



Galaxy[®] Series AF-3155

Display Manual

ED-13908

Rev 2 16 April 2004

Informing
& **Entertaining**
the **World**

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DAKTRONICS, INC.

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Section 1: Introduction

This manual explains the installation, maintenance, and troubleshooting of a Daktronics Galaxy® AF-3155 20 mm louvered RGB LED display. For questions regarding the safety, installation, operation, or service of this system, please refer to the telephone numbers listed on the cover page of this manual.

The manual is divided into 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 cables at the display
- **Maintenance and Troubleshooting** addresses such things as removing basic display components, troubleshooting the display, performing general maintenance, and exchanging display components
- **Appendix A** lists the drawings referenced within this manual
- **Appendix B** includes information on the signal converter
- **Appendix C** includes information on the Optional Temperature Sensor

Daktronics identifies manuals by an ED number located on the cover page of each manual. For example, this manual would be referred to as **ED-13908**.

Listed below are a number of drawing types commonly used by Daktronics, along with the information that each is likely to provide. This manual might not contain all 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
- **Component Placement Diagrams:** Locations of critical internal display components, such as power supply assemblies, controller boards, thermostats, and light detectors

Figure 1 illustrates the Daktronics drawing label. The drawing number is located in the lower-right corner of the drawing. Listing the last set of digits and the letter preceding them identifies drawings in the manual. In the example below, the drawing would be referred to as **Drawing B-181287**. Reference drawings are inserted in **Appendix A**.

THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS, INCLUDING ELECTRONICALLY WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2002 DAKTRONICS, INC.			
DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: VANGUARD VARIABLE MESSAGE SIGNS			
TITLE: SHOP DRAWING; VF-****-27x75-18-W			
DES. BY: CKELLY		DRAWN BY: CKELLY	
		DATE: 13 JAN 03	
REVISION	APPR. BY:	1246-E10B-181287	
00	SCALE: 1=60		

Figure 1: Drawing Label

All references to drawing numbers, appendices, figures, or other manuals are presented in **bold** typeface, as shown below.

“Refer to **Drawing B-181287** in **Appendix A** for the power supply location.”

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

Reference Drawing:

Shop Drawing; VF-****-27x75-18-W..... **Drawing B-181287**

Daktronics displays are built for long life and require little maintenance. However, from time to time, certain display components will need replacing. The **Replacement Parts List** in **Section 4.11** provides the names and numbers of components that may need to be ordered 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: OP-____-____ (component) or 0A-____-____ multi-component assembly).

Following the **Replacement Parts List** is the **Daktronics Exchange and Repair and Return Programs** in **Section 4.12**. 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 external 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

There are five (5) network systems available: RS232, RS422, modem, fiber, and radio. 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 communications 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 4,000 feet). The main advantage to RS422 over RS232 is the longer cable length that is possible. A signal converter is needed to convert the computer's RS232 to RS422. 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 at the computer uses to communicate to the modem in the display. Each modem display 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 computers 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 1,500 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, **ED13932**, for additional information.

1.3 Display Overview

Reference Drawing:

Shop Drawing, AF-3155-**x***-20mm-RGB..... **Drawing B-184075**

Daktronics AF-3155 Galaxy[®] displays are designed and manufactured for performance, reliability, easy maintenance, and long life. The pixels have a 20mm center-to-center spacing, and are lit using LEDs (light emitting diodes). A light sensor on the front of the primary display is used for automatic dimming of the LEDs based on the ambient light levels. The configuration of pixels depends on the model of display ordered.

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

The Galaxy[®] model numbers are described as follows:

AF-3155-RRCCC-20-RGB-X(X)

AF-3155	=	Outdoor 20 mm Louvered Galaxy Display
RR	=	Number of Rows High (16-48)
CCC	=	Number of Columns Long (Up to 144 Columns Standard)
20	=	20 mm pixel to pixel spacing
RGB	=	LED Color (32,000 RGB)
X(X)	=	PM (Primary-Secondary) or S (Secondary)

A typical display system consists of a Windows[®] based personal computer (PC) running Venus[®] 1500 software and one or more displays. The displays are offered as single-face units, which are single-sided stand-alone displays. They can become double-faced by mounting them back-to-back with a second unit.

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 operator's manual, **ED13530**, for installation and operation of the Venus[®] 1500 editing station.

Refer to **Sections 4.2** and **4.3** for the summaries of how signal and power are routed through the displays.

1.4 Component Identification

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

This is only a brief overview. Refer to **Section 4** for additional information on maintaining the various display components.

Com Port: A COM port is a connector on the back of the control computer. The COM port is used to control the display network through either a 9- or a 25-pin serial connector.

Controller: The display's controller is the "brains" of the display (refer to **Figure 2** below). The controller receives, translates, and activates the signal information from the computer to the appropriate pixels on the display accordingly.

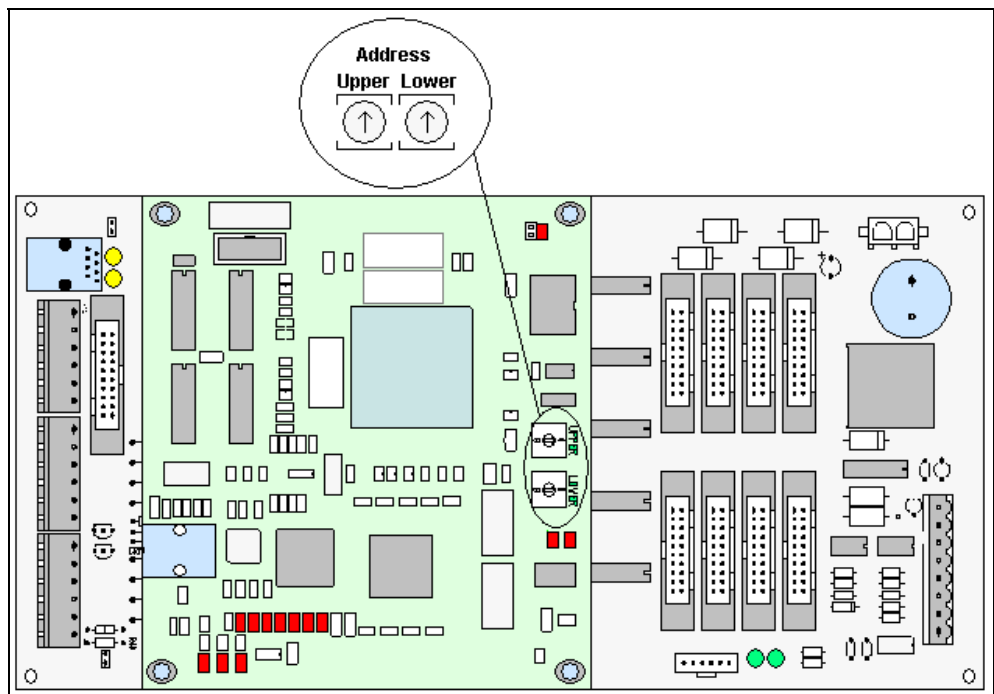


Figure 2: Version 3 Controller

Control Area Network: Serial Communication Protocol supporting distributed real-time control and multiplexing. The temperature and light sensors use this type of protocol.

Display Address: The display address is an identification number assigned to each display of a network. Rotating the address switches on the controller sets the display address. 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.

Driver/Pixel Board: The LED pixels are mounted directly onto the driver/pixel board. This board is also responsible for the switching and intensity levels of the LEDs.

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

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

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

Module: 20mm Galaxy[®] modules are 16 pixels high by 16 pixels wide. Each is individually removable from the front of the display.

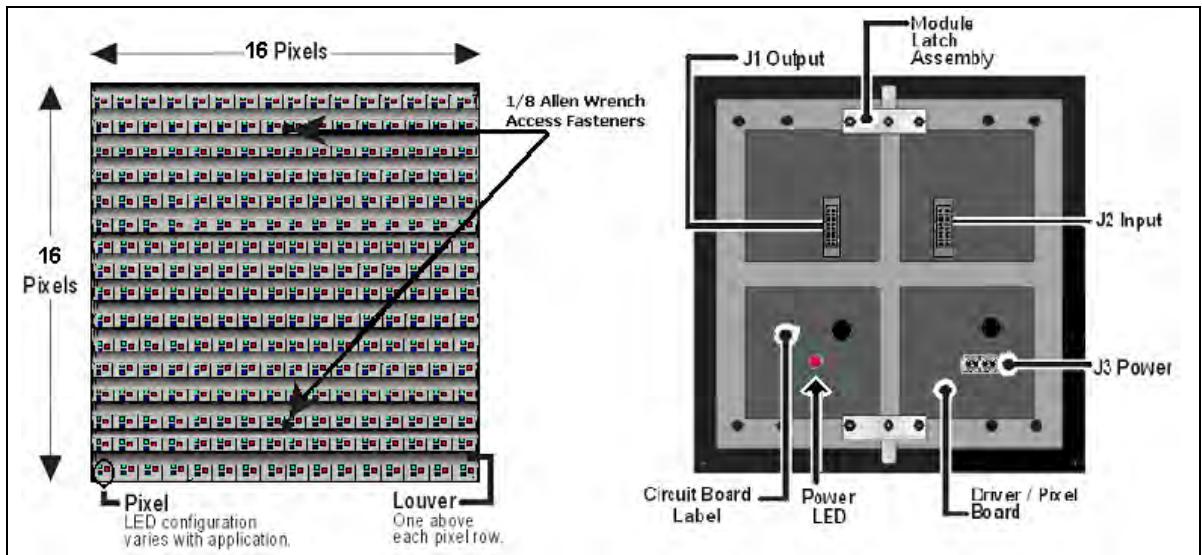


Figure 3: 20mm 16x16 Module

Module Latch Assembly: Device utilizing a rotating retainer bar to hold the module firmly to the display frame. There are two per module: one near the top and one near the bottom of each module. Use a 1/8" Allen wrench to turn the retaining bar.

Network: A network consists of multiple displays connected to each other. Up to 240 displays can exist on one network.

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

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 4,000 feet (1.2 kilometers).

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

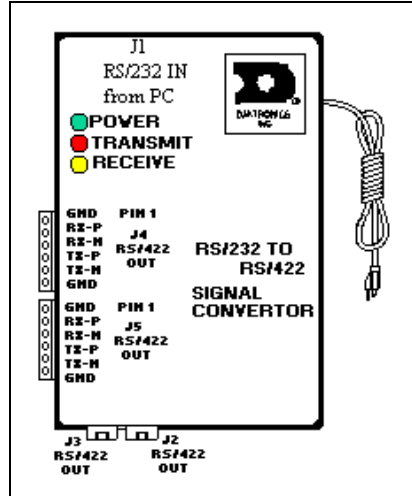


Figure 4: Signal Converter (RS232 to RS422 Shown)

1.5 Daktronics Nomenclature

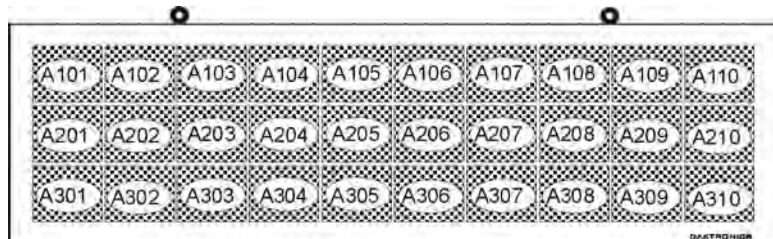


Figure 5: Module Numbering Example – 48x160 Front

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

A module is the building block of the Galaxy[®] display. Each module measures 16 pixels high by 16 pixels wide. By placing modules side-by-side and on top of one another, a display of any size can be designed and built. Individual modules can be easily removed from the display if required. **Figure 5** above illustrates how Daktronics numbers modules on a Galaxy[®] display. **Figure 6** below breaks down the module numbering method.

In addition, the following labeling formats might be found on various Daktronics drawings:

- “TB_ _” signifies a termination block for power or signal cable.
- “F_ _” represents a fuse.
- “E_ _” shows a grounding point.
- “J_ _” denotes a power or signal jack.
- “P_ _” stands for a power or signal plug for the opposite jack.

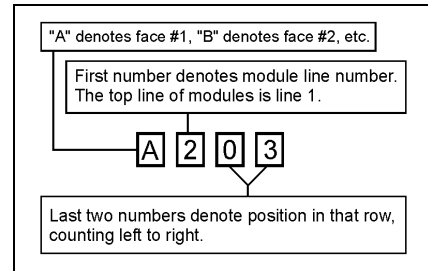


Figure 6: Module Numbering

Finally, Daktronics part numbers are commonly found on drawings. Those part numbers can be used when requesting replacement parts from Daktronics Customer Service. Take note of the following part number formats:

- “OP-____-____” indicates an individual circuit board, such as the internal fiberboard
- “OA-____-____” stands for an assembly, such as a circuit board and the plate or bracket to which it is mounted
- “W-____” represents a wire or cable

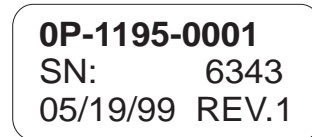


Figure 7: Typical Label

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

Most circuit boards and components within this display carry a label that lists the part number of the unit. If a circuit board or assembly is not listed in the **Replacement Parts List** in **Section 4**, use the label to order a replacement. A typical label is shown in **Figure 7**. The part number is in bold.

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 any modifications are made, detailed drawings of the changes **must** be submitted to Daktronics for evaluation and approval, or the warranty may be void.

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

2.1 Mechanical Installation Overview

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

A qualified individual 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. The structure design is critical and should be done only by a qualified individual. 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.

It is the installer's responsibility to ensure the mounting structure and hardware are capable of supporting the display, and will agree with local codes.

Before beginning the installation process, verify the following:

- The mounting structure will provide a straight and square-mounting frame for the display.
- The mounting structure is capable of supporting the display and will not yield at any unsupported points after mounting.
- Clearance: 3" of unobstructed space is available below the display for filter removal from the display. 1-1/4" of unobstructed space is available above the top of the display to remove the eyebolt and plug the hole properly.

Correct any deficiencies before installation.

2.3 Ventilation Requirements

Reference Drawing:

Shop Drawing, AF-3155-**x***-20mm-RGB..... **Drawing B-184075**

Fans are mounted in the bottom of the display for ventilation. Maintain a minimum distance of 3" (7.62cm) below the display to maintain proper airflow. Refer to the **Drawing B-184075** for additional information.

If the display cabinet is completely enclosed:

- 12 square inches of unobstructed opening per module must be provided to ensure adequate cooling.
- Allowances must be made to compensate for the percentage of material covering the openings in the structure.
- 250 cubic feet per minute of fresh air exchange per fan must be provided by means of forced ventilation when cabinet is mounted in an enclosed structure.

If these requirements are not met, the Galaxy[®] display warranty may be void.

2.4 Lifting the Display

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

Figure 8 below 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.

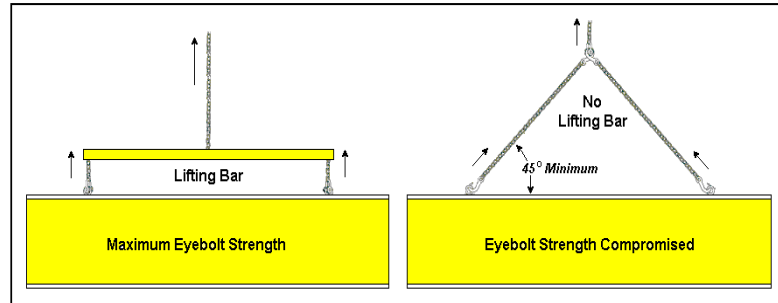


Figure 8: *Lifting the Display (Correct, Left; Incorrect, Right)*

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

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

2.5 Display Mounting

Reference Drawing:

Shop Drawing, AF-3155-***x***-20mm-RGB..... **Drawing B-184075**

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

It is the responsibility of the installer to ensure the installation will adequately meet local codes and standards, as well as the mounting hardware and method.

Before beginning the installation process, verify the following items:

- The mounting structure will provide a straight and square-mounting frame for the display. **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 display is mounted.

The back of the display is equipped with 2 x 2 x 3 x ¼" steel clip angles at the locations shown in **Drawing B-184075**. These angles may be used for mounting purposes. Remember to have **all** mounted displays inspected by a qualified structural engineer.

Refer to **Drawing B-184075** for a suggested wall mount method. The number of attachment points needed and the wall structure **must** be reviewed by a qualified structural engineer and meet all national and local codes. It is the customer's responsibility to determine the proper wall mounting method and location. Daktronics recommends using all clip angles as attachment points.

1. Carefully uncrate the display. Look each side of the display over for possible damage during shipping.
2. Following the guidelines described in **Section 2.4**, lift the display into position on the support structure.
3. Weld or use ½" Grade-5 bolts and hardware to secure the clip angles to the support structure as shown in **Drawing B-184075**.
4. Refer to **Section 3** for information on routing power and signal.
5. After installation is complete, carefully inspect the display for any holes that may allow water to seep into the display. Seal any openings with silicone. **If the eyebolts on the top of the display have been removed, plug the holes with bolts and the rubber-sealing washer that was removed with the eyebolt.**

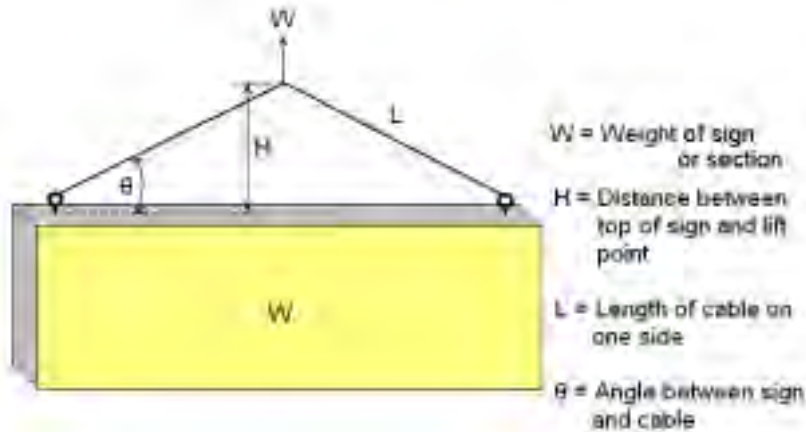
2.6 Optional Temperature Sensor Mounting

If an optional temperature sensor will be used with this display, see **Appendix C** for mounting and signal connections.

Eyebolts

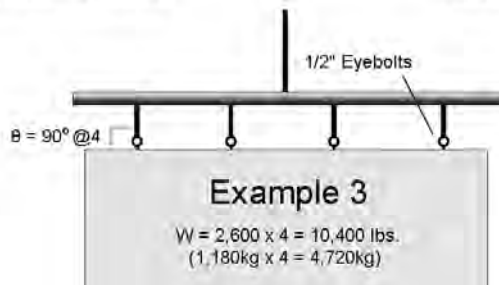
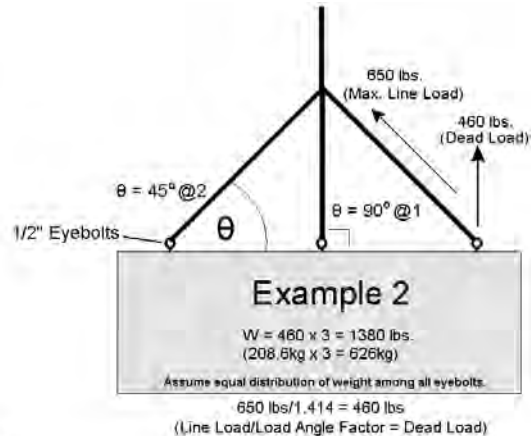
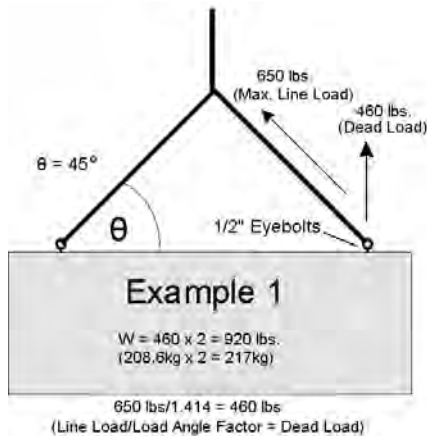
Almost every display that leaves Daktronics is equipped with eyebolts for lifting the display. There are two standard sizes of eyebolts: 1/2" and 5/8".

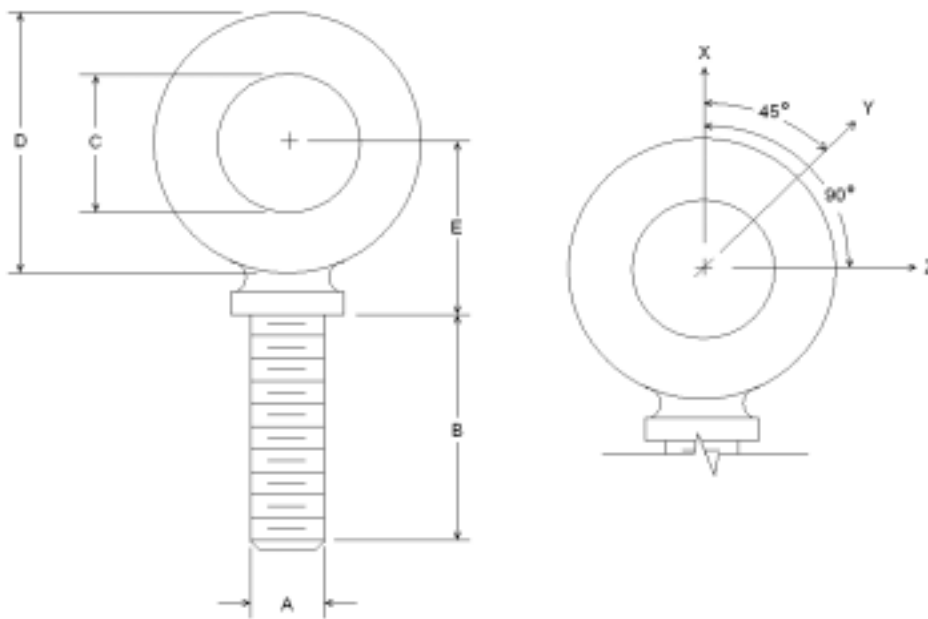
Load Increase Factor: The load increases as the lift angle (θ) decreases. The allowable load on the eyebolts also decreases with the lift angle due the bending stress on the eyebolts. In sum, the smaller the angle between the cable and the top of the display, the lighter the sign must be to safely lift 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 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 the warranty will be rendered 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 so as not to damage the connector, the cable, or the circuit board.

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

The following information presents some common connectors encountered during display installation and maintenance:

1. Ribbon Cable Connectors:

Figure 9 on the right illustrates a typical ribbon connector. To disconnect the ribbon cable, push the plastic clips on the sides out 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 will protect both the plug and the jack from corrosion.

2. Termination Blocks:

Termination blocks are usually used to connect internal power and signal wires to wires of the same type coming into the display from an external source. 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** on the right.

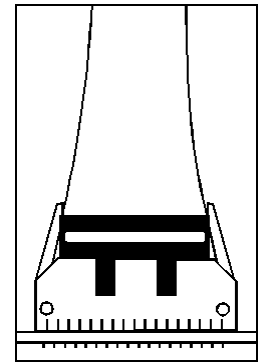


Figure 9: Ribbon Cable Connector

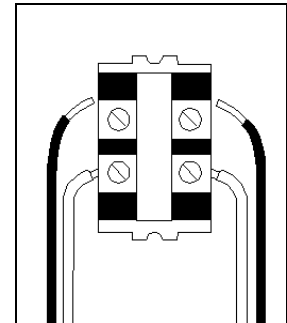


Figure 10: Termination Block

3. Phoenix™ -Style Connectors:

Phoenix-style connectors, which are usually green, are often used for signal termination on circuit boards. Refer to **Figure 11** on the right. 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 connector's 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.

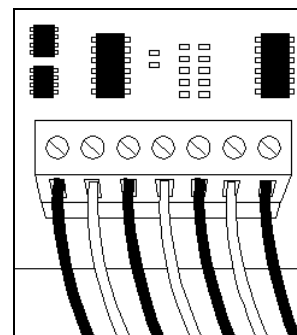


Figure 11: Phoenix Connector

4. Mate-n-Lok™ Connectors:

The Mate-n-Lok connectors found in the displays are white and come in a variety of sizes. **Figure 12** on the right illustrates a four-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.

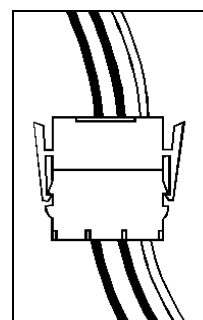


Figure 12: Mate-n-Loc Connector

5. Phone Jacks (RJ11 Connectors):

RJ connectors, as seen in **Figure 13** on the lower right, are similar to the telephone connectors found in homes and are used on the ends of flat RJ11 cable. 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.

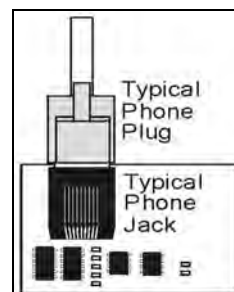


Figure 13: RJ11 Connector

6. Quick Connect Jack:

The display uses quick connect jacks for the connection of the temperature sensor, the client radio, and connection of the primary to the secondary or mirror display. The quick connect jacks are located on the back of the display and when not used the attached 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 14** illustrates the 6-pin quick connect jack.

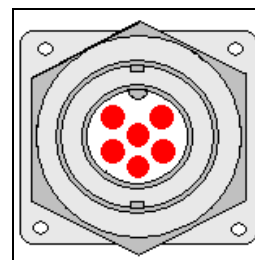


Figure 14: RS232/6-pin Quick Connect Jack

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

RS422

This cable is a 4-conductor shielded cable used to transmit an RS422 signal (Daktronics part number W-1234). This shielded cable consists of paired 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 interference signals

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

Modem

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

Ask the telephone company which colors are used by the TIP wire and which color by the RING wire for signal connections.

Note: The telephone lines must be dedicated lines and **not** run through a switch board/communications 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 it should not be subjected to mechanical flexing. The maximum length of a fiber optic cable is 2,000 feet (611.6 meters).

Radio

The Server radio connected to the computer, through a signal J-box, requires an 18-gauge six-conductor cable (Daktronics part number W-1370). Four-conductors will be used for the signal and two for power from the j-box. This wire needs to be in conduit when exposed to outdoor conditions to the Server radio. The maximum distance from the J-box to the Server radio is 1000 feet (305.8 meters).

The Client radio at the display comes with cable that is rated for outdoor use and does not need to be in conduit. The cable should be secured to the structure so it does not come loose from the display by weather or vandalism.

3.3 RJ Connector Cables

The conductor connector used in the network is an industry standard, 6-pin RJ11 or 8-pin RJ45. This connector can be found on many telephones and LANs.

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

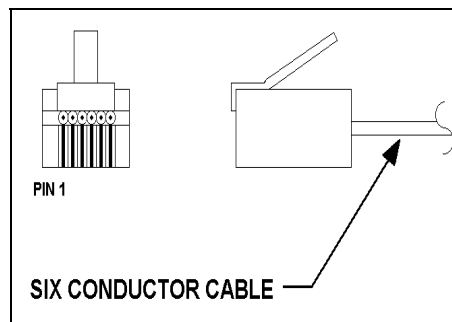


Figure 15: 6-Conductor RJ11 Connector and Cable

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

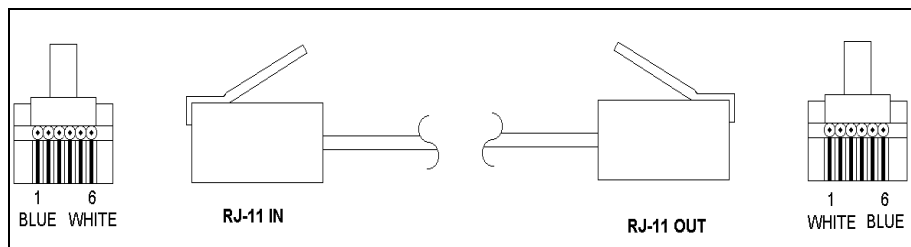


Figure 16: Flipped Cable with RJ Connectors

Installing an RJ Connector

Installing an RJ connector on the end of the conductor cable is a simple task when the correct tools are used. The RJ11 crimping tool (Daktronics part number TH-1033) performs two separate steps.

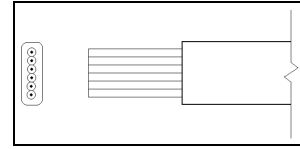


Figure 17: Wire with Outer Jacket Stripped

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

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

3.4 Conduit

Reference Drawings:

Shop Drawing; AF-3155-**x***-20mm-RGB **Drawing B-184075**

Daktronics does not include the conduit. Refer to **Drawing B-184075** for approximate locations for power and signal conduit. Separate conduit must be used to route:

- Power
- Signal IN wires
- Signal OUT wires (if signal is required for another display)

Note: Quick connect cables from display to display **do not** need to be in conduit.

Knockout holes for ½" conduit are located at the bottom right (rear view) of the back of the display (refer to **Drawing B-184075**).

For displays with more than one face, and when not using the quick connect interconnect cable, signal and temperature sensor wiring between displays can be routed through the same conduit.

3.5 Preparing for Power/Signal Connection

Reference Drawings:

Comp. Layout DrawingsRefer to Appendix A

1. Punch or use 7/8" (0.875) holes for the desired 1/2" conduits. **Be careful that none of the internal components are damaged.** Attach the conduit.
2. Remove the two bottom left modules (AX01 and AX02) to expose the power enclosure and signal panel. Use a 1/8" Allen wrench to turn the latch access fasteners one-quarter turn. Turn the top latch clockwise and the bottom latch counter-clockwise. Lift each module away from the display; reach behind it, and disconnect all power and signal connections.
3. Locate the controller and power termination box for these displays in the **Component Layout Drawings**.
4. The controller receives the incoming signal and relays it to the individual modules.
5. Route power to the display through a fused disconnect switch capable of opening all ungrounded power conductors. Install this disconnect within the line-of-sight of any personnel performing maintenance on the display. If the disconnect is located out of sight of the display, it must be capable of being locked in the open position.
6. Power conductors from the disconnect to the display should be routed through conduit in agreement with local code.
7. You may route the signal cable from the control computer to the display at this time also. **Be sure to run the power and signal cables in a separate conduit at least two feet apart.**



Figure 18: Opening the Display

3.6 Power

Reference Drawings:

Power Termination Box.....	Drawing A-129227
Power Specs, 16x144-48x144 Displays	Drawing A-183327
Schematic	Refer to Appendix A

Power Requirements

Refer to **Drawing A-183327** for voltage and current requirements for your display size. Each uses a 120VAC or 120/240 VAC single-phase power source.

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

Proper power installation is imperative for proper display operation. The following sub-sections give details of display power installation.

Grounding

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

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.

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.**

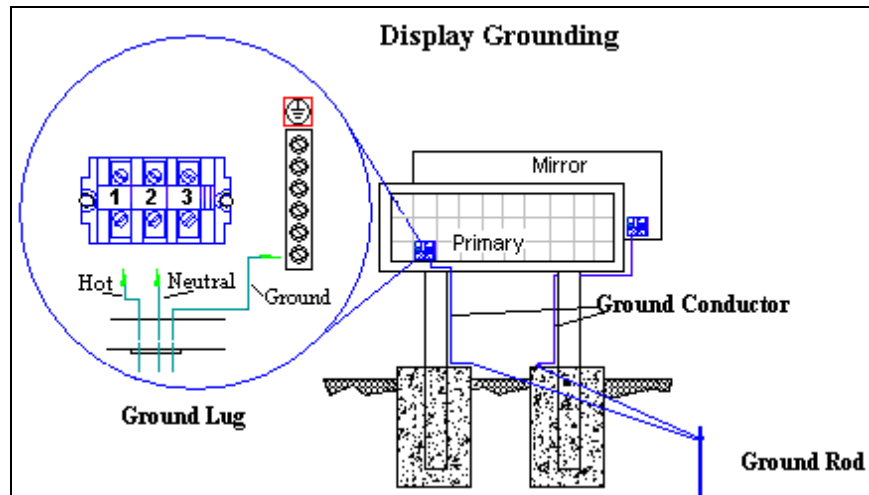


Figure 19: Display Grounding

The material of an earth-ground electrode differs from region to region and from conditions present at the site. Consult the National Electrical Code and any local electrical codes that may apply. 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.

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.

Power Installation

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

Installation with Ground and Neutral Conductors Provided

For this type of installation, the power cable **must** contain an isolated earth-ground conductor. Under this circumstance, **do not** connect neutral to ground at the disconnect or at the display. This would violate electrical codes and void the warranty. Use a disconnect so that all hot lines and neutral can be disconnected. Refer to **Figure 20** below for installation details. The National Electrical Code requires the use of a lockable power disconnect within sight of or at the sign.

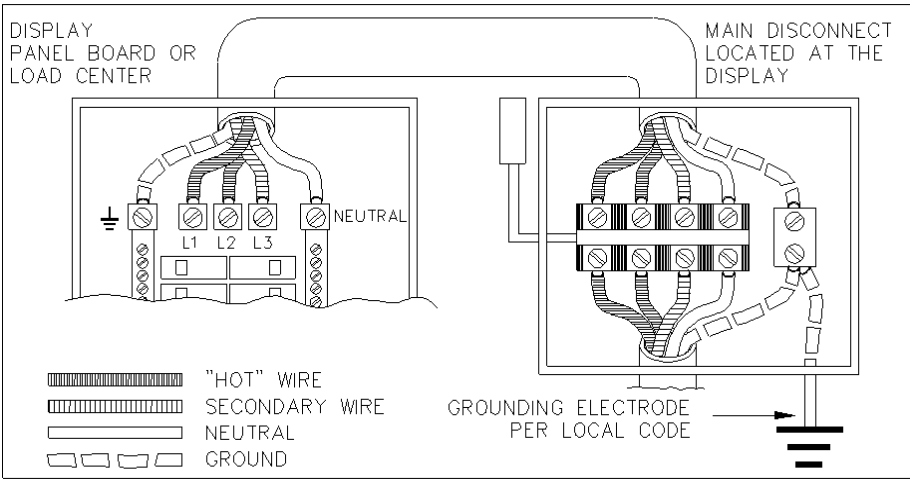


Figure 20: *Installation with Ground and Neutral Conductor Provided*

Installation with Only a Neutral Conductor Provided

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

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

Refer to **Figure 21** below for installation details.

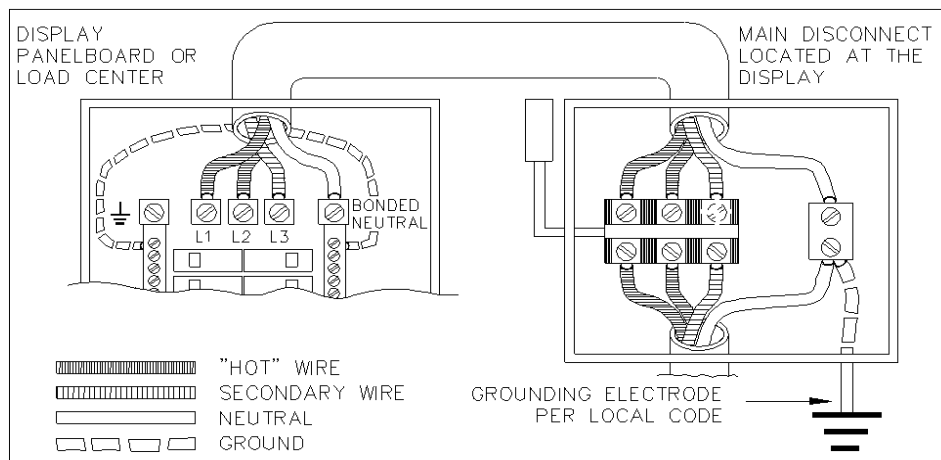


Figure 21: Installation with only Neutral Conductor Provided

Power Connection

Incoming power is connected within the power termination enclosure. Complete the following steps to terminate the hot and neutral wires at the termination block within the enclosure. Refer to the display **Schematic** for your size display.

1. Access the enclosure by removing the left bottom two modules as described in **Section 3.5**
2. Route the power cables through the power conduit in the rear of the sign and to the enclosure
3. Connect the white neutral wire to neutral bus
4. If one power line is being terminated (120VAC), connect the black “hot” wire to L1 – make sure the jumper from L1 to L2 is in place, as described in **Drawing A-129227**)
5. If two power lines are being terminated (120/240VAC) – connect the second “hot” wire to L2. (Make sure to remove the jumper from L1 to L2)
6. Connect the green grounding wire to the grounding bus E41 – refer to **Figure 21** above.

Main Disconnect

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

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

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

3.7 Signal Termination from Computer to Display

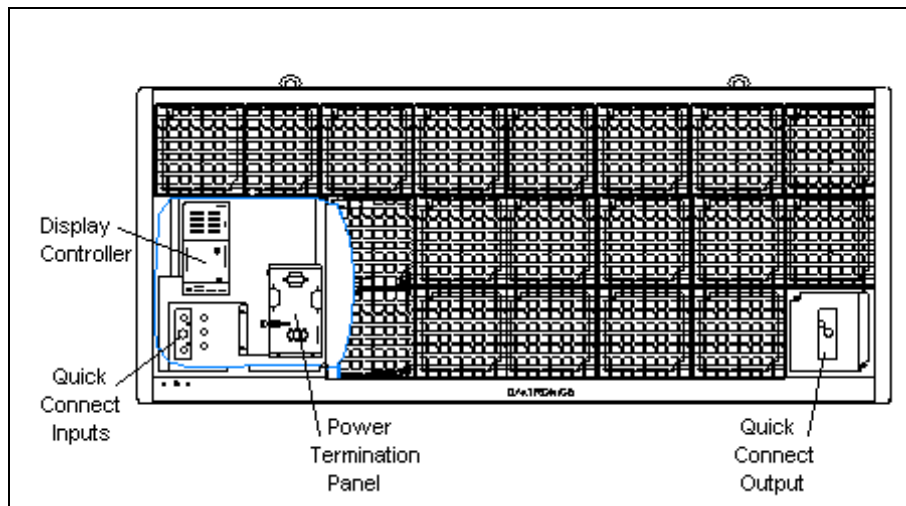


Figure 22: Display Front View

Note: The AF-3155 is designed for quicker connection to other displays, and to additional components such as the temperature sensor or a radio. Connection of the control equipment to the first display can be done using a cable with a quick connect or can be wired directly to the controller in that display. Depending on the number of displays and the communication type ordered, the following cables may be provided with the displays:

1. Interconnect cable from Primary to Secondary display, length 4 feet
2. Temperature sensor with quick connect cable, length 25 feet
3. Client radio with quick connect cable, length 25 feet

RS232

Reference Drawings:

System Riser Diagram, RS232	Drawing A-174341
Controller, Galaxy, 8-conn., J-1087	Drawing B-177838

An RS232 controlled display requires the use of a J-box within 25 feet of the display as shown in **Figure 23**. From the J-box to the display, the signal may be connected using a quick connect cable or directly wired 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. If using a quick connect cable, connect from the J-box to the RS232 jack (J33) on the back of the primary display.
2. When connecting directly to the display, terminate the 2-conductor shielded cable to the terminal block in the J-box and the other end to the 6-position terminal block on the controller labeled “RS232 IN” (TB1). **Drawing B-177838** and **Figure 24** below shows the terminal block wiring.

The controlling laptop computer connects to the J-box through the serial cable (refer to **Drawing A-174341**).

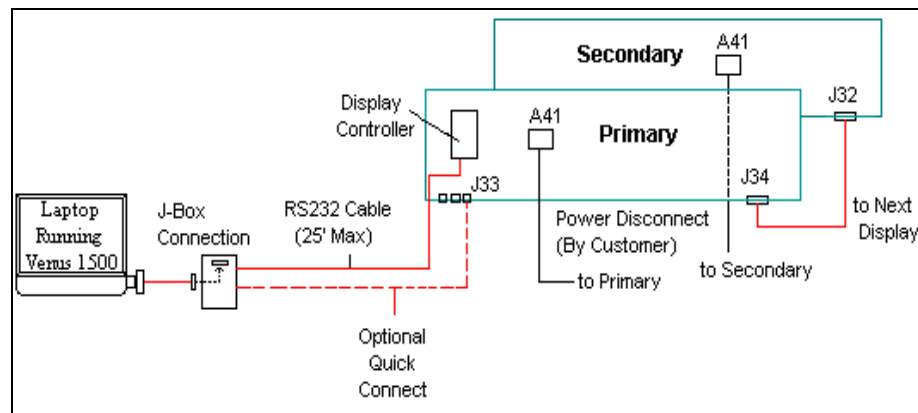


Figure 23: RS232 Display Layout

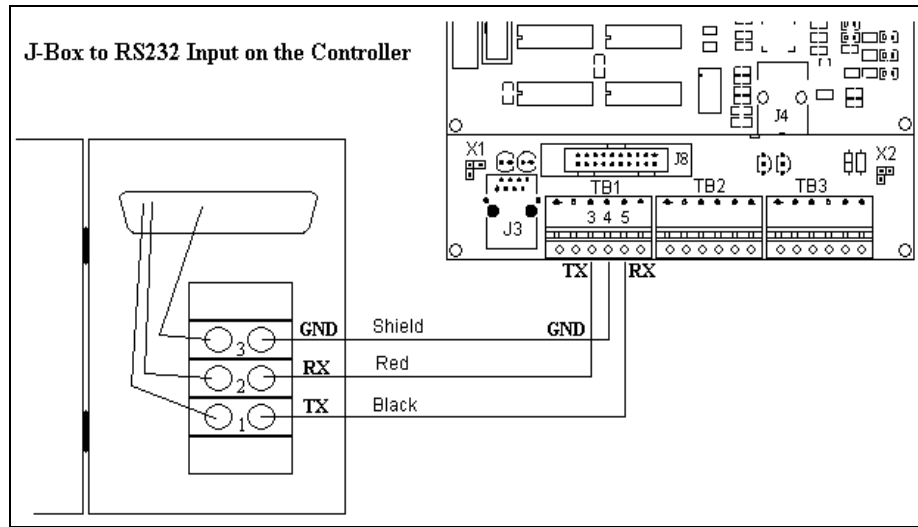


Figure 24: RS232 J-box to Controller Board

J-Box to Controller Board (A31)

J-box	Wire Color	Controller Board (TB1)
Pin 1 (TX-P)	Black	Pin 5 (RX1)
Pin 2 (RX-P)	Clear or Red	Pin 3 (TX1)
Pin 3 (GND)	Shield	Pin 4 (GND)

RS422

Reference Drawing:

System Riser Diagram, RS422 **Drawing A-174135**

Schematic, Internal, W/Quick Connect..... **Drawing B-177662**

An RS422 controlled display requires the use of signal converter near the computer. From the signal converter, cable is run to the surge board assembly in the display or to a junction box. The junction box has a quick connect plug, which will be connected to the display. In either case, the cable from the signal converter to the surge board must be routed through conduit. **Do not** run signal and display power through the same conduit. Refer to **Figure 25** and **Drawing A-174135** for the system layout.

1. If using a quick connect cable, terminate the 4-conductor shielded cable at the signal converter, and to the surge board in the junction box. A quick connect cable will then go to the RS422 jack (J32) on the back of the primary display.
2. When connecting directly to the surge board in the display, terminate one end of the 4-conductor shielded cable at the signal converter and the other end to the 6-position terminal block on the surge board labeled "RS422 IN". **Drawing B-177662** and **Figure 26** show the terminal block wiring.

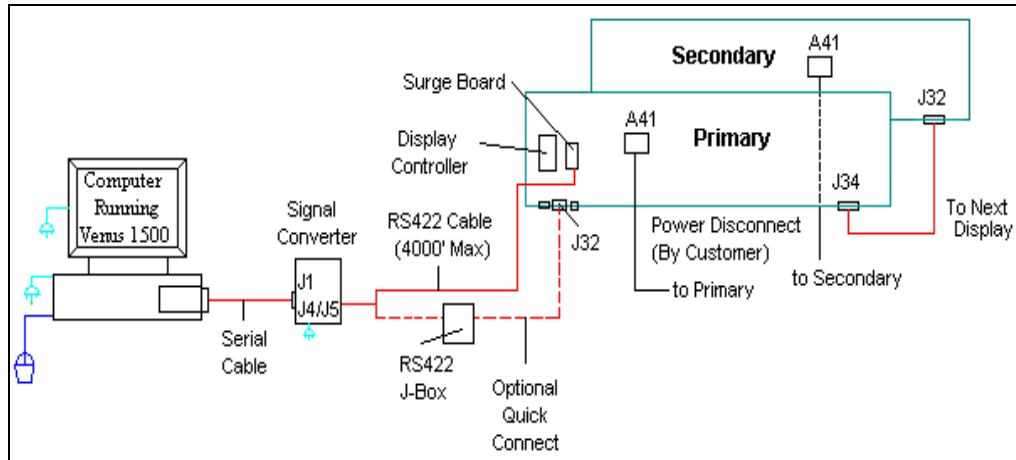


Figure 25: RS422 Display Layout

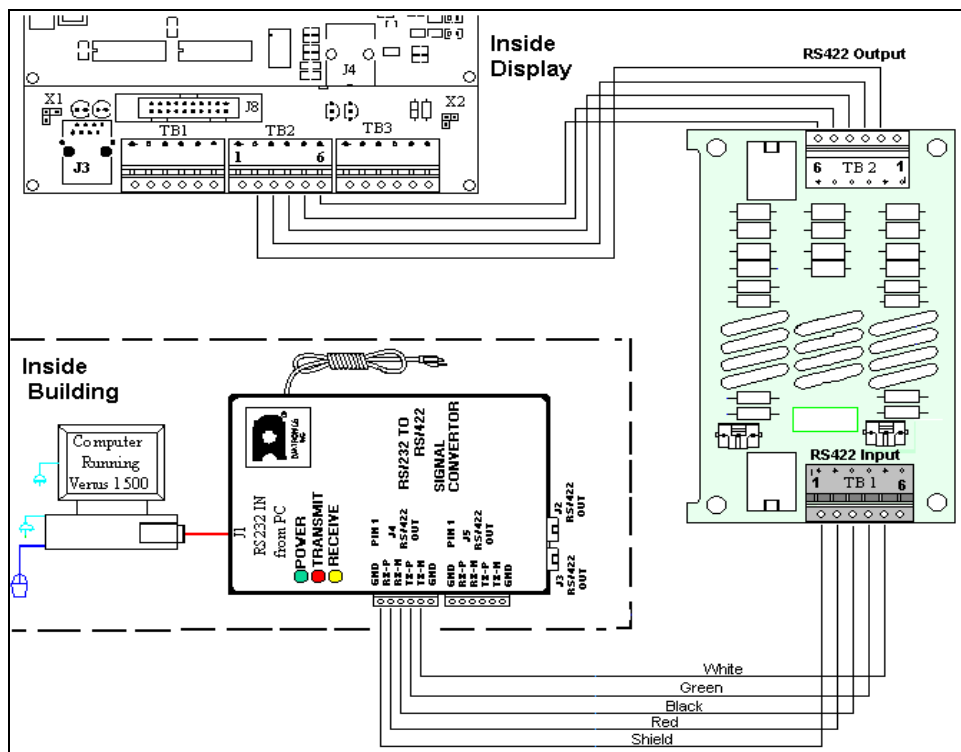


Figure 26: Signal Converter to Surge Suppressor

Signal Converter to Surge Board Assembly (A34)

Signal Converter (J4 or J5)	Wire Color	Surge Board Assembly (TB1)
Pin 1 (GND)	Shield	Pin 1 (SHLD)
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**

Schematic, Internal, W/Quick Connect..... **Drawing B-177662**

A modem-controlled display requires the use of an internal or external modem at the computer and another modem in the display. The local phone company must provide a dedicated phone line to the display and identify the colors used by the Tip wire and by the Ring wire. The telephone cable is run to the modem board in the display or is connected to a junction box with a quick connect plug that connects to the display. The phone cable must be routed through conduit. **Do not** run signal and display power through the same conduit. Refer to **Figure 27** and **Drawing A-174342** for the system layout.

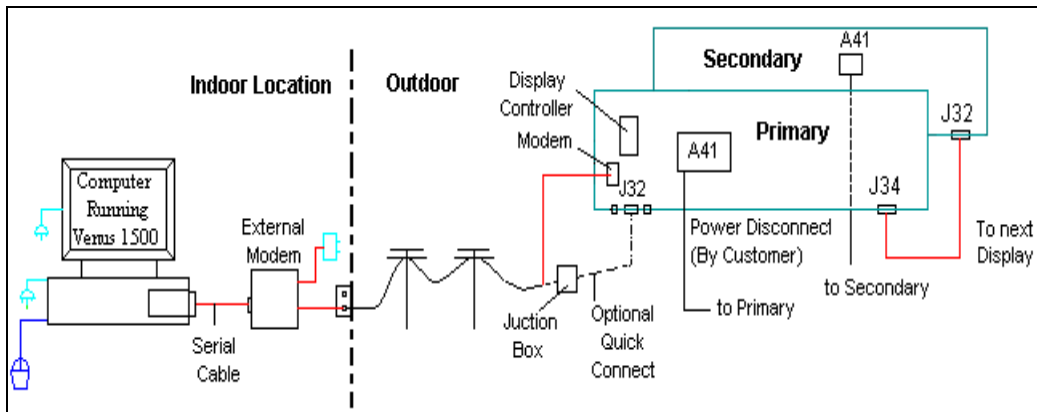


Figure 27: Modem Display Layout

1. If using a quick connect cable, connect the phone wires to the modem board, at J2, in a junction box. A quick connect cable will then go to the RS232 jack (J33) on the back of the primary display.
2. When connecting directly to the modem in the display, terminate the tip and ring wires to TB2 on the modem board. If the phone company provided a phone termination box for the tip and ring wires in the display, a straight phone cable (Daktronics part number 0A-1137-0160) can be connected from the box to the J5 Phone IN on the modem board in the display.
Drawing B-177662 and **Figure 28** shows the terminal block wiring.
3. A 8-conductor cable with RJ45 connectors (Daktronics part number 0A-1229-0054) relays the signal from J6 (RS232 Out) on the modem to J3 (RS232 IN) on the controller.

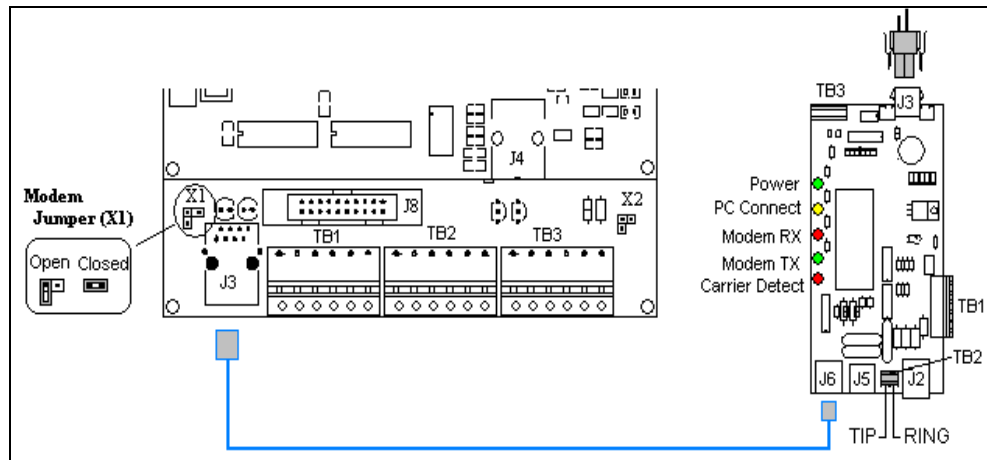


Figure 28: Modem/Signal Connections

Note: The jumper on the controller board must be closed to recognize that a modem is being used with the display. The jumper is only recognized on power-up.

Phone Line to Phone Termination Block

Field Cabling	Phone Line (TB2)
Red	Pin 1 (Tip)
Green	Pin 2 Ring)

Fiber Optic

Reference Drawings:

- System Riser Diagram Fiber **Drawing A-174344**
- Schematic, Internal, W/Quick Connect..... **Drawing B-177662**

A fiber-controlled display requires the use of signal converter near the computer. From the signal converter, cable is run to the fiberboard in the display or in a junction box. From the junction box, has a quick connect plug, which is connected to the display. The fiber cable from the signal converter to the display can be routed through conduit. In the case of fiber only, signal and display power can be run through the same conduit. Refer to **Figure 29** and **Drawing A-174135** for the system layout.

1. If using a quick connect cable, connect the two fiber cables to J5 and J4 on the fiberboard in a junction box. The quick connect cable will connect to the RS232 jack (J33) on the back of the primary display.
2. When connecting directly to the fiberboard in the display, route the cable to the fiberboard and connect the two fibers to J5 and J4. Always connect transmit (TX) at the signal converter to receive (RX) on the display's fiberboard, and RX to TX as shown in **Figure 30** and **Drawing B-177662**.
3. The fiberboard connects to the display's controller via an 8-pin RJ45 cable (Daktronics part number 0A-1229-0054) from J7 on the fiberboard to J3 (RS232 IN) on the controller.

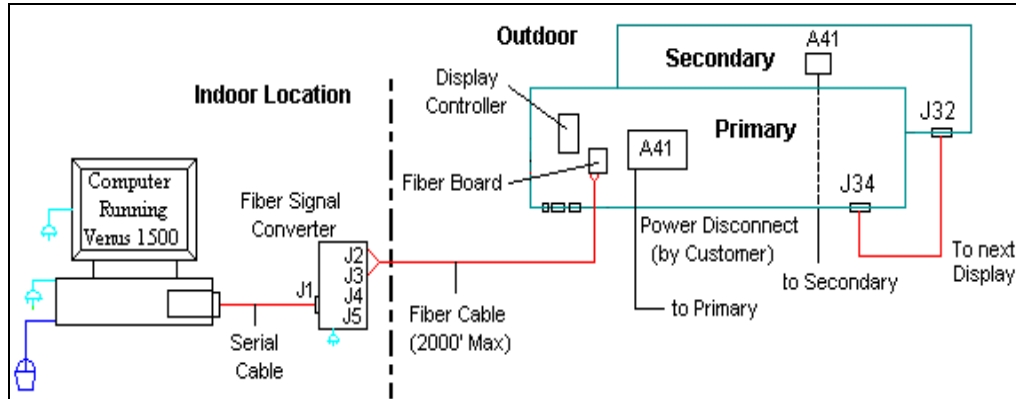


Figure 29: Fiber Optic Display Controller

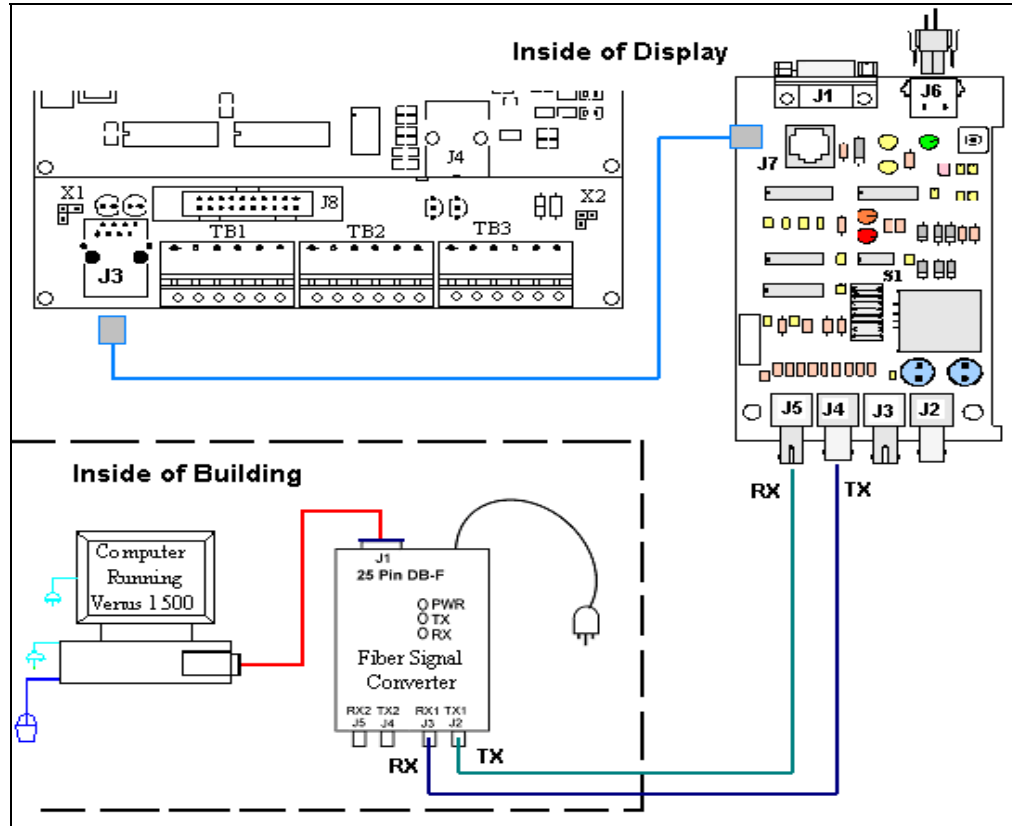


Figure 30: Fiber Signal Connections

Signal Converter to Display Fiber Board

Signal Converter	Field Cabling	Display Fiber Board
J2 Transmit (TX1)	(Color varies)	J5 Receive (RX2)
J3 Receive (RX1)	(Color varies)	J4 Transmit (TX2)

Venus[®] 1500 Radio Client

Reference Drawing:

System Riser Diagram, QC Outdoor Radio, Gen 2..... **Drawing A-185359**
 Schematic, Internal, W/Quick Connect..... **Drawing B-177662**

A display that is controlled using a radio requires a Server radio connected to the control computer, and a Client radio at the display. The radios must be within line-of-site of each other.

Figure 31 below and **Drawing A-185359** show the system layout to the Server radio through a J-box. The Client is mounted near the display, and it is supplied with 25 feet of weather resistant cable. One end of the cable is pre-terminated to TB1 inside the radio enclosure, and a quick connect plug is terminated at the other end of the cable. The quick cable connects to the primary display.

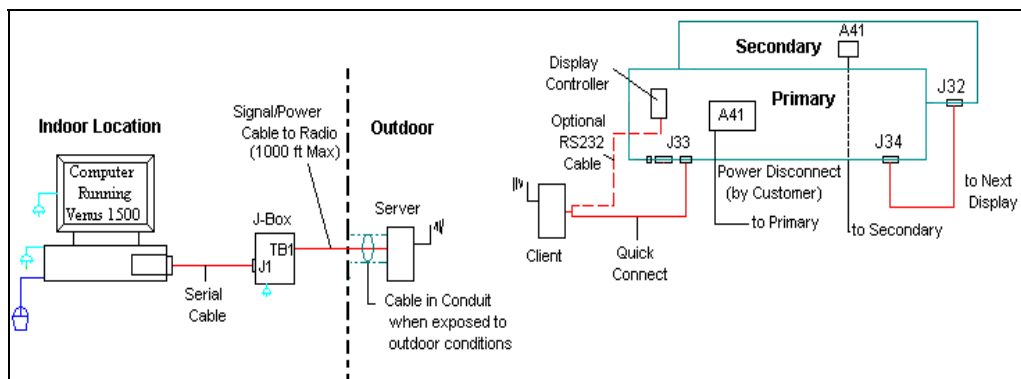


Figure 31: Radio Display Layout

1. Connect the DB9M to DBF serial cable from the computer's serial port to the J-box labeled "V1500 PC Connect". Connect the 18 AWG, 6-conductor cable from the J-box at the computer to the Server radio. The distance from the J-box to the Server cannot exceed 1000 feet. Refer to the Venus 1500 Radio Manual, **ED13932**, for J-box and Server connections.
2. Using the quick connect cable as shown in **Figure 32**, connect from the Client Radio to the RS232 jack (J33) on the back of the primary display. (Secure any additional cable to prevent it being pulled loose by weather or vandalism.)

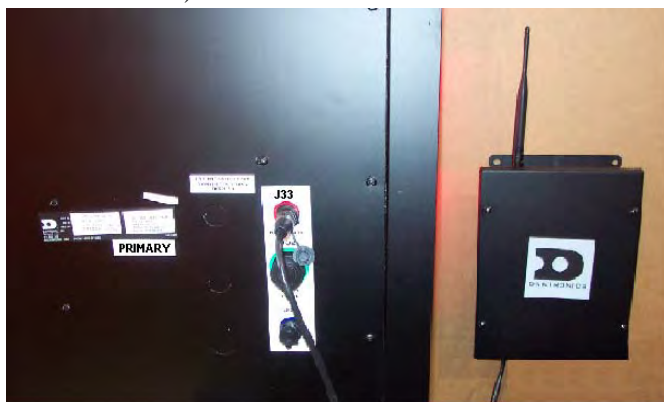


Figure 32: Radio Client Connection

3.8 Signal Termination Between Two (or More) Signs

Reference Drawings:

Controller, Galaxy, 8-conn., J-1087 **Drawing B-177838**

RS422 Interconnection

- The quick connect cable is the most common method of terminating signal between two displays. The four-foot cable goes from the RS422 OUT (J34) on the first display to the RS422 IN (J32) on the second display.

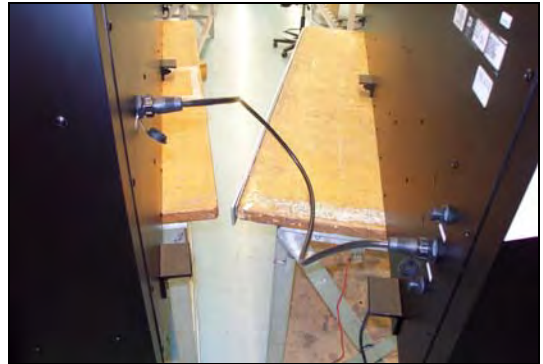


Figure 33: Quick Connect Cable

- If the displays are not back-to-back, or are too far apart for the quick connect interconnect cable to reach, use a 4-conductor shielded cable (more conductors or a second cable may be required if also using a temperature sensor). One end will connect at the “RS422 OUT” 6-position terminal block (TB3) on the controller of the first display, and the other end of the cable will terminate on the “RS422 IN” 6-position terminal block (TB2) on the controller of the second display. See **Figure 34** and **Drawing B-177838** for additional information. **Note:** When not using the quick connect cable, the cable must be run through conduit.

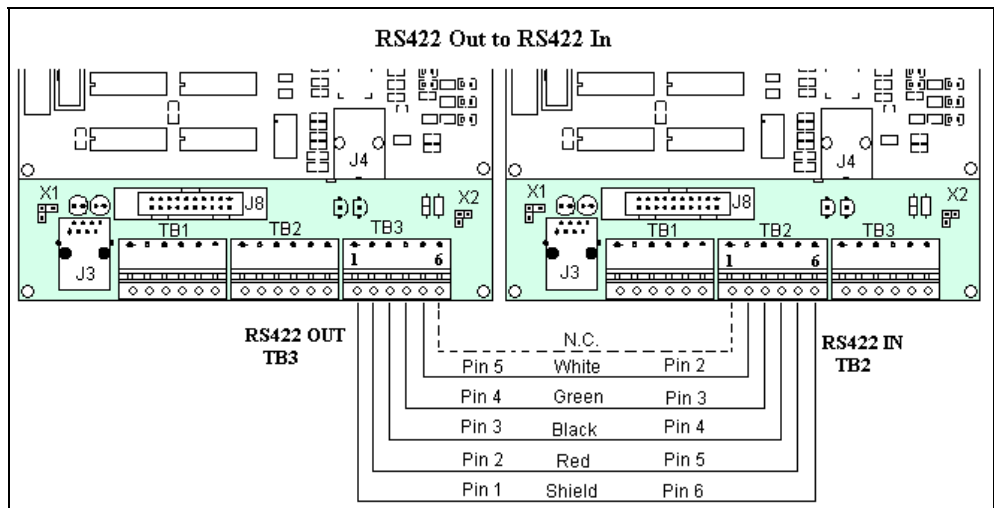


Figure 34: RS422 Signal Termination Panels

**Signal Between displays for RS422 Out on
Primary to RS422 In on Secondary.**

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)

Fiber Interconnection

Reference Drawings:

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

A fiber cable, with four fibers, is used in connecting two or more displays in the Fiber Interconnection method. Connect the fiber cable to the fiber cards in the display as described in **Drawing A-174344** and on the following table. Always connect transmit to receive and receive to transmit.

Primary Data Out	Field Cabling	Secondary Data In
J2 Transmit (TX1)	Color varies	J5 Receive (RX2)
J3 Receive (RX1)	Color varies	J4 Transmit (TX2)

3.9 Optional Temperature Sensor Electrical Installation

If an optional temperature sensor will be used with this display, see **Appendix C** for mounting and signal connections.

3.10 First Time Operation

When first 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 (32K RGB)
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: (172.16.192.25)
10. Subnet Msk: (255.255.0.0)
11. COM1 Configuration (C1:V15) ((Modem C1:V15) If a Modem is present)
12. Line Frequency (CLK:60 Hz)

Section 4: Maintenance and Troubleshooting



Important Notes:

1. Power must be turned off before any repair or maintenance work is done on the display.
2. Qualified service personnel must make any access to internal display electronics.
3. The Daktronics engineering staff must approve ANY changes made to the display. Before altering the display, detailed drawings for the proposed modifications must be submitted

to the Daktronics engineering staff for evaluation and approval or the warranty will be rendered null and void.

4.1 Maintenance and Troubleshooting Overview

Daktronics Galaxy[®] series AF-3155 displays are front accessible; meaning access to the internal components can be gained only from the front of the display.

This section provides the following Galaxy[®] display information:

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

4.2 Signal Summary

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

1. Data from the control computer, which runs Venus[®] 1500 software, travels via RS232, RS422, modem, fiber optic cable, or radio signal to the primary display.
2. For multiple face displays or a display network, an RS422 quick connect cable (most typical) relays signal between the controller of the primary display and the controller in the secondary display. In the case of fiber, two fibers would connect from the fiberboard in the primary display to the fiberboard in the secondary display.
3. From the controller, the signal then travels over one or more 20-conductor ribbon cables (J11 through J18 provide signal out) to J2 on the driver of the first row of modules in the display.
4. Data exits at J1 and is relayed to J2 of the next driver board and so on, traveling down the entire row of modules. The drivers use this display data to control the LEDs.

4.3 Power Summary

Reference Drawing:

Schematic; Power Supply Configurations **Drawing A-183321**

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

1. Incoming power terminates at the power termination enclosure. Before leaving the enclosure, power is sent through a circuit breaker and an RFI electrical filter.
2. Power for the controller board passes through a transformer located on the controller/power panel.
3. The power supplies are set to 5.3 VDC. For assistance with the wiring to the power supplies see **Drawing A-183321**. Power supplies are preset. Contact Daktronics Customer Service for the proper settings.

4.4 Service and Diagnostics

Reference Drawings:

Power Termination Box.....	Drawing A-129227
Assy, Power Box, A-1577@2.....	Drawing A-135118
Controller, 8-conn., J-1087	Drawing B-177838
Component Layout Diagram	Refer to Appendix A
Schematics.....	Refer to Appendix A

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

- transformer, RFI filter
- controller
- modules, drivers and power supplies

The sub-sections also address any diagnostic LEDs, fuses, and signal/power connectors found on the unit. On the **Schematics** and **Component Layout Diagrams**, the components are denoted as follows.

Component...	Denoted As...	Location...
Filter and Transformer	0A-1241-4005	Inside the power termination box
Controller	0A-1229-0005	Depends on the size of the display. (usually behind the bottom left module, or module one row above)
Modules	Squares (0A-1266-2551) A101 through A309	Over entire face of the display (includes driver)
Power Supplies	0A-1289-4013 or 0A-1289-4014	Behind modules (refer to your display's Schematic)
Light Detector	0A-1247-0003	Behind/below the bottom left module
Modem	0P-1279-0003	Refer to the display's Schematic
Fiber Board	0P-1127-0024	Refer to the display's Schematic
RS422 Surge Card	0P-1146-0031	Refer to the display's Schematic

Transformer and RFI Filter

Remember: Disconnect power before servicing any internal components

Transformer

The transformer is located in the upper portion of the power termination box as shown in **Figure 35**. **Turn off power to the display before removing the wires.** To replace the transformer, first disconnect and label all the wires attached to it. Then release the hardware securing it to the inside of the enclosure. Position the new transformer in its place, and tighten it down. Re-connect all the wires using the display's **Schematic** as a reference.

RFI Filter

The RFI electrical filters are mounted above and to the side of the power termination box (Z1 and Z2 in **Drawing A-129227**). Like the transformer, first removing all connecting wires, and then releasing the attachment hardware can replace the filters. Install the new filter using the display's **Schematic** as a wiring reference.

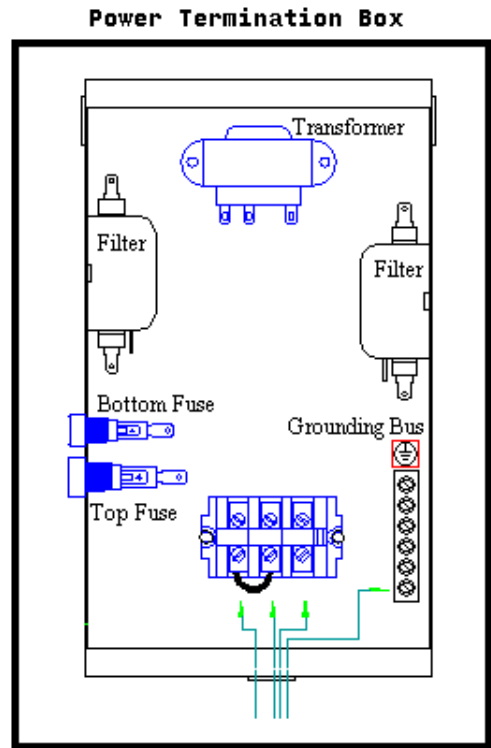


Figure 35: Power Termination Box

Controller

The controller sends data to the modules. Refer to the signal summary in **Section 4.2** for more information and to the **component layout diagrams** for the position of the controller board. **Figure 36** below illustrates a typical controller.

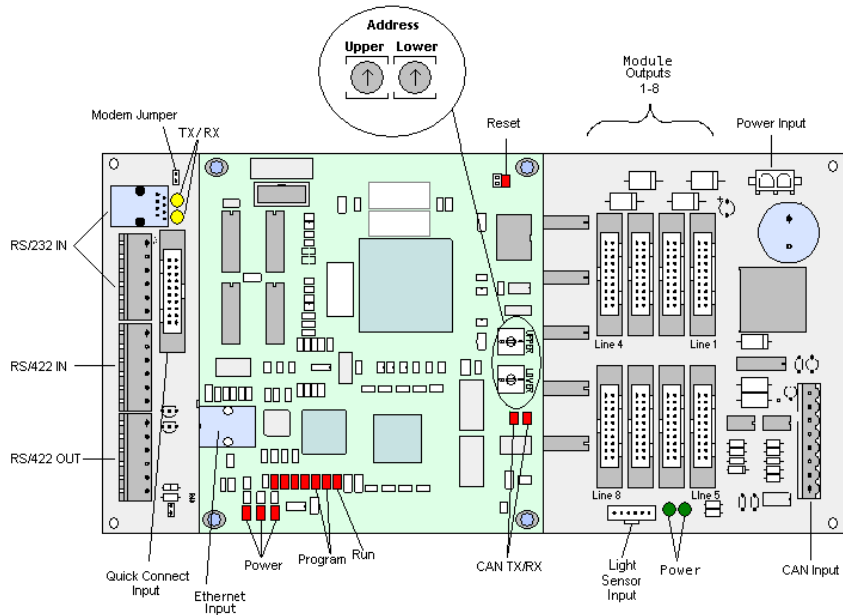


Figure 36: Controller Component Layout

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 display's power must be turned off and then turned back on to activate the test mode.

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

Tools required: $\frac{1}{8}$ " hex wrench and $\frac{3}{16}$ " nut driver

1. Remove the module directly in front of the controller
2. Disconnect power from J5
3. Remove all power and signal connections from the board (pushing apart the latches and carefully pulling them from the jack will release the "Locked" connectors) – when replacing the board, it is helpful to have the cables labeled as to which was removed from which connector.
4. The board is held in place using six screws. Remove the screws using a $\frac{3}{16}$ " nut driver

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

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

Four diagnostic LEDs are located on the controller; the table below tells 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 controller is not resetting the watchdog timer.
DS4	Red	Run	A steady flash indicates the controller is running properly. Normal flash rate is about once per second.
DS5	Red	U15 Programm ed	On when U15 contains a valid logic program.
DS6	Red	U7 Programm ed	On when U7 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 at 10Mbps.
DS9	Red	Duplex	On when the Ethernet interface is at full duplex. Off when the Ethernet interface is at half-duplex.
DS10	Red	Collision	Flashes when the Ethernet interface detects a collision in half-duplex.
DS11	Red	+5V	On when +5V power supply is functioning.
DS12	Red	+3.3V	On when +3.3V power supply is functioning.
DS13	Red	+2.5V	On when +2.5V power supply is functioning.
Product Board			
LED	Color	Function	Operation
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.
Temp/Light Sensor			
LED	Color	Function	Operation
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.

Modules and Drivers

The module and driver board are a single functional unit. The LED power supplies are identified as assemblies. Each power supply unit controls two modules; a power supply assembly (two power supply units) controls four.

To remove a module, complete the following steps:

Tools required: 1/8" hex wrench

1. Locate the latch access fasteners on the module. One is centered below the second row of pixels and one is centered above the bottom row.
2. With a 1/8" Allen wrench, turn the latch access fasteners a quarter turn as seen in **Figure 37**. The top one should be turned clockwise and the bottom one counter-clockwise.
3. Pull the display module far enough to reach around the back and disconnect the ribbon and power cables.



Figure 37: Removing a Module

When installing a module, reverse the previous steps and take note of the following points:

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

Each module assembly is made up of a module housing (containing LEDs and the driver) and a louver assembly.

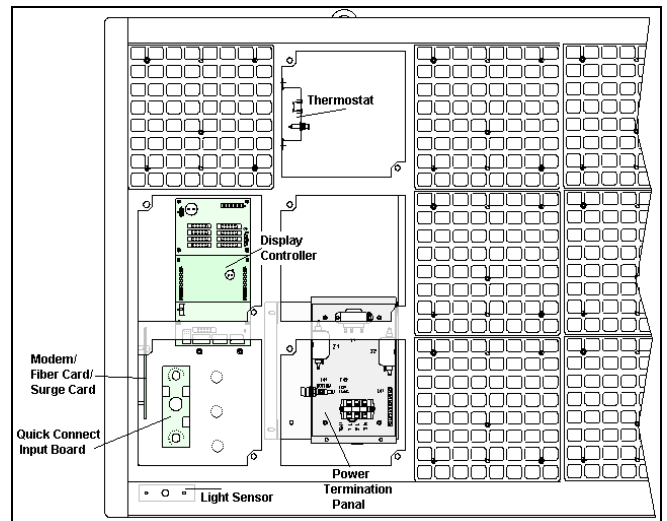


Figure 38: Control Corner Component Locations

Power Supplies

The LED power supplies are identified as assemblies 0A-1289-4013 and 0A-1289-4014 in the **Component Layout Diagrams**.

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

Tools required: 1/8" hex wrench and #2 Phillips screwdriver

1. Remove the module directly in front of the failed power supply.
2. Disconnect and label 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. Refer to the display's **Schematic** when reconnecting the wires.

Light Detector

The light detector is internally mounted and wired at Daktronics. It is located in the bottom left corner on the front of the primary display (identified as assembly OA-1241-4013 (LT) in the **Component Layout Diagram**). A 4-conductor cable connects the light detector to the controller. The cable is terminated at the terminal block on the light sensor and at the J9 jack on the controller board. When the displays are mounted back-to-back, only the primary display has a light sensor.

Modem

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

Complete the following steps to replace a modem in the display: **Tools required: 1/8" hex wrench and 3/16" nut driver**

1. Remove the module directly in front of the modem.
2. To replace the modem, first disconnect the power and signal connections (refer to **Figure 39** on the right for the cable locations).
3. The modem is held in place with four screws. Remove the screws using a 3/16" nut driver and lift the modem out of the display.
4. Follow these steps in reverse order to install a new modem.

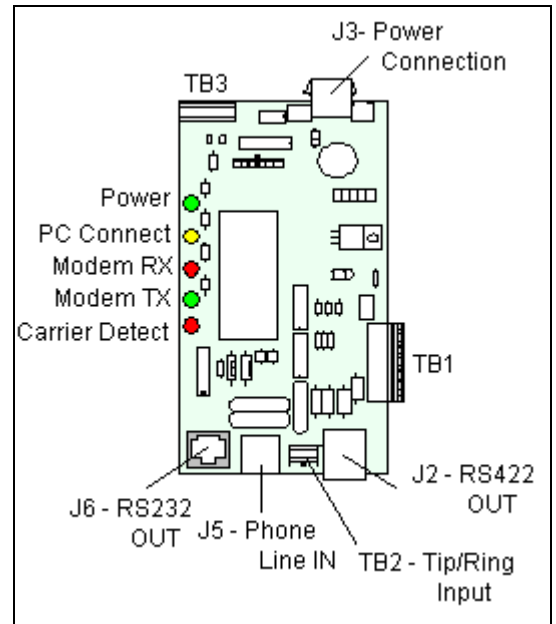


Figure 39: Modem

The modem module has five 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.
4. The PC Connect LED is not used when this modem is mounted in a display.

The modem board also has several input and output jacks.

1. J3 is the power input for 12 VAC
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 RS/232 RJ11 output to the controller
5. J2, TB1, and TB3 are not used in this display application

A modem system requires a jumper (X1) to be set on the controller board. For a modem system the jumper must jump both pins. Refer to **Figure 40** below for the location of the jumper to be set.

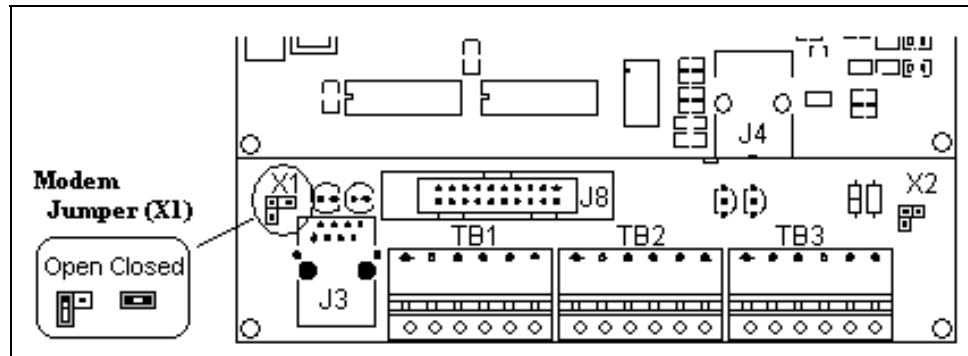


Figure 40: Modem/Signal

Fiber Board

To replace a fiber optic board: **Tools required:**
1/8" hex wrench and 3/16" nut driver.

1. Remove the module directly in front of the modem
2. Disconnect the power and signal connections (refer to **Figure 41** on the right for connection points).
3. The fiber optic board is held in place with four 3/16" screws. Carefully remove them.
4. Install the new fiberboard, replace the screws and reconnect power and signal cables.

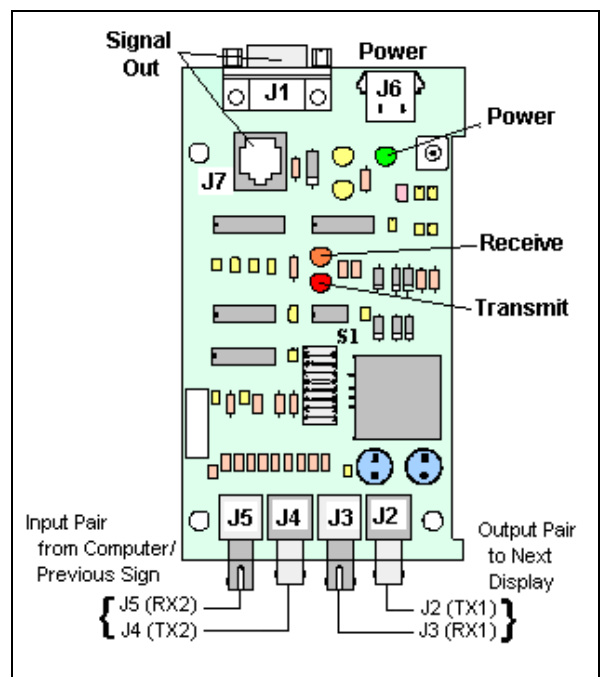


Figure 41: Fiber Optic Board

The fiber module has three LEDs.

1. The power LED (DS1) should remain lit while power is applied to the board.
2. The receive LED (DS2) will light when the display fiberboard is accepting signal from the signal converter at the computer.
3. The transmit LED (DS3) will light when the display fiberboard is sending back to the signal converter.

In addition, the fiber has several input and output jacks.

1. The transmit, J4 (TX), and receive, J5 (RX), jacks are for the connection from the signal converter or previous display.
2. There are TX (J2) and RX (J3) jacks for output to a second display.
3. There is a 12VAC power input (J6).
4. The output to the controller is from J7, using an RJ45 cable (Daktronics part number 0A-1229-0054)
5. The J1 signal out is using when the fiberboard is used in an enclosure

RS422 Surge Suppressor

To replace the RS422 surge suppression board:

Tools required: 1/8" hex wrench and 3/16" nut driver

1. Remove the module directly in front of the surge board.
2. Disconnect the signal connections (refer to **Figure 42** on the right).
3. The surge suppressor is held in place with four 3/16" screws. Carefully remove them.
4. Install the new surge suppressor, replace the screws, and reconnect the signal cables.

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 chassis in order to be effective. The mounting hardware used to secure the surge suppressor is sufficient if it is fastened properly.

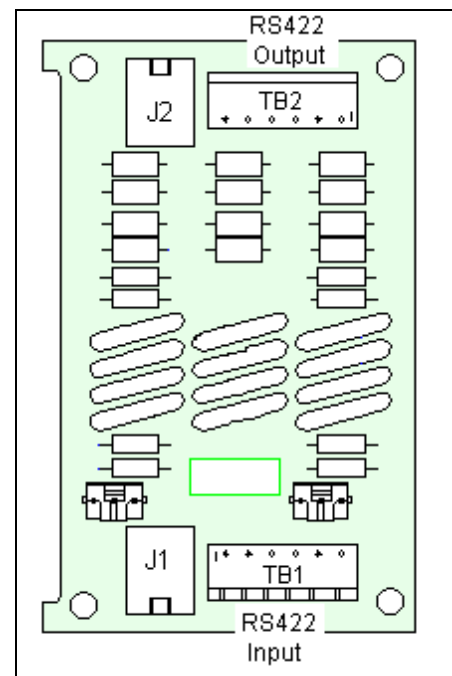


Figure 42: RS422 Surge Suppressor

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 for 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.

W1 is the necessary location of the terminations.

Displays with No External Temperature Sensor

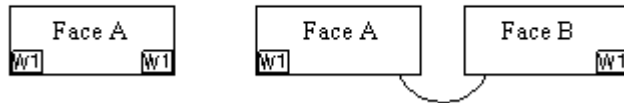


Figure 43: Displays with No External Temperature Sensor

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.

Displays with External Temperature Sensor

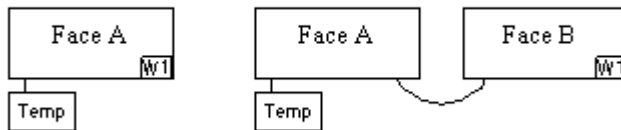


Figure 44: Displays with External Temperature Sensor

The terminating jumper (W1) 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 (W1) will be placed on the input board of the last display. Therefore, both boards are shown in **Figure 43** and **Figure 44** above.

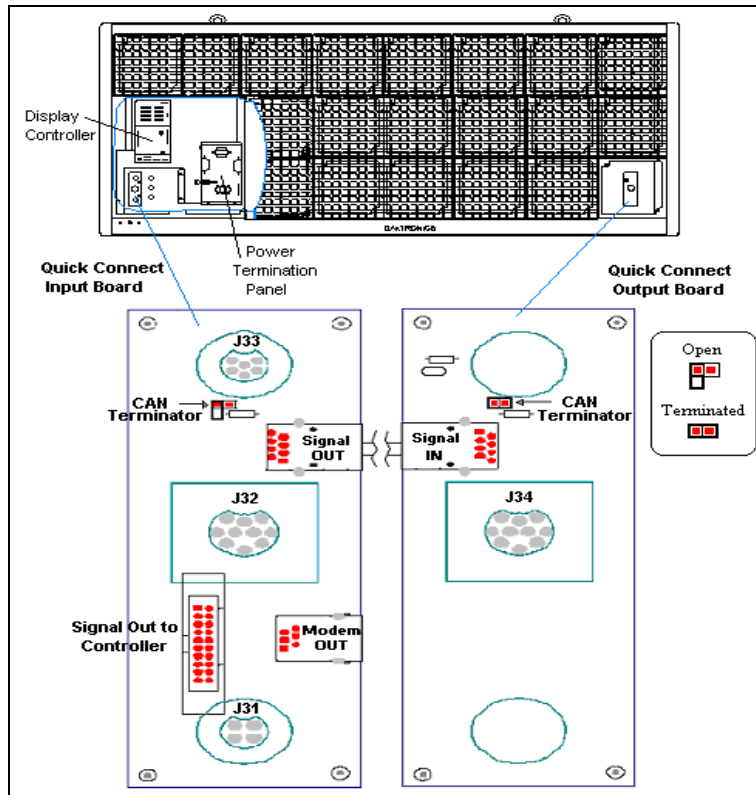


Figure 45: Quick Connect Boards

4.5 Ventilation Systems (With Fans and Filters)

Ventilation fans should be checked after 1,500 hours of operation and every 1,500 hours after that to ensure the display is being cooled properly. Fans should be checked more often if the display is located in a dusty or harsh weather environment (i.e. along a gravel road with dust laden air).

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

Each time a module is removed, 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, this indicates that the filters must be changed more often. Fan blades must be kept 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, push the bypass button (momentary contact) on the thermostat enclosure to temporarily turn the fans on: (The bypass button is located behind A102, top row, and second module from the left.)

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

Filters must be checked once a year or after every 1,500 hours of operation, whichever comes first.

Filters can be cleaned with water and a mild detergent, such as dish soap. Compressed air can also be used to clean the filters provided the nozzle is held at least six inches away from the filter, the pressure is no greater than 60 psi, and the air is blown through the filter in the opposite direction from which air normally flows. The arrow stamped on the frame filter indicates airflow direction.

4.6 Thermostats

Reference Drawing:

Comp. Layout Diagram.....**Refer to Appendix A**

A thermostat controls when the ventilation fans are turned on in the display. Refer to **Figure 38** and the **Component Layout Diagram** for your display 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).

4.7 Weather Stripping

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

4.8 Display Maintenance

A yearly inspection should be completed 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. Fasteners should be checked and tightened or replaced 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 display where weather stripping has come loose or deteriorated or where fasteners have come loose allowing gaps in the panels or where moisture may be entering around hardware. Be sure to check around the lift eyes and bolts to ensure that water has not entered there. If so, replace hardware immediately to prevent more water from entering the display. Also, check electronic components for possible corrosion.
- **Corrosion**
Check the paint, and look for possible corrosion especially at footings, structural tie points, and ground rods.

If any of the above conditions are noticed, action must be taken to correct the situation.

4.9 Troubleshooting

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

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

Entire display fails to work.	<ul style="list-style-type: none"> • Check for proper line voltage into the power termination panel. • Check for correct power to controller and modules. • Check the fuses in the power termination box. • Check/replace the ribbon cable from the controller to the modules. • Check the voltage settings on the power supplies. • Check the signal cable to the controller. • Replace the controller. • Verify proper use of the software in the operation manual (ED13530).
Temperature always reads – 196F/-127C degrees F/0 degrees C.	<ul style="list-style-type: none"> • Check temperature sensor connections. • Check for correct power on temp sensor. • Replace the temperature sensor.
Display 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.

4.10 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 (32K RGB)
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: (172.16.192.25)
10. Subnet Msk: (255.255.0.0)
11. COM1 Configuration (C1:V15) ((Modem C1:V15) If a Modem is present)
12. Line Frequency (CLK:60 Hz)
13. Display Name Description

4.11 Replacement Parts List

The following tables contain some of the items that may need to be replaced in these displays over a period of 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 II, 48x256, Louvered Galaxy	0A-1229-0005
Module, 1R1G1B (1:1) 8x8 (30x70) Type 2	0A-1266-2551
Power Supply Assembly, w/Harness, A-1577@1, A-1577 @2	0A-1289-4013 and 0A-1289-4014
Digital Temp Sensor	0P-1247-0007
Light Level Detector	0P-1247-0003
Filter; Air, Gasket, 7.50" x 13.50" x .88"	EN-1774
Fan; 110 CFM, 120V @60Hz, 29-24 watt	B-1006
Transformer; Pri 115V, Sec 10VCT@3A (120V Displays)	T-1119
Filter, RFI Line 10 AMP 120 VAC	Z-1007
Fan Finger Guard (for B-1006 fan)	HS-1036
Modem Board; 232 Coated	0P-1279-0003
Fiber Board; RS232 to Fiber, 12V	0P-1127-0024
Cable; 18" RJ45; 8-Cond., Straight	0A-1229-0054
Surge Suppression Board	0P-1146-0031
Signal Converter (RS232/RS422)	0A-1127-0255
Signal Converter (RS232/Fiber)	0A-1127-0266
Cable Assy; 20 pos Ribbon, 18", Dual Row	W-1387
Ribbon Assy; 20 Pos, 30"	0A-1000-0017
Ribbon Assy; 20 Pos, 36"	0A-1000-0018
Ribbon Assy; 20 Pos, 60"	0A-1000-0021
Quick Connect Interface, Input	0P-1229-2001
Quick Connect Interface, Output	0P-1229-2002
10ft, RJ45; 4-pair Twisted/Black	W-1383
20ft, RJ45; 4-pair Twisted 24 AWG	W-1406
Cable; 22 AWG, 2-pair, shielded (Light Sensor/Temp Sensor to Controller)	W-1234
Cable; 10-pin male to 10-pin male, 4', QC	W-1483

Part Description	Part Number
Cable; 10-pin male to 10-pin male, 10', QC	W-1500
Electrical Contact Cleaner Lubricant / Cal-Lube	CH-1019
Hex Wrench, T-Handle 1/8" RT	TH-1062
Manual; Venus 1500 Radio, Gen 2	ED-13932
Manual; Venus 1500 Operator's, Version 3.0	ED-13530

4.12 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 wrapping 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 to prevent damage during 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

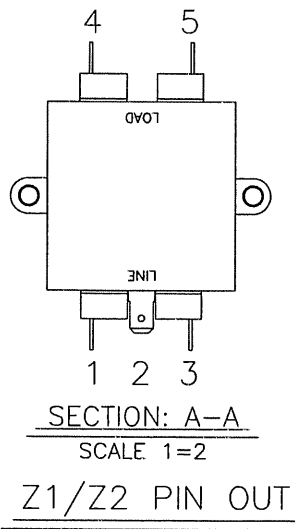
Fax: 605-697-4444

E-mail: helpdesk@daktronics.com

Appendix A: Reference Drawings

Refer to **Section 1** for information on reading drawing numbers. The following drawings are listed in numerical order by size (A, B, etc.). The drawings following this section are split into sections according to drawing type. Those drawings are listed according to display size.

Power Termination Box	Drawing A-129227
Assy, Power Supply, A-1633 & A-1591 or A-1577@2	Drawing A-135118
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
Comp. Layout, AF-3150-16/32/48x48-20-Mono-G2.....	Drawing A-178259
Comp. Layout, AF-3150-16/32/48x64-20-Mono-G2.....	Drawing A-178261
Comp. Layout, AF-3150-16/32/48x80-20-Mono-G2.....	Drawing A-178262
Comp. Layout, AF-3150-16/32/48x96-20-Mono-G2.....	Drawing A-178263
Comp. Layout, AF-3150-16/32/48x112-20-Mono-G2.....	Drawing A-178264
Comp. Layout, AF-3150-16/32/48x128-20-Mono-G2.....	Drawing A-178265
Comp. Layout, AF-3150-16/32/48x144-20-Mono-G2.....	Drawing A-178266
Symbols, AF-315* Component Layout	Drawing A-179505
Schematic; Power Supply Configurations	Drawing A-183321
Power Specs, 16X144-48X144 Displays.....	Drawing A-183327
System Riser Diagram; QC Outdoor Radio Gen 2.....	Drawing A-185359
Controller, Galaxy, 8 Conn, J1087	Drawing B-177838
Schematic, Internal, W/Quick Connect.....	Drawing B-177662
Schematic, AF-3155-16x***-20mm, RGB.....	Drawing B-183346
Schematic, AF-3155-32x***-20mm, RGB.....	Drawing B-183347
Schematic, AF-3155-48x***-20mm, RGB.....	Drawing B-183348
Shop Drawing, AF-3155-***x***-20mm-RGB	Drawing B-184075



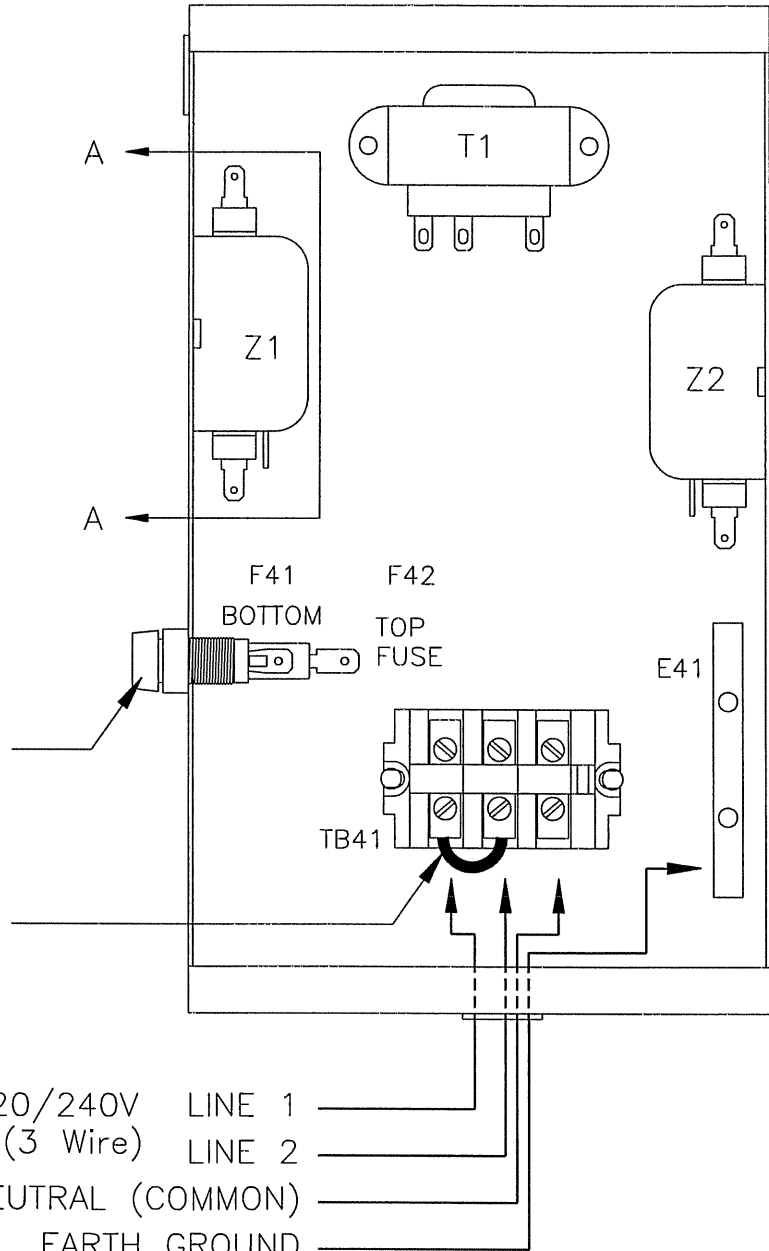
Z1/Z2 PIN OUT

REPLACE FUSES WITH THE SAME TYPE AND RATING. SEE BELOW.

SHORTING JUMPER (REMOVE IF TWO LINES ARE TERMINATED)

120 or 240 VAC
(2 Wire)
TB41-1&2 Jumpered

120/240V LINE 1
(3 Wire) LINE 2
NEUTRAL (COMMON)
EARTH GROUND



FRONT VIEW

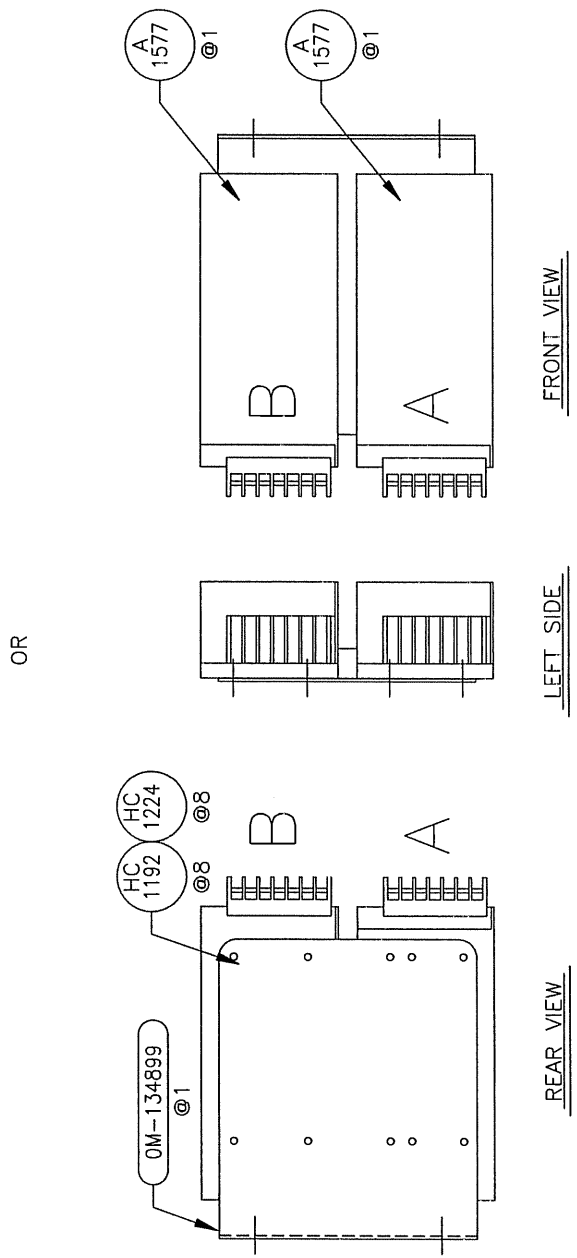
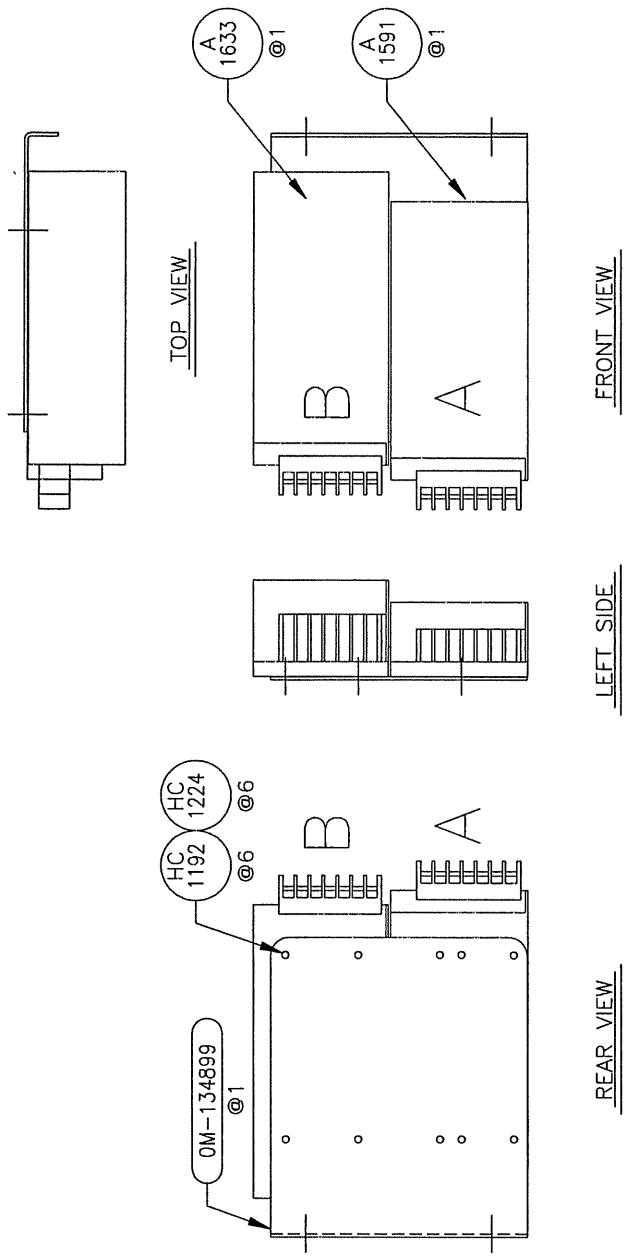
COVER REMOVED

FUSE REPLACEMENT INFORMATION

Voltage	Fuse Type	Daktronics part no.
120VAC	MWO-15	F-1028
120/240VAC	MWO-15	F-1028
240VAC	MDL-7	F-1031

REV.	DATE	DESCRIPTION	BY	APPR.
01	30OCT01	REPLACED E-1001 @2 WITH TB-1037.	MDM	

DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ: GALAXY, LOUVERED, VENUS 1500, 34MM	
TITLE: POWER TERMINATION BOX	
DES. BY: MMAMENGA	DRAWN BY: KERR/WOODARD DATE: 10MAR00
REVISION	APPR. BY:
	SCALE: 1=2
1215-R04A-129227	

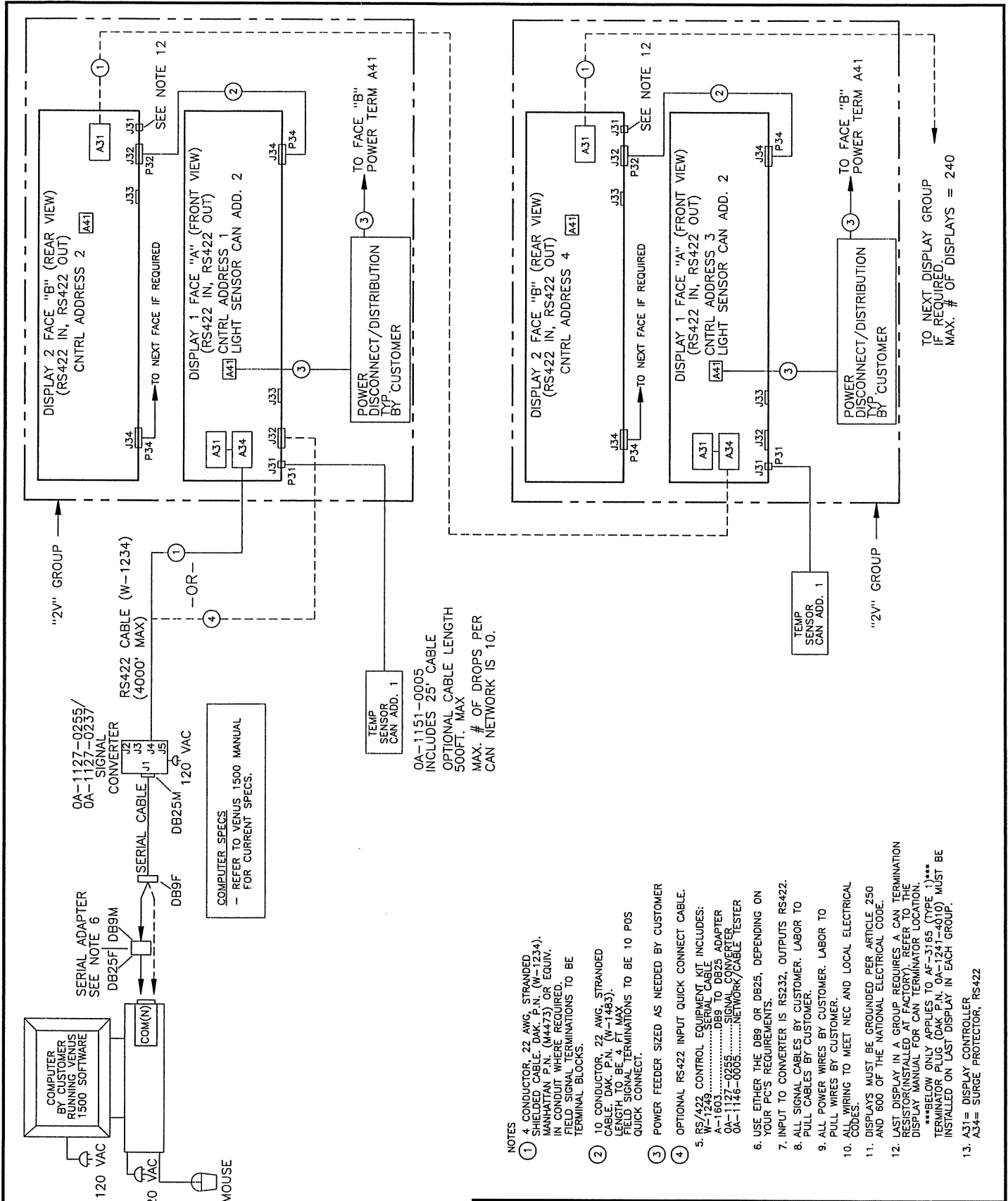


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DAKTRONICS, INC. BROOKINGS, SD 57006

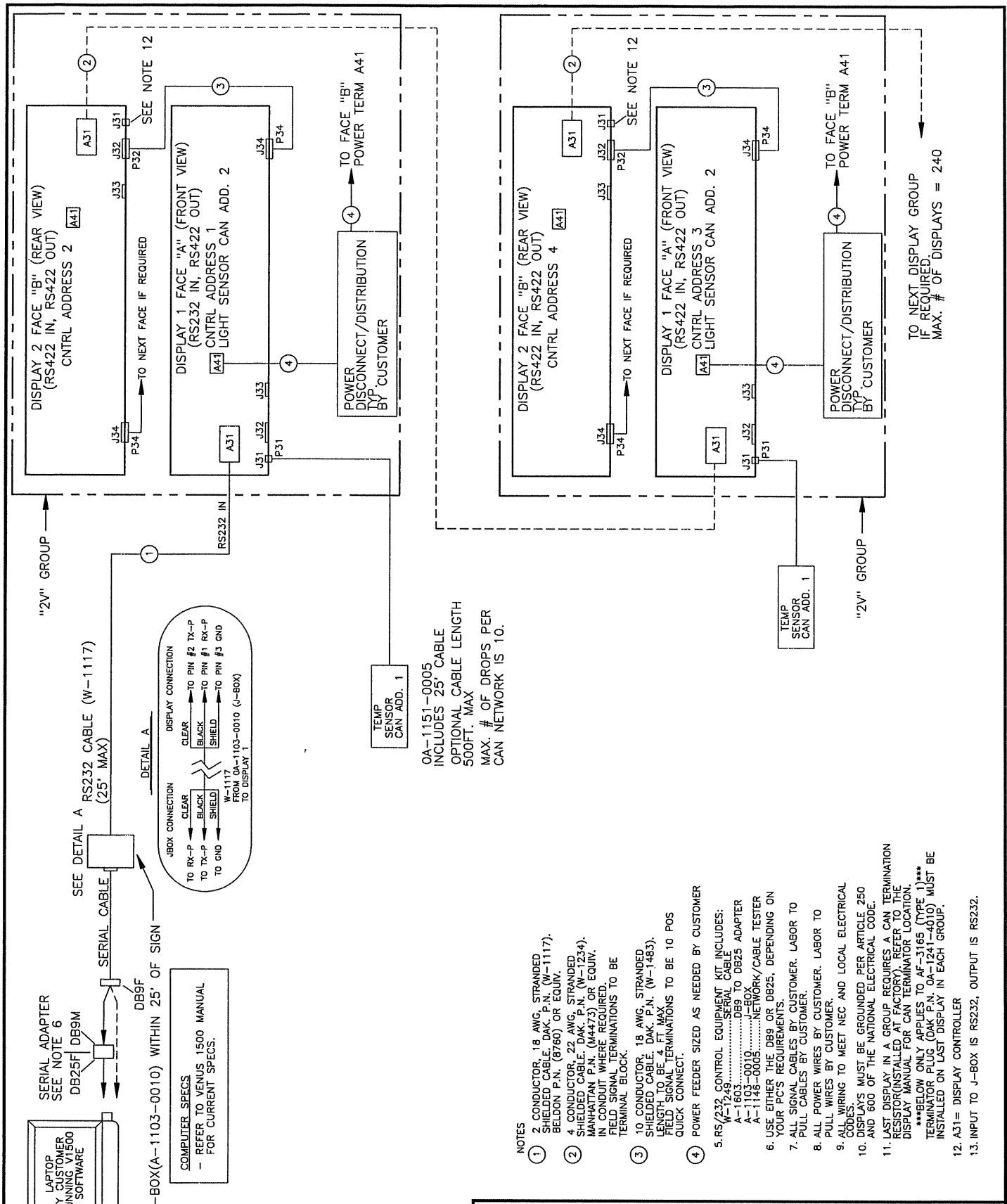
PROJ:	1.33" LINE DISPLAYS		
TITLE:	ASSY. POWER SUPPLY A-1633 & A-1591 OR A-1577@2		
DES. BY:	MMAMMENGA	DRAWN BY:	MMAMMENGA
		DATE:	14JUL00
REVISION	APPR. BY:	1213-E10A-135118	
	SCALE: 1=5		

REV.	DATE	DESCRIPTION	BY	APPR.
02	20 MAR 03	UPDATED PLACEMENT OF POWER SUPPLIES	KSM	
01	24 FEB 03	ADDED VIEW SHOWING OPTIONAL MOUNTING OF PWR SPLY A-1577 @2 FOR RGB DISPLAYS.	EJY	



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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			

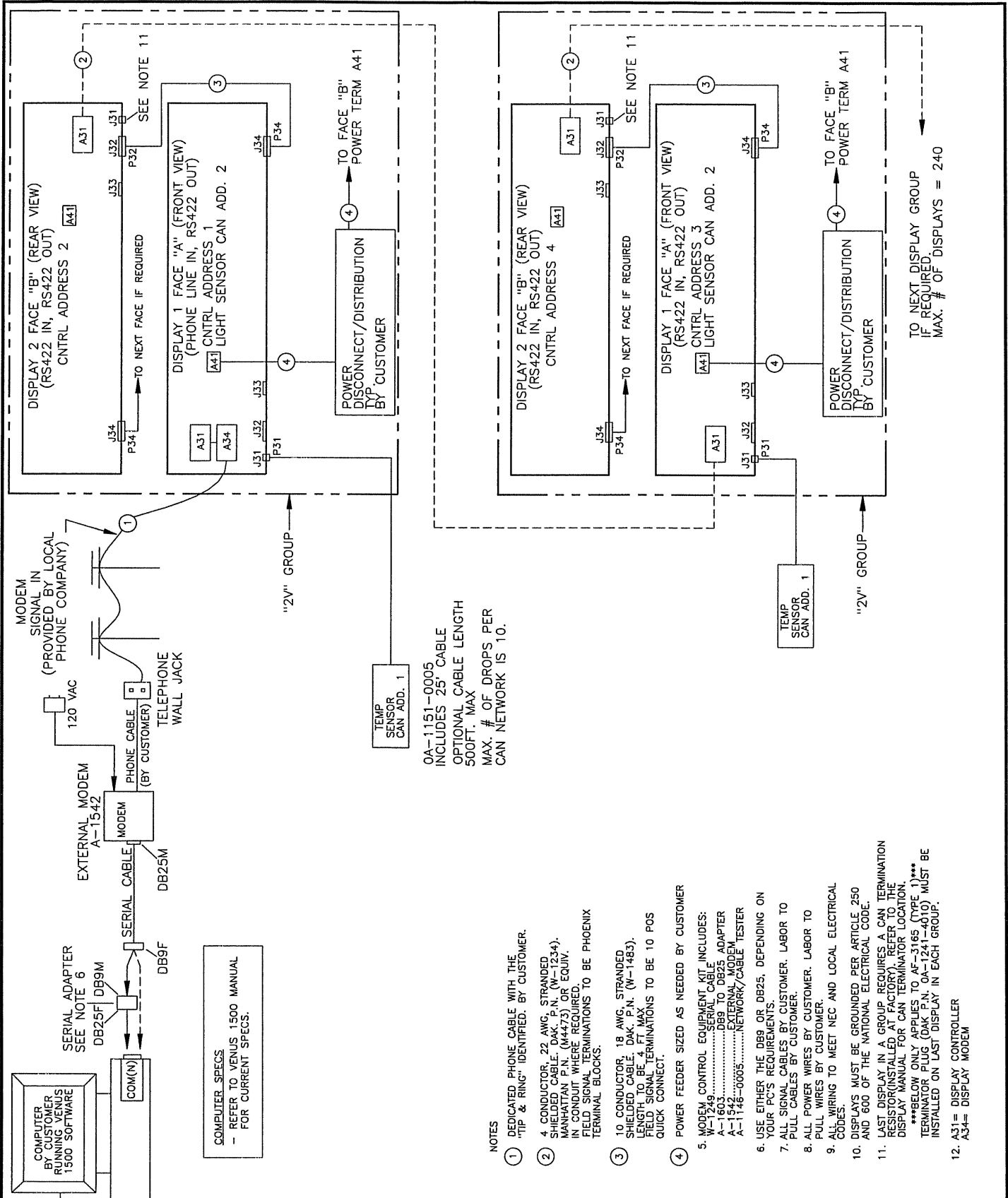
REV.	DATE	DESCRIPTION	BY	APPR.
03	26 MAR 04	REPLACED OA-1127-0237 WITH OA-1127-0255 (INCLUDES SURGE PROTECTION)	SAI	DJM
02	26DEC03	CHANGED TEMP SENSOR PART NUMBER FROM OA-1241-4017 TO OA-1151-0005. REMOVED NOTE2.		DJM
01	27JAN03	REMOVED CHART 1 (PWR, SIGNAL, SPEC). REPLACED OA-1241-4016 WITH W-1483.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



- NOTES
- 2 CONDUCTOR, 18 AWG, STRANDED SHIELDED CABLE, DAK P.N. (W-1117), BELDON P.N. (8760) OR EQUIV.
 - 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 BLOCK.
 - 10 CONDUCTOR, 18 AWG, STRANDED SHIELDED CABLE, DAK P.N. (W-1483), BELDON P.N. (8760) OR EQUIV. FIELD SIGNAL TERMINATIONS TO BE 10 POS QUICK CONNECT.
 - POWER FEEDER SIZED AS NEEDED BY CUSTOMER
 - RS/232 CONTROL EQUIPMENT KIT INCLUDES:
W-1603.....SERIAL CABLE
A-1103-0010.....DB9 TO DB25 ADAPTER
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 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.
12. A31= DISPLAY CONTROLLER
13. INPUT TO J-BOX IS RS232, OUTPUT IS RS232.

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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 OA-1241-4017 TO OA-1151-0005. REMOVED NOTE 3 AND 6.	DJM	
01	27JAN03	REMOVED CHART 1 (PWR, SIGNAL, SPEC). REPLACED OA-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.

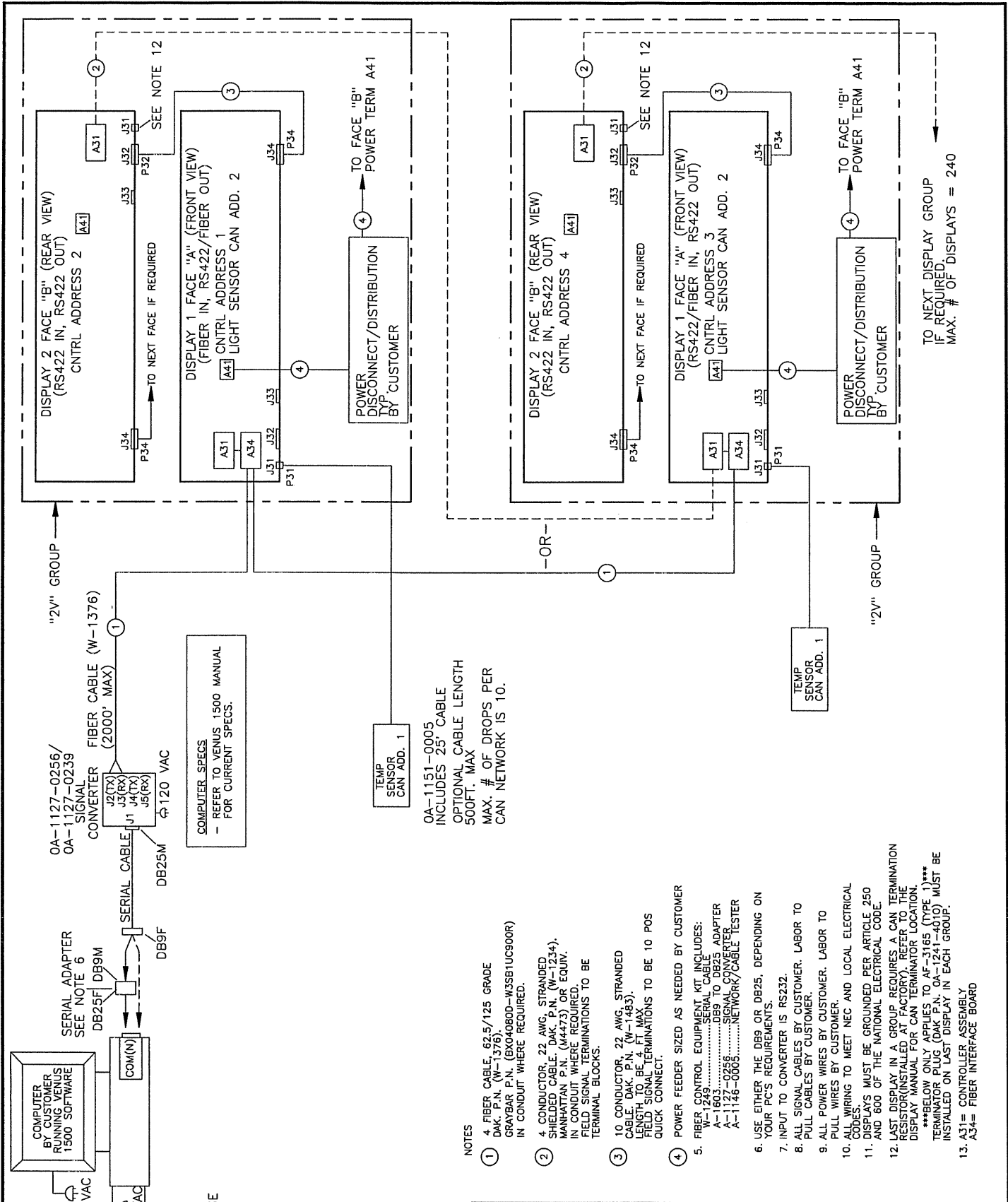
- NOTES
1. DEDICATED PHONE CABLE WITH THE "TIP & RING" IDENTIFIED, BY CUSTOMER.
 2. 4 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE, DAK, P.N. (W-1234), MANHATTAN P.N. (M4473) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE PHOENIX TERMINAL BLOCKS.
 3. 10 CONDUCTOR, 18 AWG, STRANDED 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:
A-1603.....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 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. 0A-1241-4010) 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:
02	SCALE: NONE
1229-R01A-174342	

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	



- NOTES**
- 4 FIBER CABLE, 62.5/125 GRADE DAK. P.N. (W-1376). GRAYBAR P.N. (BX04080-W35B1UC900R) IN CONDUIT WHERE REQUIRED.
 - 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 10 FT. MAX. FIELD SIGNAL TERMINATIONS TO BE 10 POS QUICK CONNECT.
 - POWER FEEDER SIZED AS NEEDED BY CUSTOMER
 - FIBER CONTROL EQUIPMENT KIT INCLUDES:
 W-1249.....SERIAL CABLE
 A-1603.....DB9 TO DB25F ADAPTER
 A-1146-3065.....NETWORK/CABLE TESTER
 - USE EITHER THE DB9 OR DB25, DEPENDING ON YOUR PC'S REQUIREMENTS.
 - INPUT TO CONVERTER IS RS232.
 - ALL SIGNAL CABLES BY CUSTOMER. LABOR TO PULL CABLES BY CUSTOMER.
 - ALL POWER WIRES BY CUSTOMER. LABOR TO PULL WIRES BY CUSTOMER.
 - ALL WIRING TO MEET NEC AND LOCAL ELECTRICAL CODES.
 - DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NATIONAL ELECTRICAL CODE.
 - 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. 0A-1241-4010) MUST BE INSTALLED ON LAST DISPLAY IN EACH GROUP.
 - A31= CONTROLLER ASSEMBLY
 A34= FIBER INTERFACE BOARD

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

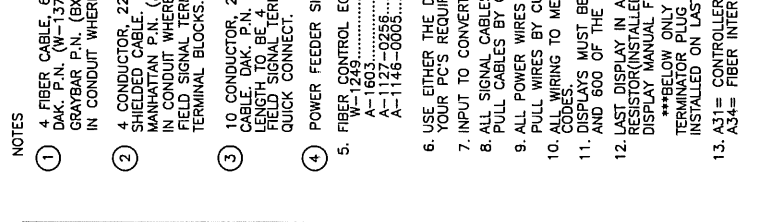
TEMP SENSOR CAN ADD. 1

COMPUTER BY CUSTOMER RUNNING VENUS 1500 SOFTWARE

SERIAL ADAPTER DB25F DB9M SEE NOTE 6

SIGNAL CONVERTER FIBER CABLE (W-1376) (2000' MAX)

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



REV.	DATE	DESCRIPTION	BY	APPR.
03	26 MAR 04	REPLACED 0A-1127-0239 WITH 0A-1127-0256 (INCLUDES SURGE PROTECTION)	SAI	DJM
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	

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: OUTDOOR LED PRODUCT LINE

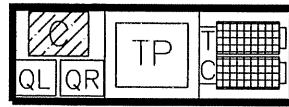
TITLE: SYSTEM RISER DIAGRAM, FIBER

DES. BY: DRAWN BY: LKERR DATE: 06SEP02

REVISION 03 APPR. BY: SCALE: NONE

1229-R01A-174344

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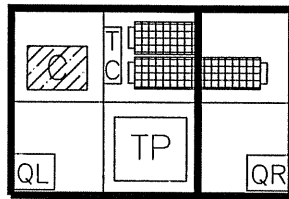


LT [hatched] B

FRONT VIEW

AF-315*-1648-20MM

[]]]

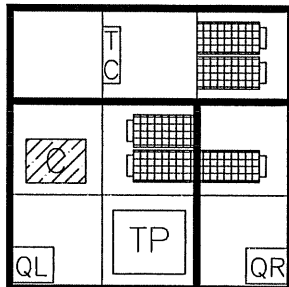


LT [hatched] B

FRONT VIEW

AF-315*-3248-20MM

[]]]



LT [hatched] B

FRONT VIEW

AF-315*-4848-20MM

NOTE:
VERTICAL ORIENTATIONS
SHOWN ABOVE FRONT VIEW.

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, AF-315*, 20MM

TITLE: COMP. LAYOUT, AF-315*-16/32/48X48-20MM-G2

DES. BY: WTUCKER

DRAWN BY: RVOSS

DATE: 03 JAN 03

REVISION

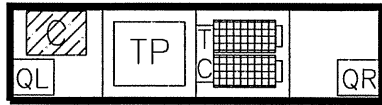
APPR. BY:

SCALE: 1=25

1289-E10A-178259

REV.	DATE	DESCRIPTION	BY	APPR.
01	24FEB03	UPDATED LABELS AND TITLE FROM 3150 SPECIFIC TO 315* SPECIFIC.	EJY	

[]]]]

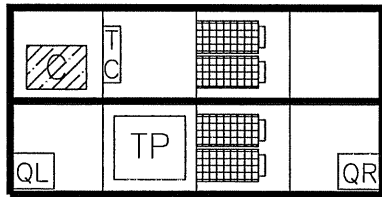


LT [diagonal hatching] B

FRONT VIEW

AF-315*-1664-20MM

[]]]]

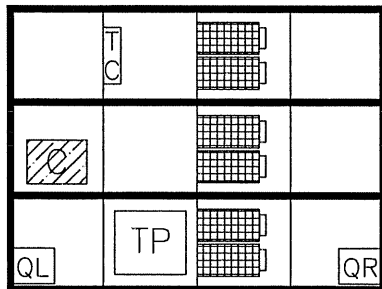


LT [diagonal hatching] B

FRONT VIEW

AF-315*-3264-20MM

[]]]]



LT [diagonal hatching] B B

FRONT VIEW

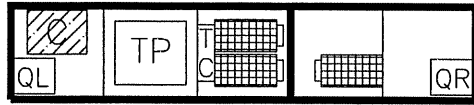
AF-315*-4864-20MM

NOTE:
VERTICAL ORIENTATIONS
SHOWN ABOVE FRONT VIEW.

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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: GALAXY, AF-315*, 20MM			
TITLE: COMP. LAYOUT, AF-315*-16/32/48X64-20MM-G2			
DES. BY: WTUCKER		DRAWN BY: RVOSS	
		DATE: 03 JAN 03	
REVISION	APPR. BY:	1289-E10A-178261	
	SCALE: 1=25		

01	24FEB03	UPDATED LABELS AND TITLE FROM 3150 SPECIFIC TO 315* SPECIFIC.	EJY	
REV.	DATE	DESCRIPTION	BY	APPR.

[]]]]]

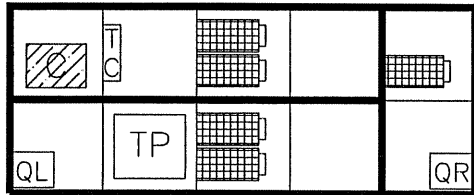


LT B

FRONT VIEW

AF-315*-1680-20MM

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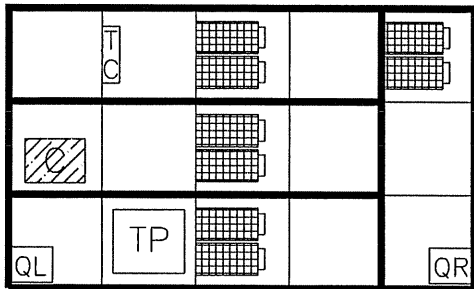


LT B

FRONT VIEW

AF-315*-3280-20MM

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LT B B

FRONT VIEW

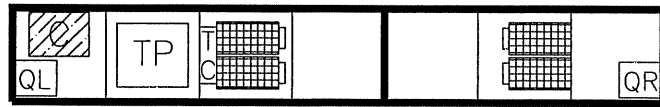
AF-315*-4880-20MM

NOTE:
VERTICAL ORIENTATIONS
SHOWN ABOVE FRONT VIEW.

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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: GALAXY, AF-315*, 20MM			
TITLE: COMP. LAYOUT, AF-315*-16/32/48X80-20MM-G2			
DES. BY: WTUCKER		DRAWN BY: RVOSS	
		DATE: 03 JAN 03	
REVISION	APPR. BY:	1289-E10A-178262	
	SCALE: 1=25		

01	24FEB03	UPDATED LABELS AND TITLE FROM 3150 SPECIFIC TO 315* SPECIFIC.	EJY	
REV.	DATE	DESCRIPTION	BY	APPR.

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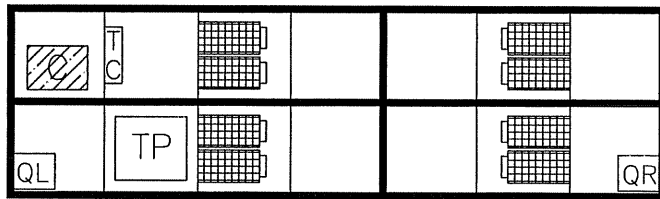


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FRONT VIEW

AF-315*-16112-20MM

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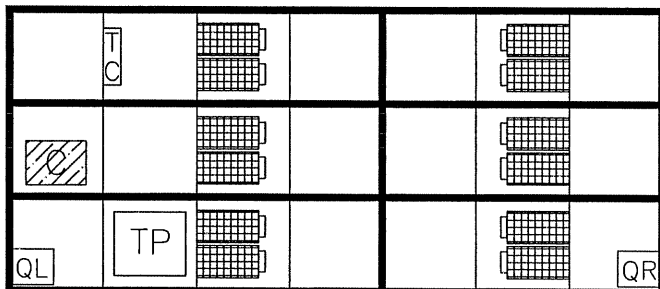


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FRONT VIEW

AF-315*-32112-20MM

[] [] [] [] [] []



LT [hatched] B [hatched] B

FRONT VIEW

AF-315*-48112-20MM

NOTE:
VERTICAL ORIENTATIONS
SHOWN ABOVE FRONT VIEW.

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, AF-315*, 20MM

TITLE: COMP. LAYOUT, AF-315*-16/32/48X112-20MM-G2

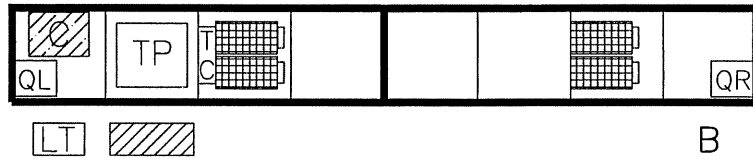
DES. BY: WTUCKER DRAWN BY: RVOSS DATE: 03 JAN 03

REVISION APPR. BY:
SCALE: 1=25

1289-E10A-178264

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REV.	DATE	DESCRIPTION	BY	APPR.

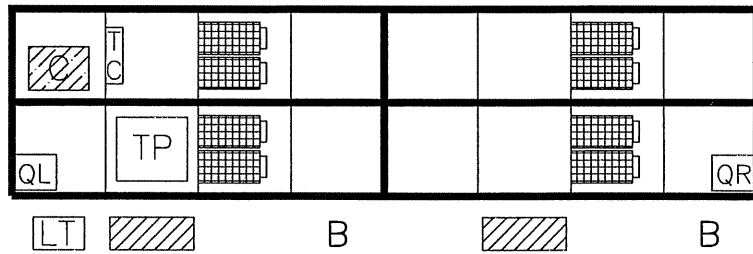
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FRONT VIEW

AF-315*-16128-20MM

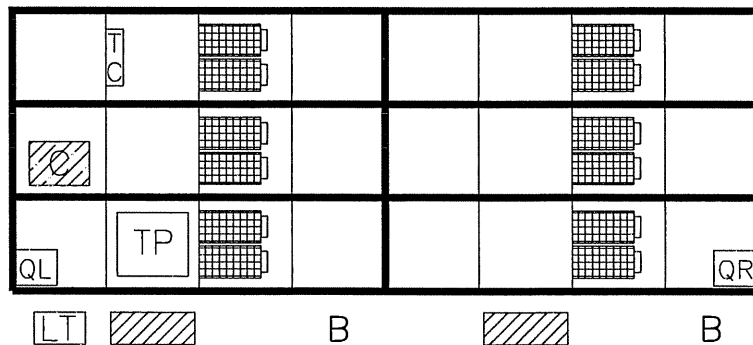
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FRONT VIEW

AF-315*-32128-20MM

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FRONT VIEW

AF-315*-48128-20MM

NOTE:
VERTICAL ORIENTATIONS
SHOWN ABOVE FRONT VIEW.

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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: GALAXY, AF-315*, 20MM			
TITLE: COMP. LAYOUT, AF-315*-16/32/48X128-20MM-G2			
DES. BY: WTUCKER		DRAWN BY: RVOSS	
		DATE: 03 JAN 03	
REVISION	APPR. BY:	1289-E10A-178265	
	SCALE: 1=25		

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REV.	DATE	DESCRIPTION	BY	APPR.

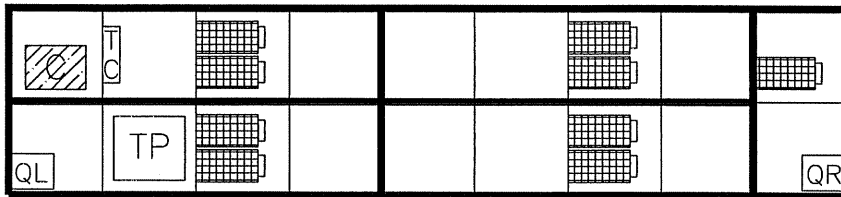


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FRONT VIEW

AF-315*-16144-20MM



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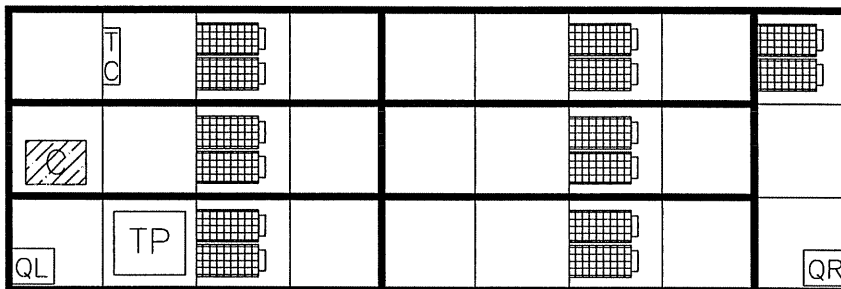
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FRONT VIEW

AF-315*-32144-20MM



LT [hatched]

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B

FRONT VIEW

AF-315*-48144-20MM

NOTE:
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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, AF-315*,20MM

TITLE: COMP. LAYOUT, AF-315*-16/32/48X144-20MM-G2

DES. BY: WTUCKER DRAWN BY: RYOSS DATE: 03 JAN 03

REVISION APPR. BY:
SCALE: 1=25

1289-E10A-178266

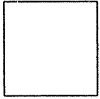
REV.	DATE	DESCRIPTION	BY	APPR.
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
TP
POWER TERMINATION BOX OA-1289-4005


LT
LIGHT DETECTOR OA-1241-4013 (MASTER) OA-1213-4009 (SLAVE)


QR
QUICK CONNECT PANEL (RIGHT SIDE) OP-1229-2002

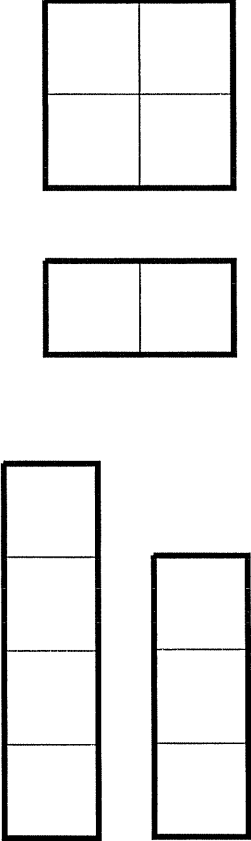
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QUICK CONNECT PANEL (LEFT SIDE) OP-1229-2001



MODULE 12.48" X 12.48" 16 PIXEL X 16 PIXEL 20mm C-C / 0.78" C-C

POWER SUPPLY CONFIGURATIONS 
OA-1289-4012 (A-1620@2) OR OA-1289-4014 (A-1577@2)


CONTROLLER OA-1229-0005


AIR FILTER EN-1774


<p>DARKER GRID LINES REPRESENT A GROUPING OF MODULES THAT ARE POWERED BY A GROUPING OF POWER SUPPLIES. ABOVE EXAMPLES SHOW GROUPING POSSIBILITIES.</p>

POWER SUPPLY CONFIGURATIONS 
OA-1289-4011 (A-1620@1) OR OA-1289-4013 (A-1577@1)

TC
THERMOSTAT OA-1213-4024

B
FAN OA-1213-4014 B-1006 W/ HARDWARE

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, AF-315*, 20MM

TITLE: SYMBOLS, AF-315* COMPONENT LAYOUT

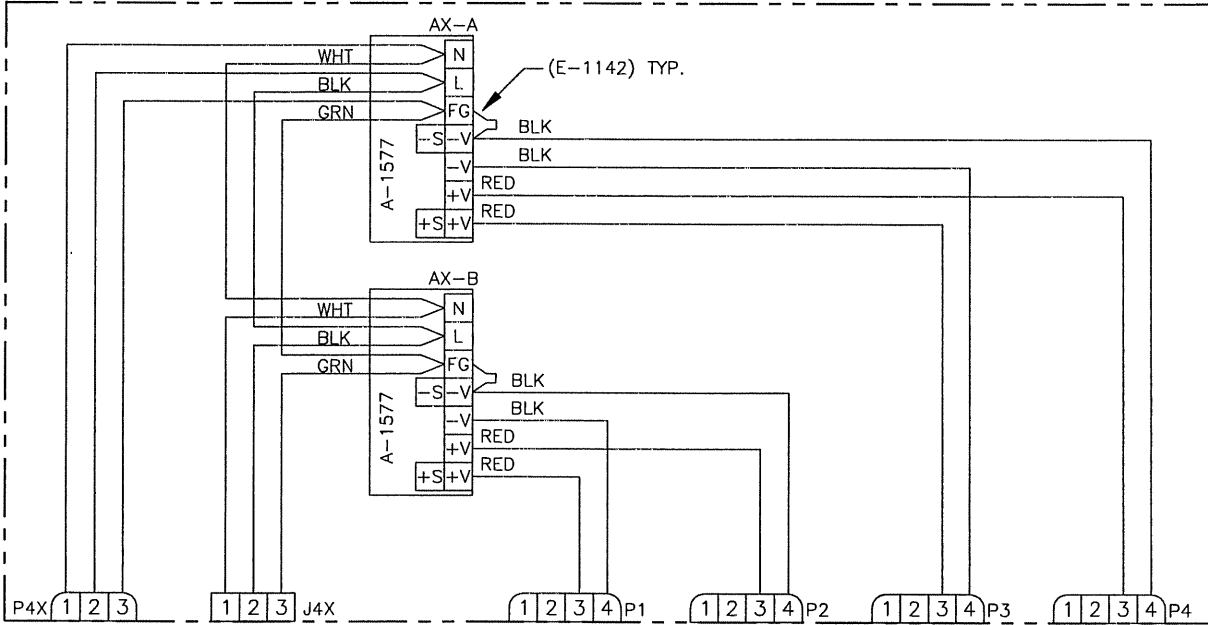
DES. BY: MMAMMENGA DRAWN BY: RVOSS DATE: 03 JAN 03

REVISION	APPR. BY:
01	SCALE: 1=30

1289-E10A-179505

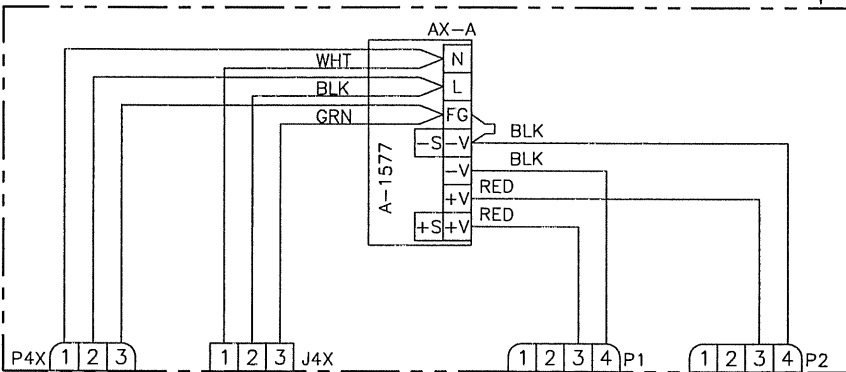
REV.	DATE	DESCRIPTION	BY	APPR.
01	24FEB03	UPDATED POWER SUPPLY OPTION TO ACCOMMODATE RGB DISPLAYS.	EJY	

DUAL 5.3VDC VERSION (RGB)
 0A-1289-4014
 (SET POWER SUPPLIES TO 5.3VDC)



BE CERTAIN ALL TERMINALS ON
 POWER SUPPLY ARE TIGHTENED.

SINGLE 5.3VDC VERSION (RGB)
 0A-1289-4013
 (SET POWER SUPPLY TO 5.3VDC)



NOTES

- 1) ALL WIRE IS 14 AWG EXCEPT * IS 18 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; LOUVERED, 20MM

TITLE: SCHEMATIC; POWER SUPPLY CONFIGURATIONS

DES. BY: LKERR

DRAWN BY: DMATHERN

DATE: 13 FEB 03

REVISION

APPR. BY:

SCALE: 1=1

1289-R03A-183321

REV.	DATE	DESCRIPTION	BY	APPR.

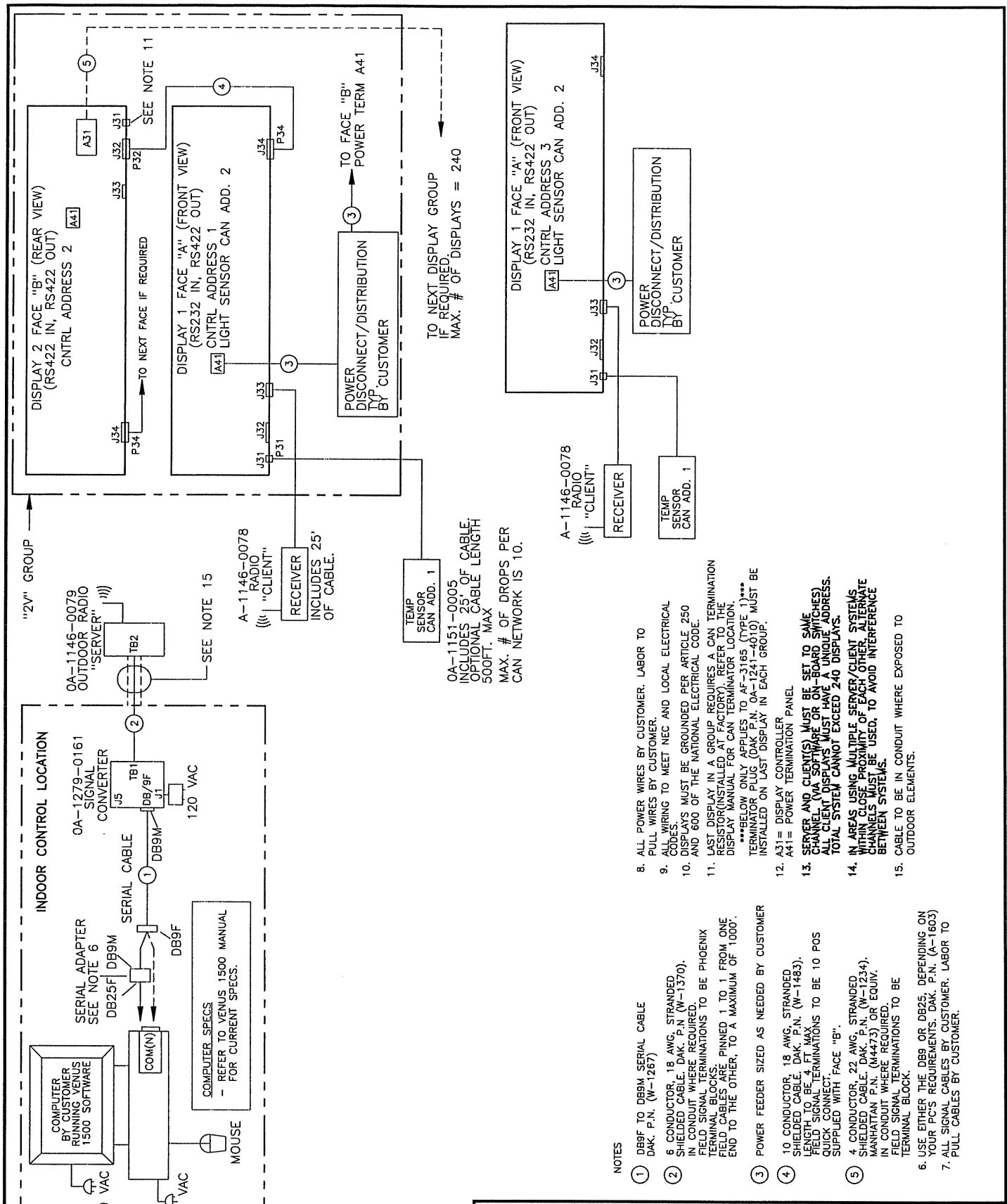
20mm LOUVERED RGB GALAXY DISPLAYS
POWER SPECIFICATION CHART

MATRIX SIZE	TOTAL WATTS	120V AMPS	120/240 3, wire		240V AMPS
			LINE 1 AMPS	LINE 2 AMPS	
16X48	281	2.34	120/240 VAC IS NOT AVAILABLE FOR SIZE		1.17
16X64	357	2.97			1.49
16X80	432	3.60	2.34	1.26	1.80
16X96	508	4.23	2.97	1.26	2.12
16X112	583	4.86	2.97	1.89	2.43
16X128	659	5.49	2.97	2.51	2.74
16X144	734	6.12	2.97	3.14	3.06
32X48	508	4.23	2.51	1.72	2.12
32X64	659	5.49	2.51	2.97	2.74
32X80	809	6.74	2.51	4.23	3.37
32X96	1000	8.34	5.03	3.31	4.17
32X112	1151	9.59	5.03	4.56	4.56
32X128	1302	10.85	5.03	5.82	5.43
32X144	1453	12.11	5.03	7.08	6.05
48X48	734	6.12	2.51	3.60	3.06
48X64	1000	8.34	2.51	5.82	4.17
48X80	1227	10.22	5.03	5.19	5.11
48X96	1453	12.11	7.54	4.56	6.05
48X112	1679	13.99	7.54	6.45	7.00
48X128	1906	15.88	7.54	8.34	7.94
48X144	2172	18.10	7.54	10.55	9.05
48X160	2398	19.98	11.32	8.67	9.99

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

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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: GALAXY, LOUVERED, VENUS 1500, 20MM, AF-3155			
TITLE: POWER SPECS, 16X144-48X144 DISPLAYS			
DES. BY:	DRAWN BY: DMATHERN	DATE: 13 DEC 03	
REVISION	APPR. BY:	1289-R10A-183327	
01	SCALE: 1=1		

01	16JUL04	ADDED 48X160 SIZE	LLK	LLK
REV.	DATE	DESCRIPTION	BY	APPR.



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	

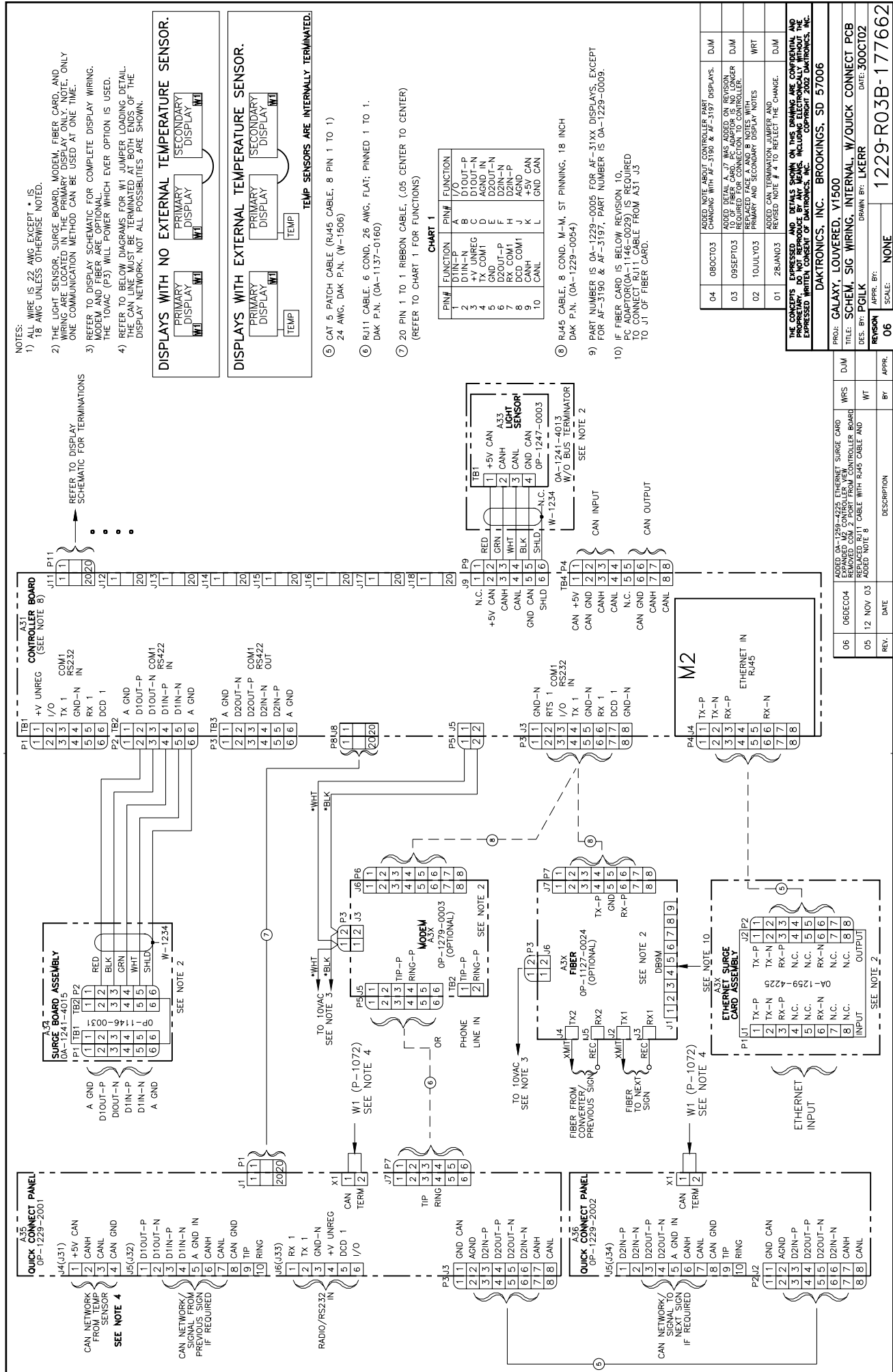
THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS, INCLUDING ELECTRONICALLY WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2003 DAKTRONICS, INC.

DAKTRONICS, INC. BROOKINGS, SD 57006

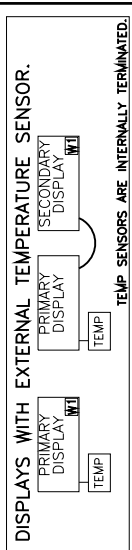
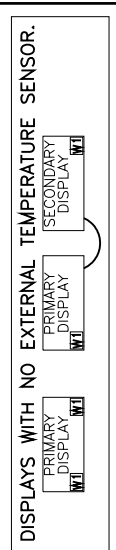
PROJ: **OUTDOOR LED PRODUCT LINE**
 TITLE: **SYSTEM RISER DIAGRAM, QC OUTDOOR RADIO, GEN 2**
 DES. BY: _____ DRAWN BY: **LKERR** DATE: **20MAR03**

REVISION: **02** APPR. BY: _____ SCALE: **NONE** **1229-R01A-185359**

- 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
 - 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 OULY CONNECT. SUPPLIED WITH FACE "B".
 - 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 BLOCK.
 - USE EITHER THE DB9 OR DB25, DEPENDING ON YOUR PC'S REQUIREMENTS. DAK. P.N. (A-1603)
 - PULL CABLES BY CUSTOMER. LABOR TO CUSTOMER.
 - ALL POWER WIRES BY CUSTOMER. LABOR TO PULL WIRES BY CUSTOMER.
 - ALL WIRING TO MEET NEC AND LOCAL ELECTRICAL CODES.
 - DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NATIONAL ELECTRICAL CODE.
 - 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.
 - A31 = DISPLAY CONTROLLER PANEL
 - SERVER AND CLIENT(S) MUST BE SET TO SAME IP ADDRESS. ALL CLIENT DISPLAYS MUST HAVE UNIQUE IP ADDRESS. TOTAL SYSTEM CANNOT EXCEED 240 DISPLAYS.
 - IN AREAS USING MULTIPLE SERVER/CLIENT SYSTEMS WITHIN CLOSE PROXIMITY OF EACH OTHER, ALTERNATE BETWEEN SYSTEMS TO AVOID INTERFERENCE BETWEEN SYSTEMS.
 - CABLE TO BE IN CONDUIT WHERE EXPOSED TO OUTDOOR ELEMENTS.



- NOTES:
- 1) ALL WIRE IS .22 AWG EXCEPT * IS .18 AWG UNLESS OTHERWISE NOTED.
 - 2) THE LIGHT SENSOR, SURGE BOARD, MODEM, FIBER CARD, AND ETHERNET SURGE CARD ARE REQUIRED FOR THIS BOARD. ONLY ONE COMMUNICATION METHOD CAN BE USED AT ONE TIME.
 - 3) REFER TO DISPLAY SCHEMATIC FOR COMPLETE DISPLAY WIRING. MODELS AND BEER ARE OPTIONAL WHICH THE 10VAC (P3) WILL POWER WHICH EVER OPTION IS USED.
 - 4) REFER TO BELOW DIAGRAMS FOR W1 JUMPER LOADING DETAIL. THE 10VAC (P3) MUST BE USED IN BOTH ENDS OF THE DISPLAY NETWORK. NOT ALL POSSIBILITIES ARE SHOWN.



- TEMP SENSORS ARE INTERNALLY TERMINATED.
- 5) CAT 5 PATCH CABLE (RJ45 CABLE, 8 PIN 1 TO 1)
24 AWG, DAK P.N. (W-1506)
 - 6) RJ11 CABLE, 6 COND, 26 AWG, FLAT; PINNED 1 TO 1.
DAK P.N. (0A-1137-0160)
 - 7) 20 PIN 1 TO 1 RIBBON CABLE, (.05 CENTER TO CENTER)
(REFER TO CHART 1 FOR FUNCTIONS)

CHART 1

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

- 8) RJ45 CABLE, 8 COND, M-M, ST PINNING, 18 INCH
DAK P.N. (0A-1229-0054)
- 9) PART NUMBER IS 0A-1229-0005 FOR AF-31XX DISPLAYS, EXCEPT FOR AF-3190 & AF-3197, PART NUMBER IS 0A-1229-0009.
- 10) 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.

REV	DATE	DESCRIPTION
06	06DEC04	EXPANDED J2 CONTROL BOARD
05	12 NOV 03	ADDED RJ11 CABLE WITH RJ45 CABLE AND
04	08OCT03	CHANGING WITH AF-3190 & AF-3197 DISPLAYS.
03	09SEP03	ADDED DETAIL A37 WAS ADDED ON REVISION
02	10JUL03	REPLACED FACE A AND B NOTES WITH
01	28JAN03	ADDED CAN TERMINATION JUMPER AND

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: 1229, LOUVERED, V1500

TITLE: SCHEM, SIG WIRING, INTERNAL W/QUICK CONNECT PCB

DES. BY: PGLK

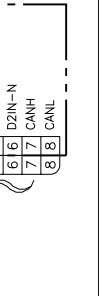
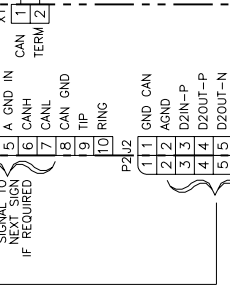
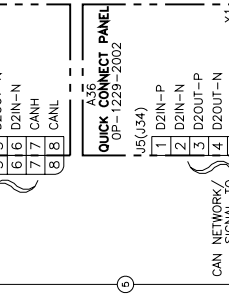
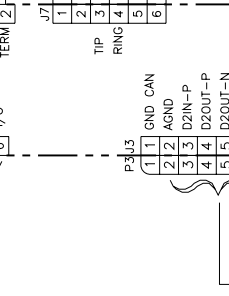
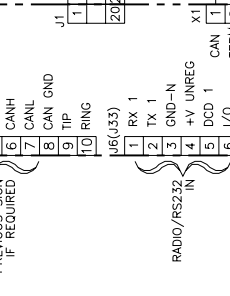
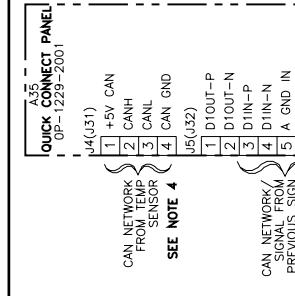
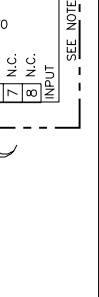
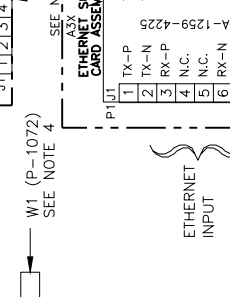
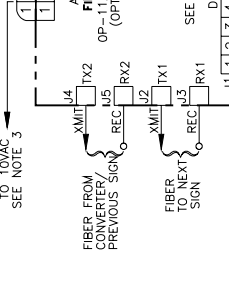
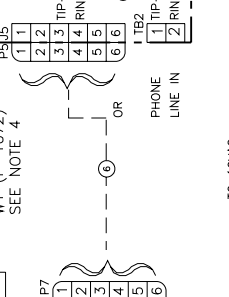
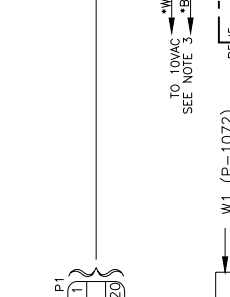
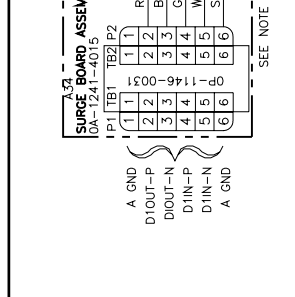
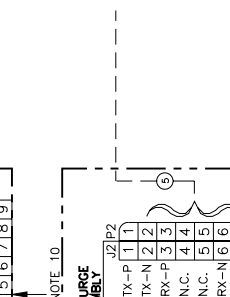
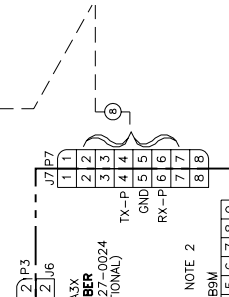
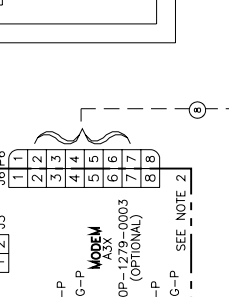
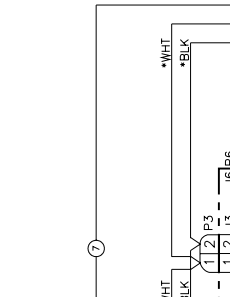
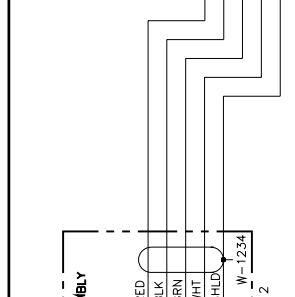
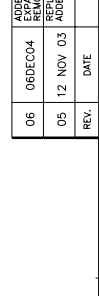
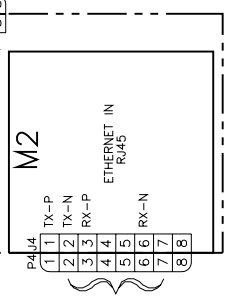
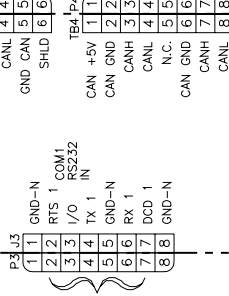
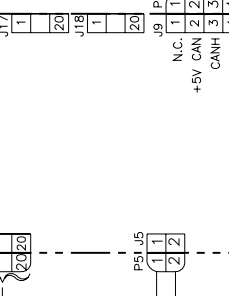
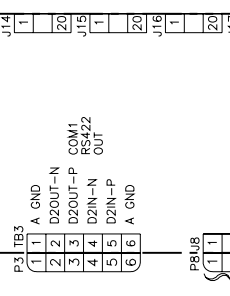
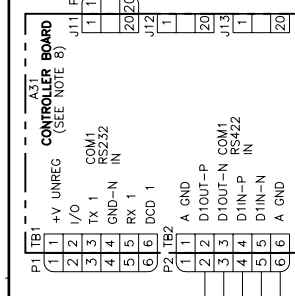
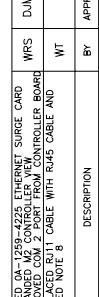
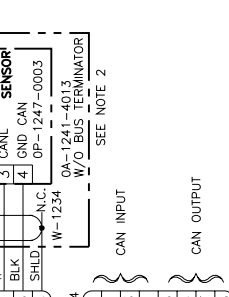
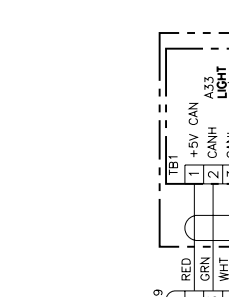
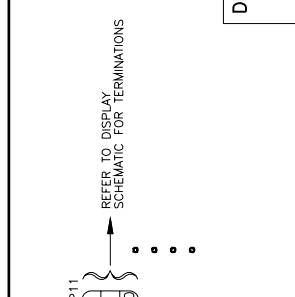
APP. BY: LKRR

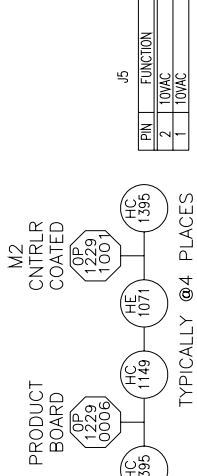
SCALE: NONE

DATE: 30OCT02

REV: 06

1229-R03B-177662

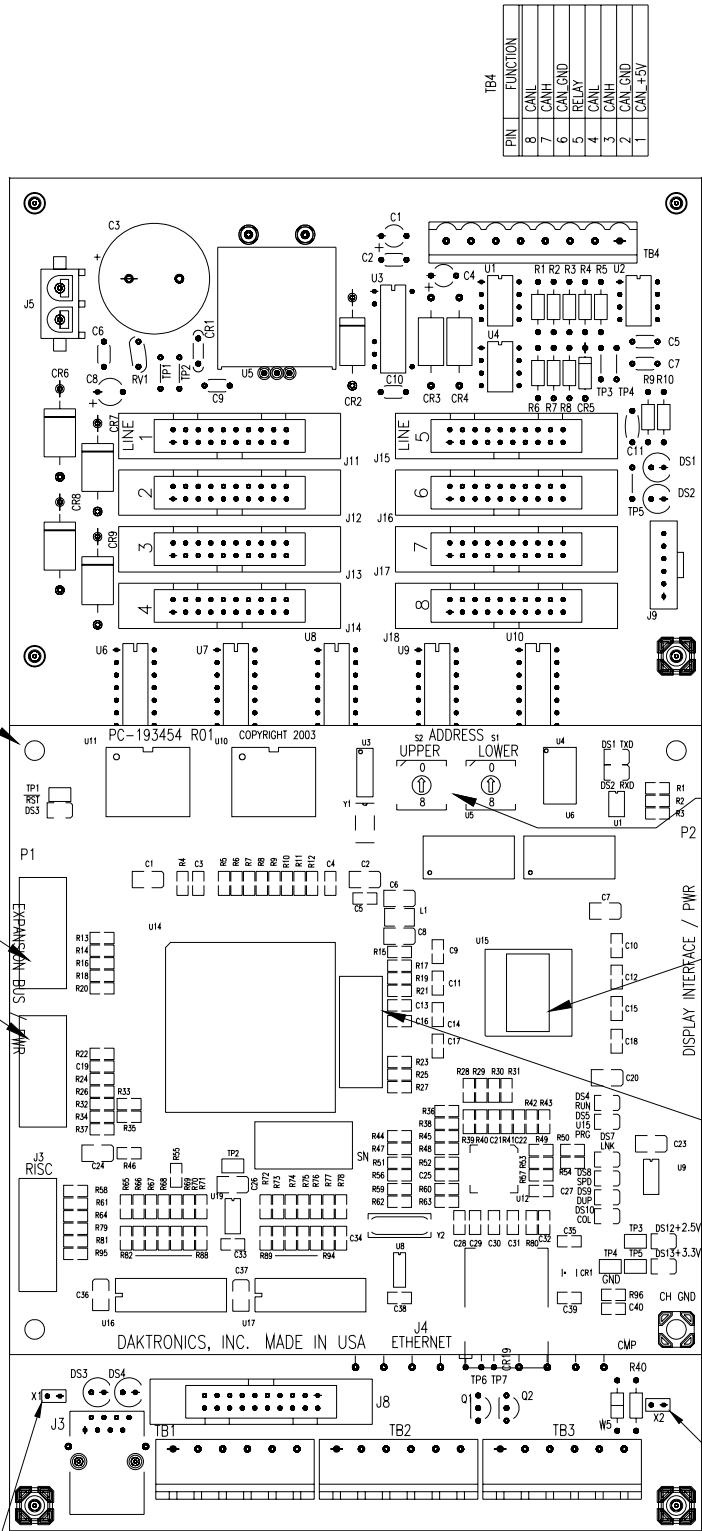




J3			
FUNCTION	PIN	PIN	FUNCTION
TD01	1	2	N.C.
TD11	3	4	TRST1
N.C.	5	6	+3.3V
TCK1	7	8	N.C.
TMS1	9	10	N.C.
HALT	11	12	N.C.
N.C.	13	14	KEYING PIN
N.C.	15	16	GND

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_O0UT-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



TB4	
PIN	FUNCTION
8	CANL
7	CANH
6	CAN_GND
5	RELAY
4	CANL
3	CANH
2	CAN_GND
1	CAN +5V

J9	
PIN	FUNCTION
1	LIGHT-P
2	LIGHT-N
3	+5V-P
4	GND-N
5	SHIELD-N
6	N.C.

UPPER / LOWER ADDRESS SWITCHES

EPID PROGRAM REVISION DATE

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.

TB1	
PIN	FUNCTION
1	GND
2	RIS
3	I/O
4	TX
5	GND
6	RX
7	DCD
8	GND

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

RS232 IN

RS232 IN

RS422 IN

RS422 OUT

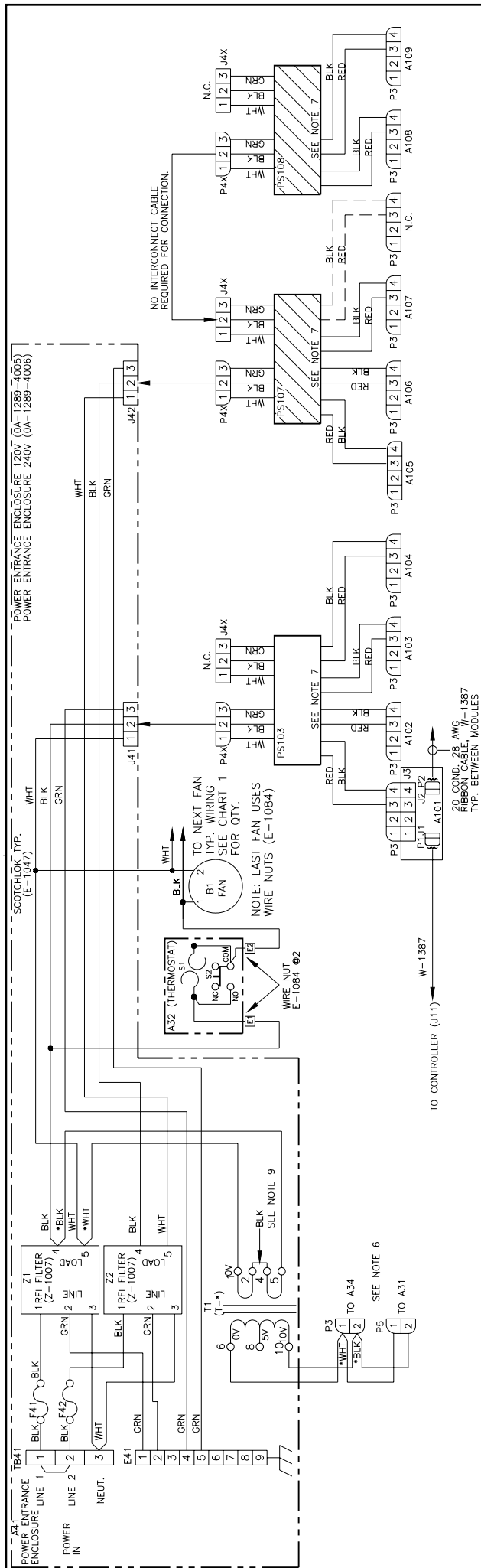
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PROJ: CNTRLR, GALAXY, 8 CONN, J1087
 TITLE: CNTRLR, GALAXY, 8 CONN, J1087
 DES. BY: WATLOR
 DATE: 04 NOV 02

REV. 03
 APPR. BY: WATLOR
 SCALE: 1=1

1229-R10B-177838

REV.	DATE	DESCRIPTION	BY	APPR.
03	14 APR 04	OP-1238-0004 TO 09-1229-1001	MER	
02	23 FEB 04	ADDED HC-1149 W/SHIELD TO STANDOFF FOR M2 TYP. #4	WT	
01	09 JUL 03	CORRECT REF. TABLE FOR TB4	WT	



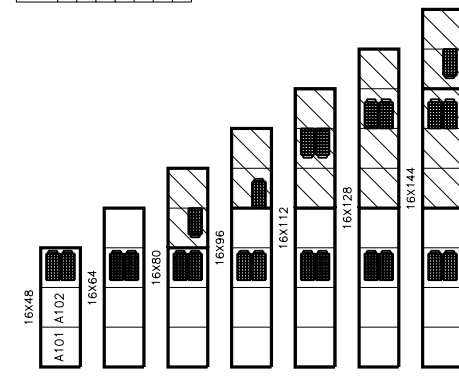
- NOTES
- 1) ALL WIRE IS 14 AWG EXCEPT * IS 18 AWG UNLESS OTHERWISE NOTED.
 - 2) FOR 120VAC INPUT F41 AND F42 ARE MWO-15 FUSES # E-1028.
 - 3) FOR 240VAC INPUT F41 AND F42 ARE MDL-7 FUSES (DOK # F-1031).
 - 4) FOR 120VAC INPUT * IS T-1119.
 - 5) FOR 240VAC INPUT * IS T-1082.
 - 6) EACH LED MODULE IS A 16X16 MATRIX.
 - 7) THE FRAME IS TO BE CONNECTED TO EARTH GROUND AT INSTALLATION TIME.
 - 8) AC POWER FOR CONTROLLER, INTERNAL INTERFACE CARD IE MODEM, FIBER (IF REQUIRED).
 - 9) REFER TO DWG. A-183321 FOR POWER SUPPLY CONFIGURATIONS.
 - 10) REFER TO DWG. A-183327 FOR POWER SPECS.
 - 11) WHEN T-1119 IS USED PINS 2, 3 AND THE JUMPER SHOWN DO NOT EXIST.
 - 12) FOR 120/240VAC CONNECT LINE(S) TO TB41-1(2) NEUT. TO TB41-3.
 - 13) FOR 240VAC CONNECT TB41-1 (LINE 1) TO TB41-2 (LINE 2) AND CONNECT INCOMING LINE TO TB41-1 AND NEUT. TO TB41-3.
 - 14) SCHEMATIC SHOWN DEPICTS THE LARGEST LENGTH 16 HIGH DISPLAY (16X144). REFER TO CHART 1 AND FIGURE 1 FOR DETAILS ON ALL LENGTH DISPLAYS.
 - 15) REFER TO DWG. B-177662 FOR CONTROLLER SIGNAL WIRING.

FIGURE 1
DEPICTS LARGEST 16 BY 144 COLUMNS.
SELECT CORRESPONDING DISPLAY SIZE.

CHART 1

DISPLAY LENGTH (PIXELS)	POWER SUPPLY ASSEMBLY QTY.	FAN QTY.
48	1	3
64	1	4
80	2	5
96	2	6
112	2	7
128	2	8
144	3	9

- ONE POWER SUPPLY ASSEMBLY
- TWO POWER SUPPLY ASSEMBLY
- MODULE POWERED BY LINE 1
- MODULE POWERED BY LINE 2



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PROJ: GALAXY; LOUVERED VENUS 1500, 20MM
TITLE: SCHEMATIC; AF-3155-16X***-20mm, RGB
DES. BY: LKERR DRAWN BY: DMATHERN DATE: 13 FEB 03
REVISION SCALE: 1=1 APPR. BY: 1289-R03B-183346

POWER ENTRANCE ENCLOSURE 120V (0A-1289-4005)
POWER ENTRANCE ENCLOSURE 240V (0A-1289-4006)

SCOTCHLOK TYP.
(E-1047)

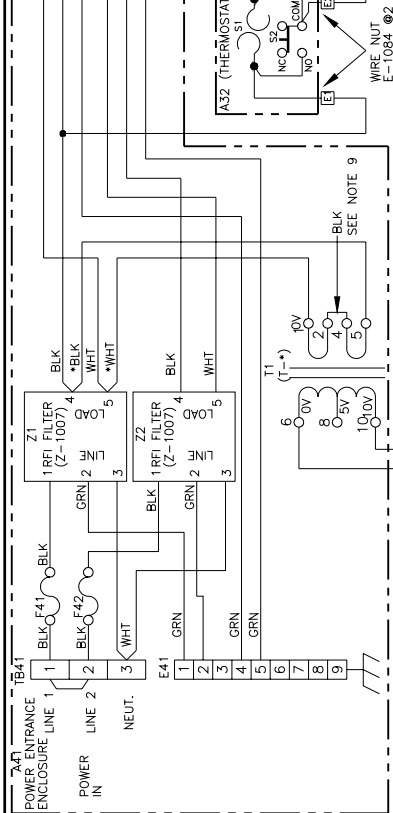
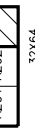


FIGURE 1
DEPICTS LARGEST 32 BY 144 COLUMNS.
SELECT CORRESPONDING DISPLAY SIZE.

32X48



A101
A201 A202



32X64



32X80



32X96



32X112



32X128



32X144

NOTES

- 1) ALL WIRE IS 14 AWG EXCEPT * IS 18 AWG UNLESS OTHERWISE NOTED.
- 2) FOR 120VAC INPUT F41 AND F42 ARE MWO-15 FUSES (DAK.# F-1028). FOR 240VAC INPUT F41 AND F42 ARE MDL-7 FUSES (DAK.# F-1031).
- 3) FOR 120VAC INPUT * IS T-1119. FOR 240VAC INPUT * IS T-1082.
- 4) EACH LED MODULE IS A 16X16 MATRIX.
- 5) THE FRAME IS TO BE CONNECTED TO EARTH GROUND AT INSTALLATION TIME.
- 6) AC POWER FOR CONTROLLER, INTERNAL INTERFACE CARD I'E MODEM, FIBER (IF REQUIRED).
- 7) REFER TO DWG. A-183321 FOR POWER SUPPLY CONFIGURATIONS.
- 8) REFER TO DWG. A-183327 FOR POWER SPECS.
- 9) WHEN T-1119 IS USED PINS 2, 3 AND THE JUMPER SHOWN DO NOT EXIST.
- 10) FOR 120/240VAC CONNECT LINE(S) TO TB41-1(2) NEUT. TO TB41-3. FOR 240VAC CONNECT TB41-1 (LINE 1) TO TB41-2 AND NEUT. TO TB41-3.
- 11) SCHEMATIC SHOWN DEPICTS THE LARGEST LENGTH AND FIGURES REPRESENT THE NUMBER OF LED LENGTH SIGNAL WIRING.
- 12) REFER TO DWG. B-177662 FOR CONTROLLER CONNECTION.
- 13) REQUIRED FOR SIZES 32X80 AND 32X144. USE INTERCONNECT CABLE (0A-1289-4010) FOR CONNECTION.

CHART 1

DISPLAY LENGTH (PIXELS)	POWER SUPPLY ASSEMBLY QTY.	FAN ASSEMBLY QTY.
48	2	6
64	2	8
80	3	10
96	4	12
112	4	14
128	4	16
144	5	18

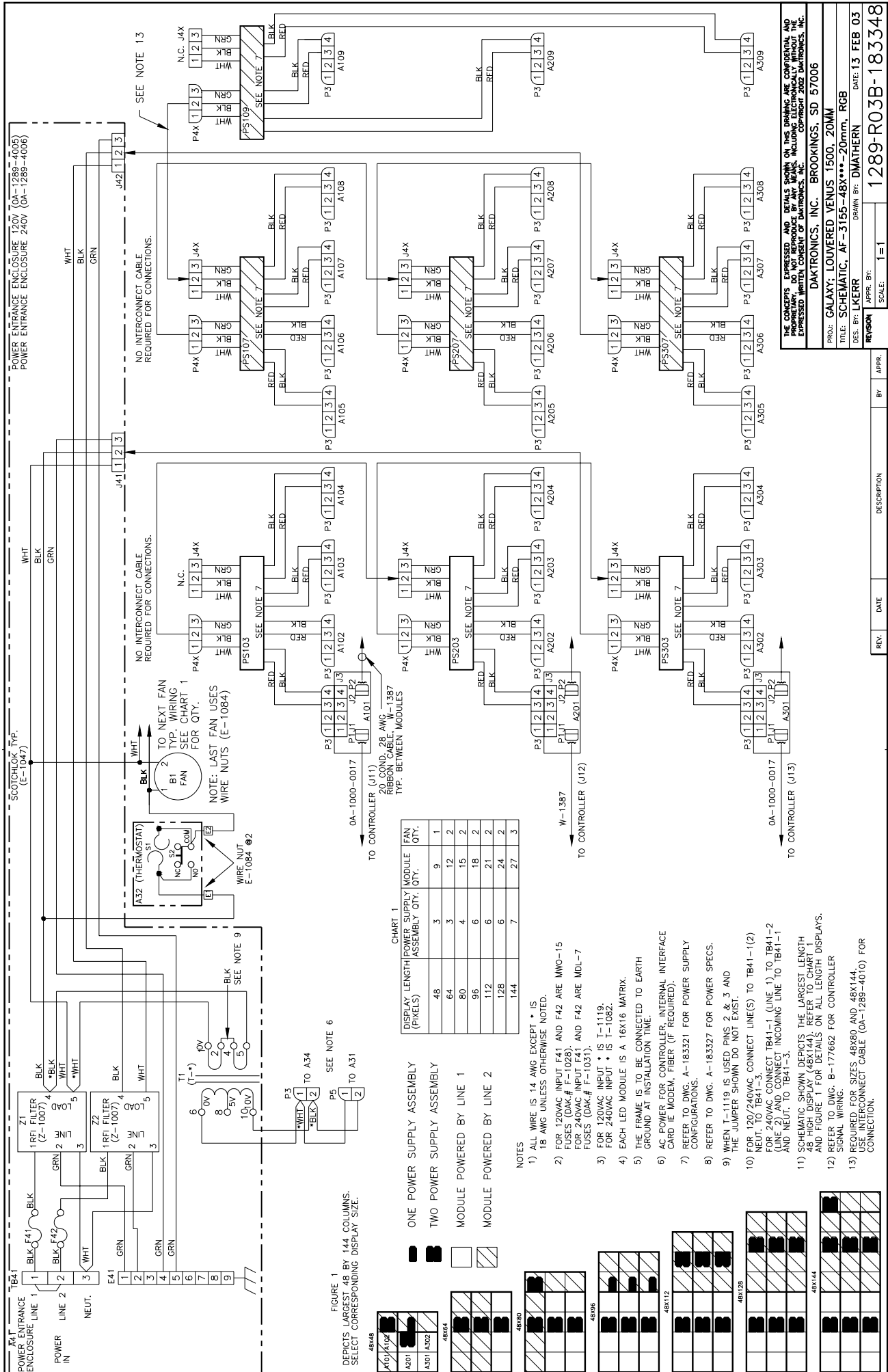
- ONE POWER SUPPLY ASSEMBLY
- TWO POWER SUPPLY ASSEMBLY
- MODULE POWERED BY LINE 1
- MODULE POWERED BY LINE 2

THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS, INCLUDING ELECTRONICALLY, WITHOUT THE EXPRESS WRITTEN CONSENT OF DAKTRONICS, INC.

DAKTRONICS, INC. BROOKINGS, SD 57006
PROJ: GALAXY; LOWERED VENUS 1500, 20MM
TITLE: SCHEMATIC; AF-3155-32X***-20mm, RGB
DES. BY: LKERR DRAWN BY: DMATHERN DATE: 13 FEB 03
REVISION APPR. BY: SCALE: 1=1

1289-R03B-183347

REV.	DATE	DESCRIPTION	BY	APPR.



POWER ENTRANCE ENCLOSURE 120V (0A-1289-4005)
 POWER ENTRANCE ENCLOSURE 240V (0A-1289-4006)

SCOTCHLOK TYP.
 (E-1047)

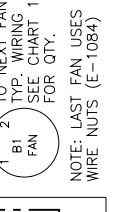
NO INTERCONNECT CABLE
 REQUIRED FOR CONNECTIONS.

NO INTERCONNECT CABLE
 REQUIRED FOR CONNECTIONS.

NO INTERCONNECT CABLE
 REQUIRED FOR CONNECTIONS.

NO INTERCONNECT CABLE
 REQUIRED FOR CONNECTIONS.

NO INTERCONNECT CABLE
 REQUIRED FOR CONNECTIONS.



TO NEXT FAN
 TYP. WIRING
 SEE CHART 1
 FOR QTY.

NOTE: LAST FAN USES
 WIRE NUTS (E-1084)

WIRE NUT
 E-1084 Ø2

TO CONTROLLER (J11)
 W-1387

TO CONTROLLER (J12)
 W-1387

TO CONTROLLER (J13)
 OA-1000-0017

CHART 1

DISPLAY LENGTH (PIXELS)	POWER SUPPLY ASSEMBLY QTY.	MODULE QTY.	FAN QTY.
48	3	9	1
64	3	12	2
80	4	15	2
96	6	18	2
112	6	21	2
128	6	24	2
144	7	27	3

- NOTES
- 1) ALL WIRE IS 14 AWG EXCEPT * IS 18 AWG UNLESS OTHERWISE NOTED.
 - 2) FOR 120VAC INPUT F41 AND F42 ARE MWO-15 FUSES (0AK # F-1026). FOR 240VAC INPUT F41 AND F42 ARE MDL-7 FUSES (0AK # F-1031).
 - 3) FOR 120VAC INPUT * IS T-1119. FOR 240VAC INPUT * IS T-1082.
 - 4) EACH LED MODULE IS A 16X16 MATRIX.
 - 5) THE FRAME IS TO BE CONNECTED TO EARTH GROUND AT INSTALLATION TIME.
 - 6) AC POWER FOR CONTROLLER, INTERNAL INTERFACE CARD IE MODEM, FIBER (IF REQUIRED).
 - 7) REFER TO DWG. A-183321 FOR POWER SUPPLY CONFIGURATIONS.
 - 8) REFER TO DWG. A-183327 FOR POWER SPECS.
 - 9) WHEN T-1119 IS USED PINS 2 & 3 AND THE JUMPER SHOWN DO NOT EXIST.
 - 10) FOR 120/240VAC CONNECT LINE(S) TO TB41-1(2) NEUT. TO TB41-3.
 - 11) SCHEMATIC SHOWN DEPICTS THE LARGEST LENGTH 48 AND HIGH DISPLAYS 48X144. REFER TO CHART AND FIGURE FOR DETAILS ON ALL LENGTH DISPLAYS.
 - 12) SIGNAL WIRING.
 - 13) USE WIRE FOR SIZES 48X80 AND 48X144. USE INTERCONNECT CABLE (0A-1289-4010) FOR CONNECTION.

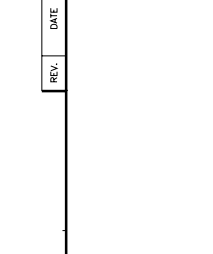
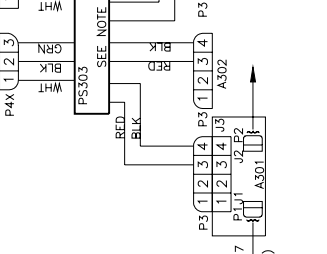


FIGURE 1
 DEPICTS LARGEST 48 BY 144 COLUMNS.
 SELECT CORRESPONDING DISPLAY SIZE.

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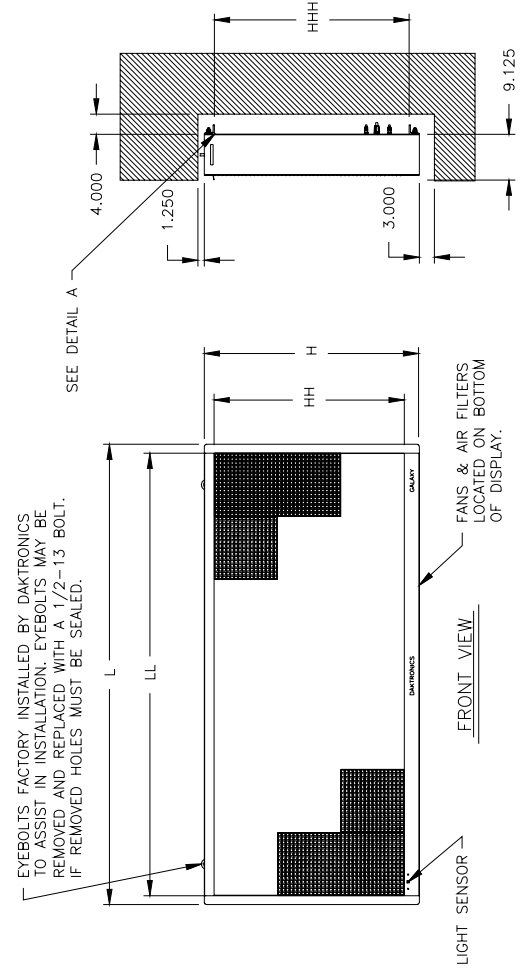
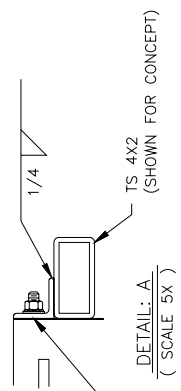
PROJ: GALAXY; LOUVERED VENUS 1500, 20MM
 TITLE: SCHEMATIC; AF-3155-48X***-20mm, RGB
 DES. BY: LKERR
 DRAWN BY: DMATHERN
 DATE: 13 FEB 03
 REVISION
 SCALE: 1=1

1289-R03B-183348

REV.	DATE	DESCRIPTION	BY	APPR.

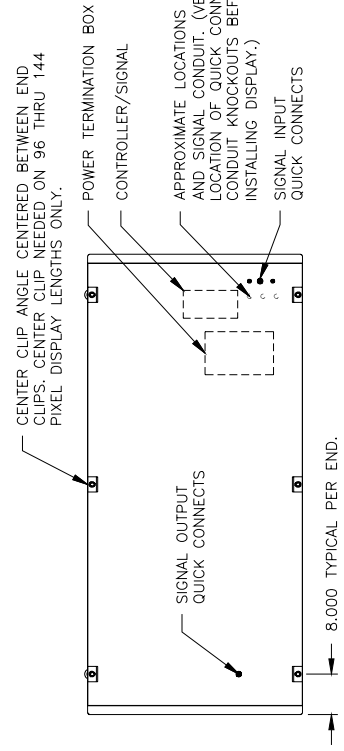
SIZES AND WEIGHTS FOR 20MM DISPLAYS
AF-3155-**-X**-20MM-RGB

SIZE	NUMBER OF MODULES	TOTAL WATTS	NUMBER OF FANS	TOTAL DISPLAY H	L	HH	LL	CLIP DISTANCE HHH	UNCURATED WEIGHT
16X48	3	281	1	17.480	40.940	12.480	37.440	13.480	42 lbs
16X64	4	357	1	17.480	53.420	12.480	49.920	13.480	56 lbs
16X80	5	432	1	17.480	65.900	12.480	62.400	13.480	70 lbs
16X96	6	508	1	17.480	78.380	12.480	74.880	13.480	84 lbs
16X112	7	583	1	17.480	90.860	12.480	87.360	13.480	98 lbs
16X128	8	659	1	17.480	103.340	12.480	99.840	13.480	112 lbs
16X144	9	734	1	17.480	115.820	12.480	112.320	13.480	126 lbs
32X48	6	508	1	29.960	40.940	24.960	37.440	25.960	84 lbs
32X64	8	659	1	29.960	53.420	24.960	49.920	25.960	112 lbs
32X80	10	809	1	29.960	65.900	24.960	62.400	25.960	140 lbs
32X96	12	1000	2	29.960	78.380	24.960	74.880	25.960	168 lbs
32X112	14	1151	2	29.960	90.860	24.960	87.360	25.960	196 lbs
32X128	16	1302	2	29.960	103.340	24.960	99.840	25.960	224 lbs
32X144	18	1453	2	29.960	115.820	24.960	112.320	25.960	252 lbs
48X48	9	734	1	42.440	40.940	37.440	37.440	38.440	126 lbs
48X64	12	1000	2	42.440	53.420	37.440	49.920	38.440	168 lbs
48X80	15	1227	2	42.440	65.900	37.440	62.400	38.440	210 lbs
48X96	18	1453	2	42.440	78.380	37.440	74.880	38.440	252 lbs
48X112	21	1679	2	42.440	90.860	37.440	87.360	38.440	294 lbs
48X128	24	1906	2	42.440	103.340	37.440	99.840	38.440	336 lbs
48X144	27	2172	3	42.440	115.820	37.440	112.320	38.440	378 lbs



NOTES:

- FOR DISPLAY SIZE AND WEIGHT SPECIFICATIONS SEE TABLE.
- ALL DIMENSIONS ARE IN INCHES.
- DISPLAY CABINET IS ALUMINUM.
- DISPLAY CABINET COLOR IS FLAT BLACK.
- FRONT ACCESS FOR SERVICE.
- MINIMUM TOP CLEARANCE IS 1.25" TO ACCOMMODATE EYEBOLT.
- MINIMUM REAR CLEARANCE IS 4.00" TO ACCOMMODATE QUICK CONNECT.
- MINIMUM BOTTOM CLEARANCE IS 3.00" FOR FILTER REPLACEMENT.
- THE DISPLAY IS BOTTOM VENTED. A MINIMUM OF 12 SQUARE INCHES OF OPEN AREA PER MODULE MUST BE PROVIDED AT BOTTOM OF DISPLAY NEAR FAN & FILTER ASSEMBLIES TO ACCOMMODATE VENTILATION.
- 250 CUBIC FEET PER MINUTE OF FRESH AIR EXCHANGE PER FAN MUST BE PROVIDED BY MEANS OF FORCED VENTILATION WHEN CABINET IS MOUNTED IN AN ENCLOSED STRUCTURE.
- DAKTRONICS IS NOT RESPONSIBLE FOR MOUNTING HARDWARE.
- DO NOT MOUNT THROUGH THE CHANNEL IN THE FILTER AREA.
- MAIN ELECTRICAL DISCONNECTS TO BE FURNISHED BY CUSTOMER.



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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY AF-3155-20MM

TITLE: SHOP DRAWING, AF-3155-**-X**-20MM-RGB

DES. BY: MMAMWENGA DRAWN BY: EYOUNG DATE: 26 FEB 03

REVISION APPR. BY: SCALE: 1=25

REV.	DATE	DESCRIPTION	BY	APPR.

1289-E10B-184075