

**Galaxy[®] Outdoor
Series AF-3197 - RGB**

Display Manual

ED14037

Rev 2

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DAKTRONICS

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DAKTRONICS, INC.

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Section 1: Introduction

This manual explains the installation, maintenance, and troubleshooting of the 89 mm AF-3197 RGB 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.

The manual contains seven sections: Introduction, Mechanical Installation, Electrical Installation, Maintenance and Troubleshooting, Appendix A, Appendix B and Appendix C.

- **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 display mounting.
- **Electrical Installation** gives general guidance on terminating power and signal cable at the display.
- **Maintenance and Troubleshooting** addresses, such topics as removing basic display components, troubleshooting the display, performing general maintenance, and exchanging display components.
- **Appendix A** lists the drawings included within the manual.
- **Appendix B** includes information about the signal converter.
- **Appendix C** includes information about the Optional Temperature Sensor.

Daktronics identifies manuals by an ED number located on the cover page of each manual. For example, Daktronics refers to this manual as **ED-14037**.

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

- **System Riser Diagrams:** Overall system layout from control computer to display, 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 display 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 B-206146**. Reference drawings are inserted in **Appendix A**.

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DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ: GALAXY, AF-3200 & AF-3400 SERIES	
TITLE: SCHEM, PRIMARY SIGNAL, INTERNAL, W/OC	
DES. BY: PGILK	DRAWN BY: LKERR
DATE: 11 MAR 04	
REVISION	APPR BY:
00	SCALE: NONE
1229-R03B-206146	

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 B-206146** in **Appendix A** for the power supply wiring.”

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

Reference Drawing:

Schem, Primary Signal, Internal, W/QC **Drawing B-206146**

Daktronics builds displays for long life and that require little maintenance. However, from time to time, certain display components need replacing. The **Replacement Parts List** in **Section 4.13** provides the names and numbers of components that may need to be replaced during the life of the display. Most display components have a white label that lists the part number. The component part number is in the following format:

0P-____-____ (circuit board) or 0A-____-____ (multi-component assembly).

Following the **Replacement Parts List** is the **Exchange and Repair and Return Programs** in **Section 4.14**. Refer to these instructions if any display component needs replacement or repair.

1.1 Safety Precautions



Important Safeguards:

1. Read and understand these instructions before installing.
2. Be sure the display and radio enclosures are properly grounded with an earth ground electrode at the display.
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.

1.2 Network Concepts

The concept of using LED displays as a 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 the complexity of multiple display installations has emerged. Daktronics display systems 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 purchase pre-terminated telephone cables for use with the displays.

There are six (6) network systems available: RS232, RS422, modem, fiber, radio and Ethernet. Up to 240 displays can exist on 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 7.6 meters (approximately 25 Feet). This interface was designed for computer communication at short distances. The computer used will require an RS232 communication port. Refer to **Section 3** for additional information.

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 signal to RS422. Refer to **Section 3** for additional information.

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 computer and display. Each modem network needs to have a dedicated phone line assigned to it. Refer to **Section 3** for additional information.

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 600 meters (approximately 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. Refer to **Section 3** for additional information.

Radio Network

The radio network is a standard communication method that uses radio waves at high frequencies to transmit signal. The Venus® 1500 Radio network has a maximum distance of 450 meters (approximately 1500 feet) outdoor and 150 meters (approximately 500 feet) indoor. A nearly straight line-of-sight path must be maintained between the Server Radio connected to the computer and the Client Radio connected to the display. Refer to **Section 3** and the Venus 1500 Radio Manual, **ED-13932**, for the additional information.

Ethernet Network

Note: The use of a quick connect cable or interconnect wiring between display controllers will not allow separate control of the second display if the input signal was Ethernet. Only separately wired primary displays are allowed when controlled by an Ethernet signal.

1. The Ethernet network that uses fiber optic cable is a standard communication method transmitting light (signal) through a glass fiber. When used with the media converter the fiber optic cable has a maximum length of 2000 meters (approximately 1.2 miles). One media converter is needed to convert the Ethernet signal from the hub or switch to fiber optic signal and then a second media converter is located in the display that converts the fiber signal back to Ethernet. A minimum of two fibers is required. Refer to **Section 3** for additional information.
2. The Ethernet network that uses copper cable is a standard communication interface that utilizes a local area network (LAN). Utilizing Cat-5/Cat-5E cable, this transmission scheme has a typical maximum cable length of 100 meters (approximately 330 feet) from an Ethernet hub or switch. The cable will connect to a network hub and then to the Ethernet surge card in the display. Refer to **Section 3** for more information.

1.3 Sign Overview

Reference Drawings:

Power Specs, AF-3197, RGB LEDs.....	Drawing A-183906
Component Layout, AF-3190-**x**-89mm	Drawing B-181666
Shop Drawings	Refer to Appendix A

Daktronics designs and manufactures AF-3197 Galaxy® displays for performance, reliability, easy maintenance, and long life. The pixels have an 89mm center-to-center spacing and LEDs (light emitting diodes). Each display section has a minimum of 24-inch character height. A light sensor on the front of the first display is used for automatic dimming of the LEDs based on the ambient light levels.

Refer to **Drawing A-183906**, **Drawing B-181666**, and the **Shop Drawings** for the approximate size, weight, and power requirements for your model of display.

The following describes the Galaxy[®] model numbers: **AF-3197-RRCCC-89-RGB**

AF-3197	=	Outdoor 89mm Louvered RGB Galaxy Sign
RR	=	Number of Rows High (8, 16, 24, 32, 40 and 48 are available)
CCC	=	Number of Columns Long (32, 48, 64, 80, 96, and 112 are available)
89	=	89mm center-to-center pixel spacing
RGB	=	LED Color (32,000 RGB)

A typical sign system consists of a Windows[®] based personal computer (PC) running Venus[®] 1500 software and one or more displays. Venus[®] 1500 is a software package that runs under Windows[®] 98, ME[™], NT[®] 4.0, 2000, or XP Home/Professional operating systems on an IBM-compatible computer. Refer to the Venus 1500 controller manual, **ED13530**, for installation and maintenance of the Venus 1500 editing station.

The displays are single-face units, which are single-sided stand-alone displays. The first display is called the primary, and if mounted back-to-back with a second display; the second display is called the echo. If the second display will be mounted at a distance of more than ten feet from the primary, which is common with the 89mm displays, the quick connect interconnect cable cannot be used. Signal between controllers will need to be hardwired.

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: The serial 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, translates, and activates the signal information from the control computer to the appropriate pixels on the display accordingly.

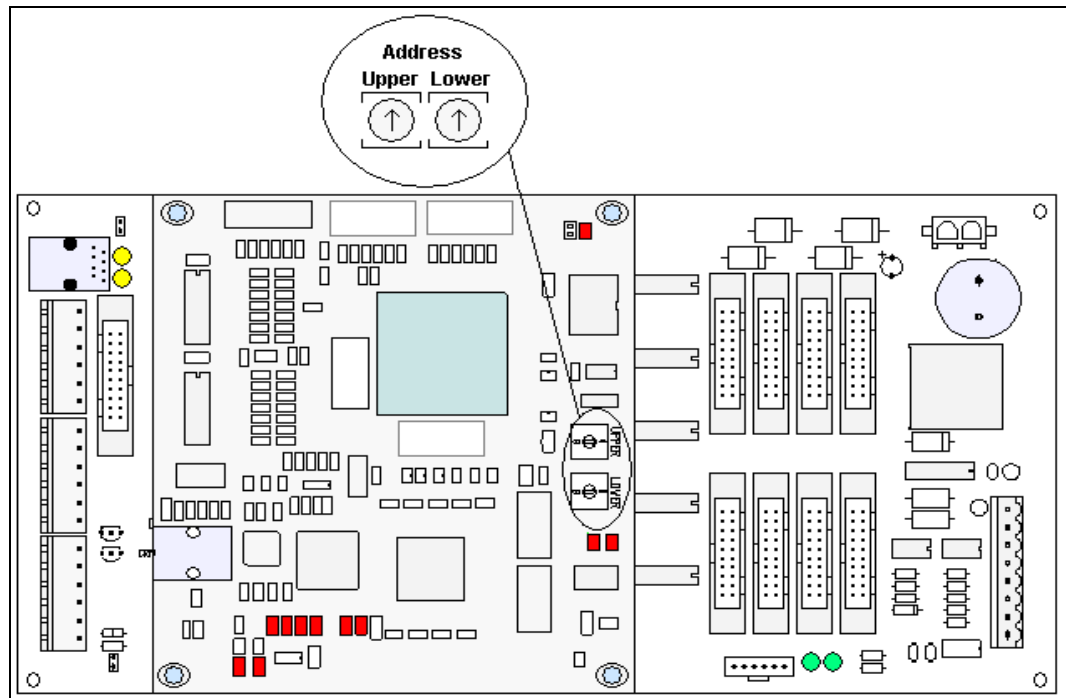


Figure 2: Controller

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.

Fiber Optic: 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.

Galaxy®: Daktronics trademarked name for LED monochrome, tri-colored, or RGB matrix signs.

Latch Access Fastener: Device utilizing a rotating retainer bar to hold the module firmly to the display frame. There is one latch near the center of the module on the right side.

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

Louver: Black shade positioned horizontally above each pixel row. The louvers increase the level of contrast on the display face and direct LED light.

Module: 89mm Galaxy® modules are 8 pixels high by 8 pixels wide. They consist of pixel strips, louvers, and a driver. Refer to **Figure 3** for identification of parts.

Network: Consists of multiple signs connected to each other.

Pixel: Cluster of LEDs. The number and color of the LEDs depends on display application.

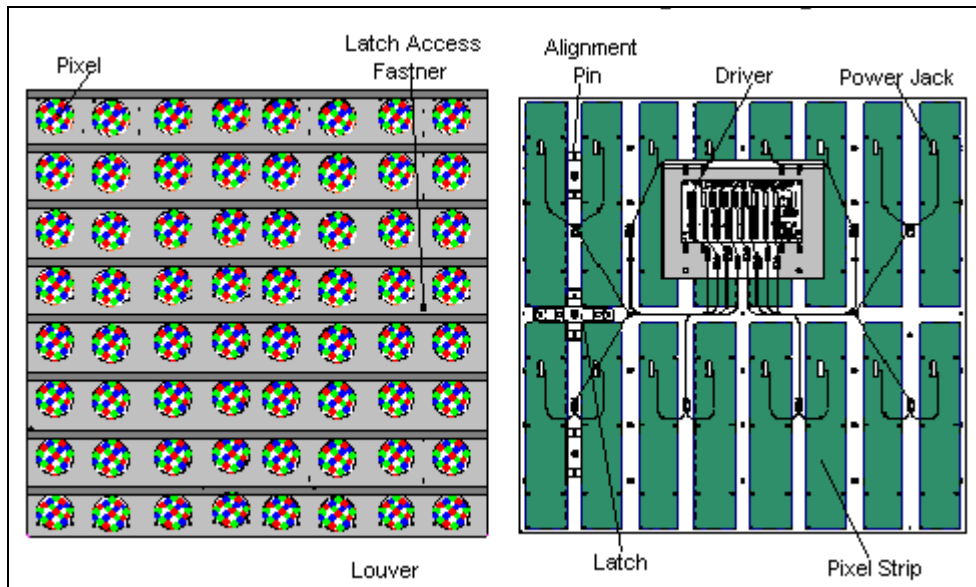


Figure 3: 8x8 Pixel Module (Front and Rear)

Pixel Strip: Four LED pixels mount directly onto a pixel strip. Each pixel strip is removable from the module. There are 16 pixel strips per module.

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).

Serial Port: An actual serial port is required for direct connections through the J-box, signal converter or the radio J-box/signal converter from the computer. Certain USB adaptors create an “actual” serial port and others create “virtual” ports. Daktronics does not support the use of a USB adaptor. The Venus 1500 software will not recognize a virtual port.

Sign Address: The sign address is an identification number assigned to each display of a network. It is set by rotating the hex address 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.

Signal Converter: The signal converter, shown in **Figure 4**, is a Daktronics supplied unit that converts the data from RS232 to RS422. A similar looking device is used to convert RS232 to fiber optic signal. The signal converter is connected to the control PC via a straight through serial cable.

Venus® 1500: Daktronics designed, Windows® based software used to create and edit messages on the display. Refer to **ED-13530** for more information.

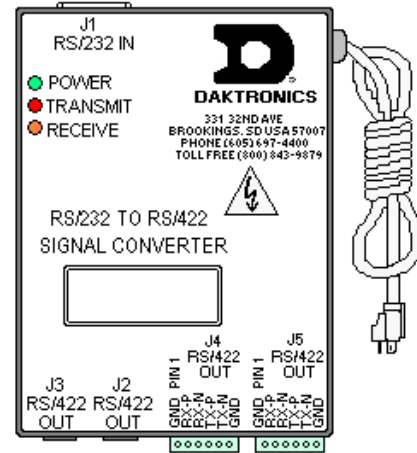


Figure 4: Signal Converter

1.5 Daktronics Nomenclature

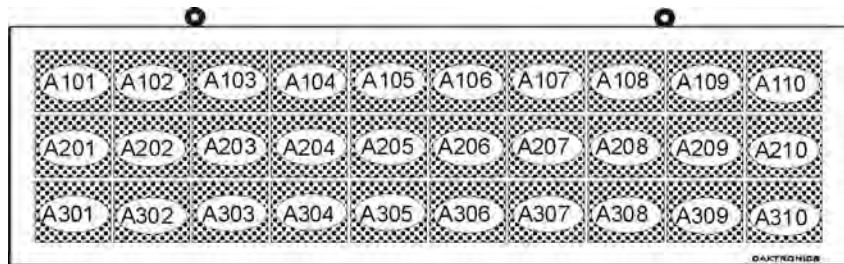


Figure 5: Module Numbering Example – 24x80 Front

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.

A module is the building block of the 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 5** illustrates how Daktronics numbers modules on a Galaxy® sign. **Figure 6** breaks down the module numbering method.

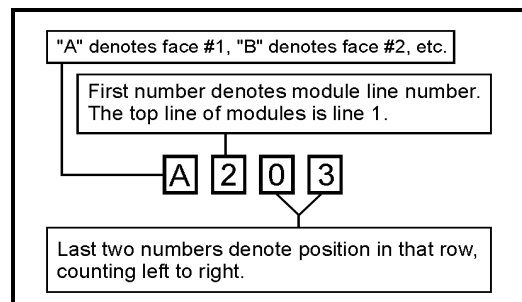


Figure 6: Module Numbering

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

- “TB_” shows a termination block for power or signal cable.
- “F_” denotes a fuse.
- “E_” signifies a grounding point.
- “J_” stands for a power or signal jack.
- “P_” represents 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-____-____” gives the form of an individual circuit board, such as a module driver.
- “OA-____-____” represents 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-____” indicates a wire or cable. Cables may also carry the assembly numbering format in certain circumstances. This is especially true of ribbon cables.
- “F-____” signifies a fuse.

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 4.13** does not list a circuit board or assembly, use the label to order a replacement. **Figure 7** on the right illustrates a typical label. The part number is in bold.

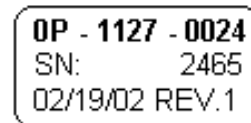


Figure 7: Typical Label

Section 2: Mechanical Installation

Note: Daktronics does not guarantee the warranty in situations where the display is not constantly in a stable environment.

Daktronics engineering staff must approve **any** changes that may affect the weather-tightness of the display. 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

Because every installation site is unique, Daktronics has no single procedure for mounting Galaxy[®] displays. 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 display.

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, display size, and weight. Since the structure design is critical, only a qualified individual should mount the display. Display 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 display and agrees with local codes.

Before beginning the installation process, verify the following:

- The mounting structure provides a straight and square frame for the display.
- The mounting structure supports the display without yielding at any unsupported points after mounting.
- Clearance: 3" of unobstructed space is available below the display for ventilation. 1¼" of unobstructed space is available above the top of the display.

Correct any deficiencies before installation.

2.3 Ventilation Requirements

Reference Drawings:

Shop DrawingsRefer to Appendix A

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 display to maintain proper airflow. Refer to the appropriate **Shop Drawing** for additional information.

If the display 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[®] display warranty.

2.4 Lifting the Display

The top of the display 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 display.

Figure 8 illustrates both the correct (left example) and the incorrect (right example) method of lifting a display. Lift the display as shown on the left, with the lifting bar. **Use every lifting point provided.**

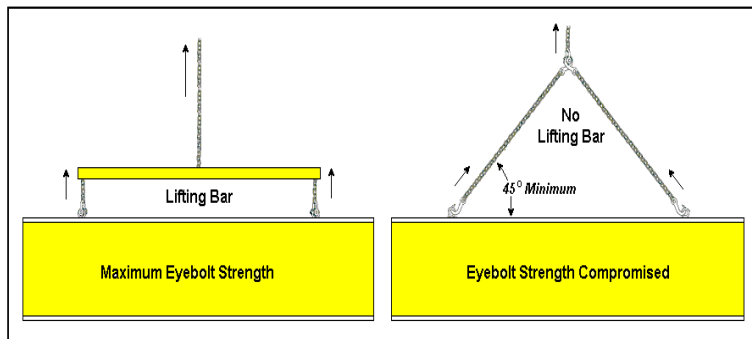


Figure 8: Lifting the Displays (left; correct) and (right; incorrect)

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

If you remove the eyebolts, adequately seal the holes using 13 bolts and sealing washers, ½ inch in size. Silicone along the threads to ensure water does not enter the display.

2.5 Display Mounting

Reference Drawings:

Assy, Grounding and Fan Harness	Drawing A-175194
Schematic, AF-3197-8-48x32x***-89, RGB	Drawing A-184111
Block Diagram, Power, AF-3197, 89mm	Drawing B-184326
Shop Drawings.....	Refer to Appendix A

The method used to mount displays 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 ¼- inch.
- The mounting structure will not give way at any unsupported points after the sign is mounted.

The back of the display uses 3x2x³/₈" steel clip angles at the locations shown in the **Shop Drawings**. These angles assist in mounting the display. Remember to have **all** mounted displays 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 display. Look each side of the display over for possible damage caused during shipping.
2. Following the guidelines described in **Section 2.4**, lift the display into position on the support structure using all provided eyebolts.
3. Weld or use ½" Grade-5 bolts and hardware to secure the clip angles to the support structure as shown in **Top View** in **Shop Drawings**. Refer to **Section 3** for information on routing power and signal.
4. **(For Sectional Displays Only):** Remove lift eyes from the bottom section. Using all lift eyes provided, lift the top section over the bottom section. Align the holes as required for 5/8" hardware. Secure sections using 5/8" hardware, as shown in the **Shop Drawings**. Connect power and signal (refer to **Drawings A-175194, A-184111, and B-184326**). The sign is then ready for installation.
5. Upon completing the installation, carefully inspect the display for any holes that may allow water to seep into the display. Seal any openings with silicone. If you remove the eyebolts on the top of the display, plug the holes with bolts and the rubber sealing washers that you removed with the eyebolts. Silicone the threads on the bolts.

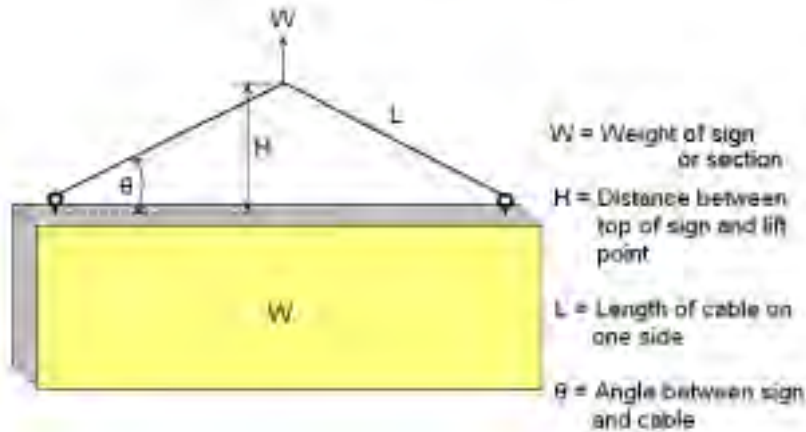
2.6 Optional Temperature Sensor

If you have an optional temperature sensor to be used with your display, see **Appendix C** for mounting and signal connections.

Eyebolts

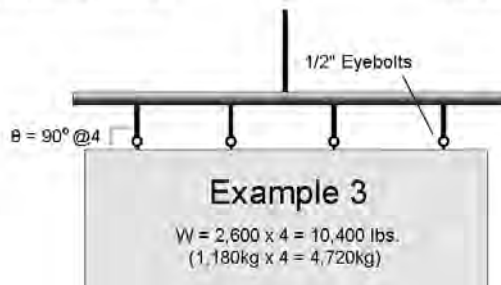
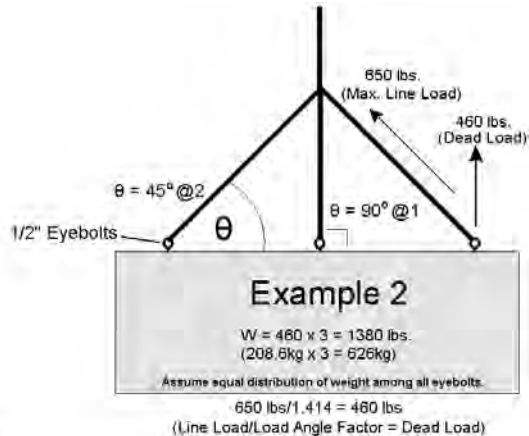
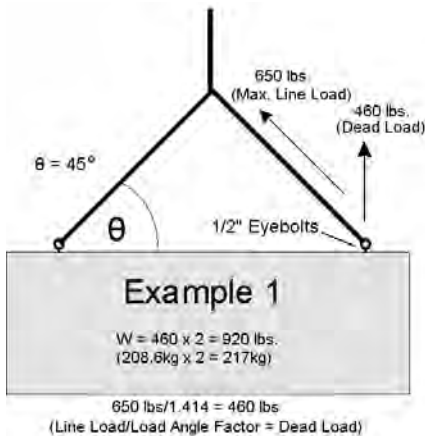
Almost every display that leaves Daktronics is equipped with eyebolts for lifting the display. There are two standard sizes of eyebolts: 1/2" and 5/8".

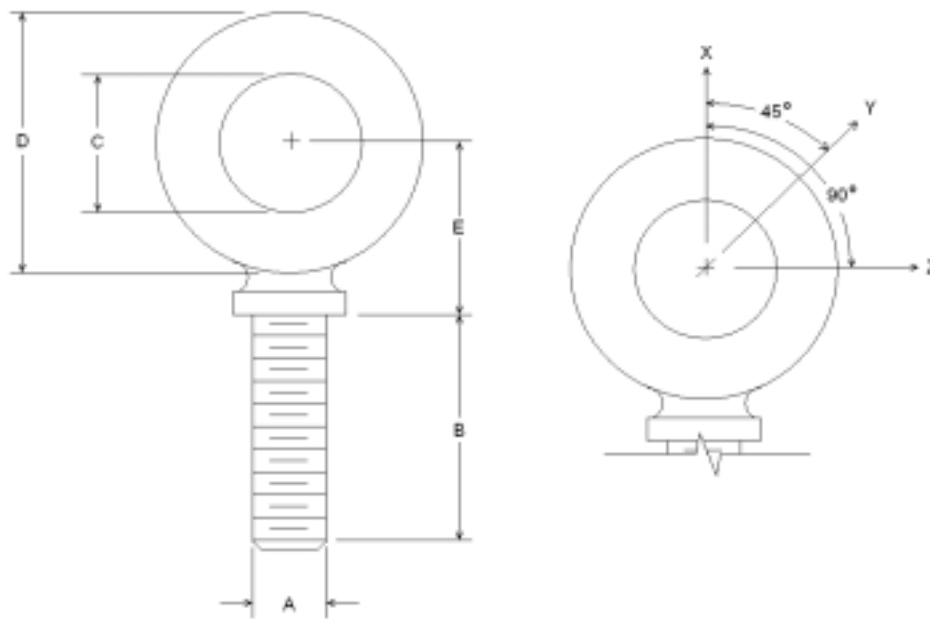
Load Increase Factor: The load increases as the lift angle (θ) decreases. The allowable load on the eyebolts also decreases with the lift angle due the bending stress on the eyebolts. In sum, the smaller the angle between the cable and the top of the display, the lighter the sign must be to safely lift it. *Do NOT attempt to lift the display when the lift angle is less than 30 degrees.*



Horizontal Angle	Load Angle Factor (L/H)
90	1.00
60	1.155
50	1.305
45	1.414
30	2.00

θ	1/2"		5/8"	
	Line Load	Weight/Anchor	Line Load	Weight/Anchor
90	2600	2600	4000	4000
60	1500	1299	3300	2858
45	650	460	1000	707
30	520	260	800	400





A	B	C	D	E	No.	Min. Proof Load (lbs.)	Min. Break Load (lbs.)	Stocked	Min. Eff. Thrd. Length	Line Loads		
										Wx	Wy	Wz
1/4	1	3/4	1-3/16	25/32	21	600	2,000	Blank 1/4-20	7/8	400	100	80
3/8	1-1/4	1	1-21/32	1-3/16	23	2,100	5,000	Blank 3/8-16	1-1/8	1,400	350	250
1/2	1-1/2	1-3/16	2-1/16	1-13/32	25	3,900	9,200	Blank 1/2-13	1-11/32	2,600	650	520
9/16	1-5/8	1-9/32	2-13/16	1-17/32	26	4,500	11,830	Blank 9/16-12	1-3/8	3,000	750	600
5/8	1-3/4	1-3/8	2-1/2	1-11/16	27	6,000	14,700	Blank 5/8-11	1-9/16	4,000	1,000	800
3/4	2	1-1/2	2-13/16	1-13/16	28	9,000	21,700	Blank 3/4-10	1-5/8	6,000	1,500	1,200
7/8	2-1/4	1-11/16	3-1/4	2-1/16	29	10,000	30,000	Blank 7/8-9	1-13/16	6,600	1,670	1,330
1	2-1/2	1-13/16	3-9/16	2-5/16	30	12,000	39,400	Blank 1-8	2-1/16	8,000	2,000	1,600
1-1/2	3-1/2	2-9/16	5-1/2	3-5/32	34	27,000	91,300	Blank 1-1/2-6	3	17,800	4,500	3,600

- A. Do not use eyebolts on angular lifts unless absolutely necessary. For angular lifts, the shoulder pattern eyebolt is preferred.
- B. Load should always be applied to eyebolts in the plane of the eye, not at some angle to this plane.
- C. Shoulder eyebolts must be properly seated (should bear firmly against the mating part), otherwise the working loads must be reduced to those indicated for regular eyebolts. A washer or spacer may be required to put the plane of the eye in the direction of the load when the shoulder is seated.
- D. No load greater than the safe working load listed in the data table should be used.
- E. To obtain the greatest strength from the eyebolt, it must fit reasonably tight in its mounting hole to prevent accidental unscrewing due to twist of cable.
- F. Eyebolts should never be painted or otherwise coated when used for lifting. Such coatings may cover potential flaws in the eyebolt.
- G. To attain the safe working loads listed for regular eyebolts, 90% of the thread length must be engaged.

Section 3: Electrical Installation

Only a qualified individual should terminate the power and signal cable within this Daktronics display.

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

3.1 Common Connectors in the Display

The power and signal connections in the displays use many different types of connectors. Take special care when disengaging any connector, 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 plastic clips on the sides to unlock and remove the jack.

Before replacing a ribbon cable 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 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™ -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.

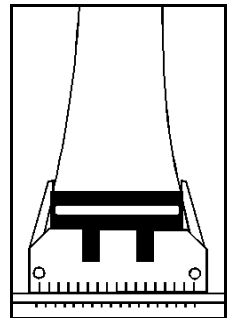


Figure 9: Ribbon Cable Connector

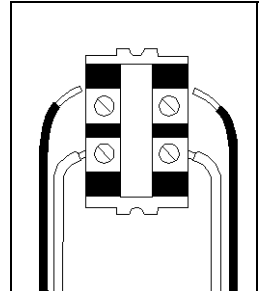


Figure 10: Termination Block

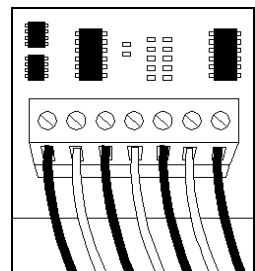


Figure 11: Phoenix Connector

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.

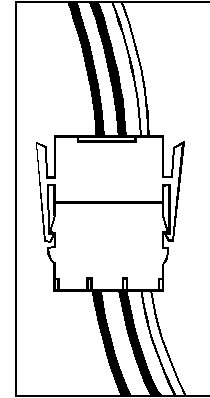


Figure 12: Mate-n-Loc Connector

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.

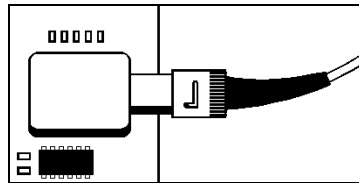


Figure 13: Fiber Optic Cable

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.

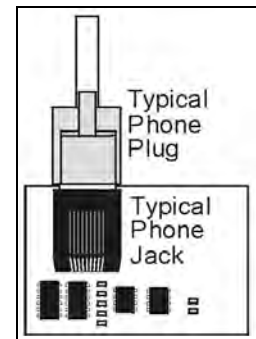


Figure 14: RJ11 Connector

7. Quick Connect Jack:

The display uses quick connect jacks for the connection of the signal termination enclosure, the temperature sensor and possible connection to an echo display. There are three input and one output quick connect jacks located on the back of the primary display, and when not used the attached dust cover should be kept closed.

To attach the cable to a jack, make sure to line up the plug to match the jack, push the plug in then turn the outer collar to lock in place. **Figure 15** illustrates the 6-pin quick connect jack.

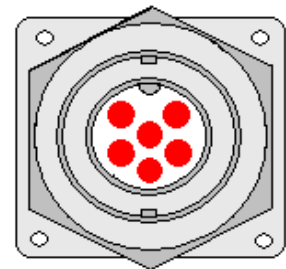


Figure 15: RS232/6-pin Quick Connect Jack

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 display structure. This cable has a maximum length of 25 feet (approximately 7.6 meters).

RS422

This cable is a 4-conductor shielded cable used to transmit an RS422 signal (Daktronics part number W-1234, Manhattan number M4473.) 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 (approximately 1.22 km).

Modem

The modem option will use standard telephone cable routed through conduit. **The phone cable and power cannot be routed in the same conduit.** The local telephone company will need to assist in this installation. Ask the telephone company which color is used for the TIP wire and which for the RING wire for signal hook up to the display.

Note: The telephone line must be a dedicated line 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 (approximately 600 meters) from the signal converter to the fiber optic board in the display.

Radio

The server radio connected to the J-box requires an 18-gauge, six-conductor shielded cable (Daktronics part number W-1370). Four-conductors will be used for the signal and two for power. These wires need to be in conduit when exposed to outdoor conditions to the server radio. The maximum distance from the RS422 J-box to the server radio is 1000 feet (approximately 330 meters).

The client radio at the display comes with a 25 foot quick connect cable that is rated for outdoor use and does not need to be in conduit. Any excess cable should be secured to protect it from weather and vandalism.

Ethernet

Note: The use of a quick connect inter-connect cable or separately wired cable is not allowed between two of more displays if the input to the first display is Ethernet.

Fiber Ethernet

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 in conduit, but it should **not** be subjected to mechanical flexing. The maximum length of the fiber optic cable from one media converter connected to the network and the second media converter in the display is 1.2 miles (approximately 2000 meters).

Ethernet

This cable is an 8-conductor network cable (Daktronics part number W-1467 Cat-5, or W-1384 Cat-5E). The cable 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, separate from the power.
- Inside buildings-if cable is not in conduit, keep away from interface signals

With interference signal, such as power conductors, intercom, etc., typically a two-foot separation is required. The maximum length of an Ethernet signal cable is 330 feet (approximately 100 meters) from the network hub or switch to the surge board in the display.

3.3 RJ Connector Cables

RJ connectors are of two basic types. They consist of the RJ11 connector that uses a six-conductor cable, and the RJ45 that uses an 8-conductor cable. This type of connector can be found on many telephones and LANs.

Both the RJ11 and RJ45 cables used inside the display are pinned as straight through cables. Exterior cables used for a network are often

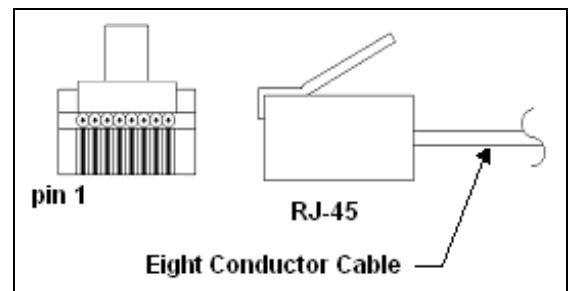


Figure 16: 6-Conductor RJ11 Connector and Cable

flipped cables. This type of cable, as shown in **Figure 17**, has one end that is a mirror image of the other end. When installing a network, to ensure correct cabling, always install the cable from the output jack of one display to the input jack of the next display.

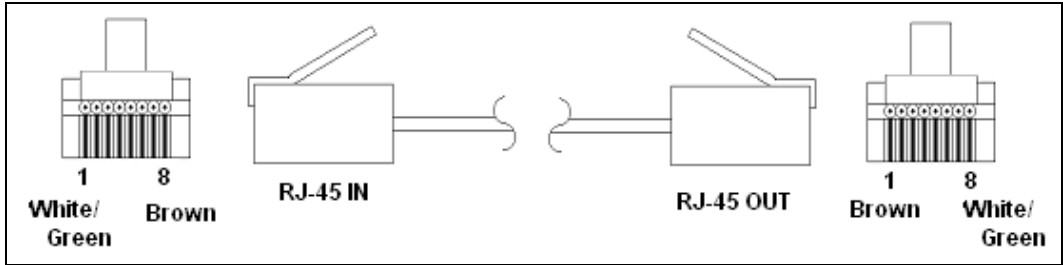


Figure 17: Flipped Cable with RJ Connectors

3.4 Conduit

Reference Drawings:

Shop Drawings..... Refer to Appendix A

Daktronics does not include the conduit. Refer to **Shop Drawings** 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 display (refer to **Shop Drawings**).

Punch or drill out the desired conduit openings. Be careful not to damage **any** internal components. Attach the conduit, and then route the power and signal cables.

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

3.5 Preparing for Power/Signal Connection

Reference Drawings:

Shop DrawingsRefer to Appendix A

If the display needs openings for the power and signal, punch out the knockouts in the lower right corner from the rear. Refer to **Shop Drawings** for more information.

1. 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.
2. 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.
3. Power conductors from the disconnect to the display must route through conduit in agreement with local codes.
4. You may also route the signal cable from the control computer to the sign at this time. **Run the power and signal cables in separate conduit.**

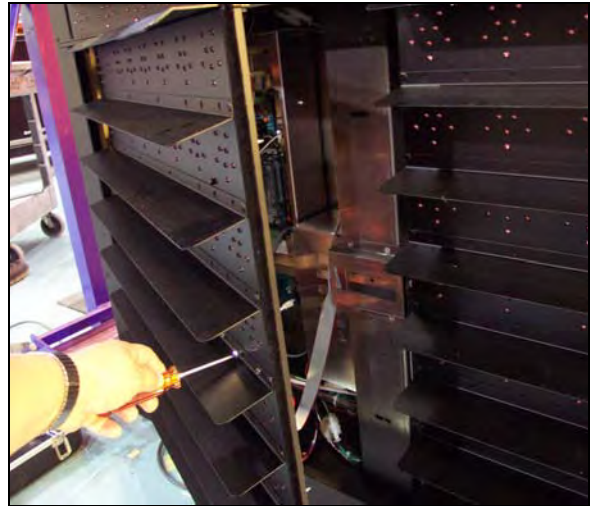


Figure 18: Opening the Display

3.6 Power

Reference Drawings:

Power Specs, AF-3197, RGB LEDs..... **Drawing A-183906**
Schematic, AF-3197-8-48x32x***-89, RGB..... **Drawing A-184111**
Layout, Pnl Bd, 8-48x32-112, 89mm, 1 Phase **Drawing A-184316**
Layout, Pnl Bd, 8-48x32-112, 89mm, 3 Phase **Drawing A-184321**

Refer to **Drawing A-183906** for voltage and current requirements for your display size. Each uses a 120/240VAC single-phase or 120/208 three-phase power source.

Do **not** connect the displays to any voltage other than what is 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 requires 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.**

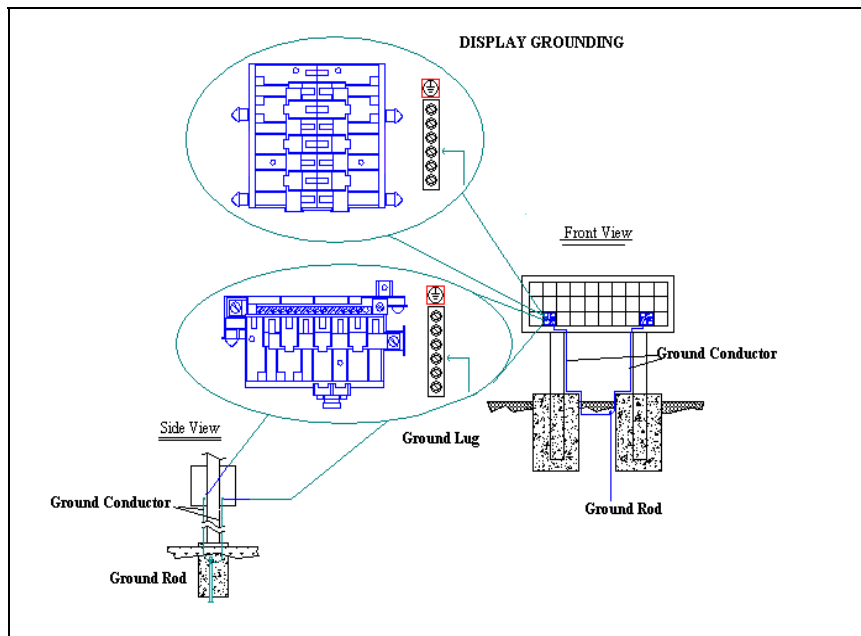


Figure 19: Display Grounding

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 requires 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 panel board.

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. For these displays, installation with ground and neutral conductors provided is used.

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. The National Electrical Code requires the use of a lockable power disconnect within sight of or at the display.

3.7 Main Disconnect

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

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

Exception: 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

Note: The AF-3197 is designed for quicker connection to other displays and other additional equipment. Connection of the control computer to the first display needs to be wired to the surge suppressor, modem, or fiber optic board in the display. Depending on the communication type ordered the following cables may be provided with the display:

1. Interconnect cable from primary to echo, length 10 feet
2. Temperature sensor with quick connect cable, length 10 feet
3. Client radio with quick connect cable, length 25 feet

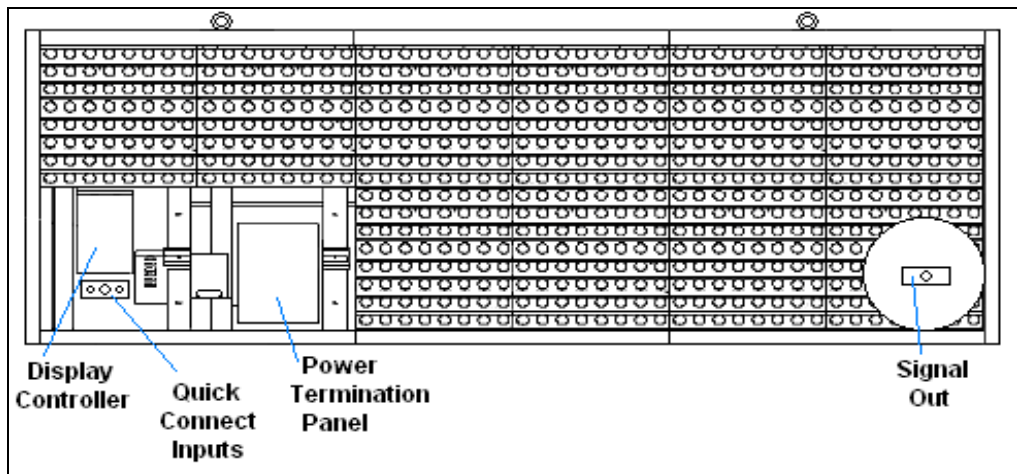


Figure 20: Signal Termination Locations

RS232

Reference Drawings:

- System Riser Diagram, RS232 **Drawing A-174341**
- Schem, Sig Wiring, Internal, W/quick Connect PCB.... **Drawing B-177662**
- Cntrlr; Galaxy, 8 Conn, J1087..... **Drawing B-177838**

A display that is controlled using RS232 requires the use of a J-box within 25 feet of the display. From the J-box to the display, the signal will be wired directly to the controller inside the display. The cable from the J-box to the display must be routed through conduit. **Do not** run signal and display power through the same conduit.

1. Terminate one end at the J-box and the other end of the wire to the 6-position terminal block on the controller labeled “RS232 IN” (A31-TB1).
2. **Figure 22** and **Drawing B-177662** shows the terminal block wiring. **Drawing B-177838** shows the controller.
3. The controlling laptop computer connects to the J-box through the DB9 to DB25 serial cable (W-1249) (refer to **Drawing A-174341**).

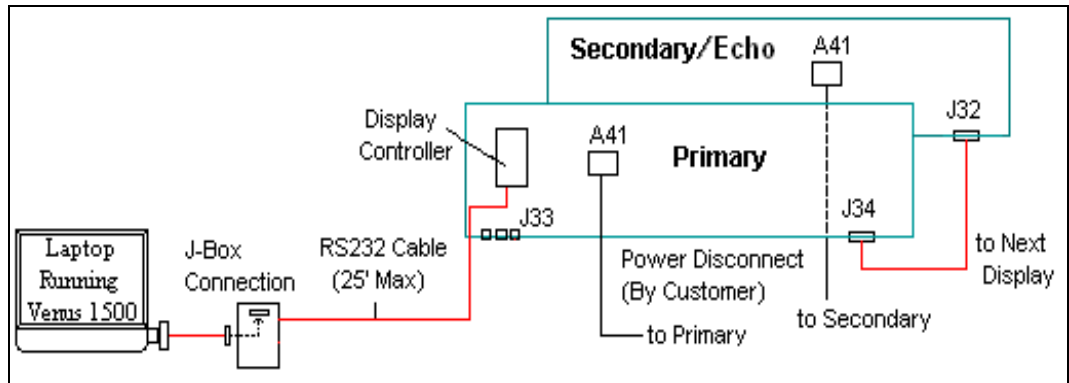


Figure 21: RS232 Display Layout

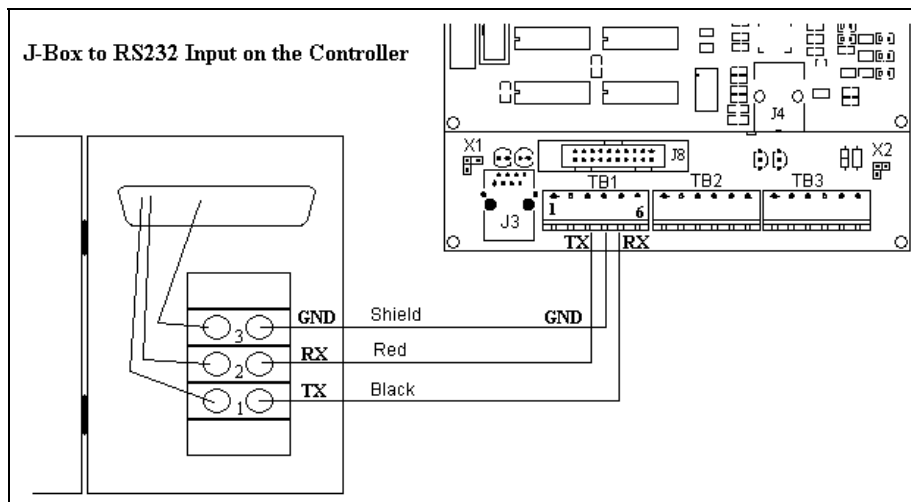


Figure 22: RS232 Controller Board

J-Box to Controller Board

J-Box	Field Cabling	Controller Board TB1 (RS232 In)
Pin 1 (TX-P)	Black	Pin 5 (RX-1)
Pin 2 (RX-P)	Clear/Red	Pin 3 (TX-1)
Pin 3 (GND)	Shield	Pin 4 (GND-N)

RS422

Reference Drawings:

- System Riser Diagram, RS422 **Drawing A-174135**
- Schem, Sig Wiring, Internal W/QC PCB **Drawing B-177662**

A display that is controlled using RS422 requires the use of signal converter (0A-1127-0255) at the computer. From the signal converter, cable is run to the surge board assembly in the display. The cable from the signal converter to the display must be routed through conduit. **Do not run signal and display power through the same conduit.** Refer to **Figure 23** and **Drawing A-174135** for system layout.

1. When connecting to the surge card (0P-1146-0031) in the display, terminate one end at signal converter (J4 or J5) and the other end of the wire to the 6-position terminal block on the surge board assembly labeled "RS422 IN" (TB1).
2. **Figure 24** and **Drawing B-177662** shows the terminal block wiring. The terminal block wiring is pinned one-to-one.
3. The computer connects to the signal converter through a DB9 to DB25 serial cable (W-1249).

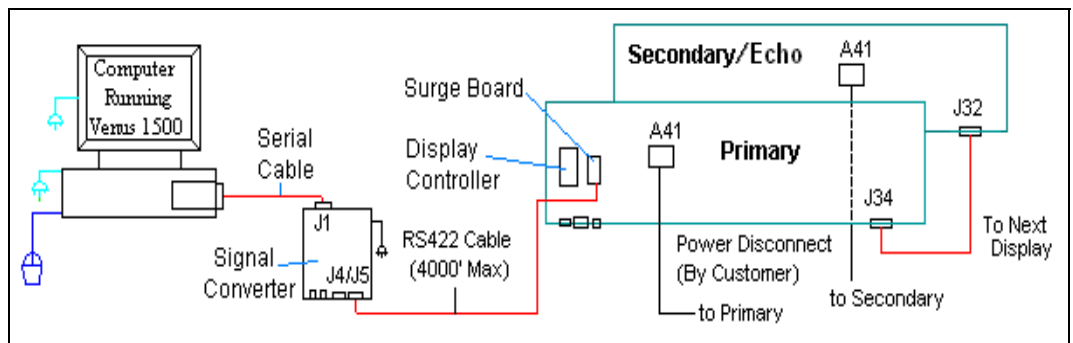


Figure 23: RS422 Display Layout

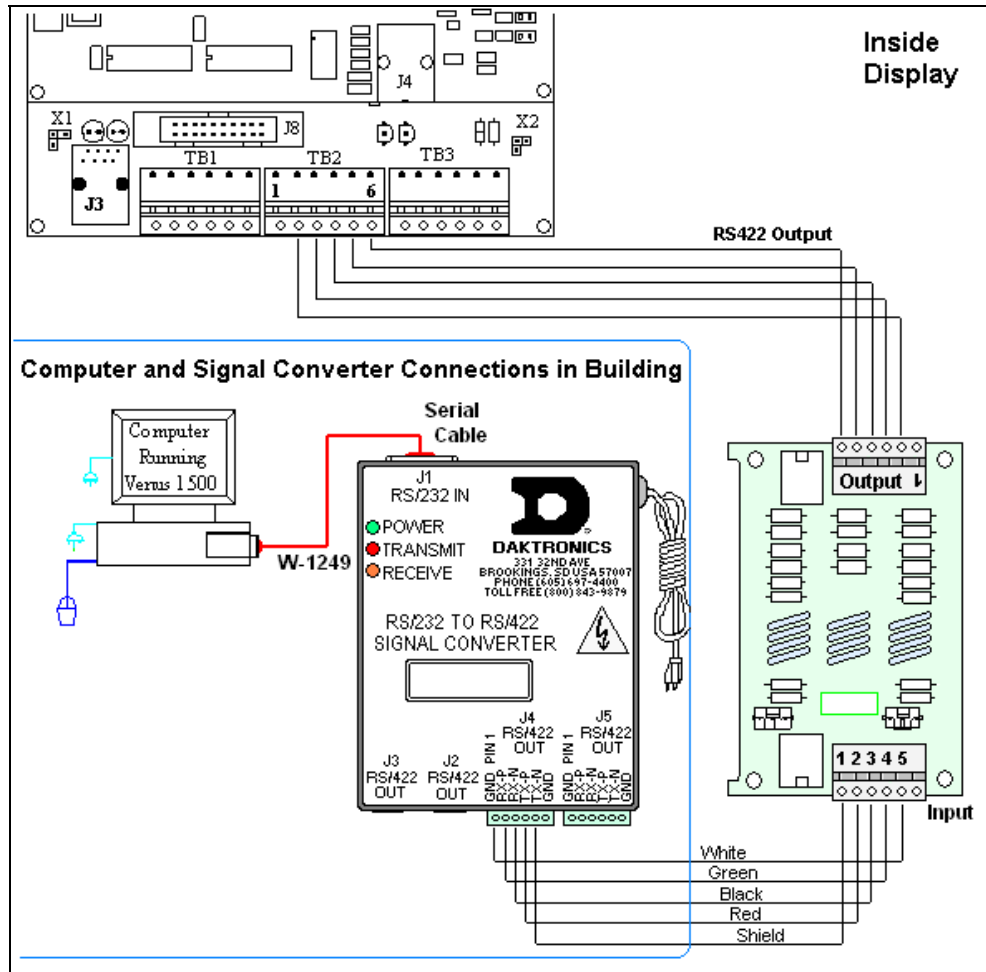


Figure 24: Signal Converter to Surge Board Connection

Signal Converter to Controller Board

Signal Converter (J4/J5)	Field Cabling	Surge Board Assembly TB1 (RS422 In)
Pin 1 (GND)	Shield	Pin 1 (A GND)
Pin 2 (RX-P)	Red	Pin 2 (D1OUT-P)
Pin 3 (RX-N)	Black	Pin 3 (D1OUT-N)
Pin 4 (TX-P)	Green	Pin 4 (D1IN-P)
Pin 5 (TX-N)	White	Pin 5 (D1IN-N)
Pin 6 (GND)		Pin 6 (A GND)

Modem

Reference Drawings:

- System Riser Diagram, Modem **Drawing A-174342**
 Schem, Sig Wiring, Internal, W/QC PCB **Drawing B-177662**

A display that is controlled using a modem requires the use of an internal or external modem at the computer. The local phone company must provide a dedicated phone line to the display and identify which color wire is used for “Tip” and which color for “Ring”. The phone cable must be routed though conduit. **Do not** run phone line and display power through the same conduit. Refer to **Figure 25** and **Drawing A-174342** for system layout.

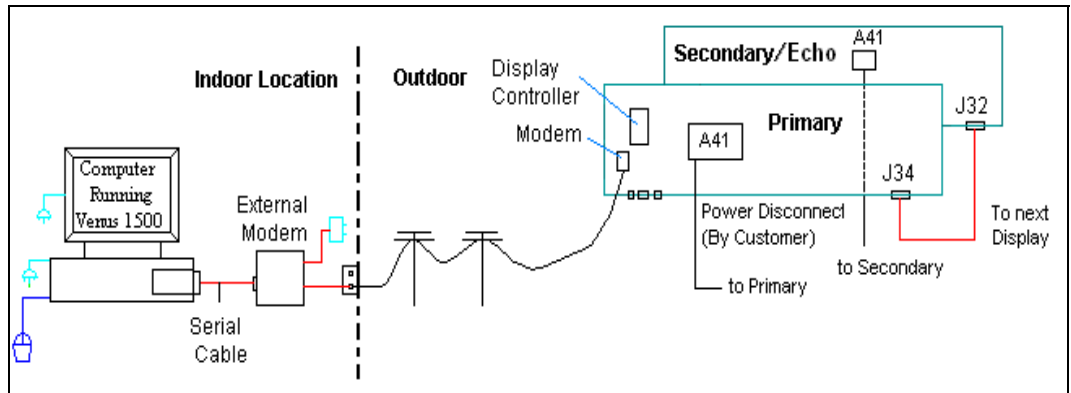


Figure 25: Modem Display Layout

1. When connecting to the modem in the display, terminate the phone line to TB2 on the display modem. If the phone company provided a phone termination box in the display a straight phone cable can be connected from the box to the J5 Phone IN on the modem board in the display.
2. **Figure 26** and **Drawing B-177662** shows the terminal block wiring.
3. A second cable (0A-1229-0054) transfers data from J6 on the modem (OP-1146-0003) to J3 (RS232 IN) on the controller.
4. X1 on the controller should be closed for the controller to recognize on bootup that a modem is being used with the display.

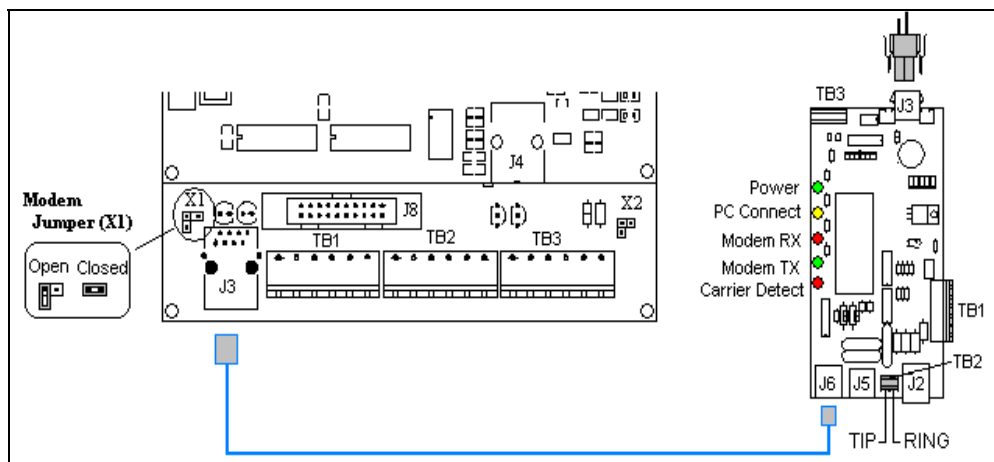


Figure 26: Modem Signal Termination Location

Fiber Optic

Reference Drawings:

System Riser Diagram, Fiber **Drawing A-174344**

Schem, Sig Wiring, Internal, W/QC PCB..... **Drawing B-177662**

When using fiber cable, the cable will connect directly from the signal converter to the fiber optic board in the display. Refer to **Figure 27** and **Drawing A-174344** for the system layout.

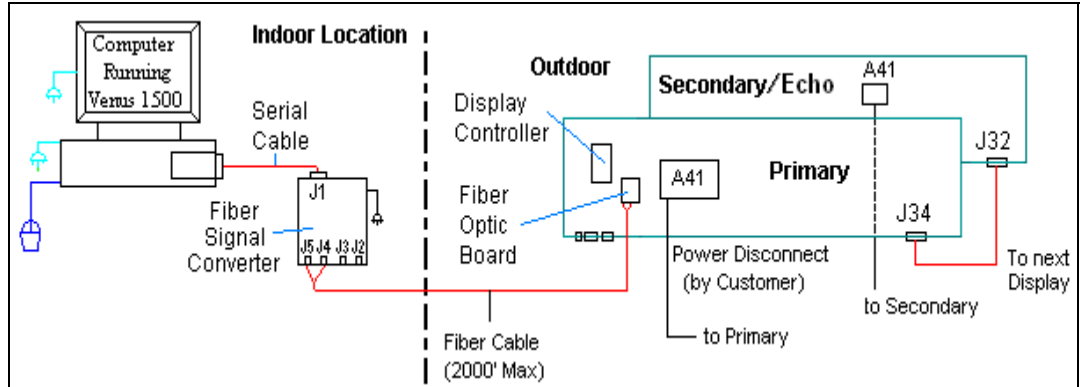


Figure 27: Fiber Display Layout

1. Connect the two fibers at the signal converter (0A-1127-0256) and the other two at the fiber optic board (J4/J5) (0P-1146-0024) in the display. Always remember to connect TX to RX and RX to TX. (Either pair of fiber outputs on the signal converter can be used, but only the left pair of inputs on the fiber optic board in the display.)
2. Refer to **Figure 28** and **B-177662** for cabling in the display.
3. A 8-conductor cable with RJ45 connectors (0A-1229-0054) then relays the signal from J7 on the fiber optic board to J3 (RS232 IN) on the controller
4. The computer connects to the signal converter through a DB9 to DB25 serial cable (W-1249).

Signal to Fiber	Signal Converter	Field Cabling	Fiber Optic Board	Converter Board
	J2 (TX1)	(Color varies)	J5 (RX)	
	J3 (RX1)	(Color varies)	J4 (TX)	

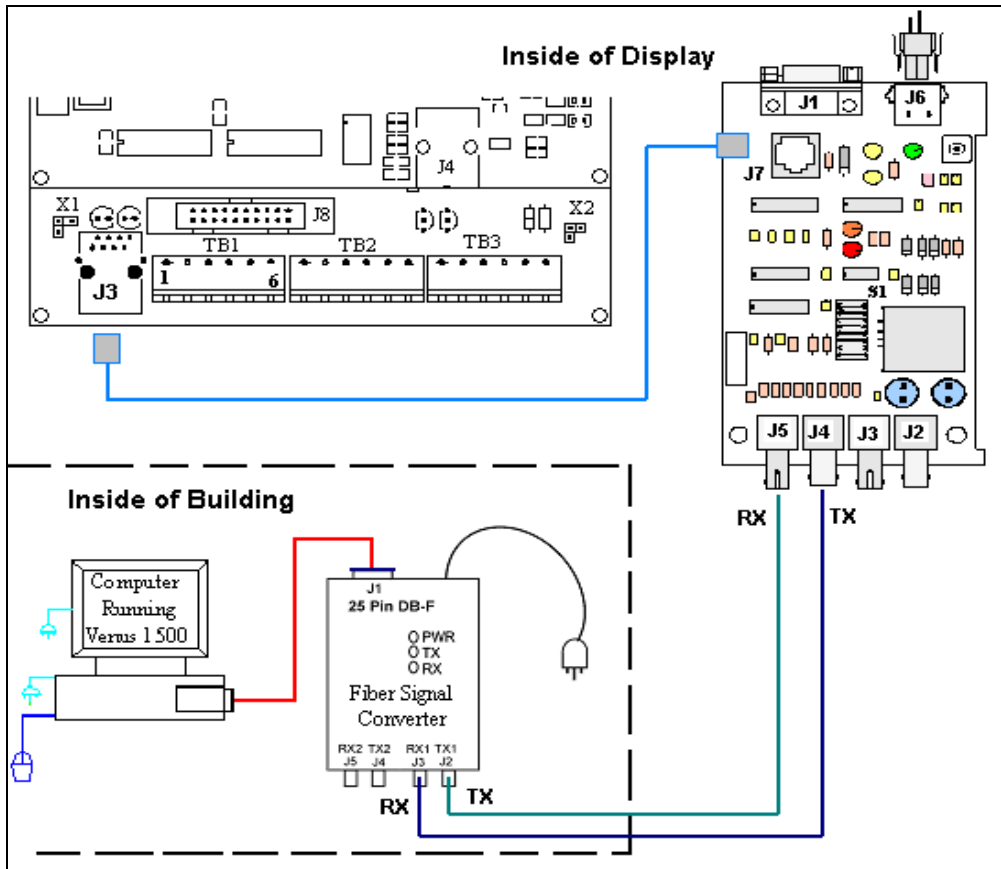


Figure 28: Fiber Signal Connections

Venus® 1500 Radio Client

Reference Drawings:

- System Riser, QC Outdoor Radio, V1500 **Drawing A-185359**
- Schem, Sig Wiring, Internal, W/Q CPCB **Drawing B-177662**

A display that is controlled using a radio requires a server radio connected to the control computer, and a client radio connected to the display using a pre-terminated cable. The following conditions are required for good radio operation:

1. The radios must be within line-of-site of each other.
2. The total distance between the outdoor radios should not exceed 1500 feet.
3. The antennas for the server and client radio should be in a parallel position with each other.

Refer to **Drawing A-185359** and **Figure 29** for system layout.

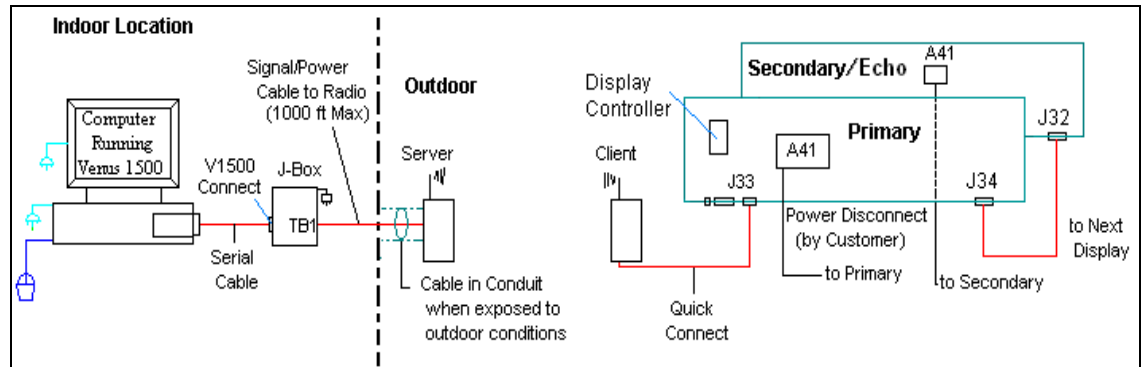


Figure 29: Radio Display Controller

1. The computer connects to the J-box/signal converter (0A-11279-0161) at the connector labeled “V1500 PC Connect” using a DB9M to DB9F serial cable (W-1267).
2. Use an 18 AWG, 6-conductor, cable to connect from the J-box/signal converter to the server radio (0A-1146-0079) mounted on the outside of the building. The cable is pinned one-to-one. (Additional drawings for the server connections are in the Venus 1500 Radio Manual, **ED13932**.)
3. The client radio (0A-1146-0078) is provided with 25 feet of weather resistant pre-terminated cable. The cable will be terminated to the display with the quick connect plug to the top, red jack, labeled J33, on the display. Refer to **Figure 30** for the quick connect termination point.
4. One end of the cable is pre-terminated to TB2 inside the radio enclosure, and a quick connect plug is terminated at the other end of the cable. **Note:** Secure any additional cable for protection from weather or vandalism.

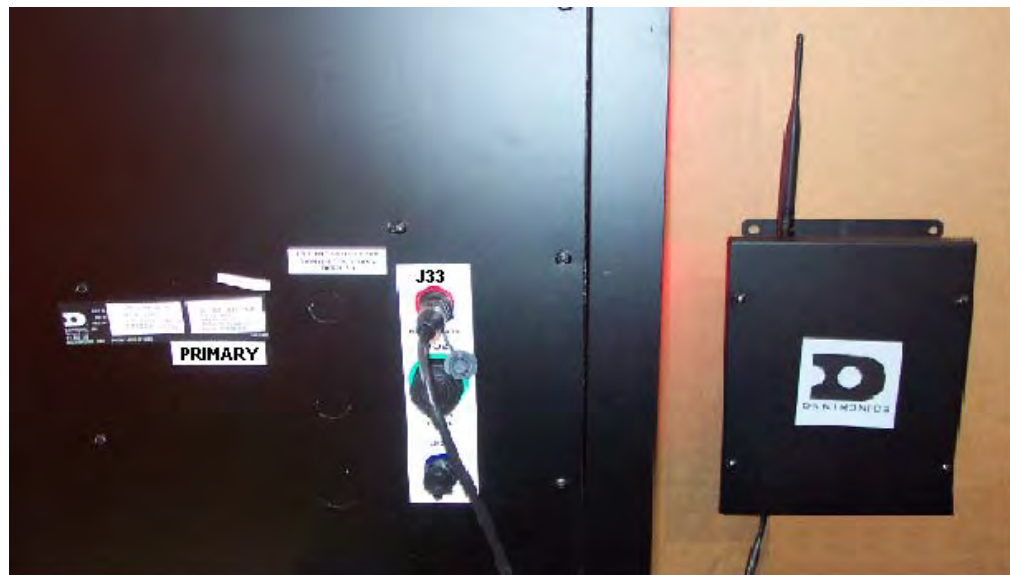


Figure 30: Client Radio connected to Display

Ethernet (Wire)

The controller has a default IP address of 172.16.192.25. Use this address to connect to the primary display, and then it can be changed to an address specified by the network administrator. **Electrical surges may enter over the cable; it is the customer's responsibility to protect their network.**

An Ethernet controlled display, requires the use of an RJ45 cable from the network to the display with the following connections:

1. Connect one end of the RJ45 cable to a network hub or switch.
2. From the network connection, cable is run to the Ethernet surge card in the display.
3. The cable from the Ethernet hub to the surge board in the display must be routed through conduit. **Do not** run signal and power through the same conduit. Refer to **Figure 31** for system layout.
4. **Note:** Ethernet signal into the display does not allow for the normal RS422 output signal to a second primary display. This includes both or either the use of an interconnect cable or separate wiring between displays.

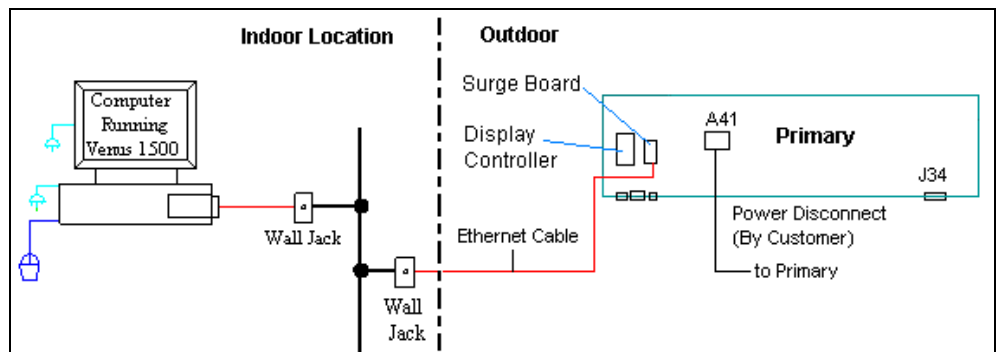


Figure 31: Ethernet Display Layout

An Ethernet controlled display, uses a Cat-5 (W-1467) or Cat-5E (W-1384) cable routed through separate conduit to the display. The maximum distance is 330 feet (100 meters).

1. Connect from the Ethernet port on the computer into the Ethernet wall jack.
2. Run the cable through separate conduit into the display and connect to J1 on the Ethernet surge board (0P-1229-2012) as shown in **Figure 32**.
3. A five-foot RJ45 cable (W-1506) connects for the J2 output on the surge card to the Ethernet port on the controller.

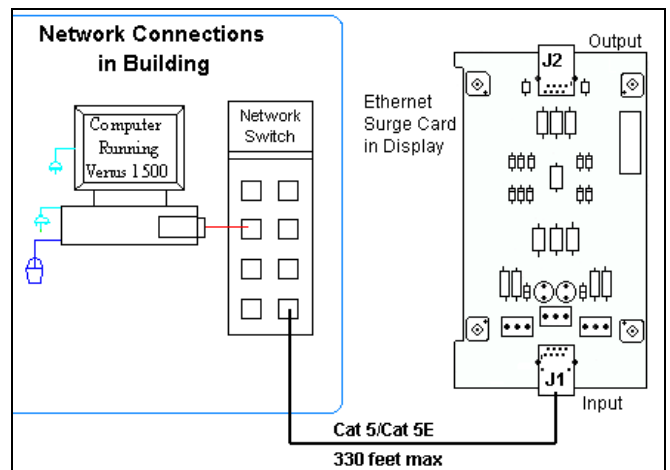


Figure 32: Ethernet Signal Connection

- Note:** It is the customer's responsibility to protect their network from surges back to their network.

Ethernet (Fiber)

The controller has a default IP address of 172.16.192.25. Use this address to connect to the primary display, and then it can be changed to an address specified by the network administrator. **Note:** Ethernet signal into the display does not allow for the normal RS422 output signal to a second primary display. This includes the both or either the use of an interconnect cable or separate wiring between displays.

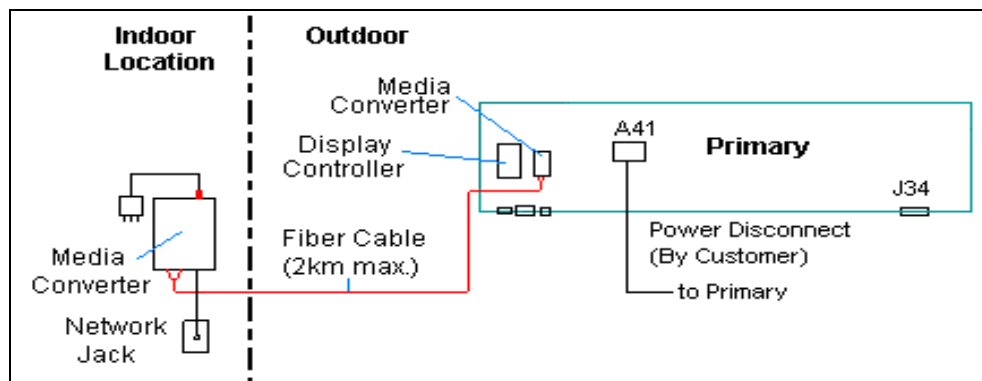


Figure 34: Fiber Ethernet Layout

A fiber Ethernet controlled display requires the use of two media converters connected by a fiber cable. The first media converter is connected to the network and the second one is connected to controller in the display as shown in **Figure 34**.

A fiber Ethernet controlled display requires the following connections:

1. A media converter (A-1778) connects to the network hub or switch using an RJ45 network cable.
2. A DC wall pack transformer provides power to the media converter from a 120 VAC outlet.
3. Connect the fiber cable from the two jacks on the first media converter to the two jacks on the second media converter in the display. (Always connect transmit on one media converter to receive on the second, and receive to transmit.)

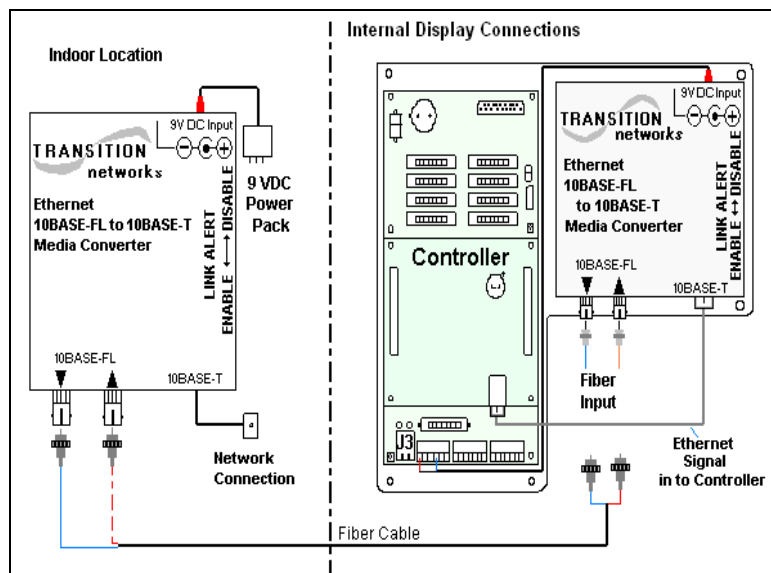


Figure 33: Fiber Ethernet Signal Connections

4. The media converter in the display connects to the controller via an RJ45 cable (W-1506). It also receives power from pins one and four of TB1 on the controller.
5. The Ethernet connections are shown in **Figure 33**.

RS422 Interconnection

The quick connect cable is the most common method of terminating signal between two displays. The interconnect cable goes from the RS422 OUT on the first display to the RS422 IN on the second display. The 10-position, quick connect cable comes in either 6 or 10 foot lengths.

If the displays are not back-to-back, or are too far apart for the quick connect interconnect cable to reach, a 4-conductor shielded cable of the correct length is used. One end will connect at the “RS422 OUT” 6-position controller board terminal block (TB3) in the first display, and terminate on the “RS422 IN” 6-position controller board terminal block (TB2) on the second display.



Figure 35: Display Interconnect Cable

Note: If a temperature sensor is also used, a separate cable must also be used to connect between controllers. **Appendix C** explains the connections for a temperature sensor.

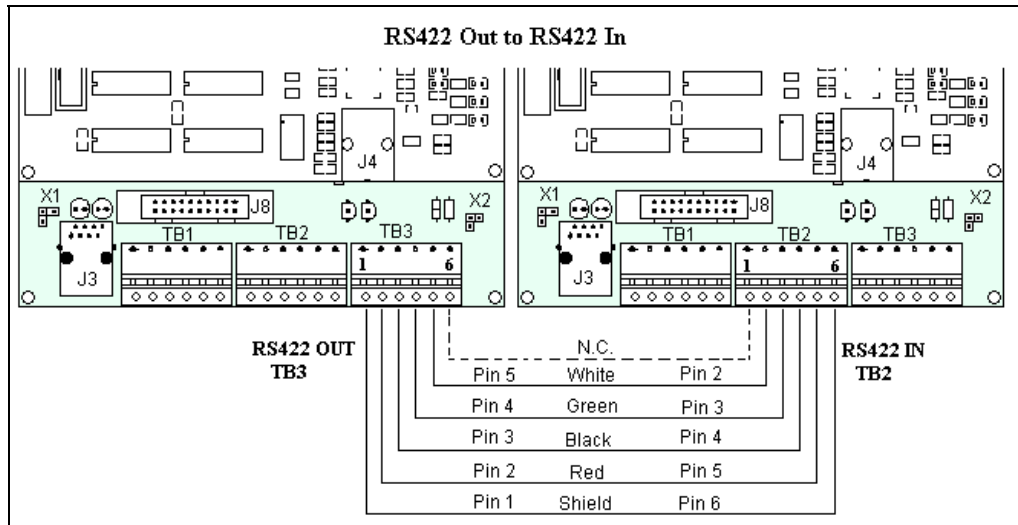


Figure 36: RS422 Interconnection

RS422 Interconnection

Face A RS422 Out (TB3)	Field Cabling	Face B RS422 IN (TB2)
Pin 1 (GND)	Shield	Pin 6 (GND)
Pin 2 (D2OUT-N)	Red	Pin 5 (D1IN-N)
Pin 3 (D2OUT-P)	Black	Pin 4 (D1IN-P)

Pin 4 (D2IN-N)	Green	Pin 3 (D1OUT-N)
Pin 5 (D2IN-P)	White	Pin 2 (D1OUT-P)
Pin 6 (Shield)		Pin 1 (Shield)

Note: When not using the quick connect interconnect cable; cabling must be in conduit between displays.

Fiber Interconnection

A four-conductor fiber cable is used in connecting two or more displays in the Fiber Interconnection method. Two fibers will be used for the connection and two will be saved for spares. Connect the fiber cable to the fiber cards in the displays as described in **Drawing A-174344** and in the following table. The two jacks on the left side of the fiber optic board (J2 and J3) will be used on the first display and the two on the right side of the board (J4 and J5) will be used in on the second display. Always connect transmit to receive and receive to transmit.

Fiber Interconnection

Face A Data Out	Field Cabling	Face B Data In
J2 Transmit (TX1)	Color Varies	J5 Receive (RX2)
J3 Receive (RX1)	Color Varies	J4 Transmit (TX2)

3.9 Optional Temperature Sensor

If you have an optional temperature sensor to be used with your display, see **Appendix C** for mounting and signal connections.

3.10 First Time Operation

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

1. Product Name (Galaxy®)
2. Display Size (Row x Column)
3. Shading (64 Mono)
4. Bootloader Version (OS X.XX)
5. Firmware Number (**ED13305**)
6. Firmware Revision (Rev X.XX)
7. Hardware Address (HW:XX)
8. Software Address (SW:XX)
9. IP Address: ((default) 172.16.192.25)
10. Subnet Msk: ((default) Msk: 255.255.0.0)
11. COM1 Configuration (C1:V15) ((Modem C1:V15) If a Modem is present)
12. COM 2 Configuration (C2:RTD)
13. Socket 3001: (IP 3001: V15)
14. Socket 3002: (IP 3002: RTD)
15. Line Frequency (CLK: AUTO 60 Hz)

16. Display Name Description (Galaxy Row x Column)

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

Section 4: Maintenance and Troubleshooting



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 and Troubleshooting Overview

Daktronics Galaxy® series AF-3197 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** give a basic explanation of the route that signal travels through the sign.
- **Power Routing Summaries** show a basic explanation of the route that power travels through the sign.
- **Service and Diagnostics** offer instructions for removing various sign components and explain the functions of circuit board connectors and the meanings of diagnostic LEDs.
- **Maintenance** lists a number of steps to take to keep this Galaxy® sign in safe, working order.
- **Troubleshooting** presents some possible sign malfunctions and provides a number of possible causes for that malfunction.
- **Replacement Parts List** includes the part number and description of sign components that could possibly need replacing during the life of this sign.
- **Daktronics Exchange and Repair and Return Programs** explain the Daktronics component return policy.

4.2 Recommended Tools List

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** to open the modules in front access displays.
- **3/16" Nut Driver** to remove hardware from signal communication boards.
- **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

Reference Drawings:

Schematic, AF-3197-8-48x32x***-89, RGB..... **Drawing A-184111**

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

1. Data from the controller computer, which runs Venus[®] 1500 software, travels via RS232, RS422, modem, fiber optic cable, radio, or Ethernet into the display.
2. For multiple face displays 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. **Note:** The RS422 interconnection is not allowed when the input to the first display is Ethernet.
3. From the controller, the signal then travels over 20-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. See **Drawing A-184111** for further information.

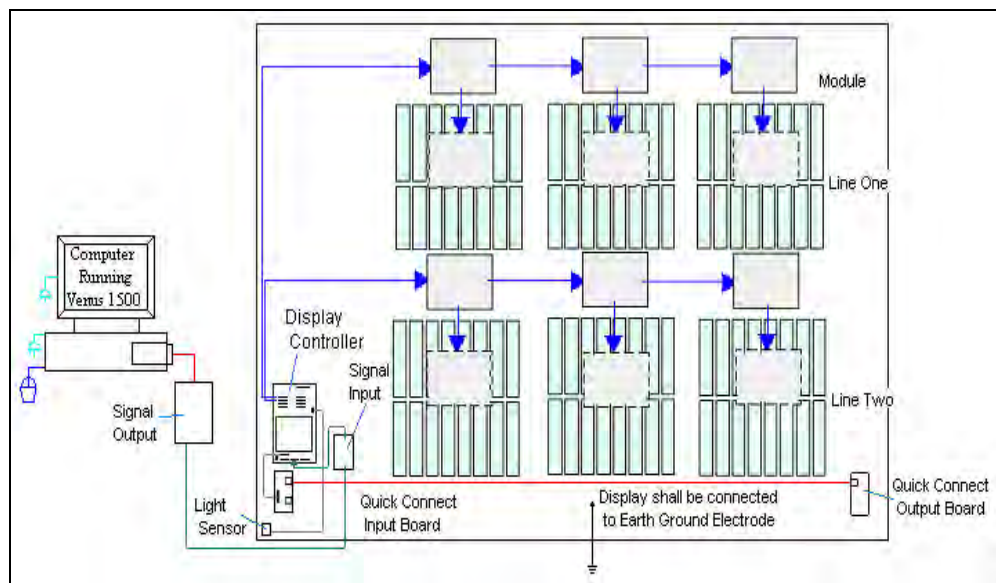


Figure 37: AF-3197 Signal Flow Diagram

4.4 Power Summary

Reference Drawings:

Schematic, AF-3197-8-48x32x***-89, RGB **Drawing A-184111**
Schematic; Power Supply Configurations, RGB..... **Drawing A-184245**

The following describes the internal display power routing:

1. Incoming power terminates at the panel board.
2. 120 VAC power is then relayed to the power supplies in the display, which convert the power to DC voltage.
3. +14.7VDC power supplies power the modules in an RGB display. Refer to **Drawings A-184111** or **A-184245** for power supply wiring information.
4. Power is also sent to the fans which cool the display and the transformer that provides power to the controller and some additional communication boards (modem, fiber, radio, or fiber Ethernet).

4.5 Display Access

Display access for all 89mm displays is normally 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.



Figure 38: Opening Display

4.6 Service and Diagnostics

Reference Drawings:

Component Layout, AF-3190-**X***-89mm **Drawing B-181666**

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.

Drawing B-181666 denotes the components as follows:

Component...	Denoted As...	Location...
Line Filters and Ground Bar	0A-1259-4003	Left side, behind module AX02
Modules	0A-1259-3126	Over entire face of the display
Power Supplies	0A-1259-4410	Behind the modules; refer to Drawing B-181666 .

Line Filter

Reference Drawings:

Z Filter Assy, 2 W/Grnd Bar **Drawing A-158472**

Schematic, AF-3197-8-48x32x***-89, RGB **Drawing A-184111**

You can replace the filter by first removing all connecting wires, and then releasing the attachment hardware. Refer to **Drawing A-158472** for more information. Install the new filter and refer to **Drawing A-184111** for the correct wiring.

Modules, Pixel Strips and Drivers

Reference Drawing:

Driver Assy; AF-3197-8x8-89mm-RGB **Drawing A-183737**

Module Panel, AF-3197-8x8-89mm-RGB **Drawing A-182812**

Driver; Large Pixel-8x8-RGB **Drawing A-182600**

A module consists of louvers, 16 pixel strips per module, and a driver board mounted to the 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. Refer to **Drawing B-182812** for more information.

3. If the pixel strip you wish to replace is located behind the driver assembly, label the signal cables and unplug them and the power connections on the driver assembly and remove the four corner screws. Refer to **Drawing A-183737** for more information.
4. Remove the six wing nuts holding the pixel strip in place.
5. Gently lift the strip from the display.
6. 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:

1. Open the display as described in **Section 4.5**.
2. Loosen the two #10 screws holding the driver cover in place.
3. Lift the cover off from the assembly. Refer to **Drawing A-183737** for more information.
4. Disconnect all power and signal connections from the driver board.
5. Remove the four #6 nuts holding the board in place.
6. Gently lift the board from the display.
7. Reverse the above procedure to install a new driver board.

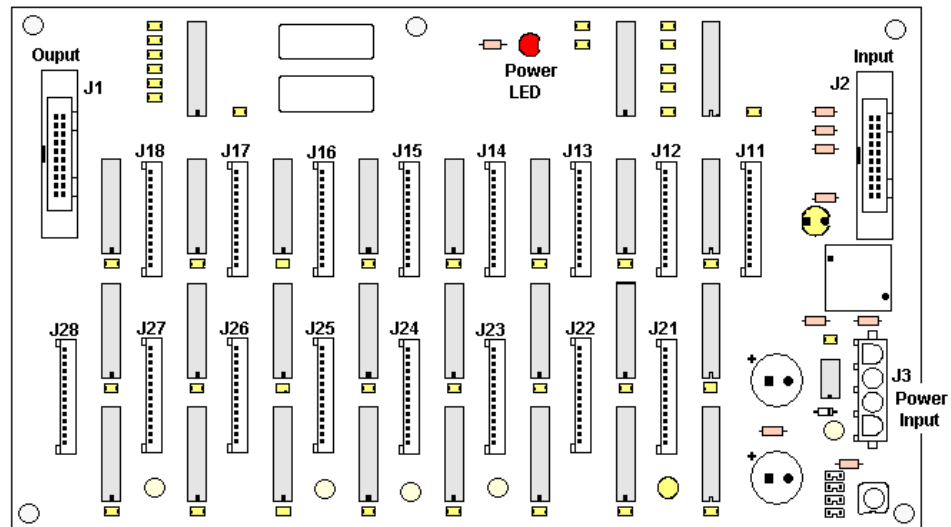


Figure 39: Driver Board

The following connectors are found on each driver board; refer to **Figure 39** above:

LED/Connector	Function
J1	Signal out to next driver board
J2	Signal in
J3	Power Input
J11-J18	Output to first row of pixel strips
J21-J28	Output to second row of pixel strips
DS1	Power indicator

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

Note: Columns are noted as how they are viewed from the front of the module (left to right). When viewed from the back, the column order is from right to left.

Connector	Pixel Strip Coordinates	Connector	Pixel Strip Coordinates
J11	Top Row, Column 1	J21	Bottom Row, Column 1
J12	Top Row, Column 2	J22	Bottom Row, Column 2
J13	Top Row, Column 3	J23	Bottom Row, Column 3
J14	Top Row, Column 4	J24	Bottom Row, Column 4
J15	Top Row, Column 5	J25	Bottom Row, Column 5
J16	Top Row, Column 6	J26	Bottom Row, Column 6
J17	Top Row, Column 7	J27	Bottom Row, Column 7
J18	Top Row, Column 8	J28	Bottom Row, Column 8

Controller

Reference Drawings:

- Controller, Galaxy, 8-conn., J1087 **Drawing B-177838**
- Component Layout Diagram **Refer to Appendix A**

The controller sends data to the modules. Refer to the signal summary in **Section 4.3** for more information and to the **Component Layout Diagram** for the position of the controller board. **Figure 40** illustrates a typical controller.

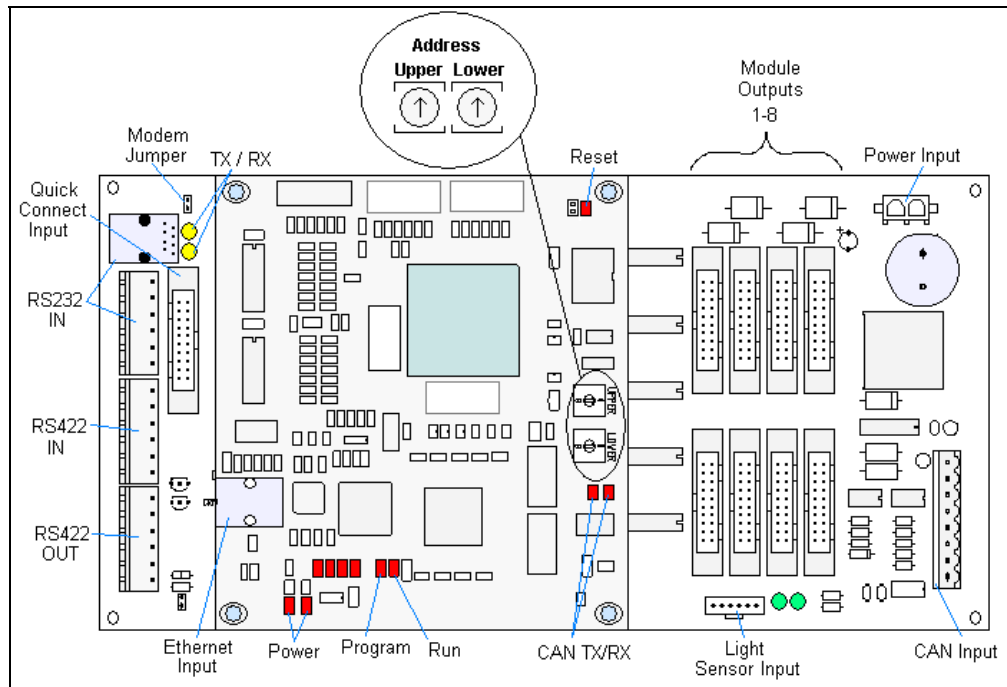


Figure 40: Controller

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

Note: Setting both rotary switches to address 0 (set the switches to 0 by rotating them counter clockwise until the arrow points to 0), can activate a test mode. The controller's power must be turned off and then turned back on to run the test mode.

The rotary switches follow a standard hexadecimal code. The table below shows several common addresses.

Controller Address Settings

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

Four diagnostic LEDs are located on the controller; the table below shows what each LED denotes:

CPU			
LED	Color	Function	Operation
DS1	Red	CAN TxD	Flashes when controller is transmitting CAN information.
DS2	Red	CAN RxD	Flashes when controller is receiving CAN information.
DS3	Red	System Reset	Off when controller is functioning properly. Flashes at 1.5-second rate if the watchdog timer is not being reset by controller.
DS4	Red	Run	A steady flash indicates the controller is running properly. Normal flash rate is about once per second.
DS5	Red	U15 Programmed	On when U15 contains a valid logic program.
DS7	Red	Link	On when Ethernet interface is in the link-up condition. Flashes when the Ethernet chip detects, transmits, or receives activity.
DS8	Red	Speed	On when the Ethernet interface is at 100Mbps. Off when the Ethernet interface is 10Mbps.
DS9	Red	Duplex	On when the Ethernet interface is at full duplex. Off when the Ethernet interface detects a collision in half-duplex.
DS10	Red	Collision	Flashes when the Ethernet interface detects a collision in half-duplex.
DS12	Red	+2.5V	On when +2.5V power supply is functioning.
DS13	Red	+3.3V	On when +3.3V power supply is functioning.
Product Board			
DS1	Green	+5V	On when +5V power supply is functioning.
DS2	Green	+3.3V	On when +3.3V power supply is functioning.
DS3	Yellow	COM1 TxD	Flashes when transmitting serial information.
DS4	Yellow	COM1 RxD	Flashes when receiving serial information.
Temperature/Light Sensor			
DS1	Green	+5V	On when +5V power supply is functioning.
DS2	Red	Run	A steady flash indicates the controller is running correctly. Normal flash rate is about once a second. Flashes faster when the sensor is transmitting temperature or light information.

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

1. Disconnect power from J5.
2. Remove all power and signal connections from the board. "Locked" connectors are released by pushing apart the latches, and then carefully pulling them from the jack. When replacing the board, it is helpful to have the cables labeled for easier replacement.
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

Reference Drawings:

Enclosure Controller M2; Modem **Drawing A-177916**

If a modem was included with the display, it is located inside the display next to the controller board. Refer to **Drawing A-177916** for modem location.

1. To replace a modem, first disconnect the power and signal connections (refer to **Figure 41** for the location of the connectors).
2. The modem is held in place with four screws. Remove the screws with a 3/16" nut driver and lift the modem out of the display.
3. Install the new modem, replace the screws, and reconnect power and signal cables.

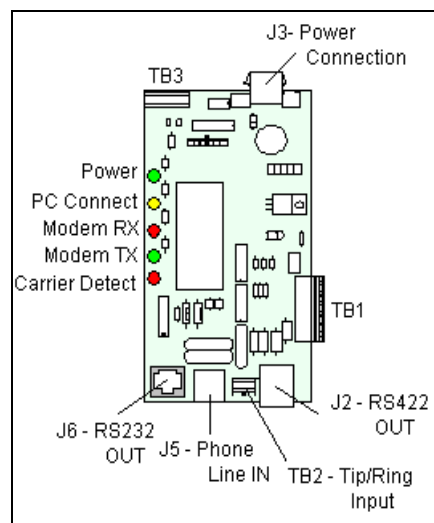


Figure 41: Modem Board

The modem module has 4 LEDs.

1. The power LED should remain lit while power is applied to the modem.
2. The modem RX and TX will flash when communicating.
3. The carrier detect LED will light when the modem has established communication to another modem.

The modem board also has several input and output jacks:

1. J3 is the power input for 12VAC
2. TB2 is a phoenix connector to terminate the Tip and Ring wires
3. J5 is an RJ11 jack for termination of a pre-terminated phone line
4. J6 is the RS232 RJ45 output to the controller
5. J2, TB1, and TB3 are not used in this display application

A modem system requires the X1 jumper to be closed on the controller board. Refer to **Figure 42** for the jumper location.

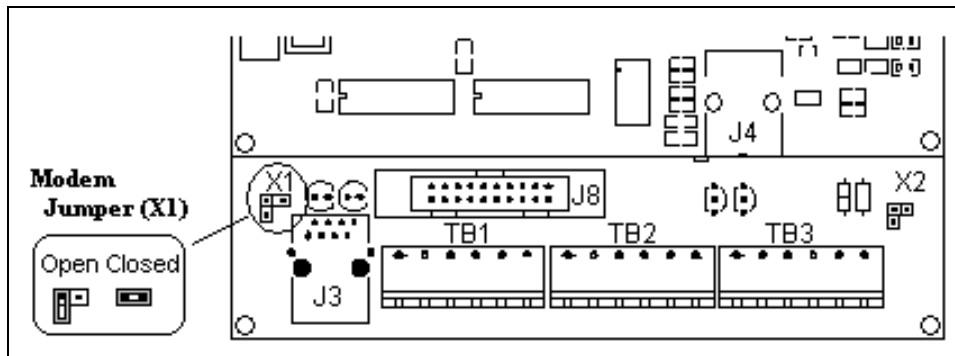


Figure 42: Modem Jumper Location

Fiber Optic Board

Reference Drawings:

Enclosure Controller M2; Fiber..... Drawing A-177918

To replace a fiber optic board:

1. Disconnect the power and signal connections (refer to **Figure 43** 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/signal cables.

The fiber module has three LEDs.

1. The power LED (DS1) should remain lit while power is applied to the module.
2. The receive LED (DS2) will flash when the display fiber optic board is accepting signal from the signal converter.
3. The transmit LED (DS3) will flash when the display fiber optic board is sending to the signal converter.

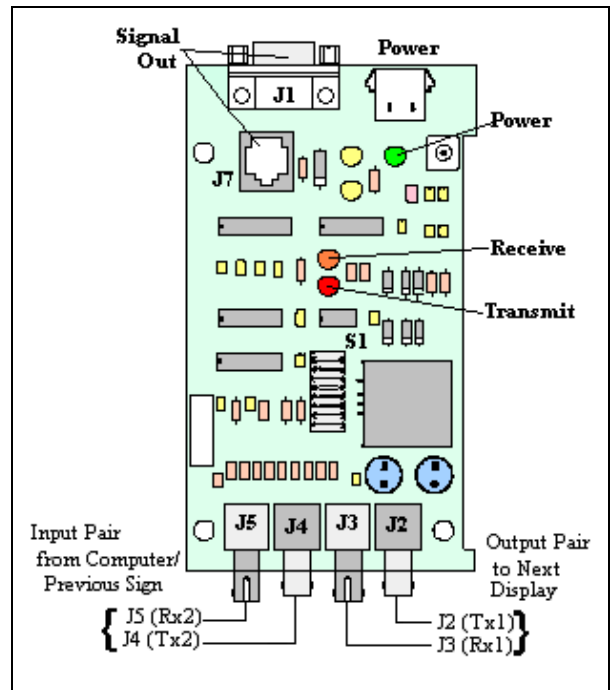


Figure 43: Fiber Optic Board

In addition, the fiber module has several input and output jacks:

1. J4 and J5 are the two fiber connectors, to which the fiber lines coming from the fiber signal converter connect. (They can also be used for connecting to fiber coming from a fiber optic board in another primary display.)
2. J6 is for the 12VAC power coming from the transformer.
3. J7 is used to transfer RS232 signal via a straight through RJ45 cable from the fiber optic board to the display controller.

4. J2 and J3 could be used as output jacks to a fiber optic board in another primary display.
5. J1 is not used in this application.

RS422 Surge Suppressor

Reference Drawings:

Enclosure Controller M2; RS232/422 **Drawing A-177905**

1. Disconnect the signal connections (refer to **Figure 44**).
2. The surge suppressor is held in place with four screws. Carefully remove them.
3. Install the new surge suppressor, replace the screws, and reconnect the signal cables.

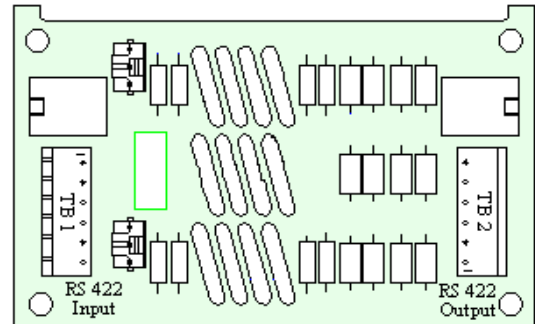


Figure 44: Surge Suppressor

The surge suppressor is an inline device that is used to filter the RS422 data line. It suppresses surges down to a low voltage in order to protect the display controller's RS422 input. The surge suppressor must be firmly connected to the display's chassis in order to be effective. The mounting hardware used to secure the surge suppressor is sufficient if it is fastened properly.

Ethernet Surge Card

Reference Drawings:

Enclosure Controller M2; Ethernet (0013) **Drawing A-229387**

1. To replace the Ethernet surge board, first disconnect the power and signal connections (refer to **Figure 45**).
2. The Ethernet surge card is held in place with four screws. Carefully remove them using a 3/16" nut driver.
3. Install the new Ethernet surge card, replace the screws and reconnect power and signal cables.

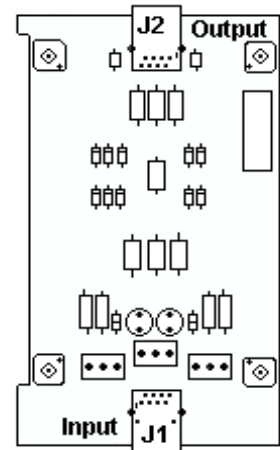


Figure 45: Ethernet Surge Card

The surge suppressor is an inline device that is used to filter the RS422 data line. It suppresses surges down to a low voltage in order to protect the display controller's RS422 input. The surge suppressor must be firmly connected to the display's chassis in order to be effective. The mounting hardware used to secure the surge suppressor is sufficient if it is fastened properly.

Media Converter

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

1. To replace the media converter, first disconnect the power and signal connections (refer to **Figure 46**).
2. The media converter is attached to a plate with four screws. Carefully remove them using a 3/16" nut driver.
3. The media converter is held to the plate by two screws. Release the two screws that hold the media converter to the plate.
4. Install the new media converter, replace the screws, reattach the plate, and reconnect the power and signal cables.



Figure 46: Media Converter

The fiber media converter has the following input and output jacks:

1. The fiber transmit and receive jacks are marked by arrows showing their function. They are labeled “10BASE-FL”. The fiber cable from the indoor media converter will connect to these jacks.
2. The input/output Ethernet signal to the display controller is routed through an RJ45 jack, labeled “10BASE-T”.
3. The DC power input from the TB1 on the display controller is connected into the media converter at a jack labeled “9V DC Input”.

Location of CAN termination jumper

Temperature and light sensors are controlled as part of a CAN network. For the CAN network to work correctly, the network must be terminated at both ends of the network. This is true for a single display, or multiple displays. The correct terminations are completed during the building process. However, if the order or number of displays is changed on-site, the terminating jumper may need to be relocated.

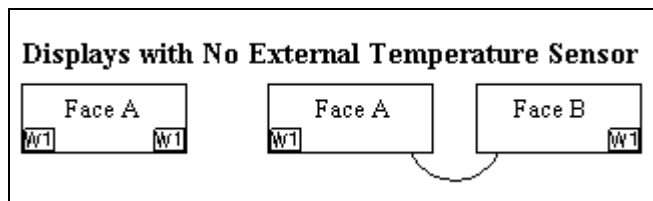


Figure 47: Displays with No External Temperature Sensor

In the case of those displays that utilize a temperature sensor, the sensor is internally terminated. Therefore, only one other termination needs to be made at the output of the last sign in the network. The most common input location for the temperature sensor is to the first display in the network.

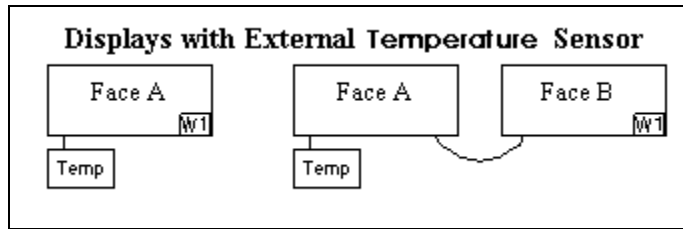


Figure 48: Termination Location for Displays with External Temperature Sensor

The terminating jumper is located on the quick connect board on the inside of the display. Most displays have both an input and an output quick connect board. When no output board is available, the terminating jumper will be placed on the input board of the last display. Therefore, both boards are shown in **Figure 47** and **Figure 48**.

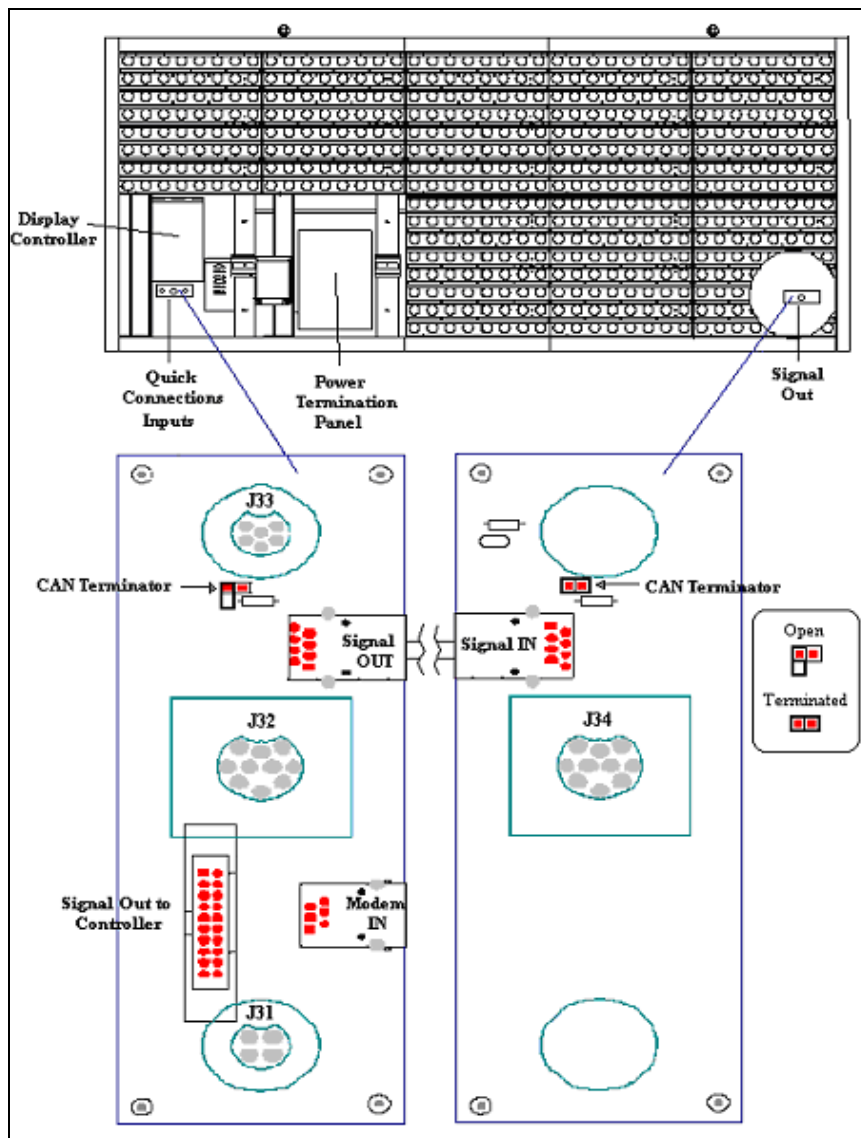


Figure 49: Location of CAN Temperature Sensor Termination Jumper

Power Supplies

The LED power supplies are identified as assemblies 0A-1259-4410 for AF-3197 RGB displays. Each power supply controls two modules.

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

1. Open 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 Ventilation Systems

Check ventilation fans after 1,500 hours of operation and every 1,500 hours after that to ensure the display cools properly. Check fans more often if the display 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 display operates for 18 hours a day with the power to the display disconnected when not in use.
- 1,500 hours is equivalent to 62 days if the display runs non-stop for 24 hours a day.

Attention: Shut off power to the display when it is not in use. Leaving the power on when the display 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 fan 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.

4.8 Thermostats

Reference Drawings:

Component Layout, AF-3190-**X**-89mm..... **Drawing B-181666**

A thermostat is used when the ventilation fans operate in the display. Refer to the **Drawing 181666** for the location of the thermostat. The ventilation fans turn on when the inside of the display reaches 85° F (29 C), and turn off at 70° F (21 C).

4.9 Sign Maintenance

Perform a yearly inspection to maintain safe and dependable display 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 display 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, 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.

4.10 Weather Stripping

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

4.11 Troubleshooting

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

Symptom/Condition	Possible Cause/Remedy
One or more LEDs on a single module fail to light.	<ul style="list-style-type: none"> • Replace/check cables on the module. • Replace pixel strip. • Replace the driver.
One or more LEDs on a single module fail to turn off.	<ul style="list-style-type: none"> • Replace/check cables on module. • Replace pixel strip. • Replace the driver.
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"> • Replace/check the cables. • Check power to the modules. • Replace the first driver on the left side of the first module that is not working. • Replace the second driver that is not working. • Replace the power supply assembly on the first module that is not working.
One row of modules does not work or is garbled.	<ul style="list-style-type: none"> • Replace/check the cables. • Replace first driver. • Replace controller. • Check the fuses in the power termination box.
A group of modules, which share the same power supply assembly, fail to work.	<ul style="list-style-type: none"> • Check power supply voltage. • Replace the power supply assembly.
Entire sign fails to work.	<ul style="list-style-type: none"> • Check for proper line voltage into the power termination panel. • Check the fuse in the power termination panel. • Check/replace the ribbon cable from the controller to the driver. • Check the voltage settings on the power supplies. • Verify proper use of the software in the operation manual. • Replace the controller. • Check/replace the signal cable to the controller.
Temperature always reads -196 degrees	<ul style="list-style-type: none"> • Check temperature sensor connections. • Replace the temperature sensor. • Replace the controller.

Sign is stuck on bright or dim.	<ul style="list-style-type: none"> • Check Manual/Auto dimming in Venus 1500 software. • Check light detector cable. • Check light detector for obstructions. • Replace the light detector. • Replace the controller.
---------------------------------	--

4.12 Initial Operation Information

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

1. Product Name (Galaxy®)
2. Display Size (Row x Column)
3. Shading (64 Mono)
4. Bootloader Version (OS X.XX)
5. Firmware Number (**ED13305**)
6. Firmware Revision (Rev X.XX)
7. Hardware Address (HW:XX)
8. Software Address (SW:XX)
9. IP Address: ((default) 172.16.192.25)
10. Subnet Msk: ((default) Msk: 255.255.0.0)
11. COM1 Configuration (C1:V15) ((Modem C1:V15) If a Modem is present)
12. COM 2 Configuration (C2:RTD)
13. Socket 3001: (IP 3001: V15)
14. Socket 3002: (IP 3002: RTD)
15. Line Frequency (CLK: AUTO 60 Hz)
16. Display Name Description (Galaxy Row x Column)

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

Replacement Parts List

The following table contains some of the items in this display that may need replacing over time. Many of the parts within the display 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-1229-0009
Signal Converter-wire	0A-1127-0255
Signal Converter-Fiber	0A-1127-0256
Serial Cable; RS232 DB9F to DB25M, 6'	W-1249
Modem in display	0P-1279-0003
Light Detector	0P-1247-0003
Digital Temp Sensor	0P-1247-0008
Fiber Board in Display	0P-1127-0024
Surge Suppression Board, RS422	0P-1146-0031
Ethernet Surge Board	0P-1229-2012
Media Converter	A-1778
Radio Client	0A-1146-0078
Radio Server (Outdoor)	0A-1146-0079
Cable; 18" RJ45; 8-cond.; Straight	0A-1229-0054
Quick Connect Interface, Input	0P-1229-2001
Quick Connect Interface, Output	0P-1229-2002
Thermostat Enclosure	0A-1213-4024
Cable; Ribbon assy, 20 position, 18"	W-1387
Cable; Ribbon Assy, 20 Position, 60"	0A-1000-0021
Cable; Ribbon Assy, 20 Position, 84"	0A-1000-0023
Cable Assy, 14P to 14 P, 30"	W-1809
Cable; 10-pin male to 10-pin male, 4', QC	W-1483
Cable; 10-pin male to 10-pin male, 10', QC	W-1500
RGB Pixel Board, 4x1	0P-1261-0012
Driver Board, 8x8, RGB, J-1087	0P-1261-0011
Power Supply Assembly (1, A-1593)	0A-1259-4410
Fan; 134CFM, 120VAC, 22W, 60Hz, 4.5"	B-1053
Line Filter Assembly	0A-1259-4003
Manual; Venus 1500 Operator's	ED-13530
Manual; Venus 1500 Radio	ED-13932

4.13 Daktronics Exchange and Repair and Return Programs

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

Daktronics' unique Exchange Program is a quick, economical service for replacing key components in need of repair. If a component fails, Daktronics sends the customer a replacement, and the customer, in turn, sends the failed component to Daktronics. This not only saves money, but also decreases display downtime.

Daktronics provides these plans to ensure users get the most from their Daktronics products, and it offers the service to qualified customers who follow the program guidelines explained below. Please call the Help Desk – 877-605-1113 – if you have questions regarding the Exchange Program or any other Daktronics service.

When you call the 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 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 box and packaging in which the replacement part arrived, fill out and attach the enclosed UPS shipping document, and **return the part to Daktronics**. In most circumstances, you will be invoiced for the replacement part at the time it is shipped. This bill, which represents the exchange price, is due when you receive it.

Daktronics expects immediate return of an exchange part if it does not solve the problem. The company also reserves the right to refuse equipment that has been damaged due to acts of nature or causes other than normal wear and tear.

If you do not ship the defective equipment Daktronics within 30 working days from the invoice date, Daktronics assumes you are purchasing the replacement part outright (with no exchange), and you will be invoiced for it. This second invoice represents the difference between the exchange price and the full purchase price of the equipment. The balance is due when you receive the second invoice. If you return the exchange equipment after 30 working days from the invoice date, you will be credited for the amount on the second invoice, minus a restocking fee. **To avoid a restocking charge, you must 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.

Return Materials Authorization: To return parts for service, contact your local representative prior to shipment to acquire a Return Material Authorization (RMA) number. If you do not have a local representative, call the Daktronics Help Desk for the RMA. This expedites repair of your component when it arrives at Daktronics.

Packaging for Return: Package and pad the item well so that it will not be damaged in shipment. Electronic components such as printed circuit boards should be installed in an enclosure or placed in an antistatic bag before boxing. Please enclose your name, address, phone number, and a clear description of symptoms.

This is how to reach us:

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

Phone: Daktronics Help Desk: 877-605-1113 (toll free)
or 605-697-4034

Fax: 605-697-4444

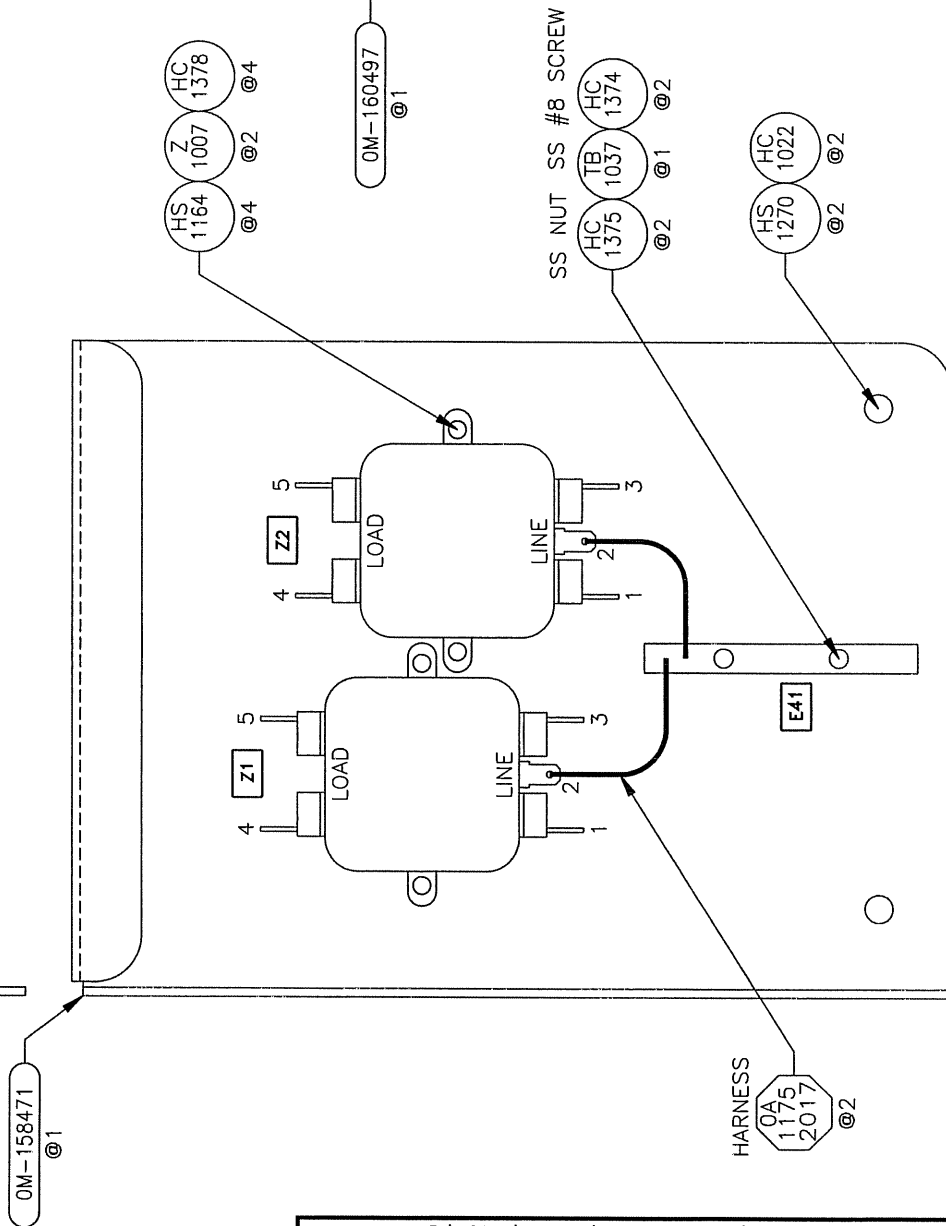
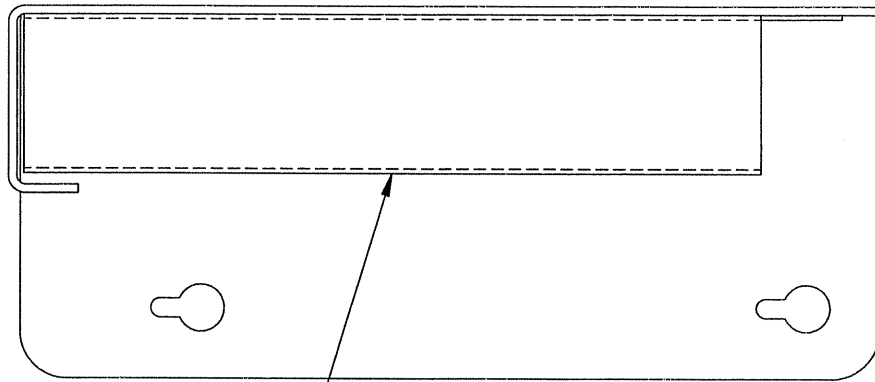
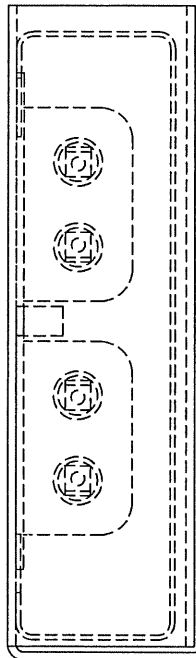
E-mail: helpdesk@daktronics.com

Appendix A: Reference Drawings

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.).

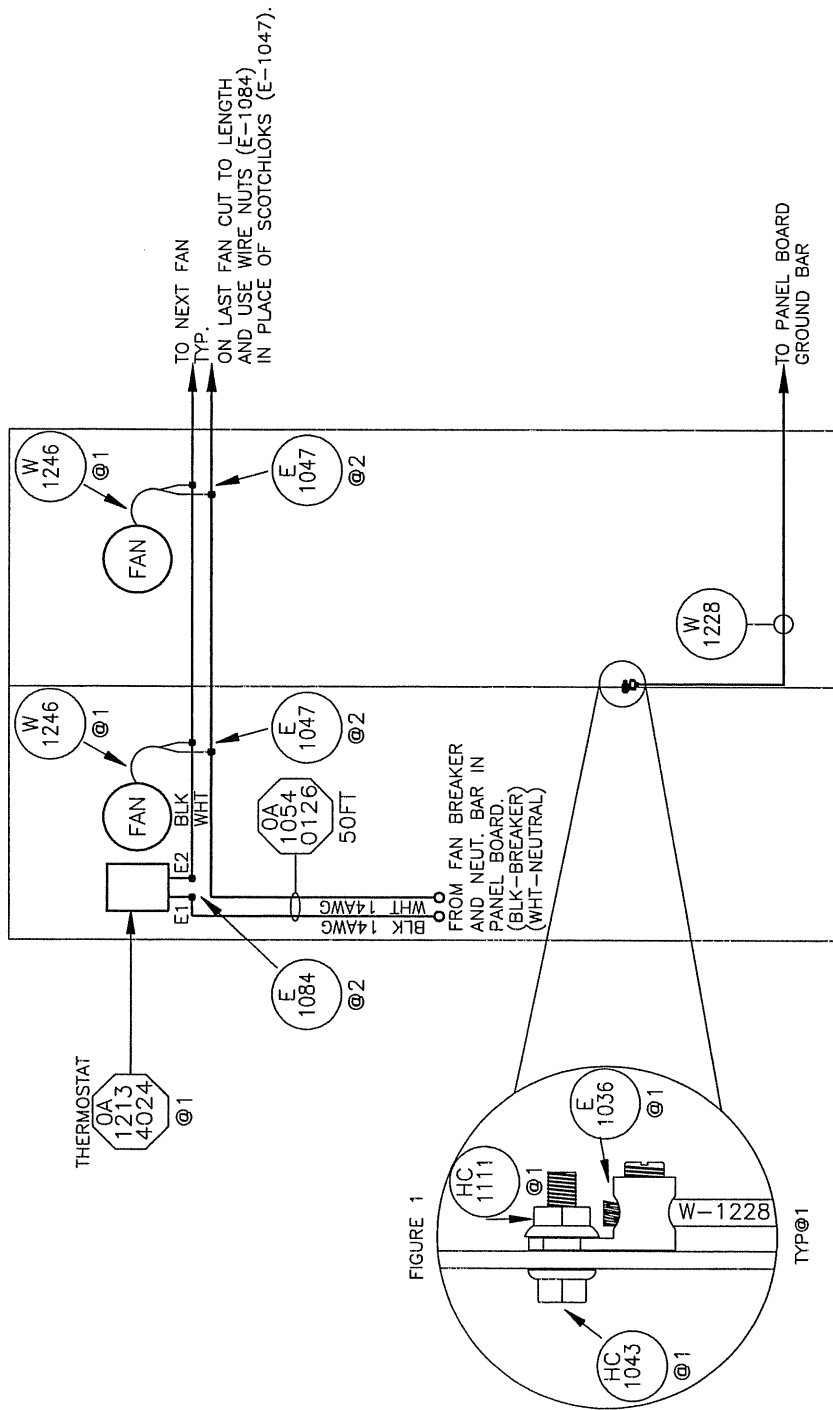
Z Filter Assy, 2 W/Gnd Bar	Drawing A-158472
Assembly, Grounding and Fan Harness	Drawing A-161307
Fan Assembly Detail.....	Drawing A-164433
System Riser Diagram, RS422.....	Drawing A-174135
System Riser Diagram, RS232.....	Drawing A-174341
System Riser Diagram, Modem.....	Drawing A-174342
System Riser Diagram, Fiber	Drawing A-174344
Assy, Grounding and Fan Harness	Drawing A-175194
Enclosure Controller M2; RS232/422	Drawing A-177905
Enclosure Controller M2; Modem	Drawing A-177916
Enclosure Controller M2; Fiber.....	Drawing A-177918
Enclosure Controller M2; RS422 Echo.....	Drawing A-177921
Driver Assy; AF-3197-8x8-89mm-RGB	Drawing A-183737
Power Specs, AF-3197, RGB LEDs.....	Drawing A-183906
Schematic, AF-3197-8-48x32x***-89, RGB.....	Drawing A-184111
Schematic; Power Supply Configurations	Drawing A-184245
Layout, Pnl Bd, 8-48x32-112, 89mm, 1 Phase.....	Drawing A-184316
Layout, Pnl Bd, 8-48x32-112, 89mm 3 Phase.....	Drawing A-184321
System Riser Diagram, Radio	Drawing A-185359
Schem, Sig Wiring, Internal, W/Quick Connect PCB	Drawing B-177662
Cntrlr; Galaxy, 8 Conn, J1087	Drawing B-177838
Component Layout, AF-3190-**x**-89mm	Drawing B-181666
Driver; Large Pixel-8x8-RGB, J-1087	Drawing B-182600
Module Panel, AF-3197-8x8-89mm-RGB	Drawing B-182812
Shop Drawing, AF-3197-8x**-89mm-RGB	Drawing B-183982
Shop Drawing, AF-3197-16x***-89mm-RGB.....	Drawing B-183983
Shop Drawing, AF-3197-24x***-89mm-RGB.....	Drawing B-183984
Shop Drawing, AF-3197-32x***-89mm-RGB.....	Drawing B-183985
Shop Drawing, AF-3197-40x***-89mm-RGB.....	Drawing B-183986
Shop Drawing, AF-3197-48x***-89mm-RGB.....	Drawing B-183987
Block Diagram, Power, AF-3197, 89mm	Drawing B-184326

NOTES:
ORIENTATION OF LINE FILTERS IS CRITICAL.



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

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



- NOTES:
- OA-1054-0126 WILL BE RUN ALONG THE POWER CONDUIT CLOSEST TO THE FANS.
 - REMOVE ALL PAINT AND ATTACH E-1036 TO THE NEAREST ALIGNMENT CHANNEL.
 - FANS HAVE NO POLARITY.

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ:

TITLE: ASSY., GROUNDING & FAN HARNESS

DES. BY: LKERR

DRAWN BY: LKERR

DATE: 14JAN02

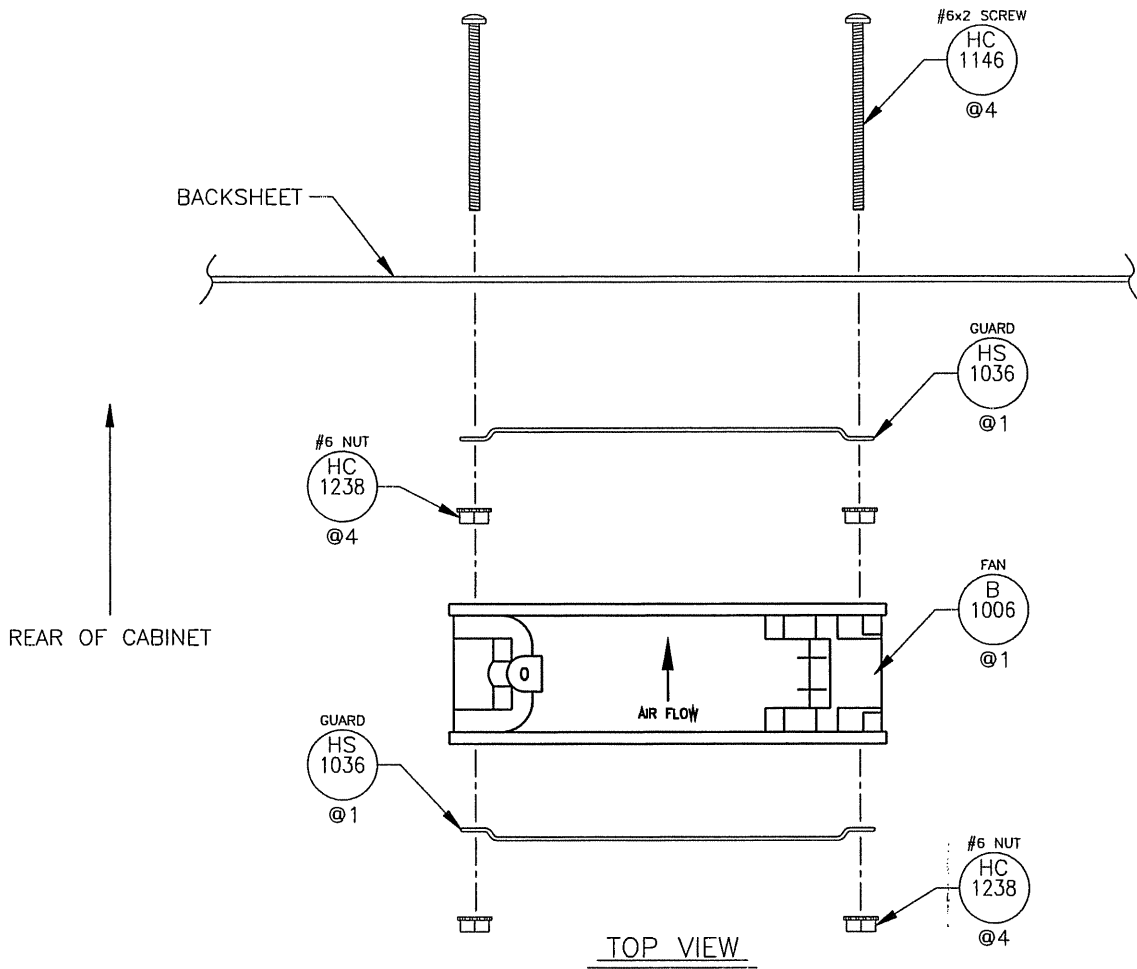
REVISION

APPR. BY:

SCALE: NONE

1259-R06A-161307

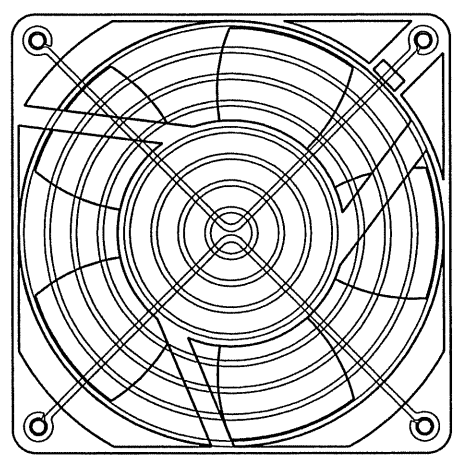
REV.	DATE	DESCRIPTION	BY	APPR.



TOP VIEW

NOTES:

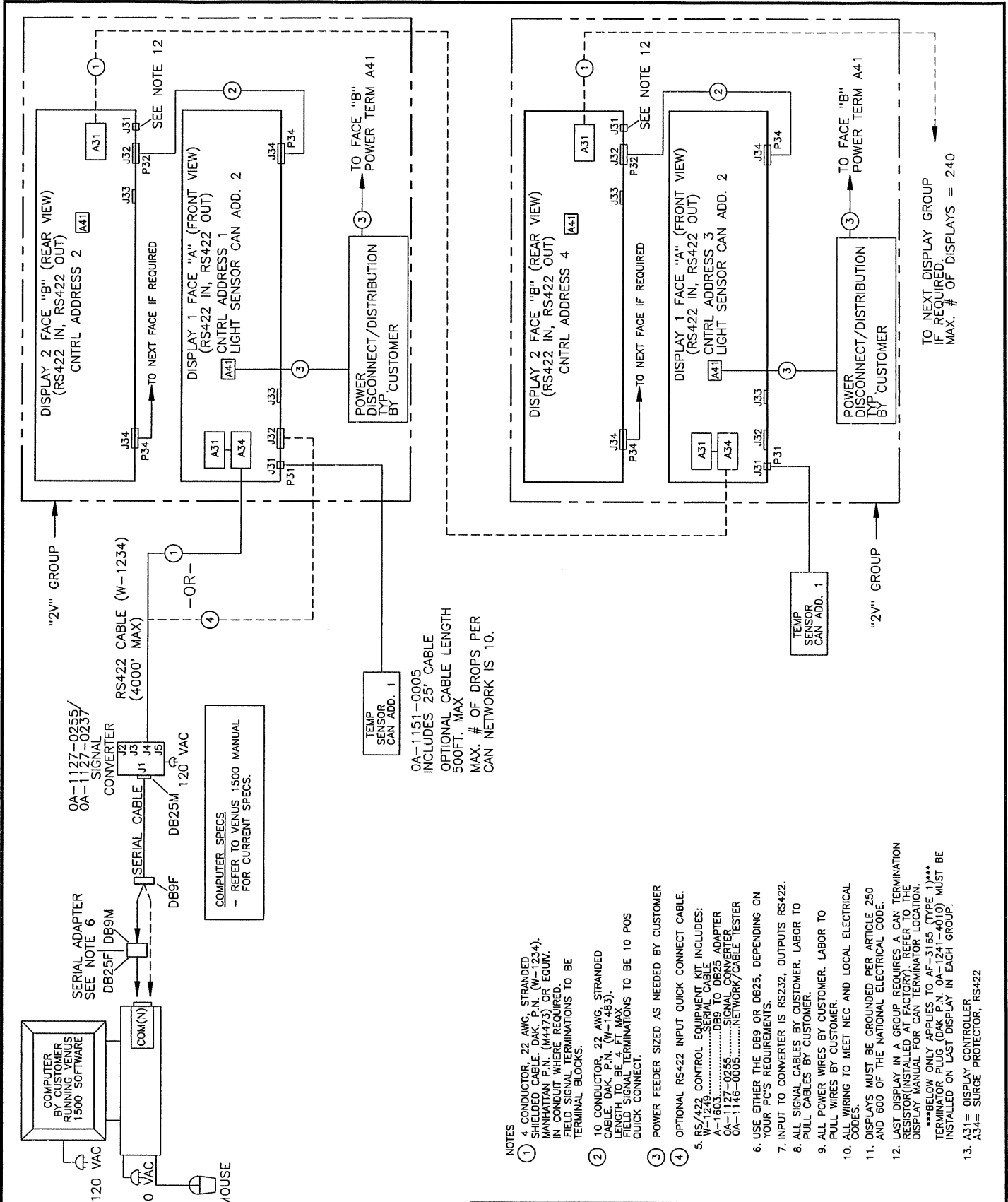
1. FAN PLUG MUST BE ON THE TOP SIDE.
2. AIR FLOW MUST BE OUT OF CABINET.



FRONT VIEW

DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: AF-3090 GALAXY LARGE CHARACTER			
TITLE: FAN ASSY DETAIL			
DES. BY: JTPELLIN		DRAWN BY: JAMUNDS	DATE: 17 APR 02
REVISION	APPR. BY:	1259-E10A-164433	
	SCALE: 1 = 2		

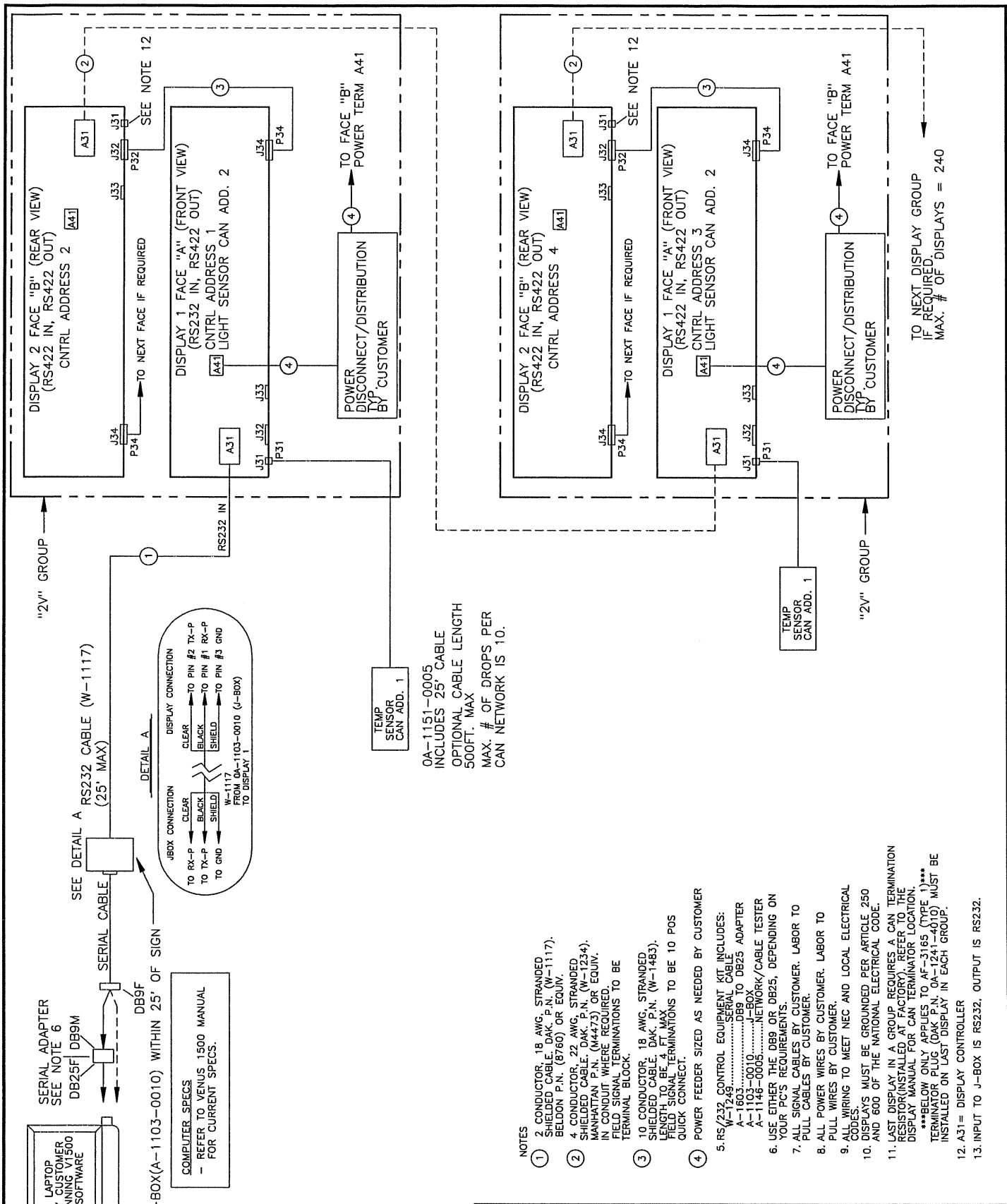
REV.	DATE	DESCRIPTION	BY	APPR.



- NOTES
- 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 TERMINAL BLOCKS.
 - 10 CONDUCTOR, 22 AWG, STRANDED CABLE, DAK P.N. (W-1483), LENGTH TO BE 4 FT. MAX. FIELD SIGNAL TERMINATIONS TO BE 10 POS QUICK CONNECT.
 - POWER FEEDER SIZED AS NEEDED BY CUSTOMER
 - OPTIONAL RS422 INPUT QUICK CONNECT CABLE.
 - RS422 CONTROL EQUIPMENT KIT INCLUDES:
 W-1249 SERIAL CABLE
 A-1603 DB9 TO DB25 ADAPTER
 OA-1146-0255 SIGNAL CONVERTER
 OA-1146-0005 NETWORK CABLE TESTER
 - USE EITHER THE DB9 OR DB25, DEPENDING ON YOUR PC'S REQUIREMENTS.
 - INPUT TO CONVERTER IS RS232, OUTPUTS RS422.
 - ALL SIGNAL CABLES BY CUSTOMER. LABOR TO PULL CABLES BY CUSTOMER.
 - ALL POWER WIRES BY CUSTOMER. LABOR TO PULL WIRES TO MEET NEC AND LOCAL ELECTRICAL CODES.
 - DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NATIONAL ELECTRICAL CODE.
 - LAST DISPLAY IN A GROUP REQUIRES A CAN TERMINATION RESISTOR (INSTALLED AT FACTORY). REFER TO THE DISPLAY MANUAL FOR CAN TERMINATOR LOCATION.
 - **BELOW ONLY APPLIES TO A*-5165 (TYPE 1)*** TERMINATOR PLUS (DAK P.N. OA-441-010) MUST BE INSTALLED ON LAST DISPLAY IN EACH GROUP.
 - A31= DISPLAY CONTROLLER, RS422
 A34= SURGE PROTECTOR, RS422

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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: OUTDOOR LED PRODUCT LINE			
TITLE: SYSTEM RISER DIAGRAM, RS422			
DES. BY:	DRAWN BY: LKERR		DATE: 22AUG02
REVISION	APPR. BY:	1229-R01A-174135	
03	SCALE: NONE		

REV.	DATE	DESCRIPTION	BY	APPR.
03	26 MAR 04	REPLACED OA-1127-0237 WITH OA-1127-0255 (INCLUDES SURGE PROTECTION)	SAI	DJM
02	26DEC03	CHANGED TEMP SENSOR PART NUMBER FROM OA-1241-4017 TO OA-1151-0005. REMOVED NOTE2.	DJM	
01	27JAN03	REMOVED CHART 1 (PWR, SIGNAL, SPEC). REPLACED OA-1241-4016 WITH W-1483. ADDED TO TERM PLUG NOTE.	DJM	



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DAKTRONICS, INC. BROOKINGS, SD 57006

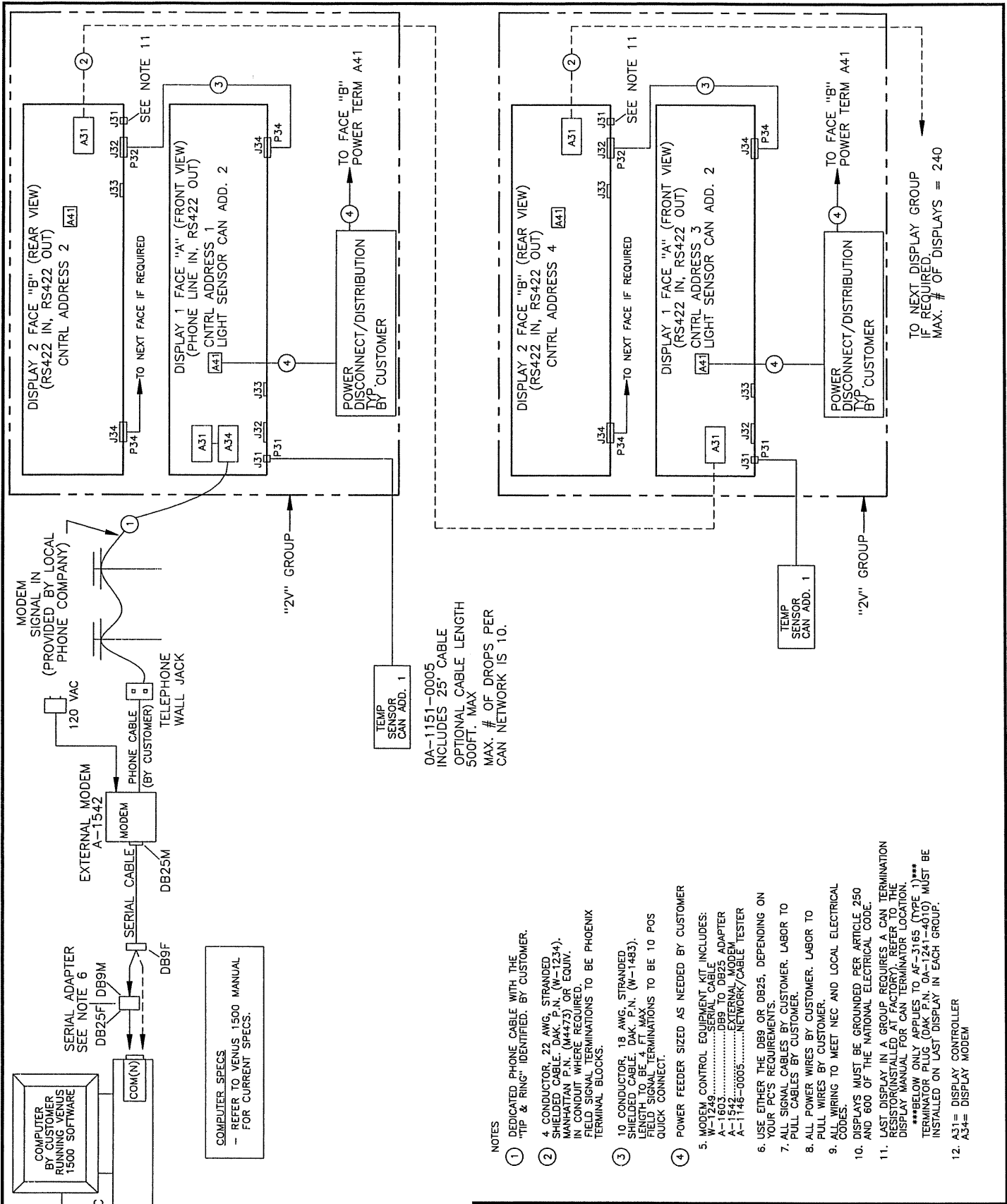
PROJ: OUTDOOR LED PRODUCT LINE
 TITLE: SYSTEM RISER DIAGRAM, RS232

DES. BY: DRAWN BY: LKERR DATE: 28AUG02

REVISION APPR. BY: 1229-R01A-174341

02 SCALE: NONE

REV.	DATE	DESCRIPTION	BY	APPR.
02	26DEC03	CHANGED TEMP SENSOR PART NUMBER FROM 0A-1241-4017 TO 0A-1151-0005. REMOVED NOTE 3 AND 6.	DJM	
01	27JAN03	REMOVED CHART 1 (PWR, SIGNAL, SPEC). REPLACED 0A-1241-4016 WITH W-1483. ADDED TO TERM PLUG NOTE.	DJM	

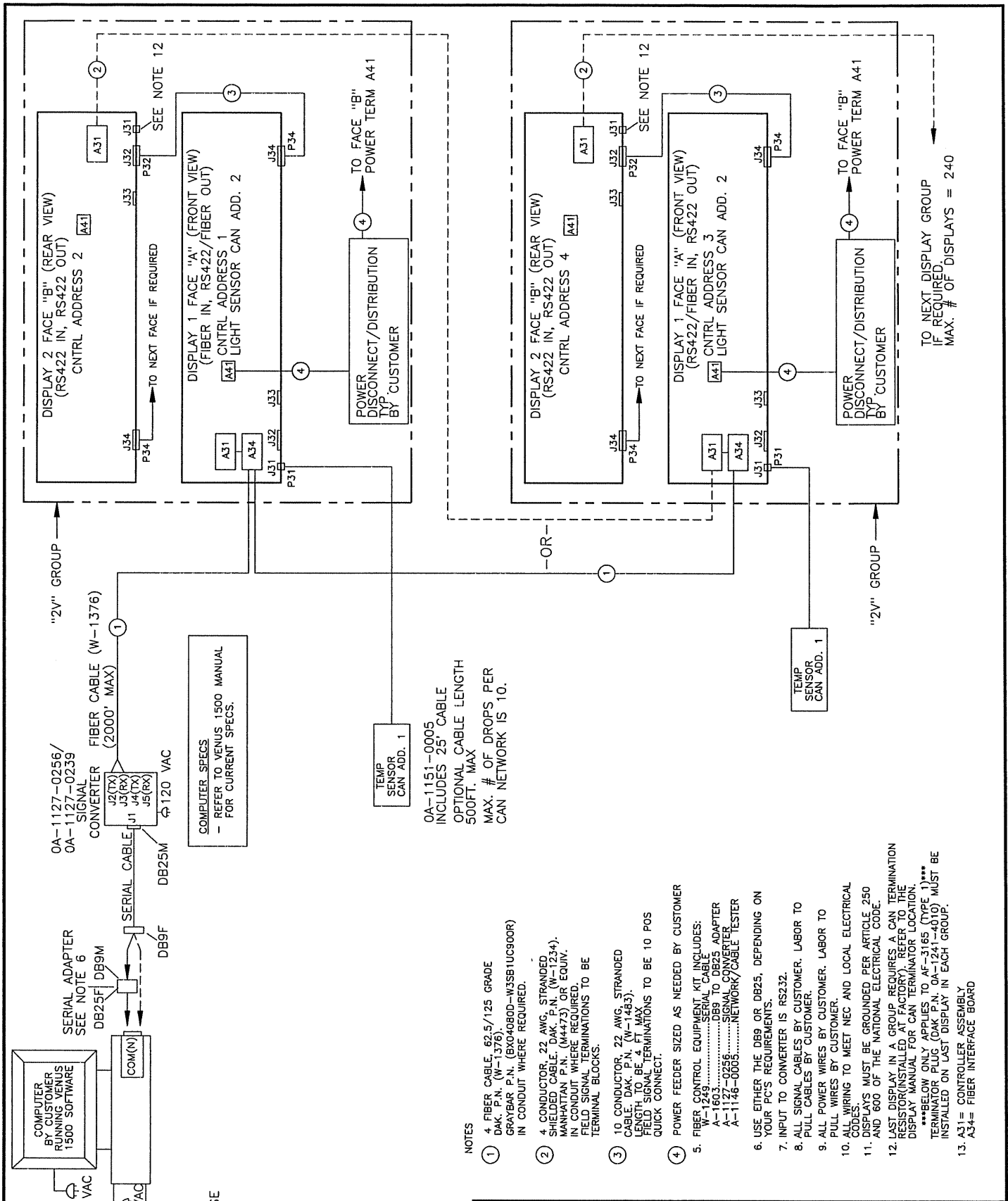


0A-1151-0005
 INCLUDES 25' CABLE
 OPTIONAL CABLE LENGTH
 500FT. MAX
 MAX. # OF DROPS PER
 CAN NETWORK IS 10.

- NOTES
1. DEDICATED PHONE CABLE WITH THE "TIP & RING" IDENTIFIED BY CUSTOMER.
 2. 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.
 3. 10 CONDUCTOR, 18 AWG, STRANDED SHIELDED CABLE, DAK P.N. (W-1483), LENGTH TO BE 4 FT. MAX. FIELD SIGNAL TERMINATIONS TO BE 10 POS QUICK CONNECT.
 4. POWER FEEDER SIZED AS NEEDED BY CUSTOMER.
 5. MODEM CONTROL EQUIPMENT KIT INCLUDES:
 W-1249.....SERIAL CABLE
 A-1603.....DB9 TO DB25 ADAPTER
 A-1542.....EXTERNAL MODEM
 A-1146-0005.....NETWORK/CABLE TESTER
 6. USE EITHER THE DB9 OR DB25, DEPENDING ON YOUR PC'S REQUIREMENTS.
 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.
 10. DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NATIONAL ELECTRICAL CODE.
 11. LAST DISPLAY IN A GROUP REQUIRES A CAN TERMINATION TO NEXT DISPLAY. A CAN TERMINATOR KIT (TYPE 1) MUST BE INSTALLED ON LAST DISPLAY IN EACH GROUP. **BELOW ONLY APPLIES TO A5-3165 (TYPE 1)***
 TERMINATOR P/N: (DAK P.N. 0A-124-4010) MUST BE INSTALLED ON LAST DISPLAY IN EACH GROUP.
 12. A31= DISPLAY CONTROLLER
 A34= DISPLAY MODEM

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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: OUTDOOR LED PRODUCT LINE			
TITLE: SYSTEM RISER DIAGRAM, MODEM			
DES. BY:	DRAWN BY: LKERR		DATE: 28AUG02
REVISION	APPR. BY:	1229-R01A-174342	
02	SCALE: NONE		

REV.	DATE	DESCRIPTION	BY	APPR.
02	26DEC03	CHANGED TEMP SENSOR PART NUMBER FROM 0A-1241-4017 TO 0A-1151-0005. REMOVED NOTE 3.	DJM	
01	27JAN03	REMOVED CHART 1 (PWR, SIGNAL, SPEC). REPLACED 0A-1241-4016 WITH W-1483. ADDED TO TERM PLUG NOTE.	DJM	



OA-1151-0005
INCLUDES 25' CABLE
OPTIONAL CABLE LENGTH
500FT. MAX
MAX. # OF DROPS PER
CAN NETWORK IS 10.

NOTES

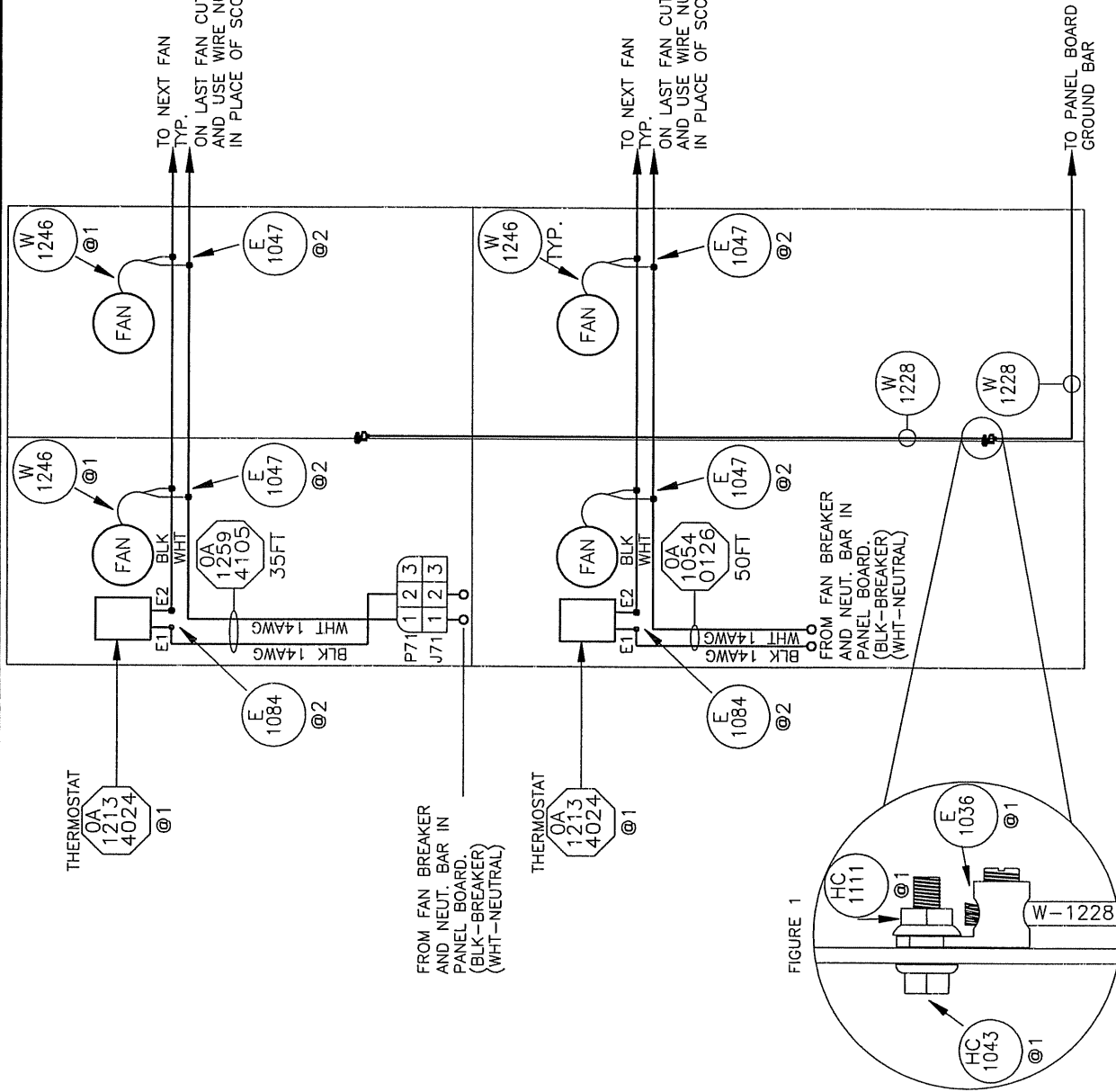
- 1 4 FIBER CABLE, 62.5/125 GRADE DAK. P.N. (W-1376). GRAYBAR P.N. (BX04080-W3SB1UC900R) IN CONDUIT WHERE REQUIRED.
- 2 4 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE. DAK. P.N. (W-1234). MANHATTAN P.N. (M4473) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE TERMINAL BLOCKS.
- 3 10 CONDUCTOR, 22 AWG, STRANDED CABLE. DAK. P.N. (W-1483). FIELD SIGNAL TERMINATIONS TO BE 10 POS QUICK CONNECT.
- 4 POWER FEEDER SIZED AS NEEDED BY CUSTOMER
- 5 FIBER CONTROL EQUIPMENT KIT INCLUDES:
A-1649.....DB9 TO DB25 ADAPTER
A-1127-0256.....SIGNAL CONVERTER
A-1146-0005.....NETWORK/CABLE TESTER
- 6 USE EITHER THE DB9 OR DB25, DEPENDING ON YOUR PC'S REQUIREMENTS.
- 7 INPUT TO CONVERTER IS RS232.
- 8 ALL SIGNAL CABLES BY CUSTOMER. LABOR TO PULL CABLES BY CUSTOMER.
- 9 ALL POWER WIRES BY CUSTOMER. LABOR TO PULL WIRES BY CUSTOMER.
- 10 ALL WIRING TO MEET NEC AND LOCAL ELECTRICAL CODES.
- 11 DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 800 OF THE NATIONAL ELECTRICAL CODE.
- 12 LAST DISPLAY IN A GROUP REQUIRES A CAN TERMINATION RESISTOR(INSTALLED AT FACTORY). REFER TO THE DISPLAY MANUAL FOR CAN TERMINATOR LOCATION.
- ***BELOW ONLY APPLIES TO AF-3165 (TYPE 1)***
TERMINATOR PLUG (DAK P.N. OA-1241-4010) MUST BE INSTALLED ON LAST DISPLAY IN EACH GROUP.
- 13 A31= CONTROLLER ASSEMBLY
A34= FIBER INTERFACE BOARD

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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: OUTDOOR LED PRODUCT LINE			
TITLE: SYSTEM RISER DIAGRAM, FIBER			
DES. BY:	DRAWN BY: LKERR		DATE: 06SEP02
REVISION	APPR. BY:	1229-R01A-174344	
03	SCALE: NONE		

REV.	DATE	DESCRIPTION	BY	APPR.
03	26 MAR 04	REPLACED OA-1127-0239 WITH OA-1127-0256 (INCLUDES SURGE PROTECTION)	SAI	DJM
02	26DEC03	CHANGED TEMP SENSOR PART NUMBER FROM OA-1241-4017 TO OA-1151-0005. REMOVED NOTE 3.		DJM
01	27JAN03	REMOVED CHART 1 (PWR, SIGNAL, SPEC). REPLACED OA-1241-4016 WITH W-1483. ADDED TO TERM PLUG NOTE.		DJM

TOP SECTION
(IF REQUIRED)

BOTTOM SECTION



TO NEXT FAN
TYP.
ON LAST FAN CUT TO LENGTH
AND USE WIRE NUTS (E-1084)
IN PLACE OF SCOTCHLOKS (E-1047).

TO NEXT FAN
TYP.
ON LAST FAN CUT TO LENGTH
AND USE WIRE NUTS (E-1084)
IN PLACE OF SCOTCHLOKS (E-1047).

TO PANEL BOARD
GROUND BAR

FROM FAN BREAKER
AND NEUT. BAR IN
PANEL BOARD.
(BLK-BREAKER)
(WHT-NEUTRAL)

FROM FAN BREAKER
AND NEUT. BAR IN
PANEL BOARD.
(BLK-BREAKER)
(WHT-NEUTRAL)

FIGURE 1

TYP.

- NOTES:
- OA-1054-0126 WILL BE RUN ALONG THE POWER CONDUIT CLOSEST TO THE FANS.
 - REMOVE ALL PAINT AND ATTACH E-1036 TO THE NEAREST ALIGNMENT CHANNEL.
 - FANS HAVE NO POLARITY.

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DAKTRONICS, INC. BROOKINGS, SD 57006

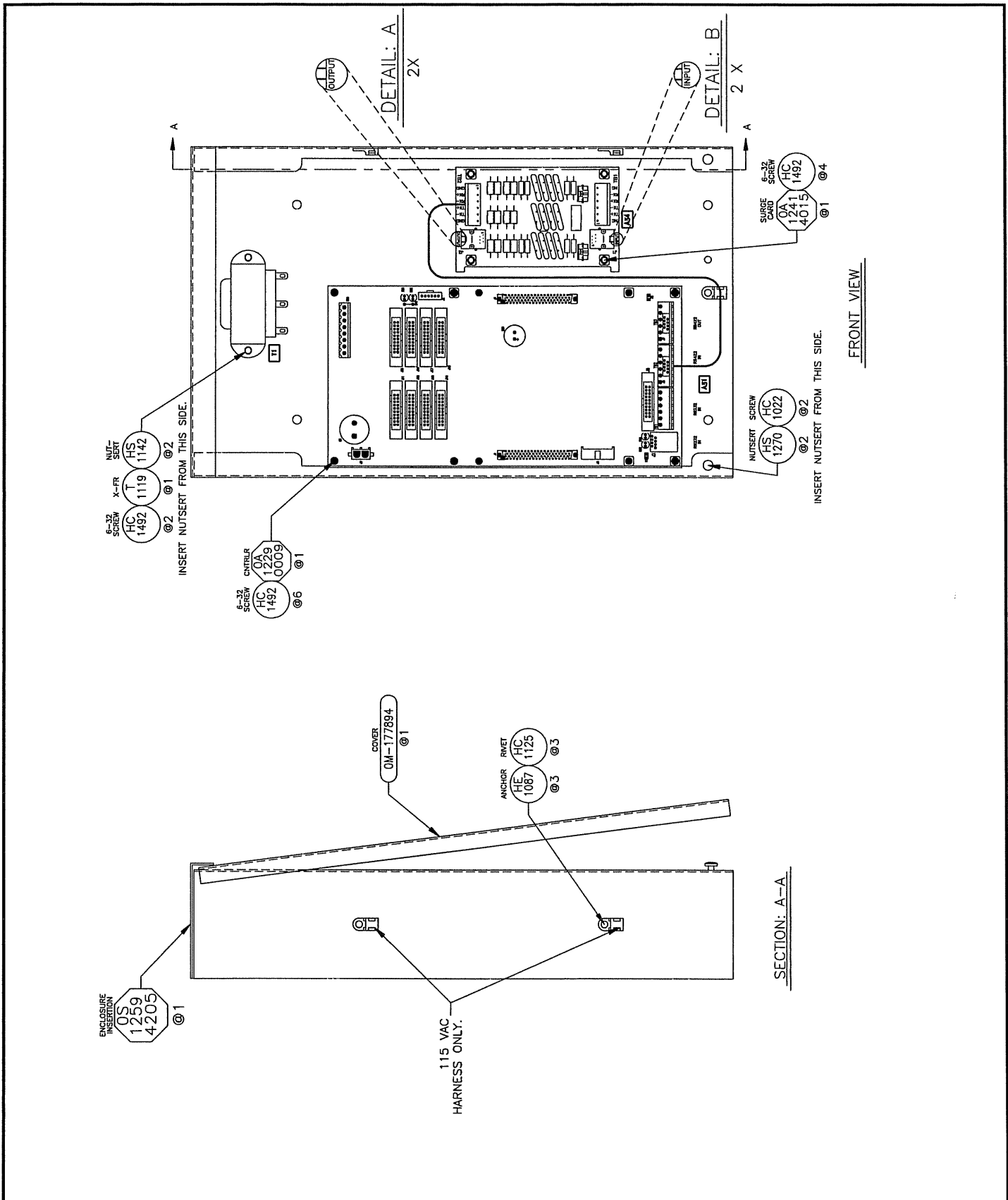
PROJ: GALAXY, LARGE CHARACTER

TITLE: ASSY., GROUNDING & FAN HARNESS

DES. BY: LKERR DRAWN BY: LKERR DATE: 16SEP02

REVISION APPR. BY: SCALE: NONE 1259-R06A-175194

REV.	DATE	DESCRIPTION	BY	APPR.



REV.	DATE	DESCRIPTION	BY	APPR.
04	11 AUG 04	ADDED DETAIL A AND B	HJB	
03	09 JUL 04	REMOVED NUSERT HS-1142 @10. REMOVED OM-177876 @1 AND ADDED OS-1259-4205 @1.	SWM	JMT
02	11 NOV 03	UPDATED CNTRLR FROM OA-1229-0005 TO OA-1229-0009.	EJY	
01	25 APR 03	REMOVED HE-1087 @1 AND HC-1125 @1, HC-1179 @12. ADDED HC-1492 @12.	RTV	

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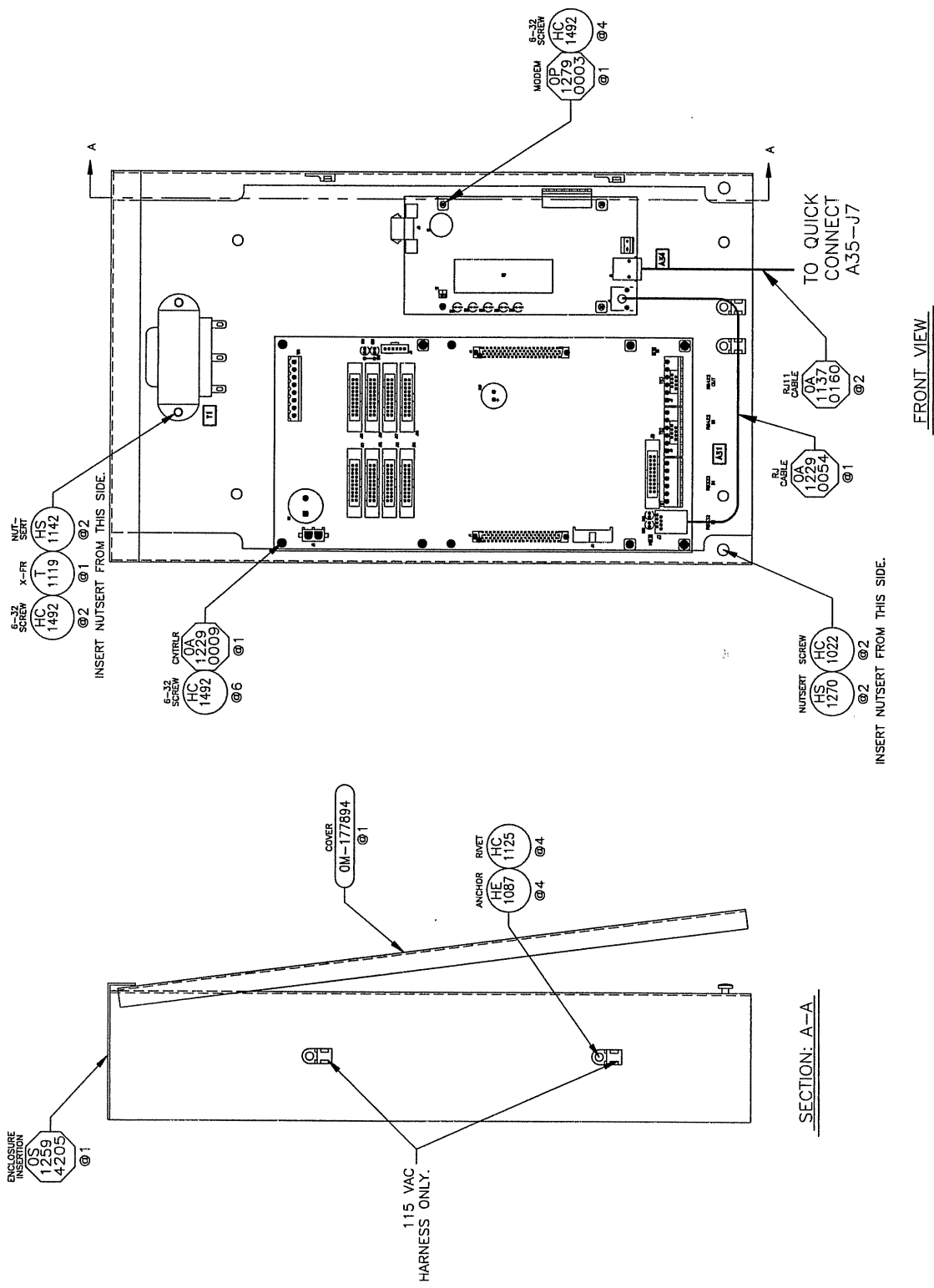
DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: AF-3190 GALAXY LARGE CHARACTER

TITLE: ENCLOSURE CONTROLLER M2; RS232/422

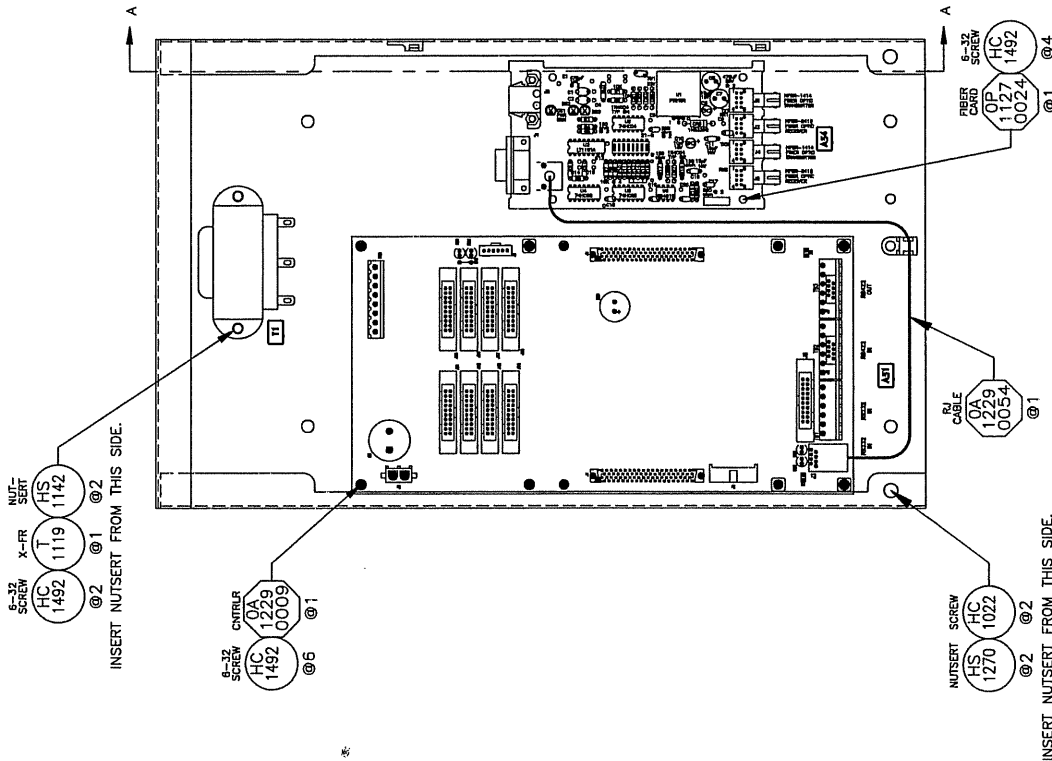
DES. BY: JMT DRAWN BY: JMT DATE: 5 NOV 02

REVISION	APPR. BY:	1259-E10A-177905
04	SCALE: 1=4	

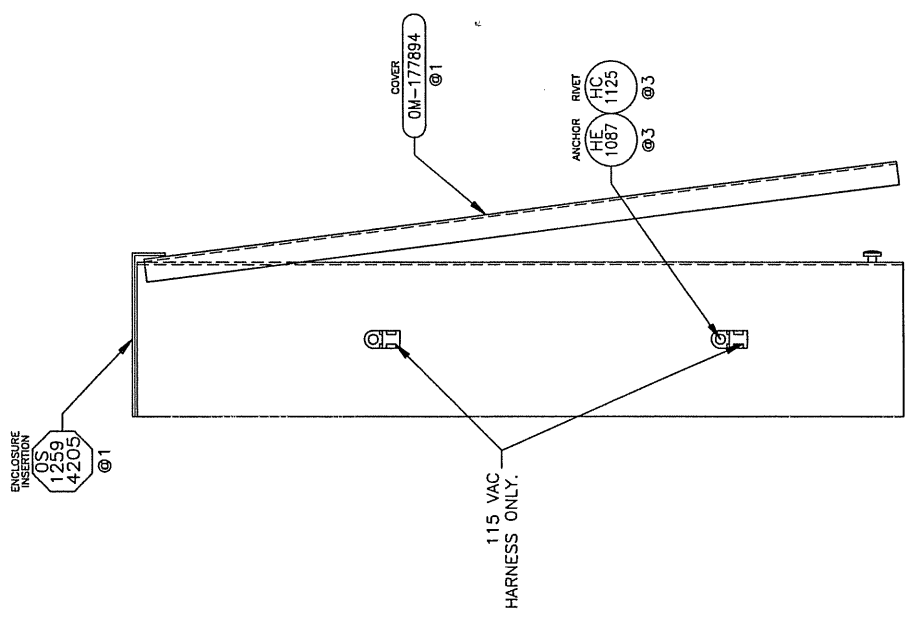


THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS, INCLUDING ELECTRONICALLY WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2002 DAKTRONICS, INC.			
DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: AF-3190 GALAXY LARGE CHARACTER			
TITLE: ENCLOSURE CONTROLLER M2; MODEM			
DES. BY: JMT		DRAWN BY: JMT	
		DATE: 5 NOV 02	
REVISION	APPR. BY:	1259-E10A-177916	
03	SCALE: 1=4		

REV.	DATE	DESCRIPTION	BY	APPR.
03	09 JUL 04	REMOVED NUSERT HS-1142 @10. REMOVED 0M-177876 @1 AND ADDED 0S-1259-4205 @1.	SWM	JMT
02	11 NOV 03	UPDATED CNTRLR FROM 0A-1229-0005 TO 0A-1229-0009.	EJY	
01	28 APR 03	REMOVED HC-1179 @12. ADDED HC-1492 @12.	RTV	

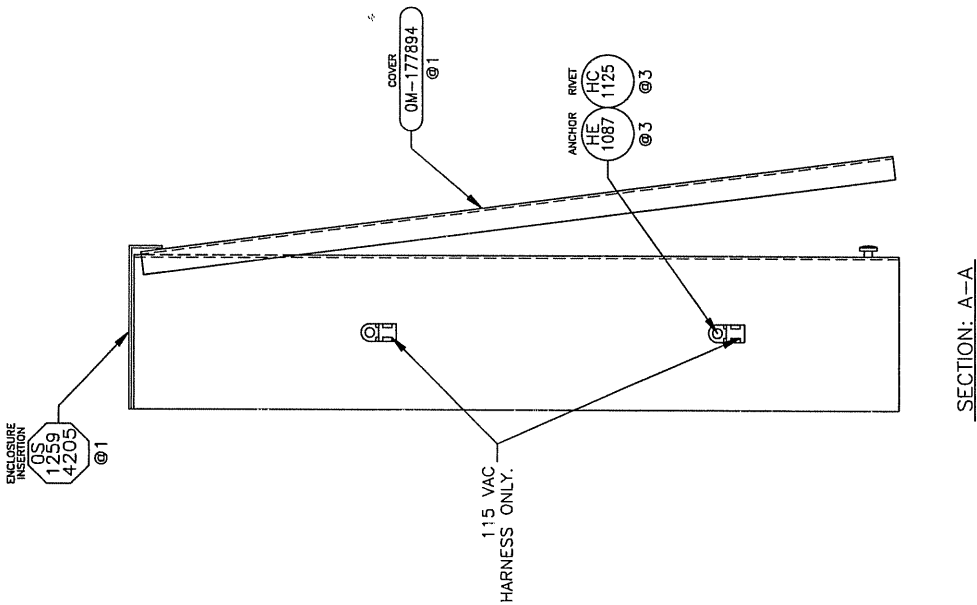
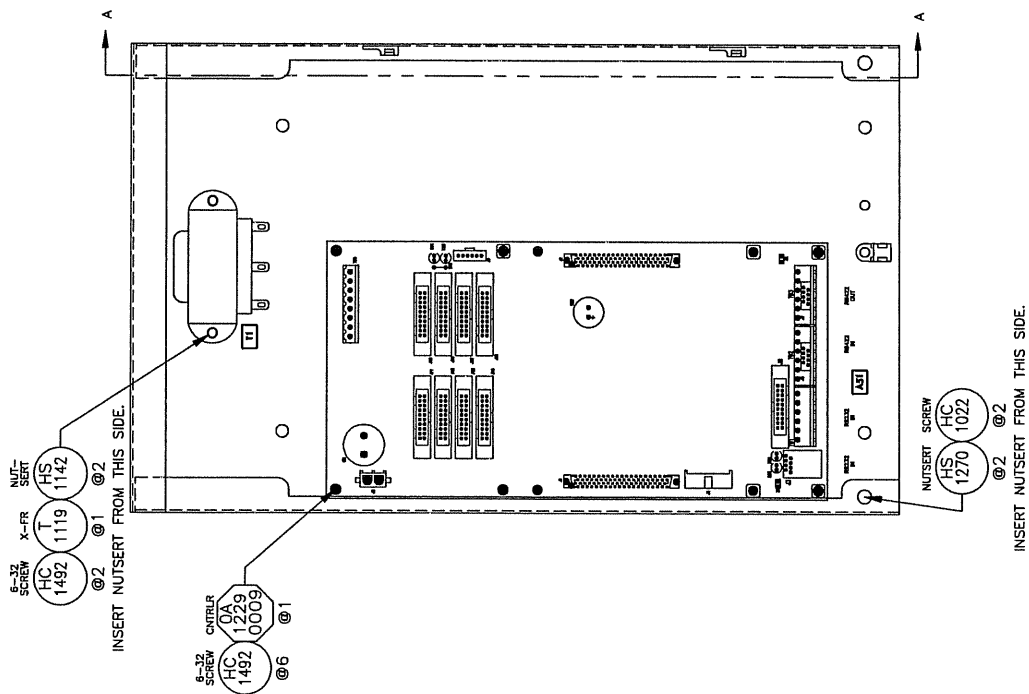


FRONT VIEW



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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: AF-3190 GALAXY LARGE CHARACTER			
TITLE: ENCLOSURE CONTROLLER M2; FIBER			
DES. BY: JMT		DRAWN BY: JMT	
DATE: 5 NOV 02		REVISION	
03	APPR. BY:	SCALE: 1=4	
1259-E10A-177918			

REV.	DATE	DESCRIPTION	BY	APPR.
03	09 JUL 04	REMOVED NUSERT HS-1142 @10. REMOVED OM-177876@1 AND ADDED OS-1259-4205 @1.	SWM	JMT
02	11 NOV 03	UPDATED FIBER CARD GRAPHIC. UPDATED CNTRLR FROM OA-1229-0005 TO OA-1229-0009	EJY	
01	25 APR 03	REMOVED HE-1087 @1 AND HC-1125 @1, HC-1179 @12. ADDED HC-1492 @12.	RTV	



01	25 APR 03	REMOVED HE-1087 @1 AND HC-1125 @1, AND HC-1179 @8. ADDED HC-1492 @8.	RTV
----	-----------	--	-----

REV.	DATE	DESCRIPTION	BY	APPR.
05	09 JUL 04	REMOVED NUSERT HS-1142 @6. REMOVED OM-177876 @1 AND ADDED OS-1259-4205 @1.	SWM	JMT
04	11 NOV 03	UPDATED CNTRLR FROM OA-1229-0005 TO OA-1229-0009	EJY	
03	15 OCT 03	DELETED: OA-1241-4015 @1, HS 1142 @4, AND HS-1492 @4.	JMT	
02	28 APR 03	ADDED OA-1241-4015 @1, HS 1142 @4, AND HS-1492 @4.	RTV	

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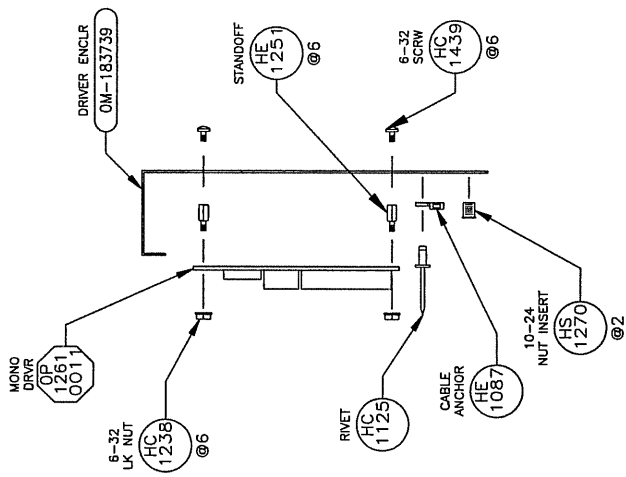
DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: AF-3190 GALAXY LARGE CHARACTER

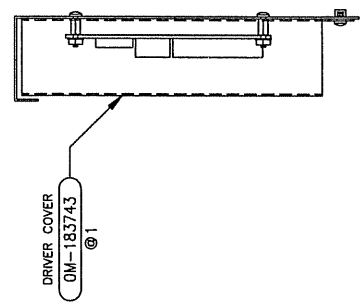
TITLE: ENCLOSURE CONTROLLER M2; RS422 ECHO

DES. BY: JMT DRAWN BY: JMT DATE: 5 NOV 02

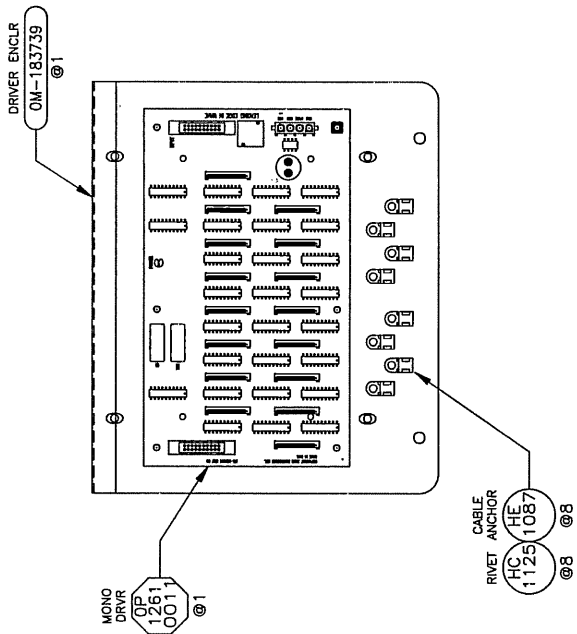
REVISION	APPR. BY:	1259-E10A-177921
05	SCALE: 1=4	



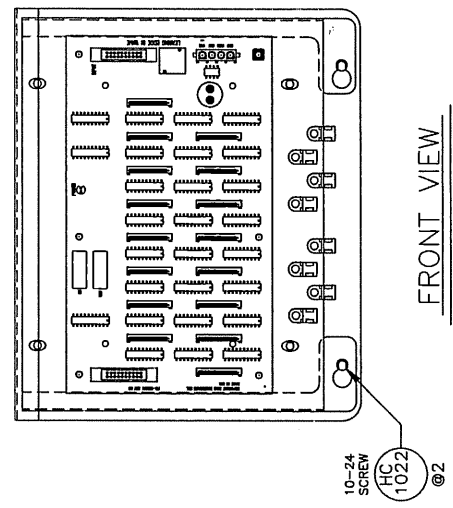
RIGHT SIDE



RIGHT SIDE
(COMPLETED ASSEMBLY)



FRONT VIEW



FRONT VIEW
(COMPLETED ASSEMBLY)

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: AF-3197 GALAXY, LARGE CHARACTER

TITLE: DRIVER ASSY; AF-3197-8X8-89MM-RGB

DES. BY: JMT DRAWN BY: JMT DATE: 20 FEB 03

REVISION 02 APPR. BY: SCALE: 1 = 5

1259-E10A-183737

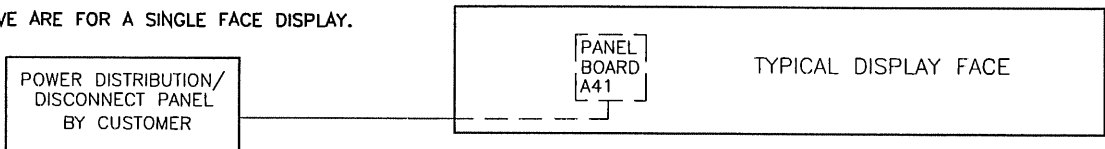
REV.	DATE	DESCRIPTION	BY	APPR.
02	27 SEP 04	UPDATED GRAPHICS FOR M-PART CHANGES.	SWM	JMT
01	05 FEB 04	ADDED HC-1238 @2, HC-1439 @2, AND HE-1251 @2 PER ECO 42086.	SWM	JMT

GALAXY, 89mm, R.G.B. 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	797	3.06	3.06	0.53	3.59	3.06
8X48	1212	3.06	6.12	0.93	3.99	6.12
8X64	1628	6.12	6.12	1.33	7.45	6.12
8X80	2043	6.12	9.17	1.74	7.85	9.17
8X96	2458	9.17	9.17	2.14	11.31	9.17
8X112	2873	9.17	12.23	2.54	11.71	12.23
16X48	2361	9.17	4.39	6.12	7.45	12.23
16X64	3143	12.23	7.85	6.12	13.97	12.23
16X80	3926	15.29	8.25	9.17	14.37	18.35
16X96	4708	18.35	11.71	9.17	20.89	18.35
16X112	5490	21.40	12.12	12.23	21.29	24.46
24X48	3557	11.30	9.17	9.17	11.30	18.35
24X64	4738	15.02	12.23	12.23	21.14	18.35
24X80	5919	18.75	15.29	15.29	21.80	27.52
24X96	7099	22.47	18.35	18.35	31.64	27.52
24X112	8280	26.19	21.40	21.40	32.31	36.69
32X48	4708	12.36	15.29	11.59	14.77	24.46
32X64	6272	18.47	18.35	15.45	27.81	24.46
32X80	7836	21.53	24.46	19.31	28.61	36.69
32X96	9400	27.64	27.52	23.18	41.65	36.69
32X112	10965	30.70	33.63	27.04	42.45	48.92
40X48	5904	18.35	15.44	15.41	18.50	30.70
40X64	7866	24.46	22.62	18.47	34.85	30.70
40X80	9829	30.58	26.75	24.59	35.92	45.99
40X96	11792	36.69	33.93	27.64	52.28	45.99
40X112	13755	42.81	38.06	33.76	53.35	61.28
48X48	7099	22.47	18.35	18.35	22.47	36.69
48X64	9461	29.92	24.46	24.46	42.15	36.69
48X80	11822	37.37	30.58	30.58	43.48	55.04
48X96	14184	44.82	36.69	36.69	63.16	55.04
48X112	16545	52.26	42.81	42.81	64.50	73.38

NOTES:

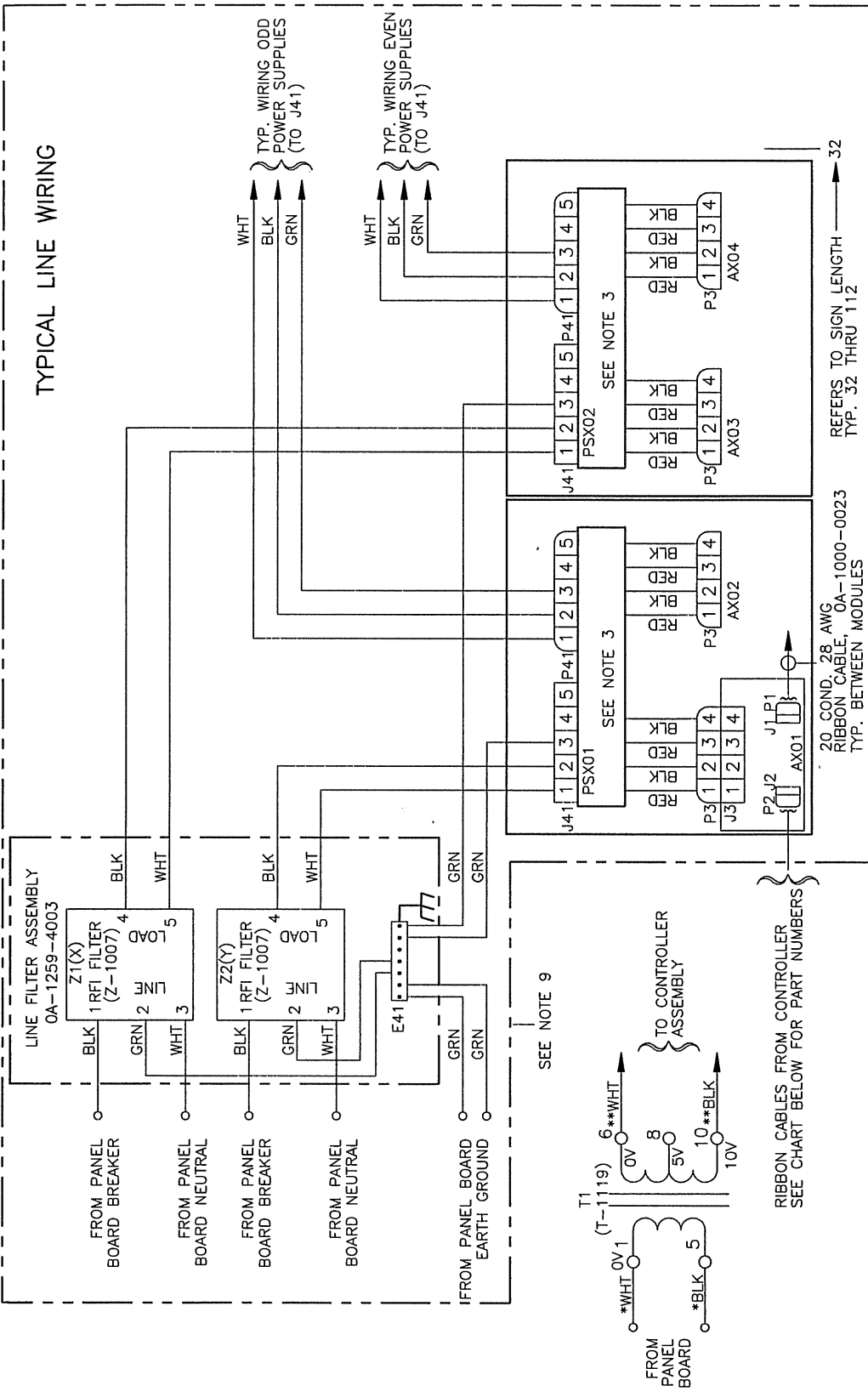
- SPECS LISTED ABOVE ARE FOR A SINGLE FACE DISPLAY.



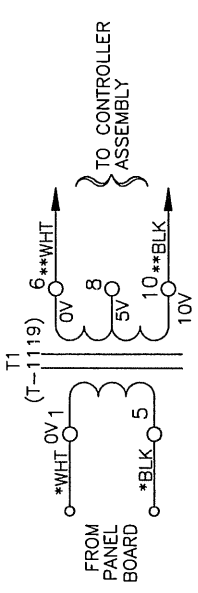
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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: AF-3197 GALAXY, LARGE CHARACTER			
TITLE: POWER SPECS, AF-3197, RGB LEDS			
DES. BY: DMATHERN		DRAWN BY: RVOSS	
		DATE: 25 FEB 03	
REVISION	APPR. BY:	1259-R10A-183906	
	SCALE: NONE		

REV.	DATE	DESCRIPTION	BY	APPR.

TYPICAL LINE WIRING



SEE NOTE 9



CONTROLLER OUTPUT RIBBON CABLE CHART

LINE/ PLUC#	8	16	24	32	40	48
1 (P11)	0023	0023	0088	0088	0089	0090
2 (P12)	N/A	0023	0023	0088	0088	0089
3 (P13)	N/A	N/A	0023	0023	0088	0088
4 (P14)	N/A	N/A	N/A	0023	0023	0088
5 (P15)	N/A	N/A	N/A	N/A	0023	0023
6 (P16)	N/A	N/A	N/A	N/A	N/A	0023

(OA-1000-****)

NOTES

- 1) ALL WIRE IS 12 AWG EXCEPT * IS 14 AWG OR ** IS 18 AWG UNLESS OTHERWISE NOTED.
- 2) EACH LED MODULE IS A 8X8 MATRIX.
- 3) FOR POWER SUPPLY CONFIGURATIONS REFER TO DWG A-184245.
- 4) FOR SINGLE PHASE (120/240VAC) PANEL BOARD 9) ABOVE WIRING DETAIL IS REPEATED FOR ALL SIZES LAYOUT REFER TO DRAWING A-184316. FOR THREE PHASE (120/208VAC) PANEL BOARD LAYOUT REFER TO DRAWING A-184321.
- 5) FOR SIGNAL AND CONTROLLER WIRING REFER TO DWG B-177662.
- 6) FOR FAN WIRING REFER TO DWG A-175194.
- 7) FOR BLOCK DIAGRAM REFER TO B-184326.
- 8) REFER TO DWG A-183906 FOR POWER SPECS.

REV.	DATE	DESCRIPTION	BY	APPR.

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LARGE CHARACTER

TITLE: SCHEMATIC, AF-3197-8-48X32X***-89mm, RGB

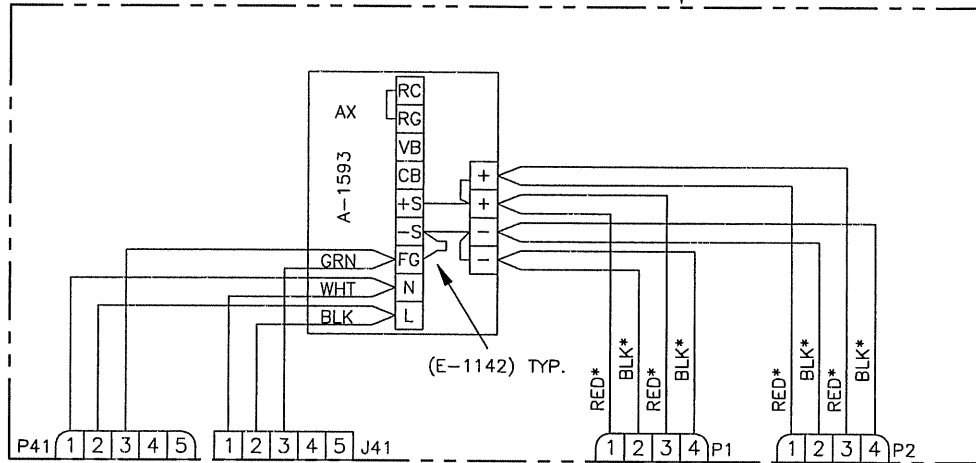
DES. BY: DRAWN BY: DMATHERN DATE: 26 FEB 03

REVISION APPR. BY: SCALE: NONE

1259-R03A-184111

14.7VDC VERSION (RGB)
 0A-1259-4410
 (SET POWER SUPPLIES TO 14.7VDC)

BE CERTAIN ALL TERMINALS ON
 POWER SUPPLY ARE TIGHTENED.



NOTES:

GRN, WHT, BLK CRIMPS MAY BE
 RAN FROM BOTH THE TOP AND
 BOTTOM OF POWER SUPPLY
 TERMINAL. FOR EASE DURRING
 ASSEMBLY.

NOTES

- 1) ALL WIRE IS 12 AWG EXCEPT * IS 14 AWG UNLESS OTHERWISE NOTED.
- 2) REFER TO ASSEMBLY PACKET FOR WIRE ROUTING COMING OFF OF POWER SUPPLIES.

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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: GALAXY; 89mm, LARGE CHARACTOR			
TITLE: SCHEMATIC; POWER SUPPLY ASSEMBLY			
DES. BY:	DRAWN BY: DMATHERN	DATE: 27 FEB 03	
REVISION	APPR. BY:	1259-R03A-184245	
01	SCALE: 1=1		

01	09 JAN 04	ADDED NOTE ABOUT POWER SUPPLY PER ECO 38529	MJW	
REV.	DATE	DESCRIPTION	BY	APPR.

8X32-112 (0A-1259-4320) EN-1217

PANEL BOARD

	20	20	15					
1	2	3	4	5	6	7	8	
	Z1 A10X EVEN PS	Z2 A10X ODD PS	CNTRL/FANS				NOT USED	
	NOT USED							

16X48-112 (0A-1259-4321) EN-1217

PANEL BOARD

	20	20	20	20	15			
1	2	3	4	5	6	7	8	
	Z1 A10X EVEN PS	Z2 A10X ODD PS	Z4 A20X ODD PS	Z3 A20X EVEN PS	CNTRL/FANS		NOT USED	
	NOT USED							

24X48-112 (0A-1259-4322) EN-1043

PANEL BOARD

20A	1	Z1 A10X EVEN PS	Z2 A10X ODD PS	2	20A
20A	3	Z3 A20X EVEN PS	Z4 A20X ODD PS	4	20A
20A	5	Z5 A30X EVEN PS	CNTRL/FANS	6	15A
20A	7	Z6 A30X ODD PS		8	
	9			10	
	11			12	

32X48-112 (0A-1259-4323) EN-1043

PANEL BOARD

20A	1	Z1 A10X EVEN PS	Z2 A10X ODD PS	2	20A
20A	3	Z3 A20X EVEN PS	Z4 A20X ODD PS	4	20A
20A	5	Z5 A30X EVEN PS	Z6 A30X ODD PS	6	20A
20A	7	Z7 A40X EVEN PS	Z8 A40X ODD PS	8	20A
15A	9	FANS	CONTROLLER	10	15A
	11			12	

40X48-112 (0A-1259-4324) EN-1043

PANEL BOARD

20A	1	Z1 A10X EVEN PS	Z2 A10X ODD PS	2	20A
20A	3	Z3 A20X EVEN PS	Z4 A20X ODD PS	4	20A
20A	5	Z5 A30X EVEN PS	Z6 A30X ODD PS	6	20A
20A	7	Z7 A40X EVEN PS	Z8 A40X ODD PS	8	20A
20A	9	Z9 A50X EVEN PS	FANS	10	15A
20A	11	Z10 A50X ODD PS	CONTROLLER	12	15A

48X48-112 (0A-1259-4325) EN-1225

PANEL BOARD

20A	1	Z1 A10X EVEN PS	Z2 A10X ODD PS	2	20A
20A	3	Z3 A20X EVEN PS	Z4 A20X ODD PS	4	20A
20A	5	Z5 A30X EVEN PS	Z6 A30X ODD PS	6	20A
20A	7	Z7 A40X EVEN PS	Z8 A40X ODD PS	8	20A
20A	9	Z9 A50X EVEN PS	Z10 A50X ODD PS	10	20A
20A	11	Z11 A60X EVEN PS	Z12 A60X ODD PS	12	20A
15A	13	FANS	CONTROLLER	14	15A
	15			16	
	17			18	
	19			20	
	21			22	
	23			24	

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: AF-3197 GALAXY, LARGE CHARACTER

TITLE: LAYOUT, PNL BD,8-48X32-112, 89mm, 1 PHASE

DES. BY: LKERR

DRAWN BY: JMT

DATE: 28FEB03

REV.	DATE	DESCRIPTION	BY	APPR.
------	------	-------------	----	-------

REVISION

APPR. BY:

SCALE: 1=1

1259-R07A-184316

8X32-112 (0A-1259-4330) EN-1236

PANEL BOARD

20A	1	Z1 A10X EVEN PS		2	
20A	3	Z2 A10X ODD PS		4	
15A	5	CNTRL/FANS		6	
	7			8	
	9			10	
	11			12	

16x48-112 (0A-1259-4331) EN-1236

PANEL BOARD

20A	1	Z1 A10X EVEN PS	Z2 A10X ODD PS	2	20A
20A	3	Z3 A20X EVEN PS	CNTRL/FANS	4	15A
20A	5	Z4 A20X ODD PS		6	
	7			8	
	9			10	
	11			12	

24x48-112 (0A-1259-4332) EN-1236

PANEL BOARD

20A	1	Z1 A10X EVEN PS	Z2 A10X ODD PS	2	20A
20A	3	Z3 A20X EVEN PS	Z4 A20X ODD PS	4	20A
20A	5	Z5 A30X EVEN PS	Z6 A30X ODD PS	6	20A
15A	7	CNTRL/FANS		8	
	9			10	
	11			12	

32x48-112 (0A-1259-4333) EN-1236

PANEL BOARD

20A	1	Z1 A10X EVEN PS	Z2 A10X ODD PS	2	20A
20A	3	Z3 A20X EVEN PS	Z4 A20X ODD PS	4	20A
20A	5	Z5 A30X EVEN PS	Z6 A30X ODD PS	6	20A
20A	7	Z7 A40X EVEN PS	CONTROLLER	8	15A
20A	9	Z8 A40X ODD PS		10	
15A	11	FANS		12	

40x48-112 (0A-1259-4334) EN-1236

PANEL BOARD

20A	1	Z1 A10X EVEN PS	Z2 A10X ODD PS	2	20A
20A	3	Z3 A20X EVEN PS	Z4 A20X ODD PS	4	20A
20A	5	Z5 A30X EVEN PS	Z6 A30X ODD PS	6	20A
20A	7	Z7 A40X EVEN PS	Z8 A40X ODD PS	8	20A
20A	9	Z9 A50X EVEN PS	FANS	10	15A
20A	11	Z10 A50X ODD PS	CONTROLLER	12	15A

48x48-112 (0A-1259-4335) EN-1237

PANEL BOARD

20A	1	Z1 A10X EVEN PS	Z2 A10X ODD PS	2	20A
20A	3	Z3 A20X EVEN PS	Z4 A20X ODD PS	4	20A
20A	5	Z5 A30X EVEN PS	Z6 A30X ODD PS	6	20A
20A	7	Z7 A40X EVEN PS	Z8 A40X ODD PS	8	20A
20A	9	Z9 A50X EVEN PS	Z10 A50X ODD PS	10	20A
20A	11	Z11 A60X EVEN PS	Z12 A60X ODD PS	12	20A
15A	13	FANS	CONTROLLER	14	15A
	15			16	
	17			18	
	19			20	

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: AF-3197 GALAXY, LARGE CHARACTER

TITLE: LAYOUT, PNL BD,8-48X32-112, 89mm 3 PHASE

DES. BY: LKERR

DRAWN BY: JMT

DATE: 26FEB03

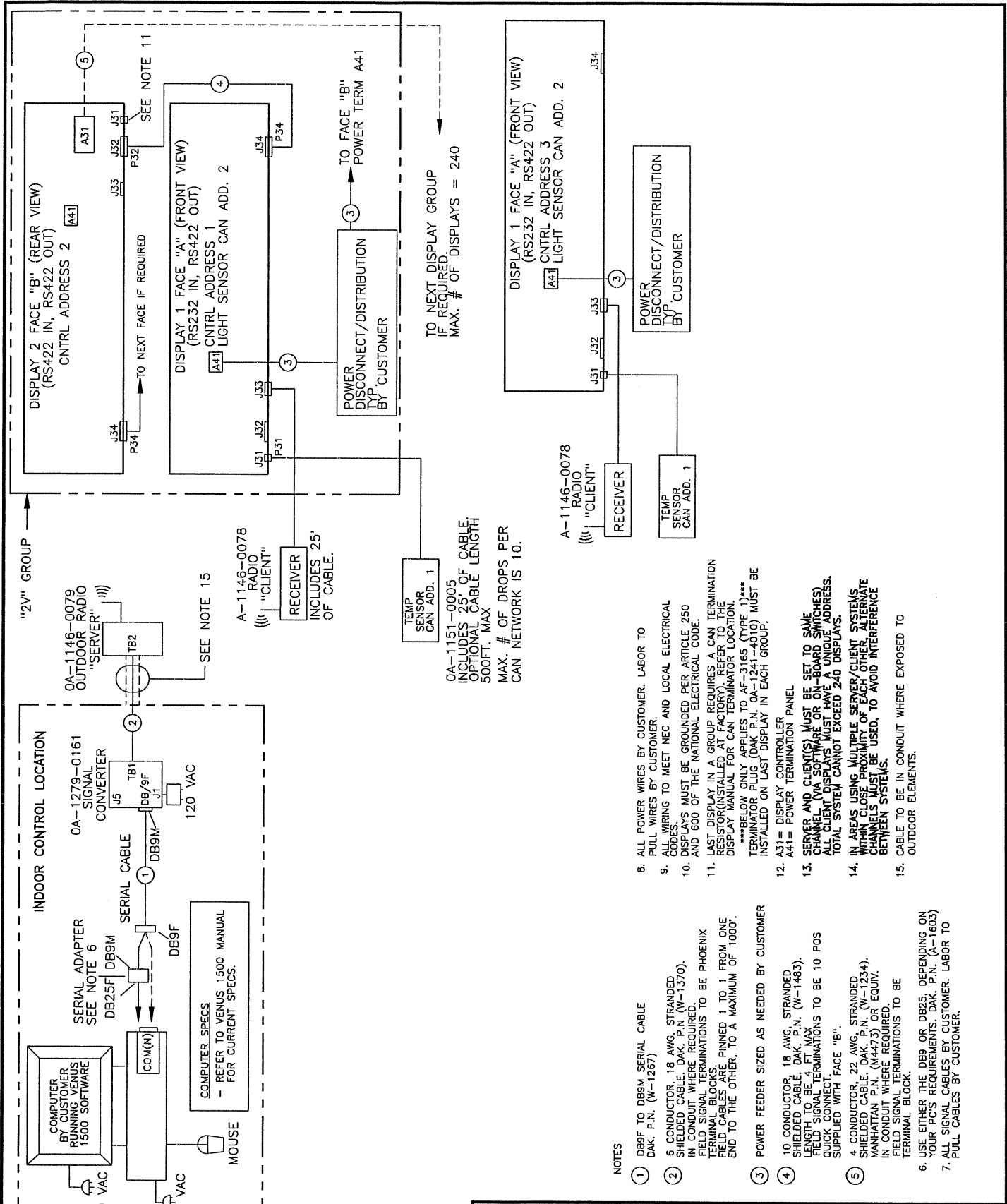
REVISION

APPR. BY:

SCALE: 1=1

1259-R07A-184321

REV.	DATE	DESCRIPTION	BY	APPR.
------	------	-------------	----	-------



- NOTES
- DB9F TO DB9M SERIAL CABLE DAK. P.N. (W-1267)
 - CONDUCTOR, 18 AWG, STRANDED SHIELDED CABLE, DAK. P.N. (W-1370). IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE PHOENIX TERMINAL BLOCKS. FIELD CABLES ARE PINNED 1 TO 1 FROM ONE END TO THE OTHER, TO A MAXIMUM OF 1000'.
 - POWER FEEDER SIZED AS NEEDED BY CUSTOMER
 - CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE, DAK. P.N. (W-1234). IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE SUPPLIED WITH FACE "B".
 - CONDUCTOR, 18 AWG, STRANDED SHIELDED CABLE, DAK. P.N. (W-1483). LENGTH TO BE 4 FT MAX. FIELD SIGNAL TERMINATIONS TO BE 10 POS QUICK CONNECT WITH FACE "B".
 - USE EITHER THE DB9 OR DB25, DEPENDING ON YOUR PC'S REQUIREMENTS. DAK. P.N. (A-1603)
 - PULL CABLES BY CUSTOMER. LABOR TO

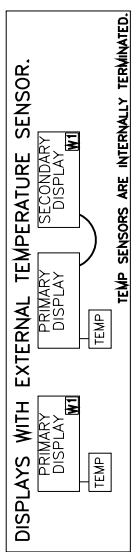
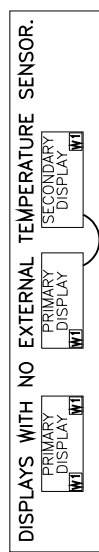
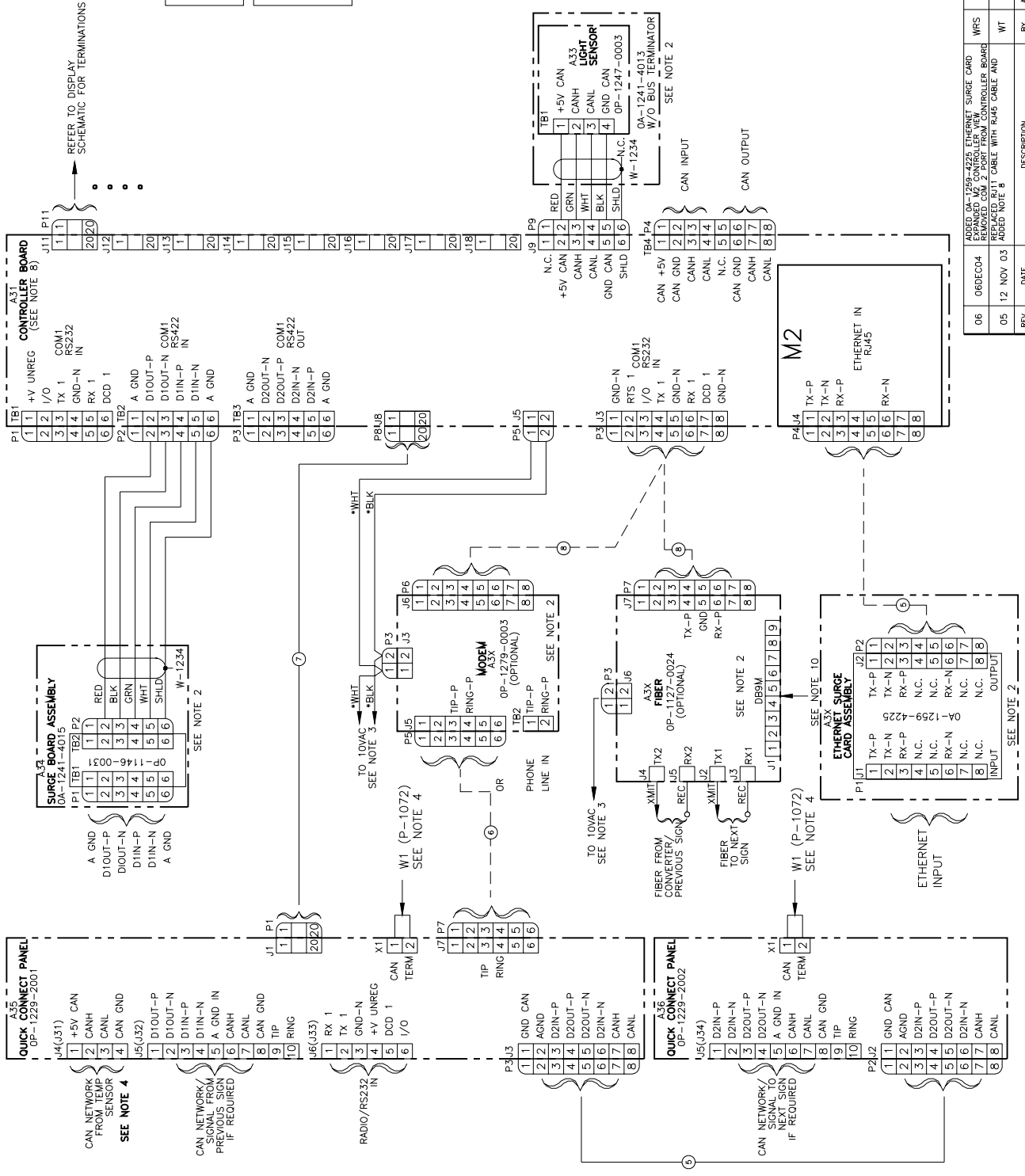
- ALL POWER WIRES BY CUSTOMER. LABOR TO FULL WIRING TO MEET NEC AND LOCAL ELECTRICAL CODES.
- DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NATIONAL ELECTRICAL CODE.
- LAST DISPLAY IN A GROUP REQUIRES A CAN TERMINATION RESISTOR (INSTALLED AT FACTORY). REFER TO THE DISPLAY MANUAL FOR CAN TERMINATOR LOCATION.
- BELLOW ONLY APPLIES TO AF-3165 (TYPE 1)*** TERMINATOR PLUG (DAK P.N. OA-1241-4010) MUST BE INSTALLED ON LAST DISPLAY IN EACH GROUP.
- A31 = DISPLAY CONTROLLER
- A41 = POWER TERMINATION PANEL
- SERVER AND CLIENT(S) MUST BE SET TO SAME CHANNEL VIA SOFTWARE OR ON-BOARD SWITCHES. ALL CLIENT DISPLAYS MUST HAVE A UNIQUE ADDRESS. TOTAL SYSTEM CANNOT EXCEED 240 DISPLAYS.
- IN AREAS USING MULTIPLE SERVER/CLIENT SYSTEMS WITHIN CLOSE PROXIMITY OF EACH OTHER, ALTERNATE CHANNELS MUST BE USED, TO AVOID INTERFERENCE BETWEEN SYSTEMS.
- CABLE TO BE IN CONDUIT WHERE EXPOSED TO OUTDOOR ELEMENTS.

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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: OUTDOOR LED PRODUCT LINE			
TITLE: SYSTEM RISER DIAGRAM, QC OUTDOOR RADIO, GEN 2			
DES. BY:		DRAWN BY: LKERR	
DATE: 20MAR03			
REVISION	APPR. BY:	1229-R01A-185359	
02	SCALE: NONE		

REV.	DATE	DESCRIPTION	BY	APPR.
02	26DEC03	CHANGED TEMP SENSOR PART NUMBER FROM OA-1241-4017 TO OA-1151-0005.	DJM	
01	25JUN03	REVISED NOTE 2 FROM W-1210 22 AWG TO W-1370 18 AWG. ADDED MAX LENGTH OF W-1370 TO 1000'.	KAP	

- NOTES:
- 1) ALL WIRE IS #22 AWG EXCEPT * IS #18 AWG UNLESS OTHERWISE NOTED.
 - 2) THE LIGHT SENSOR, SURGE BOARD, MODEM, FIBER CARD, AND WIRING ARE LOCATED IN THE PRIMARY DISPLAY ONLY. NOTE, ONLY ONE COMMUNICATION METHOD CAN BE USED AT ONE TIME.
 - 3) REFER TO DISPLAY SCHEMATIC FOR COMPLETE DISPLAY WIRING. MODEM AND FIBER ARE OPTIONAL.
 - 4) REFER TO BELOW DIAGRAMS FOR W1 JUMPER LOADING DETAIL. THE CAN LINE MUST BE TERMINATED AT BOTH ENDS OF THE DISPLAY NETWORK. NOT ALL POSSIBILITIES ARE SHOWN.

REFER TO DISPLAY SCHEMATIC FOR TERMINATIONS



- TEMP SENSORS ARE INTERNALLY TERMINATED.
- 6) CAT 5 PATCH CABLE (RJ45 CABLE, 8 PIN 1 TO 1)
 - 24 AWG, DAK P.N. (W-1506)
 - RJ11 CABLE, 6 COND, 26 AWG, FLAT; PINNED 1 TO 1.
 - 20 PIN TO 1 RIBBON CABLE, (.05 CENTER TO CENTER) (REFER TO CHART 1 FOR FUNCTIONS)

CHART 1

PIN#	FUNCTION	PIN#	FUNCTION
1	D1N-P	A	I/O
2	D1N-N	B	D1OUT-P
3	+V UNREG	C	D1OUT-N
4	GND	D	D2OUT-N
5	GND COM1	E	D2OUT-P
6	D2OUT-N	F	D2IN-N
7	D2OUT-P	G	D2IN-P
8	RX COM1	H	AGND
9	DCD COM1	I	+5V CAN
10	CANL	J	GND CAN
		K	
		L	
		M	
		N	
		O	
		P	
		Q	
		R	
		S	
		T	
		U	
		V	
		W	
		X	
		Y	
		Z	

- 8) RJ45 CABLE, 8 COND, M-M, ST PINNING, 18 INCH DAK P.N. (0A-1229-0054)
- PART NUMBER IS 0A-1229-0005 FOR AF-31XX DISPLAYS, EXCEPT FOR AF-3190 & AF-3197, PART NUMBER IS 0A-1229-0005.
- IF FIBER CARD IS BELOW REVISION 10, PC ADAPTOR (0A-1146-0029) IS REQUIRED TO CONNECT RJ11 CABLE FROM A31 J3 TO J1 OF FIBER CARD.

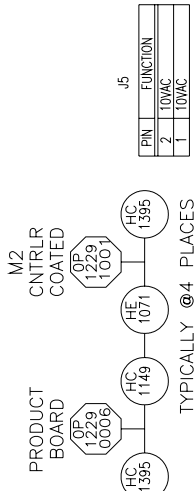
Q4	080CT03	ADDED NOTE ABOUT CONTROLLER PART CHANGING WITH A-3190 & A-3197 DISPLAYS.	DIM
03	09SEP03	ADDED DETAIL A37 WAS ADDED ON REVISION 10. THIS PART NUMBER IS REQUIRED FOR CONNECTION TO CONTROLLER. <th>DIM</th>	DIM
02	10JULY03	REPLACED FACE A AND B NOTES WITH PRIMARY AND SECONDARY DISPLAY NOTES <th>WRT</th>	WRT
01	28JAN03	ADDED CAN TERMINATION JUMPER AND REVISED NOTE # 4 TO REFLECT THE CHANGE. <th>DIM</th>	DIM

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PROJ: GALAXY, LOUVERED, V1500
 TITLE: SCHEM, SIG WIRING, INTERNAL, W/QUICK CONNECT PCB
 DES. BY: PGLK
 DRAWN BY: LKERR
 DATE: 30OCT02

REVISION: 06
 SCALE: NONE
 1229-R03B-177662

REV.	DATE	DESCRIPTION	BY	APPR.
06	06DEC04	ADDED 0A-1299-0225 ETHERNET SURGE CARD EXPANDED M2 CONTROLLER VIEW. CONTROLLED BOARD REVISION 10. REVISION 10. REVISION 10.	WFS	DJM
05	12 NOV 03	ADDED RJ11 CABLE WITH RJ45 CABLE AND REVISION 8	WT	



ASSY #
SERIAL #
DATE: REV X
TESTED BY
DATE

J3

FUNCTION	PIN	PIN	FUNCTION
TD01	1	2	N.C.
TD11	3	4	TRST1
N.C.	5	6	+3.3V
TCK1	7	8	N.C.
TMS1	9	10	N.C.
\HALT	11	12	N.C.
N.C.	13	14	KEYING PIN
N.C.	15	16	GND

J1

FUNCTION	PIN	PIN	FUNCTION
TCK	1	2	GND
TD0	3	4	+3.3V
TMS	5	6	N.C.
N.C.	7	8	N.C.
TD1	9	10	GND

J8

FUNCTION	PIN	PIN	FUNCTION
D1IN-P	1	A	I/O_00
D1IN-N	2	B	D1OUT-P
+V_UNREG	3	C	D1OUT-N
TX_COM1	4	D	AGND_IN
GND	5	E	D2_OUT-N
D2OUT-P	6	F	D2IN-P
RX_COM1	7	H	D2IN-N
DCD_COM1	8	J	AGND
CANH	9	K	+5V_CAN
CANL	10	L	GND_CAN

J5

PIN	FUNCTION
1	GND
2	RIS
3	I/O
4	TX
5	GND
6	RX
7	DCD
8	GND

TB1

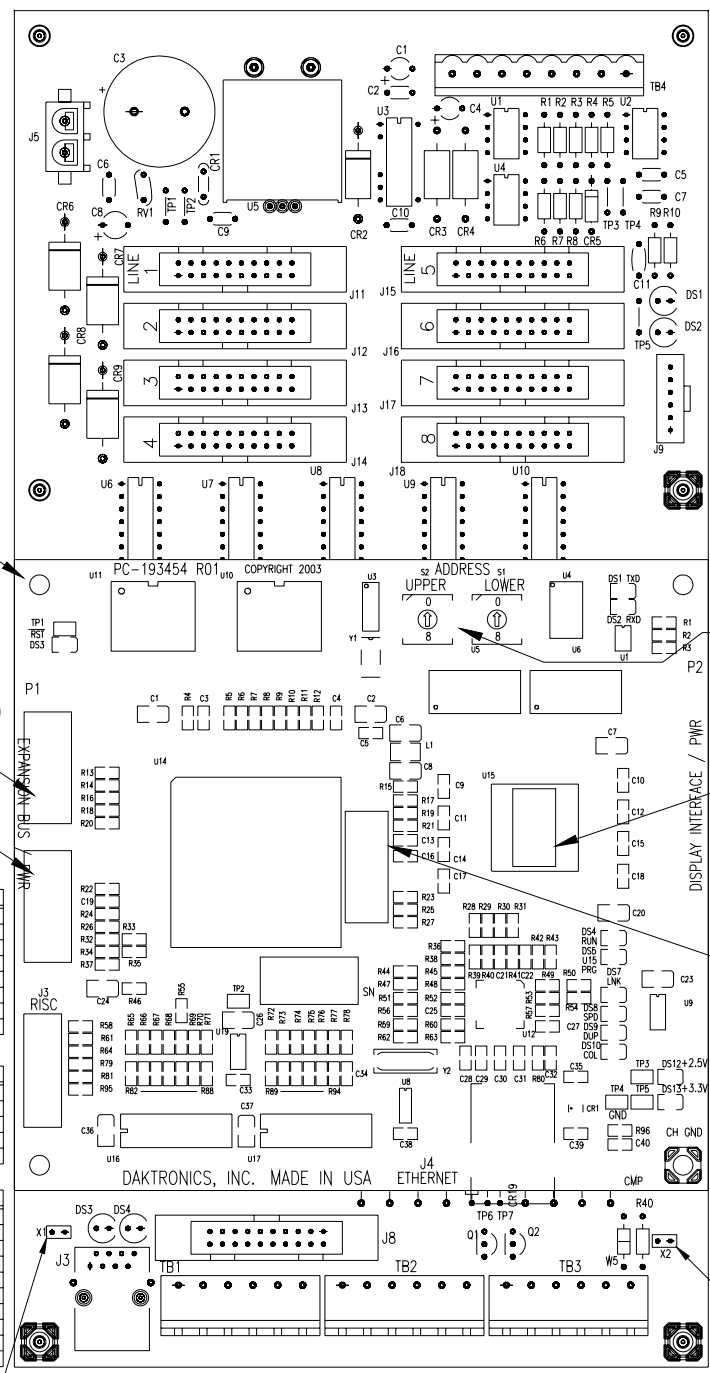
PIN	FUNCTION
1	RIS
2	GND
3	TX
4	GND
5	RX
6	DCD

TB2

PIN	FUNCTION
1	N.C.
2	OUT+
3	OUT-
4	IN+
5	IN-
6	N.C.

TB3

PIN	FUNCTION
1	AGND
2	OUT+
3	OUT+
4	IN-
5	IN+
6	AGND



TB4

PIN	FUNCTION
5	CANL
7	CANH
6	CAN_GND
3	RELAY
4	CANL
2	CANL
1	CANL+5V

J9

PIN	FUNCTION
1	LIGHT-P
2	LIGHT-N
4	CHD-N
5	SHIELD-N
6	N.C.

UPPER / LOWER ADDRESS SWITCHES

DISPLAY INTERFACE / PWM

FIRMWARE REVISION DATE

J4

PIN	FUNCTION
1	TX+
2	TX-
3	RX+
4	CHGND
5	CHGND
6	RX-
7	CHGND
8	CHGND

INSTALL JUMPER FOR RESET USE.

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PROJ: CNTRLR, GALAXY, B CONN, J1087
 DES. BY: WATLOR
 DATE: 04 NOV 02

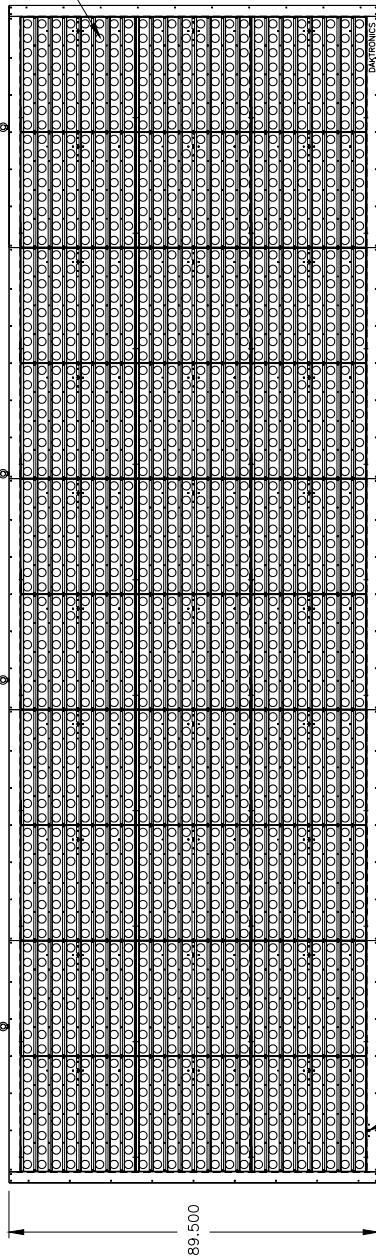
REVISION 03
 SCALE: 1=1

DAKTRONICS, INC. BROOKINGS, SD 57006

REV.	DATE	DESCRIPTION	BY	APPR.
03	14 APR 04	OP-1229-0004 TO OP-1229-1001 M2 CONTROLLER, GEN II.	MER	
02	23 FEB 04	ADDED HC-1149 WASHER TO STANDOFF FOR M2 TYP. @4	WT	
01	09 JUL 03	CORRECT REF. TABLE FOR TB4	WT	

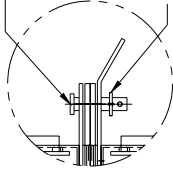
1229-R10B-177838

USE ALL LIFT EYES PROVIDED

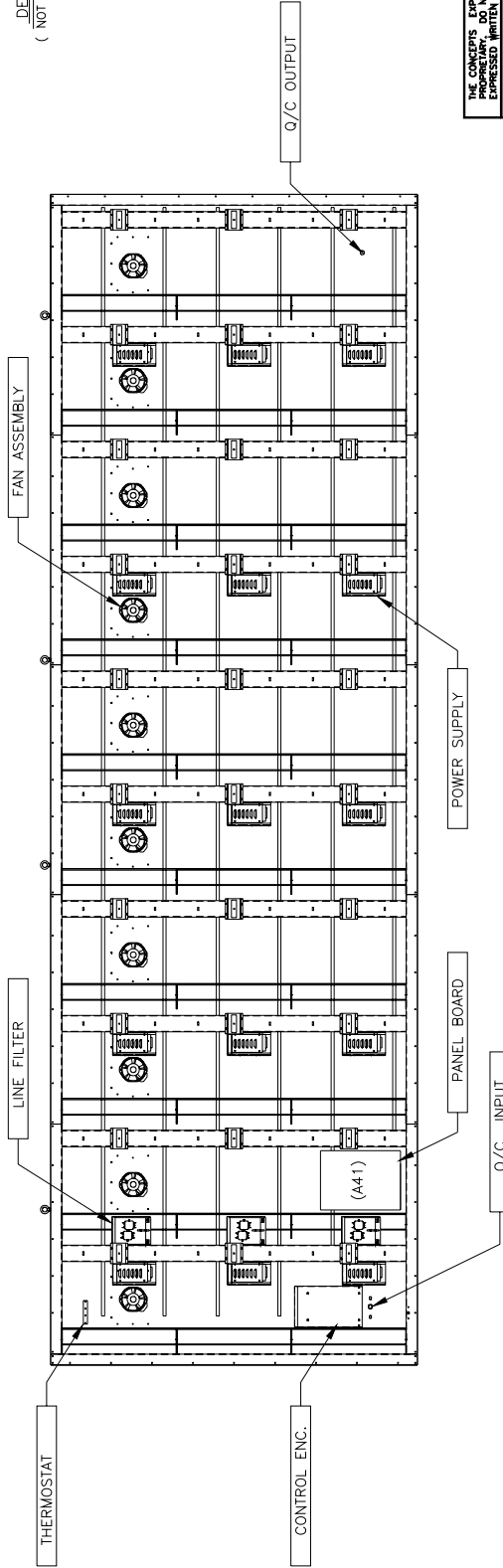


FRONT VIEW
(SHOWN WITH MODULE PANELS)

ADJUSTABLE GRIP
CLEVIS PIN
HS-1439
(QTY 36)



DETAIL: A
(NOT TO SCALE)



FRONT VIEW
(SHOWN WITHOUT MODULE PANELS)

THE CONTRACTOR HAS EXPRESSED AND SHALL REMAIN ON THE RECORDS THE CONTRACTOR'S AGREEMENT AND
 PROPERLY TO NOT BE USED FOR ANY OTHER PROJECT WITHOUT THE WRITTEN CONSENT OF DAKTRONICS, INC.
 EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC.

DAKTRONICS, INC. BROOKINGS, SD 57006

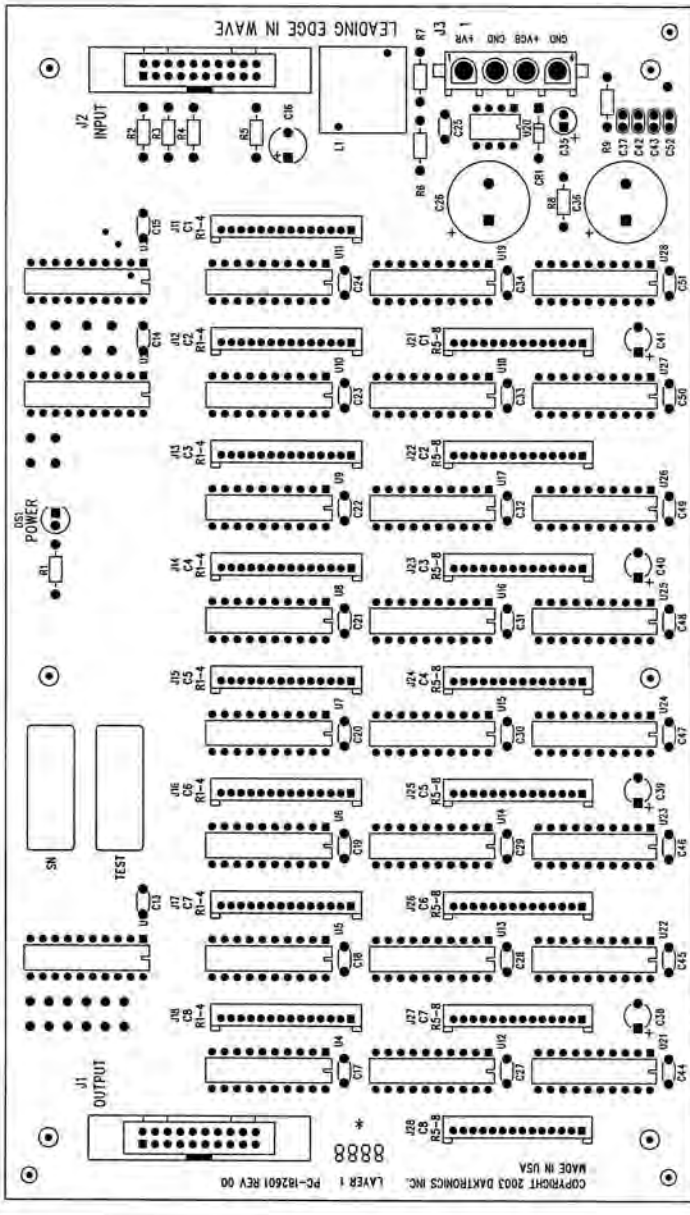
PROJ: AF-3190 GALAXY LARGE CHARACTER
 TITLE: COMPONENT LAYOUT, AF-3190-***x**-89MM
 DES. BY: JMT DRAWN BY: JMT DATE: 15 JAN 03

REVISION

REV.	DATE	DESCRIPTION	BY	APPR.
1	30			

SCALE: 1=30

1259-E10B-181666



REFERENCE NUMBER	DESCRIPTION	PART NO.	QUAN.	INSERT
C13-15,17-25,27-34,44-51	CAP: 0.01uF, 100V	C-1010	28	RADIAL
C16	CAP: 100uF, 10V	C-101	1	RADIAL
C17	CAP: 100uF, 10V	C-101	1	RADIAL
C26,36	CAP: 100nF, 50V	C-1012	2	HAND
C35	CAP: 1uF, 35V	C-1013	1	HAND
C37,42,43,52	CAP: 0.001uF, 100V	C-1031	4	RADIAL
C38-41	CAP: 33uF, 10V	C-1052	4	RADIAL
CR1	DIODE: SCHOTTKY, 5A, 30V	CR-1043	1	AXIAL
DS1	LED: RED	DS-1455	1	RADIAL
J1,2	JACK: 20 PIN MALE, 1" X 1"	J-1087	2	HAND
J3	JACK: 4 PIN M-N-LOK, FEM	J-1072	1	HAND
J11-18,21-28	JACK: 14 PIN MALE, .075 C-C	J-1312	16	HAND
L1	INDUCTOR: 300uH, 1.0A	L-1011	1	HAND
PCI	DRV, LARGE PIXEL 8x8,RGB,1087	PC-102E01	1	-
R1	RES: 880 OHM, 1/4W	R-1200	1	AXIAL
R2-5,9	RES: 10K, 1/4W	R-1032	5	AXIAL
R6	RES: 3.65K, 1/4W, 1%	R-1270	1	AXIAL
R7	RES: 1.89K, 1/4W, 1%	R-1241	1	AXIAL
R8	RES: 1.7K, 1/4W	R-1148	1	AXIAL
U1-3	IC: 74HC245	U-1195	3	DIP
U4-19,21-28	IC: TPC6595	U-1466	24	DIP
U70	IC: LM2674, REG. ADJ., 5A	U-1807	1	DIP

J3 POWER

1	+VCC RED
2	GND
3	+VCC GRN/BLU
4	GND

REFERENCE NUMBERS USED

C1-52
CR1
DS1
J1-3,11-18,21-28
L1
R1-9
U1-20
U70

REFERENCE NUMBERS NOT LOADED

C1-2
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
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C89
C90
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C92
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C94
C95
C96
C97
C98
C99
C100

J2 INPUT

FUNCTION	PIN	FUNCTION	PIN	FUNCTION
N.C.	1	A	RED IN-P	
N.C.	2	B	GRN IN-P	
N.C.	3	C	LATCH OUT-P	
N.C.	4	D	BLU IN-P	
N.C.	5	E	BLU OUT-P	
N.C.	6	F	RED2 OUT-P	
N.C.	7	H	CLK IN-P	
N.C.	8	J	GRN2 OUT-P	
N.C.	9	K	BLU2 OUT-P	
N.C.	10	L	N.C.	

J1 OUTPUT

FUNCTION	PIN	FUNCTION	PIN	FUNCTION
ID0	1	A	RED IN-P	
ID1	2	B	GRN IN-P	
GND	3	C	LATCH IN-P	
GND	4	D	BLU IN-P	
GND	5	E	BLU IN-P	
N.C.	6	F	RED2 IN-P	
GND	7	H	CLK IN-P	
GND	8	J	GRN2 IN-P	
ID2	9	K	BLU2 IN-P	
ID3	10	L	N.C.	

COL 8	COL 7	COL 6	COL 5	COL 4	COL 3	COL 2	COL 1
J18	J17	J16	J15	J14	J13	J12	J11
14 +VCC-R	14 +VCC-R	14 +VCC-R	14 +VCC-R	14 +VCC-R	14 +VCC-R	14 +VCC-R	14 +VCC-R
13 +VCC-G/B	13 +VCC-G/B	13 +VCC-G/B	13 +VCC-G/B	13 +VCC-G/B	13 +VCC-G/B	13 +VCC-G/B	13 +VCC-G/B
12 R6C8	12 R6C7	12 R6C6	12 R6C5	12 R6C4	12 R6C3	12 R6C2	12 R6C1
11 R6C8	11 R6C7	11 R6C6	11 R6C5	11 R6C4	11 R6C3	11 R6C2	11 R6C1
10 R8C8	10 R8C7	10 R8C6	10 R8C5	10 R8C4	10 R8C3	10 R8C2	10 R8C1
9 R7C8	9 R7C7	9 R7C6	9 R7C5	9 R7C4	9 R7C3	9 R7C2	9 R7C1
8 R7C8	8 R7C7	8 R7C6	8 R7C5	8 R7C4	8 R7C3	8 R7C2	8 R7C1
7 R7C8	7 R7C7	7 R7C6	7 R7C5	7 R7C4	7 R7C3	7 R7C2	7 R7C1
6 R6C8	6 R6C7	6 R6C6	6 R6C5	6 R6C4	6 R6C3	6 R6C2	6 R6C1
5 R6C8	5 R6C7	5 R6C6	5 R6C5	5 R6C4	5 R6C3	5 R6C2	5 R6C1
4 R6C8	4 R6C7	4 R6C6	4 R6C5	4 R6C4	4 R6C3	4 R6C2	4 R6C1
3 R5C8	3 R5C7	3 R5C6	3 R5C5	3 R5C4	3 R5C3	3 R5C2	3 R5C1
2 R5C8	2 R5C7	2 R5C6	2 R5C5	2 R5C4	2 R5C3	2 R5C2	2 R5C1
1 R5C8	1 R5C7	1 R5C6	1 R5C5	1 R5C4	1 R5C3	1 R5C2	1 R5C1

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DAKTRONICS, INC. BROOKINGS, SD 57006 SHEET 1 OF 1

PROJ: ASST OPTICS 09-1201-0011

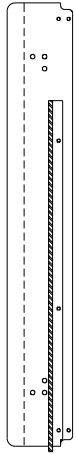
TITLE: LAY; DRV; LARGE PIXEL, 8x8, RGB, 1087

DES. BY: P. CLIK DRAWN BY: M. RICHARDSON DATE: 11 FEB 03

APP. BY: SCALE: 1=1

1261 - R04B - 182600

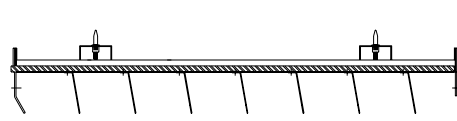
REV.	DATE	DESCRIPTION	APPR.
02	26 SEP 03	U1-3 PIN 15-NOT TESTED AT 15 VDC	MER
01	30 JUN 03	U1-3 FROM 1087 TO 1087A 40 TO U-1807	MER



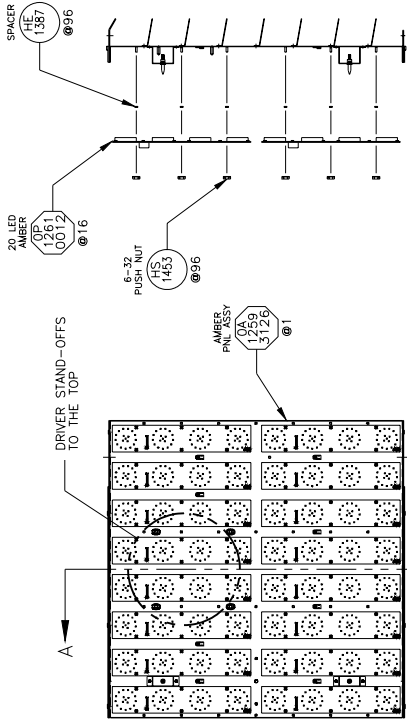
TOP VIEW
(NOT TO SCALE)

APPLY WEATHER STRIPPING
(HS-1149) TO THE OUTSIDE EDGE
OF FACE PANEL AS SHOWN.

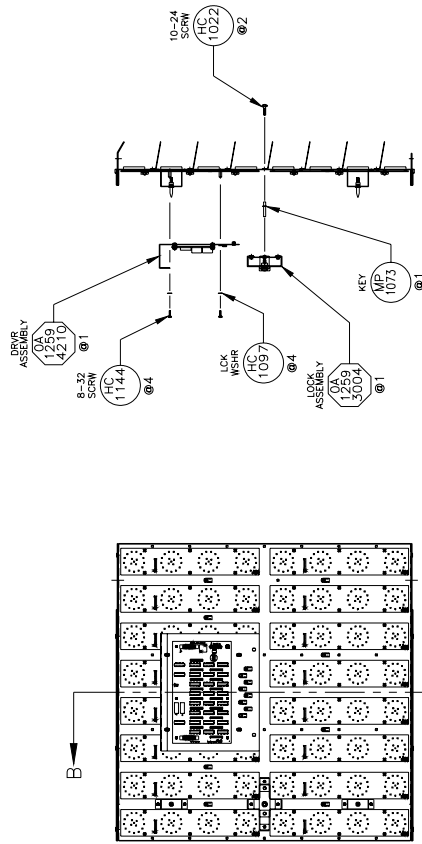
TOP AND LEFT (REAR VIEW) SIDE ONLY.



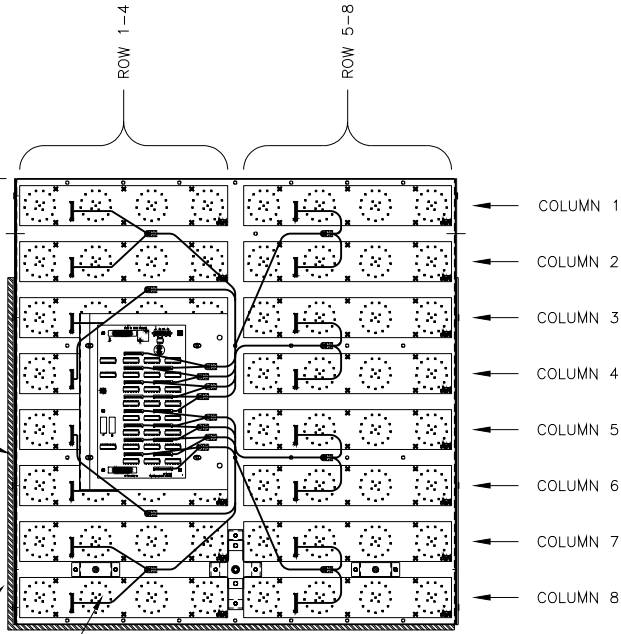
LEFT SIDE
(NOT TO SCALE)



SECTION: A-A
(SCALE 1=1)



SECTION: B-B
(SCALE 1=1)



REAR VIEW
(NOT TO SCALE)

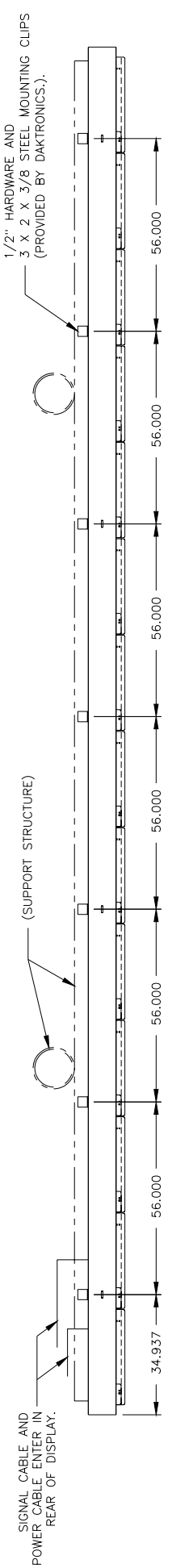
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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: AF-3190 GALAXY, LARGE CHARACTER
TITLE: MODULE PANEL, AF-3197-8X8-89MM-RGB
DES. BY: JMT
APP. BY: JMT
REASON: 01
DATE: 6 FEB 03
DRAWN BY: JMT

REV.	DATE	DESCRIPTION	BY	APPR.
01	30 SEP 03	REPLACED #10 NUT (HC-1083) WITH SPACER (HE-1387) @96.	JMT	JMT

SCALE: 1 = 12
1259-E10B-182812

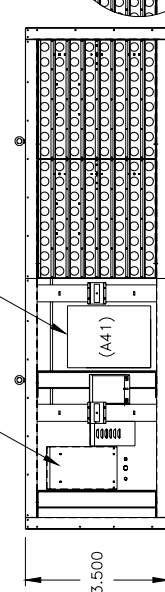


TOP VIEW

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

DISPLAY CONTROLLER MOUNTED INSIDE OF DISPLAY. ACCESS THROUGH MODULE OPENING

LOAD CENTER LOCATED INSIDE OF DISPLAY. ACCESS THROUGH MODULE OPENING



- 8x32-89MM 117.500" ESTIMATED WEIGHT: 220 LBS
- 8x48-89MM 173.500" ESTIMATED WEIGHT: 350 LBS.
- 8x64-89MM 229.500" ESTIMATED WEIGHT: 450 LBS.
- 8x80-89MM 285.500" ESTIMATED WEIGHT: 550 LBS.
- 8x96-89MM 341.500" ESTIMATED WEIGHT: 650 LBS.
- 8x112-89MM 397.500" ESTIMATED WEIGHT: 750 LBS.

FRONT VIEW

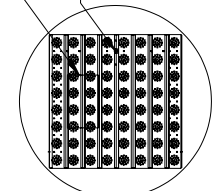
- NOTES:
- 1) ALL DIMENSIONS ARE GIVEN IN INCHES
 - 2) DISPLAY IS OF ALL ALUMINUM CONSTRUCTION WITH STEEL MOUNTING CLIP ANGLES / HARDWARE.
 - 3) DISPLAY IS PAINTED FLAT BLACK
 - 4) SERVICE ACCESS FOR ALL DRIVERS AND ELECTRONICS IS FROM THE FRONT.
 - 5) LIFT EYES WILL BE PROVIDED IN EACH SECTION FOR INSTALLATION 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.

1/2" HARDWARE AND 3 X 2 X 3/8 STEEL MOUNTING CLIPS (PROVIDED BY DAKTRONICS, INC.)

(3.00" MINIMUM)

DRIVER ATTACHED TO REAR OF EACH 8 X 8 MODULE PANEL

FRONT ACCESS FOR SERVICING: (7/32 NUT DRIVER REQUIRED)



SPACING BETWEEN MOUNTING CLIPS

23.000

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.

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: AF-3197 GALAXY LARGE CHARACTER

TITLE: SHOP DRAWING, AF-3197-BX** -89MM-RGB

DES. BY: JMT DRAWN BY: RYOSS

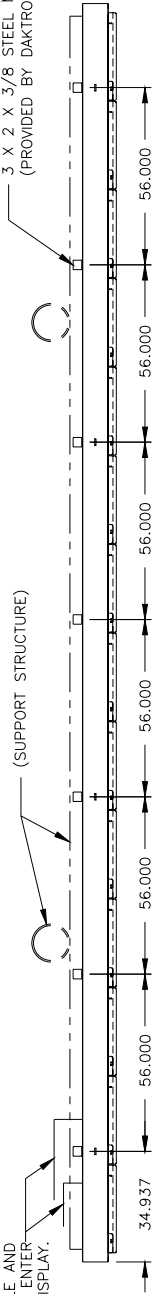
APPR. BY: [] DATE: 26 FEB 03

REVISION SCALE: 1 = 30

1259-E10B-183982

REV.	DATE	BY	APPR.	DESCRIPTION

1/2" HARDWARE AND
3 X 2 X 3/8 STEEL MOUNTING CLIPS
(PROVIDED BY DAKTRONICS.)



TOP VIEW

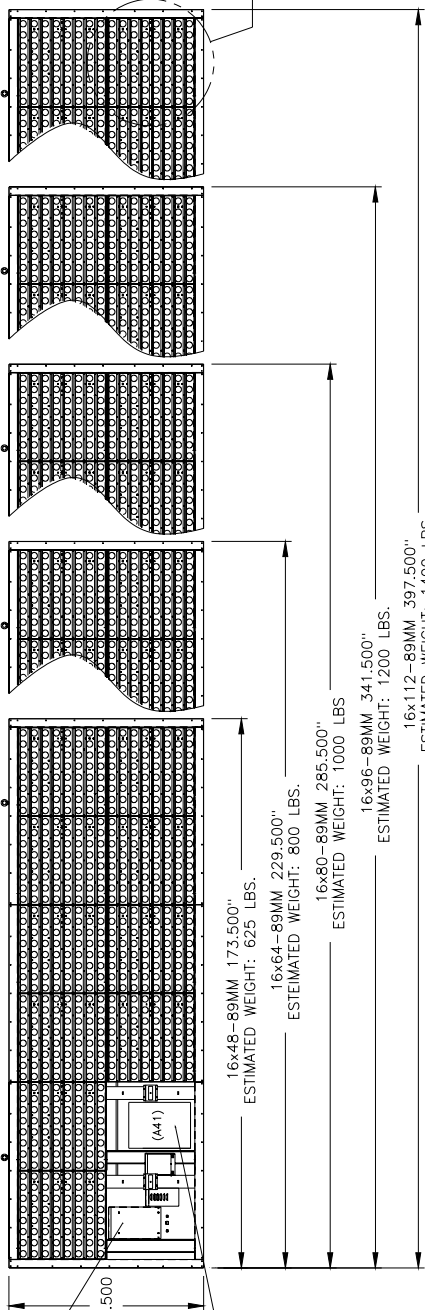
ALL SUPPORT STRUCTURE SHOWN
IS FOR CONCEPT ONLY. SUPPORT
STRUCTURE TO BE ENGINEERED
AND BUILT BY OTHERS.

(SUPPORT STRUCTURE)

SIGNAL CABLE AND
POWER CABLE ENTER
REAR OF DISPLAY.

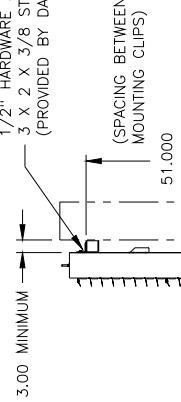
DISPLAY CONTROLLER MOUNTED
INSIDE OF DISPLAY. ACCESS
THROUGH MODULE OPENING

LOAD CENTER LOCATED
INSIDE OF DISPLAY. ACCESS
THROUGH MODULE OPENING



FRONT VIEW

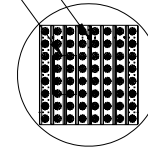
1/2" HARDWARE AND
3 X 2 X 3/8 STEEL MOUNTING CLIPS
(PROVIDED BY DAKTRONICS.)



SIDE VIEW

MINIMUMS SHOWN ARE
FOR VENTILATION REQUIREMENTS.

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



DETAIL: A
(8 X 8 MODULE PANEL)

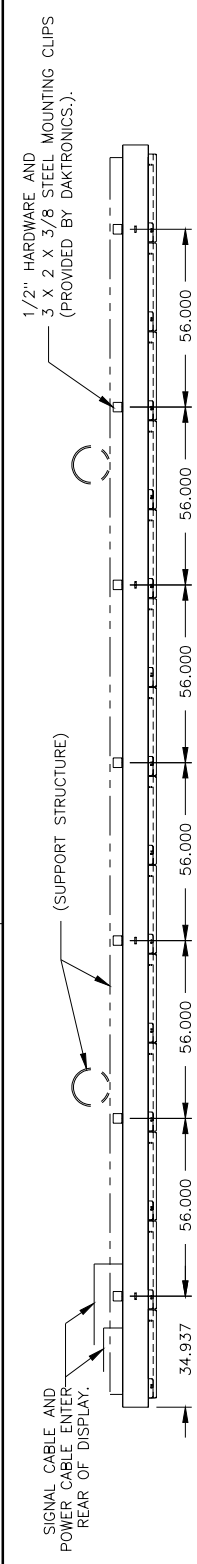
NOTE:
ALL SUPPORT STRUCTURE SHOWN IS
FOR CONCEPT ONLY. SUPPORT
STRUCTURE TO BE ENGINEERED AND
BUILT BY OTHERS.

NOTES:

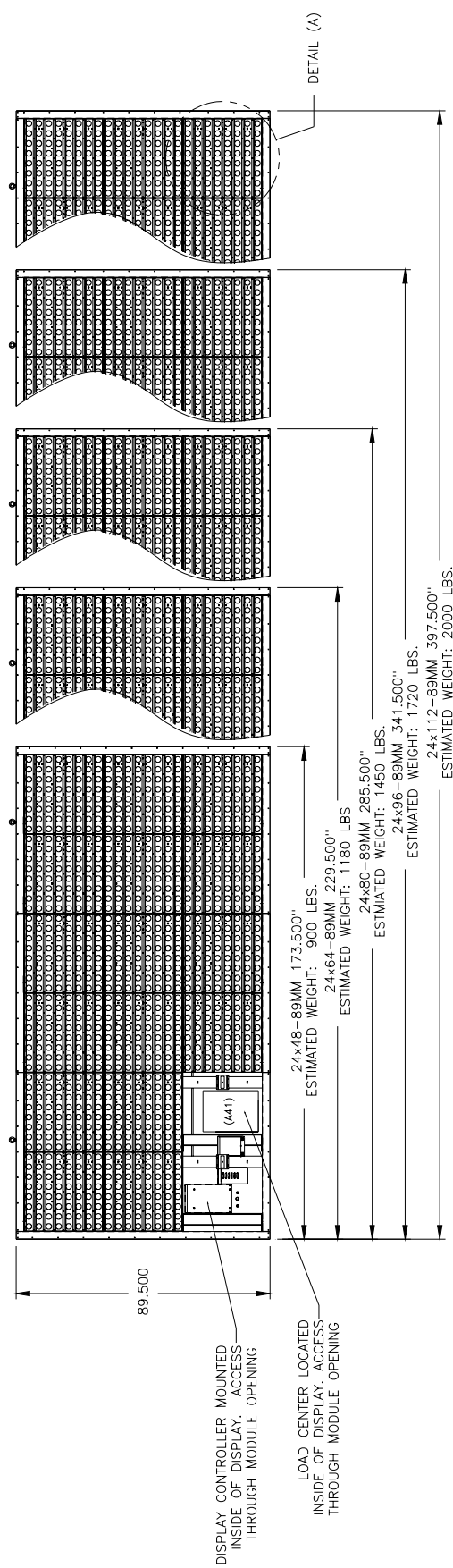
- 1) ALL DIMENSIONS ARE GIVEN IN INCHES
- 2) DISPLAY IS OF ALL ALUMINUM CONSTRUCTION WITH STEEL MOUNTING CLIP ANGLES / HARDWARE.
- 3) DISPLAY IS PAINTED FLAT BLACK
- 4) SERVICE ACCESS FOR ALL DRIVERS AND ELECTRONICS IS FROM THE FRONT.
- 5) LIFT EYES WILL BE PROVIDED IN EACH SECTION FOR INSTALLATION PURPOSES.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

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DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ: AF-3197 GALAXY, LARGE CHARACTER	DATE: 26 FEB 03
TITLE: SHOP DRAWING, AF-3197-16X**-89MM-RGB	
DES. BY: JMT	DRAWN BY: RYOSS
APPR. BY:	SCALE: 1 = 40
REVISION	1259-E10B-183983

REV.	DATE	DESCRIPTION	BY	APPR.



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



NOTES:

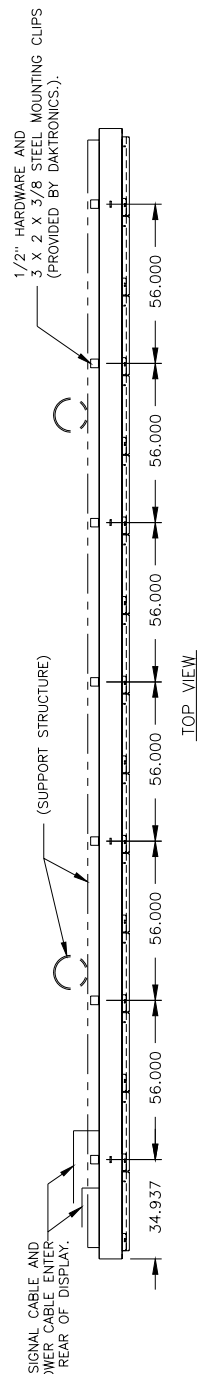
- 1) ALL DIMENSIONS ARE GIVEN IN INCHES
- 2) DISPLAY IS OF ALL ALUMINUM CONSTRUCTION WITH STEEL MOUNTING CLIP ANGLES / HARDWARE.
- 3) DISPLAY IS PAINTED FLAT BLACK
- 4) SERVICE ACCESS FOR ALL DRIVERS AND ELECTRONICS IS FROM THE FRONT.
- 5) LIFT INSTALS WILL BE PROVIDED IN EACH SECTION FOR INSTALLATION 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.



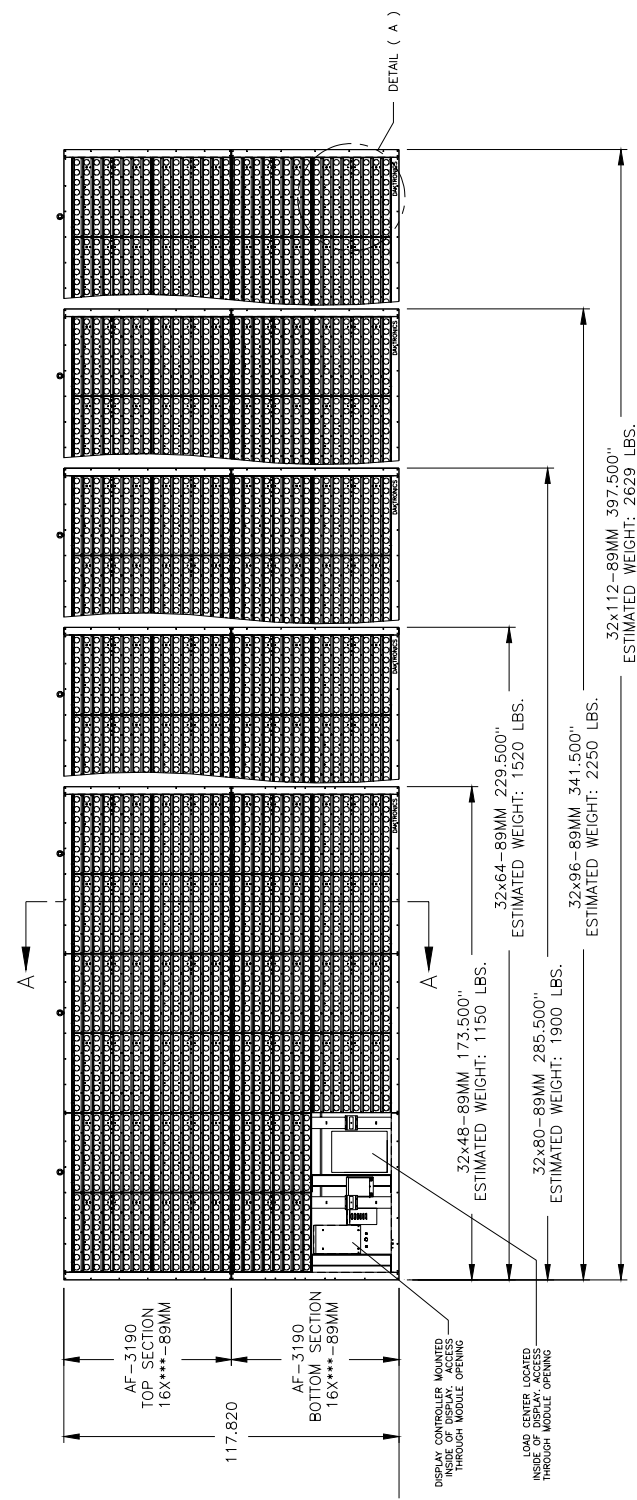
NOTE:
ALL SUPPORT STRUCTURE SHOWN IS FOR CONCEPT ONLY. SUPPORT STRUCTURE TO BE ENGINEERED AND BUILT BY OTHERS.

THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS, INCLUDING ELECTRONICALLY, WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC.	
DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ: AF-3197 GALAXY LARGE CHARACTER	DATE: 26 FEB 03
TITLE: SHOP DRAWING, AF-3197-24X**--89MM-RCB	APPR. BY: JMT
DES. BY: JMT	DRAWN BY: RYOSS
SCALE: 1 = 40	1259-E10B-183984

REV.	DATE	DESCRIPTION	BY	APPR.

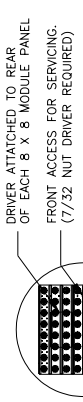


ALL SUPPORT STRUCTURE SHOWN IS FOR CONCEPT ONLY. SUPPORT STRUCTURE TO BE ENGINEERED AND BUILT BY OTHERS.



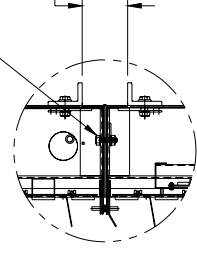
FRONT VIEW

- 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 DISPLAY FOR INSTALLATION PURPOSES. HOLES IN THE TOP OF EACH DISPLAY 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 CONDUIT LOCATION TO SIGNAL ENTRANCE IN BACK OF DISPLAY.
 - 7) POWER CABLE / SIGNAL CABLE, ALL CONDUIT, AND ALL LABOR TO BE PROVIDED BY CUSTOMER'S ELECTRICAL CONTRACTOR.
 - 8) REFER TO RISER DIAGRAM FOR ELECTRICAL SPECIFICATIONS AND SIGNAL HOOK UPS.



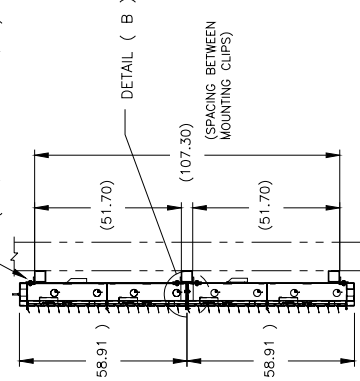
DETAIL: A
(8 X 8 MODULE PANEL)

5/8\"/>



DETAIL: B
(NOT TO SCALE)

1/2\"/>



SECTION: A-A
(1 X SCALE)

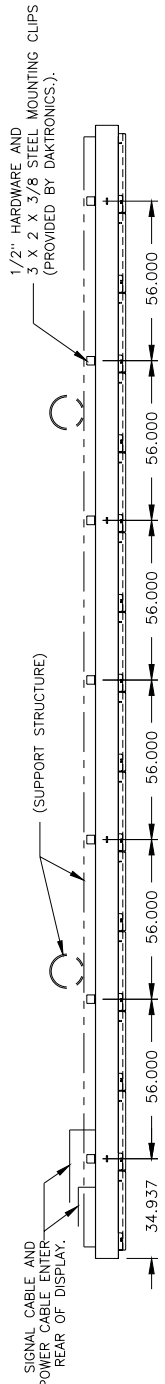
ALL SUPPORT STRUCTURE SHOWN IS FOR CONCEPT ONLY. SUPPORT STRUCTURE TO BE ENGINEERED AND BUILT BY OTHERS.

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DAKTRONICS, INC. BROOKINGS, SD 57006
 PROJ: AF-3197 GALAXY, LARGE CHARACTER
 TITLE: SHOP DRAWING, AF-3197-32*-89MM-RGB
 DES. BY: JMT DRAWN BY: RVOSS DATE: 26 FEB 03
 APPROV. BY: JMT

SCALE: 1 = 45
 1259-E10B-183985

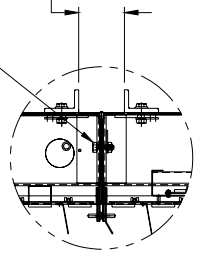
REV.	DATE	DESCRIPTION	BY	APPR.



TOP VIEW

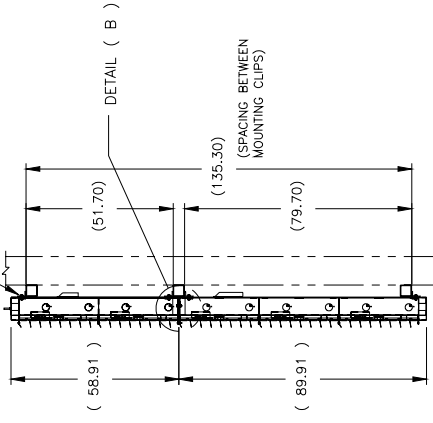
ALL SUPPORT STRUCTURE SHOWN IS FOR CONCEPT ONLY. SUPPORT STRUCTURE TO BE ENGINEERED AND BUILT BY OTHERS.

5/8" GRD 5 INTERCONNECT HARDWARE TO BE INSTALLED BY CUSTOMER DURING INSTALLATION. SILICONE BETWEEN SECTIONS.



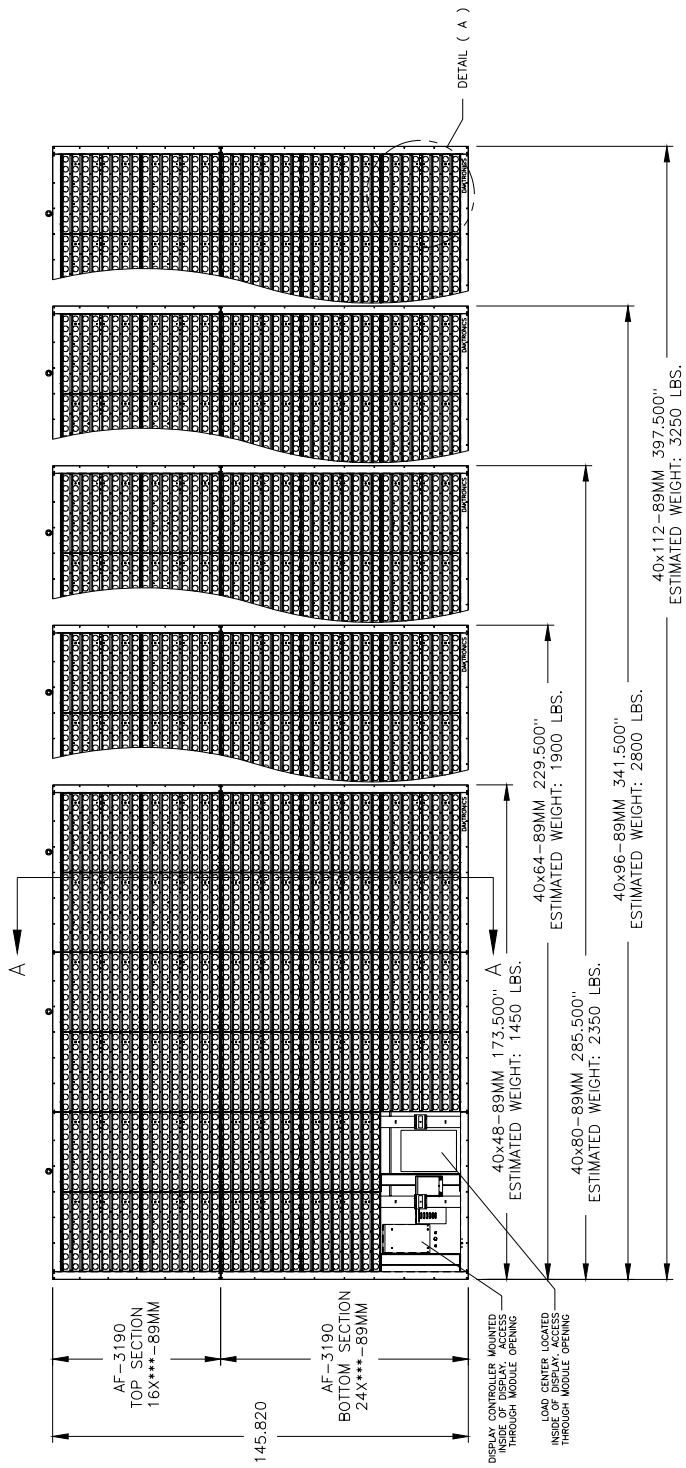
DETAIL: B
(NOT TO SCALE)

1/2" HARDWARE AND 3 X 2 X 3/8 STEEL MOUNTING CLIPS (PROVIDED BY DAKTRONICS.)



SECTION: A-A
(1 X SCALE)

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

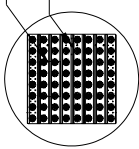


FRONT VIEW

NOTES CONTINUED:

- ALL DIMENSIONS ARE GIVEN IN INCHES
- 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.
- DISPLAY IS PAINTED FLAT BLACK
- SERVICE ACCESS FOR ALL DRIVERS AND ELECTRONICS IS FROM THE FRONT.
- LIFT EYES WILL BE PROVIDED IN EACH DISPLAY FOR INSTALLATION PURPOSES. HOLES IN THE TOP OF EACH DISPLAY MUST BE FILLED AND SEALED TO PREVENT EXCESS WATER FROM ENTERING CABINET.
- POWER CABLE / SIGNAL CABLE, ALL CONDUIT, AND ALL LABOR TO BE PROVIDED BY CUSTOMERS ELECTRICAL CONTRACTOR.
- REFER TO RISER DIAGRAM FOR ELECTRICAL SPECIFICATIONS AND SIGNAL HOOK UPS.

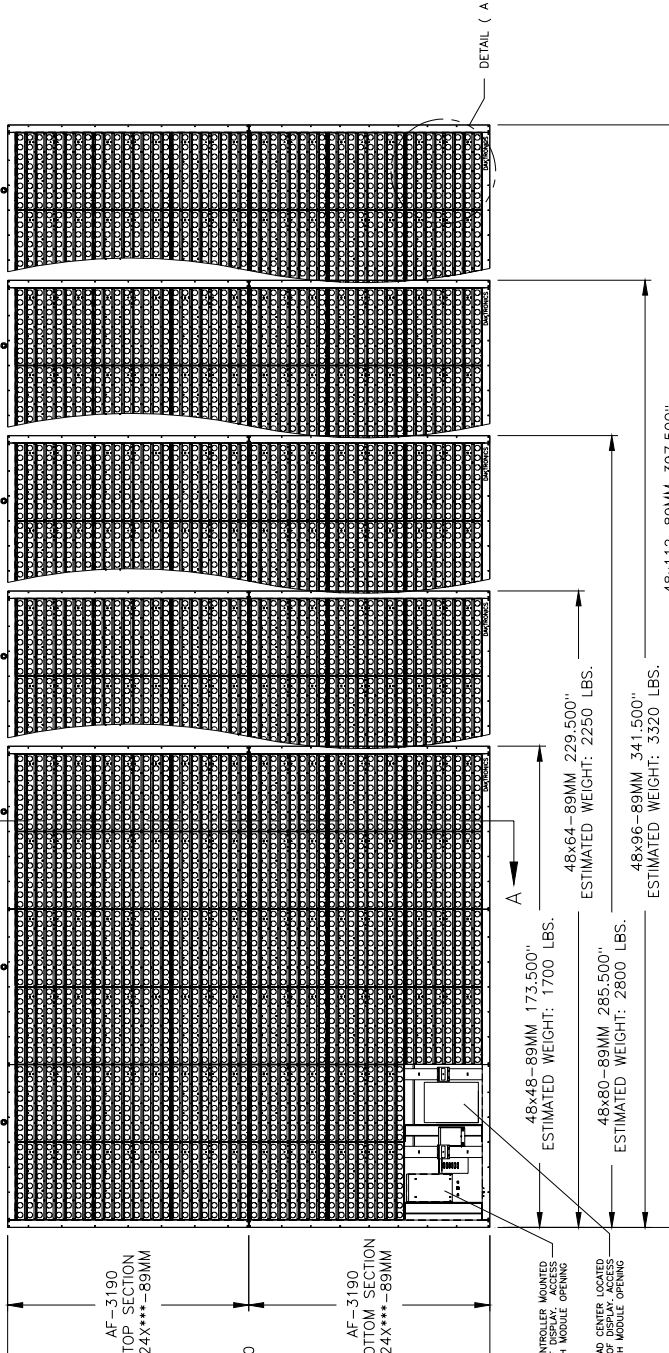
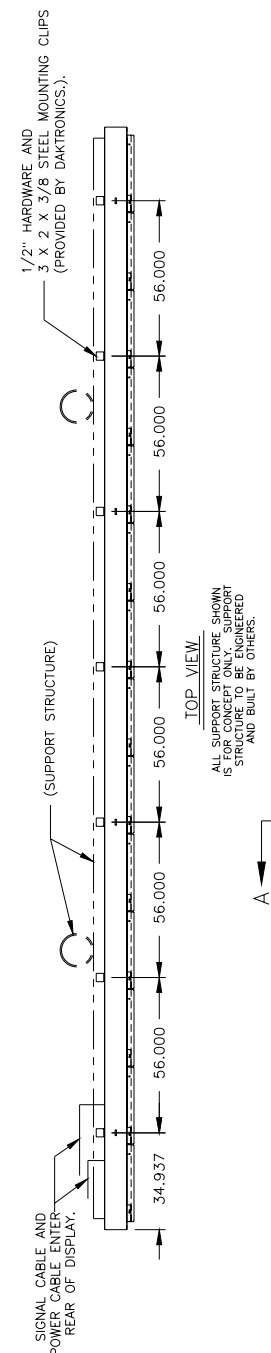
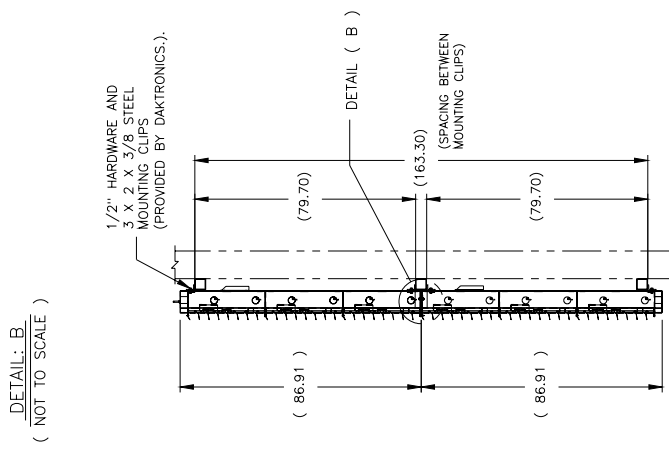
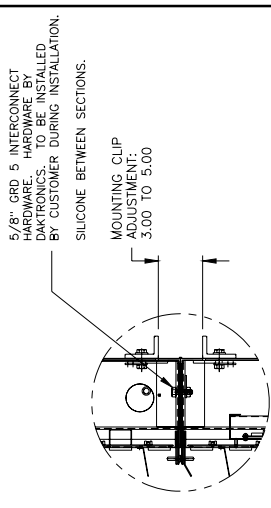
DRIVER ATTACHED TO REAR OF EACH 8 X 8 MODULE PANEL
FRONT ACCESS FOR SERVICING:
(7/32 NUT DRIVER REQUIRED)



DETAIL: A
(8 X 8 MODULE PANEL)

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DAKTRONICS, INC.	BROOKINGS, SD 57006
PROJ: AF-3197 GALAXY LARGE CHARACTER	
TITLE: SHOP DRAWING, AF-3197-40**89MM-RGB	
DES. BY: JMT	DRAWN BY: RYOSS
DATE: 26 FEB 03	
REVISION	APPR. BY: JMT
SCALE: 1 = 45	1259-E10B-183986

REV.	DATE	BY	APPR.	DESCRIPTION



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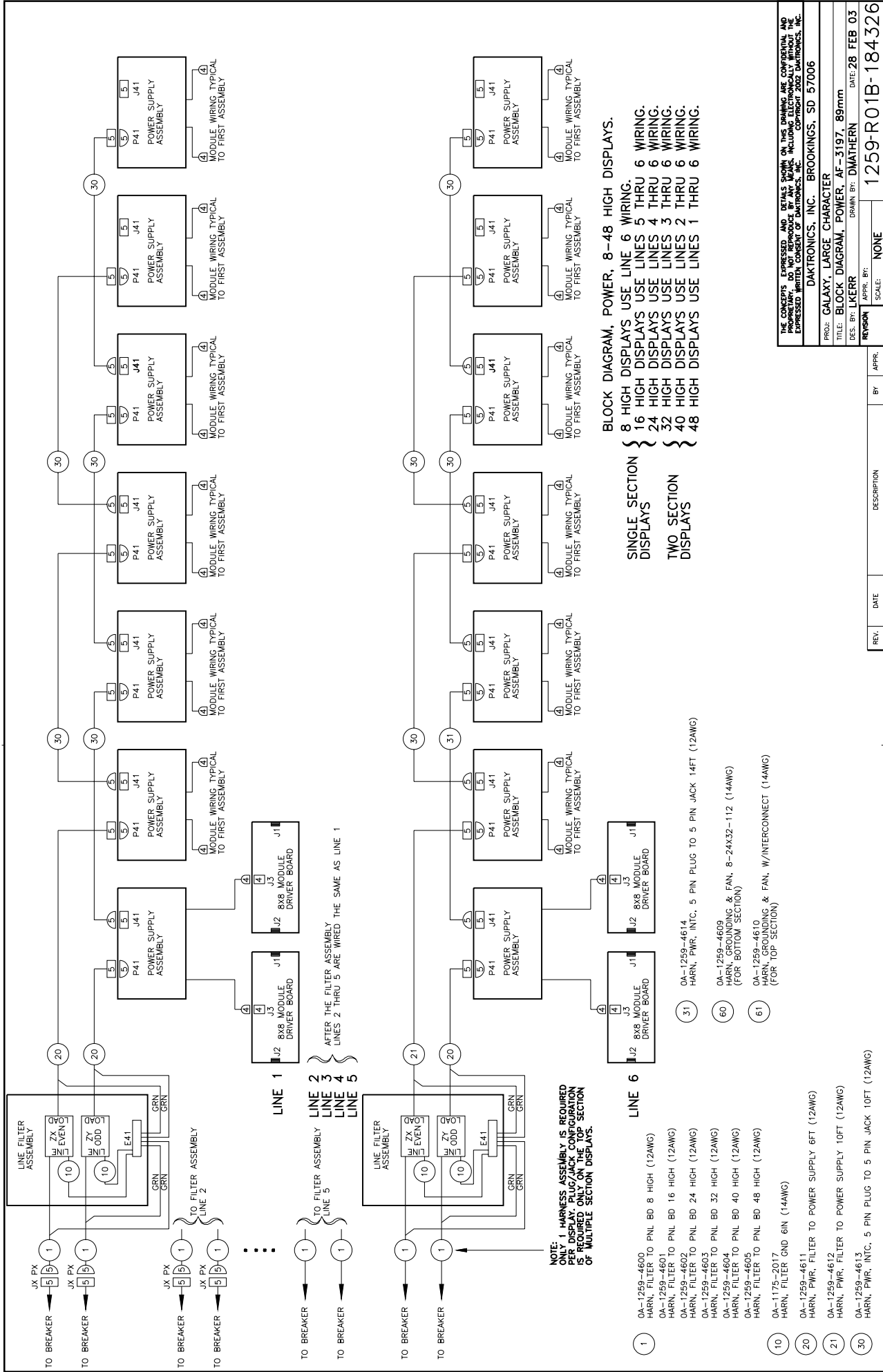
PROJ: AF-3197 GALAXY LARGE CHARACTER
 TITLE: SHOP DRAWING, AF-3197-48**-89MM-RCB
 DES. BY: JMT
 APPR. BY: RYOSS
 DATE: 26 FEB 03
 REVISION SCALE: 1 = 45
 1259-E10B-183987

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 DISPLAY FOR INSTALLATION PURPOSES. HOLES IN THE TOP OF EACH DISPLAY MUST BE FILED AND SCALED TO PREVENT EXCESS MATERIAL FROM ENTERING CABINET.
- 6) DRIVER CONTROLLER AND LOAD CENTERS SUPPLIED BY DAKTRONICS AND MOUNTED INTERNALLY. SIGNAL TO BE RAN IN CONDUIT OR RACEWAY FROM COMPARTER 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 RACK UPS.

NOTES CONTINUED:

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



BLOCK DIAGRAM, POWER, 8-48 HIGH DISPLAYS.

SINGLE SECTION DISPLAYS

- 8 HIGH DISPLAYS USE LINE 6 WIRING.
- 16 HIGH DISPLAYS USE LINES 5 THRU 6 WIRING.
- 24 HIGH DISPLAYS USE LINES 4 THRU 6 WIRING.
- 32 HIGH DISPLAYS USE LINES 3 THRU 6 WIRING.
- 40 HIGH DISPLAYS USE LINES 2 THRU 6 WIRING.
- 48 HIGH DISPLAYS USE LINES 1 THRU 6 WIRING.

TWO SECTION DISPLAYS

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PROJ: GALAXY, LARGE CHARACTER	DATE: 28 FEB 03
TITLE: BLOCK DIAGRAM, POWER, AF-3197, 89mm	DRAWN BY: DMATHERN
DES. BY: LKERR	APPR. BY:
REVISION: NONE	SCALE:
1259-R01B-184326	