



Galaxy[®] Series
AF-3160

Display Manual

ED13767

Rev 2 10 February 2004

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

ED13767
Product 1215
Rev 2 – 10 February 2004

DAKTRONICS, INC.

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Section 1: Introduction

This manual explains the installation, maintenance, and troubleshooting of a Daktronics Galaxy® 34mm monochrome and red-green (tri-color) display, series AF-3160. 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.

How to Use this Manual

This 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 cable 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 **ED13767**.

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).
- **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 A-69945**. Reference drawings are inserted in **Appendix A**.

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

Figure 1: Drawing Label

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

“Refer to **Drawing A-69945** 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:

Component Placement Diagram **Drawing A-69945**

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 part number 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-____-____ (circuit board) or OA-____-____ 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 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.

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 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. Most computers have 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 4000 feet). The main advantage to RS422 over RS232 is the longer cable length that is possible. A signal converter is needed to convert the computer's RS232 to RS422. 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 network needs to have a dedicated phone line assigned to it. Refer to **Section 3** for additional information.

Fiber Optic Network

A fiber optic network is a standard communication method transmitting light (signal) through a glass fiber. Fiber optic cable has a maximum length of 600 meters (approximately 2,000 feet). A signal converter is needed to convert the computer's RS232 signal to fiber optic signal; a minimum of two fibers are required.

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 meter (approximately 1500 feet) outdoor and 150 meters (approximately 500 feet) indoor. A nearly straight line-of-sight path must be maintained between the server radio connected to the computer and the client radio connected to the display. Refer to **Section 3** and the Venus 1500 Radio Manual, **ED13932**, for additional information.

1.3 Display Overview

Reference Drawings:

Shop Drawing; AF-3160-8-32-34-Mono-Gen2 **Drawing B-178625**

Shop Drawing; AF-3160-40/48***-34-Mono-Gen2 **Drawing B-178626**

Daktronics AF-3160 Galaxy displays are designed and manufactured for performance, reliability, easy maintenance and long life. The pixels have a 34mm center-to-center spacing, and are lit using LEDs (light emitting diodes). A light sensor on the front of the first or 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-3160-RRCCC-34-X-X(X)**

AF-3160	Outdoor 34 mm Louvered Galaxy Display
RR	Number of Rows High (8-48)
CCC	Number of Columns Long (Up to 144 Columns, Standard)
34	34 mm pixel to pixel spacing
X	LED Color (monochrome or tri-color)
X(X)	PM – Primary-Mirror or PS – Primary-Secondary M – Mirror Display, S – Secondary Display

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 Software manual, **ED13530**, for installation and operation of the Venus 1500 editing station.

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 controller is the “brains” of the display. Shown below in **Figure 2**, the controller receives signal information from the control computer, translates it, and activates the appropriate pixels on the display accordingly.

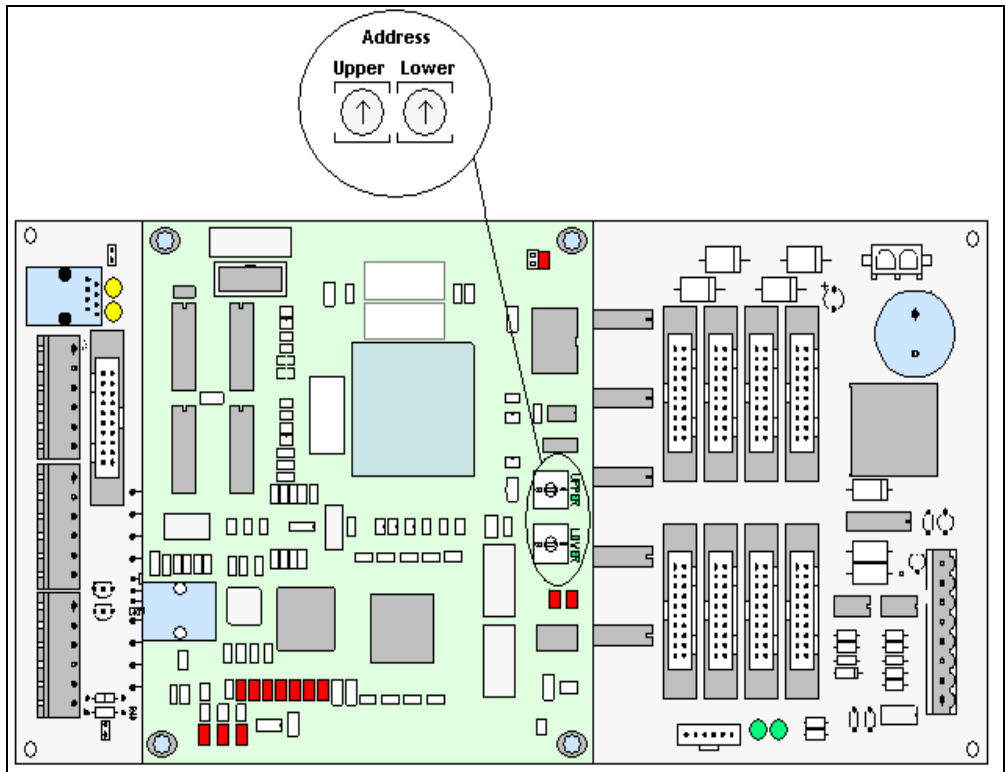


Figure 2: Version 3 Controller

Control Area Network: Serial Communication Protocol supporting distributed real-time control and multiplexing. The light and temperatures 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 it. 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.

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

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

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

Louvers: 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: 34mm Galaxy modules are 8 pixels high by 8 pixels wide. Each is individually removable from the front of the display. Refer to the module in **Figure 3** below.

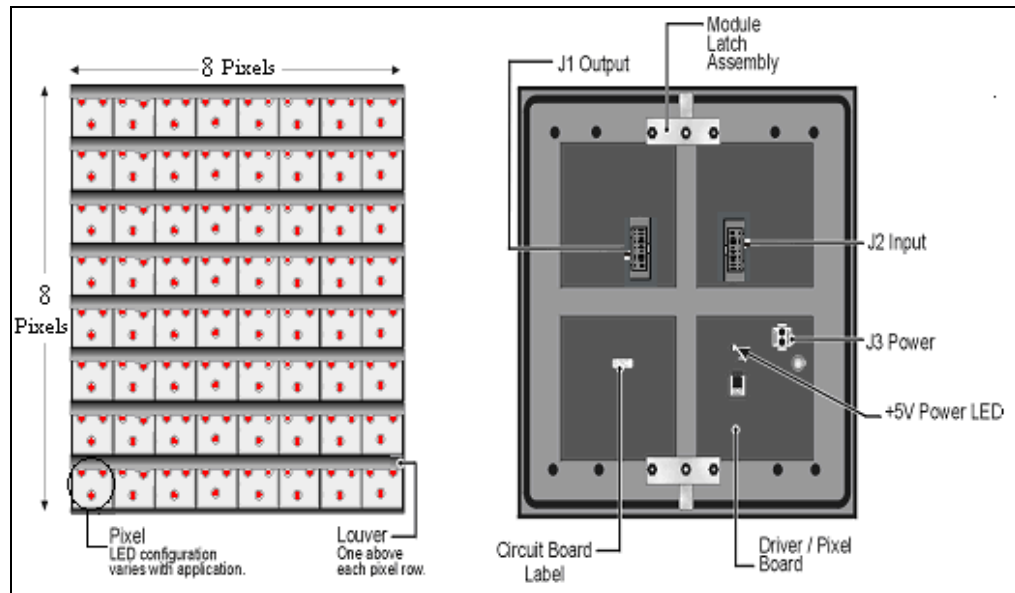


Figure 3: 8x8 Red LED Module

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. Use a 1/8" Allen wrench to turn the retaining bar.

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.

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 voltage DC for one or more module driver boards.

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

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

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 straight through serial cable.

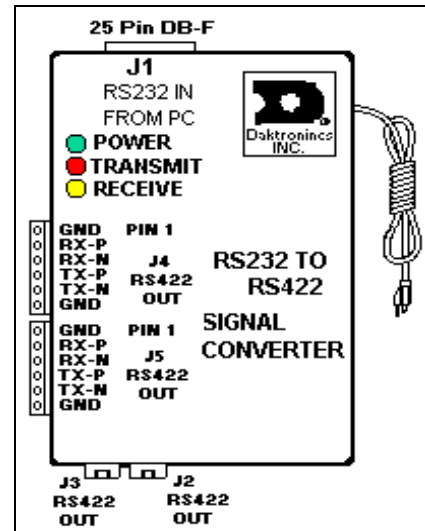


Figure 4: Signal Converter (RS232 to RS422)

1.5 Daktronics Nomenclature

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.

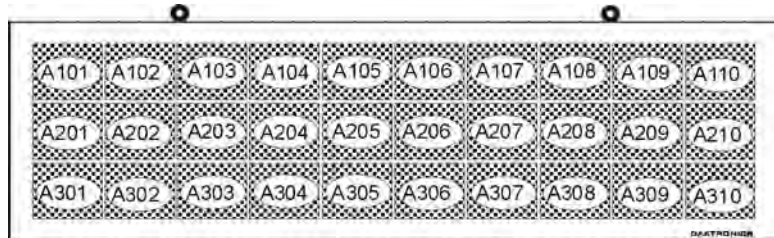


Figure 5: Module Numbering Example – 24x80 Front

A module is the building block of the Galaxy display. Each module measures 8 pixels high by 8 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 on the right breaks down the module numbering method.

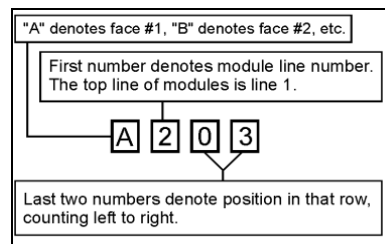


Figure 6: Module Numbering

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

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

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-____-____” denotes an individual circuit board, such as the internal fiberboard.
- “OA-____-____” represents an assembly, such as a circuit board and the plate or bracket to which it is mounted. A collection of circuit boards working as a single unit may also carry an assembly label.
- “W-____” symbolizes a wire or cable. Cables may also carry the assembly numbering format in certain circumstances. This is especially true of ribbon cables.

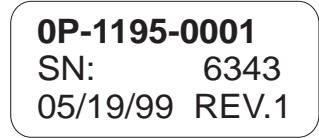


Figure 7: Typical Label

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 4.11**, 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

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 effect 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 will 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 the structure and a qualified structural engineer has approved 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 is 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 Drawings:

Shop Drawing, AF-3160-8-32 -34-Mono-Gen2 **Drawing B-178625**

Shop Drawing, AF-3160-40/48**-34-Mono-Gen2 **Drawing B-178626**

Fans are mounted in the bottom of the display for 8-32 high displays and in the back sheet for ventilation on the 40 and 48 high displays. Maintain a minimum distance of 3" (7.62cm) below the display to maintain proper airflow and maintenance (removal and cleaning/replacement of the filter). Refer to **Drawing B-178625** or **B-178626** for additional information.

If the display cabinet is completely enclosed:

- 6 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.
- For adequate cooling, forced ventilation may be required. If air is forced into the enclosed cabinet, 10 cubic feet per minute must be provided per module (10.64" x 10.64" active area).

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

2.4 Lifting the Display

The top of the 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.

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

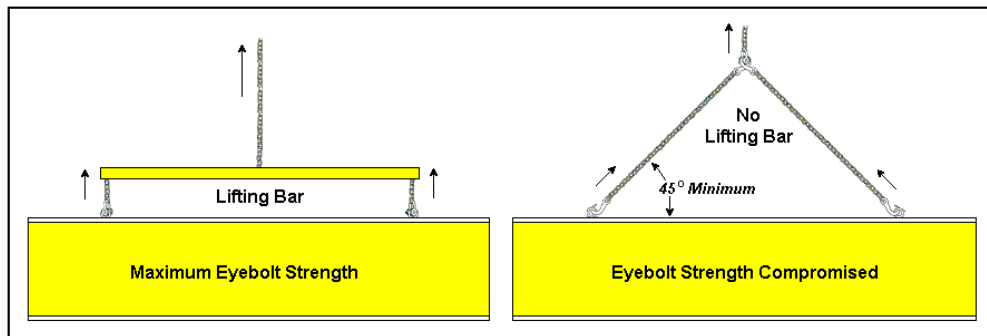


Figure 8: Lifting the Display (Correct, Left; Incorrect, Right)

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

2.5 Display Mounting

Reference Drawings:

Shop Drawing, AF-3160-8-32 -34-Mono-Gen2.....**Drawing B-178625**

Shop Drawing, AF-3160-40/48**-34-Mono-Gen2.....**Drawing B-178626**

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. The mounting hardware and method is also the responsibility of the installer.

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".**
- 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 ¼" x 3" long steel clip angles at the locations shown in **Drawing B-178625** and **Drawing B-178626**. These angles may be used for mounting purposes. Remember to have all mounted displays inspected by a qualified structural engineer.

Refer to **Drawing B-178625** or **B-178626** 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-178625** or **B-178626**.
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

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

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 cable connector. To disconnect the ribbon cable, push the plastic clips on the sides to unlock and remove the jack.

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

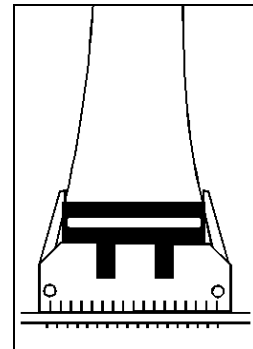


Figure 9: Ribbon Cable Connector

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.

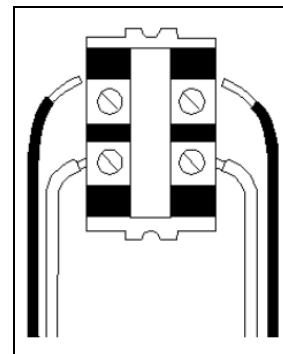


Figure 10: Termination Block

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 loose the connectors grip on the wire. To insert a wire, push the bare wire into the connector and turn the above screw clockwise to lock the wire into place.

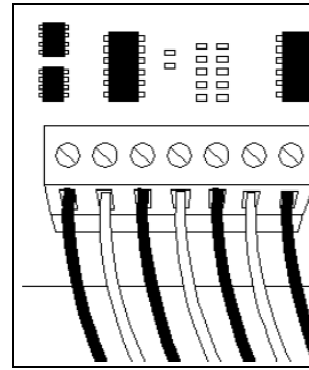


Figure 11: Phoenix Connector

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.

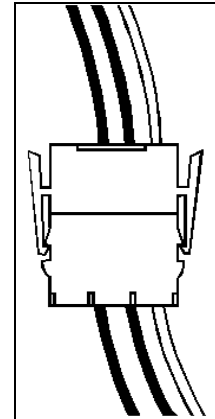


Figure 12: Mate-n-Lok Connector

5. Phone Jacks (RJ11/RJ45 Connectors):

RJ connectors, as seen in **Figure 13** on the lower right, are similar to the telephone connectors found in homes. In order to remove this plug from the jack, depress the small clip on the underside of the plug.

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

The six-pin connectors found in the display are keyed connectors, meaning that they will only go together one way and should not be forced. To remove the connector squeeze the plastic tab and gently pull the plug from the jack.

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.

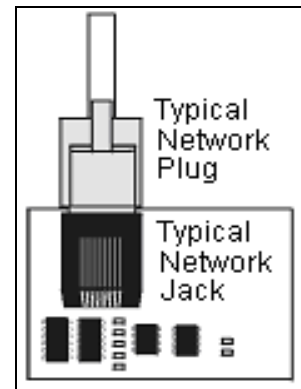


Figure 13: RJ45 Connector

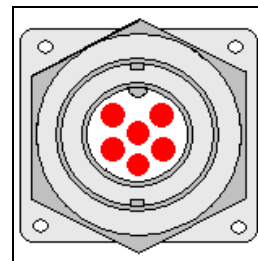


Figure 14: RS232/6-pin Quick Connect Jack

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. **Power and signal cable cannot be run in the same 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 in conduit. **Do not run power and phone cable in the same conduit.** The local telephone company will need to assist in this installation. Ask the telephone company which color is used for the TIP wire, and which color for the RING wire for signal hook up.

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 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. This wire needs to be in conduit when exposed to outdoor conditions out 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. **Note:** Secure excess cable to the structure to prevent it from being pulled loose by weather or vandalism.

3.3 RJ Connector Cables

Two types of RJ connectors are used in the display. There is the 6-pin RJ11 and the 8-pin RJ45. **Figure 15** on the right illustrates a typical RJ11 connector. These connectors can be found on many telephones and LANs.

The cables used in the display are straight through cables, meaning that the wire to pin one on one end is the same as pin one on the other end, and so forth. When installing a network, and on cables exterior to the display, flipped cables are often used. This cable has one end that is the mirror image of the other end (i.e. the cable is flipped). Refer to **Figure 16** below for a standard flipped cable.

Notice in **Figure 16** below 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.

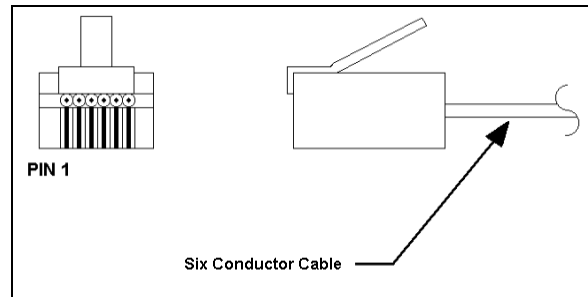


Figure 15: 6-Conductor RJ11 Connector and Cable

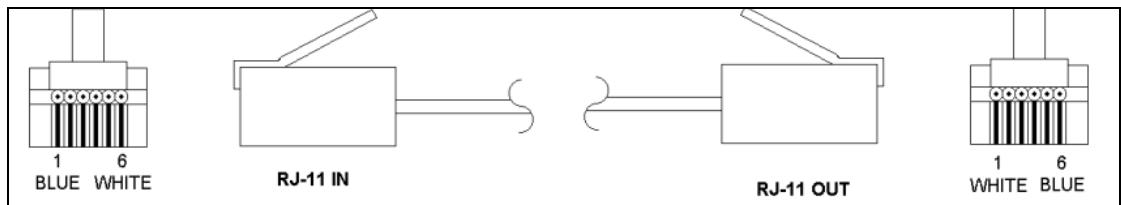


Figure 16: Flipped Cable with RJ Connectors

Installing an RJ Connector

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

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

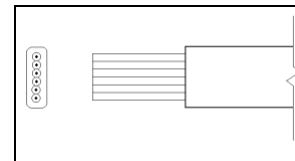


Figure 17: Wire with Outer Jacket Stripped

The crimping tool is then used to crimp the RJ connector onto the cable. The RJ connector is locked into a special socket in the tool. The stripped wire is inserted into the RJ connector. Finally, the tool is squeezed like 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-3160-8-32 -34-Mono-Gen2.....**Drawing B-178625**

Shop Drawing, AF-3160-40/48** -34-Mono-Gen2.....**Drawing B-178626**

Daktronics does not include the conduit. Refer to **Drawing B-178625** and **Drawing B-178626** for your display size located in **Appendix A** for approximate locations for power and signal conduit. Separate conduit must be used to route:

- Power
- Signal IN wires, including phone line
- Signal OUT wires (if signal is required for another display)

Knockout holes for ½" conduit are located at the bottom right (rear view) of the back of the display (refer to **Drawing B-178625** or **B-178626** for your display).

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

3.5 Preparing for Power/Signal Connection

Reference Drawings:

Component Layout Diagrams **Refer to Appendix A**

1. Punch or use ½ " (0.875) conduit holes for the desired conduit openings. **Be careful that none of the internal components are damaged.** Attach the conduit.
2. Remove the bottom left two modules (AX01 and AX02) to expose the power enclosure and signal panel. Use a ⅛" 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 Diagram**.
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.

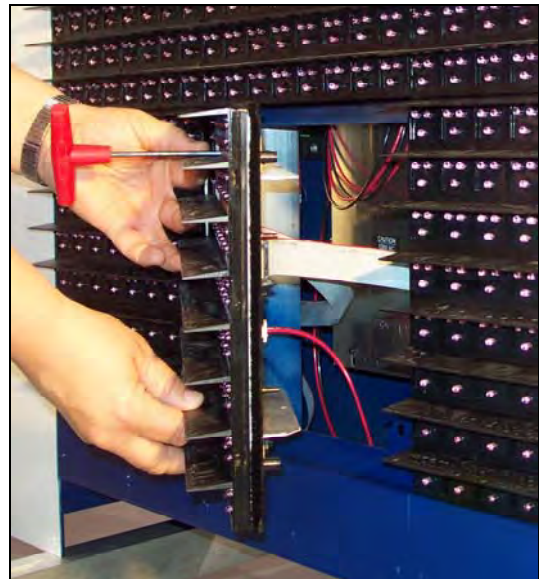


Figure 18: *Opening the Display*

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.**

3.6 Power

Power Requirements

Reference Drawings:

Power Specs, 8x48-48x128 Displays, 3 LED Pixel..... **Drawing A-179874**

Power Specs, 8x48-48x128 Displays, 4 LED Pixel..... **Drawing A-179875**

Power Specs, 8x48-48x128 Displays, RG **Drawing A-179876**

Refer to the appropriate **Power Spec Drawing** for voltage and current requirements for your display. Each uses a 120VAC or 120/240 VAC single-phase power source. Depending on the module color and display size the power supply may vary.

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 display 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 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.**

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.

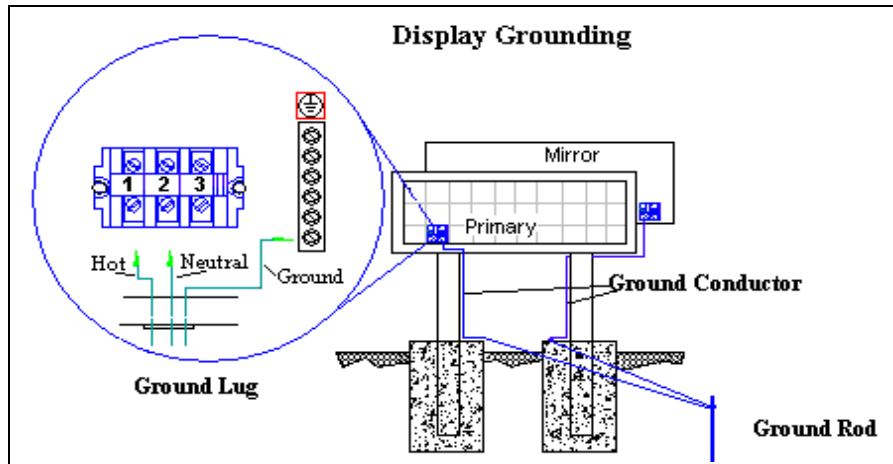


Figure 19: Display Grounding

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

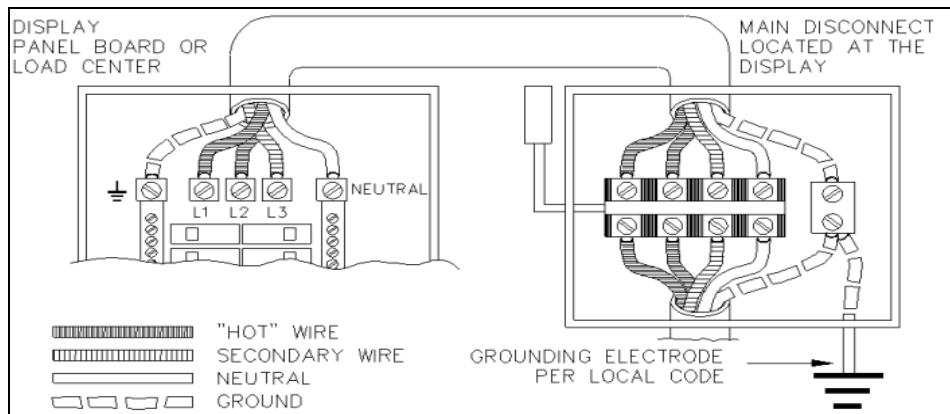


Figure 20: Installation with Ground and Neutral Conductor Provided

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.

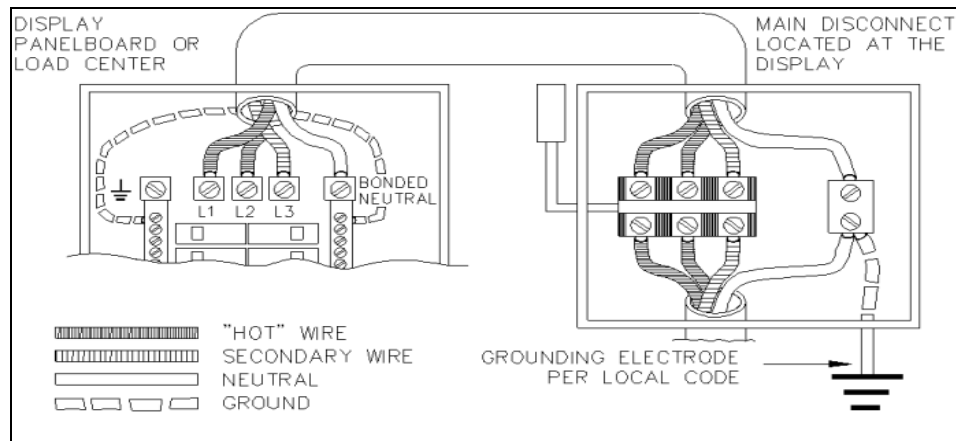


Figure 21: *Installation with only Neutral Conductor Provided*

Power Connection

Reference Drawings:

Assy; Power Termination Box **Drawing A-127361**
Schematics **Refer to Appendix A**

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 **Drawing A-127361** and the appropriate **Schematic** for your display size.

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. Install jumper per **Drawing A-127361**.
5. If two power lines are being terminated (120/240VAC). Connect the second “hot” wire to L2 and remove the jumper.
6. Connect the green grounding wire to the grounding bus E41. Refer to **Figure 19** on the previous page.

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

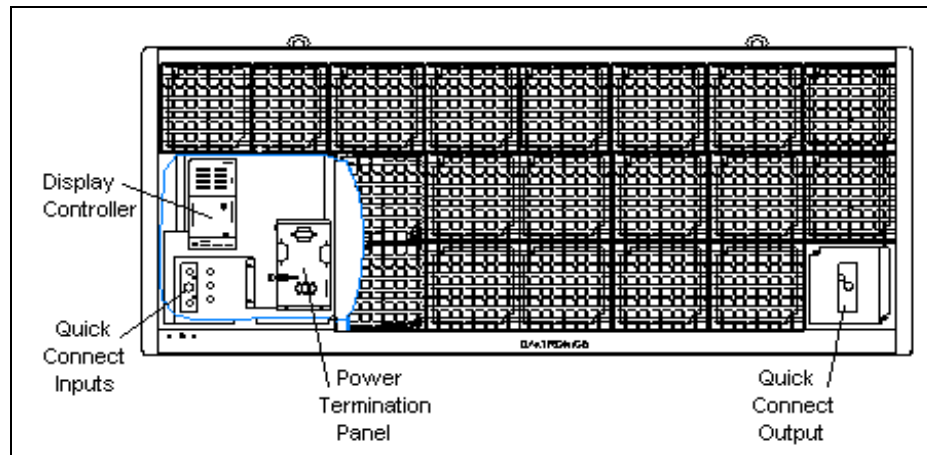


Figure 22: Signal Termination at Display (Front View)

The AF-3160 is designed for quicker connection to other displays and other additional equipment. Connection of the first display to the control equipment needs to be wired to the controller, modem, fiberboard, or surge suppression card in that display. Depending on the display type ordered the following cables may be provided with the display:

1. Interconnect cable from Primary to Secondary, length 4 feet
2. Interconnect cable from Primary to Mirror, length 6 feet.
3. Temperature sensor with quick connect cable, length 25 feet
4. Client radio with quick connect cable, length 25 feet

RS232

Reference Drawings:

System Riser Diagram, RS232	Drawing A-174341
Schematic, Signal Wiring, Internal, W/Quick Connect	Drawing B-177662
Controller, Galaxy, 8-conn., J1087	Drawing B-177838

The RS232 controlled display requires the use of a J-box within 25 feet of the display, as shown below in **Figure 23**. From the J-box to the display, the signal may be connected using a quick connect cable or wired directly to the controller inside the display. The cable from the J-box to the display **must be** routed though 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 J33 on the back of the display.
2. When connecting directly to the display, terminate one end to the terminal block at the J-box and the other end of the wire to the 6-position terminal block on the controller labeled "RS232 IN" (A31-TB1). **Figure 24** and **Drawing B-177662**, show the terminal block wiring, and **Drawing B-177838** shows the controller.

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

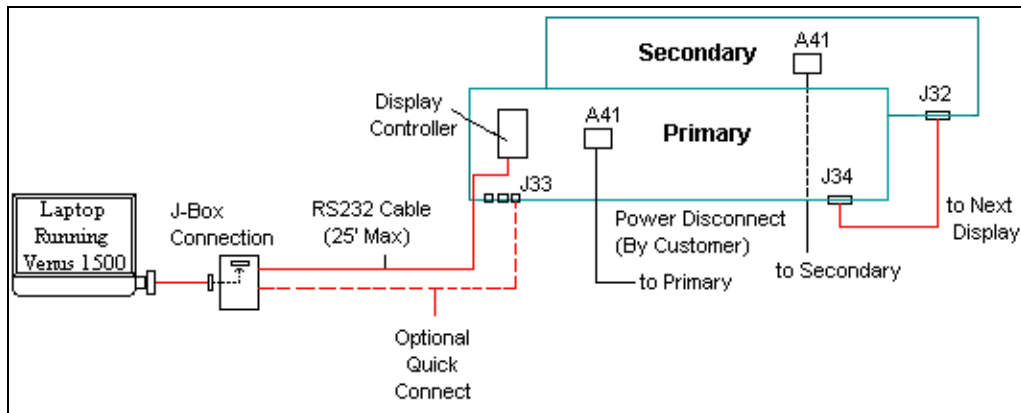


Figure 23: RS232 Display Layout

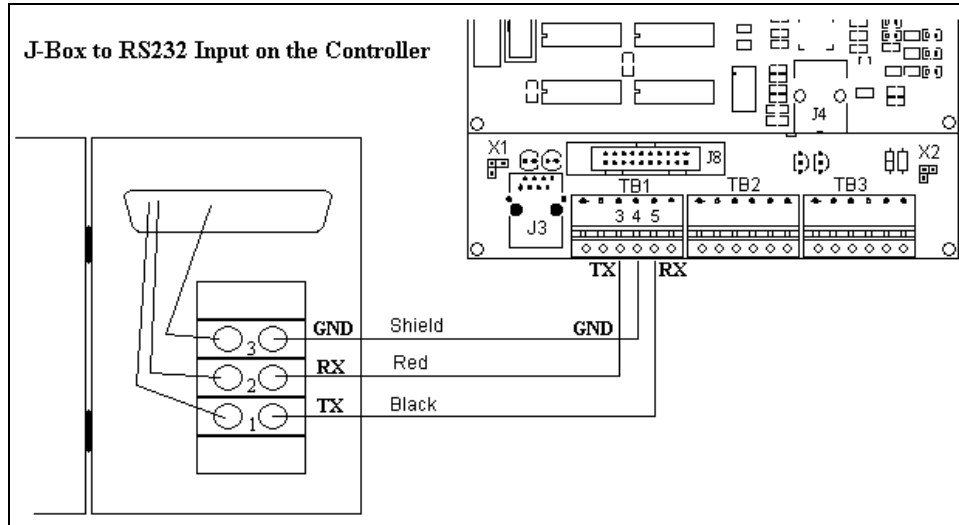


Figure 24: RS232 J-box to Controller Board

J-Box to Controller Board (A31)

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

RS422

Reference Drawings:

System Riser Diagram, RS422 **Drawing A-174135**
 Schematic, Signal Wiring, Internal, W/Quick Connect. **Drawing B-177662**

A RS422 controlled display requires the use of signal converter (0A-1127-0237) near the computer. From the signal converter, cable is run to the surge board assembly in the display. The cable from the signal converter to the display must be routed through conduit. **Do not** run signal and display power through the same conduit. Refer to **Figure 25** and **Drawing A-174135** for system layout.

1. If using a quick connect cable, signal will run from the signal converter to a box at the base of the display. From that junction box, connect to J32 on the back of the display.
2. When connecting directly to the display, terminate one end at the signal converter and the other end of the wire to the 6-position terminal block on the surge board assembly labeled "RS422 IN" (A34-TB1). **Drawing B-177662** and **Figure 26** show the terminal block wiring.

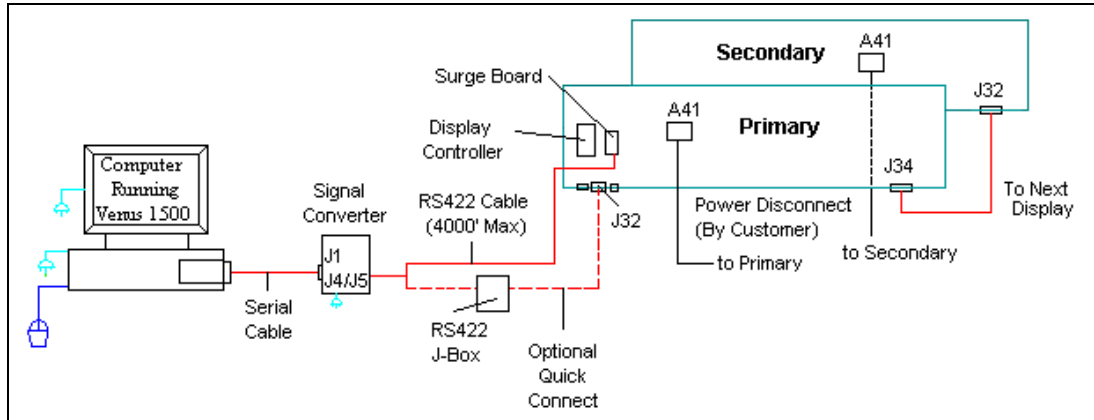


Figure 25: RS422 Display Layout

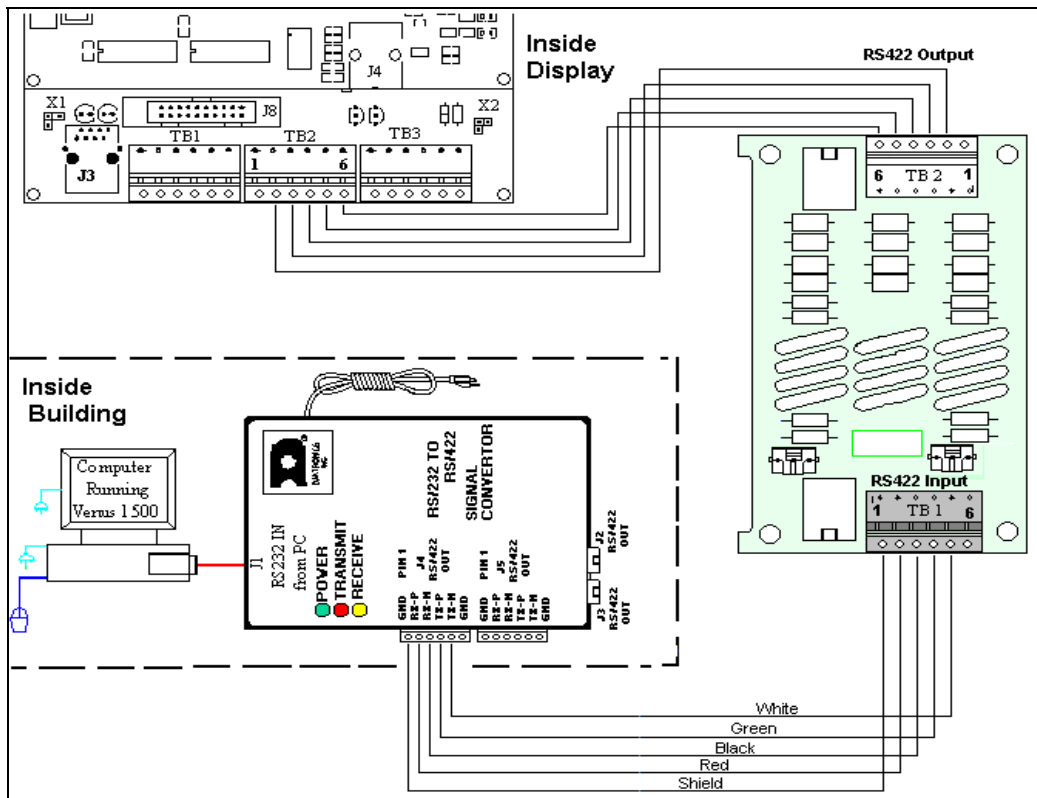


Figure 26: Signal Converter to Surge Board Assembly

Signal Converter to Surge Board Assembly

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

Modem

Reference Drawings:

System Riser Diagram, Modem **Drawing A-174342**
 Schematic, Signal Wiring, Internal, W/Quick Connect. **Drawing B-177662**

A modem-controlled display requires the use of an internal or external modem at the computer. The local phone company must provide a dedicated phone line to the display and identify the colors used for the Tip wire and Ring wire. The phone cable must be routed through conduit. **Do not** run signal and display power through the same conduit. Refer to **Drawing A-174342** and **Figure 27** for system layout.

1. If using a quick connect cable, the phone line will terminate to a junction box at the display and then a quick connect cable will connect the phone line to J32 on the back of the display. A 6-conductor phone cable with RJ11 connectors (Daktronics part number 0A-1137-0160) relays data from the quick connect input board to the modem.
2. When connecting directly to the modem in the display, terminate the phone line to TB2 on the modem as shown in **Figure 28**. If the phone company provided a phone termination box in the display, a straight phone cable can be connected from the box to the J5 Phone IN on the modem board. **Drawing B-177662** shows the terminal block wiring.
3. A straight through RJ45 cable (Daktronics part number 0A-1229-0054) transfers data from J6 on the modem to J3 (RS232 IN) on the controller.

Note: The jumper X1 on the controller board **must be** closed while the display powers up to recognize that a modem is being used with the display.

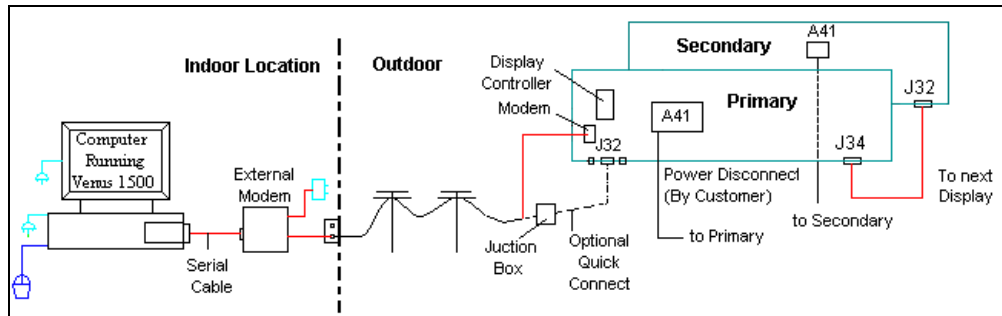


Figure 27: Modem Display Layout

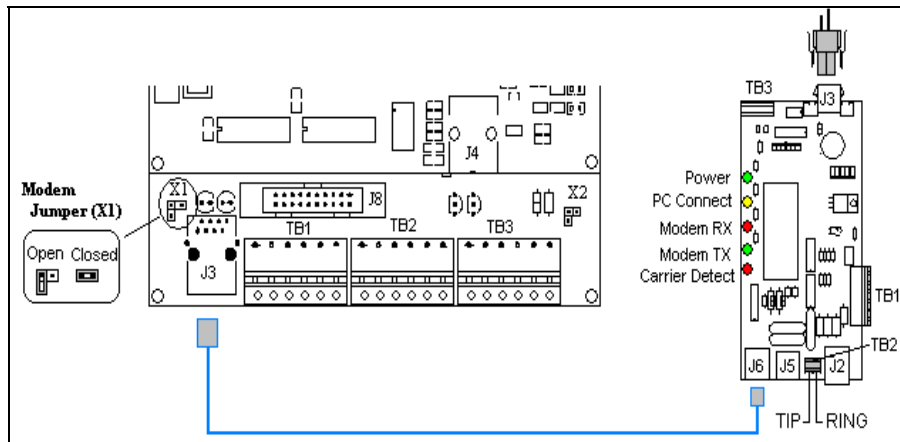


Figure 28: Modem Phone Line Termination, Modem Jumper

Fiber Optic

Reference Drawings:

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

When fiber optic cable is used, a signal converter (0A-1127-0239), connected to the computer, relays signal via fiber signal cable to the fiberboard (J4/J5) in the display. An 8-conductor cable with RJ45 connectors (Daktronics part number 0A-1229-0054) relays the signal from J7 on the fiberboard to J3 (RS232 IN) on the controller. When connecting fiber cables, always connect transmit at the signal converter to receive at the display and receive to transmit. Refer to **Drawing A-174344** and **Figure 29** for the system riser and to **Drawing B-177662** and **Figure 30** for fiber termination locations.

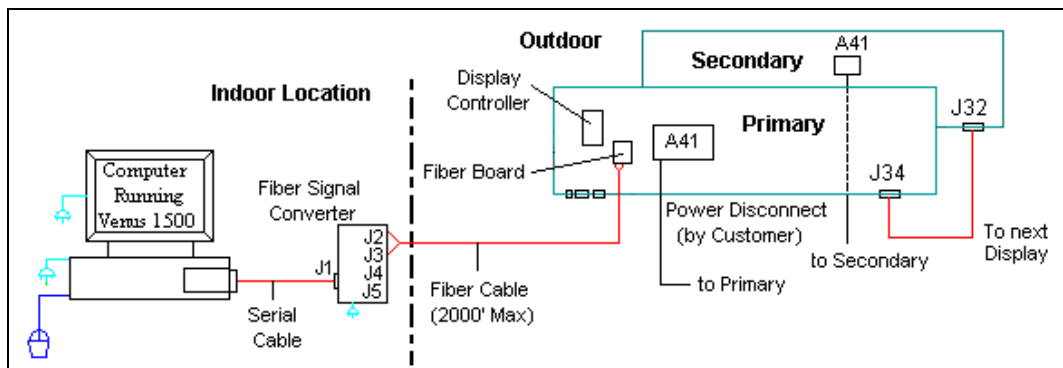


Figure 29: Fiber Display Layout

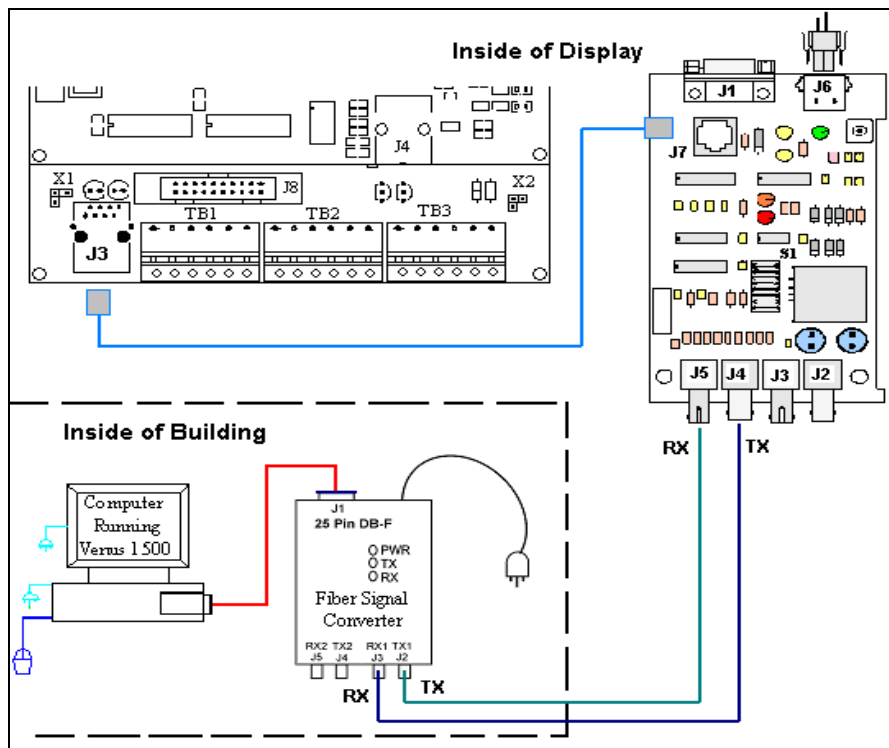


Figure 30: Signal Converter to Fiber Card

Signal Converter to Fiber Board

Signal Converter	Field Cabling	Fiber Control Card
J2 Transmit (TX1)	(Color Varies)	J5 Receive (RX2)
J3 Receive (RX1)	(Color Varies)	J4 Transmit (TX2)

Venus 1500 Radio

Reference Drawings:

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

A radio-controlled display requires a Server radio connected to the control computer and a Client radio at the display. The radios must be in line-of-site of each other. The Client radio is provided with 25 feet of weather resistant pre-terminated 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 cable will be terminated to the display with the quick connect plug to J33 on the display as shown in **Figure 32**. Refer to **Drawing A-185359** and **Figure 31** for the system riser. Additional drawings for the Server Connections are in the Venus 1500 Radio Manual (**ED13932**).

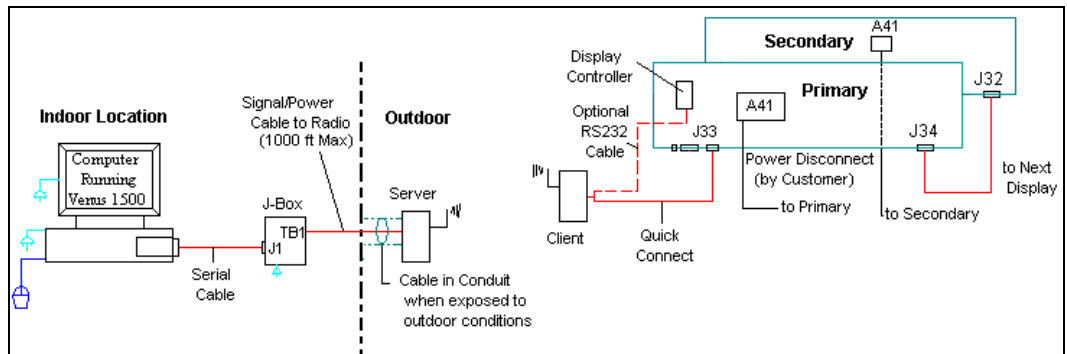


Figure 31: Radio Display Layout

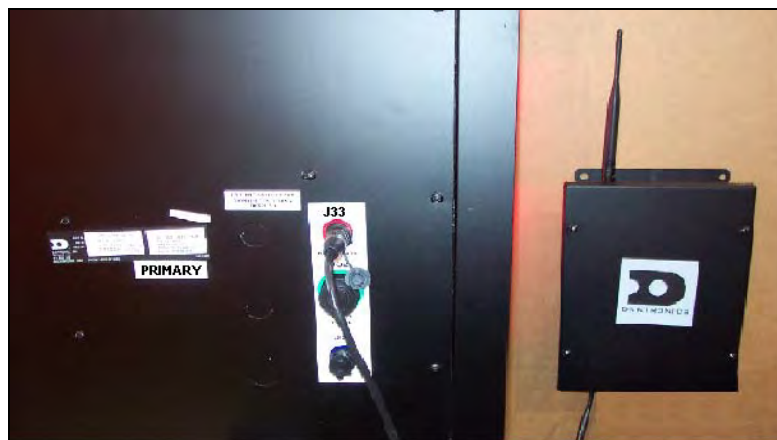


Figure 32: Client Radio Display Connection

3.8 Signal Termination Between Two (or More) Signs

Reference Drawings:

- System Riser Diagram Fiber **Drawing A-174344**
- Schematic, Signal Wiring, Internal, W/Quick Connect **Drawing B-177662**
- 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 cable goes from the RS422 OUT (J34) on the primary display to the RS422 IN (J32) on the secondary display. See **Figure 33** on the right.

If the displays are not back-to-back, or are too far apart for the interconnect cable to reach, a 4-conductor shielded cable of the correct length is used as shown in **Figure 34**. One end will connect at the “RS422 OUT” 6-position controller board terminal block (A31-TB3) in the first display, and terminate on the “RS422 IN” 6-position controller board terminal block (A31-TB2) on the second display. **When not using the quick connect cable, wire must be in conduit.**

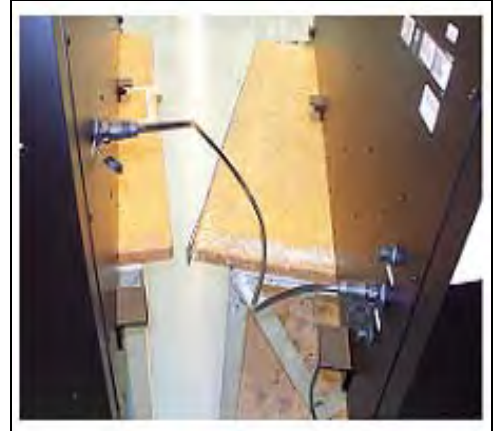


Figure 33: Display Interconnect

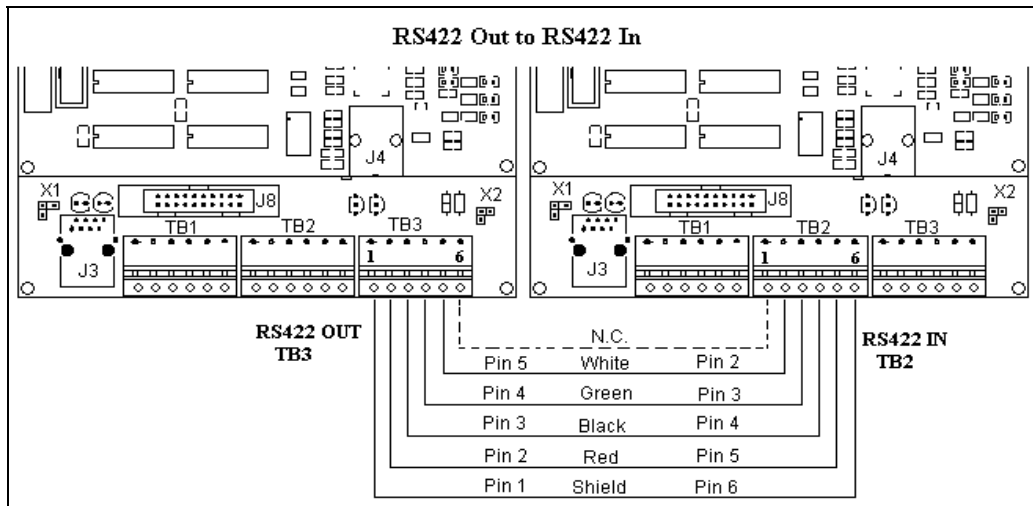


Figure 34: RS422 Interconnection

RS422 Interconnection

Primary - RS422 Out (A31-TB3)	Field Cabling	Secondary - RS422 IN (A31-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

A fiber cable can be used in connecting two or more displays in the fiber interconnection method. Connect the fiber cable to the fiber cards of the display as described in **Drawing A-174344** and on the following table:

Face A Data Out (A34)	Field Cabling	Face B Data In (A34)
J2 Transmit (TX1)	(color varies)	J5 Receive (RX2)
J3 Receive (RX1)	(color varies)	J4 Transmit (TX2)

3.9 Optional Temperature Sensor

If an optional temperature sensor will be used with your 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 (64 Mono)
4. Bootloader Version (OS X.XX)
5. Firmware Number (**ED13305**)
6. Firmware Revision (Rev X.XX)
7. Hardware Address (HW:XX)
8. Software Address (SW:XX)
9. IP Address: (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

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. **Only qualified service personnel may access 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-3160 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** provide 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 safe, working order.
- **Troubleshooting** lists some possible display malfunctions and provides a number of possible causes for that malfunction.
- **Replacement Parts List** includes the part number and description of display components that could possibly need replacing during the life of this display.
- **Exchange and Repair and Return Programs** explain the 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 into the display.
2. For multiple face displays or a display network, an RS422 interconnect cable (most typical) relays signal between the controller of the first display and the controller in the second display. Fiber cables can also be used.
3. From the controller, the signal then travels over 20-conductor ribbon cables from the controller (J11 through J16 provide signal out) to J2 on the driver of the first column 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. This display data is used to control the LEDs.

4.3 Power Summary

Reference Drawings:

Schematics **Refer to Appendix A**

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. The transformer steps down the power to approximately 10 VAC.
3. Depending on pixel count and color, power supplies (6.5VDC, 9VDC, or 11VDC) are used to power the modules. Power supplies are preset. Contact Daktronics Customer Service for the proper settings.
4. Monochrome or tri-color Galaxy displays can use red, amber, or red and green LEDs. See your display **Schematic** for power supply wiring information.
 - Each 9VDC power supply provides power to eight modules in a display that uses 3 LEDs per pixel. In those displays that have 4 monochrome LEDs per pixel, 11VDC power supplies provide power to four modules.
 - As a standard, red displays use 3 LEDs per pixels, amber displays use 4 LEDs per pixel, and red/green displays use 2 red and 2 green LEDs per pixel.
 - Tricolor RG displays use two different power supplies for each of the eight modules. The 6.5VDC power supplies power the red LEDs and the 9VDC power supplies provide power for the green LEDs.

4.4 Service and Diagnostics

Reference Drawings:

Detail; AF-3160-8/16, Power/Control Corner	Drawing A-178959
Detail; AF-3160-24/32/40/48, Power/Control Corner...	Drawing A-178960
Comp. Layout Diagram	Refer to Appendix A
Schematics.....	Refer to Appendix A

Remember: Disconnect power before servicing any internal components.

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 **Component Layout Diagrams**, the components are denoted as follows:

Component	Denoted As	Location
Filter and Transformer	0A-1215-4002 (120 VAC)	Inside the power termination box
Controller	0A-1229-0005	Inside the controller/power panel (behind the bottom left module)
Modules	0A-1208-3005 0A-1208-3006 0A-1208-2504	Over entire face of the display (includes driver)
Power Supplies	0A-1213-4022-4A 0A-1213-4026-4A 0A-1213-4013-3R 0A-1213-4034-RG	Behind modules (refer to the display's Schematic)
Light Detector	0P-1247-0003	Behind/below the bottom left module
Modem	0P-1279-0003	Refer to Drawing A-178959 or Drawing A-178960
Fiber Board	0P-1127-0024	Refer to Drawing A-178959 or Drawing A-178960
RS422 Surge Card	0P-1146-0031	Refer to Drawing A-178959 or Drawing A-178960

Transformer and RFI Filter

Reference Drawings:

Assy, Power Termination Box **Drawing A-127361**
Schematics **Refer to Appendix A**

Transformer

The transformer is located in the upper portion of the power termination box. To replace the transformer, first disconnect and label all the wires attached to it. **Turn off power to the display before removing the wires.** 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-127361**). 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.

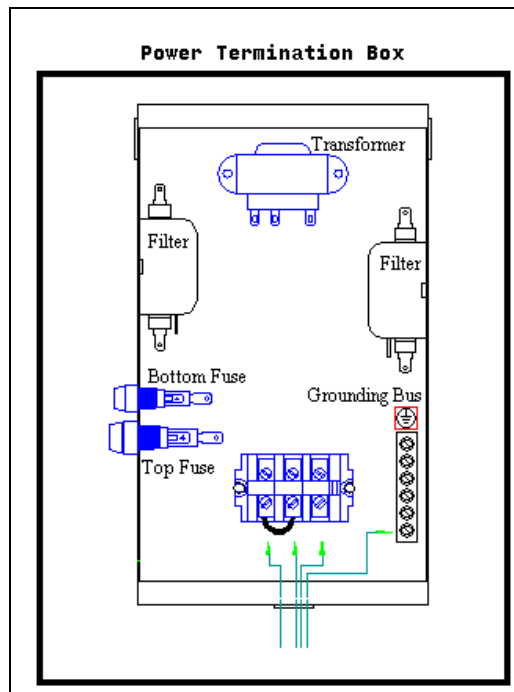


Figure 35: Power Termination Box

Controller

Reference Drawings:

Detail; AF-3160-8/16, Power/Control Corner.....**Drawing A-178959**
Detail; AF-3160-24/32/40/48, Power/Control Corner...**Drawing A-178960**
Controller, Galaxy, 8-conn, J1087**Drawing B-177838**

The controller sends data to the modules. Refer to the signal summary in **Section 4.2** and **Drawings A-178959, A-178960, and B-177838** for more information and the position of the controller board. **Figure 36** below illustrates a typical controller.

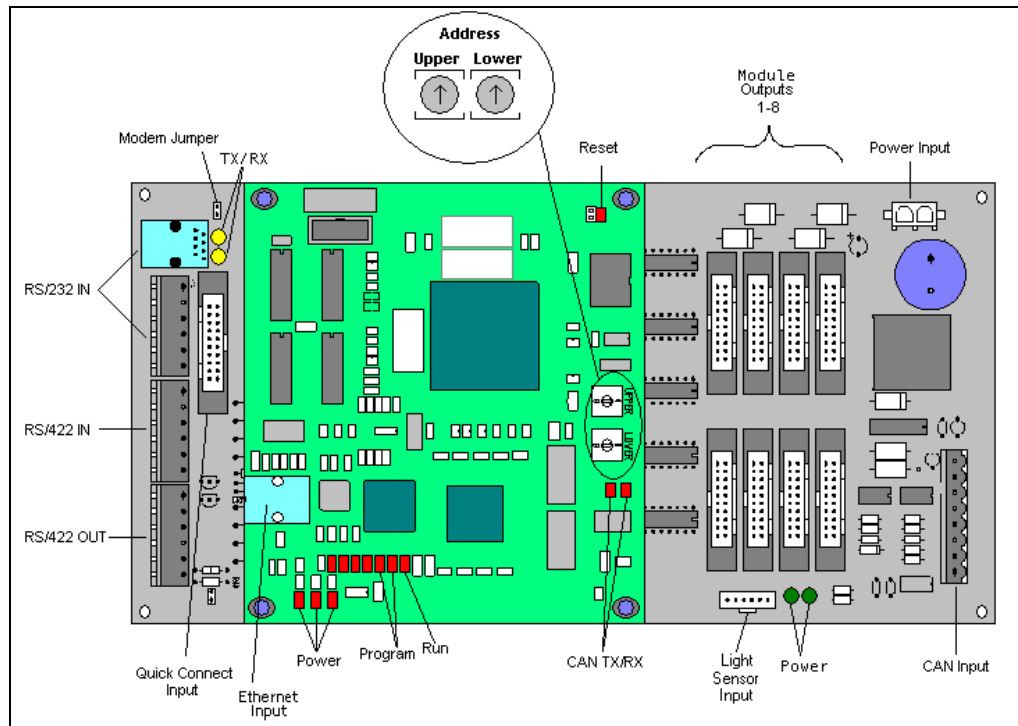


Figure 36: Controller Component Layout

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 run the test mode. Communication to the display is not possible while the display is in test mode using address 0.

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

1. Disconnect power from J5.
2. Remove all power and signal connections from the board. “Locked” connectors are released by pushing apart the latches then carefully pulling them from the jack. When replacing the board, it is helpful to have the cables labeled for easier replacement.
3. Remove the six screws holding the board in place with a 3/16” nut driver.
4. Follow the previous steps in reverse order to install a new controller board.

The address on the controller is only recognized on power up. When changing the address on the controller board, power down the display, change the address, and reenergize the display.

The following chart illustrates several common hexadecimal addresses:

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 Programmed	On when U15 contains a valid logic program.
DS6	Red	U7 Programmed	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 temp or light information.

Modules and Drivers

Reference Drawings:

Comp. Layout Diagrams..... Refer to Appendix A

The module and driver board are a single functional unit. To remove a module, complete the following steps:

1. Locate the latch access fasteners on the module. One is centered below the top 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** on the right. 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 cables and power cable.



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.

Power Supplies

Reference Drawings:

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

The LED power supplies are identified as assemblies in the **Component Layout Diagrams**.

The LED power supplies are identified as assemblies.

- In displays with 3 LEDs per pixel, each power supply unit controls eight modules.
- In displays with 4 LEDs per pixel, each power supply unit controls four modules; a power supply assembly (two power supply units) controls eight.
- In RG or tri-color displays, each set of power supplies control eight modules.

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

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

Reference Drawings:

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

The light sensor is internally mounted and wired at Daktronics. It is located in the bottom left corner on the front of the primary display as shown in **Figure 38**. In the **Component Layout Diagram** the sensor is identified as assembly 0A-1241-4013 (LT). The light and temperature sensors are part of the same CAN network and are addressed accordingly. The light sensor is address 2.

A 4-conductor cable connects the light sensor to the controller. The cable is terminated at the terminal block on the light sensor and to a jack that plugs into the controller. When the displays are mounted back-to-back, only the primary side has a light sensor

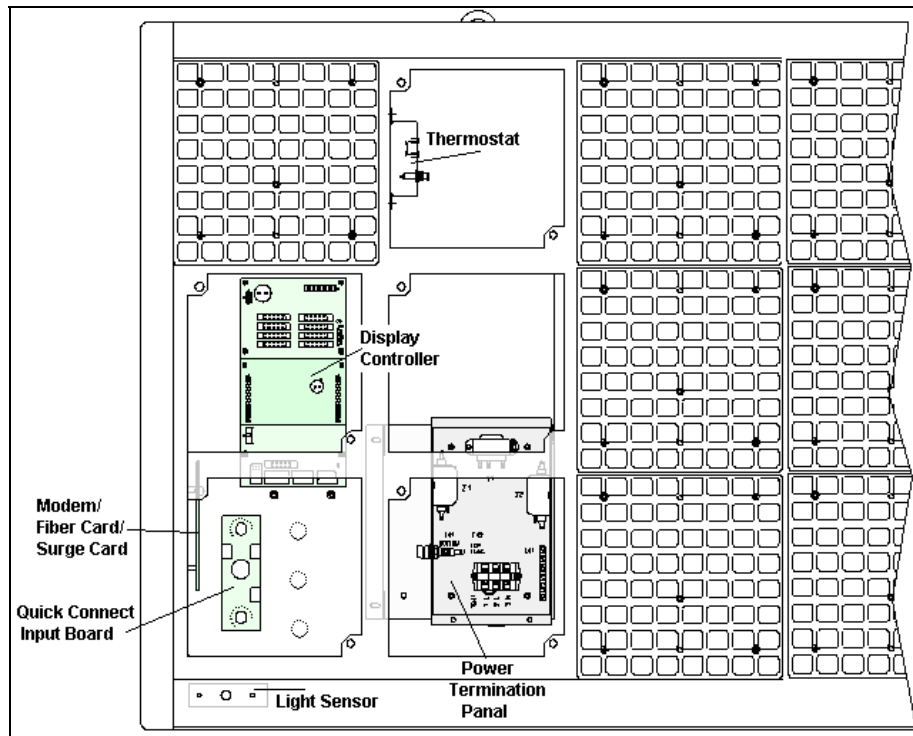


Figure 38: Power/Control Corner

Modem

Reference Drawings:

Detail; AF-3160-8/16, Power/Control Corner **Drawing A-178959**

Detail; AF-3160-24/32/40/48, Power/Control Corner .. **Drawing A-178960**

If a modem was included with the display, it is located inside the display next to the controller board. Refer to **Drawing A-178959** or **A-178960** for modem location.

1. To replace a modem, first disconnect the power and signal connections (refer to **Figure 39** on the right for the location of the connectors).
2. 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.
3. Install the new modem, replace the screws, and reconnect power and signal cables.

The modem module has five LEDs.

- The power LED should remain lit while power is applied to the modem.
- The modem RX and TX will flash when communicating.
- The carrier detect LED will light when the modem has established communication to another modem.
- The PC connect LED is not used in the display application.

The modem board also has several input and output jacks:

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

A modem system requires a jumper (X1) to be closed on the controller board. The jumper position is only recognized on power up. Refer to **Figure 40** below for the location, and the jumper settings.

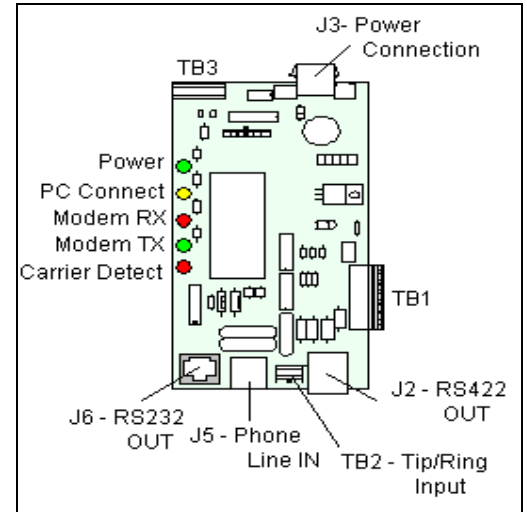


Figure 39: Modem

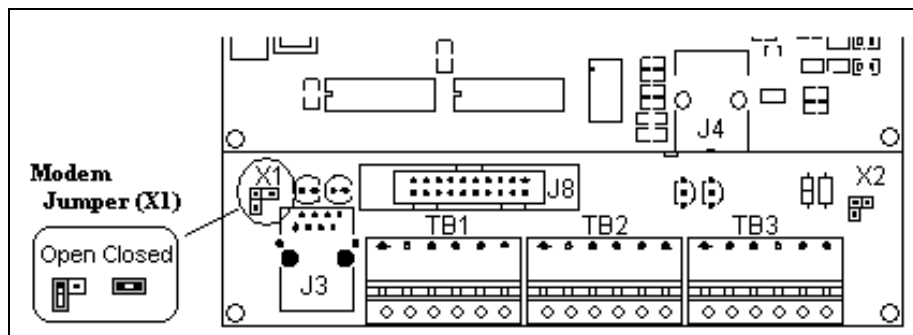


Figure 40: Modem Jumper Location

Fiber Board

Reference Drawings:

Detail; AF-3160-8/16, Power/Control Corner.....**Drawing A-178959**

Detail; AF-3160-24/32/40/48, Power/Control Corner...**Drawing A-178960**

If a fiberboard is included with the display, it is located inside the display next to the controller board. Refer to **Drawing A-178959** or **A-178960** for fiberboard location.

1. To replace a fiber optic board, first disconnect the power and signal connections (refer to **Figure 41** below for disconnection of power).
2. The fiber optic board is held in place with four screws. Carefully remove them using a 3/16" nut driver.
3. Install the new fiberboard, replace the screws and reconnect power and signal cables.

The fiber module has three LEDs.

- The power LED (DS1) should remain lit while power is applied to the module.
- The receive LED (DS2) will flash when the display fiberboard is accepting signal from the signal converter.
- The transmit LED (DS3) will flash when the display fiberboard is sending to the signal converter.

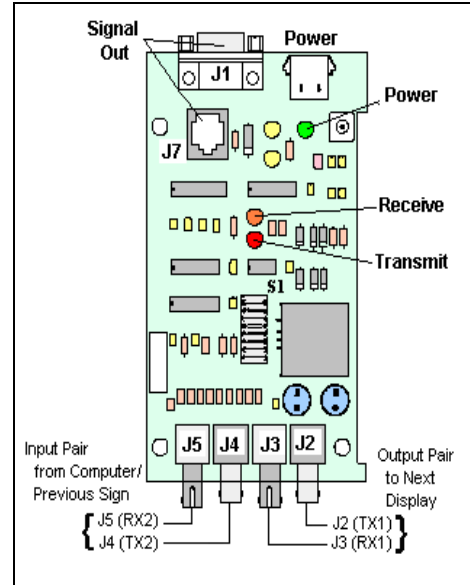


Figure 41: Fiber Optic Board

In addition, the fiber module has two input fiber connectors, which the computer or the previous display connects to, and two output fiber connectors that connect to the next display. A straight through RJ45 cable (0A-1229-0054) connects from J7 on the fiberboard to J3 on the controller board.

RS422 Surge Suppressor

Reference Drawings:

Detail; AF-3160-8/16, Power/Control Corner.....**Drawing A-178959**

Detail; AF-3160-24/32/40/48, Power/Control Corner...**Drawing A-178960**

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.

If a surge board was included with the display, it is located inside the display next to the controller board. Refer to **Drawing A-178959** or **A-178960** for surge board location.

1. To replace the surge board, first disconnect the signal connections (refer to **Figure 42** on the right).
2. The surge suppressor is held in place with four screws. Carefully remove them using a 3/16" nut driver.
3. Install the new surge suppressor, replace the screws, and reconnect power and signal cables.

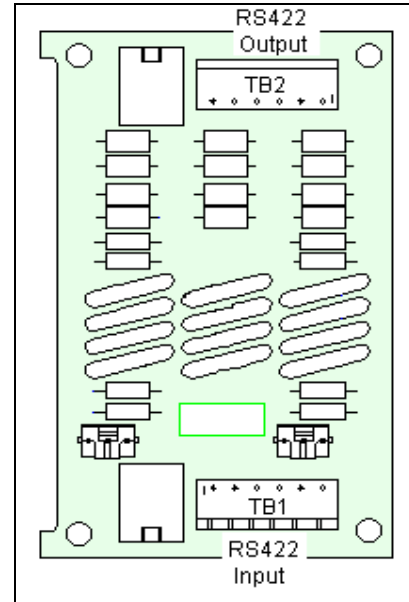


Figure 42: RS422 Surge Suppressor

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.

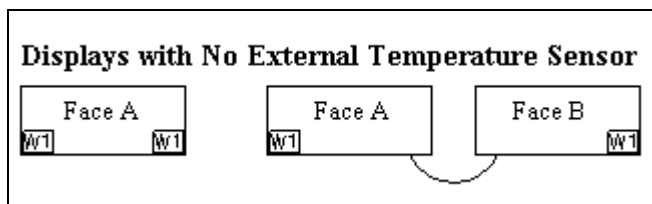


Figure 43: Displays with No External Temperature Sensor

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 or primary display in the network.

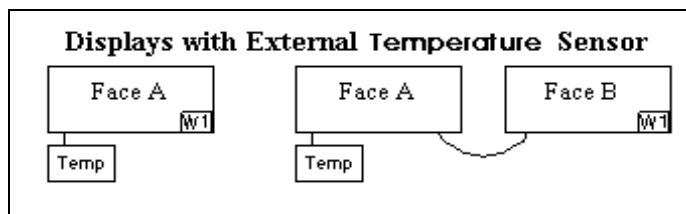


Figure 44: Displays with External Temperature Sensor

The terminating jumper is located on the quick connect board on the inside of the display. Most displays have both an input and an output quick connect board. When no output board is available, the terminating jumper will be placed on the input board of the last display. Refer to **Figure 43** and **Figure 44** for more information.

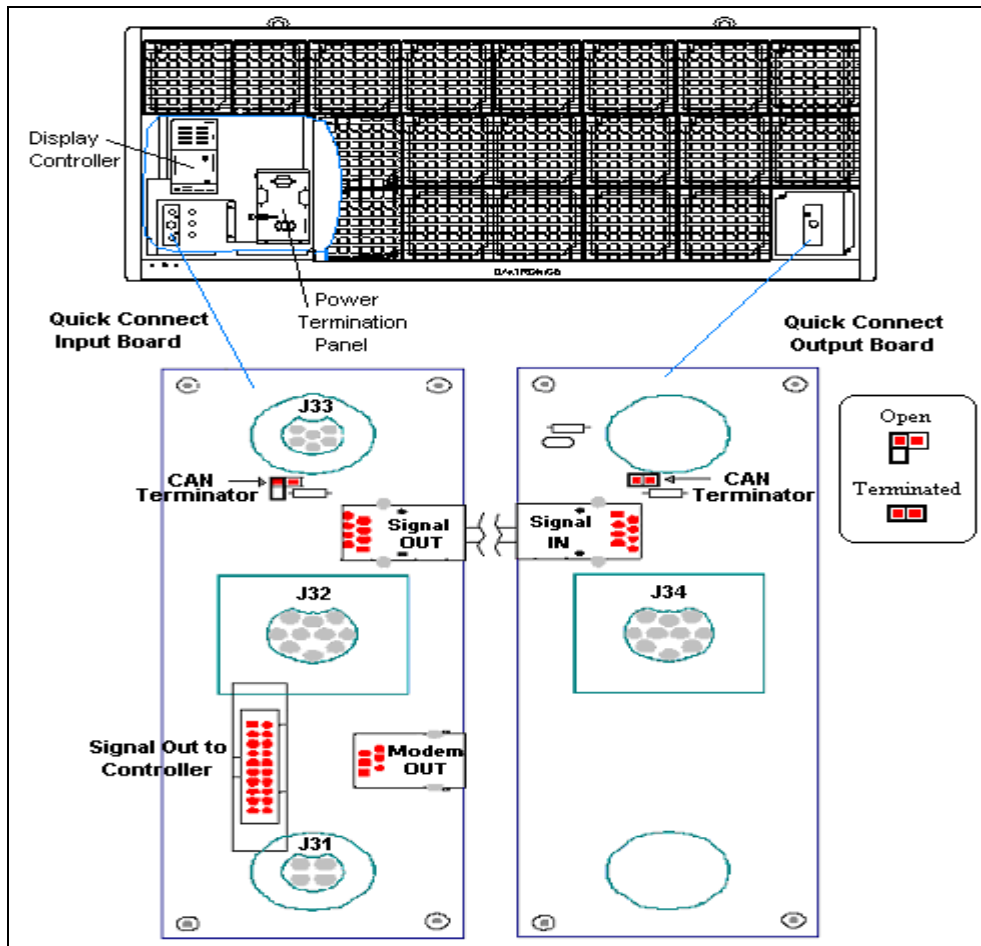


Figure 45: Quick Connect Boards

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 cleaned/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. (Allow the filters to dry completely before reinstalling them in the sign.) Compressed air can also be used to clean the filters, provided the nozzle is held at least 6" 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 Diagrams.....**Refer to Appendix B**

A thermostat controls when the ventilation fans are turned on in the display. Refer to the **Component Layout Diagram** and **Figure 38** 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, 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 or replacement 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 immediately 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 to the first module. • Check that the first module has power. • 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 garbled.	<ul style="list-style-type: none"> • Replace/check ribbon cable to first module. • Check for bent pins on module and controller. • Replace controller. • Replace first module. • Check the fuses in the power termination box.
A group of modules, (a column or block) which share the same power supply assembly, fail to work.	<ul style="list-style-type: none"> • Check the wire connections at the power supply. • Check power to modules. • 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 fuse in power termination panel. • Check/replace the ribbon cable from the controller to the modules. • Check the voltage settings on the power supplies. • Verify proper use of the software in the V1500 Controller manual (ED13530). • Replace the controller. • (For direct displays) Check the signal cable to the controller using the loopback test.
Temperature always reads -196F/-127C degrees F/ C	<ul style="list-style-type: none"> • Check temperature sensor connections. • Replace the temperature sensor. • Replace the controller.
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 the address on the Light Sensor. • Check light detector for obstructions. • Replace the light detector. • Replace the controller.

4.10 Initialization 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 Galaxy 8 Conn	0A-1229-0005
Module, 3R (1:1) 8x8 (30x70)	0A-1208-3006
Module, 4A (1:1) 8x8 (30x70)	0A-1208-3005
Module, 2R, 2G (1:1) 8x8 (30x70) Type 3	0A-1208-2504
Thermostat Enclosure 85-70-9L	0A-1213-4024
Digital Light Sensor	0P-1247-0003
Digital Temperature Sensor	0P-1247-0007
Filter; Air, Gasket, 7.50" x 13.50" x .88"	EN-1774
Fan; 110CFM, 120VAC, (B-1006) (8,16, and 24 high)	0A-1213-4014
Fan; 245CFM, 120VAC, (B-1019) (32,40, and 48 high)	0A-1213-4010
Transformer; Pri 115V, Sec 10VCT, 3Amp (120V Displays)	T-1119
Filter, RFI Line 10 AMP 120 VAC	Z-1007
Modem Board; 232 Coated	0P-1279-0003
Fiber Board; RS232 to Fiber, 12V	0P-1127-0024
Surge Suppression Board, RS422	0P-1146-0031
Signal Converter (RS232/RS422)	0A-1127-0237
Signal Converter (RS232/Fiber)	0A-1127-0239
Outdoor Client Radio Interface, QC, Gen 2	0A-1146-0078
Outdoor Server Radio Interface, QC, Gen 2	0A-1146-0079
Radio TX Interface J-box, signal converter	0A-1279-0161

Modem/Radio Interface J-box, signal converter	0A-1279-0168
Cables:	
Cable; 18" RJ11; 6-Cond., Straight	0A-1137-0160
Cable; RJ45, 8-Cond. M-M, Straight, 18"	0A-1229-0054
Cable; 10ft, RJ45, 4 pair twisted/Black	W-1383
Cable; 20ft, RJ45, 4 pair twisted 24 AWG	W-1406
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
Cable; 22 AWG (Light Sensor/Temp Sensor to Controller)	W-1234
Cable; 10-pin male to 10-pin male, 4', QC (PS to S)	W-1483
Cable; 10-pin male to 10-pin male, 10', QC (PS to S)	W-1500
Cable; 31-pin male to 31-pin male, 6', Interconnect (PM to M)	W-1503
Quick Connect Interface, Input	0P-1229-2001
Quick Connect Interface, Output	0P-1229-2002
Primary/Mirror 31-pin QC Interface	0P-1229-2008
Power Supply W/Harness; (3 Red) (1, A-1633)	0A-1213-2039
Power Supply w/Harness; (4 Amber) (2, A-1555)	0A-1213-2043
Power Supply w/Harness; (4 Amber) (1, A-1555)	0A-1213-2012
Power Supply w/Harness; (Red/Green) (1,A-1633,1,A-1591)	0A-1213-2042
Electrical Contact Cleaner Lubricant / Cal-Lube	CH-1019
Hex Wrench, T-Handle 1/8" RT	TH-1062
Manual; Venus 1500 Operator's, Version 3.0	ED-13530
Manual; Venus 1500 Radio, Gen 2	ED-13932

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

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

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

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

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

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

This is how to reach us:

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

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

Fax: 605-697-4444

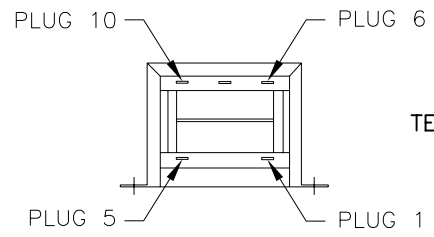
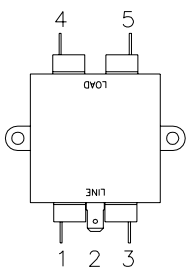
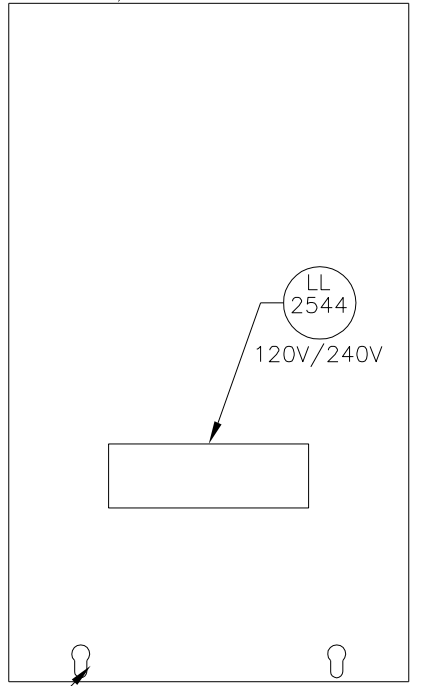
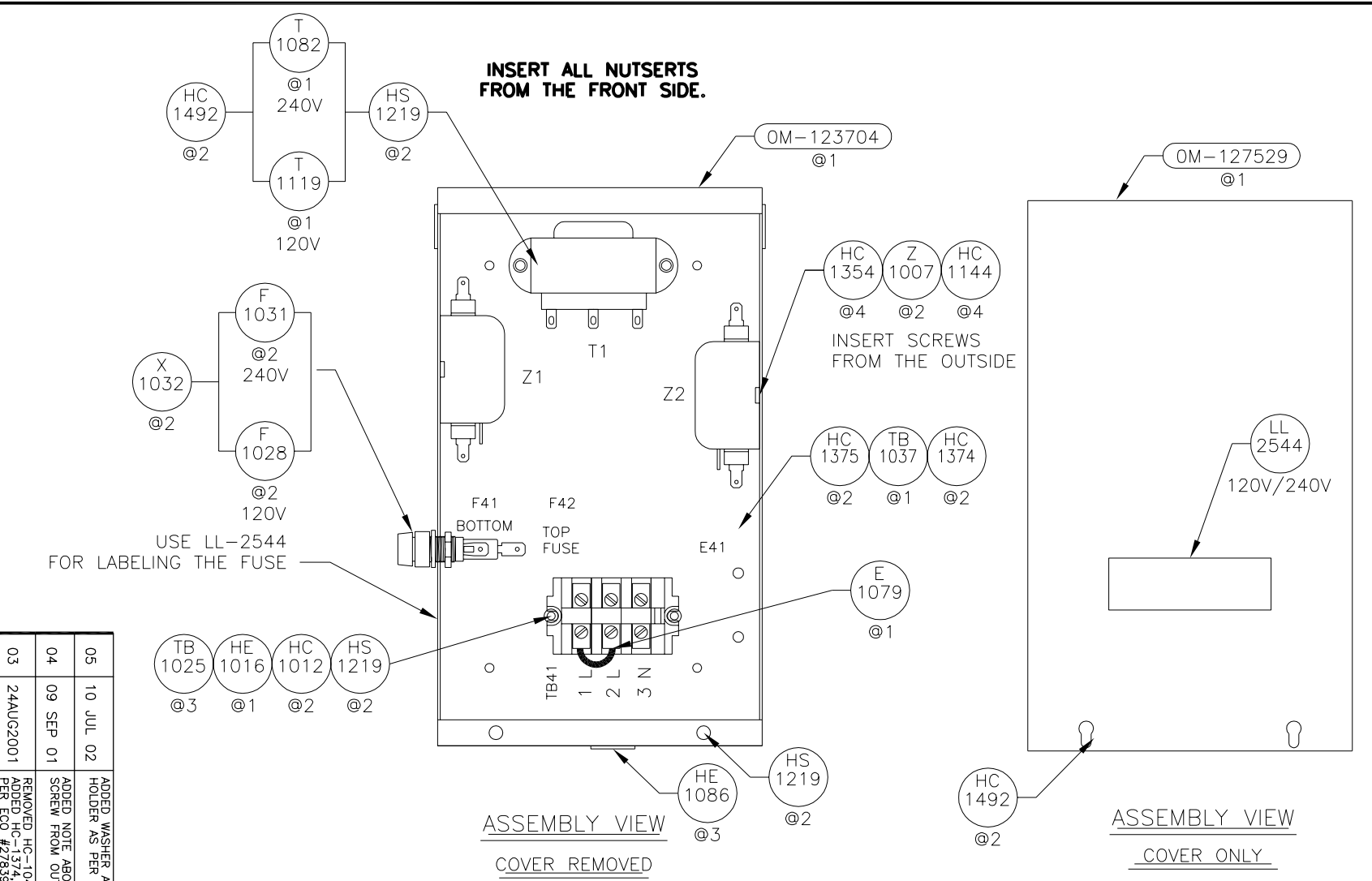
E-mail: helpdesk@daktronics.com

Appendix A: Reference Drawings

Refer to **Section 1.1** for information on reading drawing numbers. The following drawings are listed in numerical order by size (A, B, etc.).

Assy; Power Termination Box	Drawing A-127361
CAN Wiring W/Out Jacks	Drawing A-173137
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-3160-8/16/24/32x48-34-Mono.....	Drawing A-177788
Comp. Layout; AF-3160-40/48x48-34-Mono.....	Drawing A-177789
Comp. Layout; AF-3160-8/16/24/32x64-34-Mono.....	Drawing A-177790
Comp. Layout; AF-3160-40/48x64-34-Mono.....	Drawing A-177792
Comp. Layout; AF-3160-8/16/24/32x80-34-Mono.....	Drawing A-177793
Comp. Layout; AF-3160-40/48x80-34-Mono.....	Drawing A-177794
Comp. Layout; AF-3160-8/16/24/32x96-34-Mono.....	Drawing A-177795
Comp. Layout; AF-3160-40/48x96-34-Mono.....	Drawing A-177796
Comp. Layout; AF-3160-8/16/24/32x112-34-Mono.....	Drawing A-177798
Comp. Layout; AF-3160-40/48/x112-34-Mono.....	Drawing A-177800
Comp. Layout; AF-3160-8/16/24/32x128-34-Mono.....	Drawing A-177801
Comp. Layout; AF-3160-40/48x128-34-Mono.....	Drawing A-177802
Comp. Layout; AF-3160-8/16/24/32x144-34-Mono.....	Drawing A-177803
Comp. Layout; AF-3160-40/48x144-34-Mono.....	Drawing A-177804
Symbols; AF-3160 Component Layout	Drawing A-177805
Detail; AF-3160-8/16, Power/Control Corner	Drawing A-178959
Detail; AF-3160-24/32/40/48, Power/Control Corner	Drawing A-178960
Power Specs, 8x48-48x128 Displays, 3 LED/pixel	Drawing A-179874
Power Specs, 8x48-48x128 Displays, 4 LED/pixel	Drawing A-179875
Power Specs, 8x48-48x80 Displays, RG	Drawing A-179876
System Riser Diagram, QC Outdoor Radio Gen2.....	Drawing A-185359
Schematic, Signal Wiring, Internal, W/Quick Connect	Drawing B-177662
Controller, Galaxy, 8-conn., J-1087.....	Drawing B-177838
Shop Drawing, AF-3160-8-32-34, Mono Gen2.....	Drawing B-178625
Shop Drawing, AF-3160-40/48**-34-Mono Gen2.....	Drawing B-178626
Schematic, AF-3160-16X***-9, Monochrome.....	Drawing B-178693
Schematic, AF-3160-24132X***-9, Monochrome.....	Drawing B-178797
Schematic, AF-3160-40/48X***-9, Monochrome.....	Drawing B-178821
Schematic, AF-3160-8X***-9, Monochrome.....	Drawing B-178861

REV.	DATE	DESCRIPTION	BY	APPR.
06	02 OCT 02	REPLACED HC-1012 @2 WITH HC-1492 FOR THE KEHOLE	MJW	
07	20 NOV 02	REPLACED HC-1492 AND CHANGED AND 1-1108 TO 1-1119 AND 1-1082	WRT	
08	21 JAN 03	ADDED NOTE TO LABEL POWER TERM BOX PER ECO 34319	MJW	
09	17 APR 03	INSERTED FRONT VIEW OF T1 FOR PLUG ORIENTATION	MJW	
10	28 DEC 03	REMOVED LL-1084 AND LL-1882 REPLACED WITH LL-2544 PER ECO 42070	MJW	



NOTES:
TERMINATION PANEL COMPONENTS NEED TO BE LABELED.

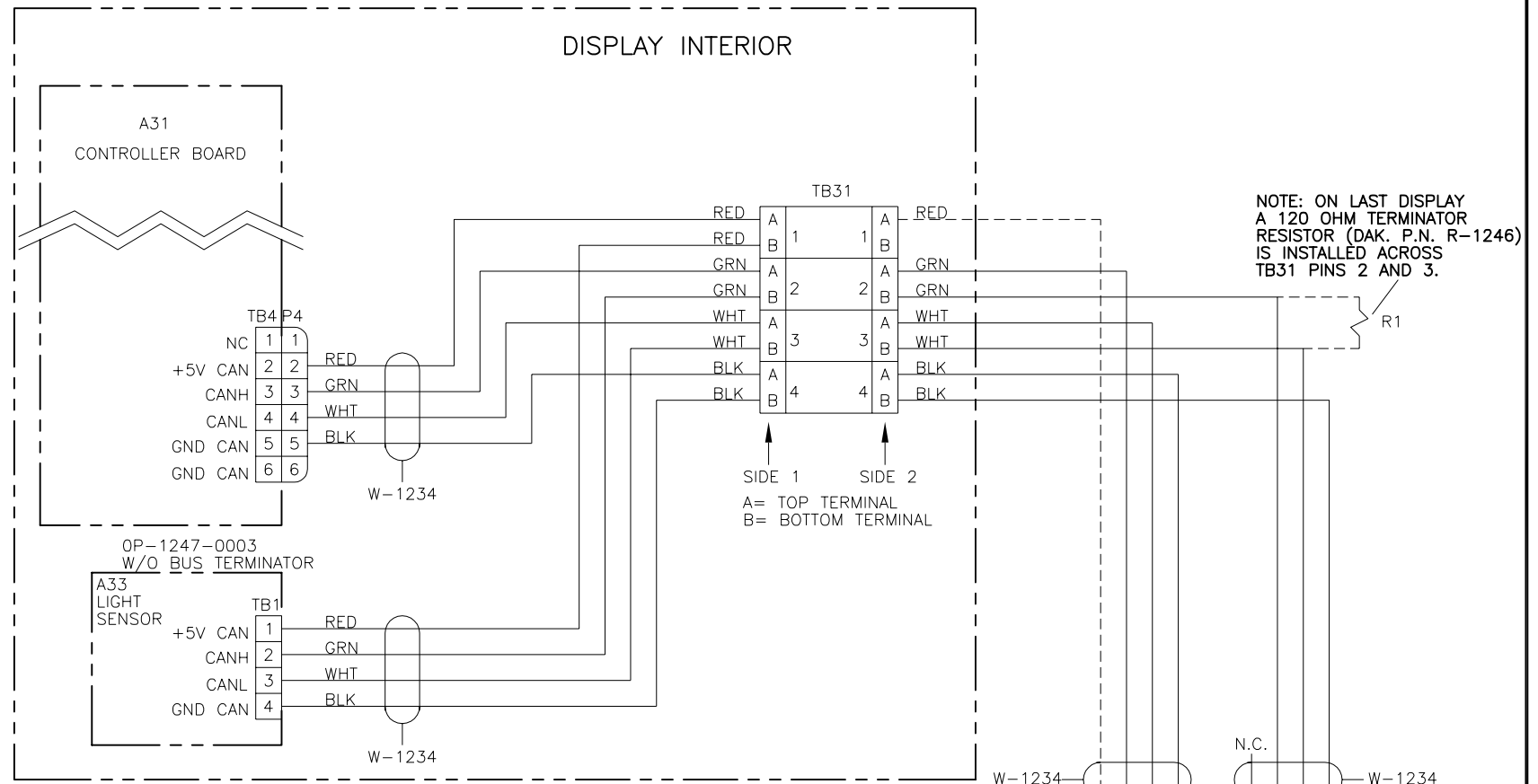
01	20APR00	CHANGED HC-1385 @6 TO @2. ADDED HC-1144 @6 AND HC-1354 @4. DELETED HC-1143.	MDM
02	21NOV00	CHANGED NOTES ABOUT WIRING.	TGW
03	24AUG2001	REMOVED HC-1043, HC-1111, AND E-1001. ADDED HC-1374, HC-1375, AND TB-1037. PER ECO #27838.	BGB
04	09 SEP 01	ADDED NOTE ABOUT INSERTING SCREW FROM OUTSIDE	MJW
05	10 JUL 02	ADDED WASHER AND NUT TO FUSE HOLDER AS PER ECO 33871	MJW

PROJ:	GALAXY, LOUVERED, VENUS 1500, 34MM		
TITLE:	ASSY: POWER TERMINATION BOX		
DES. BY:	MMAMMENGA	DRAWN BY:	MMAMMENGA
DATE:	08FEB00	SCALE:	1=3
REVISION	10	1215-E10A-127361	

DAKTRONICS, INC. BROOKINGS, SD 57006

REV.	DATE	DESCRIPTION	BY	APPR.

REVISION	APPR. BY:	DATE:
SCALE:	NONE	
	10172-R03A-173137	

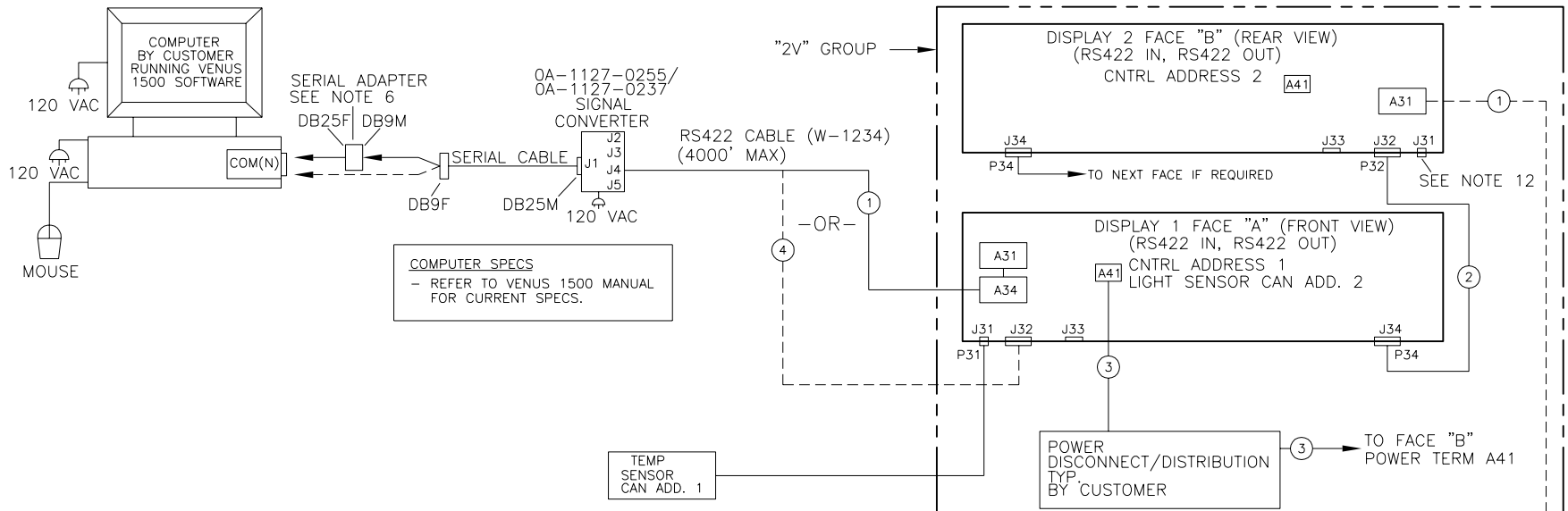


- NOTE:
1. CAN US= CAN UPSTREAM
 2. CAN DS= CAN DOWNSTREAM
 3. TB31 "SIDE 2" IS FIELD TERMINATED.

CAN NETWORK FROM
TEMP SENSOR OR
PREVIOUS DISPLAY
NOTE: RED WIRE IS
ONLY CONNECTED TO
TEMP SENSOR INPUT

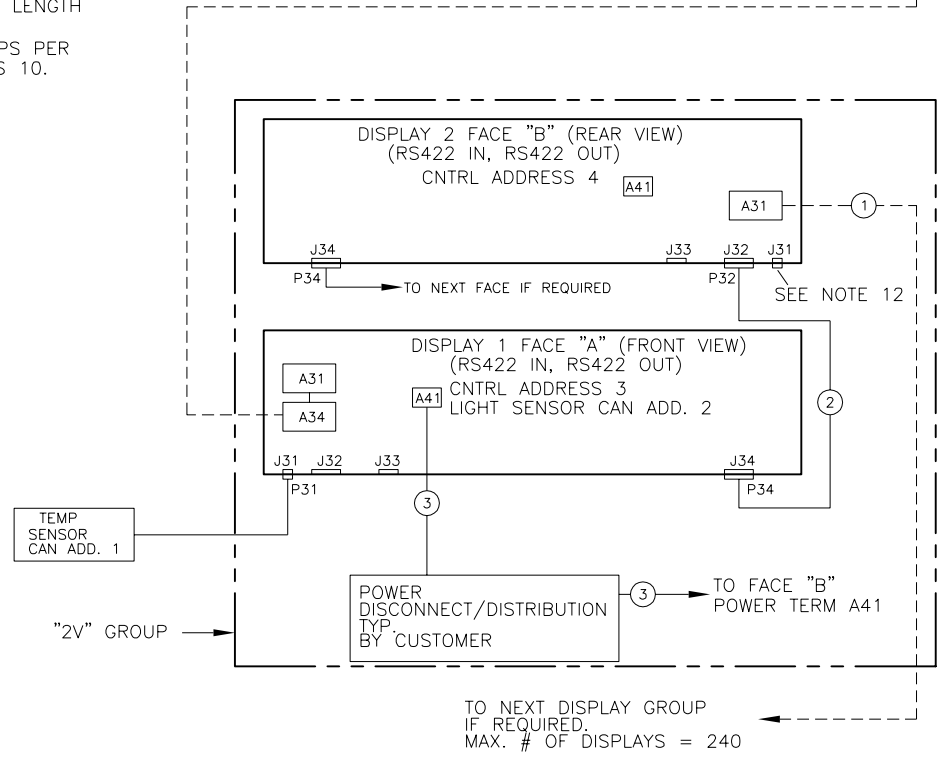
CAN NETWORK TO
NEXT DISPLAY
NOTE: ON LAST DISPLAY
THIS CABLE IS REPLACED
BY A 120 OHM TERMINATOR
RESISTOR (DAK. P.N. R-1246)
ACROSS TB31 PINS 2 AND 3.

REV.	DATE	DESCRIPTION	BY	APPR.
01	27JAN03	REMOVED CHART 1 (PWR. SIGNAL SPEC) REPLACED CHART 1 (PWR. SIGNAL SPEC) ADDED TO TERM. PLUG NOTE.	DJM	
02	26DEC03	CHANGED TEMP SENSOR PART NUMBER FROM 0A-1241-4017 TO 0A-1151-0005. REMOVED NOTE.	DJM	
03	26 MAR 04	REPLACED 0A-1127-0237 WITH 0A-1127-0255 (INCLUDES SURGE PROTECTION)	SAI	DJM



NOTES

- 4 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE, DAK. P.N. (W-1234), MANHATTAN P.N. (M4473) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE TERMINAL BLOCKS.
- 10 CONDUCTOR, 22 AWG, STRANDED CABLE, DAK. P.N. (W-1483). LENGTH TO BE 4 FT MAX. FIELD SIGNAL TERMINATIONS TO BE 10 POS QUICK CONNECT.
- POWER FEEDER SIZED AS NEEDED BY CUSTOMER
- OPTIONAL RS422 INPUT QUICK CONNECT CABLE.
- RS/422 CONTROL EQUIPMENT KIT INCLUDES:
W-1249.....SERIAL CABLE
A-1603.....DB9 TO DB25 ADAPTER
0A-1127-0255.....SIGNAL CONVERTER
0A-1146-0005.....NETWORK/CABLE TESTER
- USE EITHER THE DB9 OR DB25, DEPENDING ON YOUR PC'S REQUIREMENTS.
- INPUT TO CONVERTER IS RS232, OUTPUTS RS422.
- ALL SIGNAL CABLES BY CUSTOMER. LABOR TO PULL CABLES BY CUSTOMER.
- ALL POWER WIRES BY CUSTOMER. LABOR TO PULL WIRES 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= DISPLAY CONTROLLER
A34= SURGE PROTECTOR, RS422

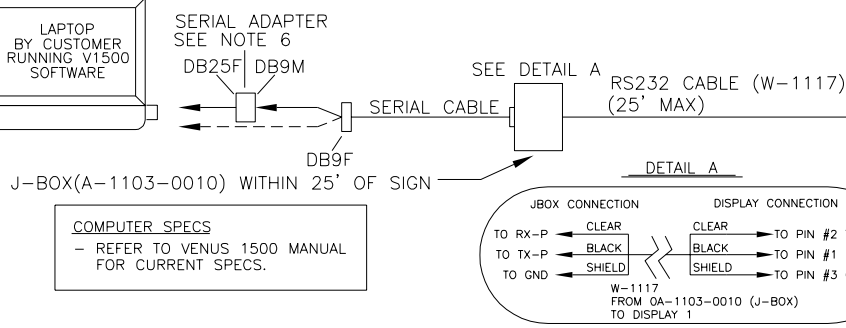
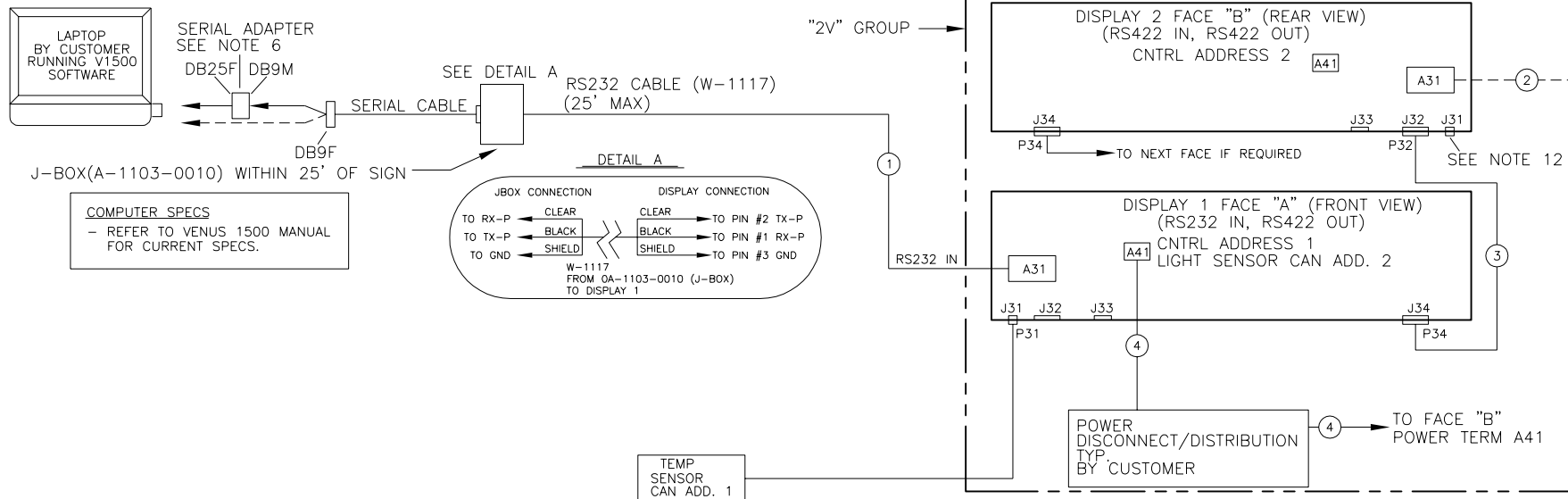


PROJ.:	OUTDOOR LED PRODUCT LINE
TITLE:	SYSTEM RISER DIAGRAM, RS422
DES. BY:	LKERR
DATE:	22AUG02
REVISION:	03
APPR. BY:	
SCALE:	NONE
1229-R01A-174135	

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DAKTRONICS, INC. BROOKINGS, SD 57006

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



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

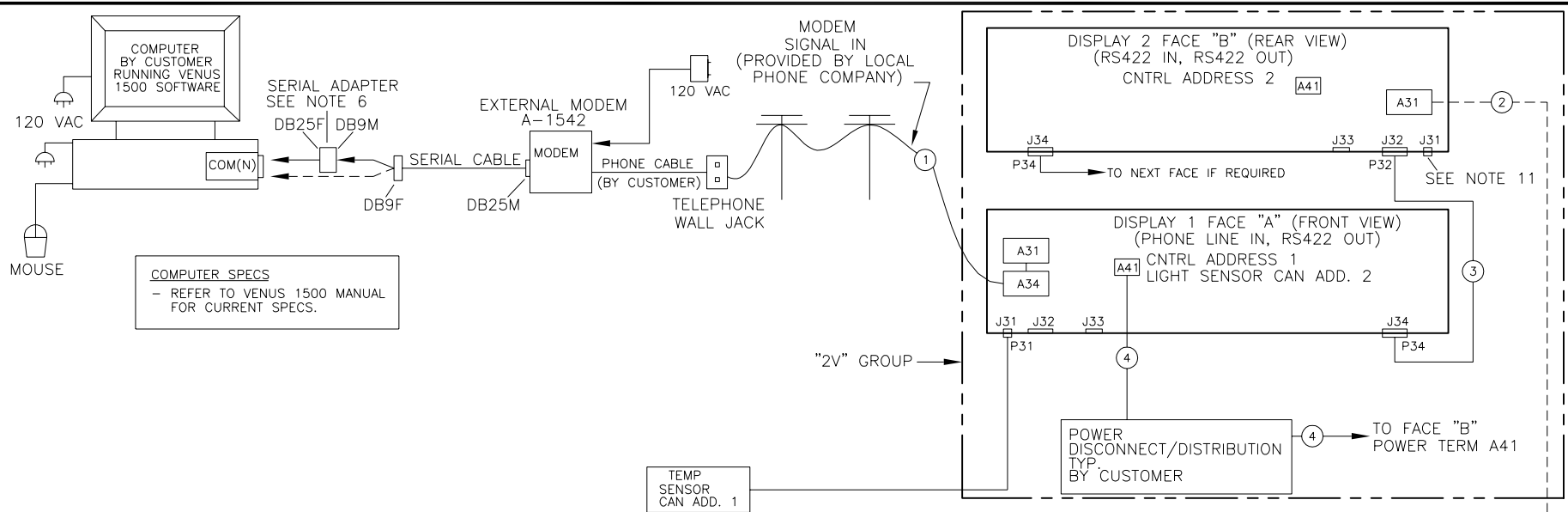
- NOTES
- 2 CONDUCTOR, 18 AWG, STRANDED SHIELDED CABLE. DAK. P.N. (W-1117). BELDON P.N. (8760) OR EQUIV.
 - 4 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE. DAK. P.N. (W-1234). MANHATTAN P.N. (M4473) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE TERMINAL BLOCK.
 - 10 CONDUCTOR, 18 AWG, STRANDED SHIELDED CABLE. DAK. P.N. (W-1483). LENGTH TO BE 4 FT MAX. FIELD SIGNAL TERMINATIONS TO BE 10 POS QUICK CONNECT.
 - POWER FEEDER SIZED AS NEEDED BY CUSTOMER
 - RS-232 CONTROL EQUIPMENT KIT INCLUDES:
W-1249.....SERIAL CABLE
A-1603.....DB9 TO DB25 ADAPTER
A-1103-0010.....J-BOX
A-1146-0005.....NETWORK/CABLE TESTER
 - USE EITHER THE DB9 OR DB25, DEPENDING ON YOUR PC'S REQUIREMENTS.
 - 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. OA-1241-4010) MUST BE INSTALLED ON LAST DISPLAY IN EACH GROUP.
 - A31= DISPLAY CONTROLLER
 - INPUT TO J-BOX IS RS232, OUTPUT IS RS232.

PROJ.:	OUTDOOR LED PRODUCT LINE
TITLE:	SYSTEM RISER DIAGRAM, RS232
DES. BY:	LKERR
REVISION	APPR. BY:
02	NONE
SCALE:	DATE: 28AUG02
1229-R01A-174341	

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DAKTRONICS, INC. BROOKINGS, SD 57006

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	

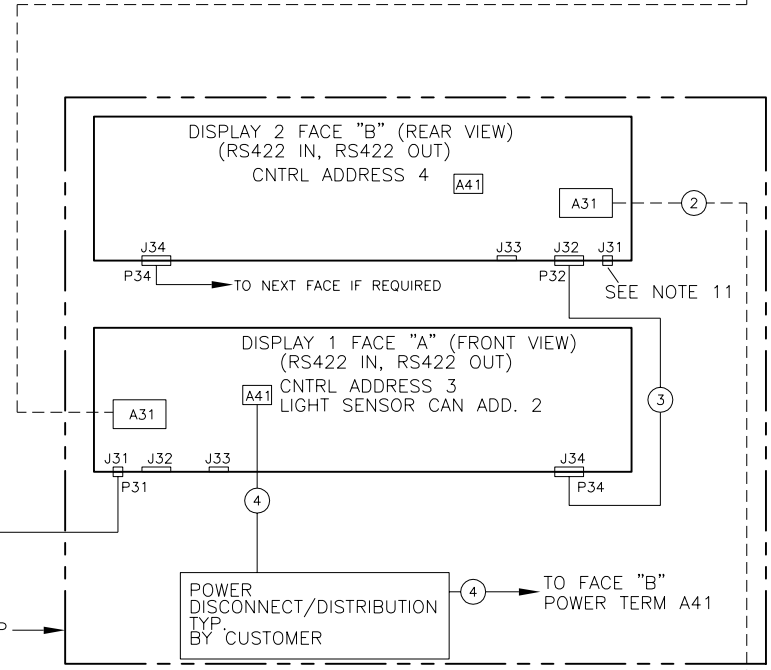


COMPUTER SPECS
 - REFER TO VENUS 1500 MANUAL FOR CURRENT SPECS.

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

NOTES

- ① DEDICATED PHONE CABLE WITH THE "TIP & RING" IDENTIFIED. BY CUSTOMER.
- ② 4 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE. DAK. P.N. (W-1234). MANHATTAN P.N. (M4473) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE PHOENIX TERMINAL BLOCKS.
- ③ 10 CONDUCTOR, 18 AWG, STRANDED SHIELDED CABLE. DAK. P.N. (W-1483). LENGTH TO BE 4 FT MAX. FIELD SIGNAL TERMINATIONS TO BE 10 POS QUICK CONNECT.
- ④ POWER FEEDER SIZED AS NEEDED BY CUSTOMER
5. MODEM CONTROL EQUIPMENT KIT INCLUDES:
 W-1249.....SERIAL CABLE
 A-1603.....DB9 TO DB25 ADAPTER
 A-1542.....EXTERNAL MODEM
 A-1146-0005.....NETWORK/CABLE TESTER
6. USE EITHER THE DB9 OR DB25, DEPENDING ON YOUR PC'S REQUIREMENTS.
7. ALL SIGNAL CABLES BY CUSTOMER. LABOR TO PULL CABLES BY CUSTOMER.
8. ALL POWER WIRES BY CUSTOMER. LABOR TO PULL WIRES BY CUSTOMER.
9. ALL WIRING TO MEET NEC AND LOCAL ELECTRICAL CODES.
10. DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NATIONAL ELECTRICAL CODE.
11. LAST DISPLAY IN A GROUP REQUIRES A CAN TERMINATION 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



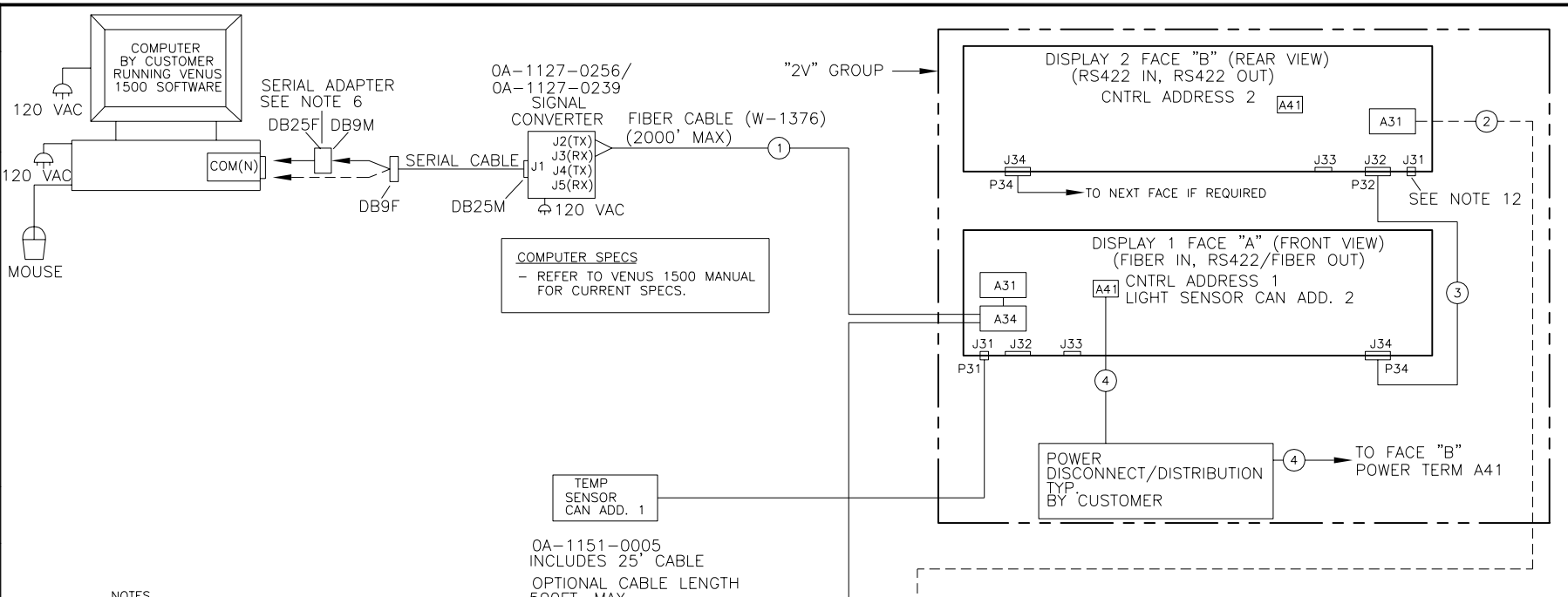
TO NEXT DISPLAY GROUP
 IF REQUIRED.
 MAX. # OF DISPLAYS = 240

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

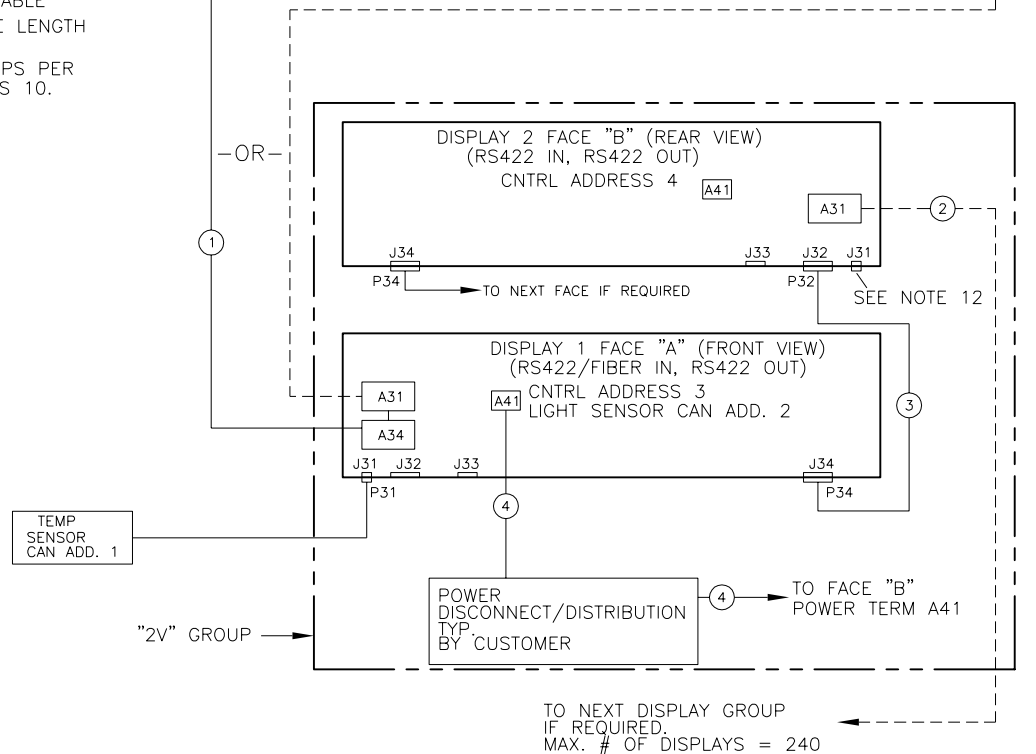
DAKTRONICS, INC. BROOKINGS, SD 57006

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

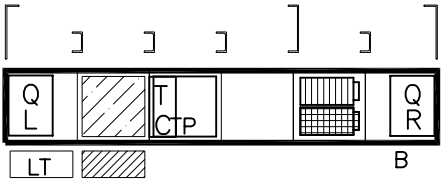


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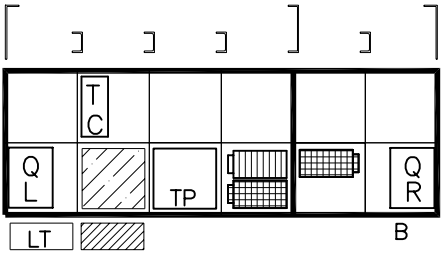
- 4 FIBER CABLE, 62.5/125 GRADE DAK. P.N. (W-1376). GRAYBAR P.N. (BX04080D-W3SB1UC900R) IN CONDUIT WHERE REQUIRED.
- 4 CONDUCTOR, 22 AWG, STRANDED SHIELDED CABLE. DAK. P.N. (W-1234). MANHATTAN P.N. (M4473) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE TERMINAL BLOCKS.
- 10 CONDUCTOR, 22 AWG, STRANDED CABLE. DAK. P.N. (W-1483). LENGTH TO BE 4 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 DB25 ADAPTER
A-1127-0256.....SIGNAL CONVERTER
A-1146-0005.....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. OA-1241-4010) MUST BE INSTALLED ON LAST DISPLAY IN EACH GROUP.
- A31= CONTROLLER ASSEMBLY
A34= FIBER INTERFACE BOARD



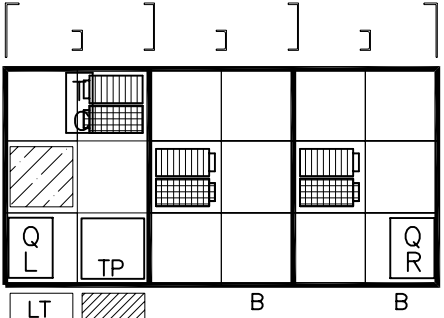
REVISION	APPR. BY:	DATE:
03	LKERR	06SEP02
SCALE:	NONE	
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DAKTRONICS, INC. BROOKINGS, SD 57006		
PROJ.: OUTDOOR LED PRODUCT LINE		
TITLE: SYSTEM RISER DIAGRAM, FIBER		
DES. BY:	DRAWN BY:	
LKERR	LKERR	
1229-R01A-174344		



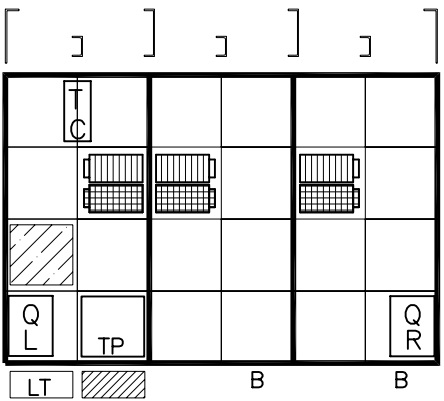
FRONT VIEW
AF-3160-848-34-MONO



FRONT VIEW
AF-3160-1648-34-MONO



FRONT VIEW
AF-3160-2448-34-MONO



FRONT VIEW
AF-3160-3248-34-MONO

REV.	DATE	DESCRIPTION	BY	APPR.
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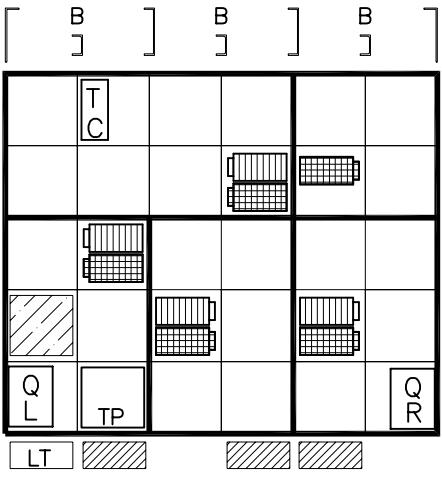
PROJ: GALAXY, LOUVERED V1500 MONO 34MM
DAKTRONICS, INC. BROOKINGS, SD 57006

TITLE: COMP. LAYOUT; AF-3160-8/16/24/32X48-34-MONO

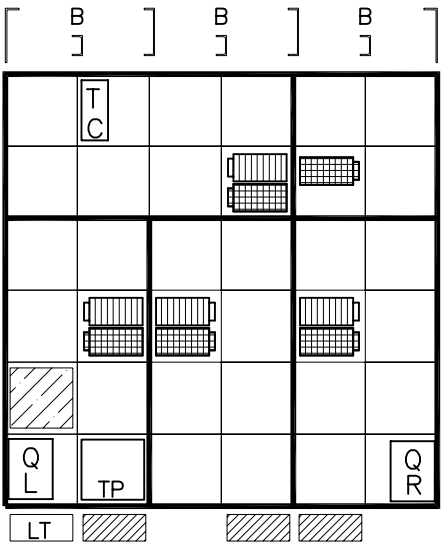
DES. BY: MMAMMENGA DRAWN BY: WTUCKER DATE: 12NOV02

REVISION APPR. BY: NONE

SCALE: NONE 1215-E10A-177788



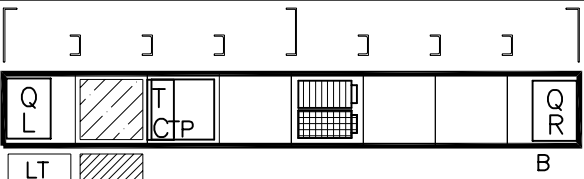
FRONT VIEW
AF-3160-4048-34-MONO



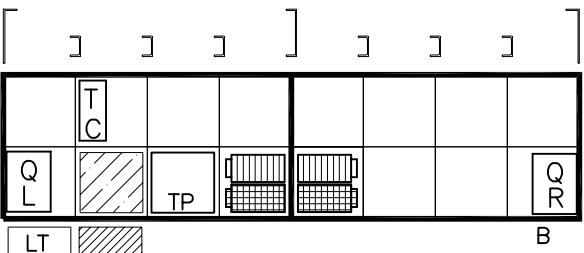
FRONT VIEW
AF-3160-4848-34-MONO

REV.	DATE	DESCRIPTION	BY	APPR.
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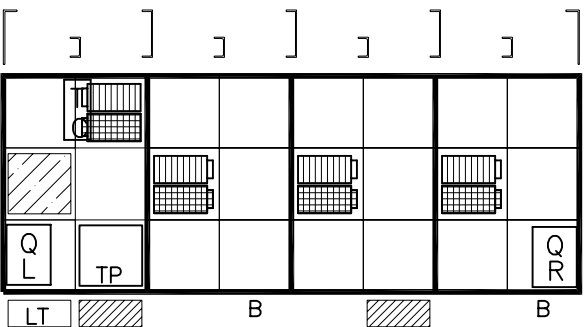
THE CONCEPTS, EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS, INCLUDING ELECTRONICALLY WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2002 DAKTRONICS, INC.				
DAKTRONICS, INC. BROOKINGS, SD 57006				
PROJ: GALAXY, LOUVERED V1500 MONO 34MM				
TITLE: COMP. LAYOUT; AF-3160-40/48X48-34-MONO				
DES. BY: MMAMMENGA DRAWN BY: WTUCKER DATE: 12NOV02				
REVISION APPR. BY: SCALE: NONE 1215-E10A-177789				



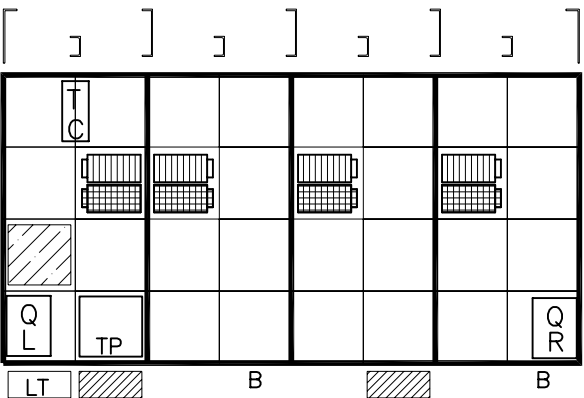
FRONT VIEW
AF-3160-864-34-MONO



FRONT VIEW
AF-3160-1664-34-MONO



FRONT VIEW
AF-3160-2464-34-MONO



FRONT VIEW
AF-3160-3264-34-MONO

REV.	DATE	DESCRIPTION	BY	APPR.
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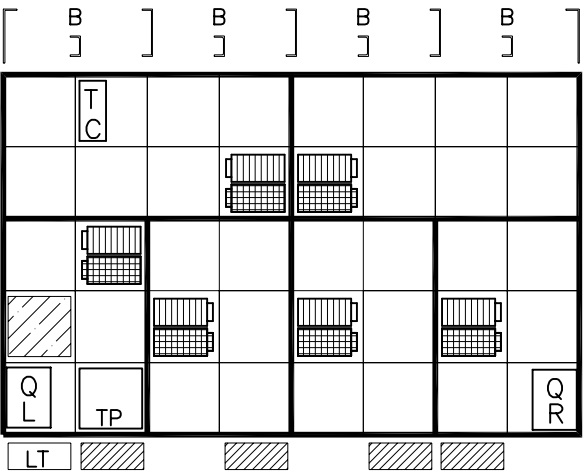
DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 MONO 34MM

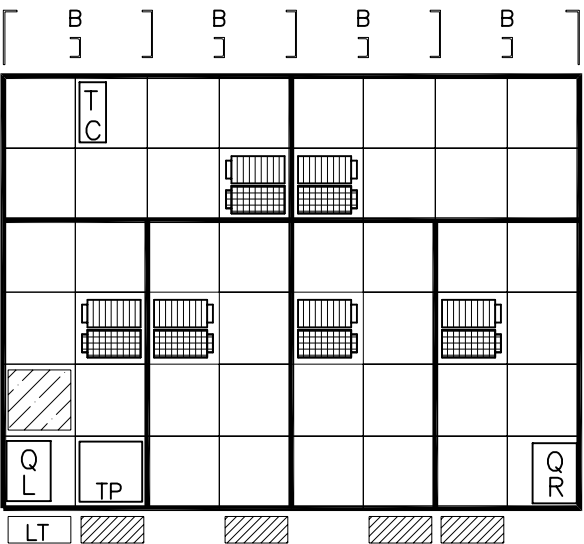
TITLE: COMP. LAYOUT; AF-3160-8/16/24/32X64-34-MONO

DES. BY: MMAMMENGA DRAWN BY: WTUCKER DATE: 12NOV02

REVISION	APPR. BY:	1215-E10A-177790
	SCALE:	NONE



FRONT VIEW
AF-3160-4064-34-MONO



FRONT VIEW
AF-3160-4864-34-MONO

REV.	DATE	DESCRIPTION	BY	APPR.
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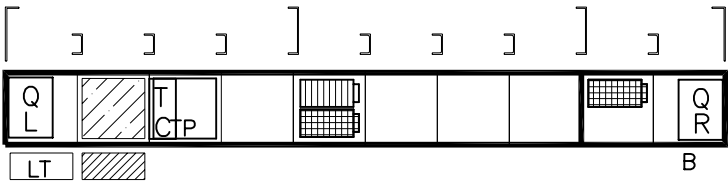
DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 MONO 34MM

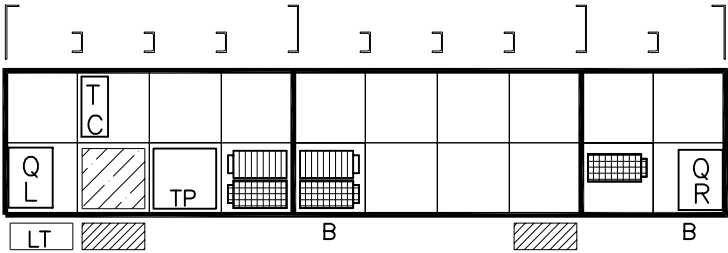
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DES. BY: MMAMMENGA DRAWN BY: WTUCKER DATE: 12NOV02

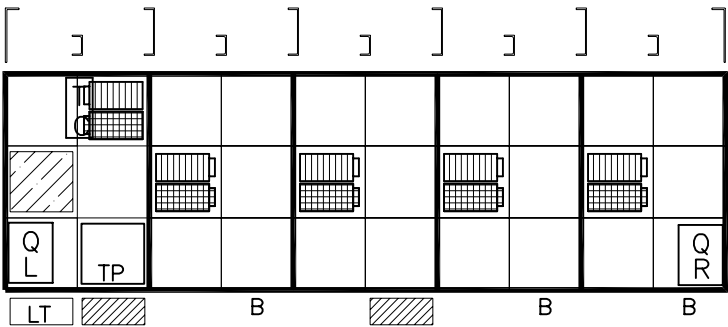
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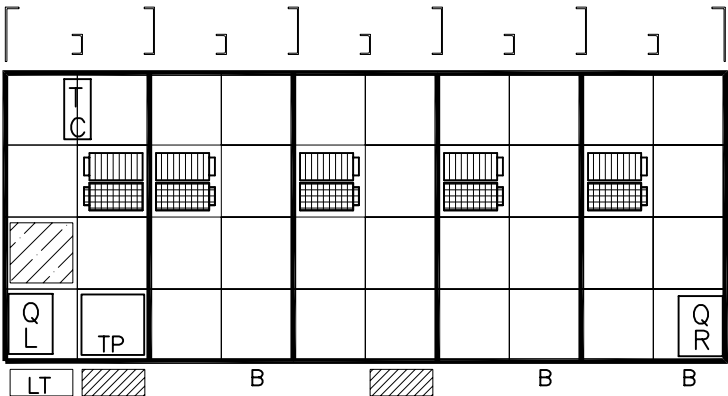
FRONT VIEW
AF-3160-880-34-MONO



FRONT VIEW
AF-3160-1680-34-MONO



FRONT VIEW
AF-3160-2480-34-MONO



FRONT VIEW
AF-3160-3280-34-MONO

REV. DATE DESCRIPTION BY APPR.

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 MONO 34MM

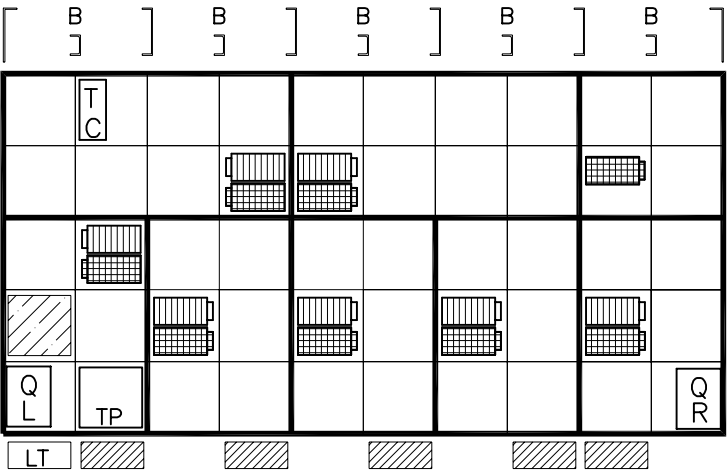
TITLE: COMP. LAYOUT; AF-3160-8/16/24/32X80-34-MONO

DES. BY: MMAMMENGA DRAWN BY: WTUCKER DATE: 12NOV02

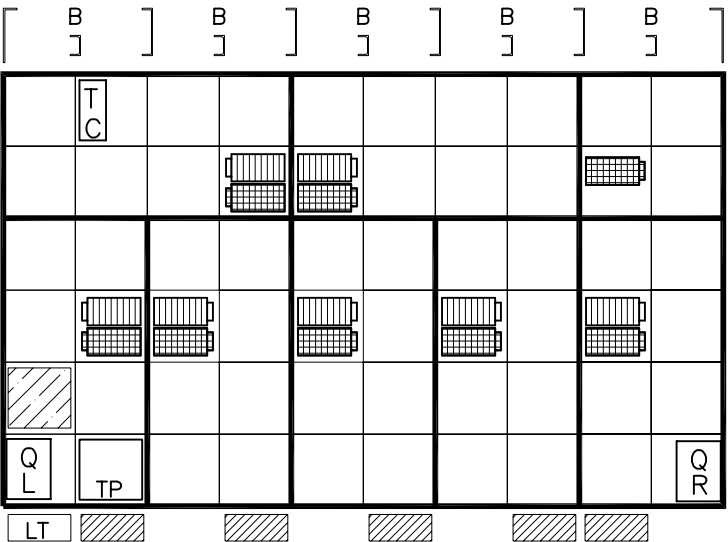
REVISION

APPR. BY: NONE
SCALE: NONE

1215-E10A-177793



FRONT VIEW
AF-3160-4080-34-MONO



FRONT VIEW
AF-3160-4880-34-MONO

REV.	DATE	DESCRIPTION	BY	APPR.
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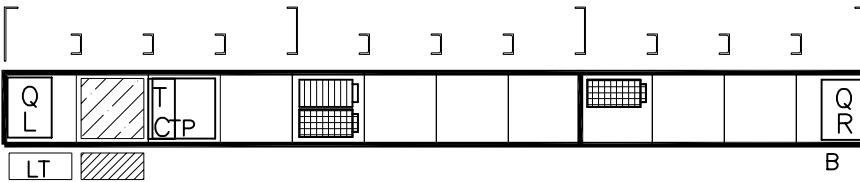
PROJ: GALAXY, LOUVERED V1500 MONO 34MM
DAKTRONICS, INC. BROOKINGS, SD 57006

TITLE: COMP. LAYOUT; AF-3160-40/48X80-34-MONO

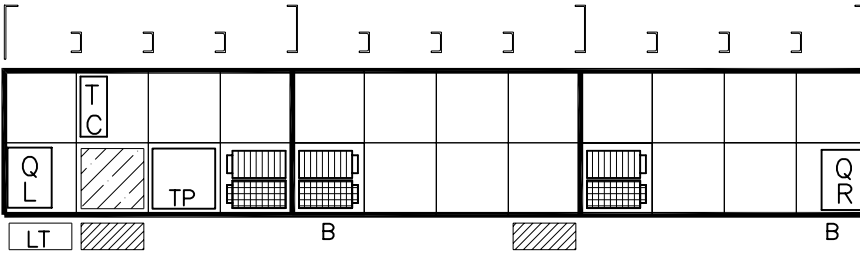
DES. BY: MMAMMENGA DRAWN BY: WTUCKER DATE: 12NOV02

REVISION APPR. BY: NONE

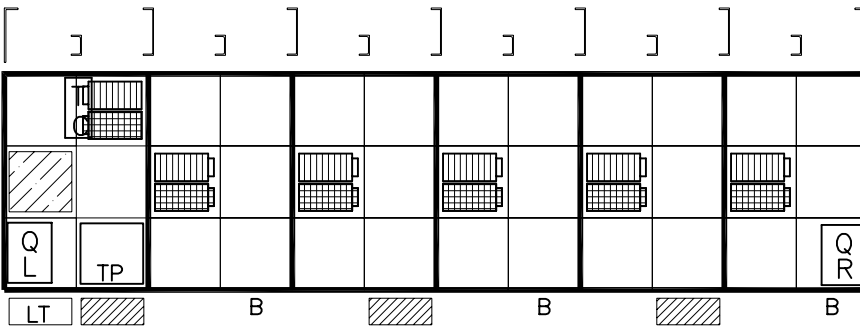
SCALE: NONE 1215-E10A-177794



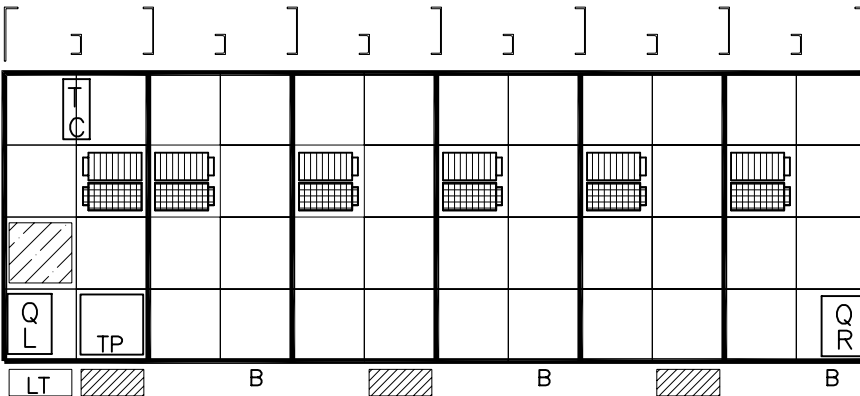
FRONT VIEW
AF-3160-896-34-MONO



FRONT VIEW
AF-3160-1696-34-MONO



FRONT VIEW
AF-3160-2496-34-MONO



FRONT VIEW
AF-3160-3296-34-MONO

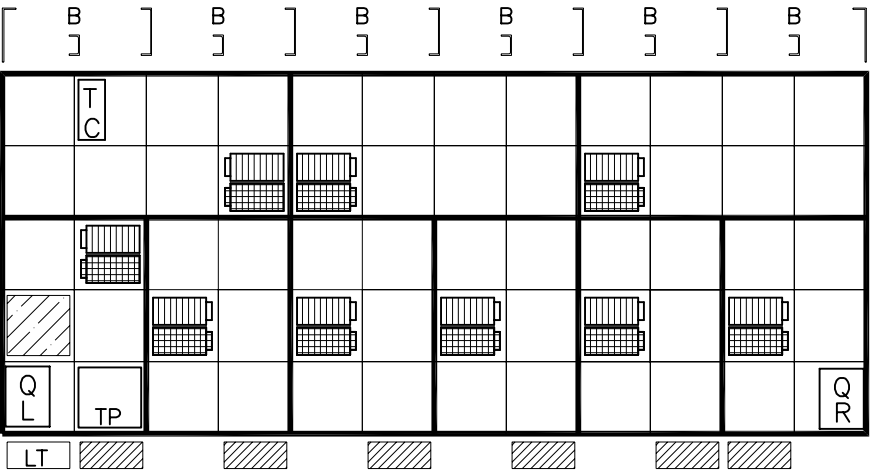
REV. DATE DESCRIPTION BY APPR.

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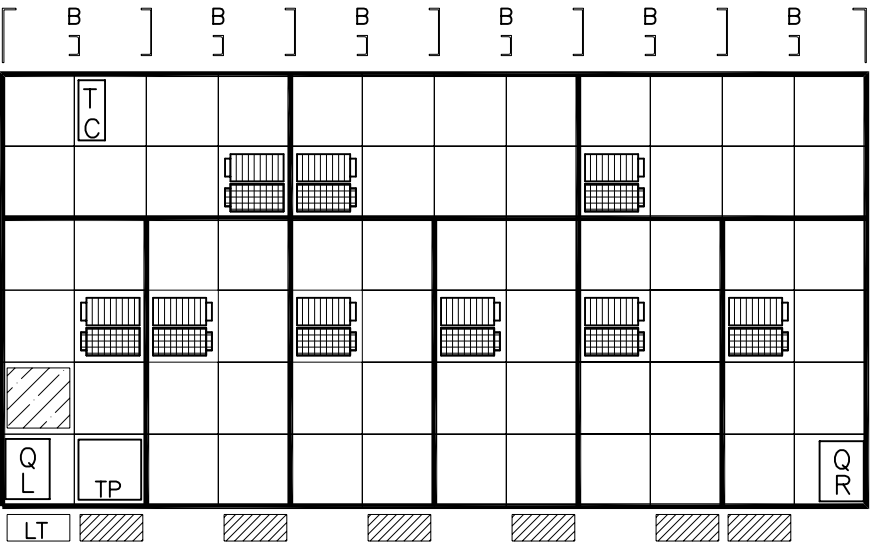
PROJ: GALAXY, LOUVERED V1500 MONO 34MM
 TITLE: COMP. LAYOUT; AF-3160-8/16/24/32X96-34-MONO
 DES. BY: MMAMMENGA DRAWN BY: WTUCKER DATE: 12NOV02

DAKTRONICS, INC. BROOKINGS, SD 57006

REVISION APPR. BY: SCALE: NONE 1215-E10A-177795



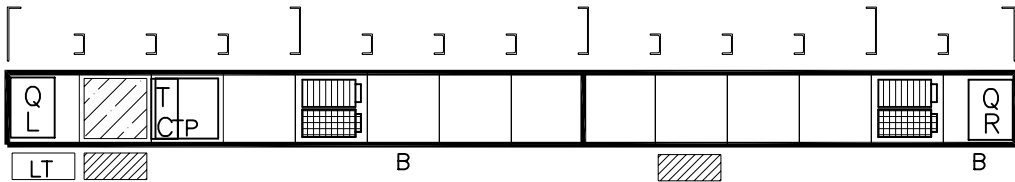
FRONT VIEW
AF-3160-4096-34-MONO



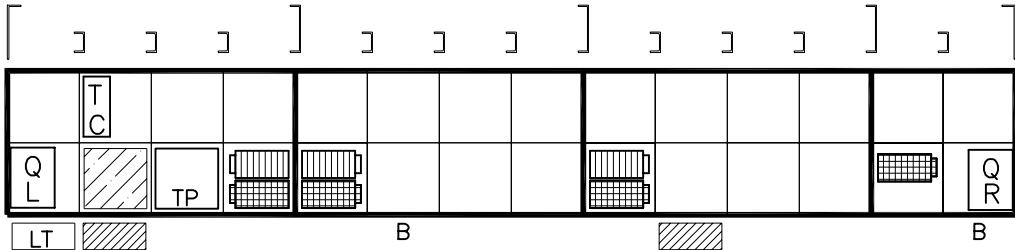
FRONT VIEW
AF-3160-4896-34-MONO

REV.	DATE	DESCRIPTION	BY	APPR.
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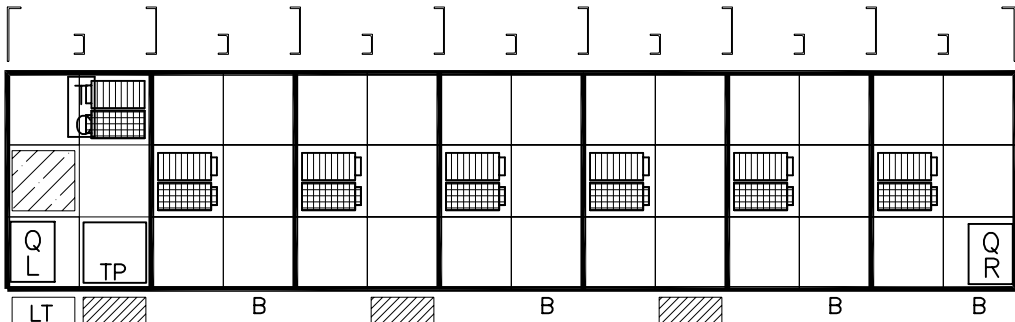
THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS, INCLUDING ELECTRONICALLY WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2002 DAKTRONICS, INC.	
DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ:	GALAXY, LOUVERED V1500 MONO 34MM
TITLE:	COMP. LAYOUT; AF-3160-40/48X96-34-MONO
DES. BY:	MAMMENGA
DRAWN BY:	WTUCKER
DATE:	12NOV02
REVISION	APPR. BY:
SCALE:	NONE
1215-E10A-177796	



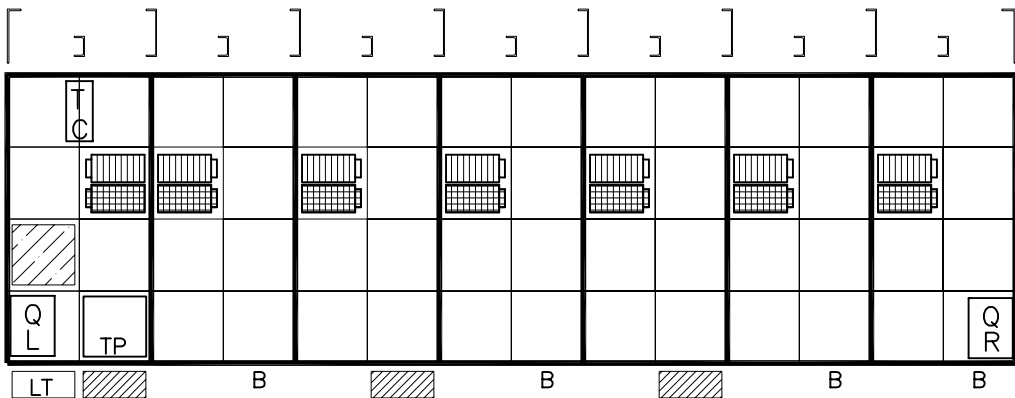
FRONT VIEW
AF-3160-8112-34-MONO



FRONT VIEW
AF-3160-16112-34-MONO



FRONT VIEW
AF-3160-24112-34-MONO



FRONT VIEW
AF-3160-32112-34-MONO

REV.	DATE	DESCRIPTION	BY	APPR.

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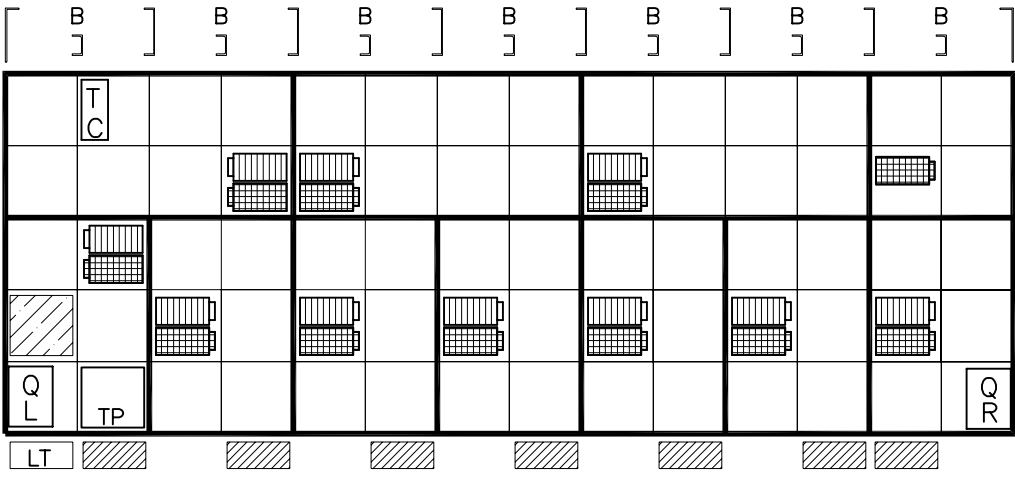
DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 MONO 34MM

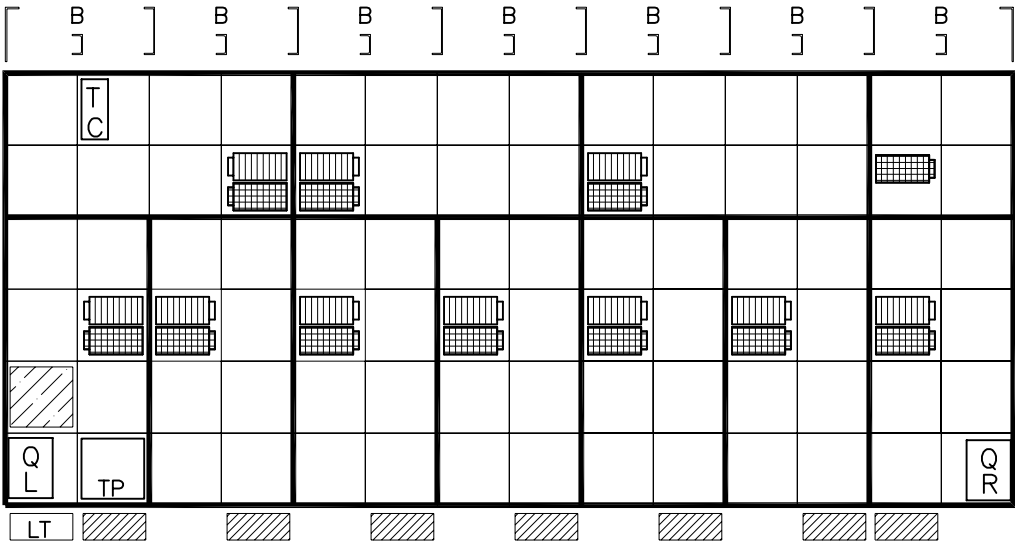
TITLE: COMP. LAYOUT; AF-3160-8/16/24/32X112-34-MONO

DES. BY: MMAMWENGA DRAWN BY: WTUCKER DATE: 12NOV02

REVISION APPR. BY: NONE SCALE: NONE 1215-E10A-177798



FRONT VIEW
AF-3160-40112-34-MONO



FRONT VIEW
AF-3160-48112-34-MONO

REV.	DATE	DESCRIPTION	BY	APPR.
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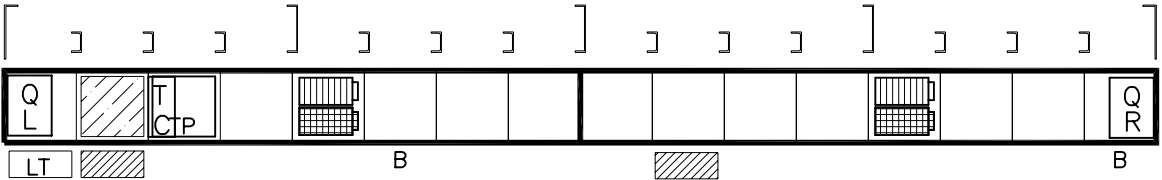
DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 MONO 34MM

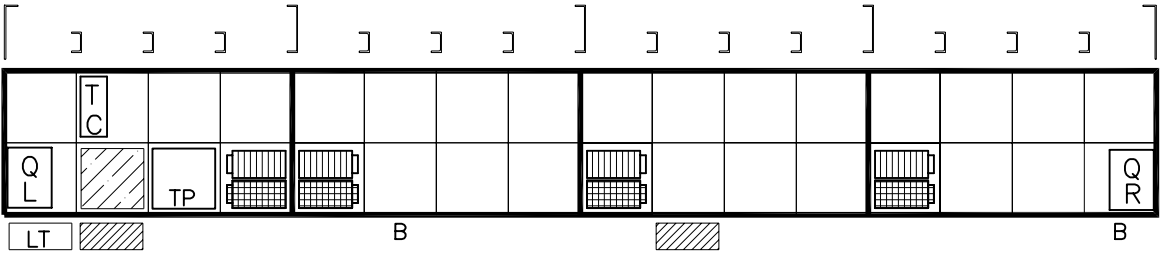
TITLE: COMP. LAYOUT; AF-3160-40/48X112-34-MONO

DES. BY: MMAMMENGA DRAWN BY: WTUCKER DATE: 12NOV02

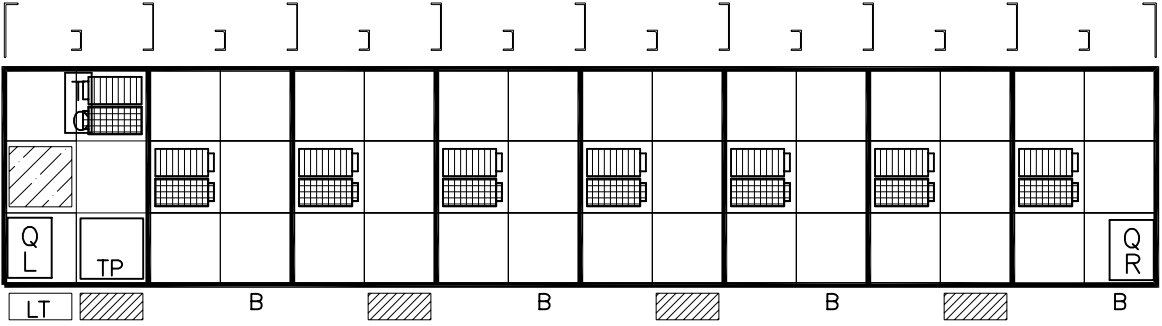
REVISION	APPR. BY:	1215-E10A-177800
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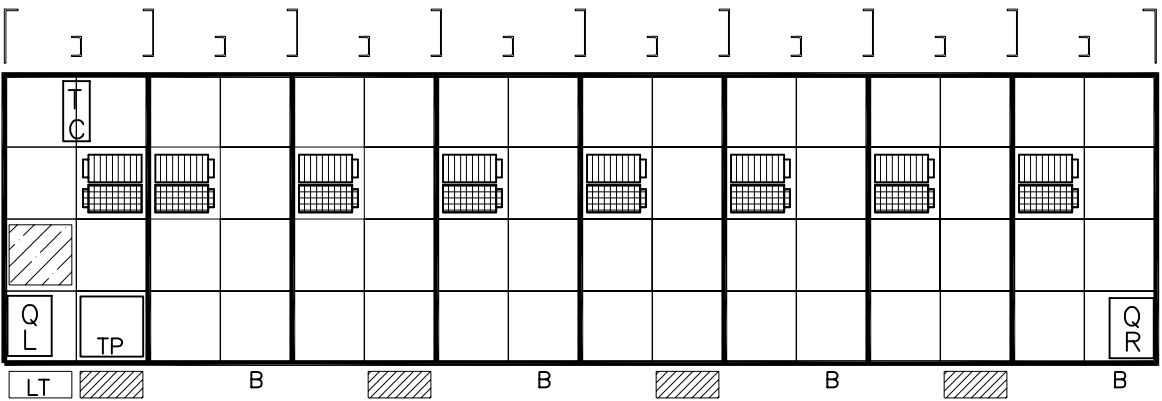
FRONT VIEW
AF-3160-8128-34-MONO



FRONT VIEW
AF-3160-16128-34-MONO



FRONT VIEW
AF-3160-24128-34-MONO



FRONT VIEW
AF-3160-32128-34-MONO

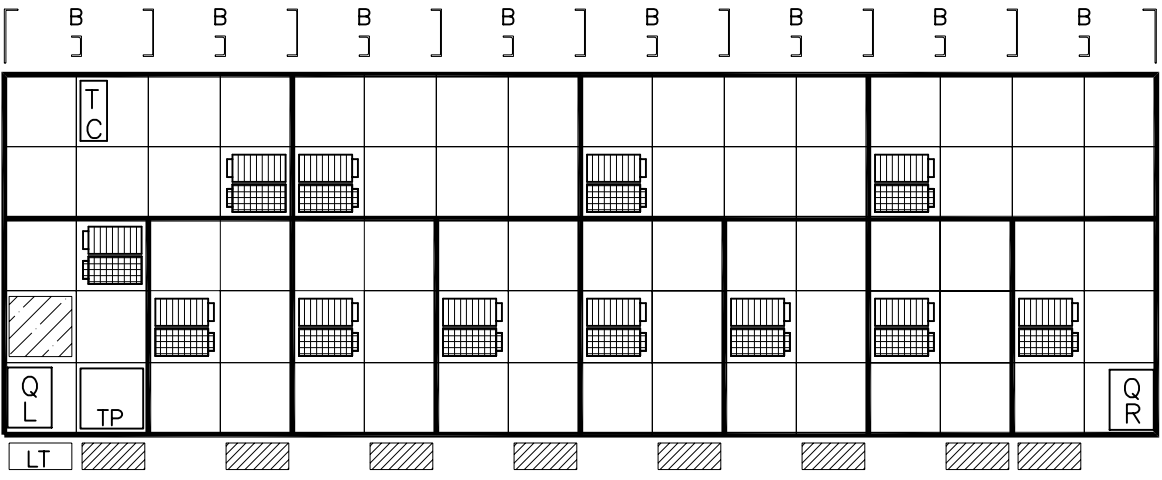
REV.	DATE	DESCRIPTION	BY	APPR.
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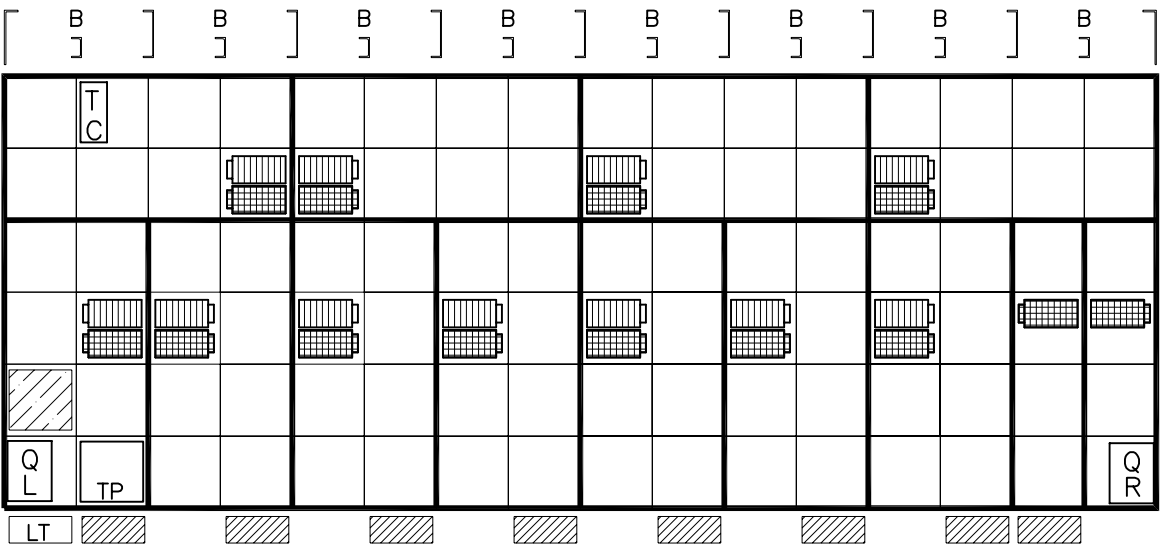
DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 MONO 34MM
 TITLE: COMP. LAYOUT; AF-3160-8/16/24/32X128-34-MONO
 DES. BY: MMAMMENGA
 DRAWN BY: WTUCKER
 DATE: 12NOV02

REVISION	APPR. BY:	1215-E10A-177801
	SCALE:	NONE



FRONT VIEW
AF-3160-40128-34-MONO



FRONT VIEW
AF-3160-48128-34-MONO

REV.	DATE	DESCRIPTION	BY	APPR.
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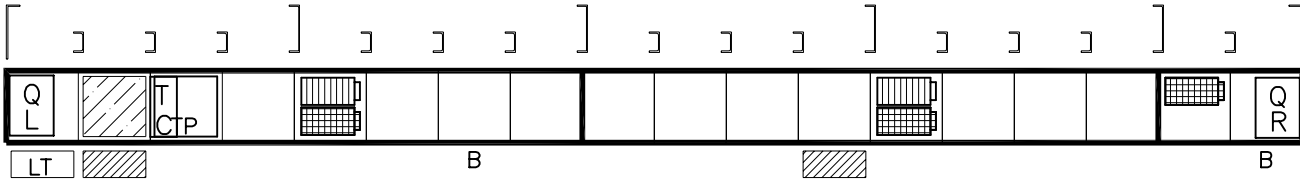
DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 MONO 34MM

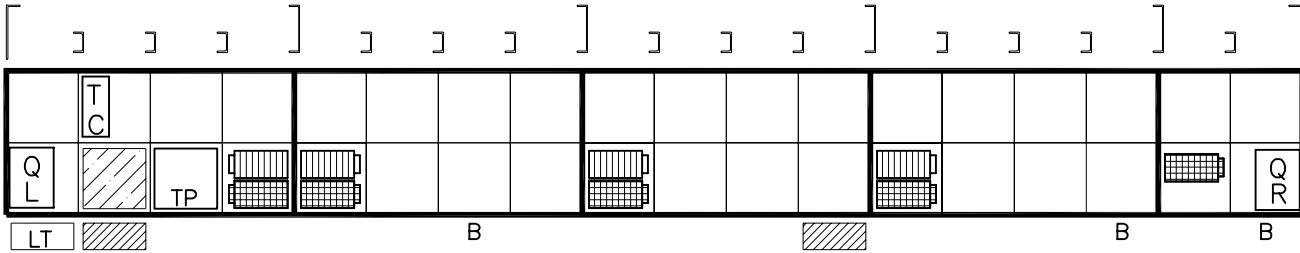
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DES. BY: MMAMMENGA DRAWN BY: WTUCKER DATE: 12NOV02

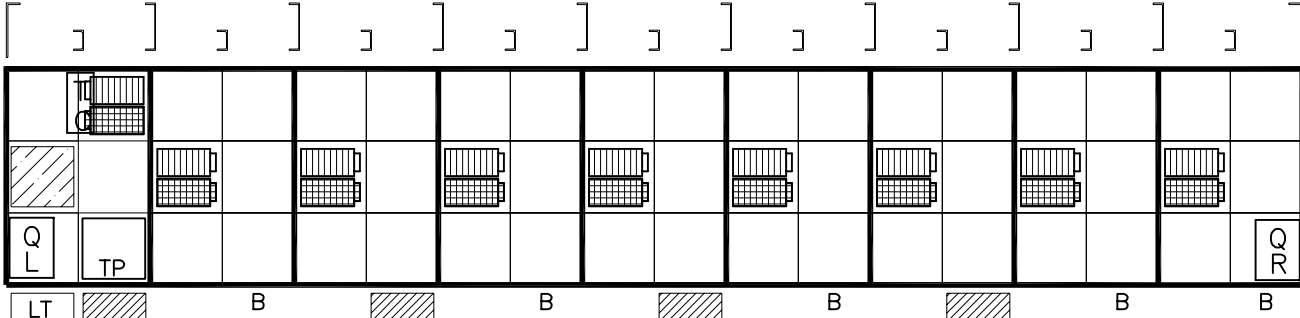
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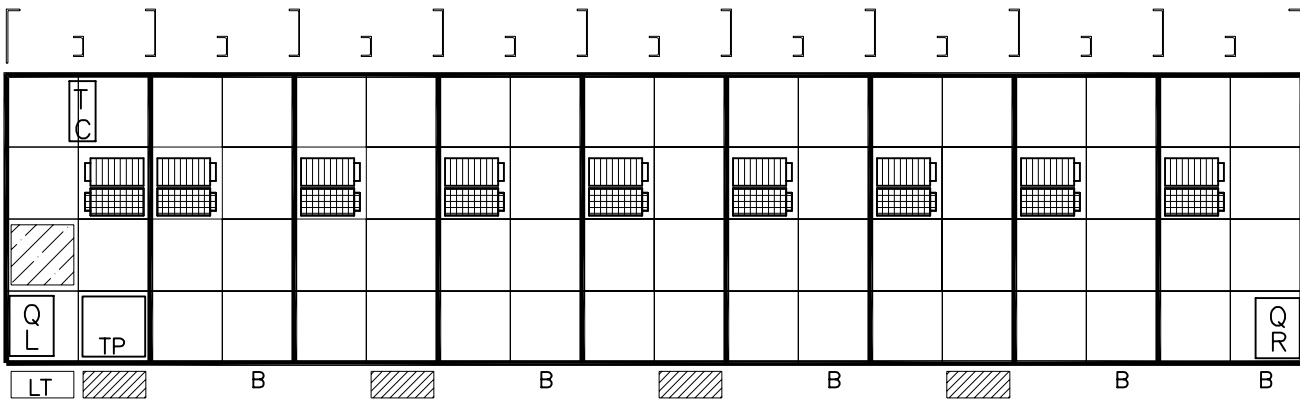
FRONT VIEW
AF-3160-8144-34-MONO



FRONT VIEW
AF-3160-16144-34-MONO



FRONT VIEW
AF-3160-24144-34-MONO



FRONT VIEW
AF-3160-32144-34-MONO

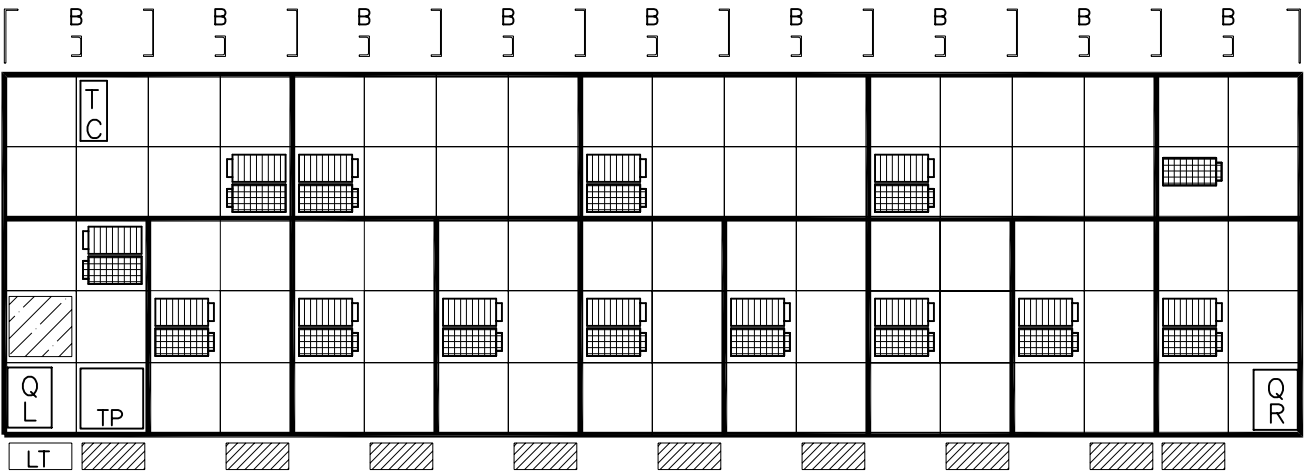
REV.	DATE	DESCRIPTION	BY	APPR.
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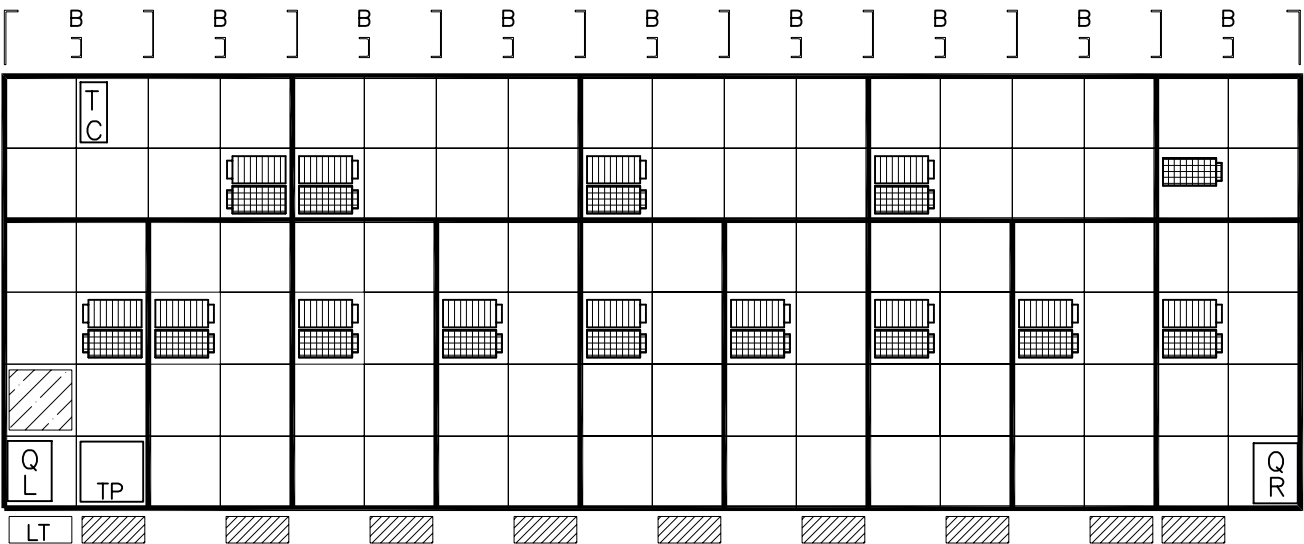
PROJ: GALAXY, LOUVERED V1500 MONO 34MM
 TITLE: COMP. LAYOUT; AF-3160-8/16/24/32X144-34-MONO
 DES. BY: MMAMWENGA DRAWN BY: WTUCKER DATE: 12NOV02

DAKTRONICS, INC. BROOKINGS, SD 57006

REVISION	APPR. BY:	1215-E10A-177803
	SCALE:	NONE



FRONT VIEW
AF-3160-40144-34-MONO




FRONT VIEW
AF-3160-48144-34-MONO

REV.	DATE	DESCRIPTION	BY	APPR.
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DAKTRONICS, INC. BROOKINGS, SD 57006				
PROJ: GALAXY, LOUVERED V1500 MONO 34MM				
TITLE: COMP. LAYOUT; AF-3160-40/48X144-34-MONO				
DES. BY: MMAMWENGA DRAWN BY: WTUCKER DATE: 12NOV02				
REVISION	APPR. BY:	DATE: 12NOV02		
SCALE:	NONE	1215-E10A-177804		

REV.	DATE	DESCRIPTION	BY	APPR.

POWER SUPPLY CONFIGURATIONS




REPRESENTS EITHER

OR

OA-1213-4022 (A-1555@2) OA-1213-4013 (A-1633@1)

NOTE: REFER TO B.O.M. FOR ACTUAL POWER SUPPLY PACKET NUMBER

POWER SUPPLY CONFIGURATIONS



REPRESENTS EITHER

OR

OA-1213-4026 (A-1555@1) OA-1213-4013 (A-1633@1)

NOTE: REFER TO B.O.M. FOR ACTUAL POWER SUPPLY PACKET NUMBER

Q
L

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


Q
R

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

TP

POWER TERMINATION BOX
OA-1215-4002
OR
OA-1215-4010

NOTE: REFER TO B.O.M. FOR ACTUAL POWER SUPPLY PACKET NUMBER



CONTROLLER
OA-1229-0005


T
C

THERMOSTAT
OA-1213-4024
MOUNTED TO VERTICAL

B

FAN
OA-1213-4014
8, 16 & 24 HIGH DISPLAYS
B-1006 WITH HARDWARE


OA-1213-4010
32, 40 & 48 HIGH DISPLAYS
B-1019 WITH HARDWARE



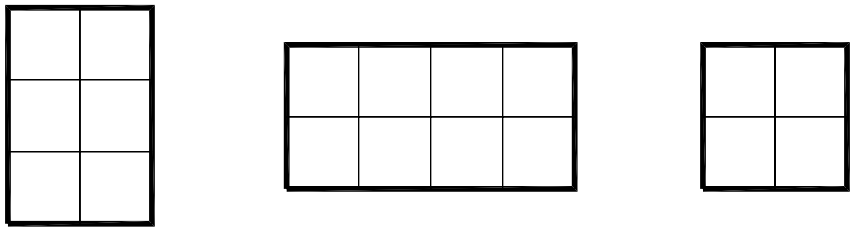
AIR FILTER
EN-1774

LT

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



MODULE
10.64" X 10.64"



DARKER GRID LINES REPRESENT A GROUPING OF MODULES THAT ARE POWERED BY A GROUPING OF POWER SUPPLIES. ABOVE EXAMPLES SHOW SIX, EIGHT AND FOUR MODULE GROUPS.

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PROJ: GALAXY, LOUVERED V1500 MONO 34MM
 TITLE: SYMBOLS; AF-3160 COMPONENT LAYOUT
 DES. BY: MMAMMENGA DRAWN BY: WTUCKER DATE: 01NOV02

DAKTRONICS, INC. BROOKINGS, SD 57006

REVISION APPR. BY: SCALE: NONE 1215-E10A-177805

REV.	01	DATE	15 JUL 03	DESCRIPTION	UPDATED NOMENCLATURE FROM (FACE A & FACE B) TO (PRIMARY & SECONDARY)	BY	EJY	APPR.
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DAKTRONICS, INC. BROOKINGS, SD 57006

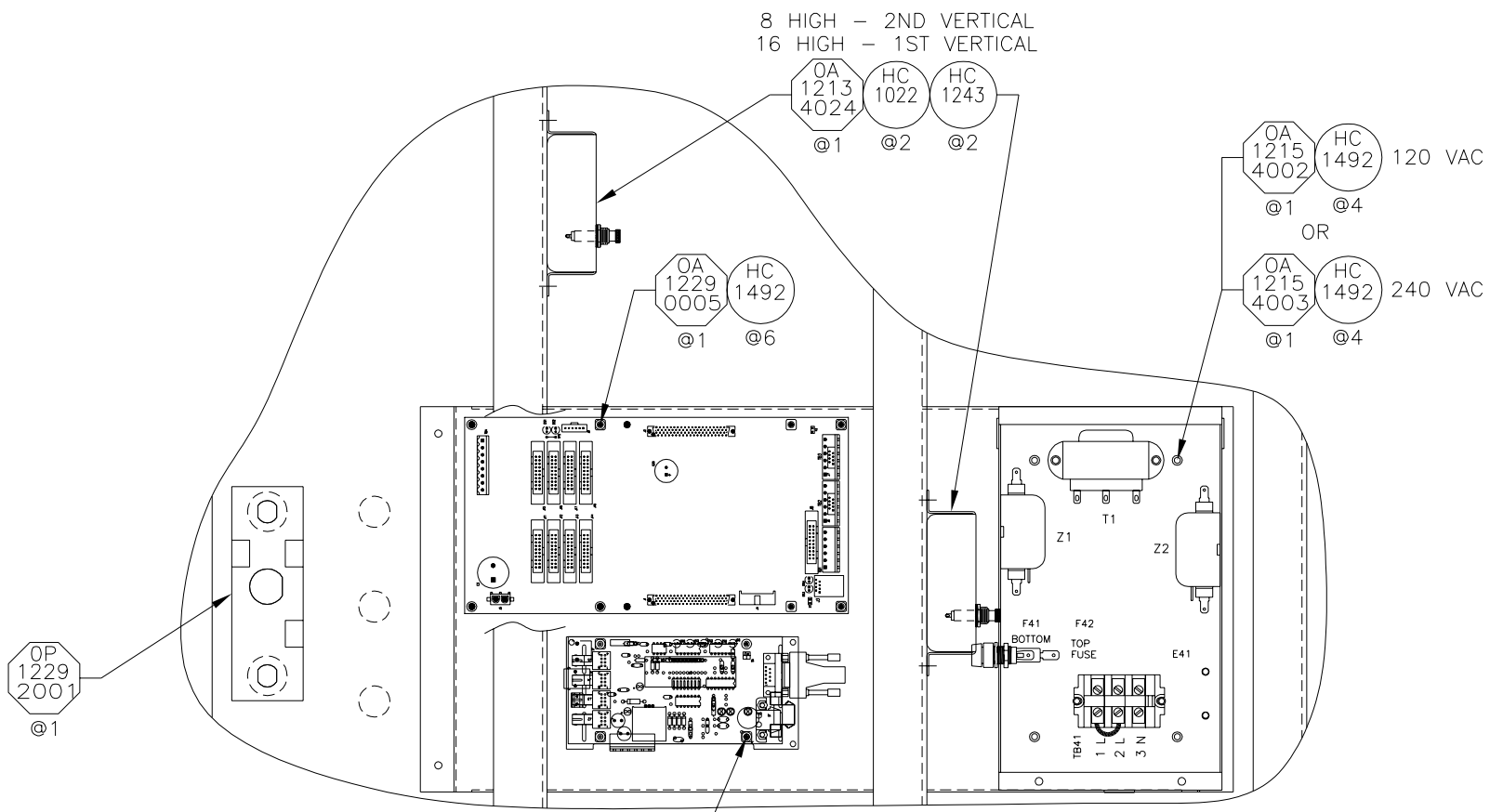
PROJ: GALAXY, LOUVERED VENUS 1500 34MM

TITLE: DETAIL: AF-3160-8/16 POWER/CONTROL CORNER

DES. BY: WTUCKER DRAWN BY: WTUCKER DATE: 20NOV2002

REVISION 01 APRR. BY: SCALE: 1=5

1215-E10A-178959



- NO COMPONENT NEEDED
- RS232/RADIO (PRIMARY OR SECONDARY)
- SURGE CARD FROM PACKET: OA 1215 4101, HC 1492 @1 @4 OR
- RS422 (PRIMARY ONLY)
- MODEM CARD FROM PACKET: OA 1215 4102, HC 1492 @1 @4 OR
- MODEM (PRIMARY ONLY)
- FIBER CARD FROM PACKET: OA 1215 4103, HC 1492 @1 @4
- FIBER (PRIMARY ONLY)

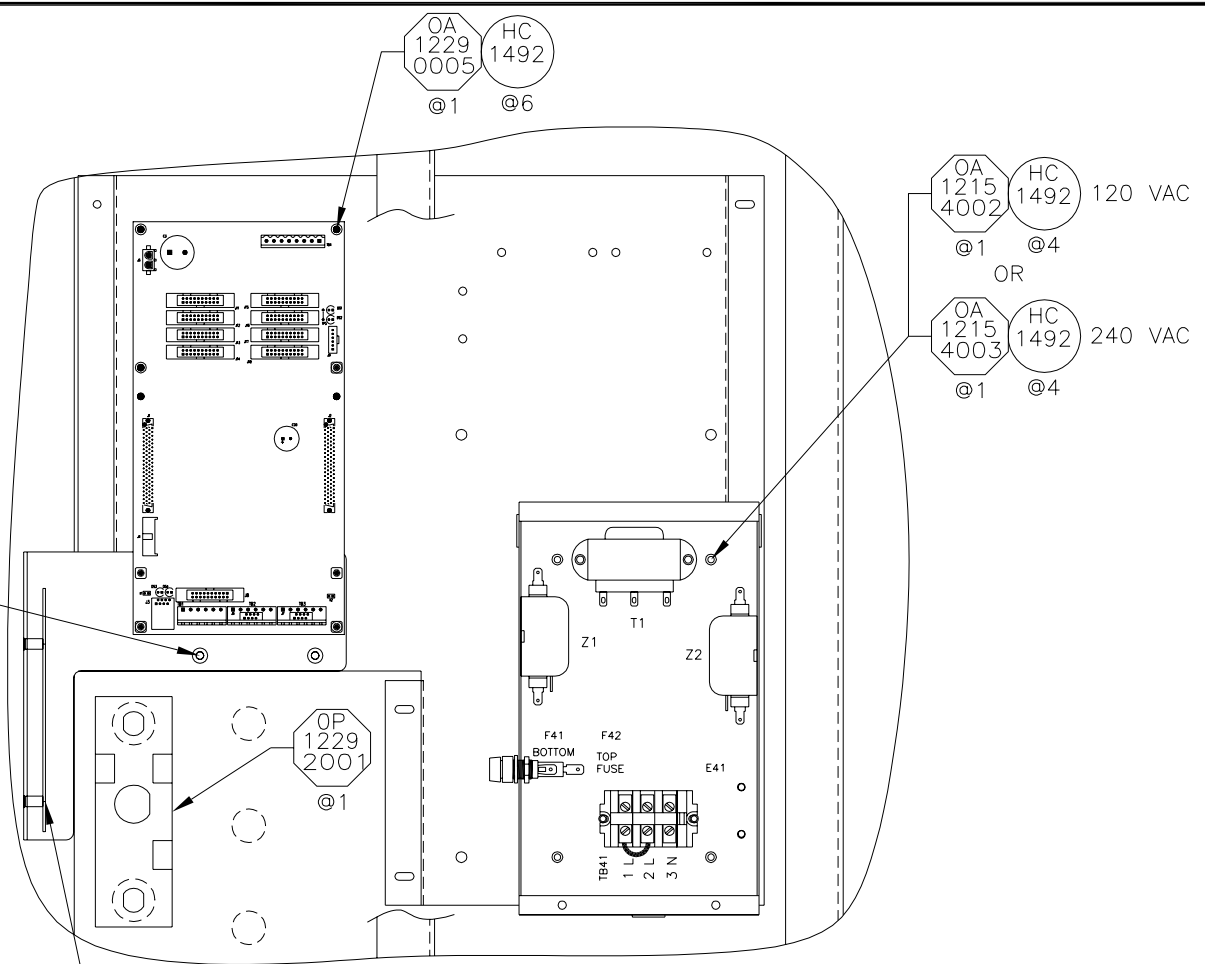
REV.	01	DATE	15 JUL 03	DESCRIPTION	UPDATED NOMENCLATURE FROM (FACE A & FACE B) TO (PRIMARY & SECONDARY)	BY	EJY	APPR.
------	----	------	-----------	-------------	--	----	-----	-------

PROJ.	GALAXY, LOUVERED VENUS 1500 34MM	
TITLE	DETAIL: AF-3160-24/32/40/48 POWER/CONTROL CORNER	
DES. BY:	WTUCKER	DATE: 20NOV2002
REVISION	01	SCALE: 1=5
APPR. BY:	1215-E10A-178960	

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DAKTRONICS, INC. BROOKINGS, SD 57006

THIS BRACKET ASSEMBLY IS LOCATED IN THE REQUIRED SIGNAL KIT LISTED BELOW.



- NO COMPONENT NEEDED — RS232/RADIO (PRIMARY OR SECONDARY)
- | | | | |
|------------------------|-----------------|------------|----------------------|
| SURGE CARD FROM PACKET | OA 1215 4101 @1 | HC 1492 @4 | RS422 (PRIMARY ONLY) |
| | OR | | |
| MODEM CARD FROM PACKET | OA 1215 4102 @1 | HC 1492 @4 | MODEM (PRIMARY ONLY) |
| | OR | | |
| FIBER CARD FROM PACKET | OA 1215 4103 @1 | HC 1492 @4 | FIBER (PRIMARY ONLY) |

34mm LOUVERED MONO(3 LED PIXEL) GALAXY DISPLAYS POWER SPECIFICATION CHART

MATRIX SIZE	TOTAL WATTS	120V AMPS	120/240 3, wire		240V AMPS
			LINE 1 AMPS	LINE 2 AMPS	
8X48	145	1.21	NOTE: 120/240 VAC, 3 WIRE PLUS GND. IS NOT AVAILABLE ON THESE DISPLAY SIZES.		0.60
8X64	180	1.50			0.75
8X80	216	1.80			0.90
8X96	251	2.09			1.05
8X112	311	2.59			1.29
8X128	346	2.88			1.44
8X144	381	3.18			1.59
16X48	251	2.09			1.05
16X64	322	2.68			1.34
16X80	417	3.47			1.74
16X96	487	4.06			2.03
16X112	558	4.65			2.32
16X128	629	5.24			2.62
16X144	723	6.03			3.01
24X48	381	3.18	1.41	1.77	1.59
24X64	487	4.06	2.29	1.77	2.03
24X80	617	5.14	2.50	2.65	2.57
24X96	723	6.03	3.38	2.65	3.01
24X112	853	7.11	3.58	3.53	3.56
24X128	959	8.00	4.46	3.53	4.00
24X144	1090	9.08	4.66	4.42	4.54
32X48	519	4.32	1.97	2.36	2.16
32X64	660	5.50	3.15	2.36	2.75
32X80	842	7.01	3.48	3.53	3.51
32X96	983	8.19	4.66	3.53	4.10
32X112	1164	9.70	4.99	4.71	4.85
32X128	1305	10.88	6.17	4.71	5.44
32X144	1487	12.39	6.50	5.89	6.20
40X48	665	5.54	2.89	2.65	2.77
40X64	882	7.35	3.81	3.53	3.67
40X80	1098	9.15	4.74	4.42	4.58
40X96	1315	10.96	5.66	5.30	5.48
40X112	1531	12.76	6.58	6.18	6.38
40X128	1748	14.57	7.50	7.07	7.28
40X144	1965	16.37	7.84	8.54	8.19
48X48	771	6.42	2.89	3.53	3.21
48X64	1023	8.52	3.81	4.71	4.26
48X80	1275	10.62	4.74	5.89	5.31
48X96	1527	12.72	5.66	7.07	6.36
48X112	1779	14.82	6.58	8.24	7.41
48X128	2031	16.92	8.09	8.83	8.46

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, 34MM, AF-3160			
TITLE: POWER SPECS, 8X48-48X128 DISPLAYS, 3 LED PIXEL			
DES. BY:		DRAWN BY: DMATHERN	
		DATE: 12 DEC 02	
REVISION	APPR. BY:	1215-R10A-179874	
	SCALE: 1=1		

REV.	DATE	DESCRIPTION	BY	APPR.

34mm LOUVERED MONO(4 LED PIXEL) GALAXY DISPLAYS POWER SPECIFICATION CHART

MATRIX SIZE	TOTAL WATTS	120V AMPS	120/240 3, wire		240V AMPS
			LINE 1 AMPS	LINE 2 AMPS	
8X48	169	1.41	NOTE: 120/240 VAC, 3 WIRE PLUS GND. IS NOT AVAILABLE ON THESE DISPLAY SIZES.		0.70
8X64	212	1.77			0.88
8X80	255	2.13			1.06
8X96	298	2.49			1.24
8X112	366	3.05			1.52
8X128	409	3.41			1.70
8X144	452	3.77			1.88
16X48	298	2.49			1.24
16X64	385	3.20			1.60
16X80	495	4.13			2.06
16X96	581	4.85			2.42
16X112	668	5.57			2.78
16X128	754	6.28			3.14
16X144	865	7.21			3.60
24X48	452	3.77	1.61	2.16	1.88
24X64	581	4.85	2.69	2.16	2.42
24X80	735	6.13	2.89	3.24	3.06
24X96	865	7.21	3.97	3.24	3.60
24X112	1018	8.49	4.17	4.32	4.24
24X128	1148	9.57	5.25	4.32	4.78
24X144	1302	10.85	5.45	5.40	5.42
32X48	613	5.11	2.23	2.88	2.55
32X64	786	6.55	3.67	2.88	3.27
32X80	999	8.32	4.00	4.32	4.16
32X96	1171	9.76	5.44	4.32	4.88
32X112	1384	11.53	5.78	5.76	5.77
32X128	1557	12.97	7.22	5.76	6.49
32X144	1769	14.75	7.55	7.20	7.37
40X48	783	6.52	3.28	3.24	3.26
40X64	1039	8.65	4.34	4.32	4.33
40X80	1294	10.79	5.39	5.40	5.39
40X96	1550	12.92	6.44	6.48	6.46
40X112	1806	15.05	7.50	7.56	7.53
40X128	2062	17.18	8.55	8.64	8.59
40X144	2318	19.32	8.88	10.43	9.66
48X48	912	7.60	3.28	4.32	3.80
48X64	1211	10.09	4.34	5.76	5.05
48X80	1510	12.59	5.39	7.20	6.29
48X96	1809	15.08	6.44	8.64	7.54
48X112	2109	17.57	7.50	10.08	8.79
48X128	2408	20.06	9.27	10.79	10.03

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, 34MM, AF-3160			
TITLE: POWER SPECS, 8X48-48X128 DISPLAYS, 4 LED PIXEL			
DES. BY:		DRAWN BY: DMATHERN	
		DATE: 12 DEC 02	
REVISION	APPR. BY:	1215-R10A-179875	
	SCALE: 1=1		

REV.	DATE	DESCRIPTION	BY	APPR.

34mm LOUVERED RG GALAXY DISPLAYS POWER SPECIFICATION CHART

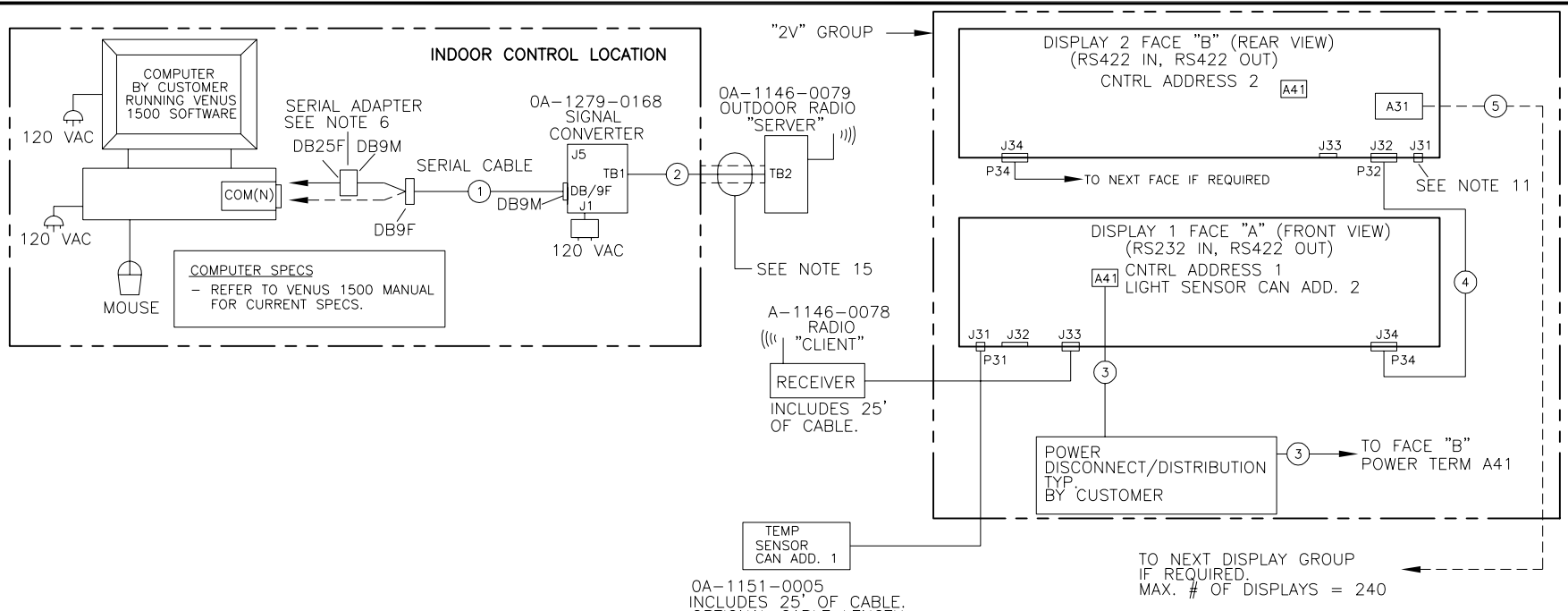
MATRIX SIZE	TOTAL WATTS	120V AMPS	120/240V, 3 wire		240V AMPS
			LINE 1 AMPS	LINE 2 AMPS	
8X48	251	2.09	NOTE: 120/240 VAC, 3 WIRE PLUS GND. IS NOT AVAILABLE ON THESE DISPLAY SIZES.		1.05
8X64	317	2.64			1.32
8X80	382	3.19			1.59
8X96	448	3.73			1.87
8X112	553	4.61			2.30
8X128	619	5.15			2.58
8X144	684	5.70			2.85
16X48	448	3.73			1.87
16X64	579	4.82			2.41
16X80	749	6.25			3.12
16X96	880	7.34			3.67
16X112	1011	8.43			4.21
16X128	1142	9.52			4.76
16X144	1313	10.94			5.47
24X48	684	5.70	2.43	3.27	2.85
24X64	880	7.34	4.06	3.27	3.67
24X80	1117	9.31	4.40	4.91	4.65
24X96	1313	10.94	6.03	4.91	5.47
24X112	1549	12.91	6.37	6.54	6.46
24X128	1746	14.55	8.00	6.54	7.27
24X144	1982	16.52	8.34	8.18	8.26
32X48	880	7.34	2.97	4.36	3.67
32X64	1142	9.52	5.15	4.36	4.76
32X80	1444	12.03	5.49	6.54	6.02
32X96	1706	14.21	7.67	6.54	7.11
32X112	2007	16.73	8.00	8.73	8.36
32X128	2269	18.91	10.18	8.73	9.45
32X144	2571	21.42	10.52	10.91	10.71
40X48	1117	9.31	4.40	4.91	4.65
40X64	1484	12.37	5.82	6.54	6.18
40X80	1851	15.43	7.25	8.18	7.71
40X96	2218	18.49	8.67	9.82	9.24
40X112	2585	21.55	10.09	11.45	10.77
48X48	1313	10.94	4.40	6.54	5.47
48X64	1746	14.55	5.82	8.73	7.27
48X80	2178	18.15	7.25	10.91	9.08

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, 34MM, AF-3160					
TITLE: POWER SPECS, 8X48-48X80 DISPLAYS, RG					
DES. BY:	DRAWN BY: DMATHERN	DATE: 12 DEC 02			
REVISION	APPR. BY:	1215-R10A-179876			
01	SCALE: 1=1				

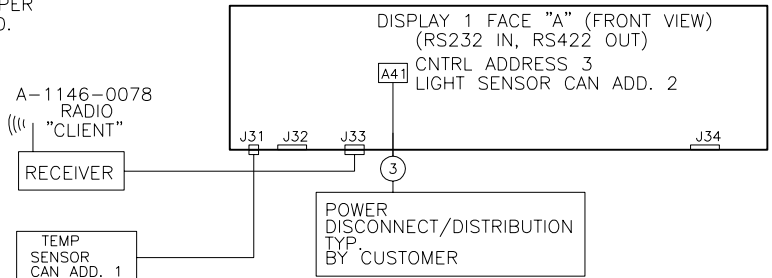
01	06MAY03	REVISED POWER SPECS DUE TO INCREASE OF LED CURRENT. REMOVED SIZES 40X128 & 48X96, OVERLOADED INTERNAL 15 AMP LINE.	DJM	
REV.	DATE	DESCRIPTION	BY	APPR.

REV.	DATE	DESCRIPTION	BY	APPR.
01	25JUN03	REVISED NOTE 2 FROM W-1210 22 AWG TO W-1370 18 AWG. ADDED MAX LENGTH OF W-1370 TO 1000'.	KAP	
02	26DEC03	CHANGED TEMP SENSOR PART NUMBER FROM 0A-1241-4017 TO 0A-1151-0005.	DJM	
03	29MAR05	CHANGED 1-BOX 0A-1279-0162 TO 0A-1279-0168	HBC	



NOTES

- DB9F TO DB9M SERIAL CABLE DAK. P.N. (W-1267)
- 6 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 QUICK CONNECT. SUPPLIED WITH FACE "B".
- 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.
- USE EITHER THE DB9 OR DB25, DEPENDING ON YOUR PC'S REQUIREMENTS. DAK. P.N. (A-1603)
- 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 = DISPLAY CONTROLLER
A41 = POWER TERMINATION PANEL
- SERVER AND CLIENT(S) MUST BE SET TO SAME CHANNEL. (VIA SOFTWARE OR ON-BOARD SWITCHES). ALL CLIENT DISPLAYS MUST HAVE A UNIQUE ADDRESS. TOTAL SYSTEM CANNOT EXCEED 240 DISPLAYS.
- IN AREAS USING MULTIPLE SERVER/CLIENT SYSTEMS WITHIN CLOSE PROXIMITY OF EACH OTHER, ALTERNATE CHANNELS MUST BE USED, TO AVOID INTERFERENCE BETWEEN SYSTEMS.
- CABLE TO BE IN CONDUIT WHERE EXPOSED TO OUTDOOR ELEMENTS.



PROJ: OUTDOOR LED PRODUCT LINE

TITLE: SYSTEM RISER DIAGRAM, QC OUTDOOR RADIO, GEN 2

DES. BY: LKERR

REVISION 03

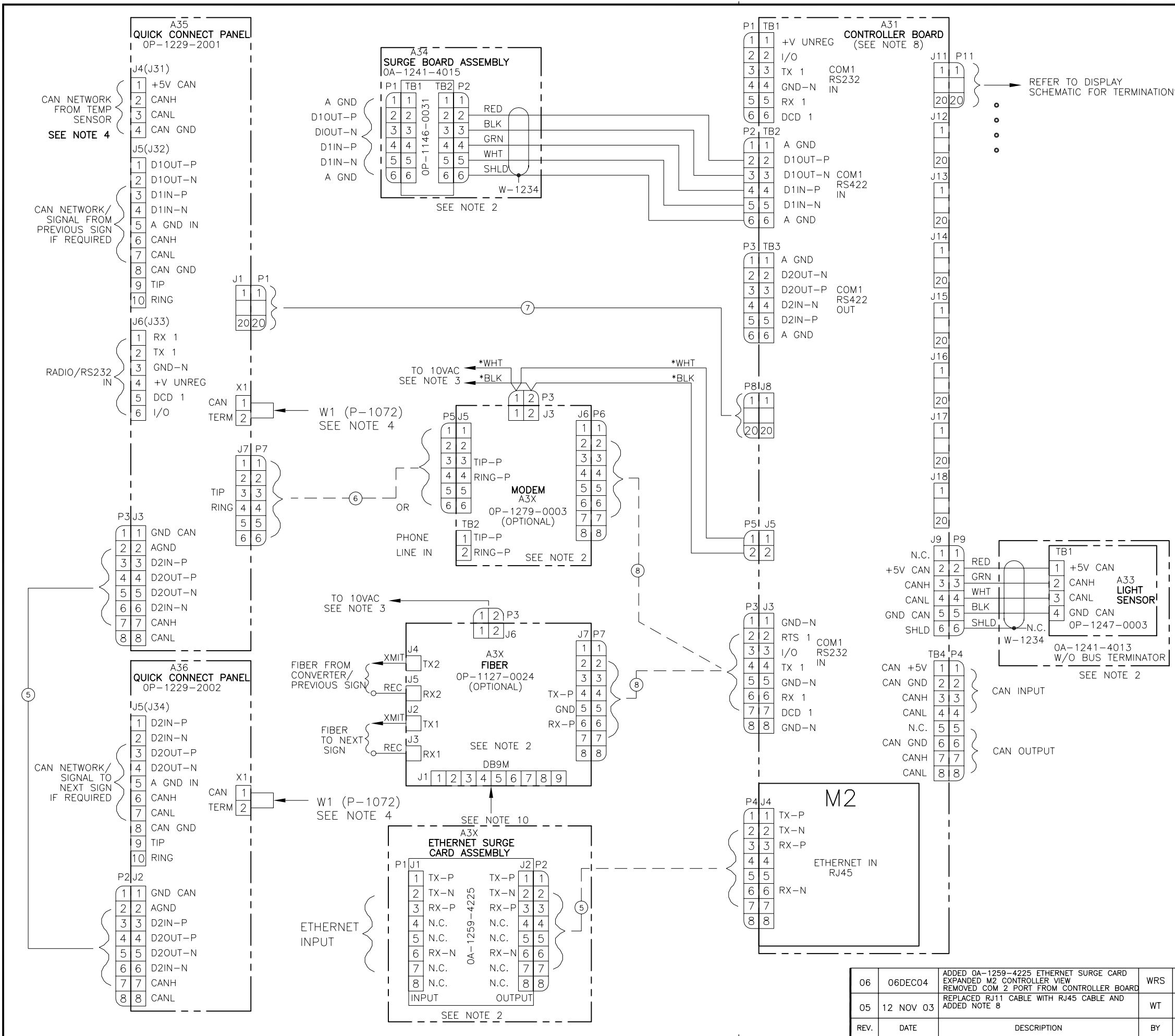
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SCALE: NONE

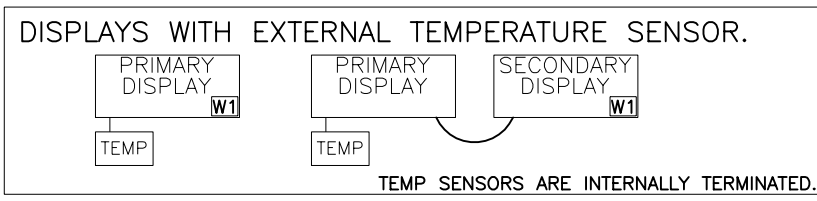
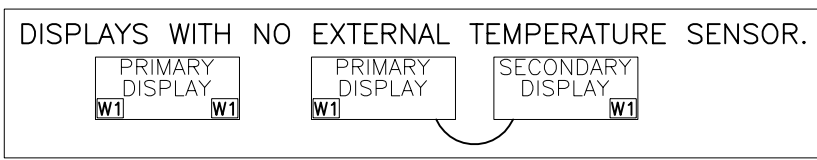
1229-R01A-185359

DAKTRONICS, INC. BROOKINGS, SD 57006

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



- 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	D11N-P	A	I/O
2	D11N-N	B	D10UT-P
3	+V UNREG	C	D10UT-N
4	TX COM1	D	AGND IN
5	GND	E	D20UT-N
6	D20UT-P	F	D2IN-N
7	RX COM1	H	D2IN-P
8	DCD COM1	J	AGND
9	CANH	K	+5V CAN
10	CANL	L	GND CAN

- 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.

04	08OCT03	ADDED NOTE ABOUT CONTROLLER PART CHANGING WITH AF-3190 & AF-3197 DISPLAYS.	DJM
03	09SEPT03	ADDED DETAIL A. J7 WAS ADDED ON REVISION 10 OF FIBER CARD. PC ADAPTOR IS NO LONGER REQUIRED FOR CONNECTION TO CONTROLLER.	DJM
02	10JULY03	REPLACED FACE A AND B NOTES WITH PRIMARY AND SECONDARY DISPLAY NOTES	WRT
01	28JAN03	ADDED CAN TERMINATION JUMPER AND REVISED NOTE # 4 TO REFLECT THE CHANGE.	DJM

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ:	GALAXY, LOUVERED, V1500
TITLE:	SCHEM, SIG WIRING, INTERNAL, W/QUICK CONNECT PCB
DES. BY:	PGILK
DRAWN BY:	LKERR
DATE:	30OCT02
REVISION	APPR. BY:
06	NONE
1229-R03B-177662	

REV.	DATE	DESCRIPTION	BY	APPR.
06	06DECO4	ADDED 0A-1259-4225 ETHERNET SURGE CARD EXPANDED M2 CONTROLLER VIEW REMOVED COM 2 PORT FROM CONTROLLER BOARD	WRS	DJM
05	12 NOV 03	REPLACED RJ11 CABLE WITH RJ45 CABLE AND ADDED NOTE 8	WT	

INSTALL JUMPER FOR MODEM USE.

FUNCTION	PIN	PIN	FUNCTION
DIIN-P	1	A	I/O_00
DIIN-N	2	B	D1OUT-P
+V_INREFG	3	C	D1OUT-N
TX_COM1	4	D	AGND_IN
GND	5	E	D2_00OUT-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

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

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

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

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

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

ASSY #
SERIAL #
DATE: REV X

TESTED BY
DATE

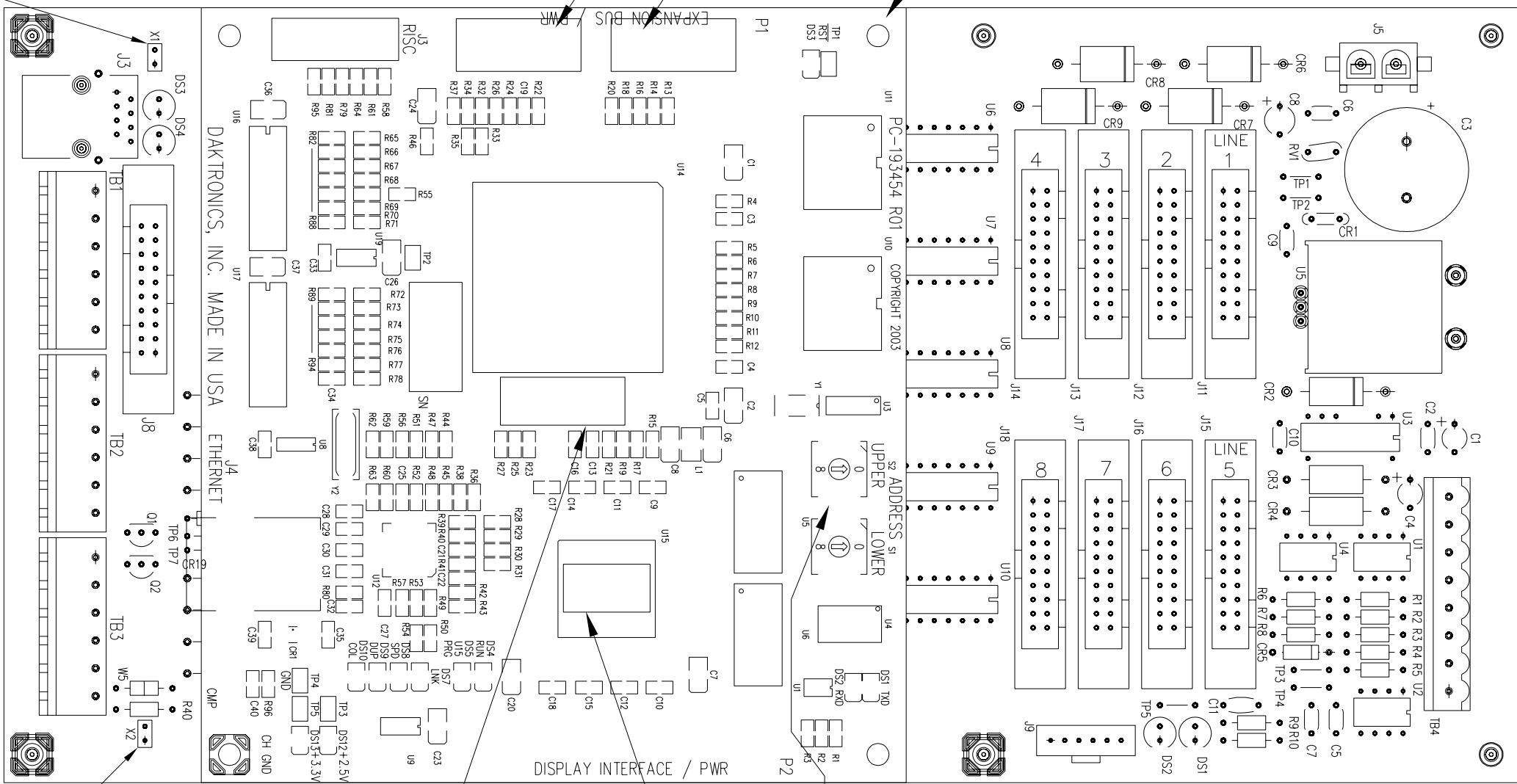
PRODUCT BOARD
M2 CNTRLR COATED

OP 1229 0006
OP 1229 1001

HC 1395
HE 1071
HC 1395

TYPICALLY @4 PLACES

PIN	FUNCTION
2	10VAC
1	10VAC



RS232 IN

RS232 IN

RS422 IN

RS422 OUT

INSTALL JUMPER FOR RESET USE.

FIRMWARE REVISION DATE

EPLD PROGRAM REVISION DATE

UPPER / LOWER ADDRESS SWITCHES

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

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

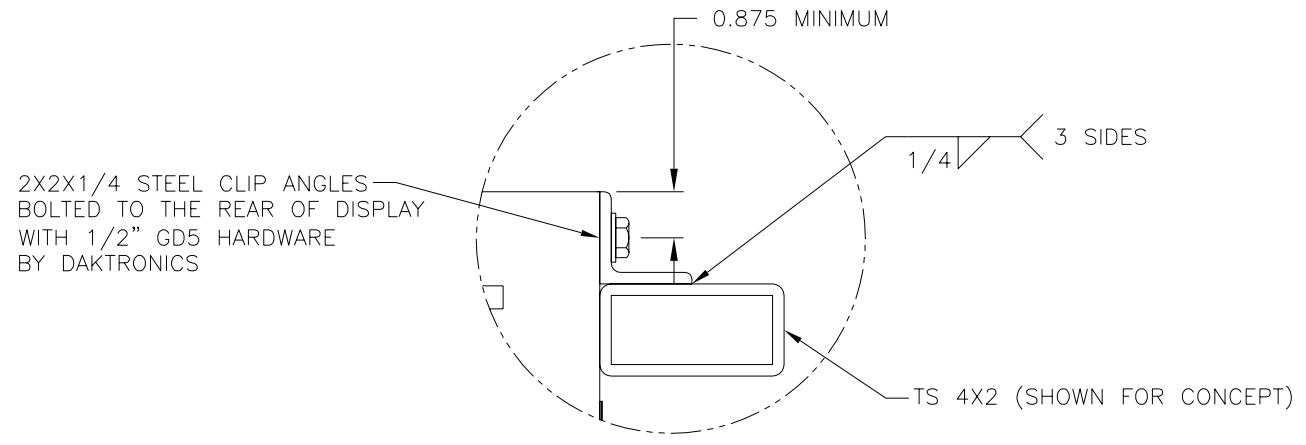
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DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ:	
TITLE:	CNTRLR, GALAXY, 8 CONN, J1087
DES. BY:	WTAYLOR
DATE:	04 NOV 02
REVISION	APPR. BY:
03	SCALE: 1=1
1229-R10B-177838	

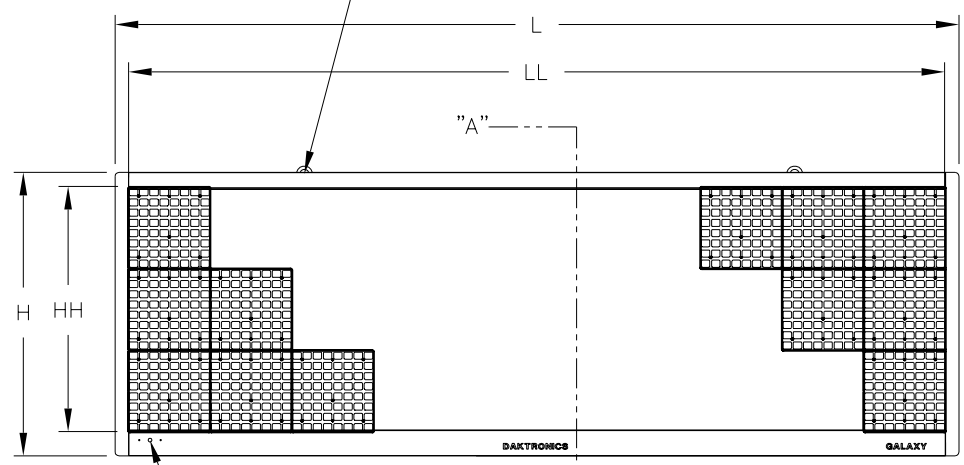
REV.	DATE	DESCRIPTION	BY	APPR.
03	14 APR 04	OP-1229-0004 TO OP-1229-1001 M2 CONTROLLER, GEN II.	MER	
02	23 FEB 04	ADDED HC-1149 WASHER TO STANDOFF FOR M2 TYP. @4	WT	
01	09 JUL 03	CORRECT REF. TABLE FOR TB4	WT	

SIZES AND (APPROX.) WEIGHTS FOR 34 mm DISPLAYS
AX-XXXX-8/32XX-34B

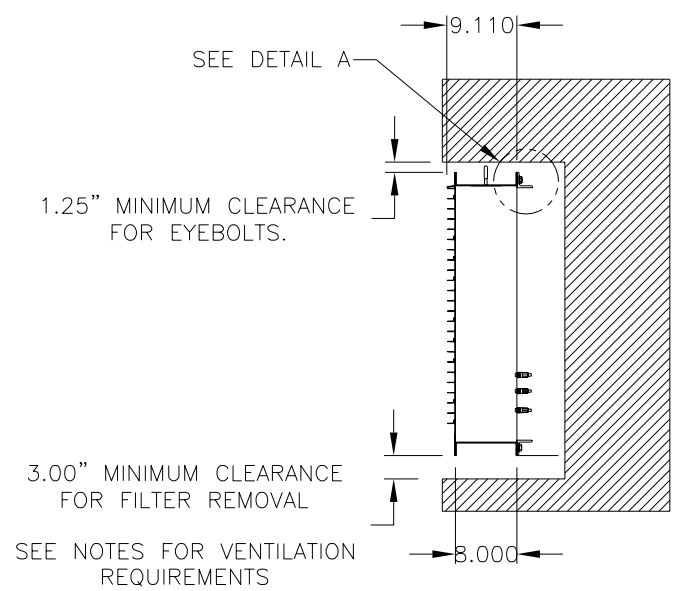
SIZE	TOTAL DISPLAY		ACTIVE AREA		CLIP DISTANCE HHH	(APPROX.) UNCRATED WEIGHT
	H	L	HH	LL		
8X48	15.64	67.34	10.64	63.84	11.64	70 lbs
8X64	15.64	88.62	10.64	85.12	11.64	90 lbs
8X80	15.64	109.90	10.64	106.40	11.64	110 lbs
8X96	15.64	131.18	10.64	127.68	11.64	140 lbs
8X112	15.64	152.46	10.64	148.96	11.64	160 lbs
8X128	15.64	173.74	10.64	170.24	11.64	180 lbs
8X144	15.64	195.02	10.64	191.52	11.64	200 lbs
16X48	26.28	67.34	21.28	63.84	22.28	140 lbs
16X64	26.28	88.62	21.28	85.12	22.28	180 lbs
16X80	26.28	109.90	21.28	106.40	22.28	220 lbs
16X96	26.28	131.18	21.28	127.68	22.28	270 lbs
16X112	26.28	152.46	21.28	148.96	22.28	310 lbs
16X128	26.28	173.74	21.28	170.24	22.28	360 lbs
16X144	26.28	195.02	21.28	191.52	22.28	400 lbs
24X48	36.92	67.34	31.92	63.84	32.92	200 lbs
24X64	36.92	88.62	31.92	85.12	32.92	270 lbs
24X80	36.92	109.90	31.92	106.40	32.92	330 lbs
24X96	36.92	131.18	31.92	127.68	32.92	400 lbs
24X112	36.92	152.46	31.92	148.96	32.92	470 lbs
24X128	36.92	173.74	31.92	170.24	32.92	530 lbs
24X144	36.92	195.02	31.92	191.52	32.92	600 lbs
32X48	47.56	67.34	42.56	63.84	32.92	270 lbs
32X64	47.56	88.62	42.56	85.12	43.56	360 lbs
32X80	47.56	109.90	42.56	106.40	43.56	440 lbs
32X96	47.56	131.18	42.56	127.68	43.56	530 lbs
32X112	47.56	152.46	42.56	148.96	43.56	620 lbs
32X128	47.56	173.74	42.56	170.24	43.56	710 lbs
32X144	47.56	195.02	42.56	191.52	43.56	800 lbs



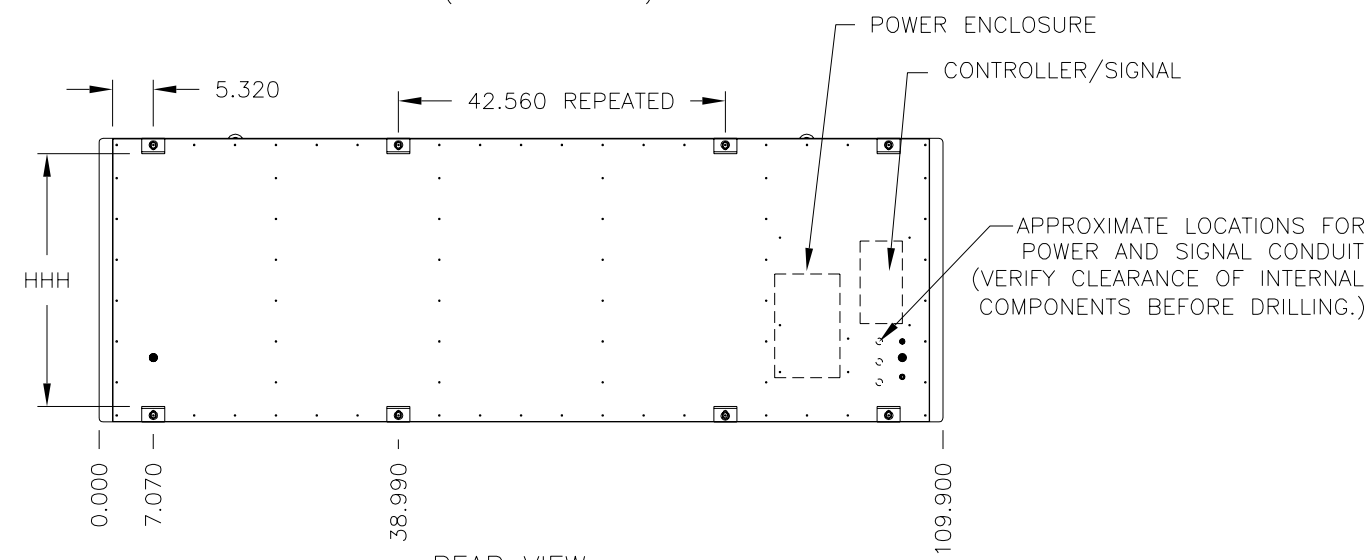
LIFTEYES FACTORY INSTALLED BY DAKTRONICS TO ASSIST IN INSTALLATION. EYEBOLTS MAY BE REMOVED AND REPLACED WITH A 1/2-13 BOLT. IF REPLACED, HOLES MUST BE ADEQUATELY SEALED.



FRONT VIEW
(24X80 SHOWN)



SECTION: A-A



REAR VIEW

NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DISPLAY CABINET IS ALUMINUM.
3. DISPLAY CABINET COLOR IS FLAT BLACK.
4. FRONT ACCESS FOR SERVICE.
5. THE DISPLAY IS BOTTOM VENTILATED.
6. MINIMUM BOTTOM CLEARANCE IS 3.00".
7. MINIMUM TOP CLEARANCE IS 1.25".
8. MAIN ELECTRICAL DISCONNECT TO BE FURNISHED BY CUSTOMER.
9. FOR POWER REQUIREMENTS REFER TO 1241-R01A-179874 (3 LED) -179875 (4 LED).
10. DAKTRONICS INC. IS NOT RESPONSIBLE FOR HARDWARE ATTACHING DISPLAY TO STRUCTURE.
11. VENTILATION: IN ENCLOSED CABINET SITUATION, 6 SQUARE INCHES OF UNOBSTRUCTED OPENING PER MODULE MUST BE PROVIDED TO INSURE ADEQUATE DISPLAY COOLING. ALLOWANCES MUST BE MADE TO COMPENSATE FOR THE PERCENTAGE OF A MATERIAL COVERING THE OPENINGS IN THE STRUCTURE. FOR ADEQUATE COOLING, FORCED VENTILATION OF THE ENCLOSED STRUCTURE MAY BE REQUIRED. IF AIR MUST BE FORCED INTO THE ENCLOSED CABINET, 10 CUBIC FEET PER MINUTE MUST BE PROVIDED PER MODULE (10.6" X 10.6" ACTIVE AREA).
12. CUSTOMER IS RESPONSIBLE FOR THE STRUCTURAL INTEGRITY OF THE STRUCTURE THAT THE DISPLAY IS MOUNTED TO.
13. MAIN ELECTRICAL DISCONNECT TO BE FURNISHED BY CUSTOMER.

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED, VENUS 1500, 34MM

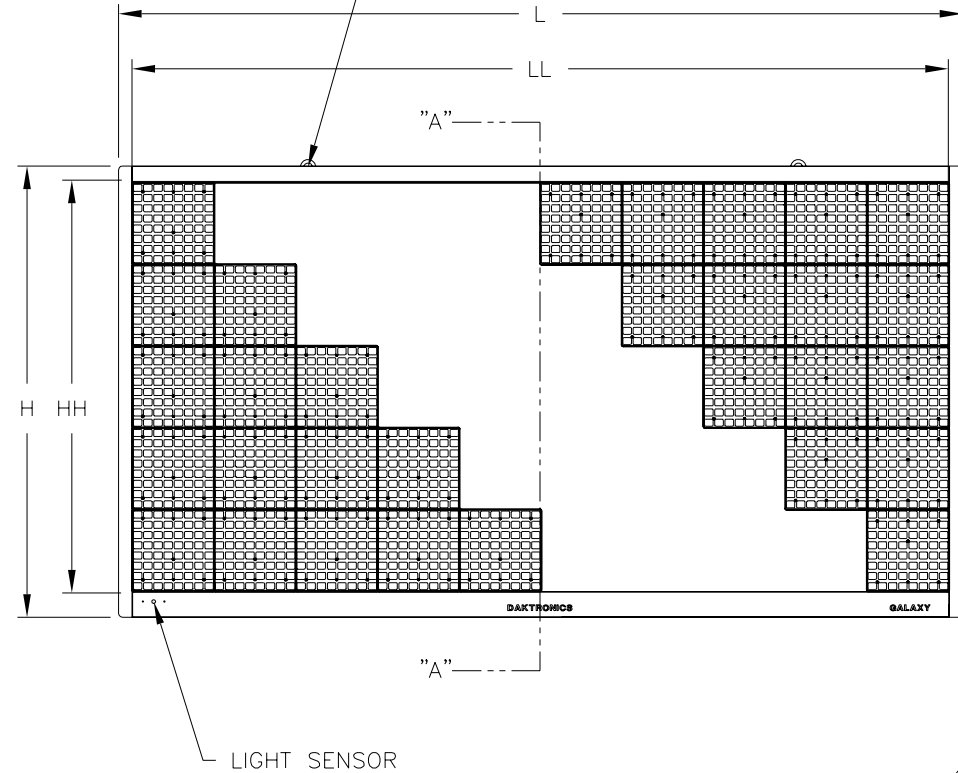
TITLE: SHOP DRAWING, AF-3160-8-32 HIGH-34-MONO-GEN2

DES. BY: MMAMMENGA DRAWN BY: MMAMMENGA DATE: 26DEC02

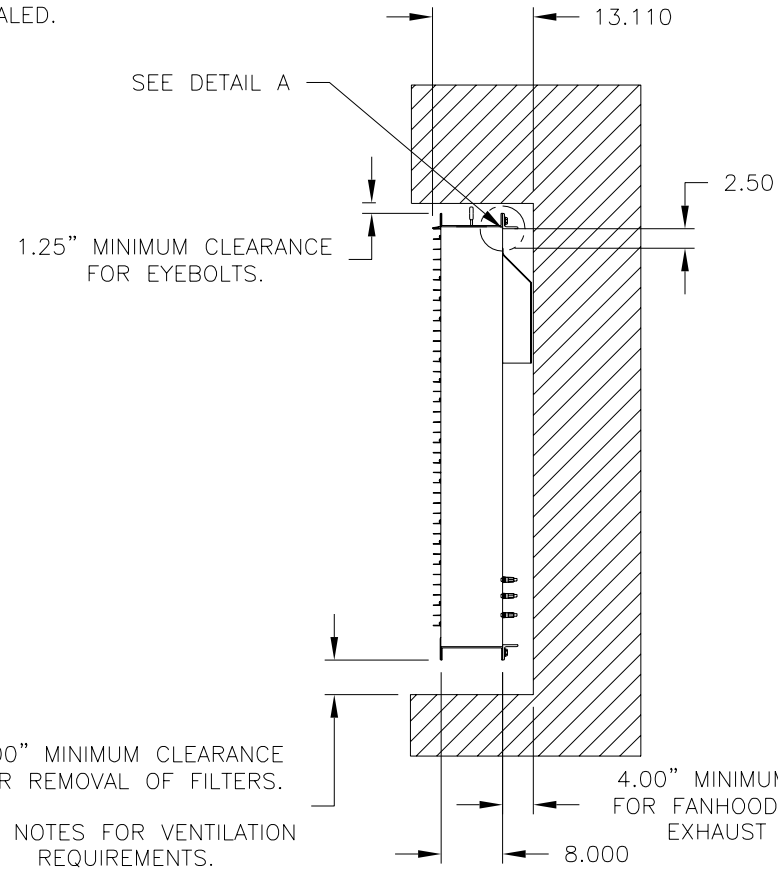
REV.	DATE	DESCRIPTION	BY	APPR.
01	21 JAN 03	UPDATED APPROX. UNCRATED WEIGHTS.	MLS	

REVISION APPR. BY: SCALE: 1 = 25 1215-E10B-178625

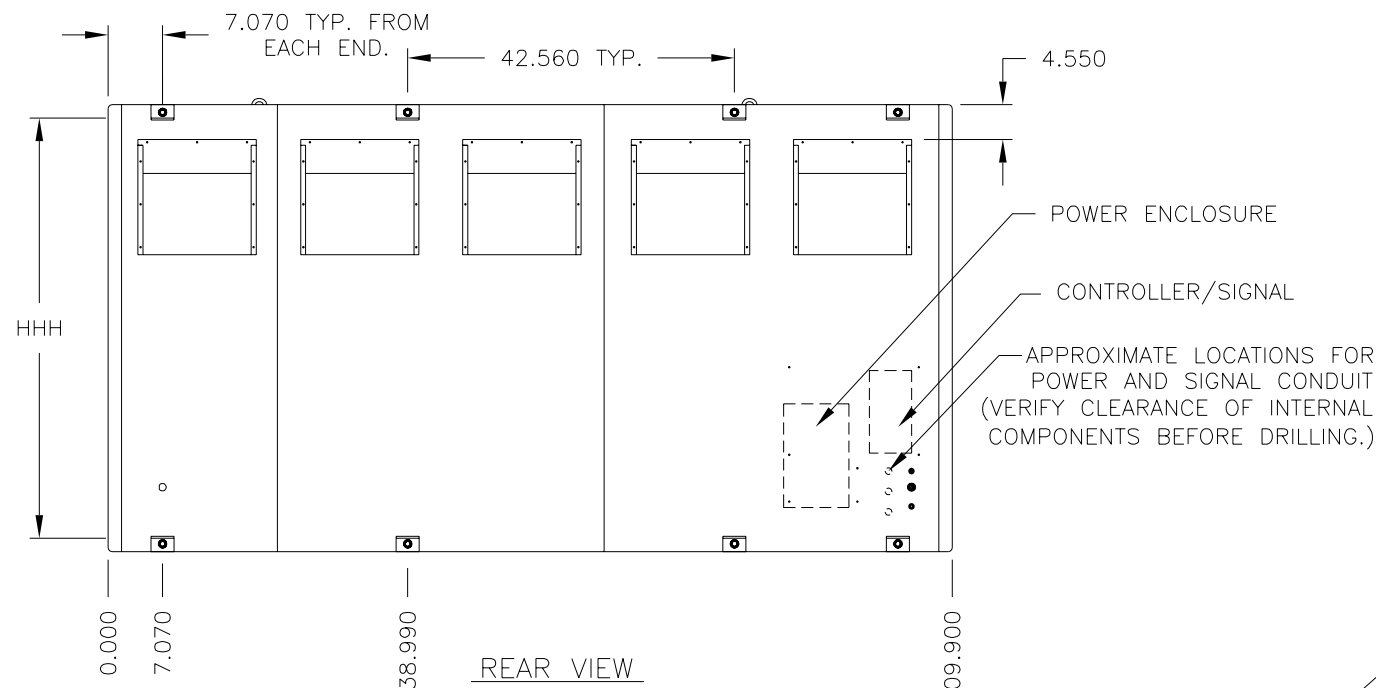
LIFTEYES FACTORY INSTALLED BY DAKTRONICS TO ASSIST IN INSTALLATION. EYEBOLTS MAY BE REMOVED AND REPLACED WITH A 1/2-13 BOLT IF REPLACED, HOLES MUST BE ADEQUATELY SEALED.



FRONT VIEW
(40X80 SHOWN)

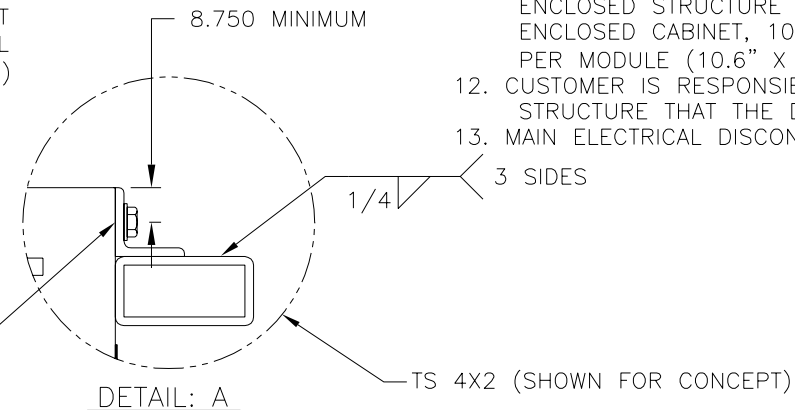


SECTION: A-A



REAR VIEW
(40X80 SHOWN)

2X2X1/4 STEEL CLIP ANGLES BOLTED TO THE REAR OF DISPLAY WITH 1/2" GD5 HARDWARE BY DAKTRONICS



DETAIL: A

SIZES AND (APPROX.) WEIGHTS FOR 34 mm DISPLAYS
AX-XXXX-40/48XX-34B.

SIZE	TOTAL DISPLAY		ACTIVE AREA		CLIP DISTANCE HHH	(APPROX.) UNCRATED WEIGHT
	H	L	HH	LL		
40X48	58.20	67.34	53.20	63.84	54.20	330 lbs
40X64	58.20	88.62	53.20	85.12	54.20	440 lbs
40X80	58.20	109.90	53.20	106.40	54.20	550 lbs
40X96	58.20	131.18	53.20	127.68	54.20	660 lbs
40X112	58.20	152.46	53.20	148.96	54.20	770 lbs
40X128	58.20	173.74	53.20	170.24	54.20	880 lbs
40X144	58.20	195.02	53.20	191.52	54.20	990 lbs
48X48	68.84	67.34	63.84	63.84	64.84	400 lbs
48X64	68.84	88.62	63.84	85.12	64.84	530 lbs
48X80	68.84	109.90	63.84	106.40	64.84	660 lbs
48X96	68.84	131.18	63.84	127.68	64.84	800 lbs
48X112	68.84	152.46	63.84	148.96	64.84	930 lbs
48X128	68.84	173.74	63.84	170.24	64.84	1100 lbs
48X144	68.84	195.02	63.84	191.52	64.84	1200 lbs

NOTES:

- ALL DIMENSIONS ARE IN INCHES.
- DISPLAY CABINET IS ALUMINUM.
- DISPLAY CABINET COLOR IS FLAT BLACK.
- FRONT ACCESS FOR SERVICE.
- THE DISPLAY IS BOTTOM VENTILATED.
- MINIMUM BOTTOM CLEARANCE IS 3.00"
- MINIMUM TOP CLEARANCE IS 1.25"
- FOR SIZES AND APPROX. WEIGHTS SEE ABOVE TABLE.
- FOR POWER REQUIREMENTS REFER TO 1241-R01A-179874 (3 LED) -179875 (4 LED).
- DAKTRONICS INC. IS NOT RESPONSIBLE FOR HARDWARE ATTACHING DISPLAY TO STRUCTURE.
- VENTILATION: IN ENCLOSED CABINET SITUATION, 6 SQUARE INCHES OF UNOBSTRUCTED OPENING PER MODULE MUST BE PROVIDED TO INSURE ADEQUATE DISPLAY COOLING. ALLOWANCES MUST BE MADE TO COMPENSATE FOR THE PERCENTAGE OF A MATERIAL COVERING THE OPENINGS IN THE STRUCTURE. FOR ADEQUATE COOLING, FORCED VENTILATION OF THE ENCLOSED STRUCTURE MAY BE REQUIRED. IF AIR MUST BE FORCED INTO THE ENCLOSED CABINET, 10 CUBIC FEET PER MINUTE MUST BE PROVIDED PER MODULE (10.6" X 10.6" ACTIVE AREA).
- CUSTOMER IS RESPONSIBLE FOR THE STRUCTURAL INTEGRITY OF THE STRUCTURE THAT THE DISPLAY IS MOUNTED TO.
- MAIN ELECTRICAL DISCONNECT TO BE FURNISHED BY CUSTOMER.

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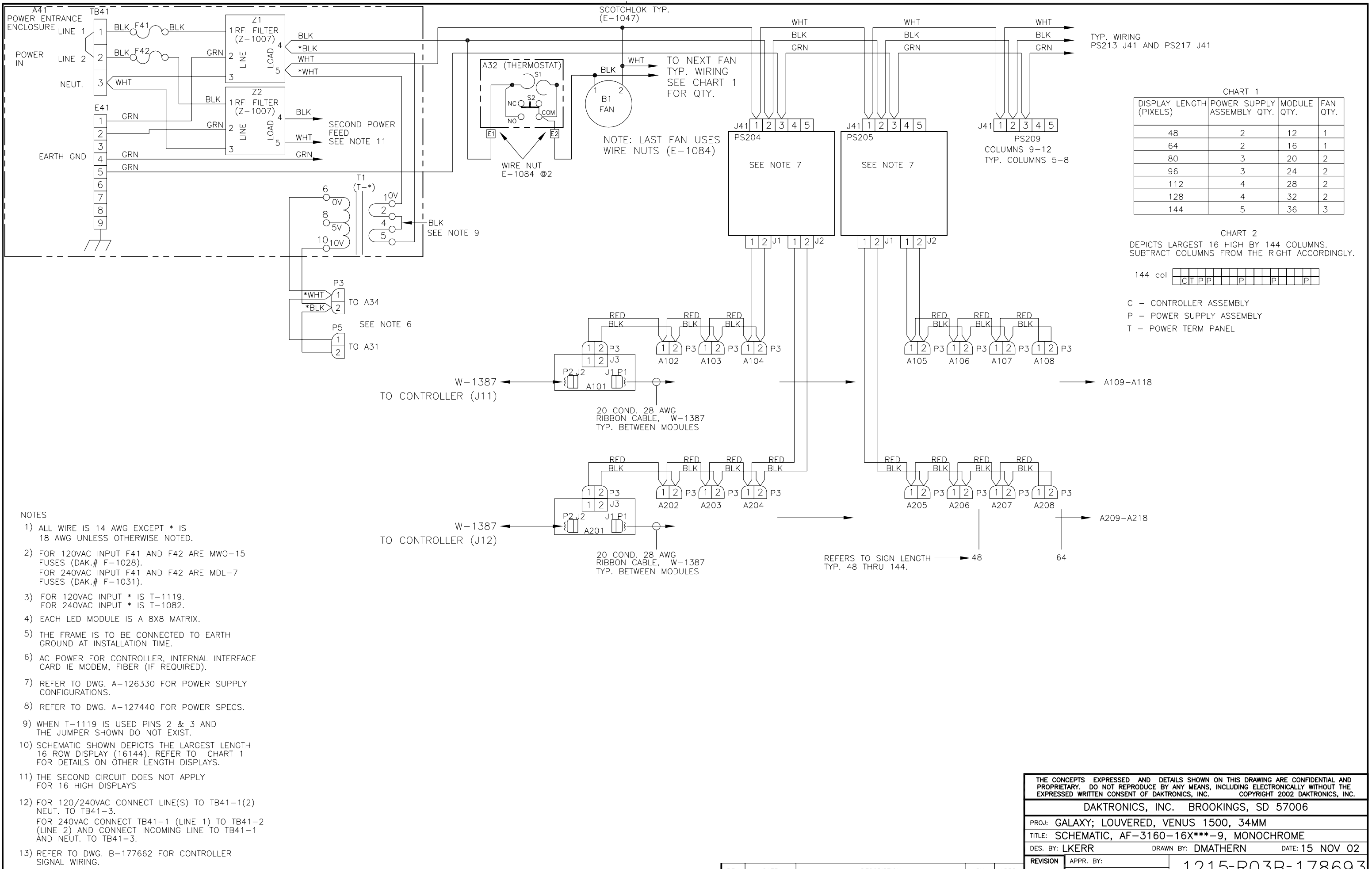
PROJ: GALAXY, LOUVERED, VENUS 1500, 34MM

TITLE: SHOP DRAWING, AF-3160-40/48***-34-MONO-GEN2

DES. BY: MMAMMENGA DRAWN BY: MMAMMENGA DATE: 16JAN03

REVISION 00 APPR. BY: SCALE: 1=25 1215-E10B-178626

REV.	DATE	DESCRIPTION	BY	APPR.



TYP. WIRING
PS213 J41 AND PS217 J41

CHART 1

DISPLAY LENGTH (PIXELS)	POWER SUPPLY ASSEMBLY QTY.	MODULE QTY.	FAN QTY.
48	2	12	1
64	2	16	1
80	3	20	2
96	3	24	2
112	4	28	2
128	4	32	2
144	5	36	3

CHART 2
DEPICTS LARGEST 16 HIGH BY 144 COLUMNS.
SUBTRACT COLUMNS FROM THE RIGHT ACCORDINGLY.

144 col

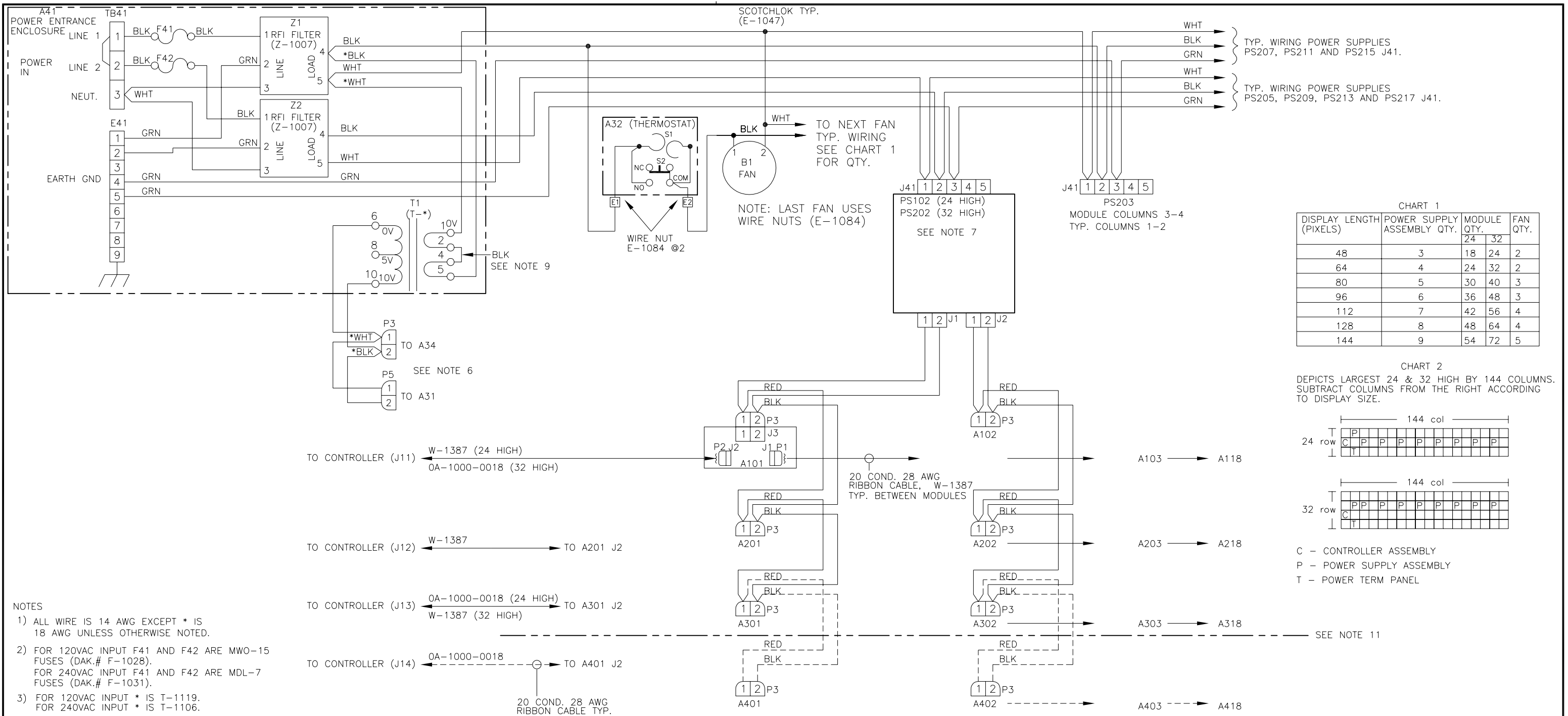
C	T	P	P	P	P	P	P	P	P
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C - CONTROLLER ASSEMBLY
P - POWER SUPPLY ASSEMBLY
T - POWER TERM PANEL

- NOTES
- ALL WIRE IS 14 AWG EXCEPT * IS 18 AWG UNLESS OTHERWISE NOTED.
 - 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).
 - FOR 120VAC INPUT * IS T-1119. FOR 240VAC INPUT * IS T-1082.
 - EACH LED MODULE IS A 8X8 MATRIX.
 - THE FRAME IS TO BE CONNECTED TO EARTH GROUND AT INSTALLATION TIME.
 - AC POWER FOR CONTROLLER, INTERNAL INTERFACE CARD IE MODEM, FIBER (IF REQUIRED).
 - REFER TO DWG. A-126330 FOR POWER SUPPLY CONFIGURATIONS.
 - REFER TO DWG. A-127440 FOR POWER SPECS.
 - WHEN T-1119 IS USED PINS 2 & 3 AND THE JUMPER SHOWN DO NOT EXIST.
 - SCHEMATIC SHOWN DEPICTS THE LARGEST LENGTH 16 ROW DISPLAY (16144). REFER TO CHART 1 FOR DETAILS ON OTHER LENGTH DISPLAYS.
 - THE SECOND CIRCUIT DOES NOT APPLY FOR 16 HIGH DISPLAYS
 - FOR 120/240VAC CONNECT LINE(S) TO TB41-1(2) NEUT. TO TB41-3.
FOR 240VAC CONNECT TB41-1 (LINE 1) TO TB41-2 (LINE 2) AND CONNECT INCOMING LINE TO TB41-1 AND NEUT. TO TB41-3.
 - REFER TO DWG. B-177662 FOR CONTROLLER SIGNAL WIRING.

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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: GALAXY; LOUVERED, VENUS 1500, 34MM			
TITLE: SCHEMATIC, AF-3160-16X**-9, MONOCHROME			
DES. BY: LKERR		DRAWN BY: DMATHERN	
DATE: 15 NOV 02			
REVISION	APPR. BY:	1215-R03B-178693	
00	SCALE: 1=1		

REV.	DATE	DESCRIPTION	BY	APPR.



WHT
BLK
GRN
WHT
BLK
GRN

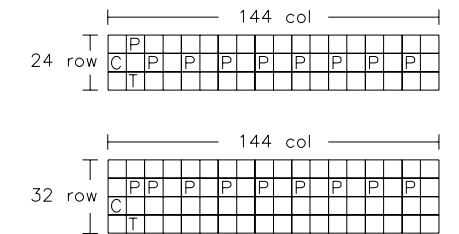
TYP. WIRING POWER SUPPLIES
PS207, PS211 AND PS215 J41.

TYP. WIRING POWER SUPPLIES
PS205, PS209, PS213 AND PS217 J41.

CHART 1

DISPLAY LENGTH (PIXELS)	POWER SUPPLY ASSEMBLY QTY.	MODULE QTY.		FAN QTY.
		24	32	
48	3	18	24	2
64	4	24	32	2
80	5	30	40	3
96	6	36	48	3
112	7	42	56	4
128	8	48	64	4
144	9	54	72	5

CHART 2
DEPICTS LARGEST 24 & 32 HIGH BY 144 COLUMNS.
SUBTRACT COLUMNS FROM THE RIGHT ACCORDING TO DISPLAY SIZE.



C - CONTROLLER ASSEMBLY
P - POWER SUPPLY ASSEMBLY
T - POWER TERM PANEL

- 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-1106.
 - 4) EACH LED MODULE IS A 8X8 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-126330 FOR POWER SUPPLY CONFIGURATIONS.
 - 8) REFER TO DWG. A-127440 FOR POWER SPECS.
 - 9) WHEN T-1119 IS USED PINS 2 & 3 AND THE JUMPER SHOWN DO NOT EXIST.
 - 10) SCHEMATIC SHOWN DEPICTS THE LARGEST LENGTH 24/32 HIGH DISPLAY (24/32X144). REFER TO CHART 1 FOR DETAILS ON OTHER LENGTH DISPLAYS.
 - 11) COMPONENTS ABOVE LINE ARE FOR 24 HIGH DISPLAYS
 - 12) FOR 120/240VAC CONNECT LINE(S) TO TB41-1(2) NEUT. TO TB41-3.
FOR 240VAC CONNECT TB41-1 (LINE 1) TO TB41-2 (LINE 2) AND CONNECT INCOMING LINE TO TB41-1 AND NEUT. TO TB41-3.
 - 13) REFER TO DWG. B-177662 FOR CONTROLLER SIGNAL WIRING.

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY; LOUVERED VENUS 1500, 34MM

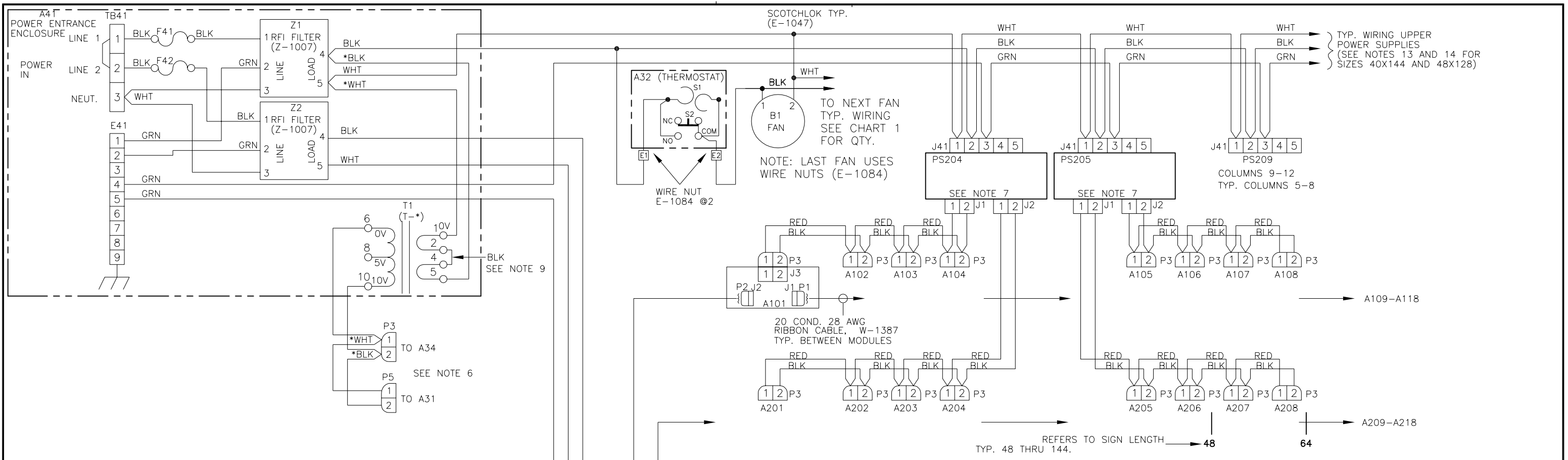
TITLE: SCHEMATIC, AF-3160-24/32X***-9, MONOCHROME

DES. BY: LKERR DRAWN BY: DMATHERN DATE: 18 NOV 02

REVISION 00 APPR. BY: SCALE: 1=1

1215-R03B-178797

REV.	DATE	DESCRIPTION	BY	APPR.



- 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-1106.
 - 4) EACH LED MODULE IS A 8X8 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-126330 FOR POWER SUPPLY CONFIGURATIONS.
 - 8) REFER TO DWG. A-127440 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 (LINE 2) AND CONNECT INCOMING LINE TO TB41-1 AND NEUT. TO TB41-3.
 - 11) COMPONENTS ABOVE LINE ARE FOR 40 HIGH DISPLAYS
 - 12) SCHEMATIC SHOWN DEPICTS THE LARGEST LENGTH 40/48 HIGH DISPLAY (40X144/48X128). REFER TO CHART 1 FOR DETAILS ON OTHER LENGTH DISPLAYS.
 - 13) FOR A 40X144 SIGN SIZE THE LAST POWER SUPPLY MODULE GROUP (A117, A118, A217 AND A218) CONTROLLED BY POWER SUPPLY PS217 WILL RECEIVE POWER FROM THE SECOND 120V POWER SOURCE (Z2).
 - 14) FOR A 48X128 SIGN SIZE THE LAST POWER SUPPLY MODULE GROUP (A316, A416, A516 AND A616) CONTROLLED BY POWER SUPPLY PS416 WILL RECEIVE POWER FROM THE FIRST 120V POWER SOURCE (Z1).
 - 15) REFER TO DWG. B-177662 FOR CONTROLLER SIGNAL WIRING.

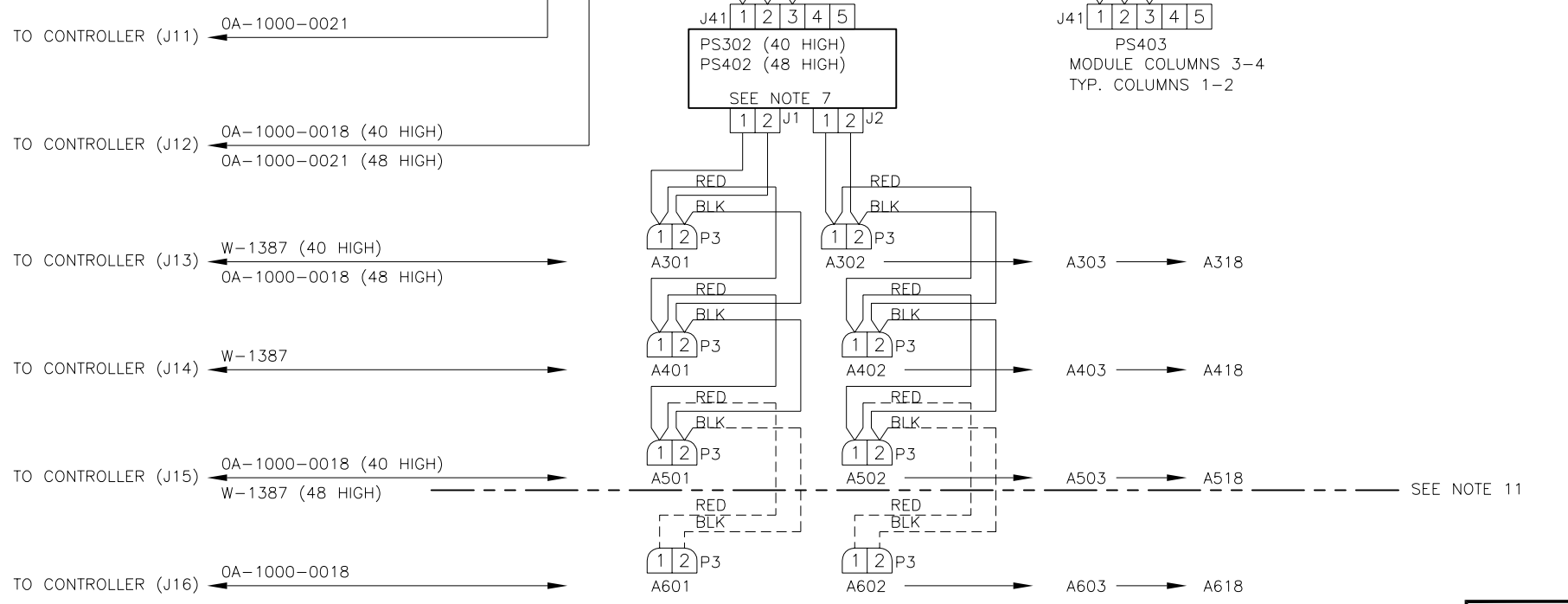
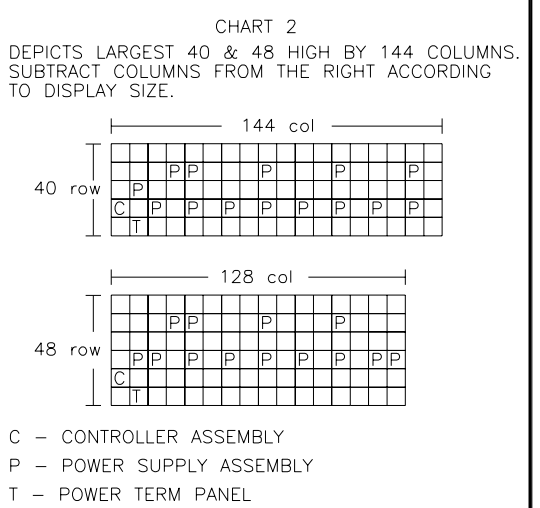


CHART 1

DISPLAY LENGTH (PIXELS)	POWER SUPPLY ASSEMBLY QTY.		MODULE QTY.		FAN QTY.
	40	48	40	48	
48	5	5	30	36	3
64	6	6	40	48	4
80	8	8	50	60	5
96	9	9	60	72	6
112	11	11	70	84	7
128	12	13	80	96	8
144	14	N.A.	90	N.A.	9



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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY; LOUVERED VENUS 1500, 34MM

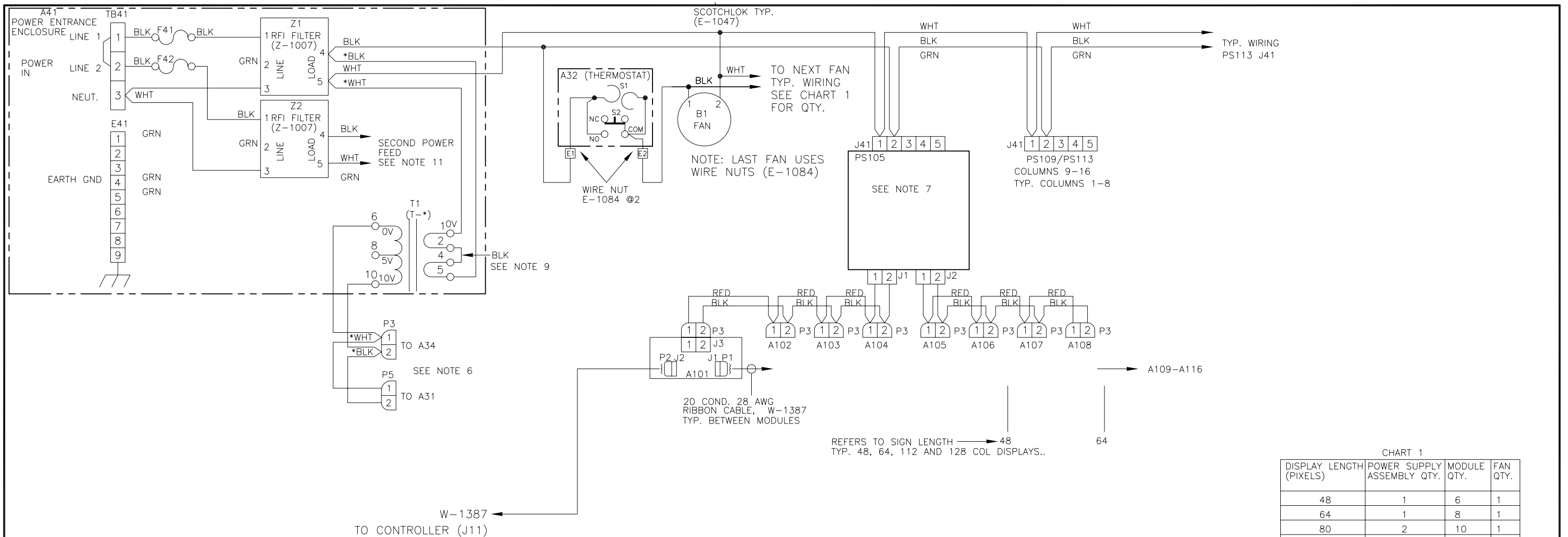
TITLE: SCHEMATIC, AF-3160-40/48X***-9, MONOCHROME

DES. BY: LKERR DRAWN BY: DMATHERN DATE: 18 NOV 02

REVISION 00 APPR. BY: SCALE: 1=1

1215-R03B-178821

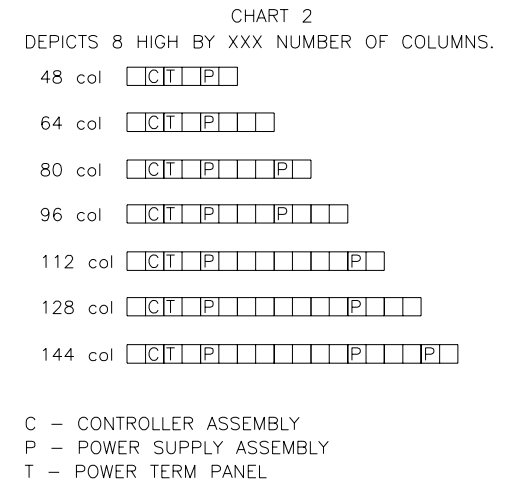
REV.	DATE	DESCRIPTION	BY	APPR.



- 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-1106.
 - 4) EACH LED MODULE IS A 8X8 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-126330 FOR POWER SUPPLY CONFIGURATIONS.
 - 8) REFER TO DWG. A-127440 FOR POWER SPECS.
 - 9) WHEN T-1119 IS USED PINS 2 & 3 AND THE JUMPER SHOWN DO NOT EXIST.
 - 10) SCHEMATIC SHOWN DEPICTS THE LARGEST LENGTH 8 ROW DISPLAY (8144). REFER TO CHART 1 FOR DETAILS ON OTHER LENGTH DISPLAYS.
 - 11) THE SECOND CIRCUIT DOES NOT APPLY FOR 8 HIGH DISPLAYS
 - 12) FOR 120/240VAC CONNECT LINE(S) TO TB41-1(2) NEUT. TO TB41-3. FOR 240VAC CONNECT TB41-1 (LINE 1) TO TB41-2 (LINE 2) AND CONNECT INCOMING LINE TO TB41-1 AND NEUT. TO TB41-3.
 - 13) REFER TO DWG. B-177662 FOR CONTROLLER SIGNAL WIRING.

CHART 1

DISPLAY LENGTH (PIXELS)	POWER SUPPLY ASSEMBLY QTY.	MODULE QTY.	FAN QTY.
48	1	6	1
64	1	8	1
80	2	10	1
96	2	12	1
112	2	14	2
128	2	16	2
144	3	18	2



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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY; LOUVERED, VENUS 1500, 34MM

TITLE: SCHEMATIC, AF-3160-8X***-9, MONOCHROME

DES. BY: LKERR DRAWN BY: DMATHERN DATE: 19 NOV 02

REVISION	APPR. BY:	1215-R03B-178861
	SCALE: 1=1	

REV.	DATE	DESCRIPTION	BY	APPR.