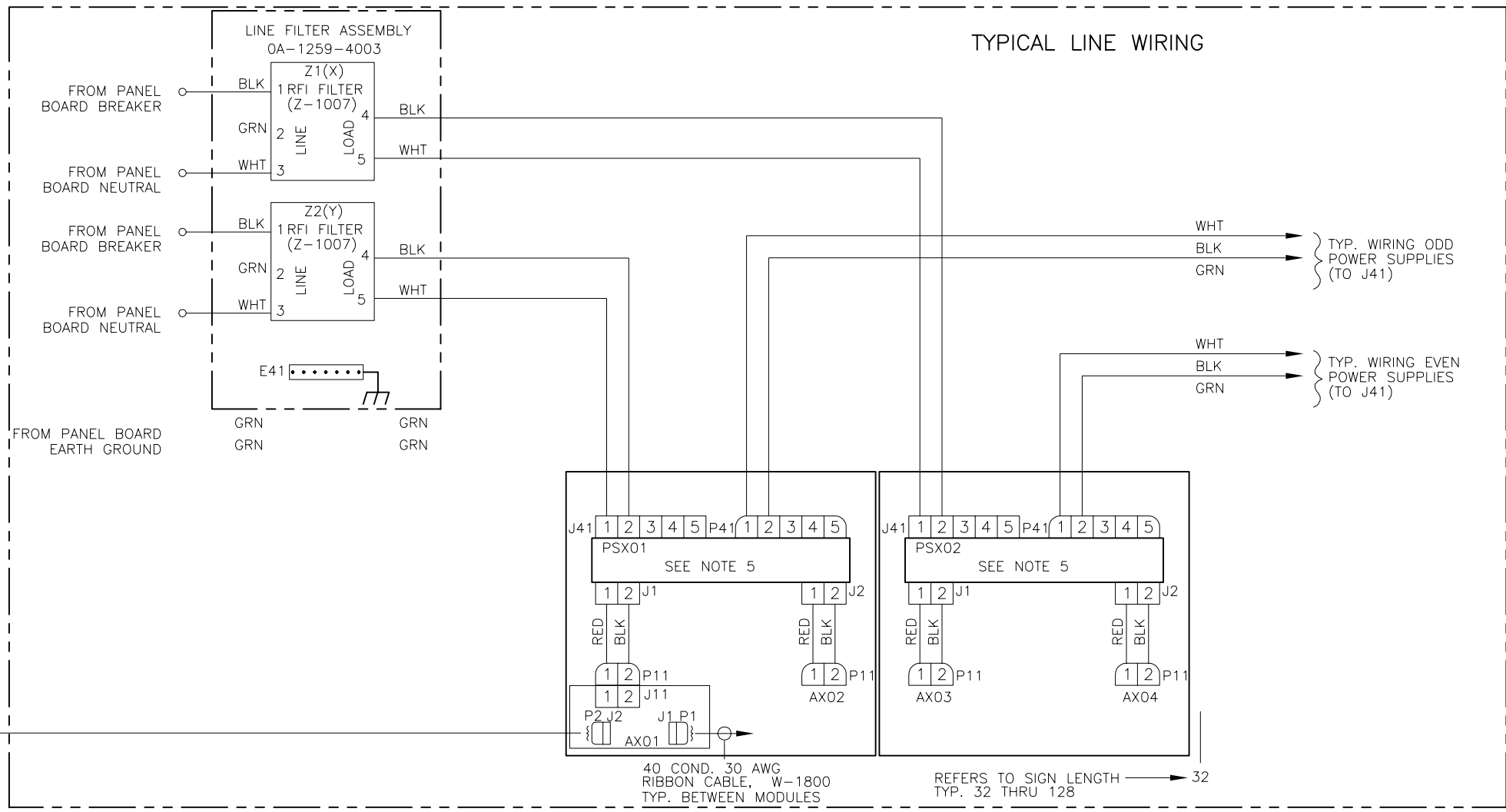
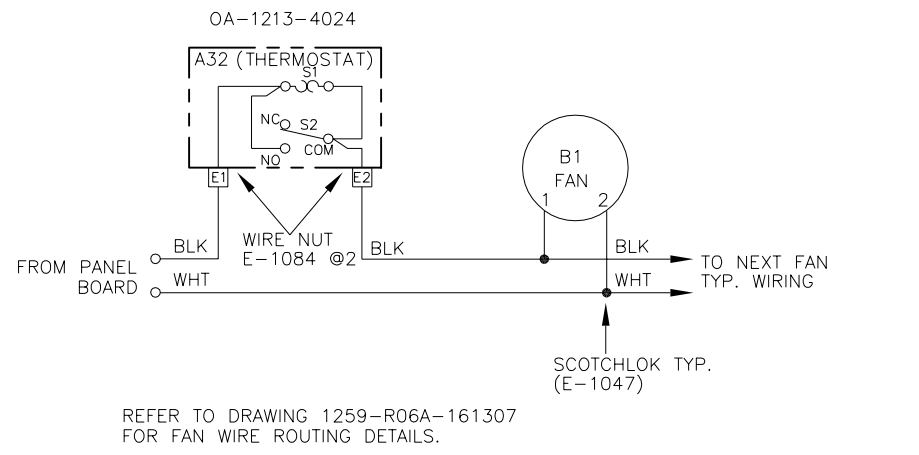
- 6) DISPLAY CONTROLLER AND LOAD CENTERS SUPPLIED BY DAKTRONICS AND MOUNTED INTERNALLY. SIGNAL TO BE RAN IN CONDUIT OR RACEWAY FROM COMPUTER LOCATION TO SIGNAL ENTRANCE IN BACK OF DISPLAY.
- 7) POWER CABLE / SIGNAL CABLE, ALL CONDUIT, AND ALL LABOR TO BE PROVIDED BY CUSTOMERS ELECTRICAL CONTRACTOR.
- 8) REFER TO RISER DIAGRAM FOR ELECTRICAL SPECIFICATIONS AND SIGNAL HOOK UPS.



DETAIL: A  
( 8 X 8 MODULE PANEL )

NOTE:  
ALL SUPPORT STRUCTURE SHOWN IS FOR CONCEPT ONLY. SUPPORT STRUCTURE TO BE ENGINEERED AND BUILT BY OTHERS.

DAKTRONICS, INC. BROOKINGS, SD 57006				
PROJ: GALAXY, AF-3090 LARGE CHARACTER				
TITLE: SHOP DRAWING, AF-3090, 32X**-24 AMBER / RED				
DES. BY: JTPELLIN		DRAWN BY: JAMUNDS		DATE: 09 JAN 02
REVISION	APPR. BY:	1259-E10B-160989		
02	17 JUL 02	ADDED VENTILATION REQUIREMENTS	JMT	
01	29 MAR 02	CHANGED MOUNTING CLIP LOCATION FROM: 111.50 , TO: 107.00	JMT	
REV.	DATE	DESCRIPTION	BY	APPR.
		SCALE: 1 = 40		



CONTROLLER OUTPUT RIBBON CABLE CHART

LINE	DISPLAY HEIGHT			
	8	16	24	32
1 (P11)	W-1800	W-1800	W-1801	W-1802
2 (P12)	N/A	W-1800	W-1800	W-1801
3 (P13)	N/A	N/A	W-1800	W-1800
4 (P14)	N/A	N/A	N/A	W-1800

- NOTES
- 1) ALL WIRE IS 14 AWG EXCEPT \* IS 18 AWG UNLESS OTHERWISE NOTED.
  - 2) THE FRAME IS TO BE CONNECTED TO EARTH GROUND AT INSTALLATION TIME.
  - 3) AC POWER FOR INTERNAL INTERFACE CARD IE MODEM, FIBER (IF REQUIRED). REFER TO DWG A-125900 FOR MODEM AND FIBER INPUT DETAILS.
  - 4) EACH LED MODULE IS A 8X8 MATRIX.
  - 5) FOR POWER SUPPLY CONFIGURATIONS REFER TO DWG A-158225.
  - 6) FOR SINGLE PHASE (120/240VAC) PANEL BOARD LAYOUT REFER TO DRAWING A-158195. FOR THREE PHASE (120/208VAC) PANEL BOARD LAYOUT REFER TO DRAWING A-161874.
  - 7) FOR DISPLAYS USING AMBER LEDS REFER TO DWG A-158396 FOR POWER SPECS.. FOR DISPLAYS USING RED LEDS REFER TO DWG A-162439 FOR POWER SPECS..
  - 8) ABOVE WIRING DETAIL IS REPEATED FOR ALL SIZES IE. A 16 HIGH DISPLAY WOULD REQUIRE 2 OF THE ABOVE.

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LARGE CHARACTER

TITLE: SCHEMATIC, AF-3090-8-32X\*\*\*-24, MONO

DES. BY: LKERR      APPR. BY:      DRAWN BY: LKERR      DATE: 13DEC01

REVISION      SCALE: 1=1

1259-R03B-161855

REV.	DATE	DESCRIPTION	BY	APPR.
01	07MAY02	CHANGED P3 AND J3 TO P11 AND J11	LLK	

# Appendix B: Signal Converter

The following table gives the typical state of the signal converter when the LEDs are either on or off. Refer to **Figure 24** for an illustration of the signal converters and the locations of the various components.

LED Indicators	Typical States	
PWR	ON	Signal Converter (SC) is receiving power.
	OFF	SC is not receiving power. Internal 1 AMP Fuse is bad.
TX	ON Steady	SC is not connected to a serial port. (If connected to serial port) Serial port or serial cable may be bad.
	OFF Steady	Normal state, SC is not transmitting data.
	Brief Flicker	SC is transmitting data.
RX	ON Steady	Field cabling between SC and display is bad, connected to display out or terminated incorrectly.
	OFF Steady	Normal state, SC is not receiving data.
	Brief Flicker	SC is receiving data.

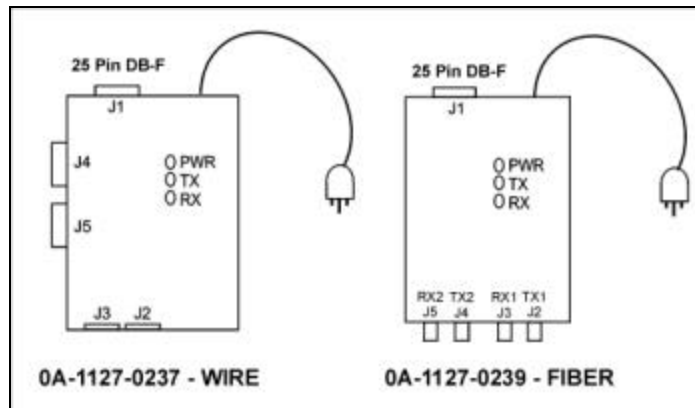


Figure 24: Signal Converters

## 0A-1127-0237 – Wire

The following tables list the jack pin-outs for a wire signal converter.

J2 & J3 - RJ11	
PIN	OPERATION
1	GND
2	TX-N (out)
3	TX-P (out)
4	RX-N (in)
5	RX-P (in)
6	GND

J4 & J5 – Phoenix	
PIN	OPERATION
1	GND
2	RX-P (in)
3	RX-N (in)
4	TX-P (out)
5	TX-N (out)
6	GND

J1 25 Pin DB-F	
PIN	OPERATION
2	TX-P (out)
3	RX-P (in)
7	GND

**Loop-Back Test:** To perform a loop-back, for testing purposes only, connect the following using copper conductor jumpers.

**Note:** This test should be performed with only one jack at a time. Do not connect loop back to more than one jack at a time.

<b>J2 &amp; J3</b>	<b>OR</b>	<b>J4 &amp; J5</b>
TX-N to RX-N		RX-P to TX-P
TX-P to RX-P		RX-N to TX-N

### 0A-1127-0239 – Fiber

The following tables give the jack pin-outs for a fiber signal converter.

JACK	OPERATION
J2	TX1 (out)
J3	RX1 (in)
J4	TX2 (out)
J5	RX2 (in)

J1 – 25 Pin DB-F	
PIN	OPERATION
2	TX-P (out)
3	RX-P (in)
7	GND

**Loop-Back Test:** To perform a loop-back, for testing purposes only, connect the following using a fiber optic cable jumper.

<b>J2 &amp; J3 or J4 &amp; J5</b>
TX to RX

### Serial Cable (W-1249)

This table lists the pin connections when using a serial cable (W-1249).

DB9-F	DB25-F
Pin 3 – TX	Pin 2 – TX
Pin 2 – RX	Pin 3 – RX
Pin 5 – GND	Pin 7 - GND

### Serial Adaptor (A-1603)

DB9-F	DB25-M
Pin 3 – TX	Pin 2 – TX
Pin 2 – RX	Pin 3 – RX
Pin 5 – GND	Pin 7 - GND