

**Galaxy AF-3165
34mm RGB Type 1**

Display Manual

ED-13607

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DAKTRONICS

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Section 1: Introduction

1.1 How to Use This Manual

This manual explains the installation, maintenance and troubleshooting of a Daktronics Galaxy 34mm louvered LED (light emitting diode) display (seriesAF-3165). 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.

Daktronics displays are built for long life, and require little maintenance. However, from time to time, certain display components will need replacing. The **Replacement Parts List** in **Section 4.11** provides the names and numbers of components that may need to be ordered during the life of the display. Most display components have a white label that lists the part number. The component part number is in the following format: OP-____-____ (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.

1.2 Safety Precautions



Important Safeguards:

1. Read and understand these instructions before installing.
2. Be sure the display is properly grounded with an earth ground electrode at the display.
3. Disconnect power when servicing the display.
4. Do not modify the display structure or attach any panels or coverings to the display without the written consent of Daktronics, Inc.

1.3 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, and 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.

RS-232 Network

RS-232 (EIA/TIA-232-E) is a standard communication interface that employs a single-ended serial transmission scheme that uses a maximum cable length of 8 meters (25 feet). This interface was designed for computer communication at short distances. All computers have an RS-232 communications port. Refer to **Section 3** for additional information.

RS-422 Network

RS-422 (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 RS-422 over RS-232 is the longer cable length that is possible. A signal converter is needed to convert the computer's RS-232 to RS422. Refer to **Section 3** for additional information.

Modem Network

The modem is a standard communication interface that utilizes standard phone transmission lines. The phone company assigns each phone line a number that the modem uses to communicate between controller and display. 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 2,000 feet. A signal converter is needed to convert the computers RS-232 signal to fiber optic signal; a minimum of two fibers is 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 length of 2000 feet. 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 **ED13348** for the additional information.

1.4 Display Overview

Reference Drawings:

- Shop Drawing; AF-3165-8-32 High-34-RGB..... **Drawing B-172745**
- Shop Drawing; AF-3165-40-48 High-34-RGB..... **Drawing B-172746**

Daktronics AF-3165 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 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-3165-RRCCC-34-X**

AF-3165	=	Outdoor 34mm Louvered Galaxy Display
RR	=	Number of Rows High (8-48)
CCC	=	Number of Columns Long (Up to 144 Columns Standard)
34	=	34mm pixel to pixel spacing
X	=	LED Color (32,000 RGB)

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.

The Venus 1500 controller is a software package that runs under Windows 98, ME, NT® 4.0 or 2000 operating systems on an IBM®-compatible computer. Refer to the Venus 1500 controller operator's manual for installation and operation of the Venus 1500 controller editing station.

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

1.5 Component Identification

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

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

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

Controller: The display's controller is the “brains” of the display (refer to **Figure 1** below). The controller receives signal information from the control computer, translates it, and activates the appropriate pixels on the display accordingly.

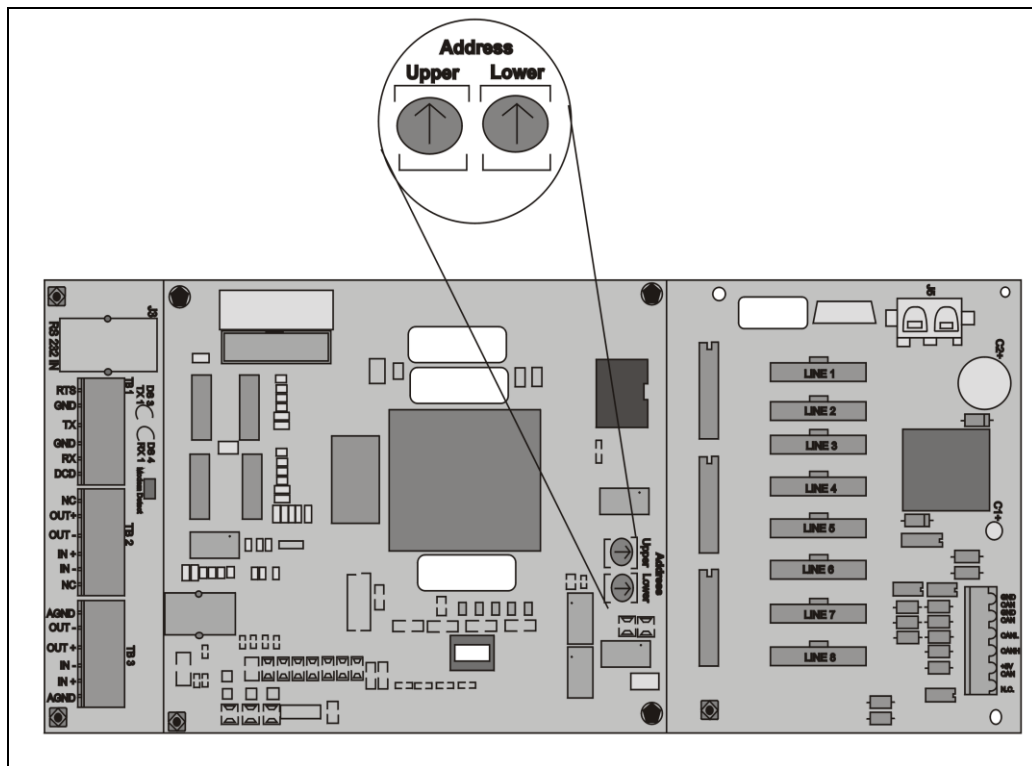


Figure 1: Version 3 Controller

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

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.

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

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

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

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.

Signal Converter: The signal converter, shown in **Figure 2** 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.

Signal Termination Panel (A35): The RS232, RS422 IN, RS422 OUT, and CAN Signal is terminated at this panel.

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.

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

Louwer: 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.

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.

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

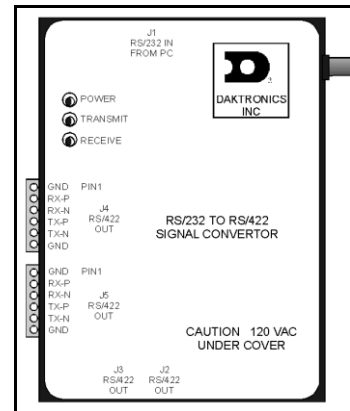


Figure 2: Signal Converter (RS232 to RS422 Shown)

1.6 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.

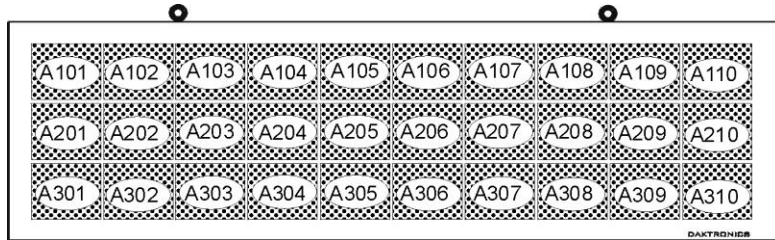


Figure 3: Module Numbering Example – 24x80 Front

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 3** above illustrates how Daktronics numbers modules on a Galaxy display. **Figure 4** on the right breaks down the module numbering method.

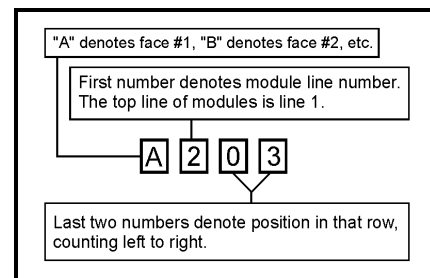


Figure 4: Module Numbering

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

- “TB_ _” denotes a termination block for power or signal cable.
- “F_ _” denotes a fuse.
- “E_ _” denotes a grounding point.
- “J_ _” denotes a power or signal jack.
- “P_ _” denotes 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- _ _ _ - _ _ _ _” denotes 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- _ _ _ _” denotes a wire or cable. Cables may also carry the assembly numbering format in certain circumstances. This is especially true of ribbon cables.

Most circuit boards and components within this display carry a label that lists the part number of the unit. If a circuit board or assembly is not listed in the replacement parts list in **Section 4**, use the label to order a replacement. A typical label is shown in **Figure 5** below. The part number is in bold.

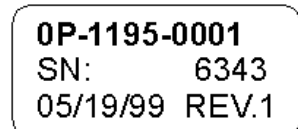


Figure 5: Typical Label

Section 2: Mechanical Installation

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

Daktronics engineering staff must approve **any** changes that may affect the weather-tightness of the display. If any modifications are made, detailed drawings of the changes **must** be submitted to Daktronics for evaluation and approval, or the warranty may be void.

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

2.1 Mechanical Installation Overview

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

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

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

2.2 Support Structure Design

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

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

Before beginning the installation process, verify the following:

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

Correct any deficiencies before installation.

2.3 Ventilation Requirements

Reference Drawings:

Shop Drawing, AF-3165-8-32 High-34-RGB.....	B-172745
Shop Drawing, AF-3165-40-48 High-34-RGB.....	B-172746

Fans are mounted in the bottom of the display and to the back sheet for ventilation. Maintain a minimum distance of 3" (7.62cm) below the display to maintain proper airflow. Refer to the appropriate shop drawing 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 (10.6" x 10.6" active area).

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

2.4 Lifting the Display

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

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

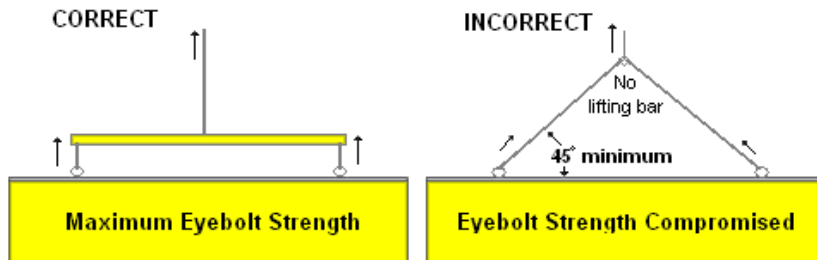


Figure 6: *Lifting the Display*

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

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

2.5 Display Mounting

Reference Drawings:

Shop Drawing, AF-3165-8-32 High-34-RGB.....	B-172745
Shop Drawing, AF-3165-40-48 High-34-RGB.....	B-172746

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-inch.
- The mounting structure will not give way at any unsupported points after the display is mounted.

The back of the display is equipped with 2 x 2 x ¼" steel clip angles at the locations shown in the **Shop Drawings** listed within **Appendix B**. These angles may be used for mounting purposes. Remember to have **all** mounted displays inspected by a qualified structural engineer. It is the customer's responsibility to determine the proper wall mounting method and location.

Refer to the appropriate shop drawing 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. Daktronics recommends using all clip angles as attachment points.

1. Carefully uncrate the display. Look each side of the display over for 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 the appropriate shop drawing.
4. Refer to **Section 3** for information on routing power and signal.
5. After installation is complete, carefully inspect the display for any holes that may allow water to seep into the display. Seal any openings with silicone. If the eyebolts on the top of the display have been removed, plug the holes with bolts and the rubber-sealing washer that was removed with the eyebolt.

2.6 Optional Temperature Sensor Mounting

The optional temperature sensor is mounted separately and requires a location away from the influence of chimneys, air conditioners, vents, tar roofs, concrete and parking lots which can cause abnormal temperature fluctuations. Usually a separation of at least 20 to 30 feet horizontally and eight feet vertically is required to achieve this. Locations where air movement is restricted are also unsatisfactory.

A first-choice temperature sensor location is a north eave or northern exposure away from direct sun light and above grass. This location gives extra stability and accuracy to the sensor because of the added shading usually obtained on a northern exposure. There should be at least one foot between the bottom of the eave and the top of the temperature sensor housing for accurate readings.

Other choices are mounting the temperature sensor on the display structure or the display cabinet.



Figure 7: Temperature Sensor Mounting

Due to the nature of the signal cable used to send the temperature information, the maximum distance between the temperature sensor and the display is 500 feet (152.4 meters).

Refer to **Section 3.9** for wiring instructions.

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

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

2. Termination Blocks:

Termination blocks are usually used to connect internal power and signal wires to wires of the same type coming into the display from an external source. Power wires need to have one-half inch of insulation stripped from the end of the wire prior to termination. Tighten all screws firmly to ensure a good electrical connection. Refer to **Figure 9** on the right.

3. Phoenix™ -Style Connectors:

Phoenix-style connectors, which are usually green, are often used for signal termination on circuit boards. Refer to **Figure 10** 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.

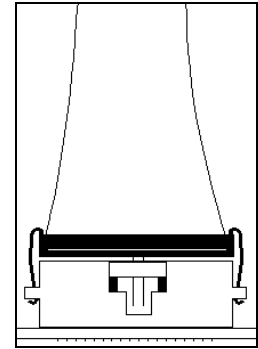


Figure 8: Ribbon Cable Connector

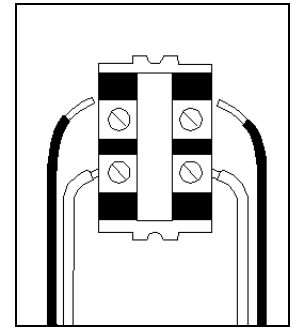


Figure 9: Termination Block

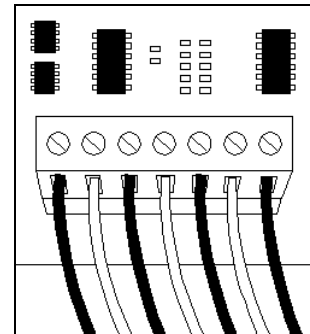


Figure 10: Phoenix Connector

4. Mate-n-Lok™ Connectors:

The Mate-n-Lok connectors found in the displays are white and come in a variety of sizes. **Figure 11** 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.

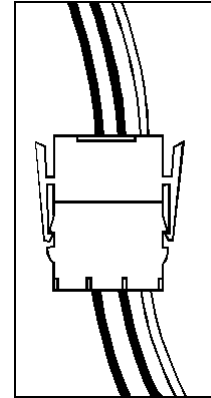


Figure 11: Mate-n-Loc Connector

5. Phone Jacks (RJ11 Connectors):

RJ connectors, as seen in **Figure 12** on the lower right, are similar to the telephone connectors found in homes and are used on the ends of flat RJ11 cable. In order to remove this plug from the jack, depress the small clip on the underside of the plug.

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

6. Six-Pin Insulation Displacement Connector

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.

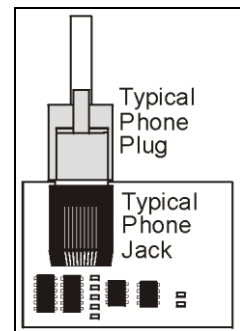


Figure 12: RJ11 Connector

3.2 Control Cable Requirements

RS-232

This cable is a 2-conductor shielded cable used to transmit an RS-232 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.

RS-422

This cable is a 4-conductor shielded cable used to transmit an RS-422 signal (Daktronics part number W-1234). This shielded cable consists of paired wires. They should not be subjected to mechanical flexing after installation. This cable is not for direct burial and should have one of the following routings:

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

With interference signals (such as power conductors, intercom, etc.) typically a two-foot separation is required. The maximum length of an RS-422 signal cable is 4,000 feet (1.22 km).

Modem

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

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

Note: The telephone lines must be dedicated lines and **not** run through a switch board/communications system.

Fiber Optic

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

Radio

The Server radio connected to the computer requires two cables, a six-conductor flipped cable with RJ11 connectors at each end for the signal, and a two-conductor shielded cable for the power. These wires need to be in conduit out to the Server radio. The maximum distance from the RS-422 signal converter to the Server radio is 2000 feet (611.6 meters).

The Client radio at the display comes with cable that is rated for outdoor use and does not need to be in conduit.

3.3 RJ Connector Cables

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

The cable used in the network is a standard flat six-conductor telephone cable (standard flipped cable). Refer to **Figure 13** on the right. This cable has one end that is the mirror image of the other end (i.e. the cable is flipped). Refer to **Figure 14** on the following page for a standard flipped cable.

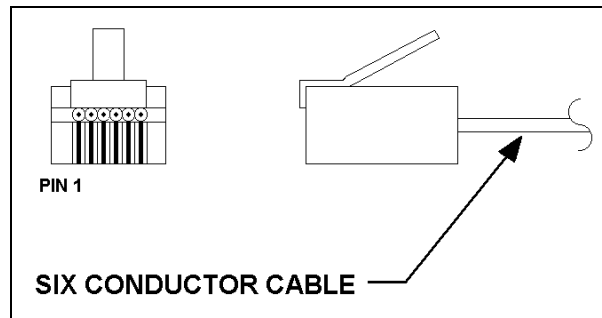


Figure 13: 6-Conductor RJ11 Connector and Cable

Notice below in **Figure 14** 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.

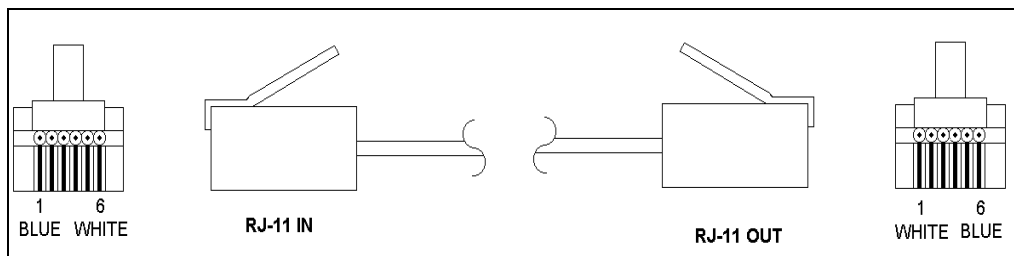


Figure 14: Flipped Cable with RJ Connectors

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 15** on the right.

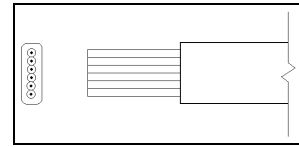


Figure 15: Wire with Outer Jacket Stripped

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:

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
System Riser, Radio QC Outdoor Radio.....	Drawing A-177006
Signal Input, Venus 1500.....	Drawing B-175387
Shop Drawing;.....	Refer to Appendix B

Daktronics does not include the conduit. Refer to the appropriate shop drawing for your display size located in **Appendix B** for approximate locations for power and signal conduit. Separate conduit must be used to route:

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

Knockout holes for ½" conduit are located at the bottom right (rear view) of the back of the display (refer to **Shop Drawings** located in **Appendix B**).

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

3.5 Preparing for Power/Signal Connection

1. Punch or use 7/8" (0.875) holes for the desired ½" 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. To do this, use a nut driver or 1/8" Allen wrench to turn the latch access fasteners one-quarter turn. Turn the top latch clockwise and the bottom latch counter-clockwise. Lift each module away from the display; reach behind it and disconnect all power and signal connections.
3. Locate the controller and power termination box for these displays in the **Component Layout 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.

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

Reference Drawings:

Power Specs, 8x48-4x144 Display, AF-3165 **Drawing A-179873**

Power Connection, AF-306X..... **Drawing A-154965**

Schematic **Refer to Appendix B**

Power Requirements

Refer to **Drawing A-179873** for voltage and current requirements for your display size. 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

Displays **must** be grounded according to the provisions outlined in Article 250 of the National Electrical Code®. Daktronics recommends a resistance to ground of 10 ohms or less.

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

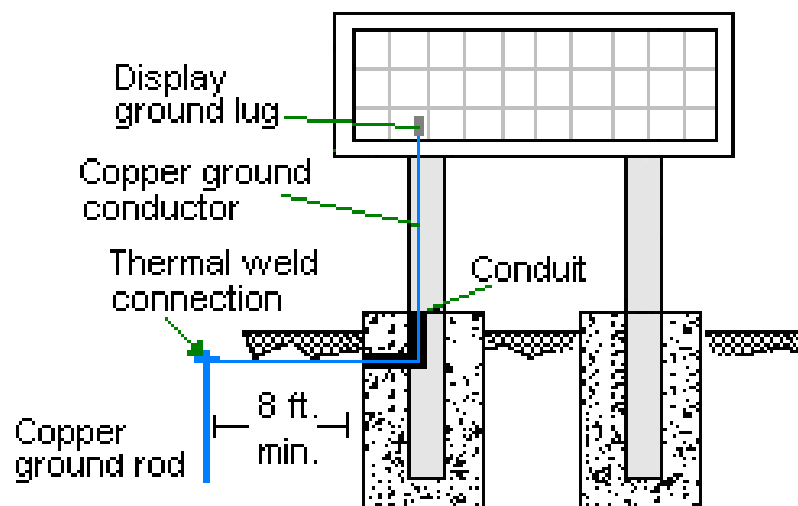


Figure 16: Ground Conductor

The material of an earth-ground electrode differs from region to region and from conditions present at the site. Consult the National Electrical Code and any local electrical codes that may apply. The support structure of the display cannot be used as an earth-ground electrode. The support is generally embedded in concrete, and if in earth, the steel is either primed or it corrodes, making it a poor ground.

A minimum of one grounding electrode must be installed for each display face. The grounding electrode is typically one grounding rod for each display face. Other grounding electrodes as described in Article 250 of the National Electric Code may be used. Daktronics recommends that the resistance to ground be 10 ohms or less. If the resistance to ground is higher than 10 ohms it will be necessary to install additional grounding electrodes to reduce the resistance. The grounding electrode should be installed within 25 feet of the base of the display. The grounding electrode must be connected to the ground terminal in the display panel board.

Power Installation

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

Installation with Ground and Neutral Conductors Provided

For this type of installation, the power cable **must** contain an isolated earth-ground conductor. Under this circumstance, **do not** connect neutral to ground at the disconnect or at the display. This would violate electrical codes and void the warranty. Use a disconnect so that all hot lines and neutral can be disconnected. Refer to **Figure 17** below for installation details. The National Electrical Code requires the use of a lockable power disconnect within sight of or at the sign.

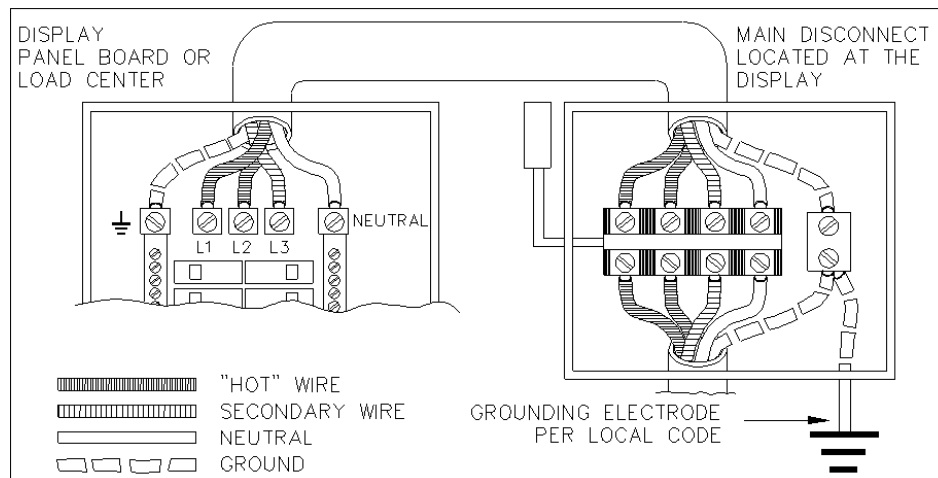


Figure 17: Installation with Ground and Neutral Conductor Provided

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 18** below for installation details.

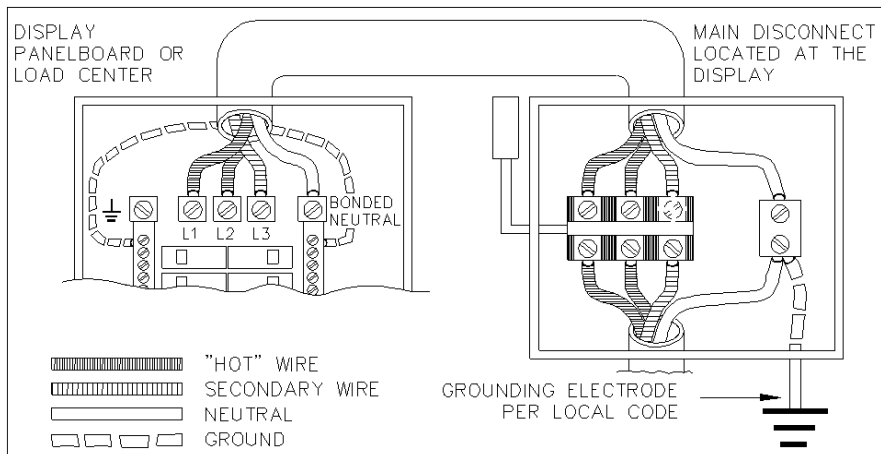


Figure 18: *Installation with only Neutral Conductor Provided*

Power Connection

Incoming power is connected within the power termination enclosure. Complete the following steps to terminate the hot and neutral wires at the termination block within the enclosure. Refer to **Drawing A-154965** 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 Note 1 on **Drawing A-154965**.
5. If two power lines are being terminated (120/240VAC). Connect the second “hot” wire to L2.
6. Connect the green grounding wire to the grounding bus L1. Refer to **Figure 20** above.

Main Disconnect

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

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

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

3.7 Signal Termination from Computer to Display

Reference Drawings:

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
System Riser; QC Outdoor Radio, V1500.....	Drawing A-177006
Signal Input, Venus 1500	Drawing B-175387

Note: The AF-3165 is designed for quicker connection to other displays, and to either the temp sensor or a radio. Connection of the control equipment to the first display can be done using a cable with a quick connect or can be wired directly to the Signal Termination Panel in that display. The following cables are provided with the displays:

1. Interconnect cable from Display 1 to Display 2, length 4 feet.
2. Temp sensor with Quick Connect cable, length 10 feet.
3. Client radio with Quick Connect cable, length 25 feet.

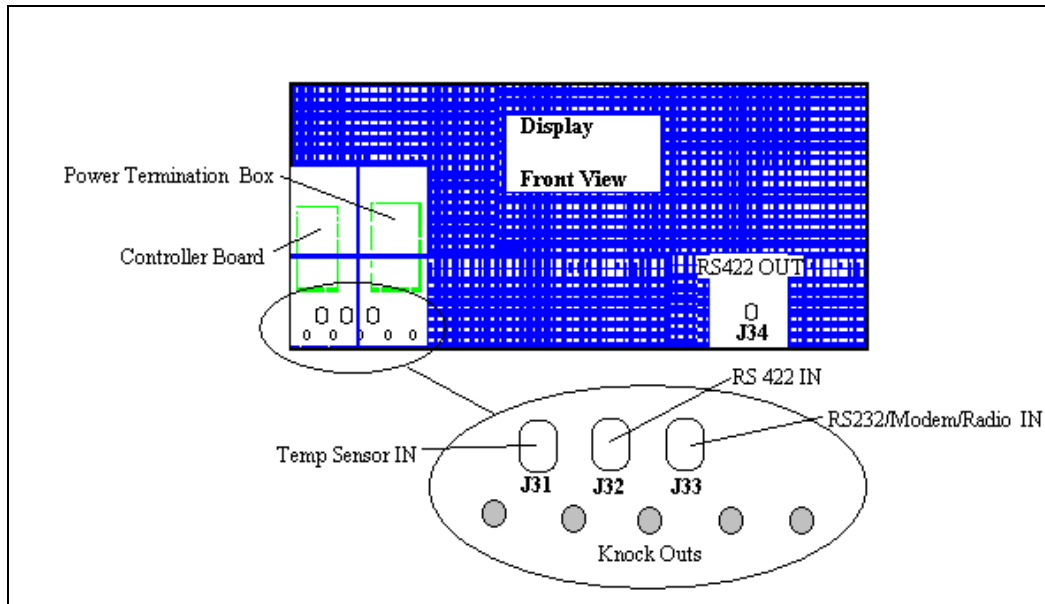


Figure 19: Signal Termination

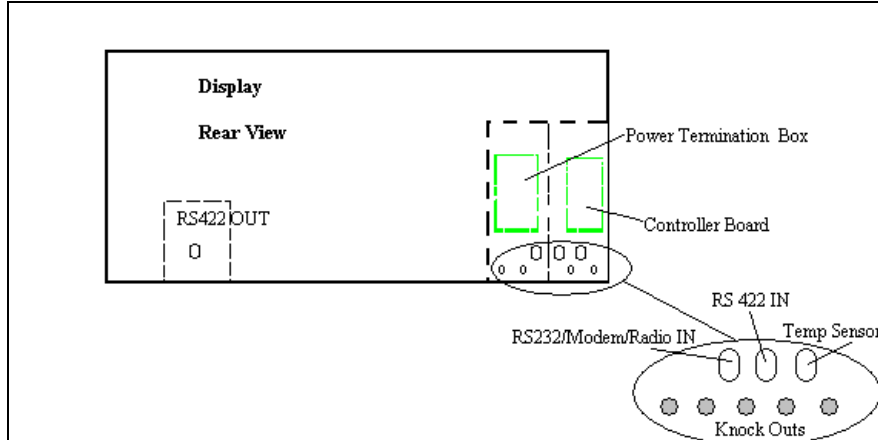


Figure 20: Signal Termination Display Rear View

RS-232

A display that is controlled using RS-232 requires the use of a J-box within 25 feet of the display. From the J-box to the display, the signal may be connected using a quick connect cable or directly wired to the signal termination panel inside the display. The cable from the J-box to the display must be routed through conduit. Do not run signal and display power through the same conduit.

1. If using a quick connect cable, connect from the J-box to J33 on the back of the display.
2. When connecting directly to the display, terminate one end at the J-box and the other end of the wire to the 6-position terminal block in the display labeled "RS232 IN" (A35-TB1).

Drawing B-175387 shows the terminal block wiring.

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

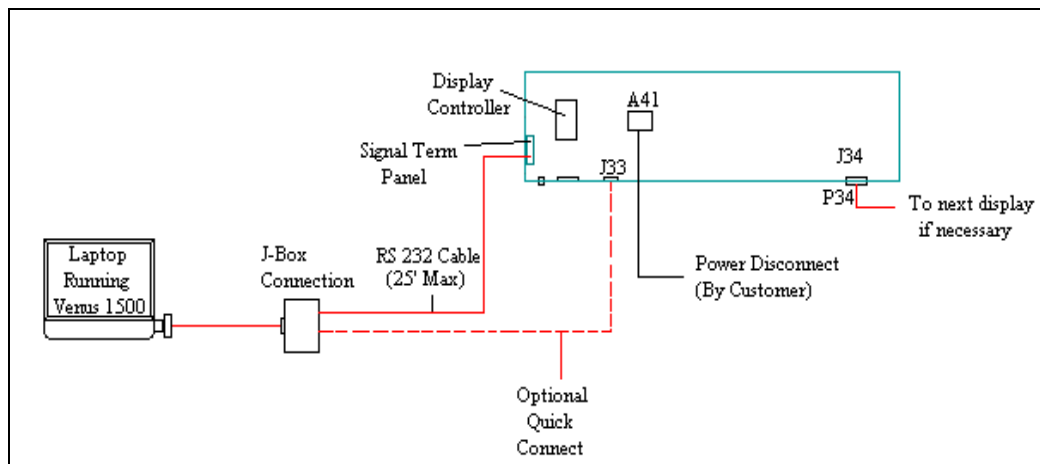


Figure 21: RS232 Quick Connect

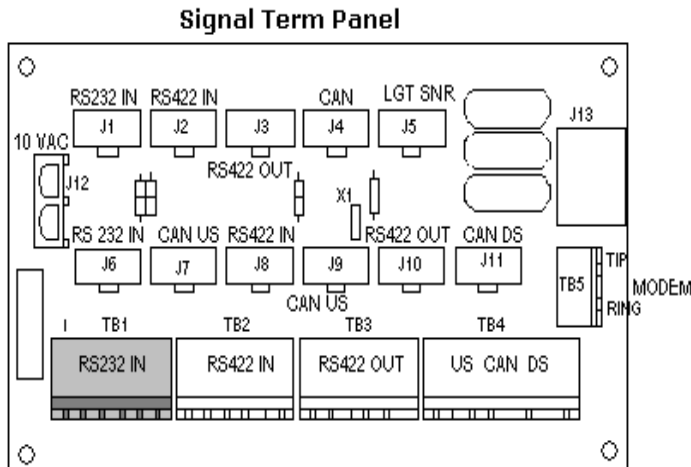


Figure 22: RS232 Signal Term Panel

J-Box to Signal Term Panel (A35)

J-box	Wire Color	Signal Term Panel (TB1)
Pin 1 (TX-P)	Black	Pin 1 (RX1)
Pin 2 (RX-P)	Clear or Red	Pin 2 (TX1)
Pin 3 (GND)	Shield	Pin 3 (GND)

RS-422

A display that is controlled using RS-422 requires the use of Signal Converter near the computer. From the Signal converter cable is run to the Signal termination Panel in the display or to a plug that is connected to the Quick Connect at 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 **Drawing A-174135** for system layout.

1. If using a quick connect cable, connect from the Signal Converter to J32 on the back of the display.
2. When connecting directly to the display, terminate one end at Signal converter and the other end of the wire to the 6-position terminal block in the display labeled "RS422 IN" (A35-TB2). **Drawing B-175387** shows the terminal block wiring.

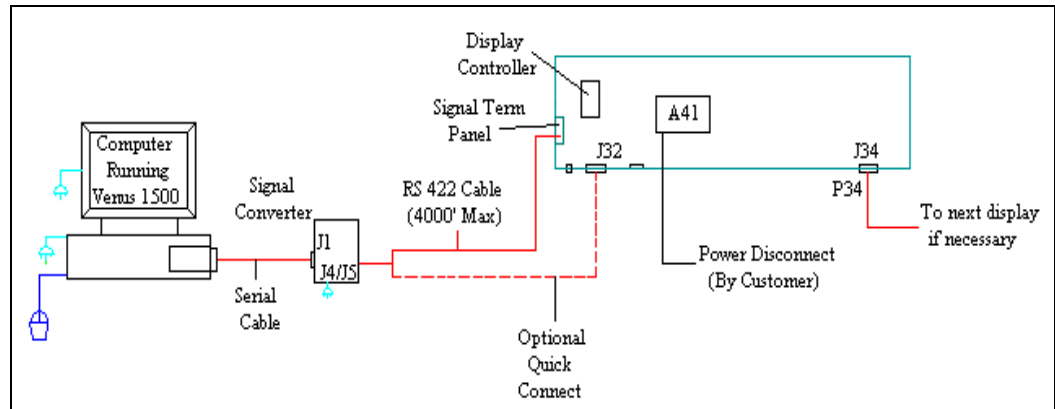


Figure 23: RS422 Quick Connect

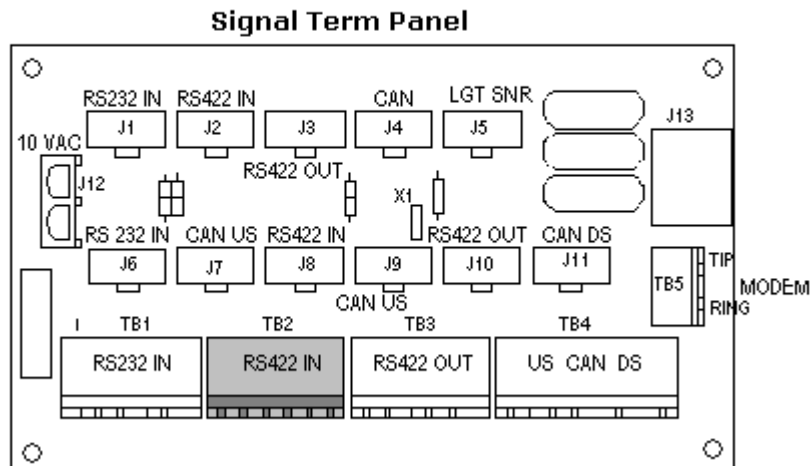


Figure 24: RS 422 Signal Term Panel

Signal Converter to Signal Term Panel (A35)

Signal Converter (J4 or J5)	Wire Color	Signal Term Panel (TB2)
Pin 1 (GND)	Shield	Pin 1 (SHLD)
Pin 2 (RX-P)	Red	Pin 2 (D1OUT-P)
Pin 3 (RX-N)	Black	Pin 3 (D1OUT-N)
Pin 4 (TX-P)	Green	Pin 4 (D1IN-P)
Pin 5 (TX-N)	White	Pin 5 (D1IN-N)
Pin 6 (GND)		Pin 6 (A GND)

Modem

A display that is controlled using a modem requires the use of an internal or external modem at the computer. The local phone company must provide a dedicated phone line to the display and identify the colors used for “Tip” and “Ring”. The telephone cable is run to the Signal termination Panel in the display or to a plug that is connected to the Quick Connect at the display. The phone cable must be routed through conduit. Do not run signal and display power through the same conduit. Refer to **Drawing A-174342** for system layout.

1. If using a quick connect cable, connect the phone line to J32 on the back of the display.
2. When connecting directly to the display, terminate the phone line to TB5 on the Signal Termination Panel. If the phone company provided a phone termination box in the display a straight phone cable can be connected from the box to the J1 Phone IN on the modem board in the display. **Drawing B-175387** shows the terminal block wiring.
3. A 6-conductor phone cord with RJ11 connectors (Daktronics part number 0A-1137-0160) relays the signal to the modem. A second phone cord (Daktronics part number 0A-1137-0160) transfers data from J2 on the modem to J1 (RS232 IN) on the controller.

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

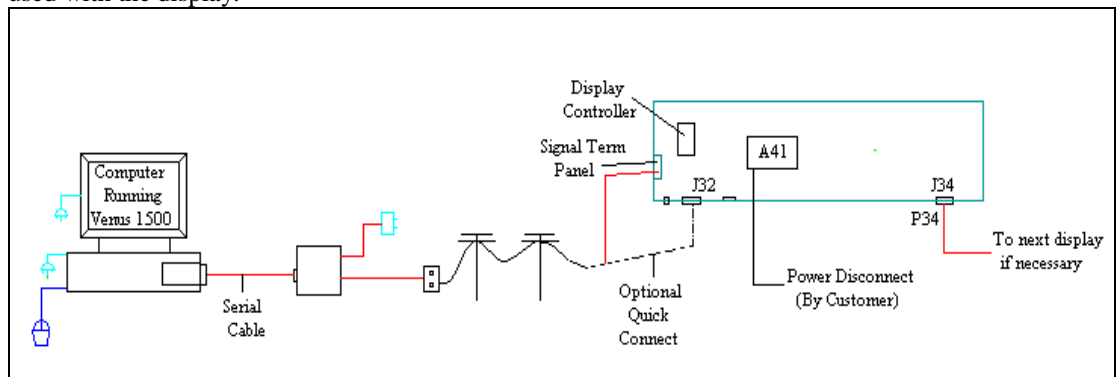


Figure 25: Modem/ Layout

Phone Line to Phone Termination Block (A35)

Field Cabling	Phone Line (TB5)
Red	Pin 1 (Tip)
Green	Pin 2 (Ring)

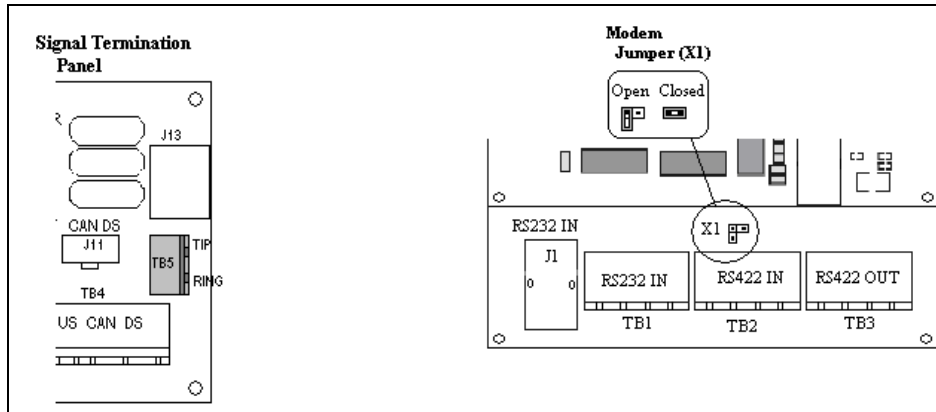


Figure 26: Modem/ Signal

Fiber Optic

When fiber optic cables are used, signal from the converter enters the display and connects to the fiberboard (J4/J5). An adapter module (Daktronics part number 0A-1146-0029) allows the use of a 6-conductor phone cord with RJ11 connectors (Daktronics part number 0A-1137-0160) to relay the signal to J3 (RS232 IN) on the controller. Refer to **Drawing A-174344** for the system riser and to **B-175387** for terminal block cabling.

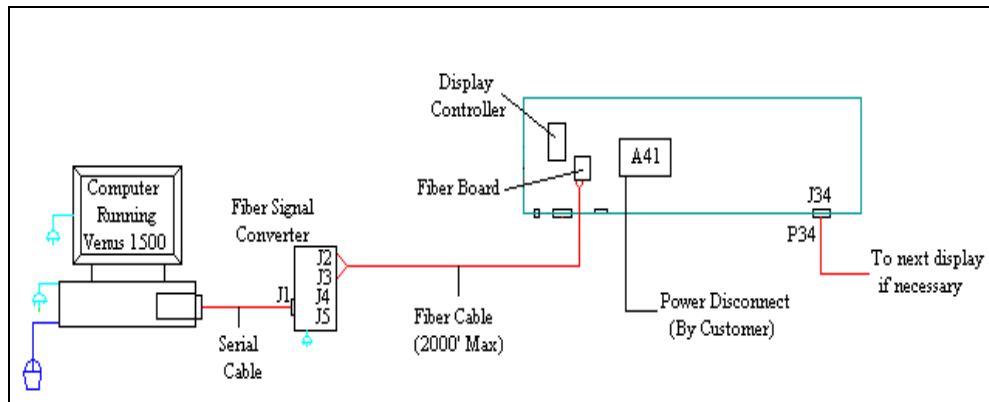


Figure 27: Fiber Optic

Signal Converter to Display Fiber Board

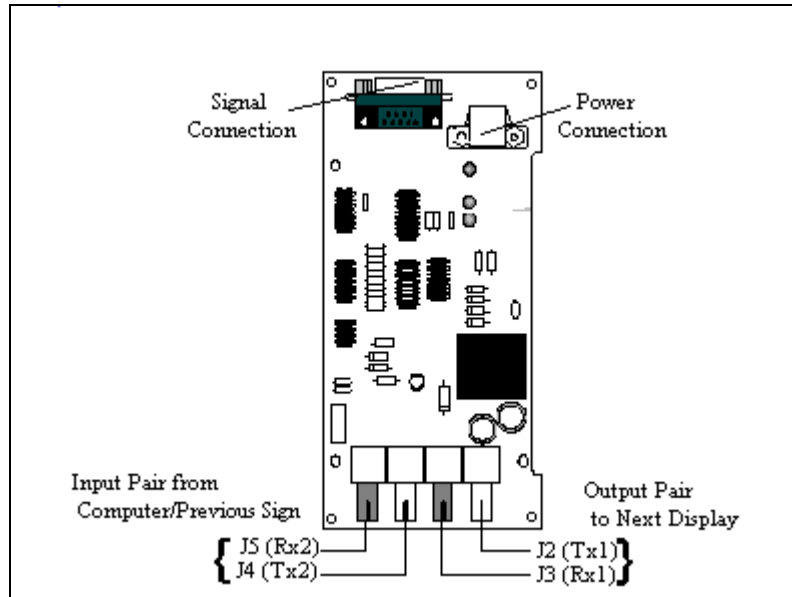


Figure 28: Fiber Signal Connections

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

Venus 1500 Radio Client

A display that is controlled using a radio requires a Server radio connected to the control computer, and a Client radio at the display. The radios must be within line-of-site of each other. The diagram below shows the connections through a Signal Converter. The Client radio must be located within 25 feet of the display, therefore 25 feet of cable is supplied with the Client radio. 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 can be cut and terminated directly to the Signal termination Panel in the display. Refer to **Drawing A-175387** and the Radio manual (**ED13348**) for the correct cable terminations.

1. If using a quick connect cable, connect from the Client Radio to J33 on the back of the display.
2. When connecting directly to the display, terminate the other end of the cable to the 6-position terminal block (TB1) on the Signal Termination Panel, labeled “RS232 IN”

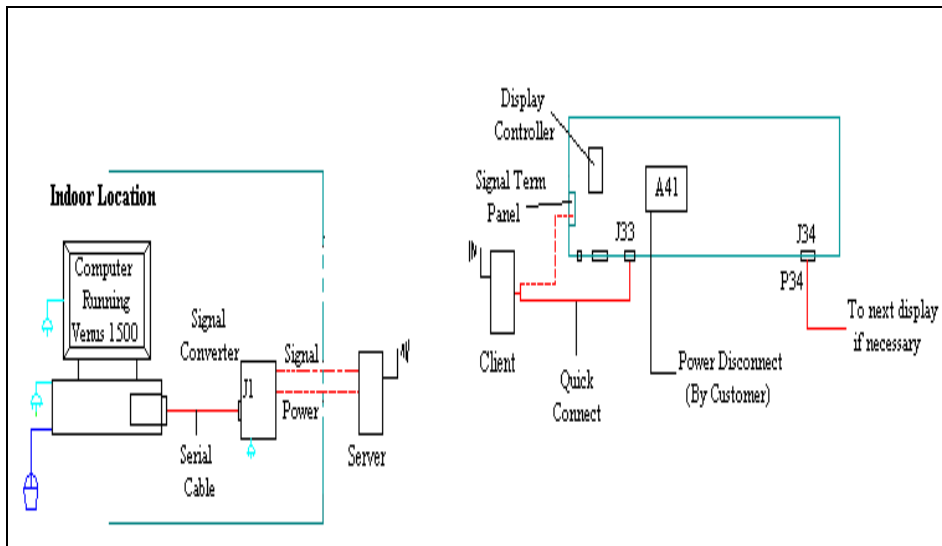


Figure 29: Venus 1500 Radio

Client Radio to Signal Term Panel (A35)

Venus 1500 Radio Client	Field Cabling	Signal Term Panel (TB1)
Pin 6 (TX-P)	Red 2	Pin 1 (RX-P)
Pin 5 (RX-P)	Black 2	Pin 2 (TX-P)
Pin 4 (GND)	Black 3	Pin 3 (GND)
Pin 7 (10V Unreg)	Black 1	Pin 6 (10V Unreg)
Pin 8 (10 V Unreg)	Red 1	Pin 5 (10V Unreg)
	Shield	Pin 4 (Shield)

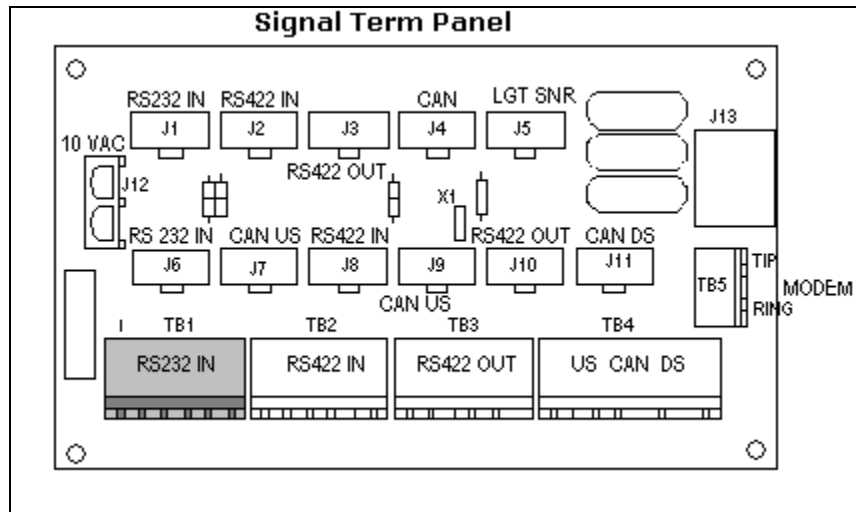


Figure 30: Signal Term Panel

3.8 Signal Termination Between Two (or More) Signs

Reference Drawings:

- System Riser Diagram, Modem **Drawing A-174342**
- System Riser Diagram, RS422 **Drawing A-174135**
- System Riser Diagram, RS232 **Drawing A-174341**
- System Riser Diagram Fiber..... **Drawing A-174344**
- Signal Input, Venus 1500..... **Drawing A-175387**
- System Riser, QC Outdoor Radio, V1500 **Drawing A-177006**

RS-422 Interconnection

The Quick Connect cable is the most common method of terminating signal between two displays. The four-foot cable goes from the RS-422 OUT on the first display to the RS-422 IN on the second display. If the displays are not back-to-back, or are too far apart for the Quick connect interconnect cable to reach, a 4-conductor shielded cable of the correct length is used. One end will connect at the “RS422 OUT” 6-position terminal block (A35-TB3) in the Signal Termination Panel of the first display, and the other end of the cable will terminate on the “RS422 IN” 6-position terminal block (A35-TB2) on the Signal Termination Panel of the second display.

Face A – RS422 OUT (A35-TB3)	Field Cabling	Face B – RS422 IN (A35-TB2)
Pin 1 (GND)	Shield	Pin 6 (GND)
Pin 2 (D2OUT-N)	Red	Pin 5 (D1IN-N)
Pin 3 (D2OUT-P)	Black	Pin 4 (D1IN-P)
Pin 4 (D2IN-N)	Green	Pin 3 (D1OUT-N)
Pin 5 (D2IN-P)	White	Pin 2 (D1OUT-P)
Pin 6 (Shield)		Pin 1 (Shield)

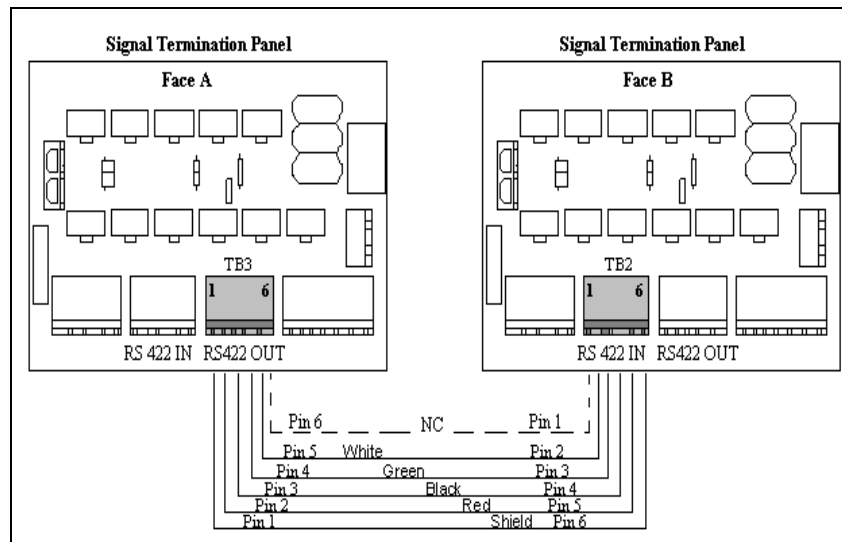


Figure 31: Signal Termination Panels

Fiber Interconnection

A four-conductor fiber cable is 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 (TX1)		J5 (RX2)
J3 (RX1)		J4 (TX2)

CAN Interconnection

If the display is using the Quick Connect interconnect cable, this connection is already complete. Make sure the terminating resistor is mounted to the display at the Temp sensor quick connect location.

If the interconnect cable was not used a 4-conductor shielded cable is used to the temp sensor for side one to side two. One end terminates at the “CAN US/DS” 8-position terminal block (A35-TB4) on the first display. The other end terminates at the “CAN US/DS” 8-position terminal block (A35-TB4) in the second display.

Face A CAN DS (A35-TB4)	Field Cabling	Face B CAN US (A35-TB4)
Pin 6 (CAN H)	Green	Pin 2 (CAN H)
Pin 7 (CAN L)	White	Pin 3 (CAN L)
Pin 8 (GND CAN)	Black	Pin 4 (GND CAN)
	Shield	Pin 5 (Shield)

Note: Cable shield should not be terminated in Face A.

3.9 Optional Temperature Sensor Electrical Installation

Reference Drawing:

Schematic, Signal Wiring, Internal.....**Drawing B-175387**

After mounting the optional temp sensor as described in **Section 2.6** follow these steps to complete the electrical installation.

Using the Quick Connect and 10 foot cable

1. Run ¾" conduit from the sensor location to the Quick connect Temp Sensor input at the back of the first display. The cable must be routed through ¾" metal conduit that should be earth-grounded to protect the sensor and controller from lightning damage.
2. Route the cable through the conduit and connect the Quick Connect to the Temp Sensor input on the back of the first display.

Using the Quick Connect and less then the 10 foot cable

1. Run 3/4" conduit from the sensor location to the Quick connect Temp Sensor input at the back of the first display. The cable must be routed through 3/4" metal conduit that should be earth-grounded to protect the sensor and controller from lightning damage.
2. Disconnect the CAN temp sensor cable from the temperature sensor terminal block in the CAN temp sensor housing. (0A-1241-4017)
3. Cut the cable to desired length and reattach to the temperature sensor terminal black in the CAN temp sensor housing as follows:

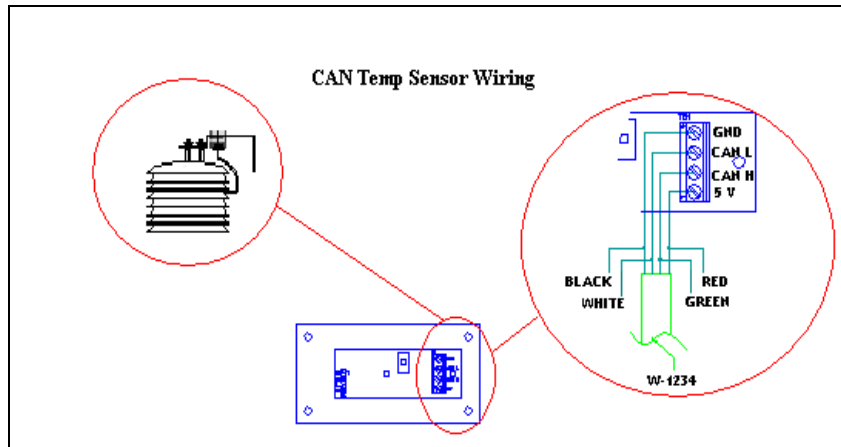


Figure 32: CAN Temp Sensor Wiring

Wire Color	Terminal Block (TB1)
Red	+5V CAN
Green	CANH
White	CANL
Black	GND CAN

***Note:** Do not terminate shield at this point.

Using more than 10 feet of cable, and no Quick Connect

1. Run ½" conduit from the sensor location to a knockout on the back of the first display. The cable must be routed through ½" metal conduit that should be earth-grounded to protect the sensor and controller from lightning damage.
2. Use a 2-pair, individually shielded cable (Belden 5594, Daktronics part number W-1234) to connect the sensor to the controller.
3. Disconnect the CAN temp sensor cable from the temperature sensor terminal block in the CAN temp sensor housing. (0A-1241-4017)
4. Connect the desired length of cable from the temperature terminal block in the CAN temp sensor housing through conduit to the display.
5. Terminate the cable to the 8-position terminal block in the display labeled "CAN US/DS" (A35/TB4). Drawing **A-175387** shows the terminal block wiring.

CAN Temp Sensor (TB1)	Field Cabling	CAN US (A35-TB4)
Pin 1 (+5V CAN)	Red	Pin 1 (+5V CAN)
Pin 2 (CAN H)	Green	Pin 2 (CAN H)
Pin 3 (CAN L)	White	Pin 3 (CAN L)
Pin 4 (GND CAN)	Black	Pin 4 (GND CAN)
	Shield	Pin 5 (Shield)

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 (32,768 or 8)
4. Operating System (OS 3.XX)
5. Firmware Number (**ED13305**)
6. Firmware Revision (Rev X.XX)
7. Hardware Address (HW: XX)
8. Software Address (SW: XX)
9. IP Address (Not used at this time)
10. COM1 Configuration (C1: V15) or (Modem C1: V15), if modem is present.
11. Clock Mode (CLK:RTC)
12. Display Name

Section 4: Maintenance and Troubleshooting



Important Notes:

- Power must be turned off before any repair or maintenance work is done on the display.
- Qualified service personnel must make any access to internal display electronics.
- The Daktronics engineering staff must approve ANY changes made to the display. Before altering the display, detailed drawings for the proposed modifications must be submitted to the Daktronics engineering staff for evaluation and approval or the warranty will be rendered null and void.

4.1 Maintenance and Troubleshooting Overview

Daktronics Galaxy series AF-3165 displays are front accessible; meaning access to the internal components can be gained only from the front of the display.

This section provides the following Galaxy display information.

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

4.2 Signal Summary

Reference Drawings:

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
Signal Input, Venus 1500.....	Drawing A-175387
System Riser, QC Outdoor Radio.....	Drawing A-177006
Schematic.....	Refer to Appendix B

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 (most typical) or fiber cable relays signal between the controller of the first display and the controller in the second display.
3. From the controller, the signal then travels over a 40-conductor ribbon cable 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. The drivers use this display data to control the LEDs.

4.3 Power Summary

Reference Drawing:

Schematic.....	Refer to Appendix B
----------------	----------------------------

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

1. Incoming power terminates at the power termination enclosure. Before leaving the enclosure, power is sent through a circuit breaker and an RFI electrical filter.
2. Power for the controller board passes through a transformer located on the controller/power panel.
3. Both +6.5VDC and +9VDC power supplies are used to power the modules. Power supplies are preset. Contact Daktronics Customer Service for the proper settings.
4. In Galaxy displays, the 9VDC power supply powers the green and blue LEDs through the 4-pin connector. The 6.5VDC power supply powers the red LEDs and driver's logic circuit through 2-pin connectors.

4.4 Service and Diagnostics

Reference Drawings:

Assy, Power Supply A-1633 @2, A-1591	Drawing A-148636
Assy, Power Box 2 Position	Drawing A-155736
Exploded Front, Module	Drawing B-126111
Exploded Rear, Module	Drawing B-126112
Comp. Layout Diagram	Refer to Appendix B
Schematic	Refer to Appendix B

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

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

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

Component...	Denoted As...	Location...
Filter and Transformer	0A-1241-4005	Inside the power termination box
Controller	0A-1229-0001	Inside the controller/power panel (behind the bottom left module)
Modules	Squares (0A-1208-2552) A101 through A418	Over entire face of the display (includes driver)
Power Supplies	0A-1241-4001	Behind modules (refer to your display's schematic)
Light Detector	0A-1241-4013	Behind/below the bottom left module
Modem	0P-1146-0003	Refer to the display's schematic
Fiber Board	0P-1127-0024	Refer to the display's schematic
RS422 Surge Card	0A-1241-4015	Refer to the display's schematic

Transformer and RFI Filter

Remember: Disconnect power before servicing any internal components.

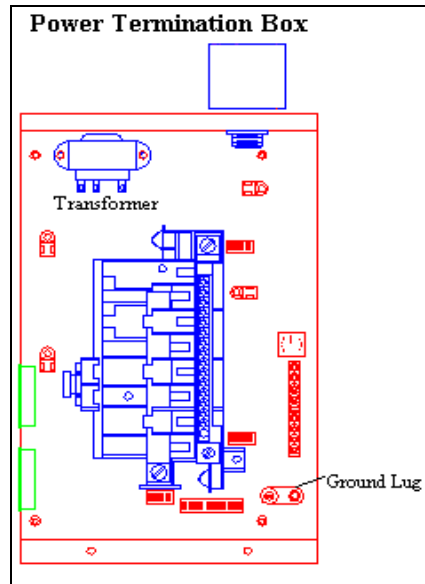


Figure 33: Power Termination Box

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 **Figure 35** above). Like the transformer, the filters can be replaced by first removing all connecting wires, then releasing the attachment hardware. Install the new filter using the display's schematic as a wiring reference.

Controller

The controller sends data to the modules. Refer to the signal summary in **Section 4.2** for more information and to the component location drawings for the position of the controller board. **Figure 34** below illustrates a typical controller.

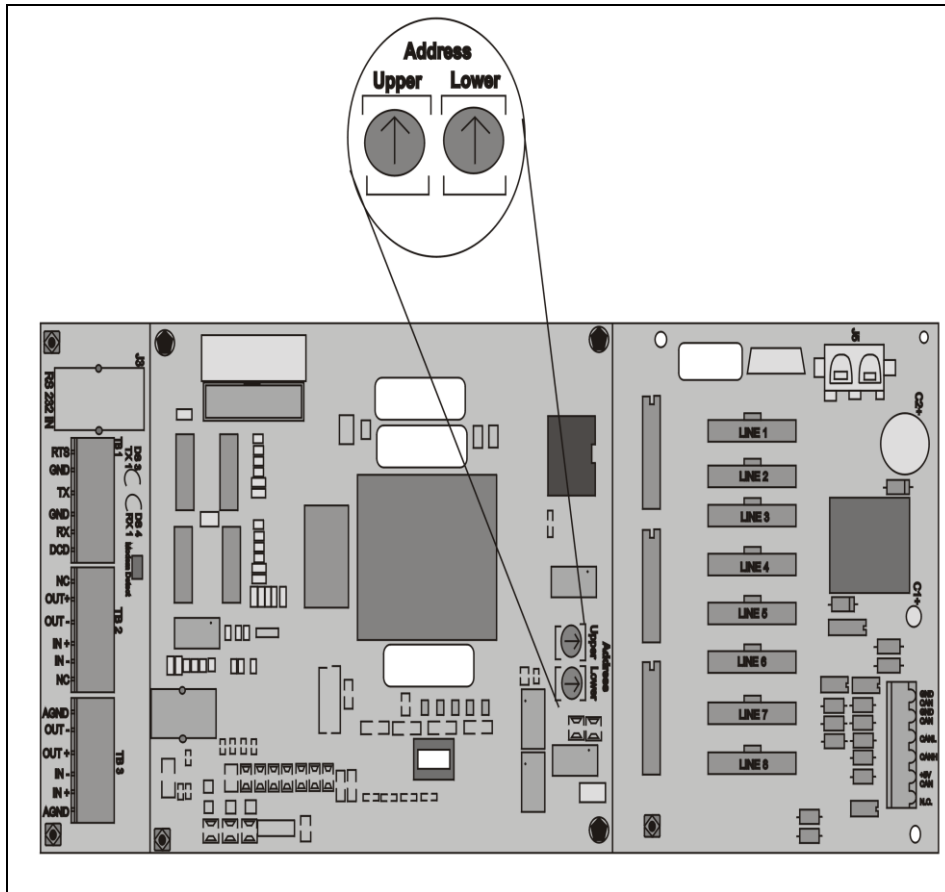


Figure 34: Controller Component Layout

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 the 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.

Controller Address Settings		
S2 (Upper)	S1 (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 the watchdog timer is not being reset by controller
DS4	Red	Run	A steady flash indicates the controller is running properly. Normal flash rate is about once per second.
DS5	Red	U15 Programmed	On when U7 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.

The controller contains one jumper (X1) for use with a modem system. The jumpers **must** jump both pins for a modem system.

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

1. Disconnect power from J5.
2. Remove all power and signal connections from the board. "Locked" connectors are released by squeezing together the tabs, then carefully pulling them from the jack. When replacing the board, it is helpful to have the cables labeled as to which was removed from which connector.
3. Remove each of the six nuts holding the board in place.
4. Follow the previous steps in reverse order to install a new controller board.

Modules and Drivers

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

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 following page. 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.

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. **Drawings B-126111** and **B-126112** illustrate the various module components.

From time to time, it may become necessary to remove one or more parts from the module housing for repair or replacement. The following sub-sections explain how to disassemble a module.

Removing the Louver Assembly

Complete the following steps to remove the louver assembly from the face of the module:

1. From the backside of the module, remove the five twist-on fasteners holding the louver assembly to the module.
2. Lift the louver assembly straight away from the module.

Damaged louvers may reduce the brightness and contrast of this display. If any of the louvers on the display are broken or damaged, the entire louver assembly must be replaced. Refer to the **Replacement Parts List** in **Section 4.11**. When replacing the louver assembly take care not to strip the plastic twist-on fasteners.

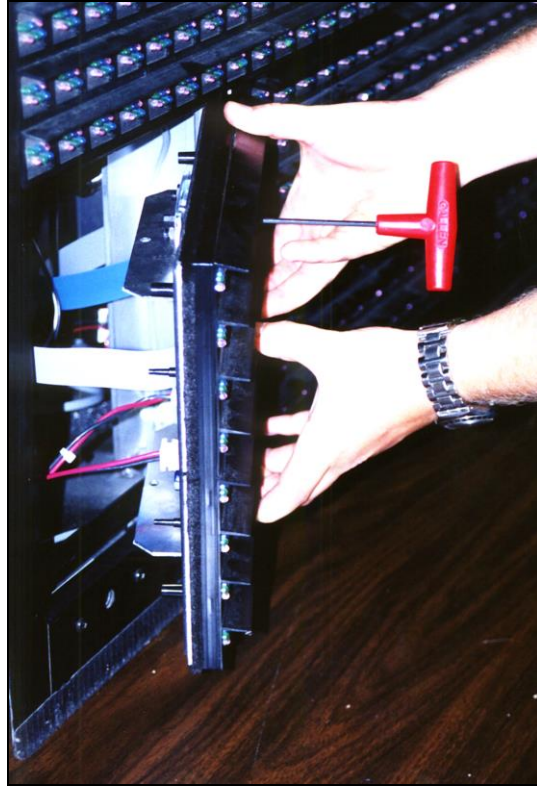


Figure 35: *Removing a Module*

Power Supplies

The LED power supplies are identified as assemblies 0A-1241-4001 in the component location drawings.

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

The light detector is internally mounted and wired at Daktronics. It is located in the bottom left corner on the front of the display (identified as assembly 0A-1241-4013 (LT) in the **Component Layout Diagram**). A 4-conductor cable connects the light detector to the signal termination panel. The cable is terminated at the terminal block on the light sensor and at the signal termination panel (refer to your display's schematic). When the displays are mounted back-to-back, only one side has a light sensor.

Light Detector Pin No. (TB1)	Cable Wires Color
1	Red
2	Green
3	White
4	Black

Modem

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

1. To replace a modem, first disconnect the power and signal connections (refer to **Figure 36** on the right for the location of the power jack).
2. The modem is held in place with four screws. Remove the screws and lift the modem out of the display.
3. Attach the new modem using the same four screws removed in step 2, above.

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

A modem system requires a jumper to be set on the controller board.

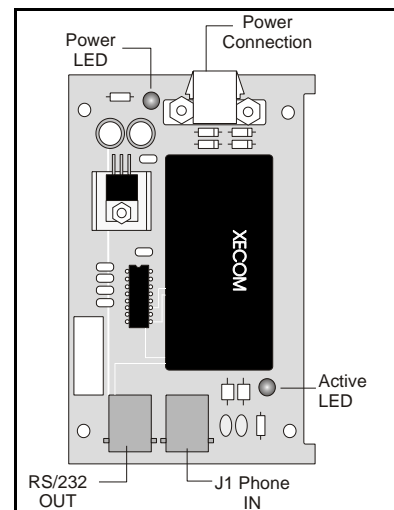


Figure 36: Modem

Fiber Board

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

To replace a fiber optic board:

1. Disconnect the power and signal connections (refer to **Figure 37** above for disconnection of power).
2. The fiber optic board is held in place with four screws. Carefully remove them.
3. Install the new fiberboard, replace the screws and reconnect power and signal cables.

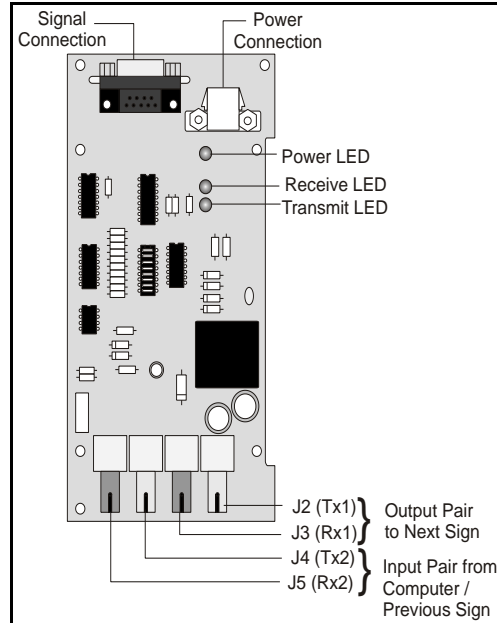


Figure 37: Fiber Optic Board

RS-422 Surge Suppressor

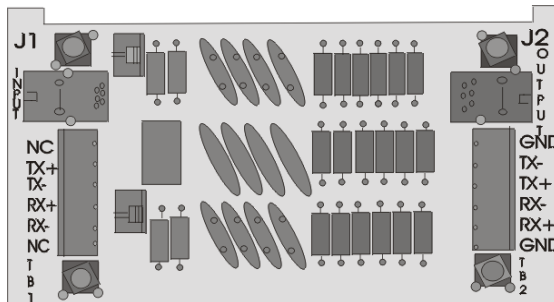


Figure 38: Surge Suppressor, RS422

1. Disconnect the signal connections (Refer to **Figure 38** above).
2. The surge suppressor is held in place with four screws. Carefully remove them.
3. Install the new surge suppressor, replace the screws and reconnect power and signal cables.

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

4.5 Ventilation Systems (With Fans and Filters)

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

- 1,500 hours is equivalent to 83 days if the display is operated for 18 hours a day and the power to the display is turned off when not in use.
- 1,500 hours is equivalent to 62 days if the display is running non-stop for 24 hours a day. Each time a module is removed, for whatever reason, take a minute to inspect the fans.
- Check the fan blades for dirt and debris. If the fan blades have a large accumulation of dirt and debris, this indicates that the filters must be changed more often. Fan blades must be kept clean to maintain fan efficiency and ensure proper cooling.
- Spin the fan blades with a pen or pencil to ensure that the bearings are free and the fan is still in balance.

To check the operation of the fans, push the bypass button (momentary contact) on the thermostat enclosure to temporarily turn the fans on: (The bypass button is located behind A102, top row, and second module from the left.)

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

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

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

4.6 Thermostats

Reference Drawing:

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

A thermostat controls when the ventilation fans are turned on in the display. Refer to the **Component Layout Diagram** for the location of the thermostat. The ventilation fans turn on when the inside of the display reaches 85° F (29° C), and turn off at 70° F (21° C).

4.7 Weather Stripping

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

4.8 Display Maintenance

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

- **Loose Hardware**
Verify fasteners, such as bolts and rivets, have not come loose. Fasteners should be checked and tightened or replaced as required.
- **Excessive Dust Buildup**
Occasionally it may be necessary to vacuum the inside of the display cabinet to remove dust/dirt buildup that may interfere with airflow.
- **Water Intrusion – Water Stain Marks**
Water can enter the display where weather stripping has come loose or deteriorated or where fasteners have come loose allowing gaps in the panels or where moisture may be entering around hardware. Be sure to check around the lift eyes and bolts to ensure that water has not entered there. If so, replace hardware immediately to prevent more water from entering the display. Also, check electronic components for possible corrosion.
- **Corrosion**
Check the paint, and look for possible corrosion especially at footings, structural tie points and ground rods.

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

4.9 Troubleshooting

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

Symptom/Condition	Possible Cause/Remedy
One or more LEDs on a single module fail to light.	<ul style="list-style-type: none"> • Replace/check ribbon cables on the module. • Replace the module.
One or more LEDs on a single module fail to turn off.	<ul style="list-style-type: none"> • Replace/check ribbon cables on module. • Replace the module.
A section of the display is not working. The section extends all the way to the right side of the display.	<ul style="list-style-type: none"> • Replace 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. • Replace the ribbon cable.
One row of modules does not work or is garbled.	<ul style="list-style-type: none"> • Replace first module. • Replace ribbon cable to first module. • Check for bent pins on module and controller • Replace controller. • Check the fuses in the power termination box.
A group of modules, (a column of block) which share the same power supply assembly, fail to work.	<ul style="list-style-type: none"> • Check the wire connections at the power supply. • 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/replace the ribbon cable from the controller to the modules. • Check the voltage settings on the power supplies. • Check/replace the signal cable to the controller. • Replace the controller. • Verify proper use of the software in the operation manual.
Temperature always reads – 196F/-127C degrees F/0 degrees 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 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 (32,768 or 8)
4. Firmware Number (**ED13305**)
5. Operating System (OS 3.XX)
6. Firmware Revision (Rev X.XX)
7. Hardware Address (HW: XX)
8. Software Address (SW: XX)
9. IP Address (not used at this time)
10. COM1 Configuration (C1: V15) or (Modem C1:V15), if modem is present.
11. Clock Mode (CLK: RTC)
12. Display Name

4.11 Replacement Parts List

The following tables contain some of the items that may need to be replaced in these displays over a period of time. Many of the parts within the display also list their part numbers on labels affixed to them.

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

Part Description	Part Number
Controller II, 48x168, Louvered Galaxy	0A-1229-0001
Module, 2R2G2B (1:1) 8x8 (30x70) Type 1	0A-1208-2552
Power Supply Assembly, 2 A-1633, 1 A-1591	0A-1241-4001 and 0A-1213-4034
Thermostat Enclosure 85-70-9L	0A-1213-4024
Light Level Detector;	0A-1241-4013
Filter; Air, Gasket, 7.50" x 13.50" x .88"	EN-1774
Fan; 250CFM, 115VAC, 0.65A, 5.84x6.0"	B-1019
Transformer; Pri 115V, Sec 10VCT@3A (120V Displays)	T-1119
Filter, RFI Line 10 AMP 120 VAC	Z-1007
Fan Finger Guard (for B-1019 fan)	HS-1130
Modem Board; 232 Coated	0P-1146-0003
Fiber Board; RS232 to Fiber, 12V	0P-1127-0024
Cable; 18" RJ11; 6-Cond., Straight	0A-1137-0160
Signal Converter (RS232/RS422)	0A-1127-0237
Signal Converter (RS232/Fiber)	0A-1127-0239
Manual; Venus 1500 Operator's, Version 3.0	ED13530
Ribbon Cable; 40 Cond. 30 AWG 18" (Controller to Module, Module to Module)	W-1412
Ribbon Cable Assy; 40 Pos, 66"	W-1439
Ribbon Cable Assy; 40 Pos, 36"	W-1423
Cable; 22 AWG (Light Sensor/Temp Sensor to Controller)	W-1234
Flipped PC Connector; DB9F/RJ11F	0A-1146-0029
Digital Temp Sensor	0P-1247-0002
Electrical Contact Cleaner Lubricant / Cal-Lube	CH-1019
Hex Wrench, T-Handle 1/8" RT	TH-1062

4.12 Daktronics Exchange and Repair and Return Programs

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

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

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

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

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

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

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

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

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

Packaging for Return: Package and pad the item well 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: 866-343-3122 (toll free)
or 605-697-4034

Fax: 605-697-4444

Appendix A: Signal Converter

The following table gives the typical state of the signal converter when the LEDs are either on or off. Refer to **Figure 41** below for an illustration of the signal converters and the locations of the various components.

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

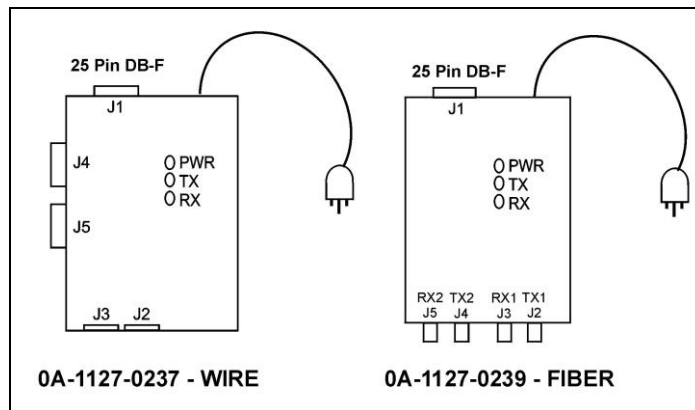


Figure 39: Signal Converters

0A-1127-0237 – Wire

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

J2 and J3 - RJ/11	
PIN	OPERATION
1	GND
2	TX-N (out)
3	TX-P (out)
4	RX-N (in)
5	RX-P (in)
6	GND

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

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

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

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

J2 and J3	OR	J4 and J5
TX-N to RX-N		RX-P to TX-P
TX-P to RX-P		RX-N to TX-N

0A-1127-0239 – Fiber

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

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

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

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

J2 and J3 or J4 and J5
TX to RX

Serial Cable (W-1249)

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

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

Serial Adaptor (A-1603)

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

Appendix B: 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.)

Power Specs, 8x48 – 48x144 Display, RGB	Drawing A-148571
Assy, Power Supply A-1633 @2, A-1591.....	Drawing A-148636
Power Connection, AF-306X	Drawing A-154965
Assy, Power Box 2 Position.....	Drawing A-155736
Comp. Layout Diagram; AF-3165-8-32x48-34-RGB	Drawing A-172652
Comp. Layout Diagram; AF-3165-40-48x48-34-RGB	Drawing A-172655
Comp. Layout Diagram; AF-3165-8-32x64-34-RGB	Drawing A-172657
Comp. Layout Diagram; AF-3165-40-48x64-34 RGB	Drawing A-172658
Comp. Layout Diagram; AF-3165-8-32x80-34-RGB	Drawing A-172660
Comp. Layout Diagram; AF-3165-40-48x80-34-RGB	Drawing A-172662
Comp. Layout Diagram; AF-3165-8-32x96-34-RGB	Drawing A-172667
Comp. Layout Diagram; AF-3165-40-48x96-34-RGB	Drawing A-172669
Comp, Layout Diagram; AF-3165-8-32x112-34-RGB	Drawing A-172674
Comp. Layout Diagram; AF-3165-40-48x112-34-RGB	Drawing A-172679
Comp. Layout Diagram; AF-3165-8-32x128-34-RGB	Drawing A-172680
Comp. Layout Diagram; AF-3165-40-48x128-34-RGB	Drawing A-172682
Comp. Layout Diagram; AF-3165-8-32x144-34-RGB	Drawing A-172684
Comp. Layout Diagram; AF-3165-40-48x144-34-RGB	Drawing A-172687
Comp. Layout Diagram Symbols;	Drawing A-172691
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
System Riser Diagram; QC Outdoor Radio, V1500	Drawing A-177006
Controller, Galaxy, 8 Conn, J1256	Drawing B-165246
Shop Drawing, AF-3165-8-32 High-34-RGB	Drawing B-172745
Shop Drawing, AF-3165-40-48 High-34-RGB	Drawing B-172746
Schematic, Signal Wiring Internal	Drawing B-175387
Schematic, AF-3165-16/32/48/64X***-9.....	Drawing C-172459
Schematic, AF-3165-40X***-9	Drawing C-172535

34mm LOUVERED RGB GALAXY DISPLAYS POWER SPECIFICATION CHART

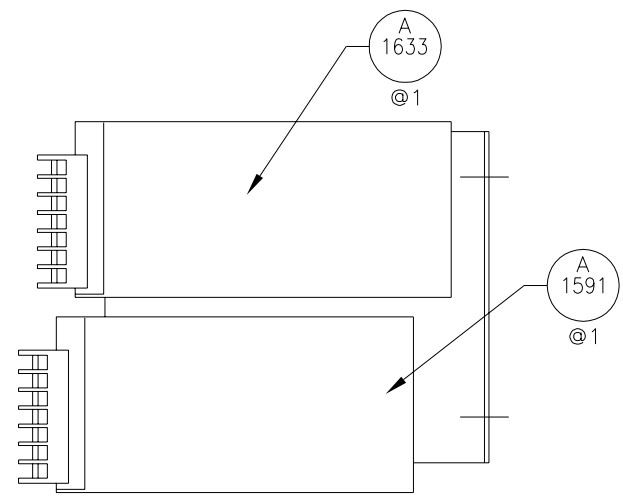
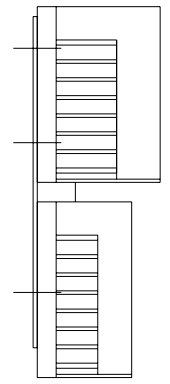
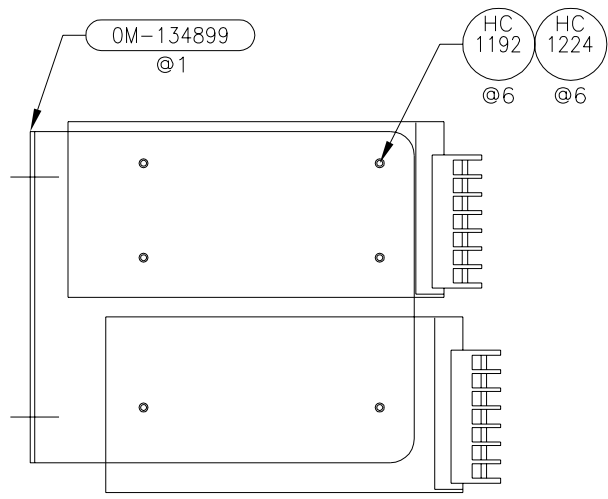
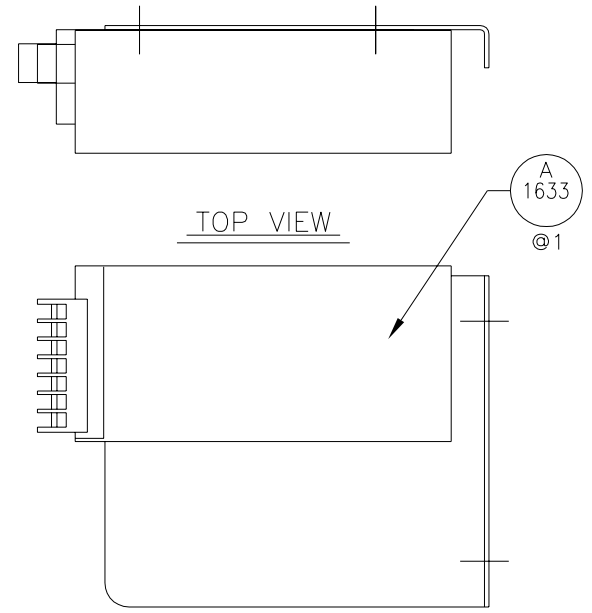
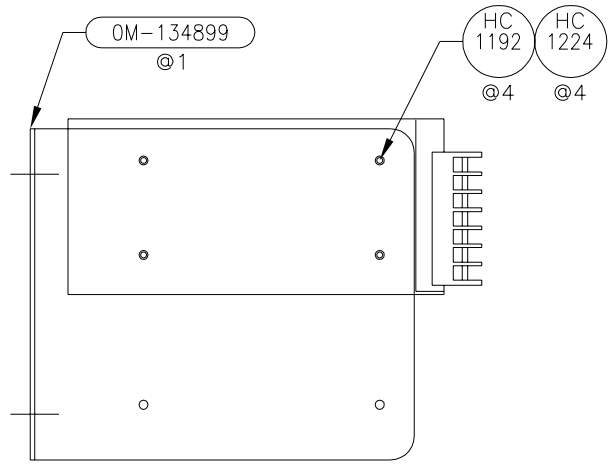
MATRIX SIZE	TOTAL WATTS	120V AMPS	120/240 3, wire		240V AMPS
			LINE 1 AMPS	LINE 2 AMPS	
8X48	363	3.02	NOTE: 120/240 VAC, 3 WIRE PLUS GND. IS NOT AVAILABLE ON THESE DISPLAY SIZES.		1.51
8X64	458	3.82			1.91
8X80	553	4.61			2.31
8X96	649	5.41			2.70
8X112	816	6.80			3.40
8X128	911	7.59			3.80
8X144	1006	8.39			4.19
16X48	649	5.41			2.23
16X64	839	6.99	3.82	3.18	3.50
16X80	1102	9.18	4.41	4.77	4.59
16X96	1292	10.77	4.41	6.36	5.38
16X112	1483	12.36	6.00	6.36	6.18
16X128	1674	13.95	7.59	6.36	6.97
16X144	1936	16.13	8.19	7.95	8.07
24X48	1006	8.39	3.62	4.77	4.19
24X64	1292	10.77	6.00	4.77	5.38
24X80	1650	13.75	6.60	7.15	6.87
24X96	1936	16.13	8.98	7.15	8.07
24X112	2294	19.11	9.58	9.54	9.56
24X128	2580	21.50	11.96	9.54	10.75
24X144	2937	24.48	12.56	11.92	12.24
32X48	1292	10.77	4.41	6.36	5.38
32X64	1674	13.95	7.59	6.36	6.97
32X80	2127	17.72	8.19	9.54	8.86
32X96	2508	20.90	8.19	12.71	10.45
32X112	2961	24.68	11.96	12.71	12.34
32X128	3343	27.85	15.14	12.71	13.93
32X144	3795	31.63	15.74	15.89	15.81
40X48	1650	13.75	5.80	7.95	6.87
40X64	2198	18.32	10.37	7.95	9.16
40X80	2747	22.89	10.97	11.92	11.44
40X96	3295	27.46	13.95	13.51	13.73
40X112	3843	32.03	16.13	15.89	16.01
40X128	4391	36.60	20.70	15.89	18.30
40X144	4940	41.16	21.30	15.89	20.58
48X48	1936	16.13	6.60	9.54	8.07
48X64	2580	21.50	11.96	9.54	10.75
48X80	3223	26.86	12.56	14.30	13.43
48X96	3867	32.22	13.15	19.07	16.11
48X112	4511	37.59	18.52	19.07	18.79
48X128	5154	42.95	23.88	19.07	21.48
48X144	5798	48.32	24.48	23.84	24.16

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). 240VAC (2 WIRE + GND) SERVICES (TYPICAL OVERSEAS), REQUIRE BREAKERS DESIGNED FOR SUCH USE. * WHERE 2 WIRE + GND SYSTEMS ARE USED, LINE 1 AND LINE 2 TERMINALS NEED TO BE CONNECTED BY FIELD INSTALLED JUMPER. JUMPER SIZED PER NEC.

DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: 34MM			
TITLE: POWER SPECS, 8X48-48X144 DISPLAY, RGB			
DES. BY: LKERR		DRAWN BY: JSPAHR	
DATE: 10 MAY 01			
REVISION	APPR. BY:		
	SCALE:	1=1	1241-R10A-148571

REV.	DATE	DESCRIPTION	BY	APPR.

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



REAR VIEW

LEFT SIDE

FRONT VIEW

NOTES:

THIS IS ONE ASSEMBLY. IT CONSISTS OF 2 PLATES. ONE PLATE HAS 2 P.S. THE OTHER HAS 1 P.S. THE 2 PLATES CAN MOUNT IN DIFFERENT LOCATIONS IN THE CABINET. THE POWER SUPPLIES ARE CONNECTED TOGETHER BY A HARNESS.

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DAKTRONICS, INC. BROOKINGS, SD 57006

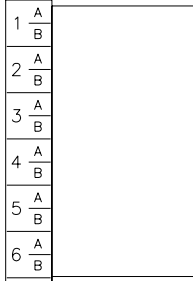
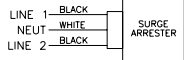
PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: ASSY, POWER SUPPLY A-1633 @2, A-1591

DES. BY: MMAMMENGA DRAWN BY: MMAMMENGA DATE: 25JUL02

REVISION	APPR. BY:	1241-E10A-148636
SCALE:	1=4	

HOOK UP THE WIRES FROM THE SURGE ARRESTER DURING PRODUCT INSTALLATION ACCORDING TO THIS DIAGRAM:

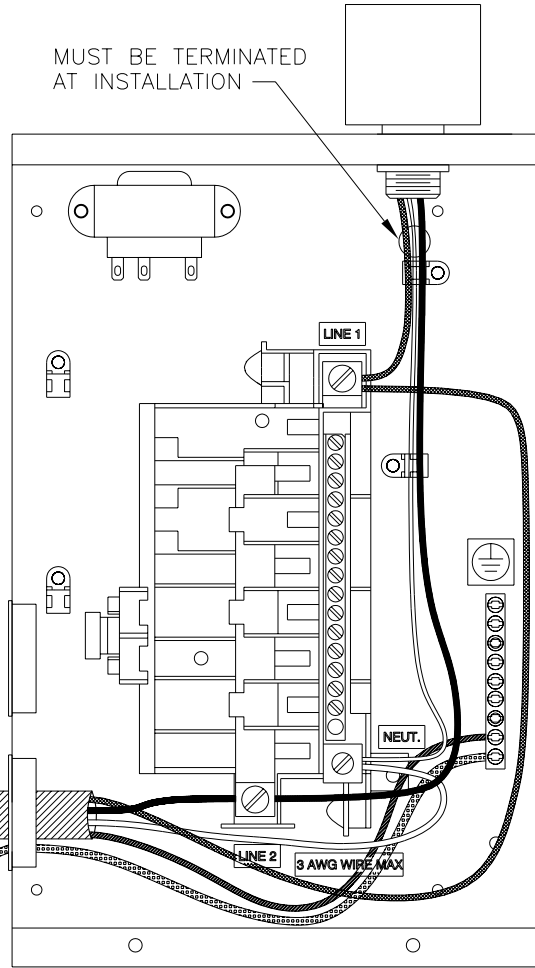


0

0

FRONT VIEW
(COVER)

ALL ELECTRICAL WORK (INCLUDING GROUNDING) MUST BE DONE ACCORDING TO LOCAL AREA AND THE NATIONAL ELECTRICAL CODES.



LINE 1
LINE 2
NEUTRAL
GROUND

TO DISPLAY GROUND ELECTRODE

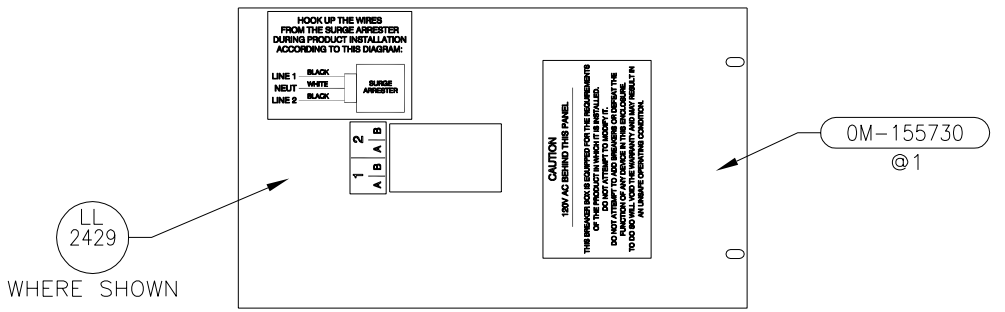
NOTE 1: IF DISPLAY IS POWERED WITH 120VAC SINGLE PHASE (TWO WIRE + GND), INSTALL A JUMPER BETWEEN LUG(LINE 1) AND LUG(LINE 2). SIZE JUMPER PER NEC.

DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: GALAXY, LOUVERED V1500 RGB 34MM			
TITLE: POWER CONNECTION, AF-306X			
DES. BY:	DRAWN BY: DMATHERN	DATE: 22AUG01	
REVISION	APPR. BY:	1241-R01A-154965	
	SCALE: NONE		

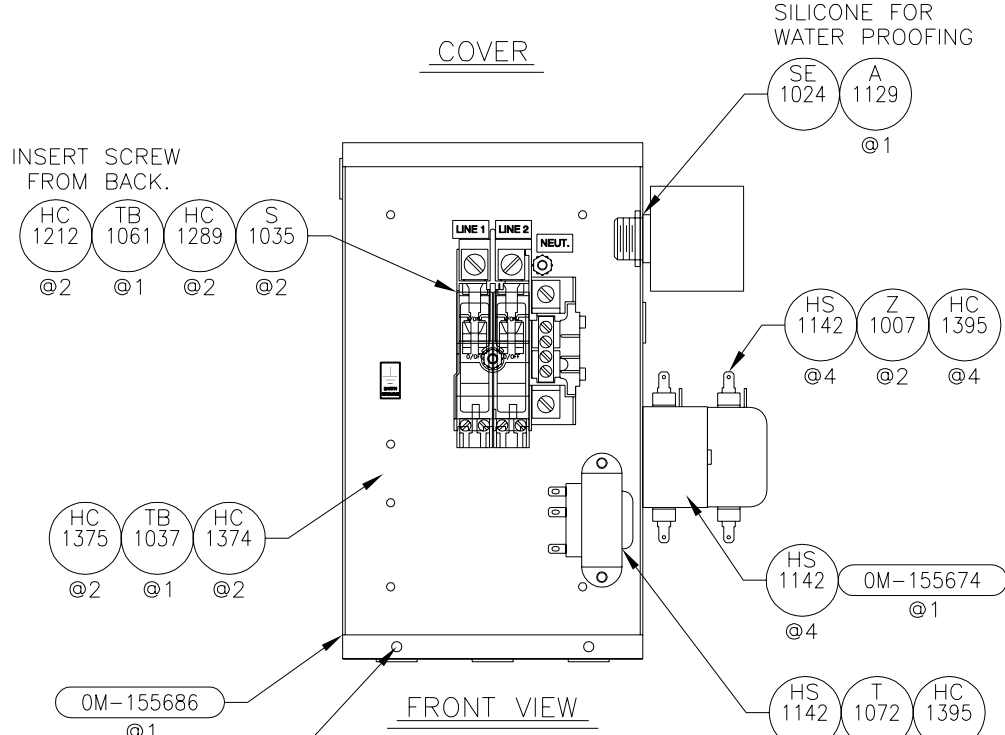
REV.	DATE	DESCRIPTION	BY	APPR.

REV.	DATE	DESCRIPTION	BY	APPR.
02	09 OCT 01	REMOVED HC-1021 ADDED HC-1012 PER ECO 31094	MJM	MDM
01	12SEP01	MOVED TRANSFORMER IN FROM EDGE OF BOX 0.1"	MDM	MDM

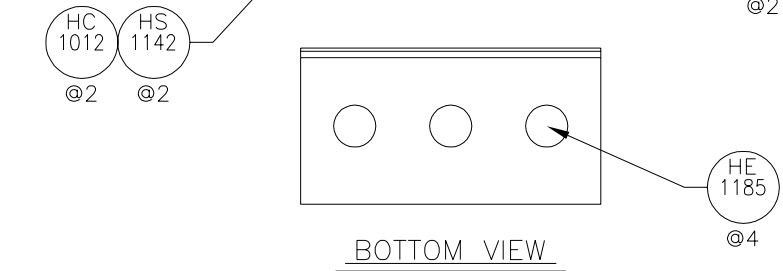
DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ.:	GALAXY, LOUVERED V1500 RGB 34MM
TITLE:	ASSY, POWER BOX 2 POSITION
DES. BY:	MAMMANGA
DRAWN BY:	BBENNING
DATE:	07SEP01
REVISION	APPR. BY:
SCALE:	1 = 4
1241E10A-155736	



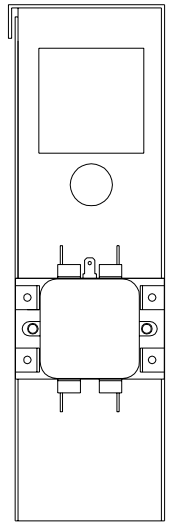
COVER



FRONT VIEW



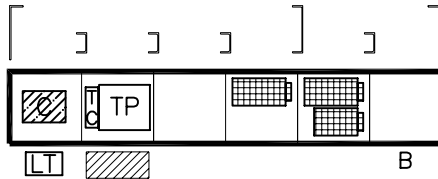
BOTTOM VIEW



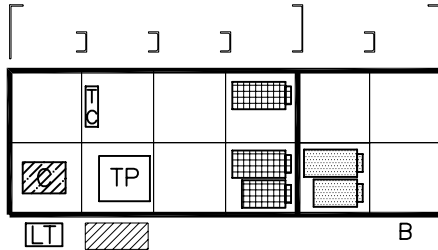
SIDE VIEW

NOTES:

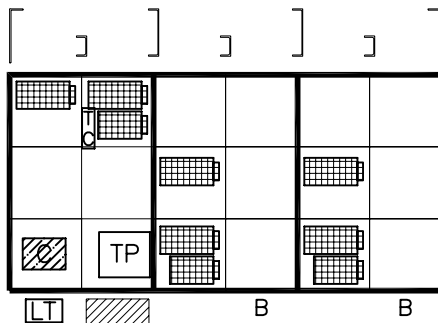
1. FROM THE FRONT VIEW AS SHOWN, Z1 IS THE LEFT FILTER, (Z-1007).
2. GROUND TERMINAL IS UP ON Z-1007.



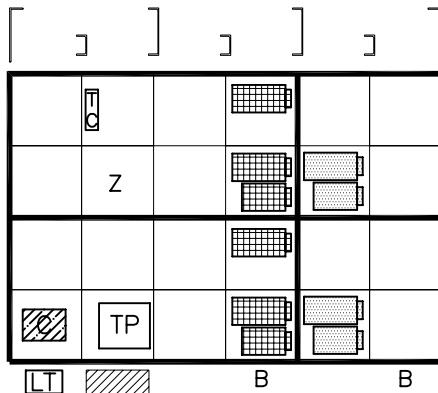
FRONT VIEW
AF-3165-848-34-RGB



FRONT VIEW
AF-3165-1648-34-RGB



FRONT VIEW
AF-3165-2448-34-RGB



FRONT VIEW
AF-3165-3248-34-RGB

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: COMP. LAYOUT; AF-3165-8/16/24/32X48-34-RGB

DES. BY: MMAMMENGA

DRAWN BY: WTUCKER

DATE: 22OCT2002

REVISION

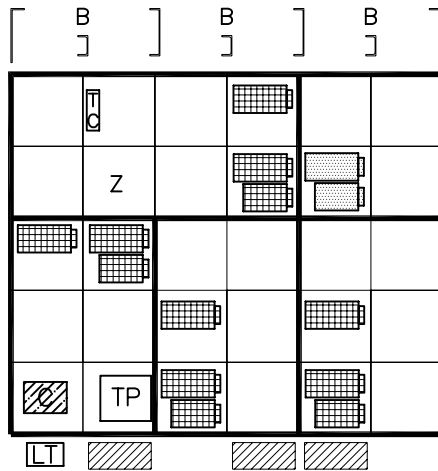
APPR. BY:

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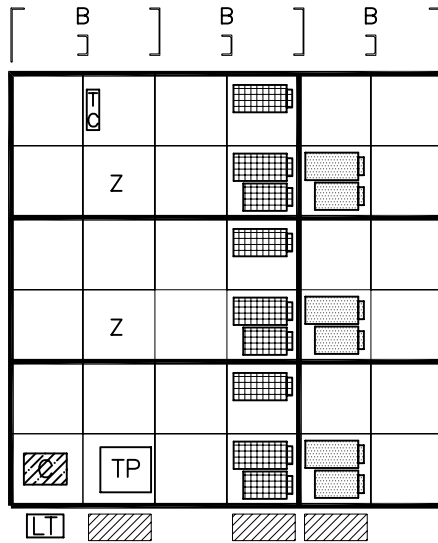
SCALE: NONE

1241-E10A-172652

01	31MAR03	UPDATED LAYOUT	MLS	
REV.	DATE	DESCRIPTION	BY	APPR.



FRONT VIEW
AF-3165-4048-34-RGB



FRONT VIEW
AF-3165-4848-34-RGB

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: COMP. LAYOUT; AF-3165-40/48X48-34-RGB

DES. BY: MMAMMENGA

DRAWN BY: WTUCKER

DATE: 22OCT2002

REVISION

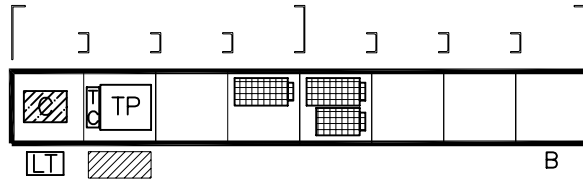
APPR. BY:

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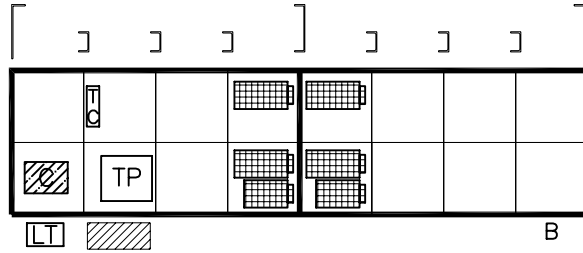
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1241-E10A-172655

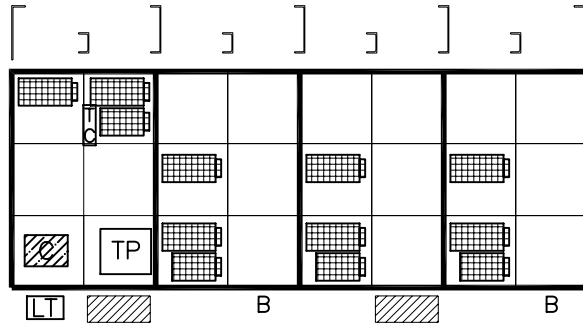
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REV.	DATE	DESCRIPTION	BY	APPR.



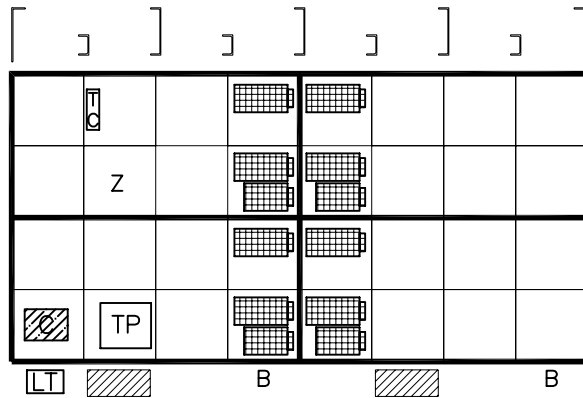
FRONT VIEW
AF-3165-864-34-RGB



FRONT VIEW
AF-3165-1664-34-RGB



FRONT VIEW
AF-3165-2464-34-RGB



FRONT VIEW
AF-3165-3264-34-RGB

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: COMP. LAYOUT; AF-3165-8/16/24/32X64-34-RGB

DES. BY: MMAMMENGA

DRAWN BY: WTUCKER

DATE: 22OCT2002

REVISION

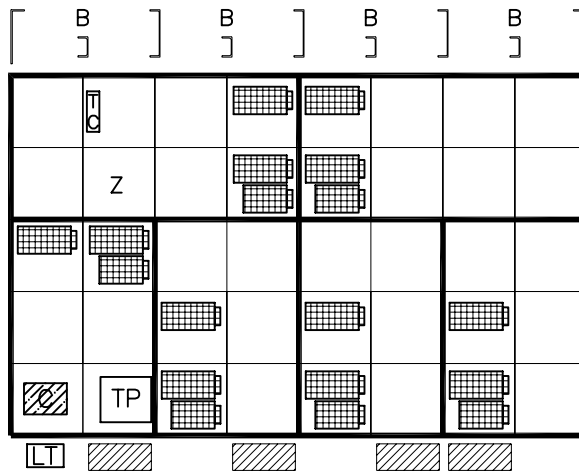
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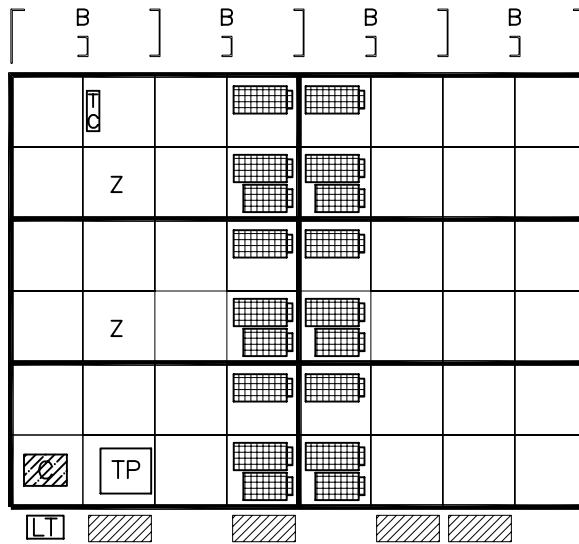
1241-E10A-172657

01	31 MAR 03	UPDATED DRAWING	MLS	
REV.	DATE	DESCRIPTION	BY	APPR.



FRONT VIEW

AF-3165-4064-34-RGB



FRONT VIEW

AF-3165-4864-34-RGB

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: COMP. LAYOUT; AF-3165-40/48X64-34-RGB

DES. BY: MMAMMENGA

DRAWN BY: WTUCKER

DATE: 22OCT2002

REVISION

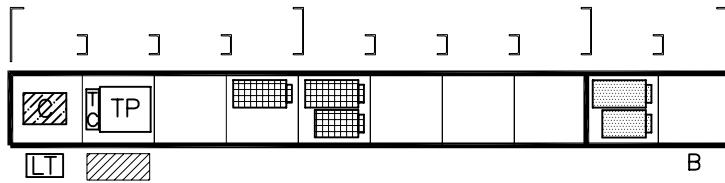
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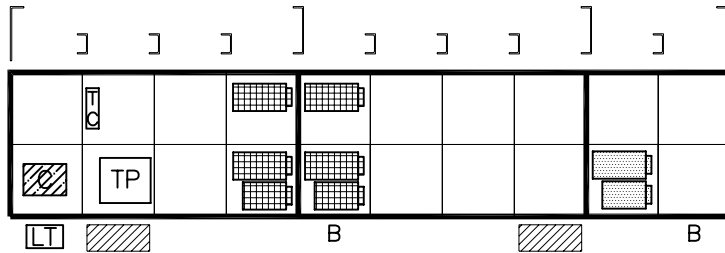
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1241-E10A-172658

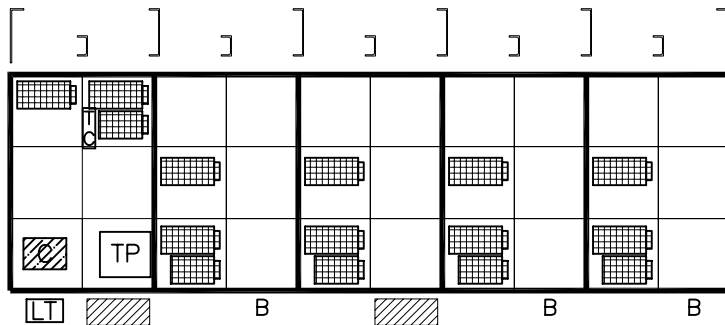
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REV.	DATE	DESCRIPTION	BY	APPR.



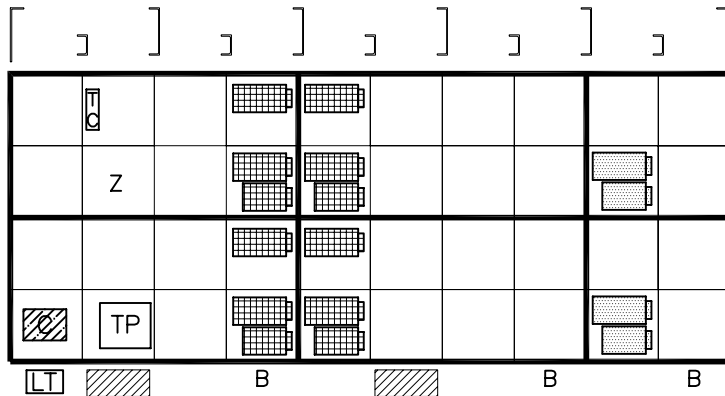
FRONT VIEW
AF-3165-880-34-RGB



FRONT VIEW
AF-3165-1680-34-RGB



FRONT VIEW
AF-3165-2480-34-RGB



FRONT VIEW
AF-3165-3280-34-RGB

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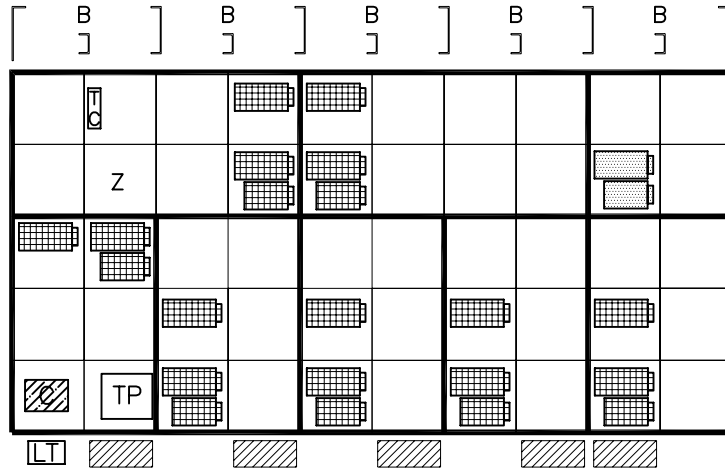
PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: COMP. LAYOUT; AF-3165-8/16/24/32X80-34-RGB

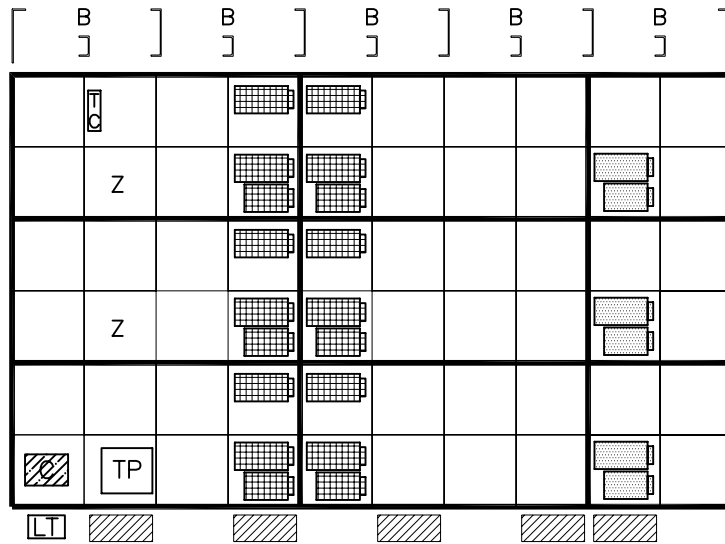
DES. BY: MMAMMENGA DRAWN BY: WTUCKER DATE: 22OCT2002

REVISION	APPR. BY:	1241-E10A-172660
01	SCALE: NONE	

01	31MAR03	UPDATED LAYOUT	MLS	
REV.	DATE	DESCRIPTION	BY	APPR.



FRONT VIEW
AF-3165-4080-34-RGB



FRONT VIEW
AF-3165-4880-34-RGB

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: COMP. LAYOUT; AF-3165-40/48X80-34-RGB

DES. BY: MMAMMENGA

DRAWN BY: WTUCKER

DATE: 22OCT2002

REVISION

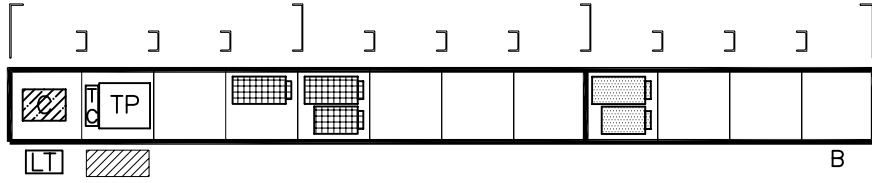
APPR. BY:

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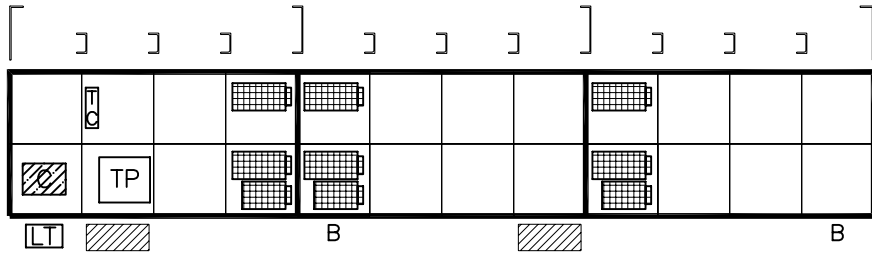
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1241-E10A-172662

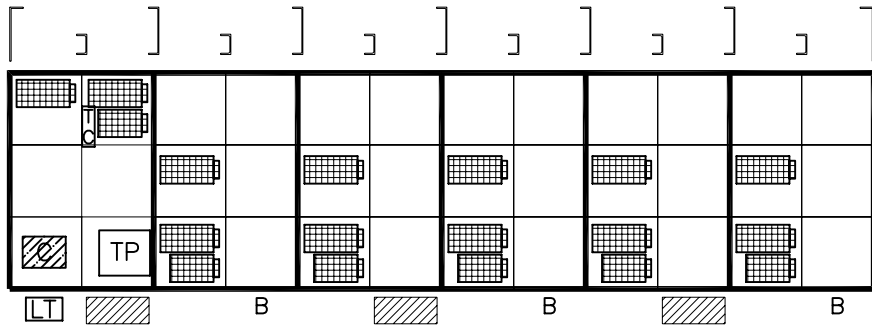
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REV.	DATE	DESCRIPTION	BY	APPR.



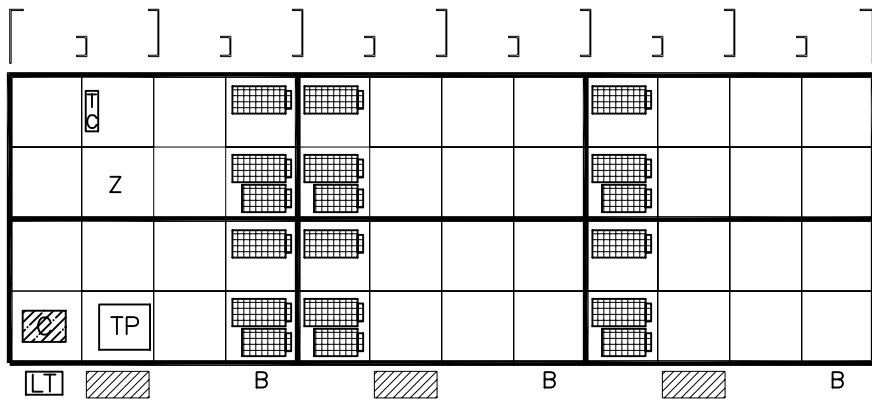
FRONT VIEW
AF-3165-896-34-RGB



FRONT VIEW
AF-3165-1696-34-RGB



FRONT VIEW
AF-3165-2496-34-RGB



FRONT VIEW
AF-3165-3296-34-RGB

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: COMP. LAYOUT; AF-3165-8/16/24/32X96-34-RGB

DES. BY: MMAMMENGA

DRAWN BY: WTUCKER

DATE: 21OCT2002

REVISION

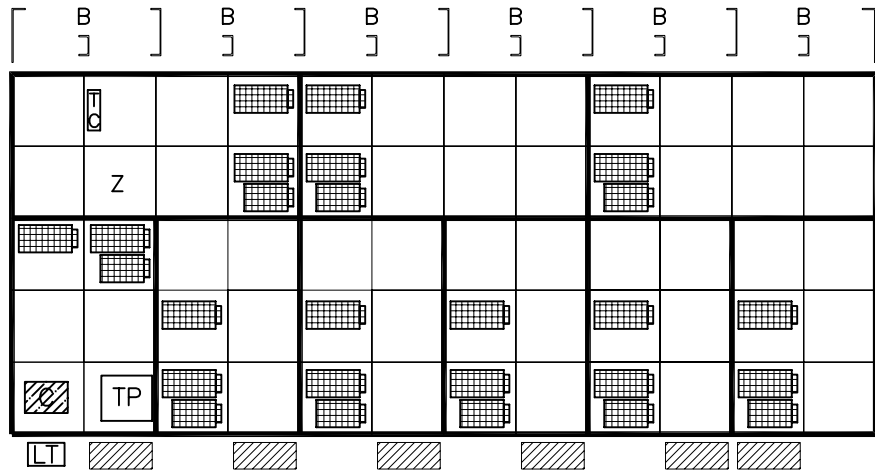
APPR. BY:

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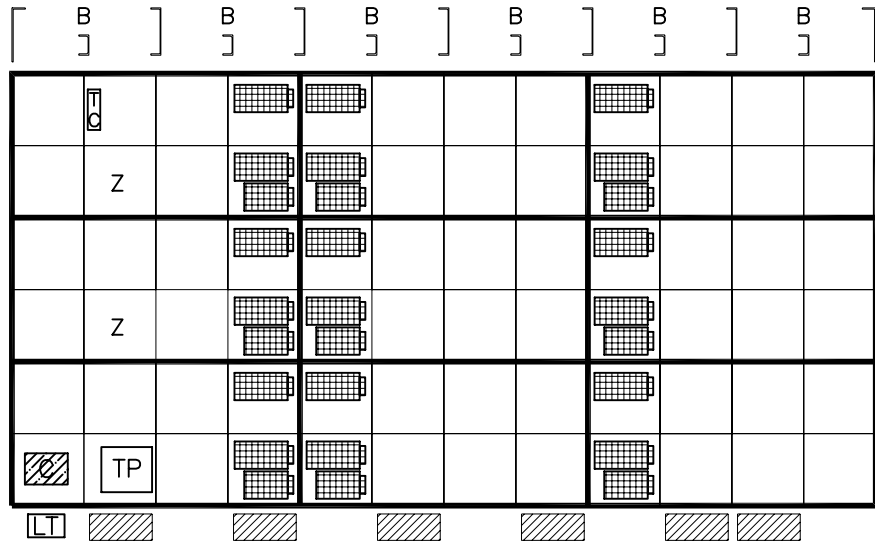
SCALE: NONE

1241-E10A-172667

01	31MAR03	UPDATED LAYOUT	MLS	
REV.	DATE	DESCRIPTION	BY	APPR.



FRONT VIEW
AF-3165-4096-34-RGB



FRONT VIEW
AF-3165-4896-34-RGB

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: COMP. LAYOUT; AF-3165-40/48X96-34-RGB

DES. BY: MMAMMENGA

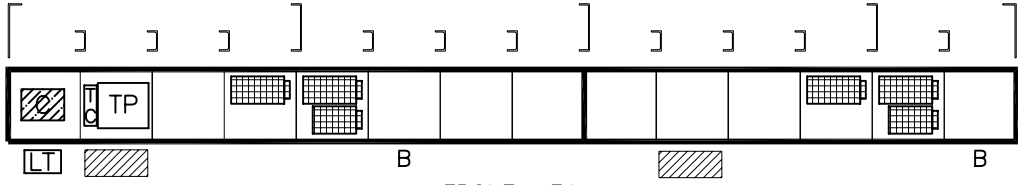
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DATE: 21OCT2002

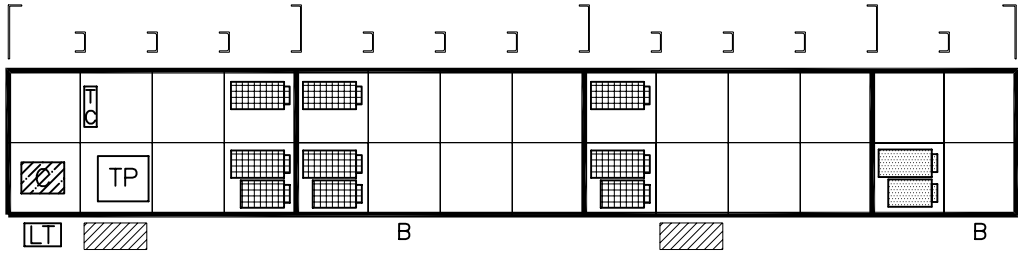
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REV.	DATE	DESCRIPTION	BY	APPR.

REVISION	APPR. BY:
01	NONE

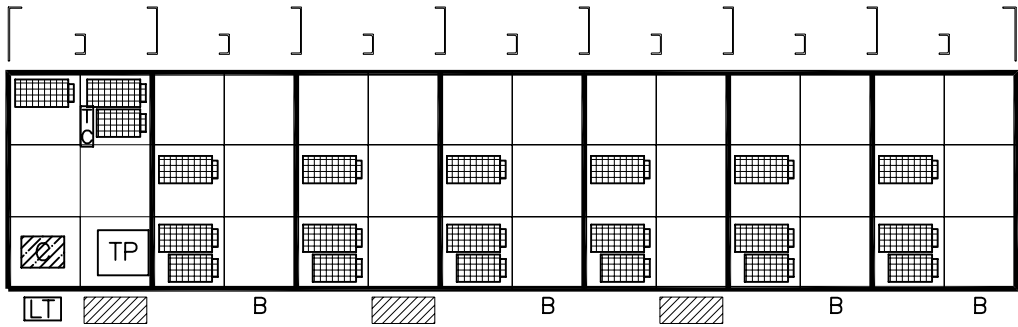
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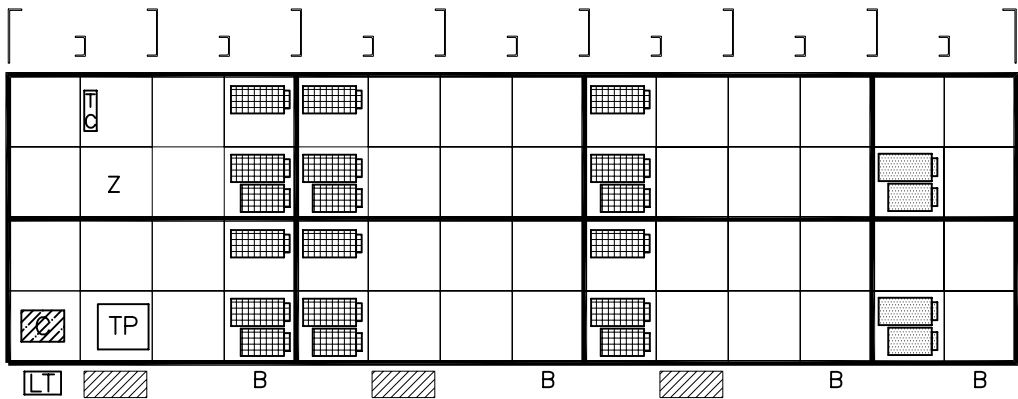
FRONT VIEW
AF-3165-8112-34-RGB



FRONT VIEW
AF-3165-16112-34-RGB



FRONT VIEW
AF-3165-24112-34-RGB



FRONT VIEW
AF-3165-32112-34-RGB

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: COMP. LAYOUT; AF-3165-8/16/24/32X112-34-RGB

DES. BY: MMAMMENGA

DRAWN BY: WTUCKER

DATE: 21OCT2002

REVISION

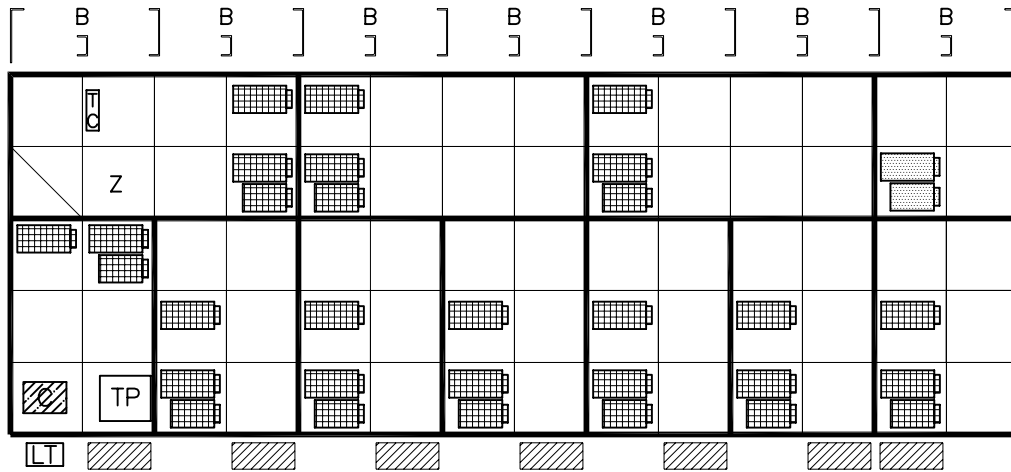
APPR. BY:

01

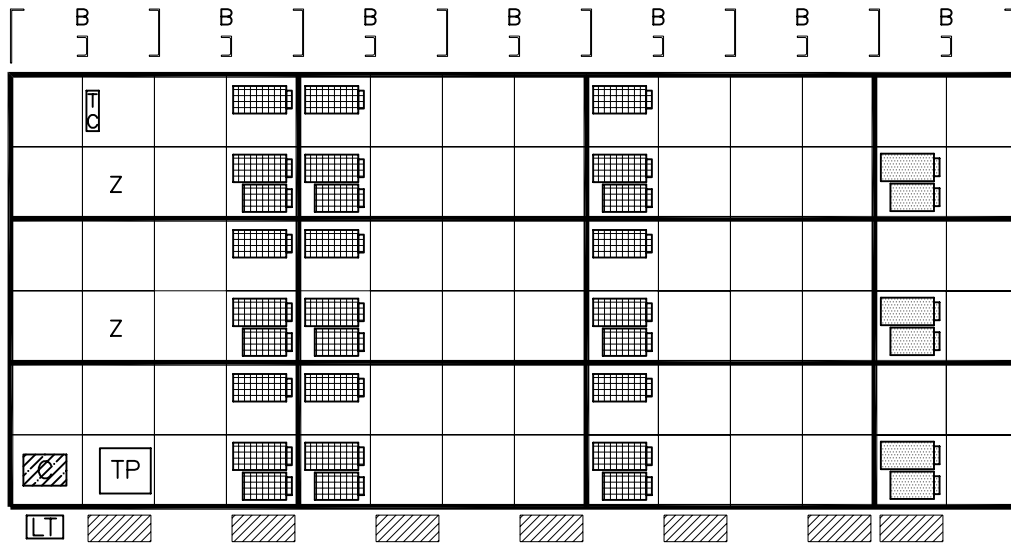
SCALE: NONE

1241-E10A-172674

01	31MAR03	UPDATED LAYOUT	MLS	
REV.	DATE	DESCRIPTION	BY	APPR.



FRONT VIEW
AF-3165-40112-34-RGB



FRONT VIEW
AF-3165-48112-34-RGB

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: COMP. LAYOUT; AF-3165-40/48X112-34-RGB

DES. BY: MMAMMENGA

DRAWN BY: WTUCKER

DATE: 21OCT2002

REVISION

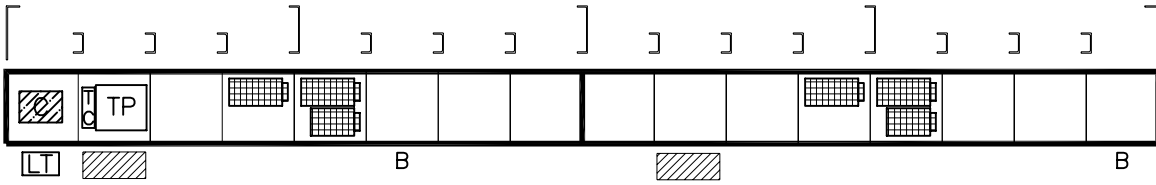
APPR. BY:

01

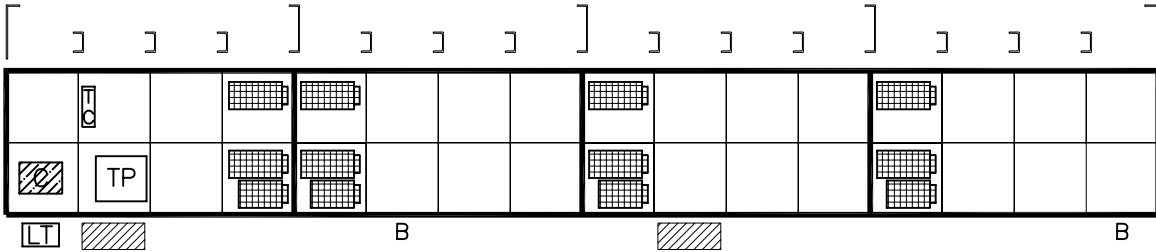
SCALE: NONE

1241-E10A-172679

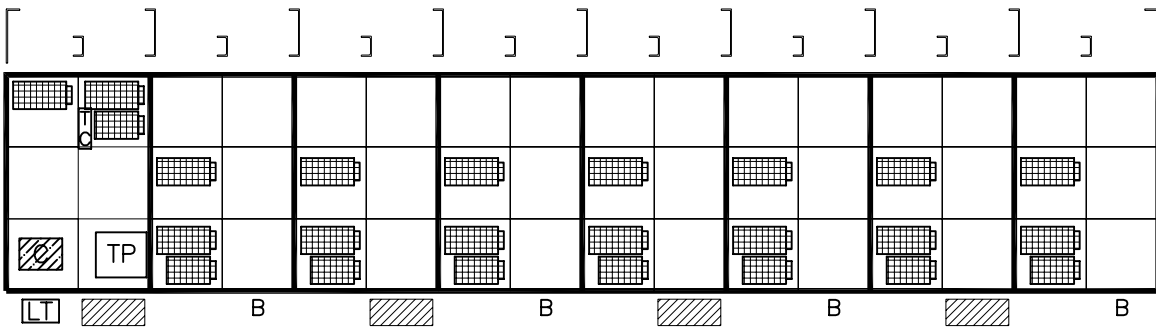
01	31MAR03	UPDATED LAYOUT	MLS	
REV.	DATE	DESCRIPTION	BY	APPR.



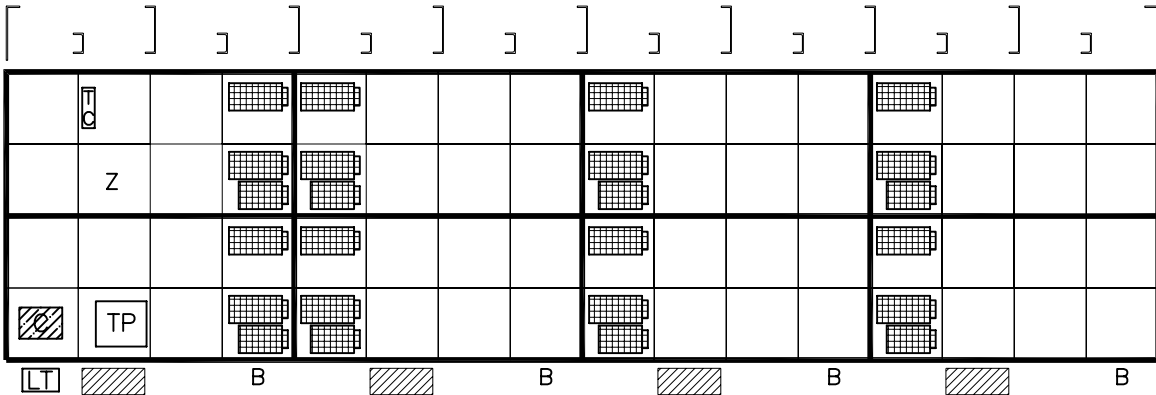
FRONT VIEW
AF-3165-8128-34-RGB



FRONT VIEW
AF-3165-16128-34-RGB



FRONT VIEW
AF-3165-24128-34-RGB



FRONT VIEW
AF-3165-32128-34-RGB

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: COMP. LAYOUT; AF-3165-8/16/24/32X128-34-RGB

DES. BY: MMAMMENGA

DRAWN BY: WTUCKER

DATE: 21OCT2002

REVISION

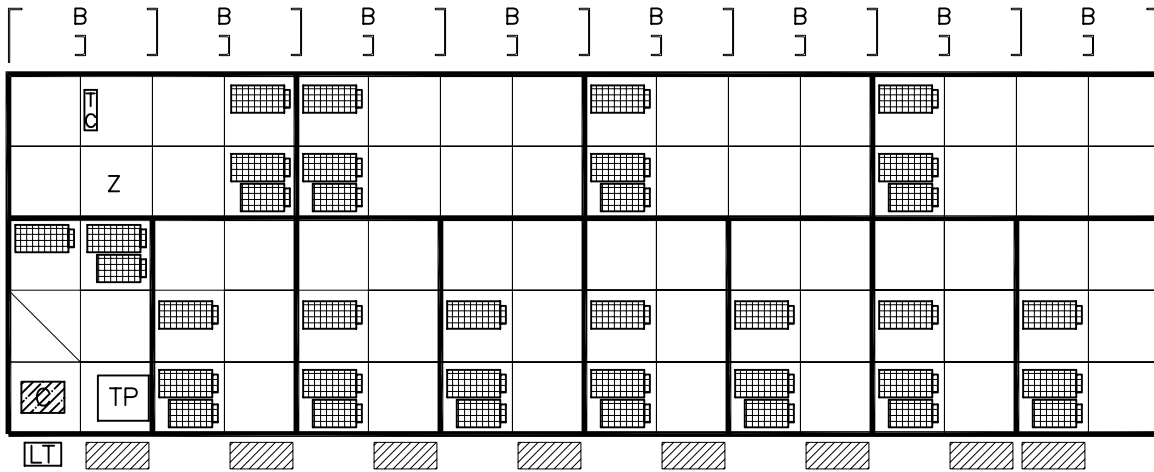
APPR. BY:

01

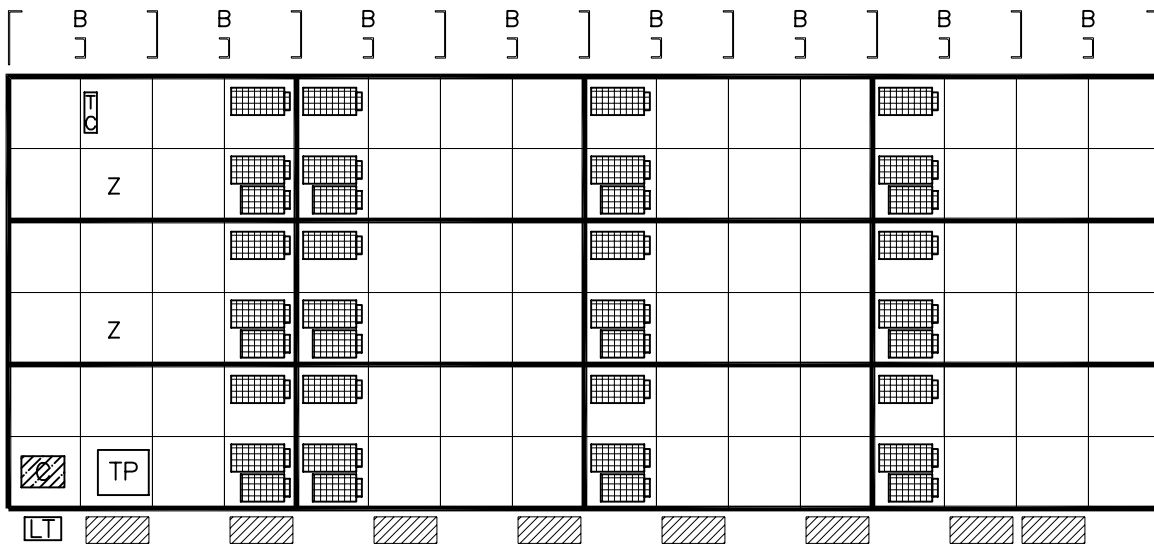
SCALE: NONE

1241-E10A-172680

01	31MAR03	UPDATED LAYOUT	MLS	
REV.	DATE	DESCRIPTION	BY	APPR.



FRONT VIEW
AF-3165-40128-34-RGB



FRONT VIEW
AF-3165-48128-34-RGB

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: COMP. LAYOUT; AF-3165-40/48X128-34-RGB

DES. BY: MMAMMENGA

DRAWN BY: WTUCKER

DATE: 21OCT2002

REVISION

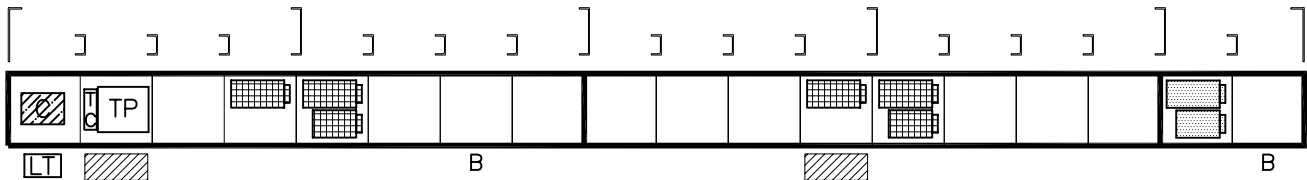
APPR. BY:

01

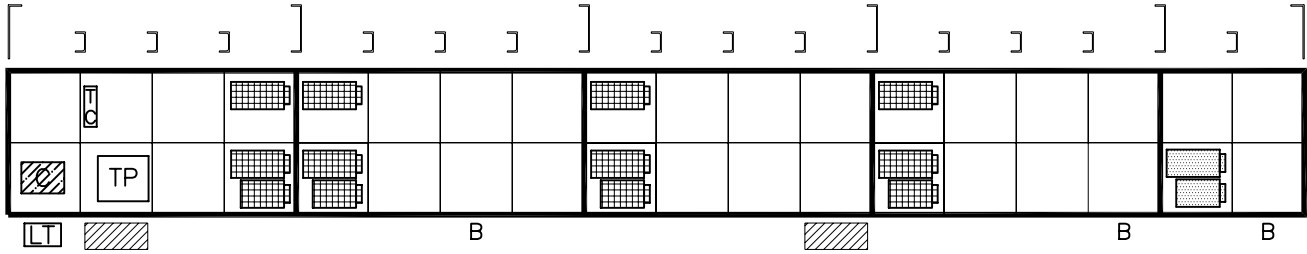
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1241-E10A-172682

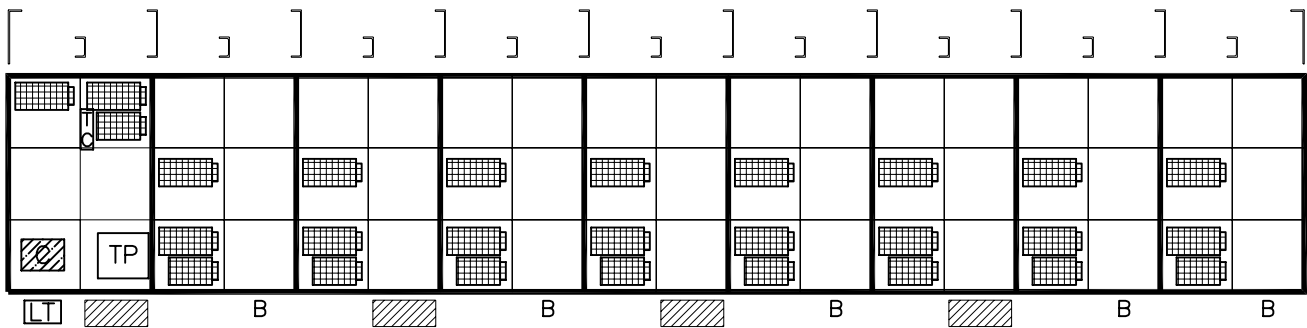
01	31MAR03	UPDATED LAYOUT	MLS	
REV.	DATE	DESCRIPTION	BY	APPR.



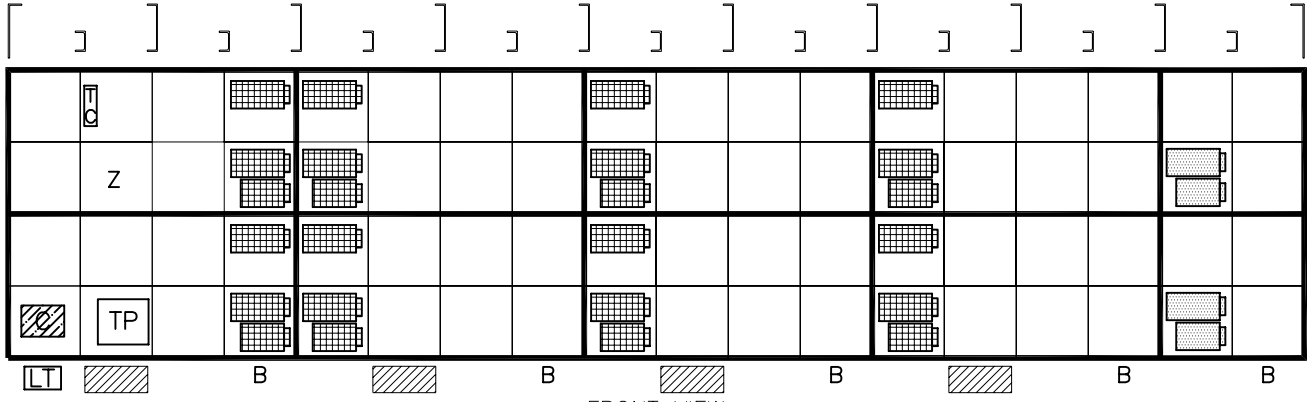
FRONT VIEW
AF-3165-8144-34-RGB



FRONT VIEW
AF-3165-16144-34-RGB



FRONT VIEW
AF-3165-24144-34-RGB



FRONT VIEW
AF-3165-32144-34-RGB

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: COMP. LAYOUT; AF-3165-8/16/24/32X144-34-RGB

DES. BY: MMAMMENGA

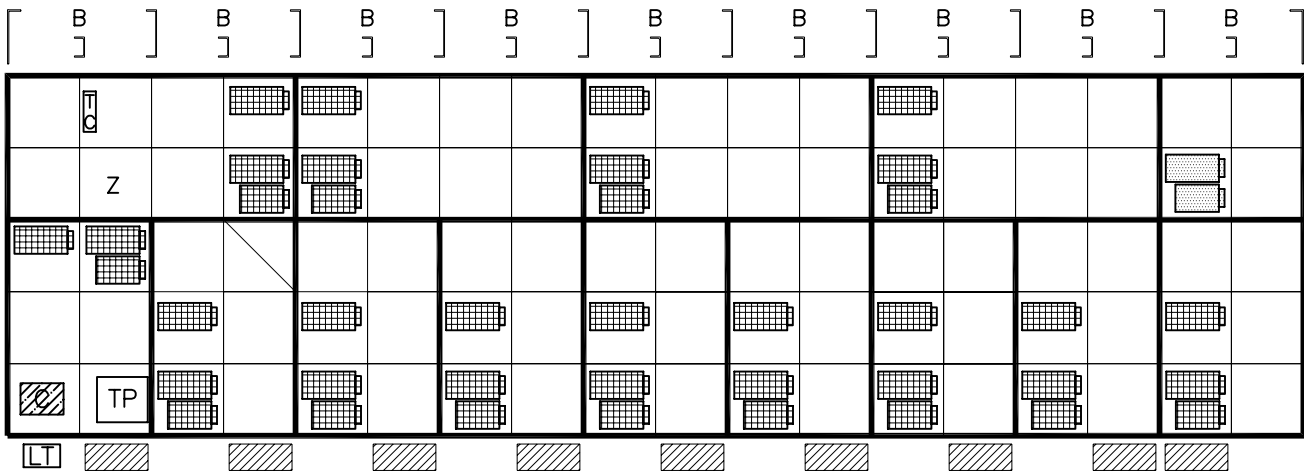
DRAWN BY: WTUCKER

DATE: 17OCT2002

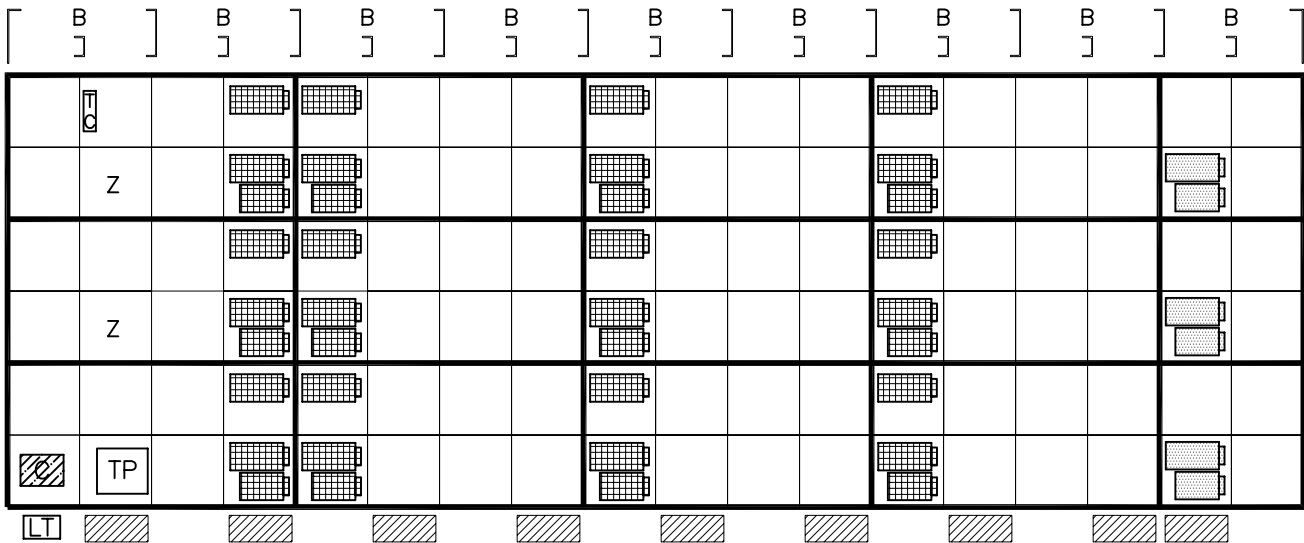
01	31MAR03	UPDATED LAYOUT	MLS	
REV.	DATE	DESCRIPTION	BY	APPR.

REVISION	APPR. BY:
01	SCALE: NONE

1241-E10A-172684



FRONT VIEW
AF-3165-40144-34-RGB



FRONT VIEW
AF-3165-48144-34-RGB

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 RGB 34MM

TITLE: COMP. LAYOUT; AF-3165-40/48X144-34-RGB

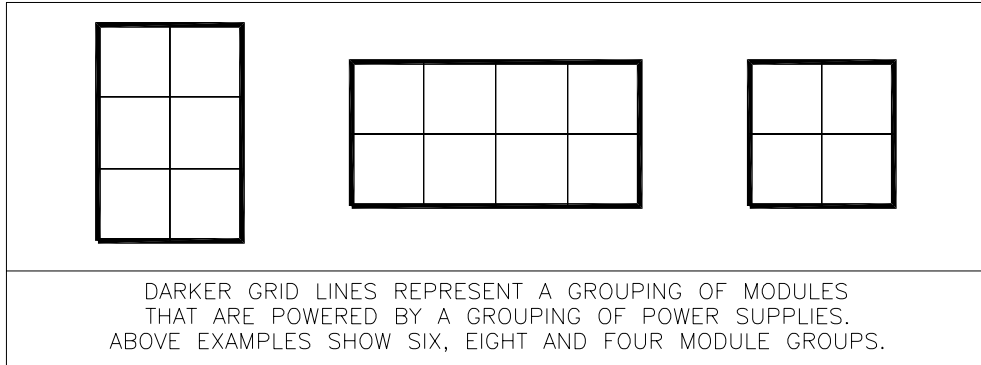
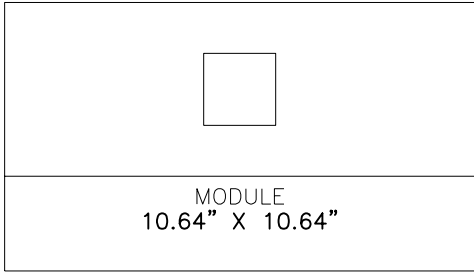
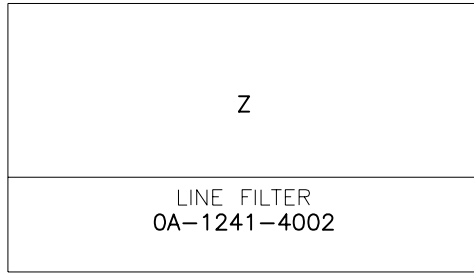
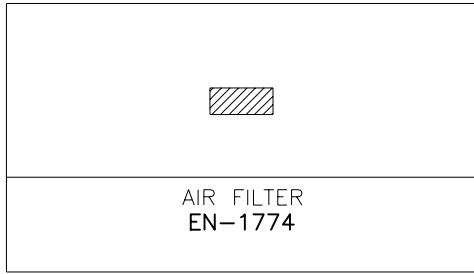
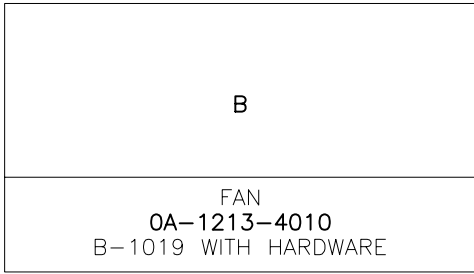
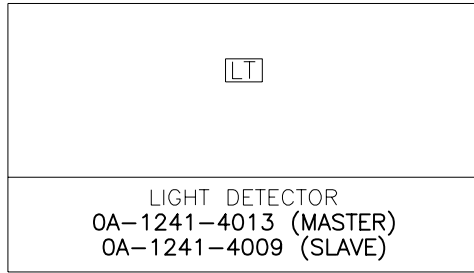
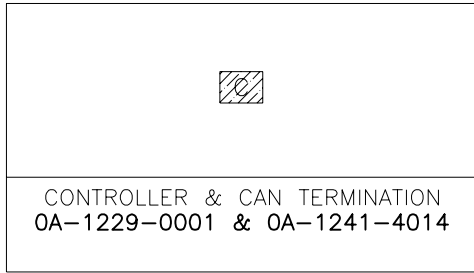
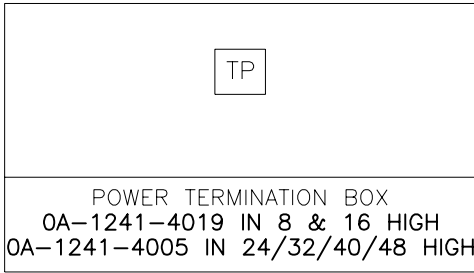
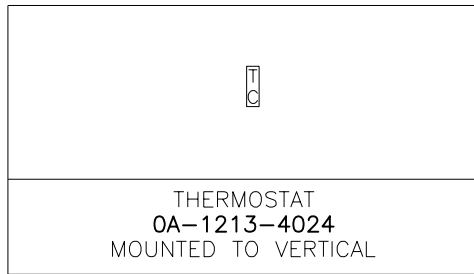
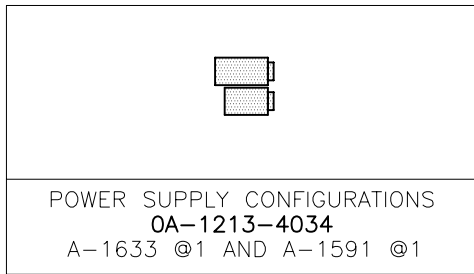
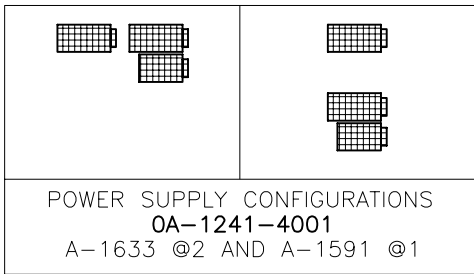
DES. BY: MMAMMENGA DRAWN BY: WTUCKER DATE: 21OCT2002

REVISION 01 APPR. BY: SCALE: NONE

1241-E10A-172687

01	31MAR03	UPDATED LAYOUT	MLS	
REV.	DATE	DESCRIPTION	BY	APPR.

REV.	01	31 MAR 03	UPDATED SYMBOLS PER LAYOUT UPDATES	BY	MJS	APPR.
			DESCRIPTION			

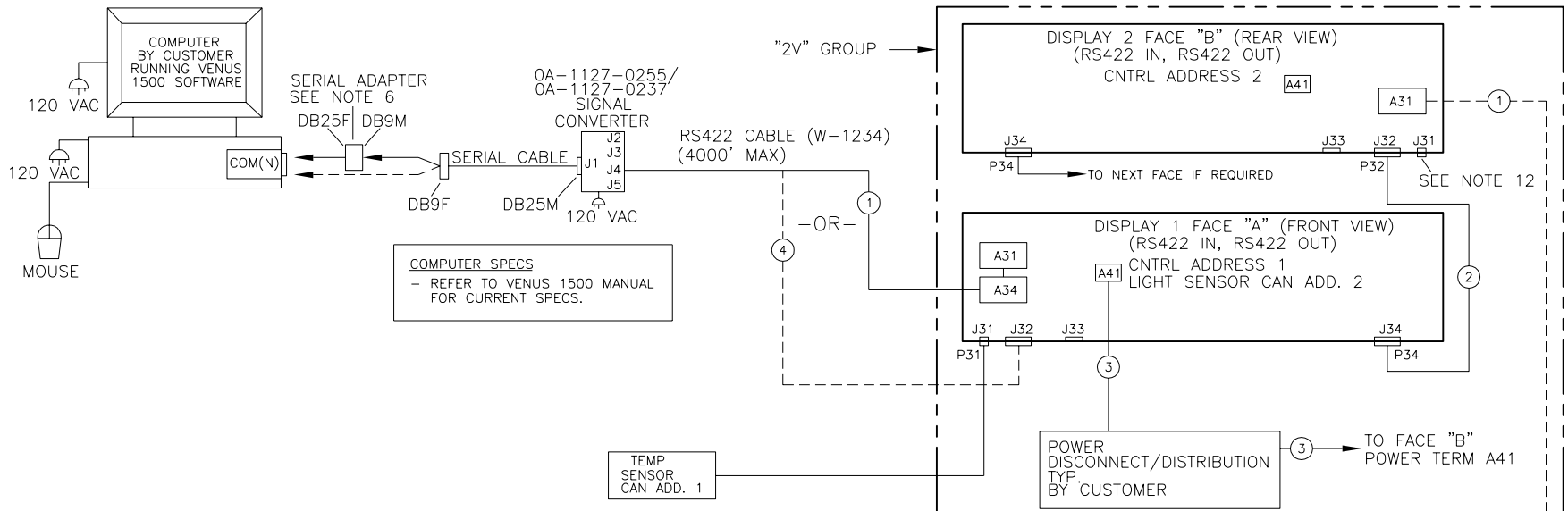


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PROJ: GALAXY, LOUVERED V1500 RGB 34MM
 TITLE: SYMBOLS, AF-3165 COMPONENT LAYOUT
 DES. BY: MMAMMENGA DRAWN BY: WTUCKER DATE: 22OCT2002
 REVISION 01 APPR. BY: DATE: 1241-E10A-172691
 SCALE: NONE

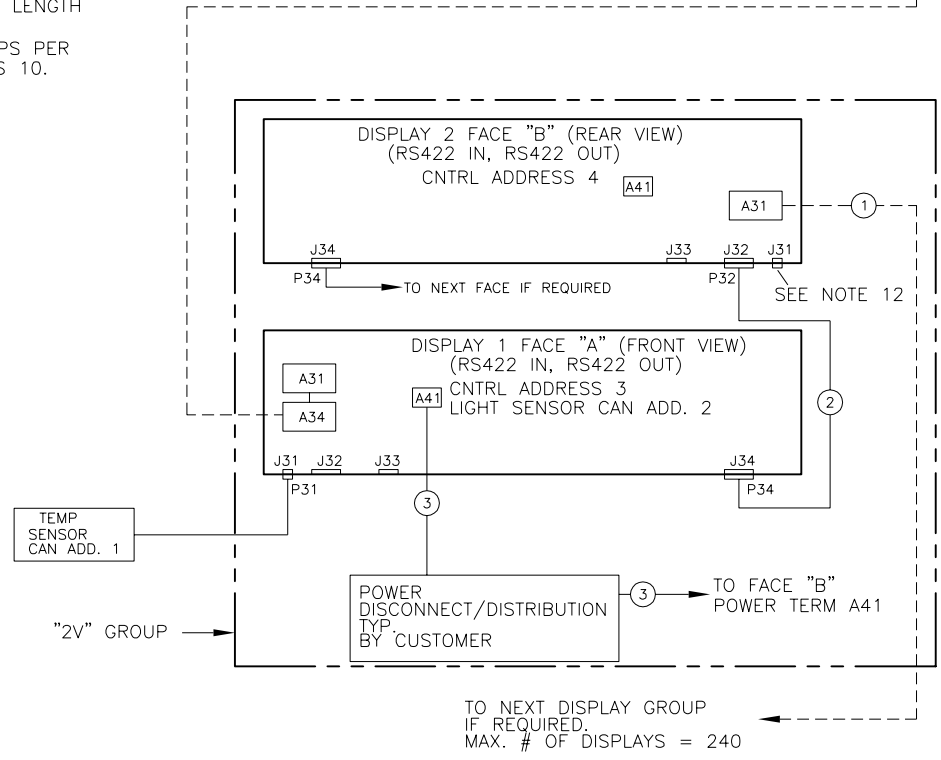
DAKTRONICS, INC. BROOKINGS, SD 57006

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.	DJM	
03	26 MAR 04	REPLACED OA-1127-0237 WITH OA-1127-0255 (INCLUDES SURGE PROTECTION)	SAI	DJM



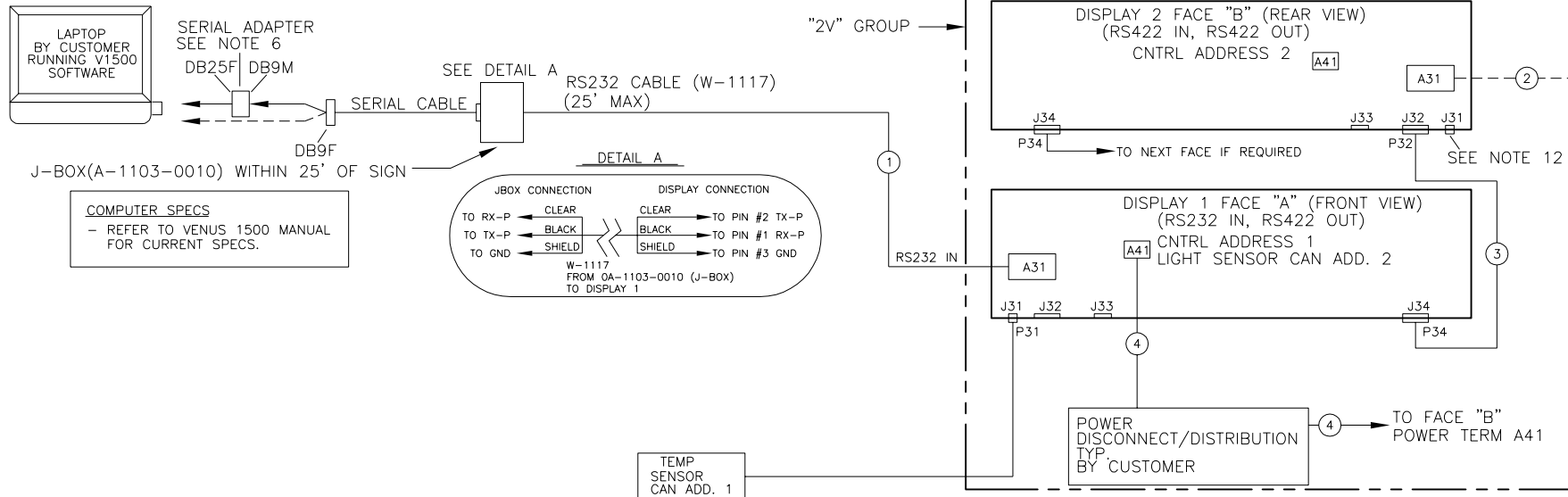
NOTES

- 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
OA-1127-0255.....SIGNAL CONVERTER
OA-1146-0005.....NETWORK/CABLE TESTER
- USE EITHER THE DB9 OR DB25, DEPENDING ON YOUR PC'S REQUIREMENTS.
- INPUT TO CONVERTER IS RS232, OUTPUTS RS422.
- ALL SIGNAL CABLES BY CUSTOMER. LABOR TO PULL CABLES BY CUSTOMER.
- ALL POWER WIRES BY CUSTOMER. LABOR TO PULL WIRES 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
A34= SURGE PROTECTOR, RS422

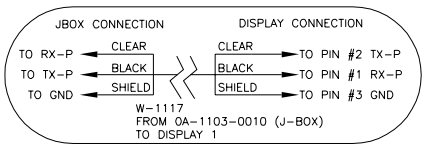


REVISION	APPR. BY:	DATE:
03	LKERR	22AUG02
SCALE:	NONE	
PROJ.: OUTDOOR LED PRODUCT LINE TITLE: SYSTEM RISER DIAGRAM, RS422 DES. BY: LKERR DRAWN BY: LKERR		
THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS, INCLUDING ELECTRONICALLY WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2002 DAKTRONICS, INC.		
DAKTRONICS, INC. BROOKINGS, SD 57006		
1229-R01A-174135		

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	

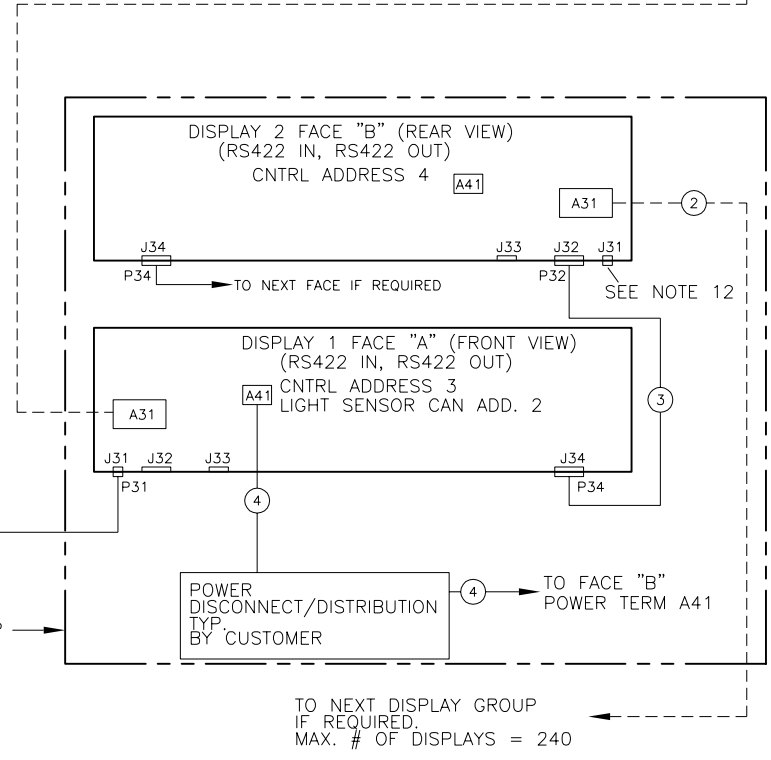


COMPUTER SPECS
 - REFER TO VENUS 1500 MANUAL FOR CURRENT SPECS.



TEMP SENSOR CAN ADD. 1
 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.



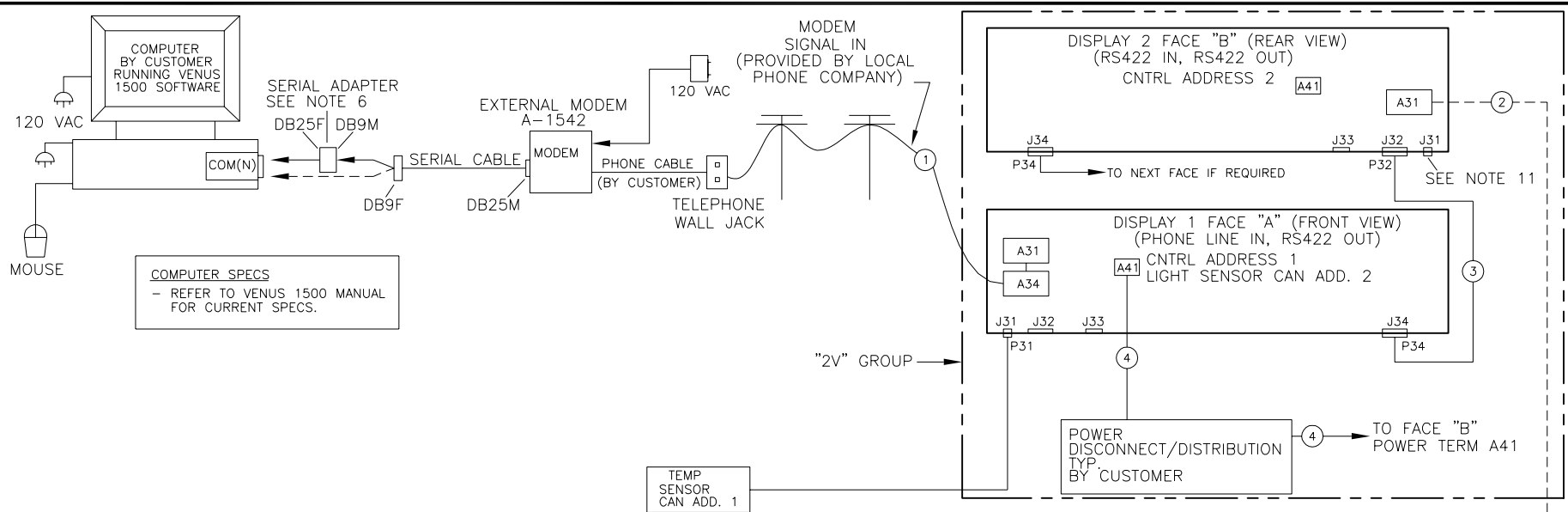
TO NEXT DISPLAY GROUP IF REQUIRED.
 MAX. # OF DISPLAYS = 240

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

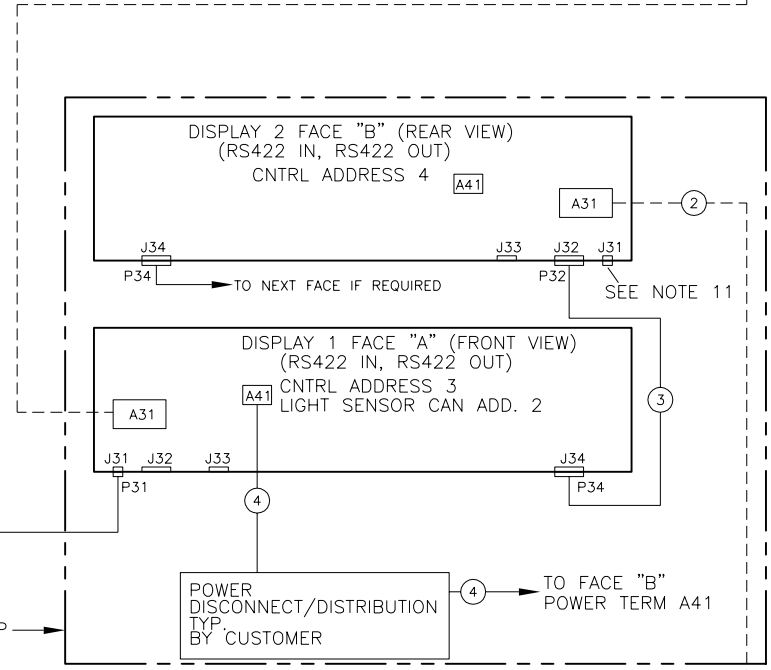
REV.	DATE	DESCRIPTION	BY	APPR.
02	26DEC03	CHANGED TEMP SENSOR PART NUMBER FROM 0A-1241-4017 TO 0A-1151-0005. REMOVED NOTE 3.	DJM	
01	27JAN03	REMOVED CHART 1 (PWR. SIGNAL SPEC). REPLACED 0A-1241-4016 WITH W-1483. ADDED TO TERM PLUG NOTE.	DJM	



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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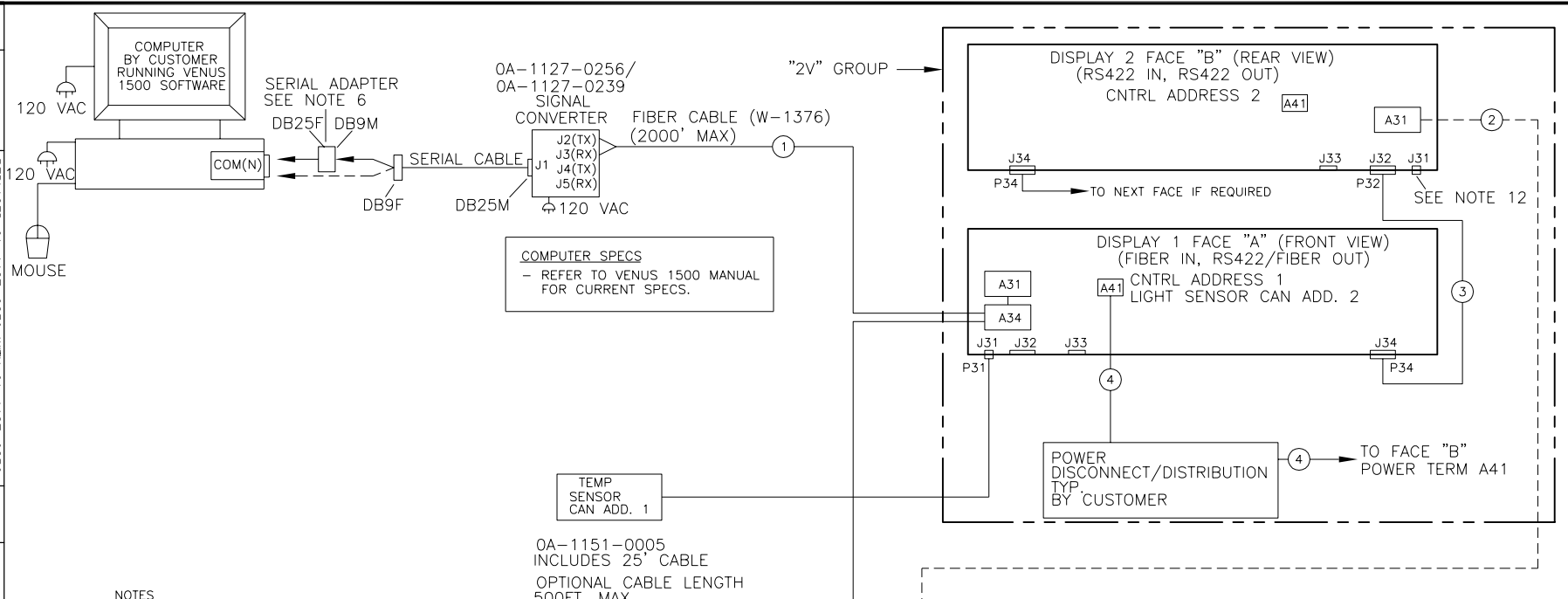
DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: OUTDOOR LED PRODUCT LINE
TITLE: SYSTEM RISER DIAGRAM, MODEM
DES. BY: LKERR
DRAWN BY: LKERR
DATE: 28AUG02

REVISION 02
APPR. BY: NONE
SCALE: NONE

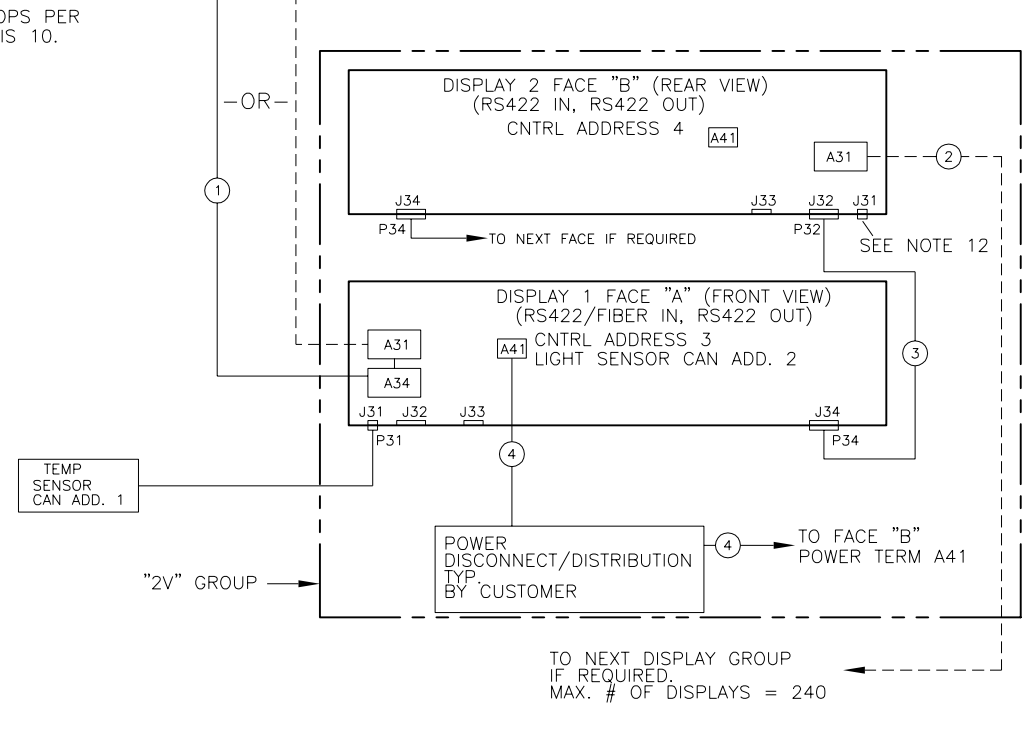
1229-R01A-174342

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



NOTES

- 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

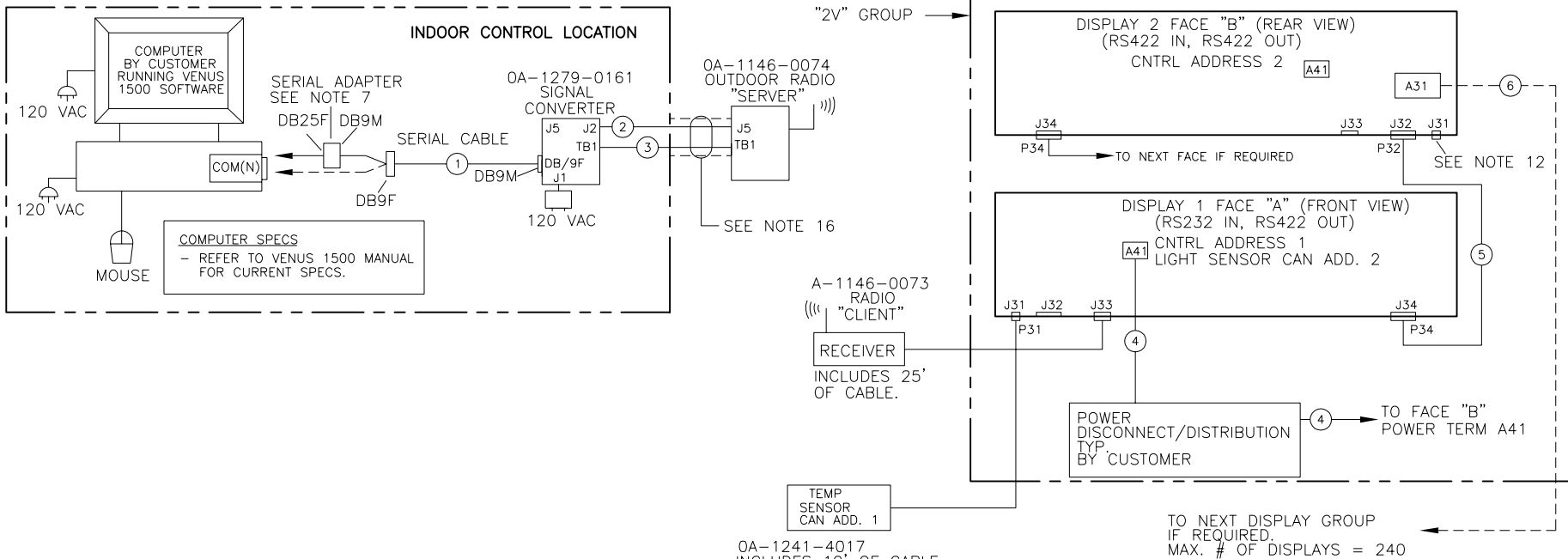


REVISION	APPR. BY:	DATE:
03	LKERR	06SEP02
SCALE:	NONE	

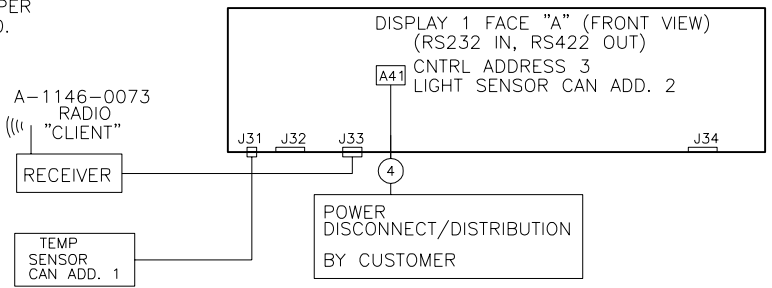
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PROJ: OUTDOOR LED PRODUCT LINE
TITLE: SYSTEM RISER DIAGRAM, FIBER
DAKTRONICS, INC. BROOKINGS, SD 57006

REV.	01
DATE	27JAN03
DESCRIPTION	REMOVED CHART 1 (PWR. SIGNAL SPEC) REPLACED OA-1241-4016 WITH W-1483. ADDED TO TERM. PLUG NOTE.
BY	DJM
APPR.	



OA-1241-4017
INCLUDES 10' OF CABLE.
OPTIONAL CABLE LENGTH
500FT. MAX
MAX. # OF DROPS PER
CAN NETWORK IS 10.



NOTES

- DB9F TO DB9M SERIAL CABLE
DAK. P.N. (W-1267)
- 6 CONDUCTOR, 26 AWG, STRANDED
SILVER SATIN CABLE. DAK. P.N. (W-1368).
ANIXTER P.N. (6C26F19) OR EQUIV.
IN CONDUIT WHERE REQUIRED.
FIELD SIGNAL TERMINATIONS TO BE RJ11 6 COND.
FIELD CABLES ARE "FLIPPED" FROM ONE
END TO THE OTHER.
- 2 CONDUCTOR, 18 AWG, STRANDED,
SHIELDED, DAK. P.N. (W-1117)
- 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. OA-1241-4010) MUST BE
INSTALLED ON LAST DISPLAY IN EACH GROUP.
- A31= DISPLAY CONTROLLER
A41= POWER TERMINATION PANEL
- SERVER AND CLIENT(S) MUST BE SET TO SAME
CHANNEL. (VIA SOFTWARE OR ON-BOARD SWITCHES)
ALL CLIENT DISPLAYS MUST HAVE A UNIQUE ADDRESS.
TOTAL SYSTEM CANNOT EXCEED 240 DISPLAYS.
- IN AREAS USING MULTIPLE SERVER/CLIENT SYSTEMS
WITHIN CLOSE PROXIMITY OF EACH OTHER, ALTERNATE
CHANNELS MUST BE USED, TO AVOID INTERFERENCE
BETWEEN SYSTEMS.
- CABLE TO BE IN CONDUIT WHERE EXPOSED TO
OUTDOOR ELEMENTS.

REVISION	APPR. BY:	SCALE:
	NONE	
DES. BY: DMATHERN DATE: 16OCT02 TITLE: SYSTEM RISER DIAGRAM: QC OUTDOOR RADIO, V1500 PROJ.: OUTDOOR LED PRODUCT LINE DAKTRONICS, INC. BROOKINGS, SD 57006		
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FUNCTION	PIN	PIN	FUNCTION
TDO1	1	2	N.C.
TDI1	3	4	TRST
N.C.	5	6	+3.3V
TCK1	7	8	N.C.
TMS1	9	10	N.C.
HALT	11	12	N.C.
N.C.	13	14	KEYING PIN
N.C.	15	16	GND

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

PIN	FUNCTION
2	10VAC
1	10VAC

PIN	FUNCTION
6	CAN_GND
5	CAN_GND
4	CANL
3	CANH
2	CAN_+5V
1	N.C.

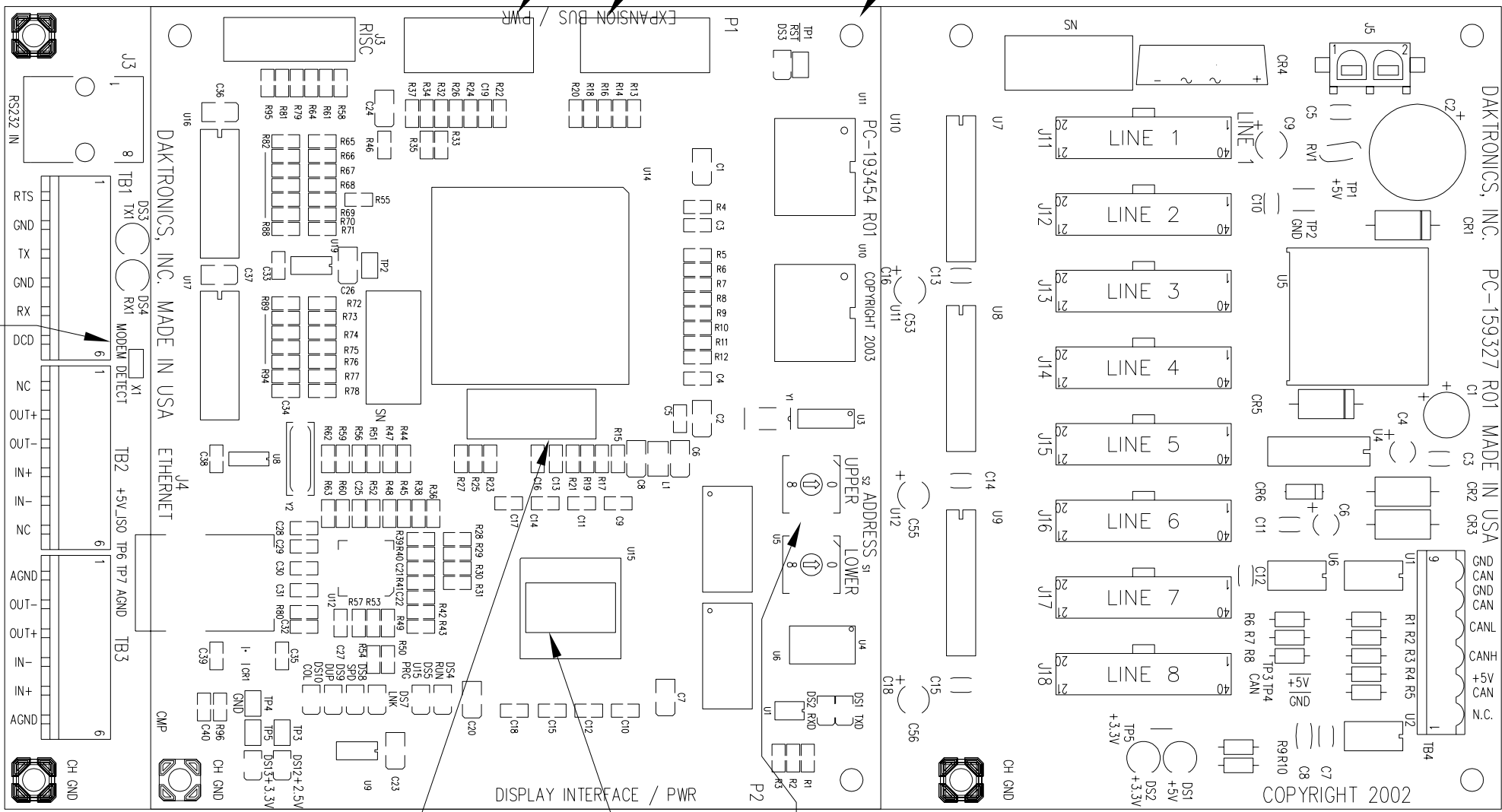
PIN	FUNCTION
1	TX+
2	TX-
3	RX+
4	CHGND
5	CHGND
6	RX-
7	CHGND
8	CHGND

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



RS232 IN

RS232 IN

INSTALL JUMPER FOR MODEM USE.

RS422 IN

RS422 OUT

FIRMWARE REVISION DATE

EPLD PROGRAM REVISION DATE

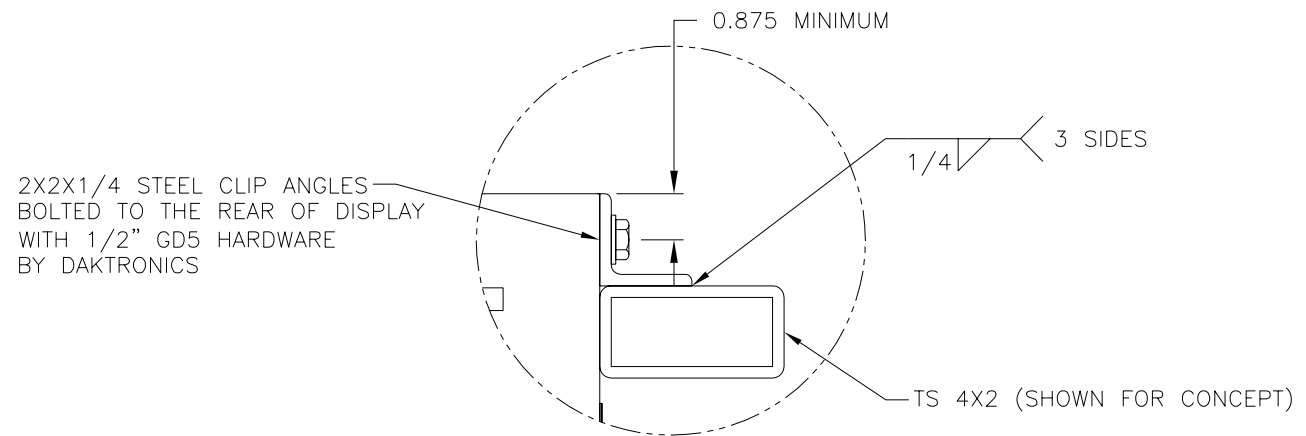
UPPER / LOWER ADDRESS SWITCHES

REV.	DATE	DESCRIPTION	BY	APPR.
03	14 FEB 07	REMOVED HC-1149 FROM M2 TO PRODUCT BOARD MOUNTING. SPACING 1/2".	RBN	
02	12 APR 04	OP-1229-0004 TO OP-1229-1001 M2 CONTROLLER, GEN II	MER	
01	23 FEB 04	ADDED HC-1149 WASHER TO STANDOFF FOR M2 TYP. @4	WT	

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DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ:	
TITLE:	CNTRLR, GALAXY, 8 CONN, J1256
DES. BY:	M.RICHARDSON
DATE:	21 JUN 02
REVISION	APPR. BY:
03	SCALE: 1=1
1229-R10B-165246	

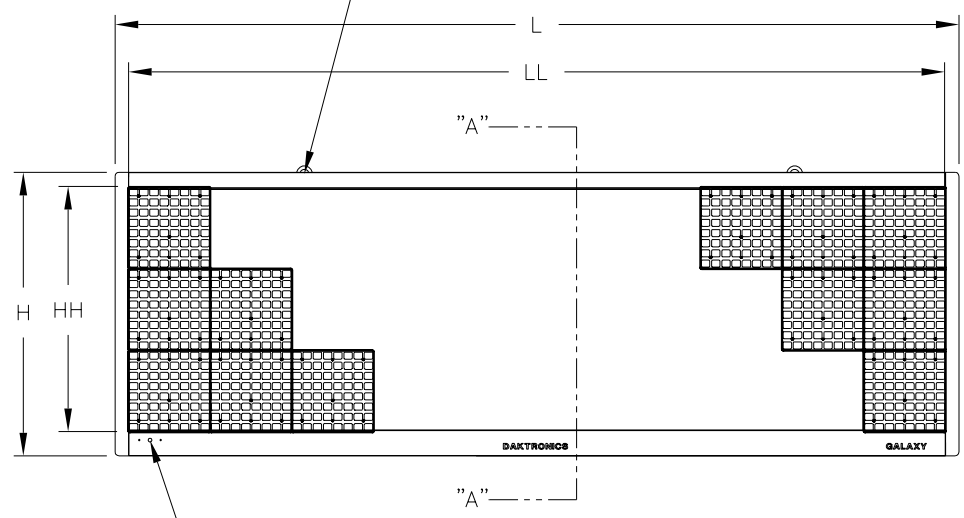
SIZES AND (APPROX.) WEIGHTS FOR 34 mm DISPLAYS
AX-XXXX-8/32XX-34B

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

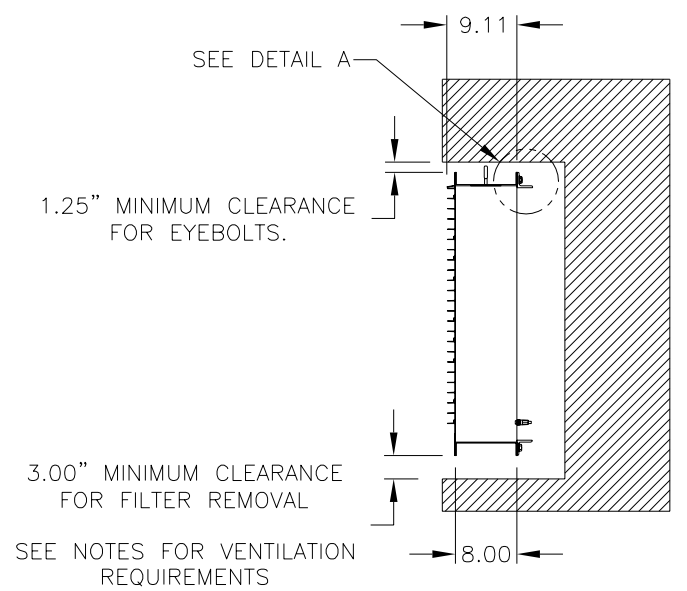


DETAIL: A

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.



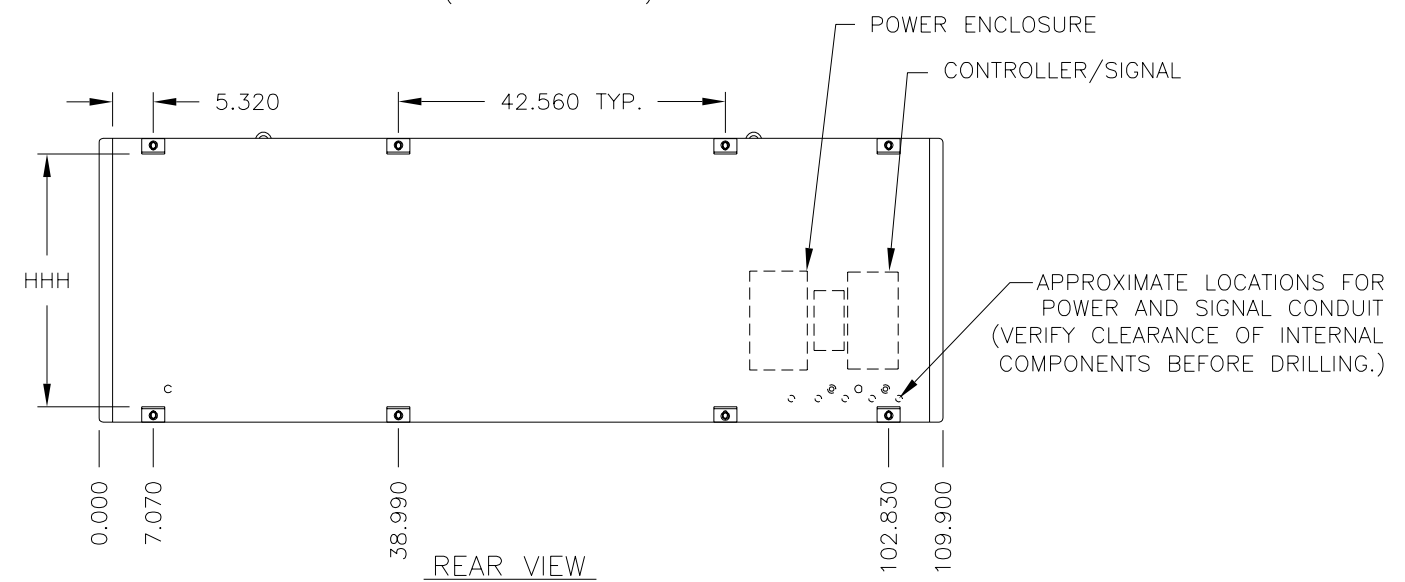
FRONT VIEW
(24X80 SHOWN)



SECTION: A-A

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".
7. MAIN ELECTRICAL DISCONNECT TO BE FURNISHED BY CUSTOMER.
8. FOR SIZES AND APPROX. WEIGHTS SEE ABOVE TABLE.
9. FOR POWER REQUIREMENTS REFER TO 1241-R01A-148571.
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.



REAR VIEW

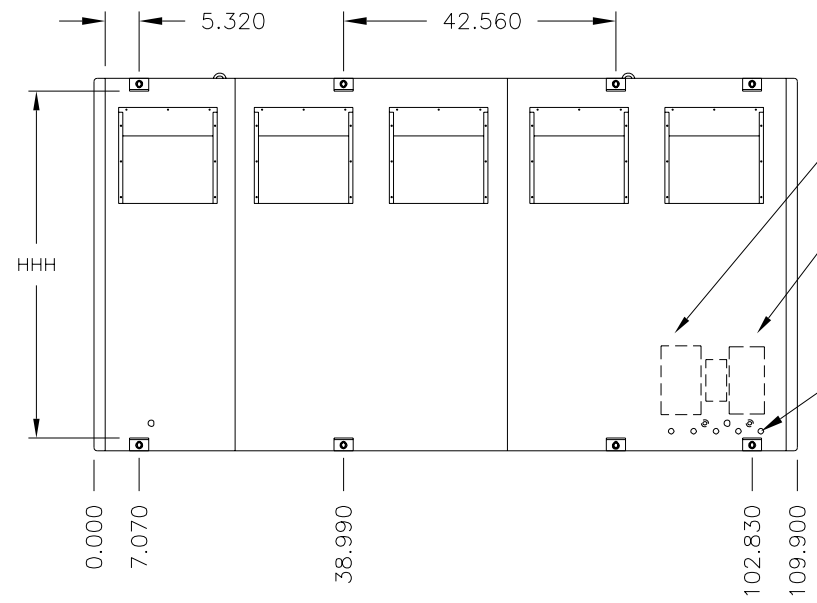
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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED V1500 RGB 34MM
TITLE: SHOP DRAWING, AF-3165-8-32 HIGH-34-RGB
DES. BY: MMAMMENGA DRAWN BY: MMAMMENGA DATE: 02AUG02

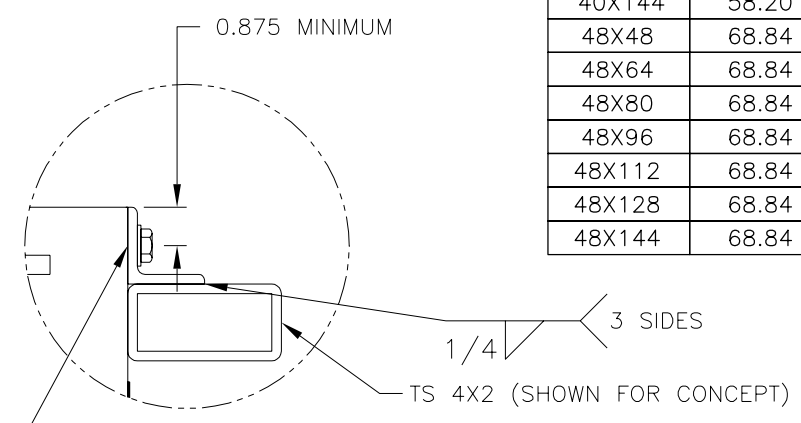
REV.	DATE	DESCRIPTION	BY	APPR.
02	20 JAN 03	UPDATED APPROX. UNCRATED SIGN WEIGHTS.	MLS	
01	14 JAN 03	UPDATED MTG CLIP PLACEMENT	MLS	

REVISION APPR. BY: SCALE: 1 = 25 1241-E10B-172745



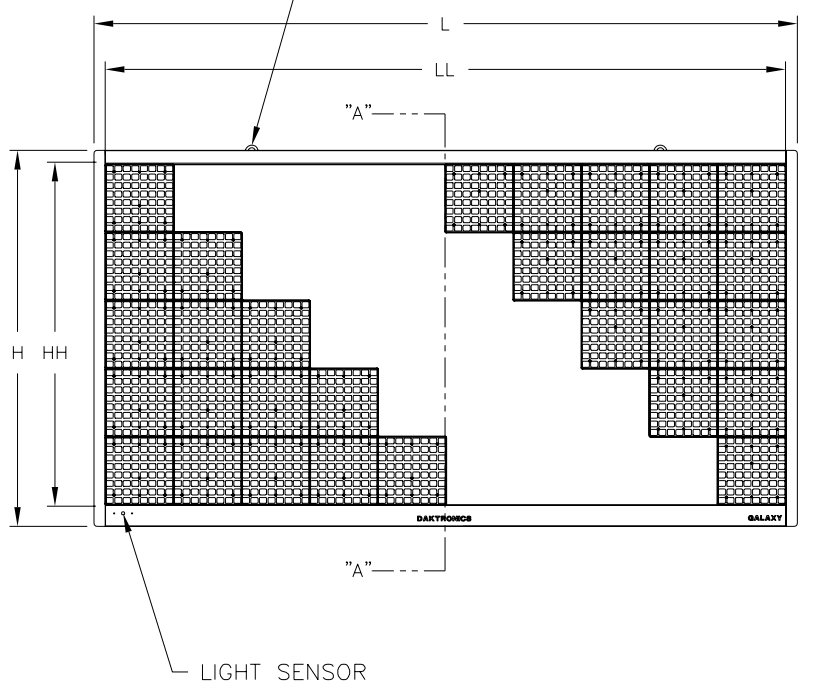
REAR VIEW

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

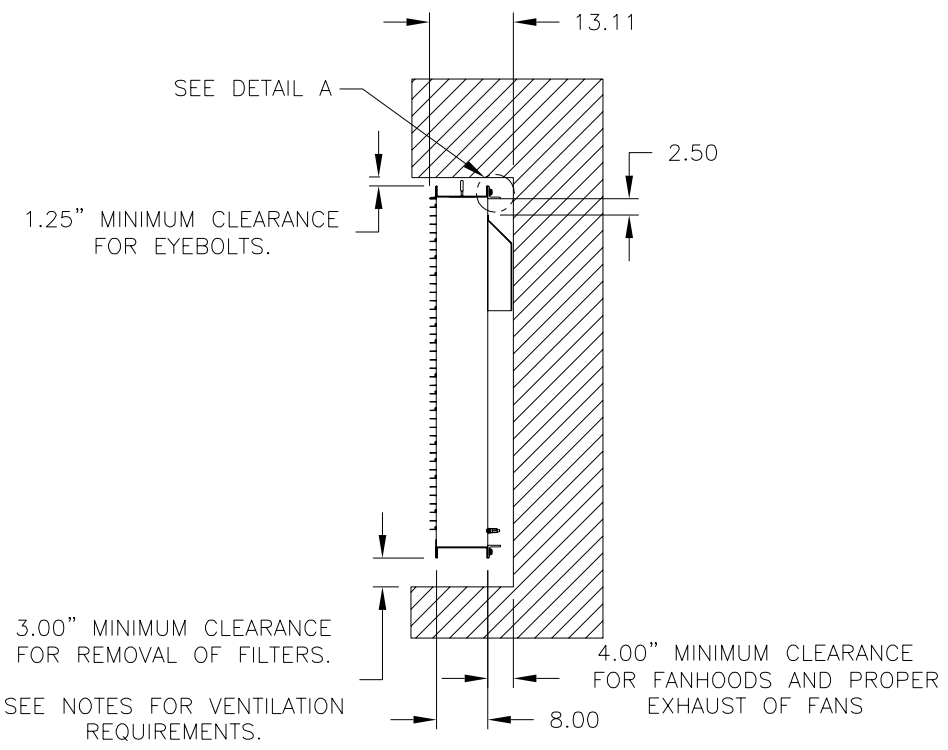


DETAIL: A

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

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:

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. FOR SIZES AND APPROX. WEIGHTS SEE ABOVE TABLE.
9. FOR POWER REQUIREMENTS REFER TO 1241-R01A-148571.
10. DAKTRONICS INC. IS NOT RESPONSIBLE FOR HARDWARE ATTACHING DISPLAY TO STRUCTURE.
11. REFER TO INSTALLATION ENGINEERING DOCUMENT FOR MOUNTING TEMPERATURE SENSOR. (ER-010711)
12. 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).
13. CUSTOMER IS RESPONSIBLE FOR THE STRUCTURAL INTEGRITY OF THE STRUCTURE THAT THE DISPLAY IS MOUNTED TO.
14. MAIN ELECTRICAL DISCONNECT TO BE FURNISHED BY CUSTOMER.

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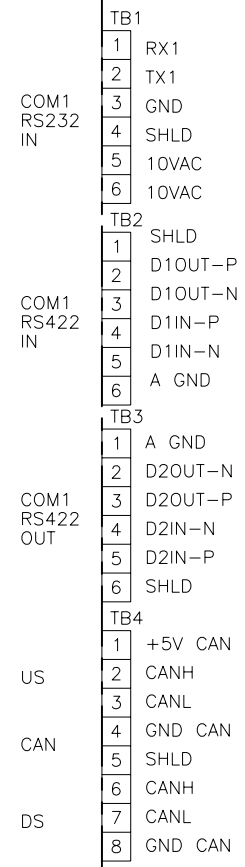
DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ:	GALAXY, LOUVERED V1500 RGB 34MM		
TITLE:	SHOP DRAWING, AF-3165-40-48 HIGH-34RGB		
DES. BY:	MMAMMENGA	DRAWN BY:	MMAMMENGA
DATE:	06AUG02	SCALE:	1 = 30
REVISION	1241-E10B-172746		

REV.	DATE	DESCRIPTION	BY	APPR.
02	20 JAN 03	UPDATED APPROX. UNCRATED SIGN WEIGHTS.	MLS	
01	14 JAN 03	UPDATED MTG CLIP PLACEMENT	MLS	

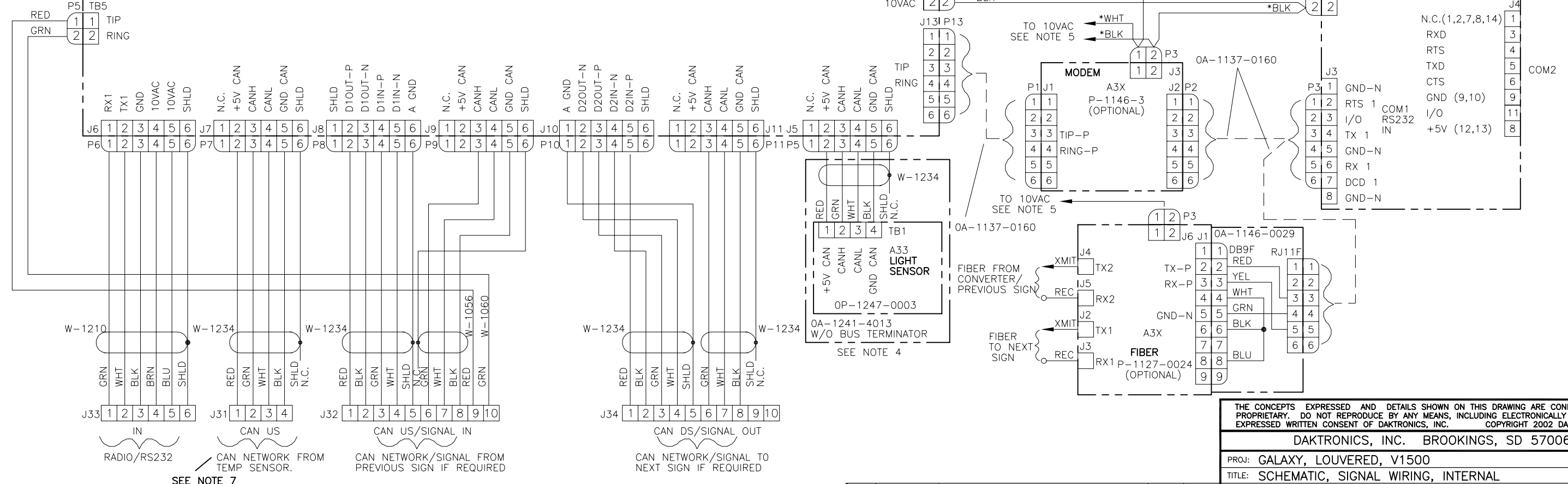
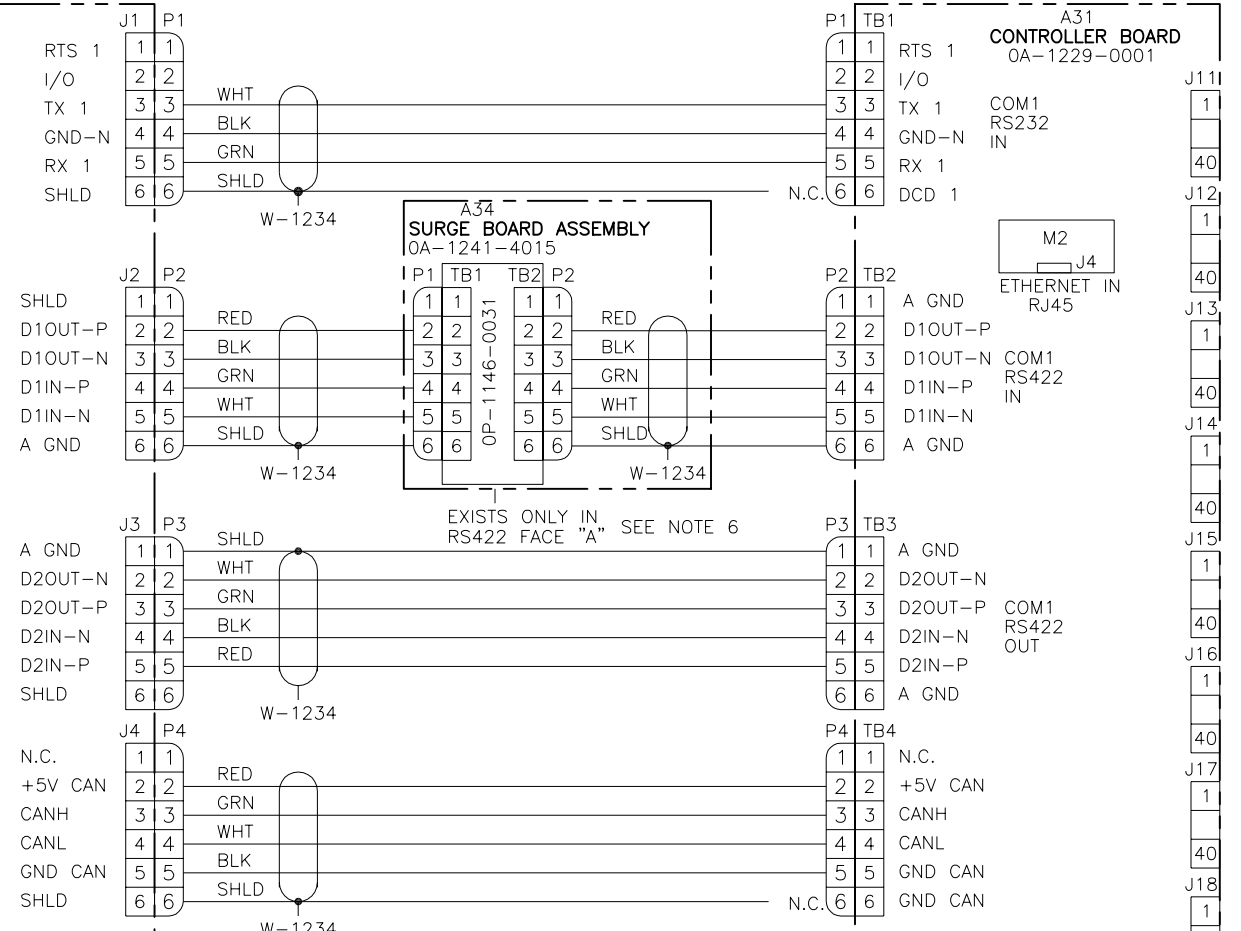
A35
SIGNAL TERM PANEL
0P-1229-2000

A31
CONTROLLER BOARD
0A-1229-0001



- NOTES:
- 1) ALL WIRE IS 22 AWG EXCEPT * IS 18 AWG UNLESS OTHERWISE NOTED.
 - 2) CAN US= CAN UPSTREAM
 - 3) CAN DS= CAN DOWNSTREAM
 - 4) THE LIGHT SENSOR AND WIRING IS LOCATED IN FACE "A" ONLY.
 - 5) REFER TO DISPLAY SCHEMATIC FOR COMPLETE DISPLAY WIRING. MODEM AND FIBER ARE OPTIONAL. THE 10VAC (P3) WILL POWER WHICHEVER OPTION IS USED.
 - 6) WHEN SURGE BOARD ASSEMBLY (0A-1241-4015) IS NOT USED THE CABLE TERMINATING TO A34 TB1 TERMINATES INTO A31 TB2.
 - 7) IF NO EXTERNAL TEMP SENSOR IS USED ON FIRST DISPLAY IN NETWORK GROUP A TERMINATING PLUG DAK# 0A-1241-4010 IS CONNECTED TO J31. ON LAST DISPLAY IN NETWORK GROUP A TERMINATING PLUG DAK# 0A-1241-4010 IS CONNECTED TO J31.

ON LAST DISPLAY IN NETWORK GROUP
A TERMINATING PLUG DAK# 0A-1241-4010
IS CONNECTED TO J31.

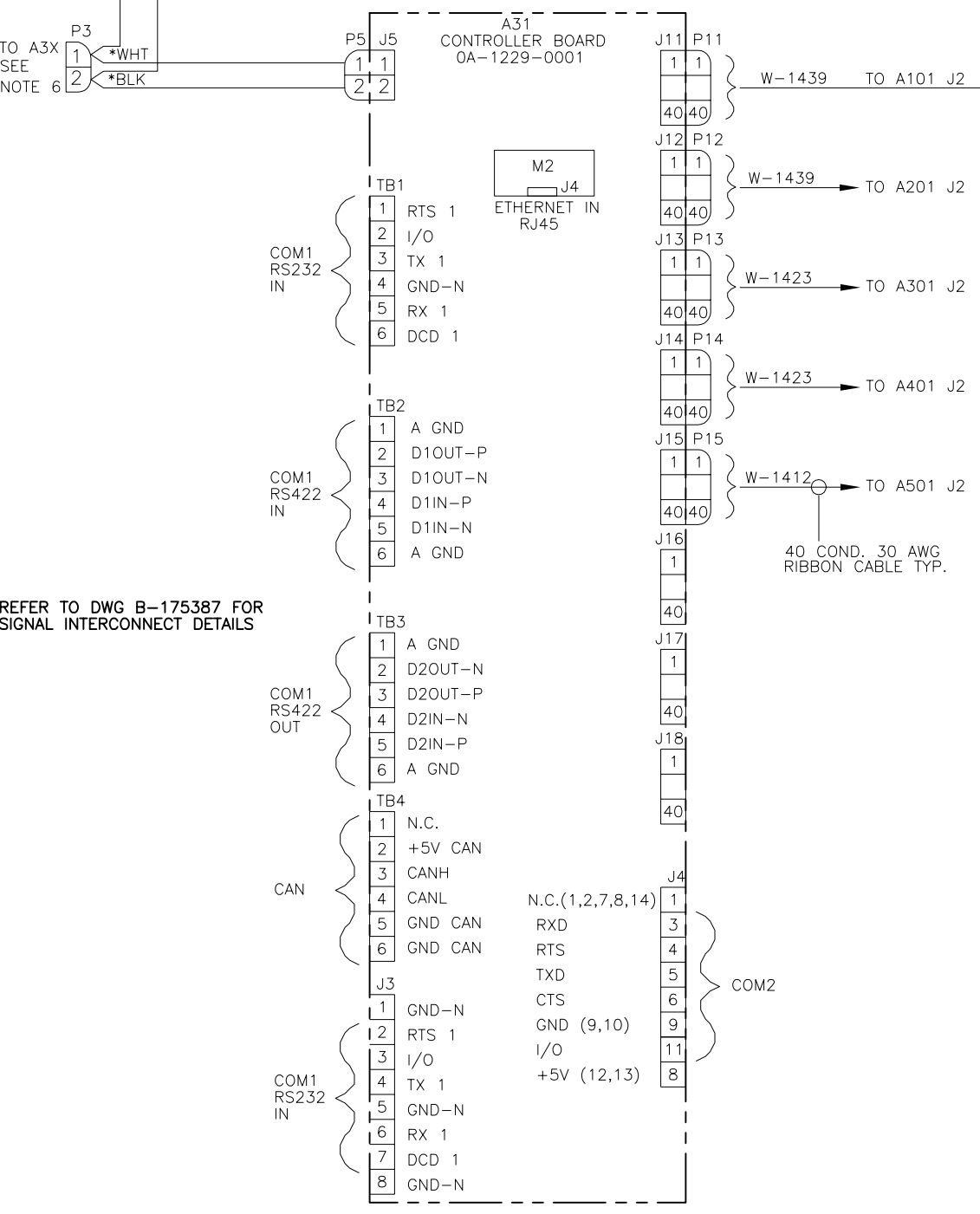
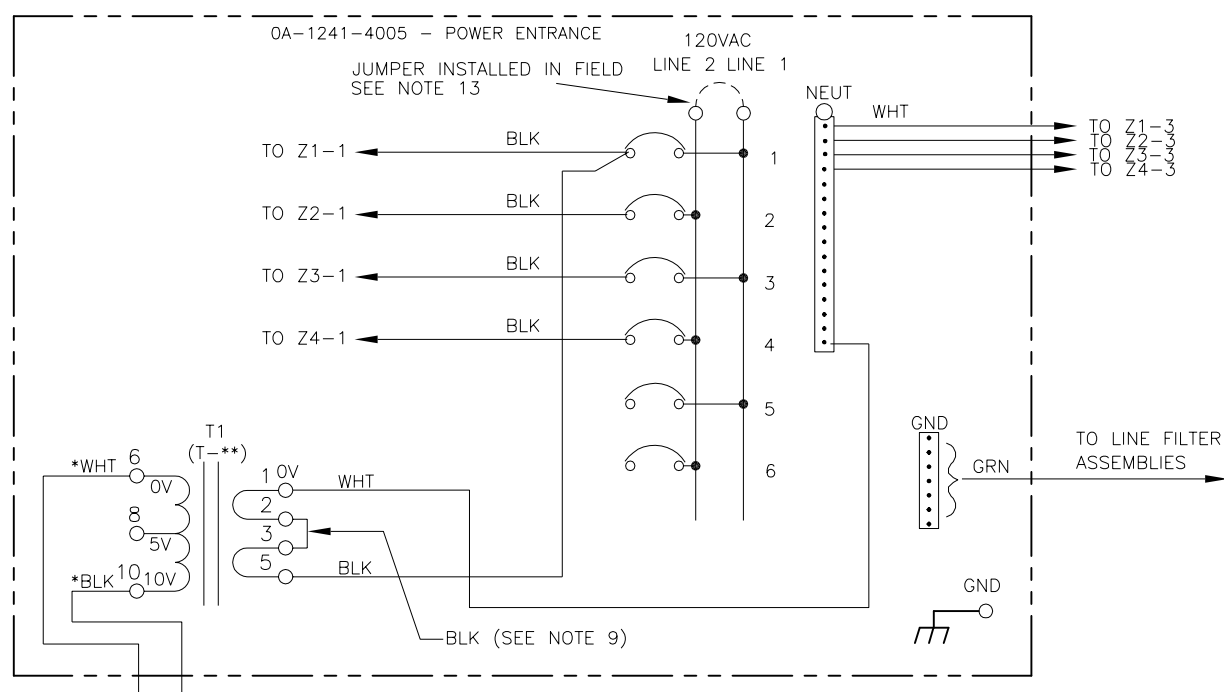


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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED, V1500
TITLE: SCHEMATIC, SIGNAL WIRING, INTERNAL
DES. BY: PGILK DRAWN BY: LKERR DATE: 18SEP02
REVISION APPR. BY: SCALE: NONE
1229-R03B-175387

REV.	DATE	DESCRIPTION	BY	APPR.
1	01OCT02	ADDED FIBER OPTION	LLK	LLK

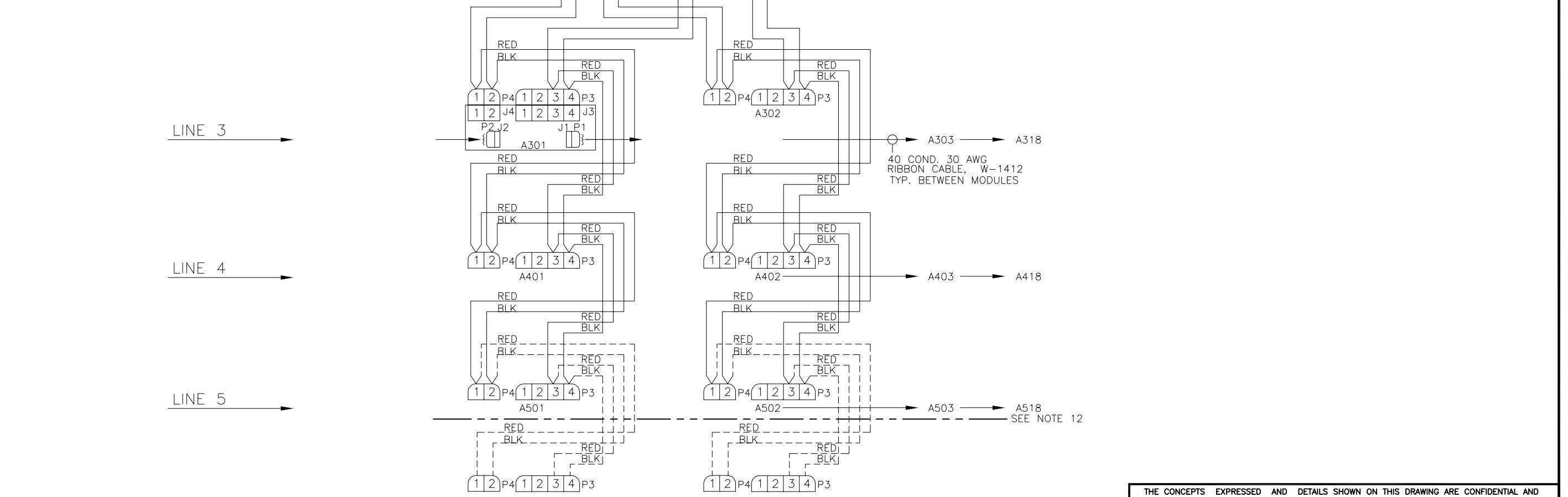
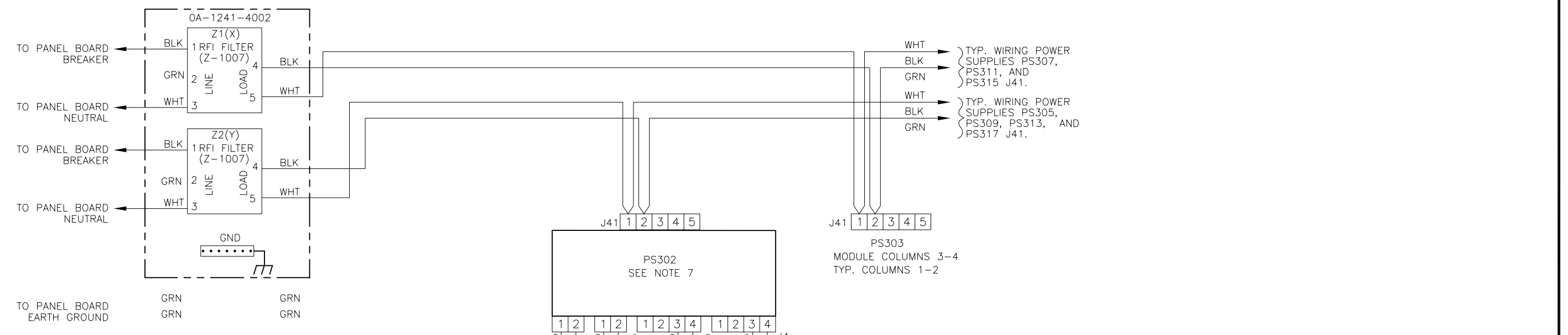
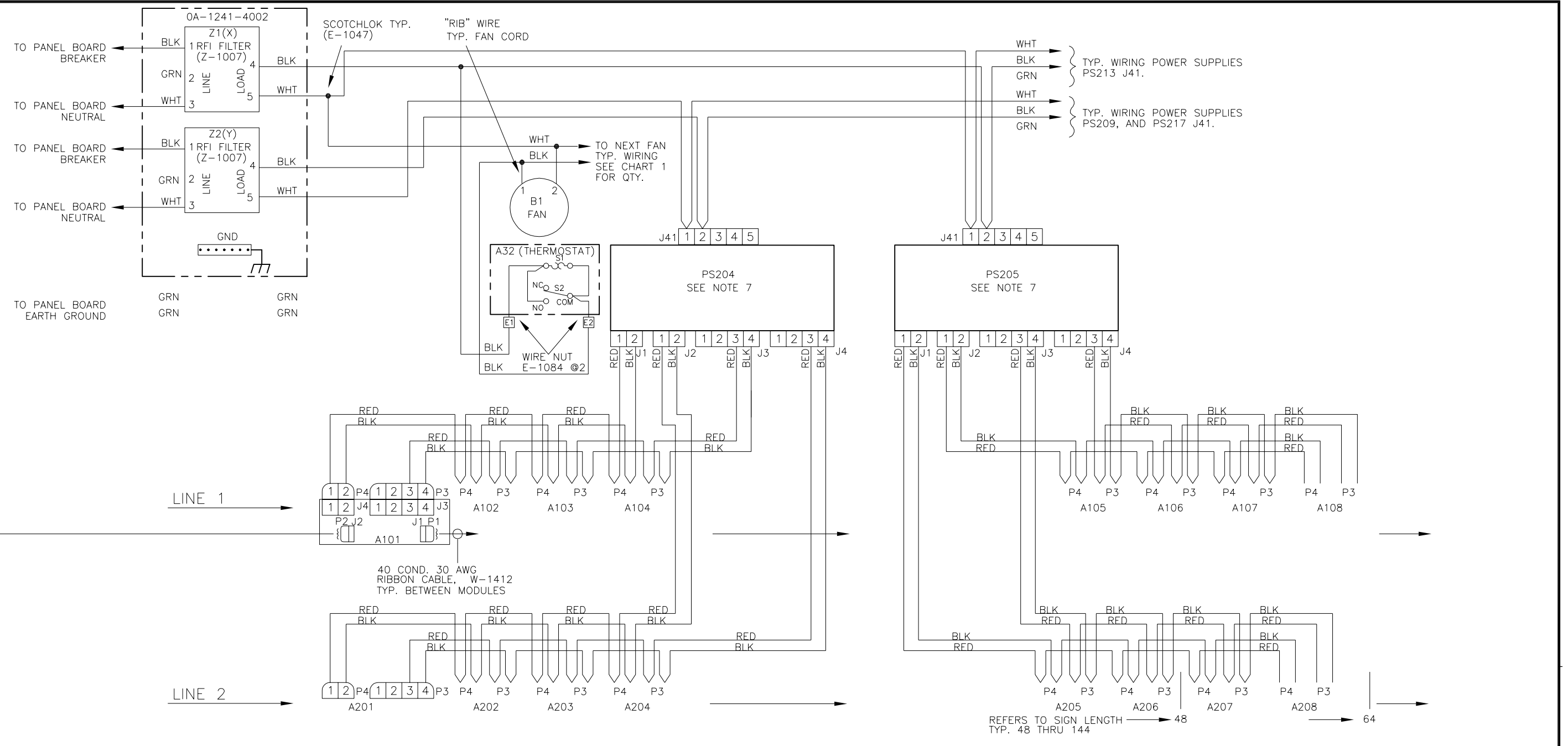


REFER TO DWG B-175387 FOR SIGNAL INTERCONNECT DETAILS

CHART 1

DISPLAY LENGTH (PIXELS)	POWER SUPPLY ASSEMBLY QTY.	MODULE QTY.	FAN QTY.
48	4	30	3
64	5	40	4
80	7	50	5
96	8	60	6
112	9	70	7
128	10	80	8
144	12	90	9

- NOTES
- ALL WIRE IS 14 AWG EXCEPT * IS 18 AWG UNLESS OTHERWISE NOTED.
 - CIRCUIT BREAKERS 1-6 (WHEN USED) ARE 15 AMP (DAK.# S-1035).
 - 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 INTERNAL INTERFACE CARD IE MODEM, FIBER (IF REQUIRED). REFER TO DWG B-175387 FOR MODEM AND FIBER INPUT DETAILS.
 - REFER TO DWG A-126330 FOR POWER SUPPLY CONFIGURATIONS.
 - REFER TO DWG A-148571 FOR POWER SPECS.
 - WHEN T-1119 IS USED PINS 2 & 3 AND THE JUMPER SHOWN DOES NOT EXIST.
 - SCHEMATIC SHOWN DEPICTS THE LARGEST LENGTH 40 ROW DISPLAY (X144). REFER TO CHART 1 FOR DETAILS ON OTHER LENGTH DISPLAYS.
 - 40 HIGH DISPLAYS USE POWER ENTRANCE 0A-1241-4005.
 - REMAINING HARNESS IS NOT USED.
 - WHEN 120 VAC (2 WIRES + GND) IS USED TO POWER DISPLAYS, A JUMPER PER NEG MUST BE INSTALLED IN FIELD AS SHOWN.



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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY, LOUVERED, V1500, RGB 34MM

TITLE: SCHEMATIC, AF-3165-40X***-9

DES. BY: DRAWN BY: LKERR DATE: 31 JUL 02

1	02OCT02	INSERTED NEW CONTROLLER BOARD LAYOUT.	LLK	
REV.	DATE	DESCRIPTION	BY	APPR.

SCALE: NONE 1241-R03C-172535