

Galaxy Series
AE-3010 – 7.62 mm

Display Manual

ED11169

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DAKTRONICS

DAKTRONICS, INC.

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ED-11169 -- P1161
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Section 1: Introduction

This manual explains the installation, maintenance, and troubleshooting of a Daktronics Galaxy[®] AE-3010 Indoor Tri-color LED display. For questions regarding the safety, installation, operation, or service of this system, please refer to the telephone numbers listed on the cover page of this manual.

This manual is divided into eight sections: Introduction, Mechanical Installation, Electrical Installation, Maintenance and Troubleshooting, Appendix A, Appendix B, Appendix C and Appendix D.

- **Introduction** covers the basic information needed to make the most of the rest of this manual. Take time to read the entire introduction as it defines terms and explains concepts used throughout the manual.
- **Mechanical Installation** provides general guidance on sign mounting.
- **Electrical Installation** gives general guidance on terminating power and signal cable at the sign.
- **Maintenance and Troubleshooting** addresses such things as removing basic sign components, troubleshooting the sign, performing general maintenance, and exchanging sign components.
- **Appendix A** includes the drawings referenced in this manual.
- **Appendix B** contains general information about the signal converters.
- **Appendix C** provides general information about the optional temperature sensor.
- **Appendix D** provides information on the configuration of the serial server.

Daktronics identifies manuals by an ED number located on the cover page of each manual. For example, this manual would be referred to as **ED-11169**.

Listed below are a number of drawing types commonly used by Daktronics, along with the information that each is likely to provide. This manual might not contain all these drawings.

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

Figure 1 illustrates the Daktronics drawing label. The drawing number is located in the lower-right corner of the drawing. Listing the last set of digits and the letter preceding them identifies drawings in the manual. In the example below, the drawing would be referred to as **Drawing B-206146**. Reference drawings are inserted after the section that references them.

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

Figure 1: Drawing Label

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

“Refer to **Drawing B-206146** in **Appendix A** for the power connection.”

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

Reference Drawing:

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

Daktronics signs are built for long life and require little maintenance. However, from time to time, certain sign components will need replacing. The **Replacement Parts List** in **Section 4.7** provides the names and part numbers of components that may need to be ordered during the life of the sign. Most sign components have a white label that lists the part number. The component part number is in the following format: OP-____-____ (component) or OA-____-____ (multi-component assembly).

Following the **Replacement Parts List** is the **Daktronics Exchange and Return and Repair Programs** in **Section 4.8**. Refer to these instructions if any sign component needs replacement or repair.

1.1 Safety Precautions

Important Safeguards:



1. Read and understand these instructions before installing.
2. Be sure the sign is properly grounded.
3. Disconnect power when servicing the sign.
4. **Do not** modify the sign structure or attach any panels or coverings to the sign without the written consent of Daktronics, Inc.
5. Most products are equipped with a 3-wire grounding-type plug having a third (grounding) pin. This plug will only fit into a grounding-type outlet. This is a safety feature. Do not defeat the purpose of the grounding-type plug.

1.2 Network Concepts

The concept of using LED displays as a cost effective, high impact method of communication is rapidly growing throughout many industries and businesses. The reasons for this growth are many, but the need for additional features and the complexity of multiple sign installations has emerged. Daktronics display systems are designed to meet those needs. The common thread to most client requests is a means of programming and controlling a group of signs from a central control point. Daktronics responded by developing a power system of interconnecting and controlling signs. 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 sign or group of signs in the network which message should run
- The ability to determine the status of any sign on the network
- The ability to control multiple sign technologies on the same network

In order to avoid technical difficulties, Daktronics uses the popular and readily available RJ11 connector. This connector is also used on modern home and office telephone equipment, allowing for easily understood installation procedures.

All that is required for signal installation is standard six (6)-conductor modular telephone wire and a tool to install the connector. Tools required for mounting the display depend on the location and size of the display. For some installations, it may be possible to purchase pre-terminated telephone cables for use with the displays.

There are four (4) network systems available: RS232, RS422, modem and TCP/IP (Ethernet).

RS232 Network

RS232 (EIA/TIA-232-E) is a standard communication interface that employs a single-ended serial transmission scheme. The RS232 uses a maximum cable length of 7.6 meters (approximately 25 feet). This interface was designed for computer communication at short distances. The computer used will require an RS232 serial communications port. Refer to **Section 3** for additional information.

RS422 Network

RS422 (EIA/TIA-422-B) is a standard communication interface that utilizes a differential balanced transmission scheme, which uses a typical maximum cable length of 1.2 km (approximately 4,000 feet). The main advantage of RS422 over RS232 is the longer cable length. A signal converter is needed to convert the computer's RS232 to RS422. Refer to **Section 3** for additional information.

Modem Network

The modem is a standard communication interface that utilizes standard phone transmission lines. The phone company assigns each phone line a number that the modem uses to communicate between the control computer and display. Refer to **Section 3** for additional information.

TCP/IP Network

The TCP/IP protocol is an interface allowing the Ethernet network card (installed in the operator's computer) to communicate with the display via a Local Area Network (LAN). Refer to **Section 3** and **Appendix D** for additional information.

1.3 Display Overview

The Daktronics indoor LED displays have been designed and manufactured for performance, reliability, easy maintenance, and long life. The displays consist of an array of LED pixels. The configuration of LED pixels is dependent on the family of LED displays.

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.

Venus® 1500 is a software package that runs under Windows® 98, ME™, NT® 4.0, 2000, or XP Home/Professional operating systems on an IBM®-compatible computer. Refer to the Venus® 1500 controller operator's manual (**ED-13530**) for installation and operation of the Venus® 1500 editing station.

Refer to **Section 4** for the summaries of how signal and power are routed through the displays.

Galaxy displays are graphic indoor LED displays, which are available in tri-color (red, green, and amber) characters. Daktronics offers Galaxy displays with a 7.62 center-to-center spacing, with characters in six (6) different lengths. The Galaxy model numbers are described as follows: **AE-3010-RRxCCC-7.62-TRI**.

AE-3010	=	Indoor Galaxy® Display
RR	=	Number of rows high (16, 32 and 48 are available)
CCC	=	Number of Columns Long (96, 128, 160, 192, 224 and 256 are available)
7.62	=	7.62mm center-to-center pixel spacing
TRI	=	Tricolor (red, green and amber)

1.4 Component Identification

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

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

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

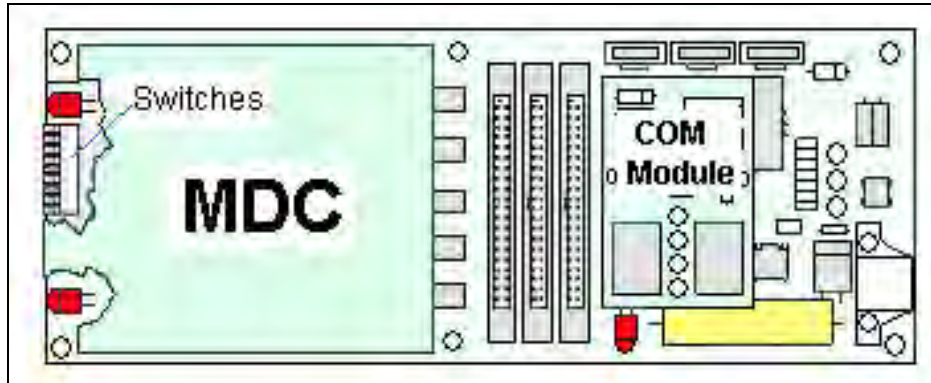


Figure 2: MDC Controller

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

Pixel: Each circle on an LED block represents one pixel. Each pixel is made up of a red and green LED which when both lit creates the amber color. For monochrome displays, only a red LED is used in each pixel.

Display/Driver Module: The module shown in **Figure 3** is 16 pixels high by 32 pixels wide. Each is individually removable from the front of the sign. The LED pixel blocks are mounted directly onto the module board. The driver is responsible for the switching and intensity levels of the LEDs.

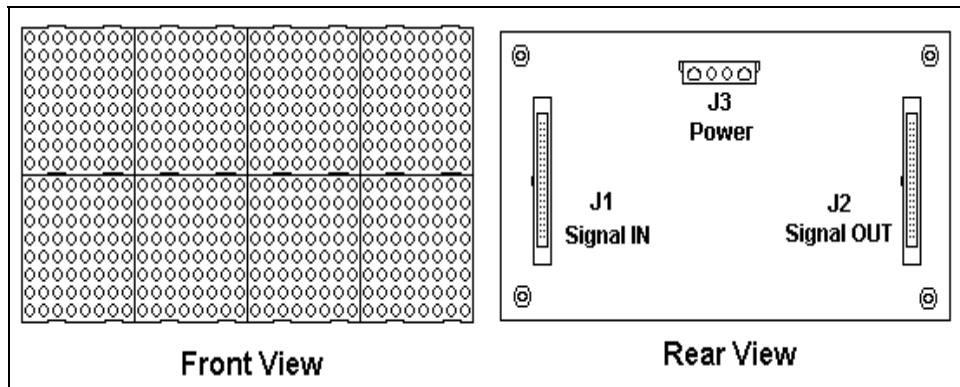


Figure 3: 16x32 Pixel Module (Front and Rear View)

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

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

Network: Consists of multiple signs connected to each other. Up to 240 Venus 1500 controlled displays can exist on one network.

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

RS422: Standard differential communication type with a maximum cable length of 4,000 feet (1.2 kilometers). A signal converter is required to convert the computer's RS232 signal to RS422.

Serial Port: An actual serial port is required for direct connections from the computer or those through a signal converter. Certain USB adapters create an “actual” serial port and others create “virtual” ports. The Venus 1500 software will not recognize a virtual port; therefore use of a USB adapter is not supported by Daktronics.

Serial Server: Device used to obtain information from a LAN and convert it to a serial signal. The communication protocol used is called TCP/IP.

Sign Address: Identification number assigned to each sign of a network. Flipping DIP switches on the controller sets the sign address. The control software uses the address to locate and communicate with each sign, but signs on the same network cannot have the same address.

Signal Cable Tester: Used to test the cable connections and data communications through an RJ11 jack.

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

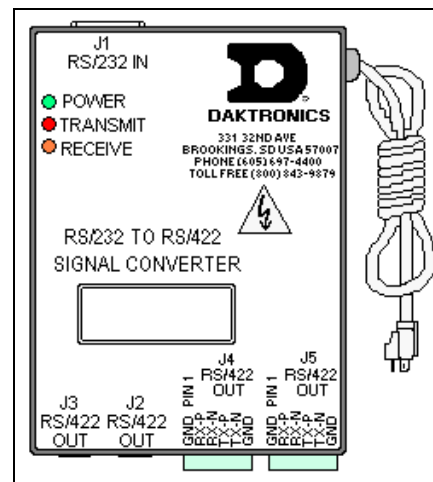


Figure 4: RS232 to RS422 Signal Converter

1.5 Daktronics Nomenclature

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

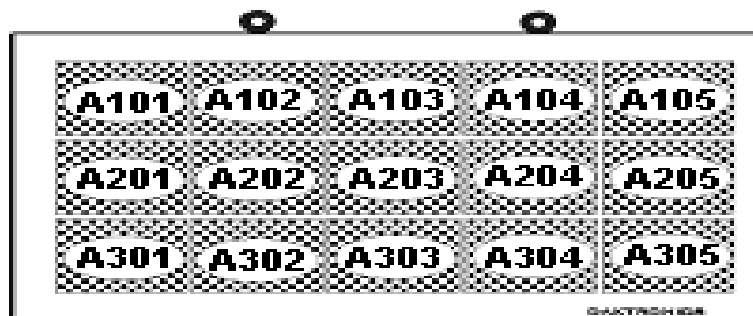


Figure 5: Module Numbering Example – 48x160 Front

A module is the building block of the Galaxy sign. Each module measures 16 pixels high by 32 pixels wide. By placing modules side-by-side and on top of one another, a sign of any size can be designed and built. Individual modules can be easily removed from the sign if required. **Figure 5** illustrates how Daktronics numbers modules on a Galaxy sign. **Figure 6** breaks down the module numbering method.

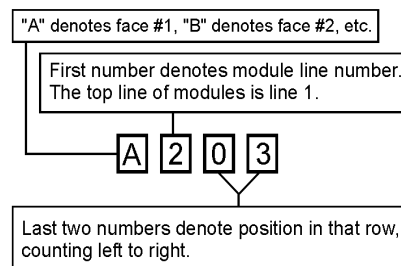


Figure 6: Module Numbering

The label “A” on a drawing typically denotes an assembly. An assembly can be a single circuit board or a collection of components that function together, usually mounted on a single plate or in a single enclosure. Assemblies are divided into two types: those that route signal and those that route power.

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

- “TB__” represents a termination block for power or signal cable.
- “F__” stands for a fuse.
- “E__” indicates a grounding point.
- “J__” symbolizes a power or signal jack.
- “P__” identifies 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 a driver board.
- “OA-____-____” represents an assembly, such as a circuit board and the plate or bracket to which it is mounted. A collection of circuit boards working as a single unit may also carry an assembly label.
- “W-____” shows a wire or cable. Cables may also carry the assembly numbering format in certain circumstances. This is especially true of ribbon cables.
- “F-____” indicates a fuse.

Most circuit boards and components within this sign 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 4.7**, use the label to order a replacement. A typical label is shown in **Figure 7**. The part number is in bold.

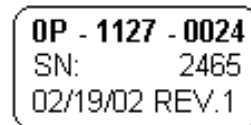


Figure 7: Typical Label

Section 2: Mechanical Installation

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

Daktronics engineering staff must approve **any** changes made to 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 installation or the structural integrity of support structures done by others. It is the customer's responsibility to make sure that a qualified structural engineer has ensured the structure and any additional hardware.

2.1 Mechanical Installation Overview

Because every installation site is unique, there is no single Daktronics-approved procedure for mounting the Galaxy signs. 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 sign.

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

2.2 Support Structure Design

Daktronics recommends either a wall mount or a hanging mount method. Remember to have all mounted displays inspected by a qualified structural engineer. **Daktronics is not responsible for the installation or the structural integrity of support structures done by others.**

2.3 Display Ventilation Requirements

Fresh air inlets and exhaust vents should not be obstructed in any way. To ensure proper ventilation, use the Daktronics suggested mounting methods. Consult a Daktronics sales representative for clearance requirements regarding your particular display if you are using a different mounting method. If ventilation requirements are not met, the display warranty will be void.

2.4 Hanging Mount

Reference Drawings:

Mounting Methods, AE-3010-****-7.62mm **Drawing A-107655**

The Galaxy Series Display has two pre-drilled holes in the top of the display for use in the hanging mount method. Refer to **Drawing A-107655** and the directions below to hang the display.

1. Remove the two retaining screws from the top of the display using a Philips screwdriver.
2. Slide the provided sealing washer over the threads of each eyebolt.
3. Insert the eyebolts in to the pre-drilled holes on the display (refer to **Figure 8**).
4. Hand-tighten the eyebolts.

Note: Hanging the display without using the supplied eyebolts will negate the warranty. Attaching or hanging anything from the display will render the warranty null and void.

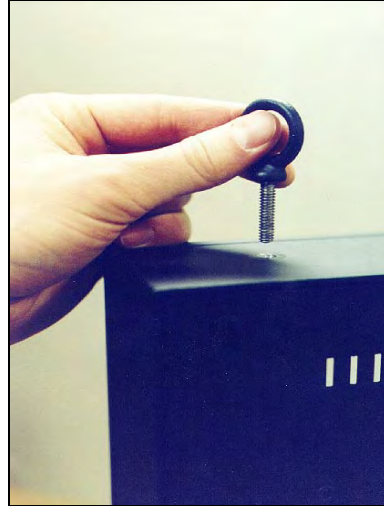


Figure 8: Eye Bolt Insertion

2.5 Wall Mount

Reference Drawing:

Shop Drawing, AE-3010-16***-7.62mm-SB-RG Drawing A-107618

Shop Drawing, AE-3010-32***-7.62mm-SB-RG Drawing A-107636

Shop Drawing, AE-3010-48***-7.62mm-SB-RG Drawing A-107639

The Galaxy has holes on the back of the display for the attachment of the wall mounting clips. Using the #8-32 screws provided with the display, attach the mounting clips to the rear of the display as shown (refer to both **Figure 10**, **Figure 9** and the **Shop Drawing** for your sign size for more information). **Use all the supplied clips.**

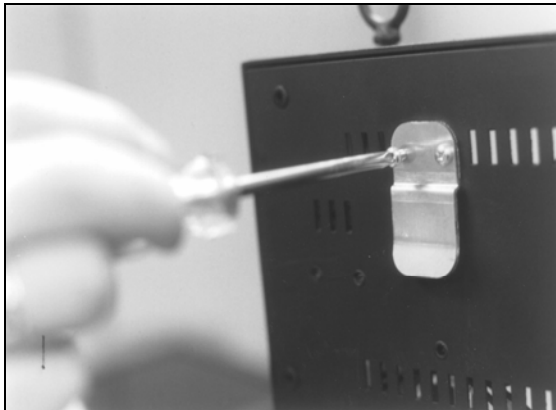


Figure 10: Wall Mounting Clip Attachment

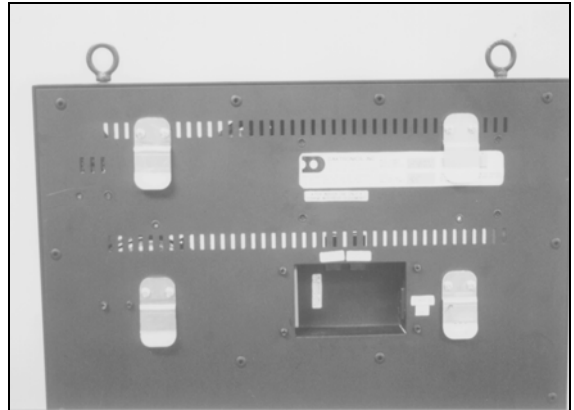


Figure 9: Mounting Clip Placement; Rear View

1. Mount the wall bracket to the wall where the display is to be located. Refer to the referenced shop drawings for your display model to determine the location of the bracket with respect to the display. **Be sure the bracket is mounted to sufficiently support the weight of the display. Have all mountings inspected by a qualified structural engineer.**
2. Set the display on the wall-mounted bracket. The bracket fits onto the wall mounting clips as shown in the reference drawings.

Section 3: Electrical Installation

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

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

3.1 Common Connectors in the Sign

The power and signal connections in the signs use several 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 cable and connector.

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

1. Ribbon Cable Connectors:

Figure 11 illustrates a typical ribbon cable connector. To disconnect the ribbon cable, push the plastic clips on the sides of the jack inward.

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 CalLube™ protector paste to the plug before inserting it into the jack. This paste will protect both the plug and the jack from corrosion.

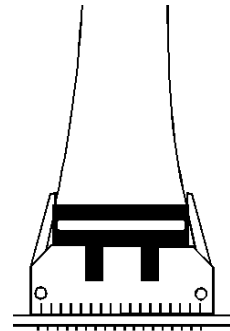


Figure 11: Ribbon Cable Connector

2. Termination Blocks:

Termination blocks are usually used to connect internal power and signal wires to wires of the same type coming into the sign 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 12**.

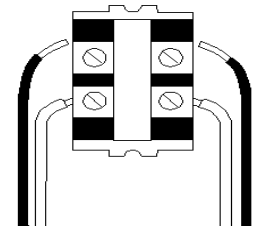


Figure 12: Termination Block

3. Phoenix™-Style Connectors:

Phoenix-style connectors, which are usually green, are used for the external temperature sensor termination to the display. Refer to **Figure 13**. Strip one-quarter inch of insulation from the wire prior to termination. To remove a wire, turn the above screw counter-clockwise to loosen the connector's grip on the wire. To insert a wire, push the bare wire into the connector, and turn the above screw clockwise to lock the wire into place.

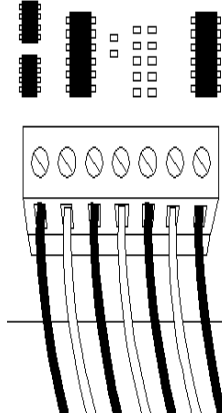


Figure 13: Phoenix-Style Connector

4. Mate-n-Lok™ Connectors:

The Mate-n-Lok connectors found in the signs are white and come in a variety of sizes. **Figure 14** 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.

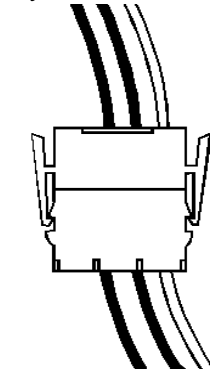


Figure 14: Mate-n-Lok Connector

5. Phone Jacks (RJ11/RJ45 Connectors):

RJ11 and RJ45 connectors are similar to the telephone and network connectors found in homes and businesses cables. 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 CalLube™ protector paste to the plug before inserting it into the jack. This paste will protect both the plug and the jack from corrosion.

3.2 Control Cable Categories

Cable Types

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 15**. This cable has one end that is the mirror image of the other end (i.e. the cable is flipped). Refer to **Figure 16** for a standard flipped cable.

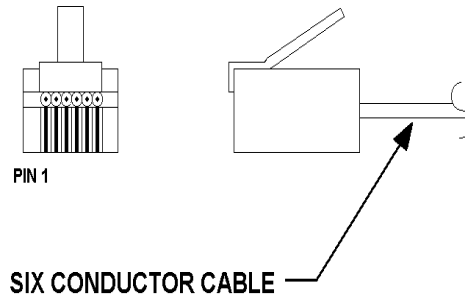


Figure 15: 6-Conductor RJ11 Connector and Cable

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

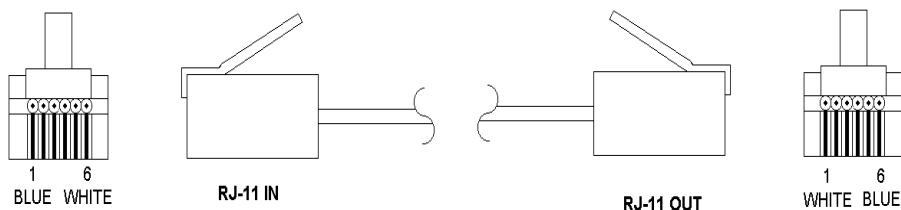


Figure 16: Flipped Cable with RJ Connectors

Installing an RJ11 Connector

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

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

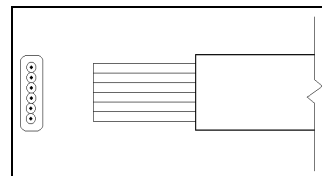


Figure 17: Wire with Outer Jacket Stripped

3.3 Power

Reference Drawings:

- Shop Drawing; AE-3010-16***-7.62mm-SBRG **Drawing A-107618**
- Shop Drawing; AE-3010-32***-7.62mm-SBRG **Drawing A-107636**
- Shop Drawing; AE-3010-48***-7.62mm-SBRG **Drawing A-107639**

Refer to the **Shop Drawings** listed in this section for voltage and current requirements. A 120VAC single-phase outlet powers the displays.

Do not connect the display to any voltage other than that listed on the Daktronics product label attached to the back of the display.

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.

3.4 Grounding

Proper grounding is necessary for reliable equipment operation and provides some protection to the equipment from damaging electrical disturbances. The displays are supplied with a power cord that contains an earth ground conductor. Make sure to plug this cord into a grounded outlet. **The display must be properly grounded or the warranty will be void.**

Note: Displays must be earth grounded according to local electrical code.

The Galaxy displays are supplied with an eight (8) foot power cord.

The socket-outlet should be installed near the equipment and be easily accessible. Plug the power cord into the back of the display as shown in **Figure 18**.

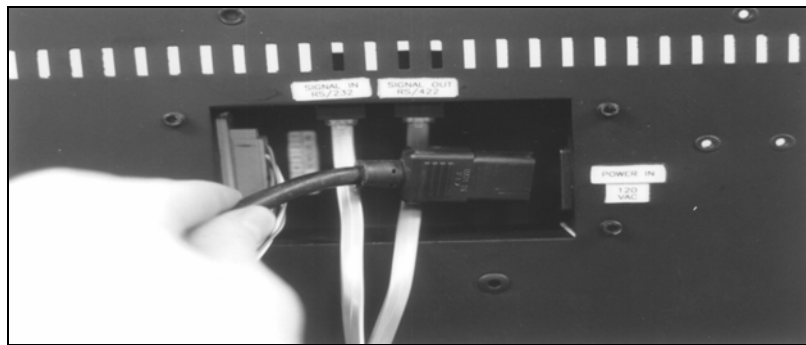


Figure 18: Power Cord Connection

3.5 Signal Termination from Computer to Display

RS232

Reference Drawings:

V1500 System Riser Diagram; RS/232..... **Drawing A-91388**

A RS232 system connects the first sign directly to the computer via an adapter. The adapter has either a DB9 (0A-1115-0042) or a DB25 (0A-1115-0044) connector on one side, and an RJ11 jack on the other. One end of the RJ11 cable plugs into this adaptor and the other end to the display. Refer to **Figure 19** and **Drawing A-91388** for system layout.

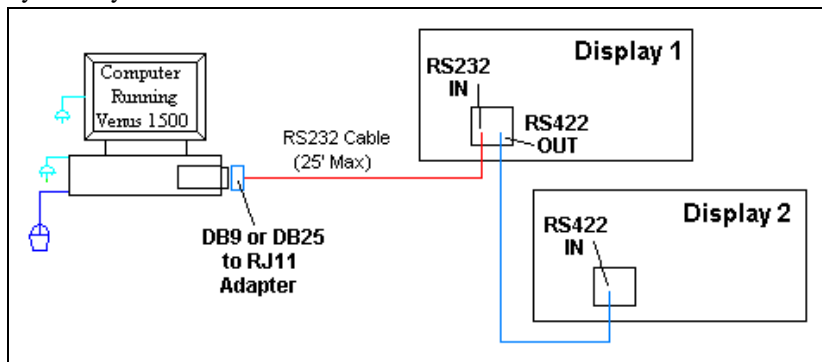


Figure 19: RS232 System Layout



Figure 20: RS232 Input Connection

1. Plug the DB9 or DB25 to RJ11 adaptor into the computer's RS232 serial port.
2. Plug one end of the flipped RJ11 cable (W-1265) into the adaptor.
3. Plug the opposite end of the cable into the RS232 IN jack on the rear of the display as shown in **Figure 20**.

Pin out of the RS232 IN jack.

Pin Number	Function
1	RTS OUT-P
2	RESET OUT-P
3	TX OUT-N
4	GND
5	RX IN-N
6	DCD IN-P

RS422

Reference Drawings:

V1500 System Riser Diagram; RS422**Drawing A-91387**

An RS422 system connects the first sign through a signal converter near the computer. A serial cable (W-1249) connects to the signal converter, and an RJ11 flipped cable will connect from there to the display. Refer to **Figure 21** and **Drawing**

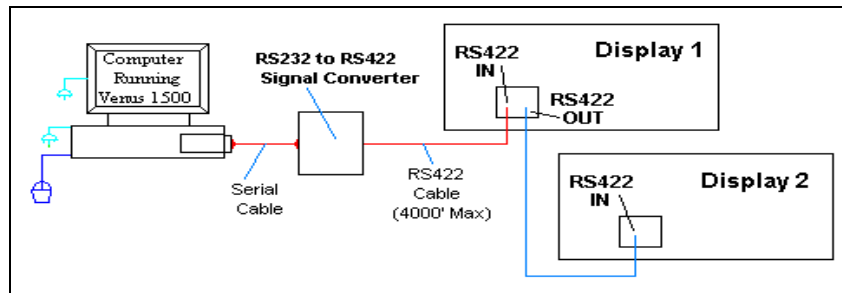


Figure 21: RS422 System Layout

A-91387 for system layout.

1. Connect the DB9 end of the serial cable to the serial port of the computer.
2. Connect the DB25 end of the serial cable to J1 on the signal converter (0A-1127-0237 or 0A-1127-0255).
3. Connect one end of the flipped RJ11 cable to J2 or J3 on the signal converter as shown in **Figure 22**.



Figure 22: RS422 Signal Converter Connections

Signal Converter to Display Connection Using Flipped Cable	
Signal Converter (J2/J3) RS422 OUT	RS422 IN Jack on the Display
Pin 1 (GND)	Pin 1 (N.C.)
Pin 2 (TX-N)	Pin 2 (D1OUT-P)
Pin 3 (TX-P)	Pin 3 (D1OUT-N)
Pin 4 (RX-N)	Pin 4 (D1IN-P)
Pin 5 (RX-P)	Pin 5 (D1IN-N)
Pin 6 (GND)	Pin 6 (N.C.)

Note: The table of the pinouts of the signal converter and the RS422 In at the display illustrate that the pinouts to both are the same. Therefore, a flipped cable is required to connect from the signal converter to the display.

Modem

Reference Drawings:

V1500 System Riser Diagram, Modem**Drawing A-91386**

A modem system uses standard phone lines to connect from the computer to the display. Both the modem at the computer and at the display will need to be connected to a phone jack. Refer to **Drawing A-91386** and **Figure 23** for the system layout.

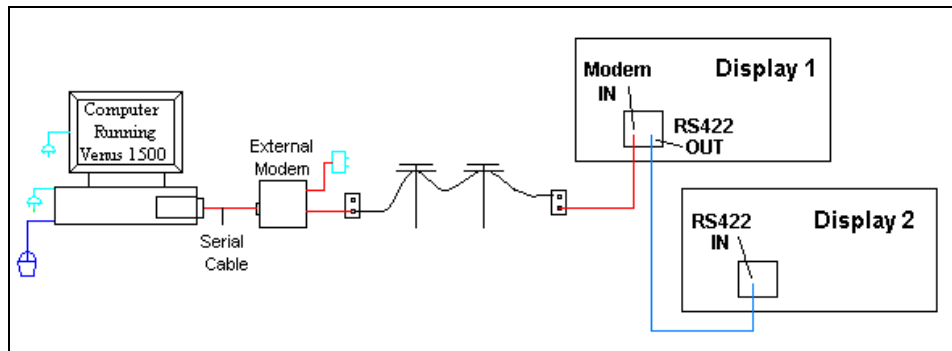


Figure 23: Modem System Layout

1. Modem connection:
 - a. If using an internal modem, connect a phone line from the modem to the wall phone jack.
 - b. If using an external modem, connect the cable from the serial port on the computer to the input on the modem, then connect a phone line from the modem to the wall jack. Plug in the power pack to the external modem.
2. Connect an RJ11 phone line from the wall jack to the input on the back of the display.
3. The display requires a dedicated phone line.

Pin out of the Modem In Jack	
Pin Number	Function
Pin 1	N.C.
Pin 2	N.C.
Pin 3	TIP-P
Pin 4	Ring-P
Pin 5	N.C.
Pin 6	N.C.

TCP/IP or LAN System

Reference Drawings:

System Riser Diagram, TCP/IP Network**Drawing A-231373**

To communicate to the display over an Ethernet network requires an Ethernet card in the computer and a network connection to the display. Refer to **Drawing A-231373** and **Figure 24** for system layout.

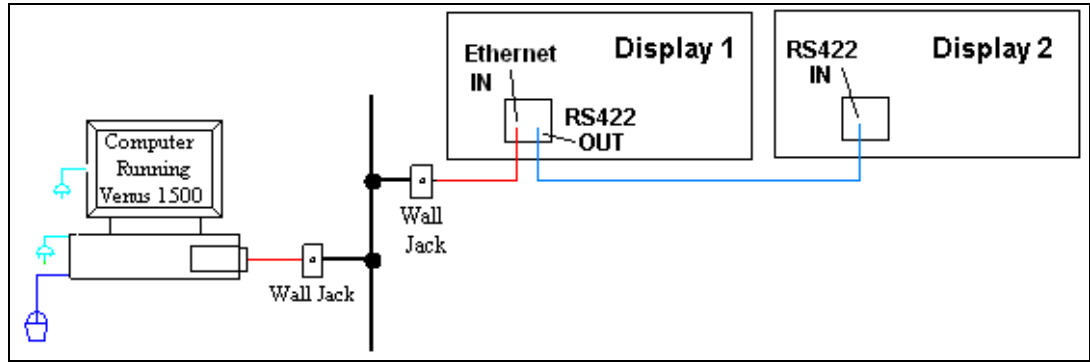


Figure 24: TCP/IP (Ethernet) System Layout

1. Connect the second network cable from a network jack to the display.
2. The maximum distance from the network hub or switch is 100m.

Note: The Serial Server used in each case is the same, but it must be programmed for either RS232 or RS422 output.

3.6 Signal Connection Between Two (or More) Displays

Reference Drawings:

- System Riser Diagram, Modem **Drawing A-91386**
- System Riser Diagram; RS422 **Drawing A-91387**
- System Riser Diagram, RS232 **Drawing A-91388**
- System Riser Diagram, TCP/IP Network **Drawing A-231373**

The signal connection between displays is the same for all types of systems. Refer to the **System Riser Diagram** for your system for the connection method.

When wiring from display to display the RJ11 cable between displays will always be flipped. See **Section 3.2** for descriptions and methods for making flipped cables. The best method of wiring the displays together is to start at the first sign, and connect from the out of that display to the in port on the next display, etc. in the network.

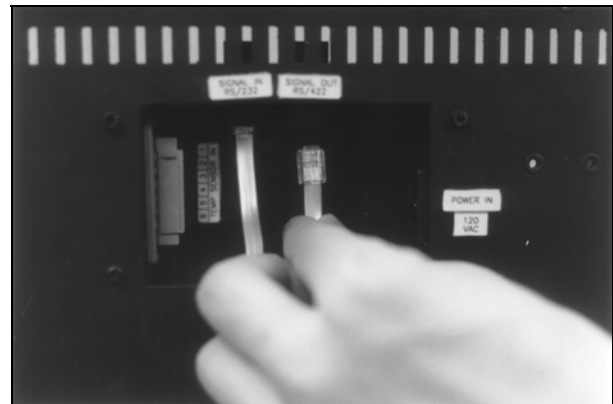


Figure 25: RS422 Interconnection

RS422 Out Jack on Display	
Pin 1	Gnd-N
Pin 2	D2Out-N
Pin 3	D2Out-P
Pin 4	D2In-N
Pin 5	D2In-P
Pin 6	Gnd-N

RS422 IN Jack on Display	
Pin 1	N.C.
Pin 2	D1Out-P
Pin 3	D1Out-N
Pin 4	D1In-P
Pin 5	D1Out-N
Pin 6	N.C.

1. Plug one end of the flipped RJ11 cable into the “Signal Out” output jack on the first display and the other end of the cable in the input jack on the next display.
2. Refer to **Figure 25**.
3. Continue this procedure throughout the network. When the cabling is complete, the last display will have nothing in the output jack.

3.7 Initial Operation

Each time power is applied to the display; the display will run through an initialization in which it will display the following:

1. Output Test (DDDs)
2. Product Name (Galaxy)
3. Display Size (Row x Column)
4. Firmware Number (ED10134)
5. Firmware Revision (Rev X.XX)
6. COM1 Configuration (C1: V15/RTD)
7. COM2 Configuration (C2: None)
8. Line Frequency (60 Hz)
9. Hardware Address (HW: XX)
10. Software Address (SW: XX)
11. Display Name
12. Modem (if Present)

Section 4: Maintenance and Troubleshooting



Important Notes:

1. **Disconnect power before any repair or maintenance work is done on the display.**
2. **Qualified service personnel must make any access to internal display electronics.**
3. **Care must be taken when handling the display's face panel to prevent scratches or other damage.**

4.1 Maintenance and Troubleshooting Overview

Daktronics Galaxy[®] series AE-3010 displays are front accessible; meaning access to the internal components can be gained only from the front of the display.

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

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

4.2 Signal Summary

The signal routing for the display, as shown in **Figure 26**, can be summarized as follows:

1. Data from the control computer, which runs Venus[®] 1500 software, travels via RS232, RS422, modem, or Ethernet signal to the first display.
2. The input signal to the display is connected to the display controller. From the controller, the signal then travels over one or more 40-conductor ribbon cables (J1 through J3 provide signal out) to J2 on the driver of the first row of modules in the display.
3. Data exits at J1 and is relayed to J2 of the next module and so on, traveling down the entire row of modules. The modules use this display data to control the LEDs.
4. For multiple displays or a display network, an RS422 RJ11 cable relays signal between the first display and the second display.

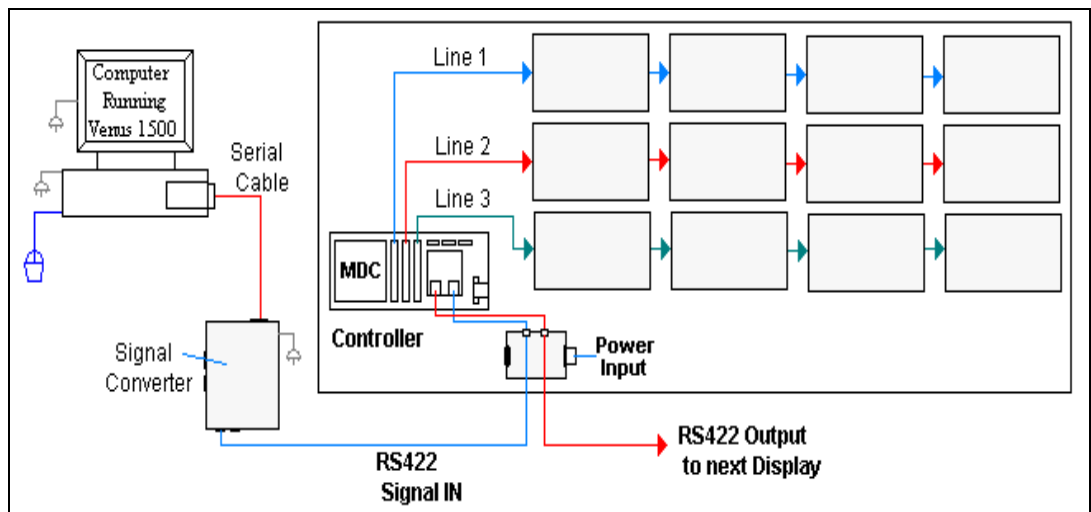


Figure 26: Signal Summary using RS422

4.3 Power Summary

Reference Drawing:

- Schematic; AE-3010-32**(*)-2.1..... **Drawing B-102485**
- Schematic; AE-3010-48**(*)-2.1..... **Drawing B-102706**
- Schematic; AE-3010-16**(*)-2.1..... **Drawing B-105418**

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

1. Power terminates to the display using a 120 VAC power cord that plugs into the recessed panel on the back of the display.
2. Incoming power goes through an electrical line filter and a fuse. It is then distributed to the transformer and the power supplies mounted to the back sheet of the display.
3. The controller board receives about 10 VAC from the transformer.
4. The power supplies are set to 5.3 VDC. For assistance with the wiring to the power supplies see the **Schematics**. Power supplies are preset. Contact Daktronics Customer Service for the proper settings.

4.4 Service and Diagnostics

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

- accessing the interior of the display
- LED module replacement
- power supply replacement
- controller replacement
- display addressing

Accessing the Interior of the Display

Remove the socket head screws from the face panel using a 9/64" Allen wrench (refer to **Figure 27**).

Gently pull the face panel from the body of the sign. The display opens as shown in **Figure 28**. The LED module panels can now be seen.

To access the display's interior electronic components:

1. Disconnect Power to the display.
2. Open the face panel as described above.
3. Using a #2 Philips screwdriver, turn the screws securing the top of the LED module panel to the cabinet one-quarter turn counter-clockwise. (The screws are designed to remain in the LED module flanges, but release from the cabinet.)
4. Gently tilt the LED module panel downward from the body of the display. The panel will be supported in a horizontal position by lanyards. **DO NOT** use the module panel to support additional weight. Refer to **Figure 29**.

Once the LED module panel is opened, the display interior will be visible. Various internal components, including the display controller, transformer, light detector, LED modules, and power supplies are now accessible for repair or replacement.

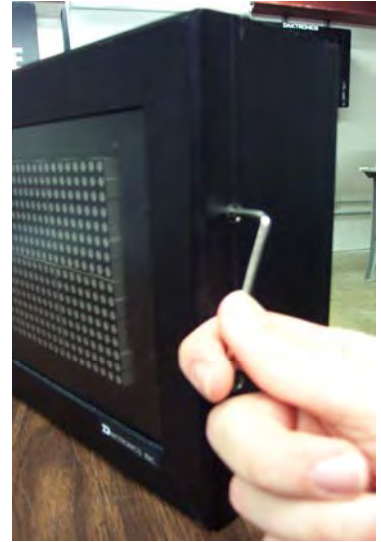


Figure 27: Removing the Screws from the Face Panel



Figure 28: Display, Face Panel partially removed

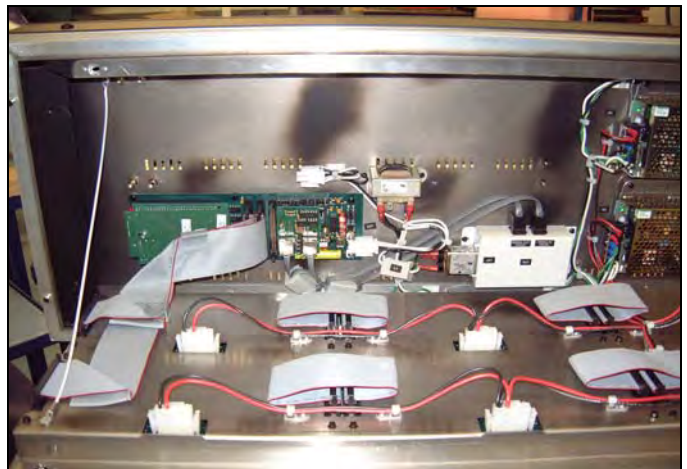


Figure 29: Display Interior

LED Module Replacement

If any LED modules fail, the recommended procedure is to replace the failed module or send it to Daktronics or a Daktronics Sales and Service office for repair.

To remove an individual module:

1. Disconnect Power to the display.
2. Push the clips outward and gently pull the 40-pin ribbon cables from the failed module as shown in **Figure 31**.
3. Open the display and access the display interior as previously described.
4. Press the tabs on either side of the four-pin power connector to release it and shown in **Figure 30**.
5. Each module is held in place by #6 screws. Using a 3/16" nutdriver, remove the module screws from the rear of the panel.
6. Gently pull the failed module from the panel. Reverse the previous

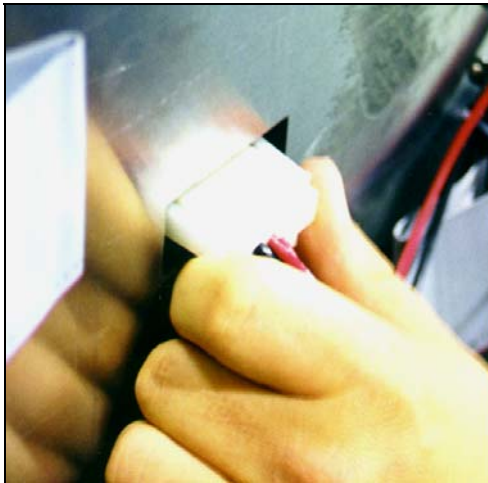


Figure 30: Disconnecting Power from LED Module



Figure 31: LED Module Ribbon Cable Removal

steps to attach a new module.

Power Supply Replacement

Note: Disconnect power from the display before removing a power supply.

Power to the LED modules is provided by a small 5V power supply. Each power supply can support up to three (3) modules. They are located on the back sheet of the display.

Each power supply is secured to a power supply plate by two (2) 3x10 metric screws. The plate is secured to the back sheet by two (2) #6 hex head screws as shown in **Figure 32**. Use a 3/16 nutdriver to remove the #6 screws.



Figure 32: Loosening Power Supply Screws

1. Lift the power supply and plate off the back sheet standoffs. The metric screws securing the power supply to the plate are now accessible.
2. Use a #1 Philips head screwdriver to remove the screws and free the power supply.
3. Disconnect the power cables as shown in **Figure 33**.
4. The power supply is now fully released and ready for replacement.
5. Follow the previous steps in reverse order to reattach the new power supply.
6. Be sure to connect the power wires in the correct locations

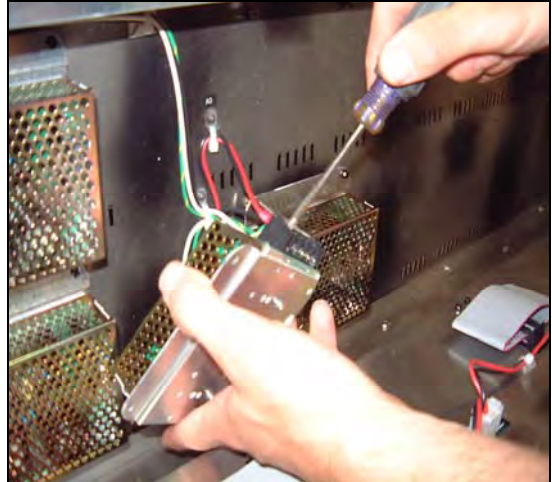


Figure 33: Power Supply Cable Connections

Refer to your display's **Schematic** for the proper wiring configuration.

Accessing and Replacing the Controller Board

The display controller is mounted to the back sheet of the cabinet in the lower left corner. The controller receives, interprets, and activates the information from the computer to the appropriate LEDs on the display.

The controller board includes three LEDs:

1. DS1 should be on whenever power is applied to the board.
2. DS2 should have a steady flash to indicate that the controller is running properly. The normal rate is about once per second. The run LED will flash faster when the controller is in test mode.
3. DS3 should flash when receiving information from the light sensor.
4. See **Figure 34** below for LED and connector locations.

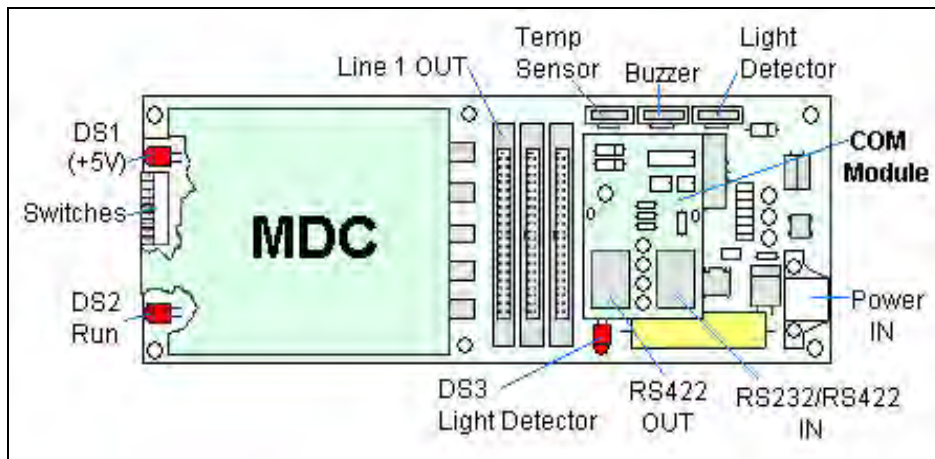


Figure 34: Controller Board

To replace a failed controller:

1. Disconnect power to the display.
2. Open the display and lift the LED module panel to access the interior components.
3. Label all the signal cables before removing them from the controller
4. Remove all power and signal connections from the board. Pressing outward on the tabs, and carefully pulling them from the jack releases the “Locked” connectors.
5. Remove the #6 mounting screws. Five of the five screws are hex head, while one is a Philips head. Remove the mounting six screws using a 3/16" nutdriver.
6. Take note of the switch configuration and set the same address on the new controller.
7. Carefully remove the controller board from the display.
8. Attached the new controller using the #6 screws. Be sure to replace the Philips head screw in the location where it was removed.
9. Reconnect the power and signal cables.

Display Addressing

Before a display can be run in a sign network, it must have an address. The display address can be set using “DIP” switches located on a PC board known as the MDC. The MDC is the circuit card mounted on the left end of the controller board.

Locate the DIP switches on the MDC. They should be on the bottom end of the card. Refer to **Figure 35** for a picture of the DIP switches.

When replacing a controller board, be sure to set the DIP switches to the same address configuration as the defective controller. The DIP switches follow standard binary code.

Note: By setting the DIP switches to address 0 (flip all the switches up or toward the numbers on the circuit board), a test mode can be activated. The display’s power must be turn off and then back on to recognize test mode, or any address change.

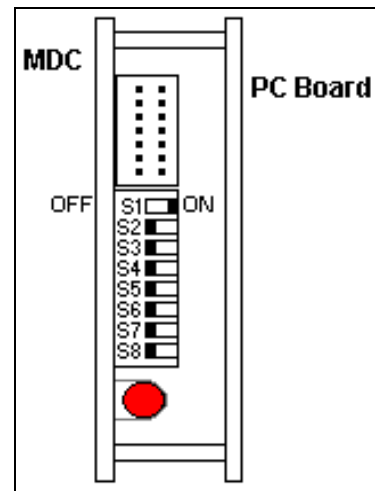


Figure 35: DIP Switches (Address 1 shown)

Switch 8	Switch 7	Switch 6	Switch 5	Switch 4	Switch 3	Switch 2	Switch 1	Address
Off	Off	Off	Off	Off	Off	Off	Off	Test Mode
Off	Off	Off	Off	Off	Off	Off	On	1
Off	Off	Off	Off	Off	Off	On	Off	2
Off	Off	Off	Off	Off	Off	On	On	3
Off	Off	Off	Off	Off	On	Off	Off	4
Off	Off	Off	Off	Off	On	Off	On	5
Off	Off	Off	Off	Off	On	On	Off	6
Off	Off	Off	Off	Off	On	On	On	7
Off	Off	Off	Off	On	Off	Off	Off	8
Off	Off	Off	Off	On	Off	Off	On	9
Off	Off	Off	Off	On	Off	On	Off	10
...
Off	On	On	On	On	On	On	On	127

4.5 Troubleshooting

This section lists some symptoms that may be encountered with the display. Possible cause and corrective actions are given. This list does not include every possible problem, but does represent some of the more common situations that may occur. Contact Daktronics Customer Service if problems continue with the display (refer to **Section 4.8**).

Symptom/Condition	Possible Corrective Action
One or more individual LED pixels will not light.	<ul style="list-style-type: none"> • Check/Replace ribbon cable. • Replace module.
A column of LED pixels will not light.	<ul style="list-style-type: none"> • Check/Replace ribbon cable. • Check for bent pins on LED blocks • Replace module.
A row of pixels will not light.	<ul style="list-style-type: none"> • Check/Replace ribbon cable. • Check for bent pins on LED blocks • Replace module
A section of the display is not working. Section extends all the way to the right side of the display.	<ul style="list-style-type: none"> • Check/ Replace the ribbon cable. • Check for power on modules. • Move/Replace the first module on the left side of the module that is not working. • Move/Replace the second module that isn't working. • Replace controller.
Entire display is garbled.	<ul style="list-style-type: none"> • Power down and power back up to watch bootup sequence. • Check power to controller board. • Replace the controller board.
A single line is distorted.	<ul style="list-style-type: none"> • Check/Replace ribbon cable. • Check for bent pins on module jacks • Replace the first module on the left side of the display of the bad line. • Replace the controller board.
Modules, which share power supplies will not light.	<ul style="list-style-type: none"> • Check power to modules. • Check wires and plugs to modules. • Check AC power to power supplies • Replace the power supply.
Entire display does not work.	<ul style="list-style-type: none"> • Check 120 VAC power to the display. • Check fuse in Power term panel. • Power down and power up to see bootup sequence. • Check 10 VAC to the controller board. • Check for correct use of software.
Cannot communicate to the display	<ul style="list-style-type: none"> • Check flipped RJ11 cable connections to the display. • Check for use of correct signal input • Check display configuration. • Check Venus 1500 software configuration. • Check signal converter, modem, or serial server connections.
Controller not operating properly.	<ul style="list-style-type: none"> • Check 10 VAC to the controller board. • Refer to the Venus 1500 operator's manual (ED-13530).

Cannot communicate to section of the network of displays	<ul style="list-style-type: none"> • Check the cabling between displays. • Check for bad input on first bad display. • Check for bad output on the last good display. • Switch the suspected bad display with a known good display. • Check displays and software for correct addressing
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. • Replace light detector. • Replace controller board.

4.6 Initial Operation Information

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

1. Output Test (DDD's)
2. Product Name (Galaxy)
3. Display Size (Row x Column)
4. Firmware Number (**ED10134**)
5. Firmware Revision (Rev X.XX)
6. COM1 Configuration (C1: V15/RTD)
7. COM2 Configuration (C2: None)
8. Line Frequency (60 Hz)
9. Hardware Address (HW: XX)
10. Software Address (SW: XX)
11. Display Name
12. If Modem is Present (Modem)

4.7 Replacement Parts

Part Description	Daktronics Part No.
Controller Board, (RS232, Modem)	0A-1161-0179
Controller Board, (RS422)	0A-1161-0180
Controller Board (Ethernet In, RS422 Out)	0A-1161-0258
LED Module; Tri-color	0P-1127-0026
Light Detector	0P-1151-0002
Signal Converter (RS232 to RS422)	0A-1127-0237 or 0A-1127-0255
Modem; RS232 coated	0P-1146-0003
Power Supply; 120VAC input	A-1499
Power Supply; 240VAC input	A-1449
Transformer (120 VAC Input)	T-1072
Transformer (240 VAC Input)	T-1106
Buzzer; Solid State, 2-35 VDC 3500	DS-1357
Ribbon Cable; Controller to first mod., 40-pos., 18"	W-1362
Ribbon Cable; Between Modules, 40-pos., 8."	W-1341
Serial Cable; RS232, DB9F to DB25M, 6'	W-1249
Adapter; DB9M to DB25F	A-1603
PC Adapter; DB9 to RJ11	0A-1115-0042
PC Adapter; DB25 to RJ11	0A-1115-0044
Serial Server (RS232 mode)	0A-1146-0063
Adapter; DB25M to RJ11F (RS232 Serial Server)	0A-1115-0045
Serial Server (RS422 mode)	0A-1146-0064
Adapter; DB25M to RJ11F (RS422 Serial Server)	0A-1146-0062
Cable, RJ45, 10 ft., 4-pair, twisted/Black	W-1383
25' RJ11, 6-cond. cable	W-1265
100' RJ11, 6-cond. cable	0A-1146-0002
500' RJ11, 6-cond. cable	0A-1146-0003
1000' RJ11, 6-cond. cable	0A-1146-0004
Cable; 18" RJ11; 6-cond., Straight	0A-1137-0160
Cable; 22 AWG, 4-cond. shielded (temp sensor)	W-1234
Power Cord, 360 degree rotating, 8 ft.	W-1181
Fuse; MDL-7 (F41, 120 VAC)	F-1031
Fuse; MDL-4 (F41, 240 VAC)	F-1043
Optional temperature sensor board	0P-1151-0003
Plug, 6-pin male, telephone, 6 pos.	P-1211
Crimp Tool for RJ11 connectors	TH-1033
Network Cable Tester	0A-1146-0005
Manual; Venus 1500 Operator's, Version 3	ED-13530

4.8 Daktronics Exchange and Repair and Return Programs

To serve customers' repair and maintenance needs, Daktronics offers both an exchange and a repair and return program. The exchange program reduces down time by providing timely replacement of key components. This service is provided to qualified customers who follow the program guidelines explained below. It is our pleasure to provide this service to ensure you get the most from your Daktronics products. Please call our Help Desk (1-877-605-1113) if you have any questions regarding the exchange program or any other Daktronics service.

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

If the replacement part fixes the problem, package the defective part in the same packaging the replacement part arrived in, fill out and attach the enclosed UPS shipping document, and **return the part to Daktronics**. You may use the same box and packing the exchange part was sent in. This will speed up the transaction and alleviate confusion when the failed component arrives at Daktronics. Daktronics expects immediate return of the exchange part if it does not solve the problem. For most equipment, you will be invoiced for the replacement part at the time it is shipped. This invoice is due when you receive it.

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

If the defective equipment is not shipped to Daktronics within 30 working days from the invoice date, it is assumed you are purchasing the replacement part and you will be invoiced for it. This second invoice represents the difference between the exchange price and the purchase price of the equipment. This amount is due when you receive the second invoice. If you return the exchange equipment after 30 working days from invoice date, you will be credited for the amount on the second invoice minus a restocking fee.

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

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

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

Packaging for Return: Package and pad the item well to prevent damage during shipment. Electronic components, such as printed circuit boards, should either be installed in an enclosure or should be put in an anti-static bag before boxing. Please enclose your name, address, phone number, and a clear description of symptoms.

This is how to reach us:

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

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

Customer Service Fax: 1-605 / 697-4444

E-mail: helpdesk@daktronics.com

4.9 Daktronics Warranty and Limitation of Liability

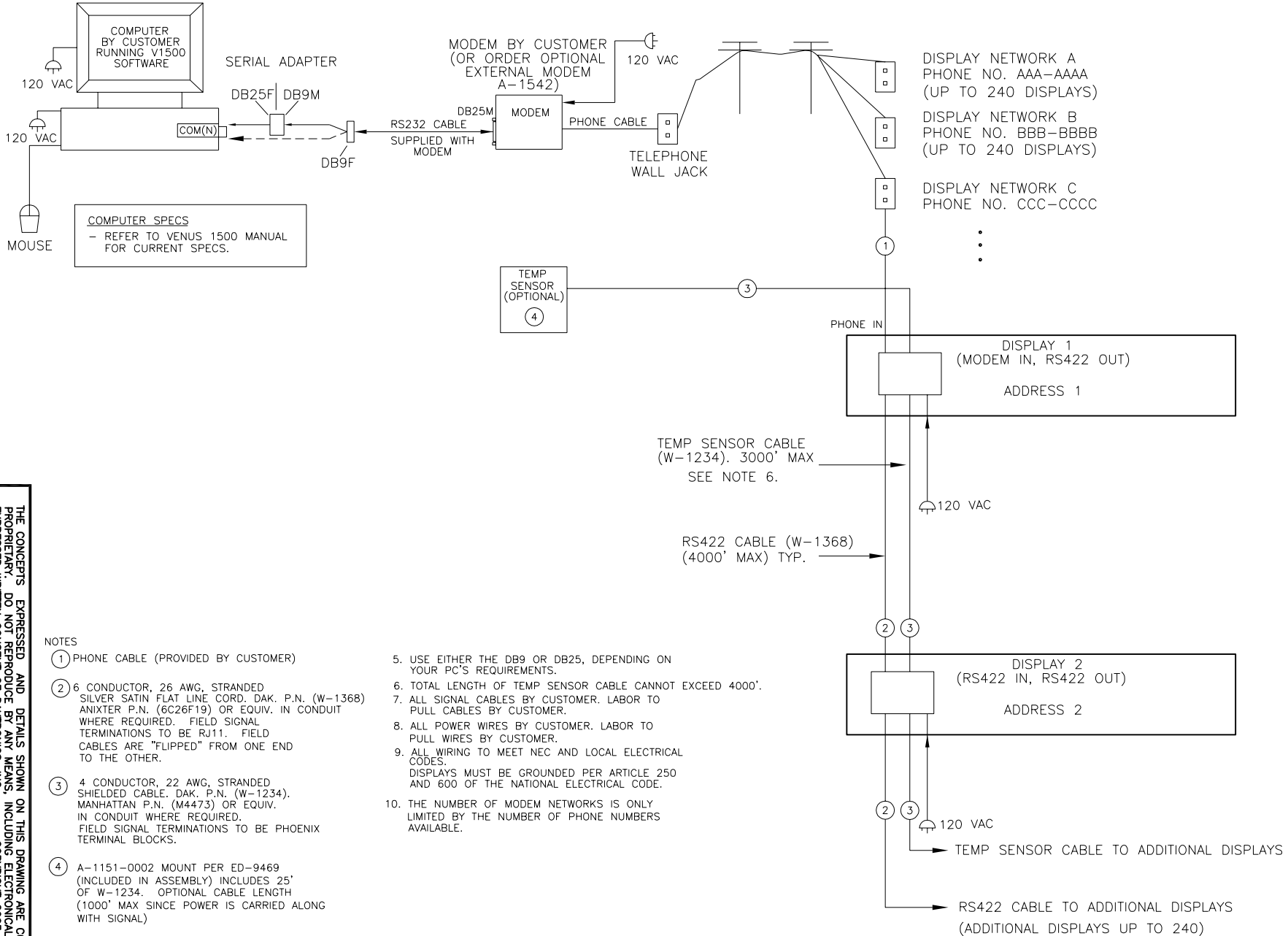
The Daktronics Warranty and Limitation of Liability is located in Appendix X. The Warranty is independent of Extended Service Agreements and is the authority in matters of service, repair, and display operation.

Appendix A: Reference Drawings

Drawings listed below are listed according to drawing type, and then listed according to sign size.

System Riser Diagram, Modem	Drawing A-91386
System Riser Diagram, RS422	Drawing A-91387
System Riser Diagram, RS232	Drawing A-91388
Shop Drawing, AE-3010-16***-7.62mm-SB-RG	Drawing A-107618
Shop Drawing, AE-3010-32***-7.62mm-SB-RG	Drawing A-107636
Shop Drawing, AE-3010-48***-7.62mm-SB-RG	Drawing A-107639
Mounting Methods, AE-3010-****-7.62mm	Drawing A-107655
System Riser Diagram, TCP/IP Network.....	Drawing A-231373
Schematic; AE-3010-32**(*)-2.1	Drawing B-102485
Schematic; AE-3010-48**(*)-2.1	Drawing B-102706
Schematic; AE-3010-16**(*)-2.1	Drawing B-105418

REV.	DATE	DESCRIPTION	BY	APPR.
01	01FEB02	UPDATED RISER	TJN	
02	30MAY03	UPDATED RISER, REMOVED ED-12717 BECAUSE THIS IS NO LONGER THE CURRENT MANUAL FOR V1500.	DJM	



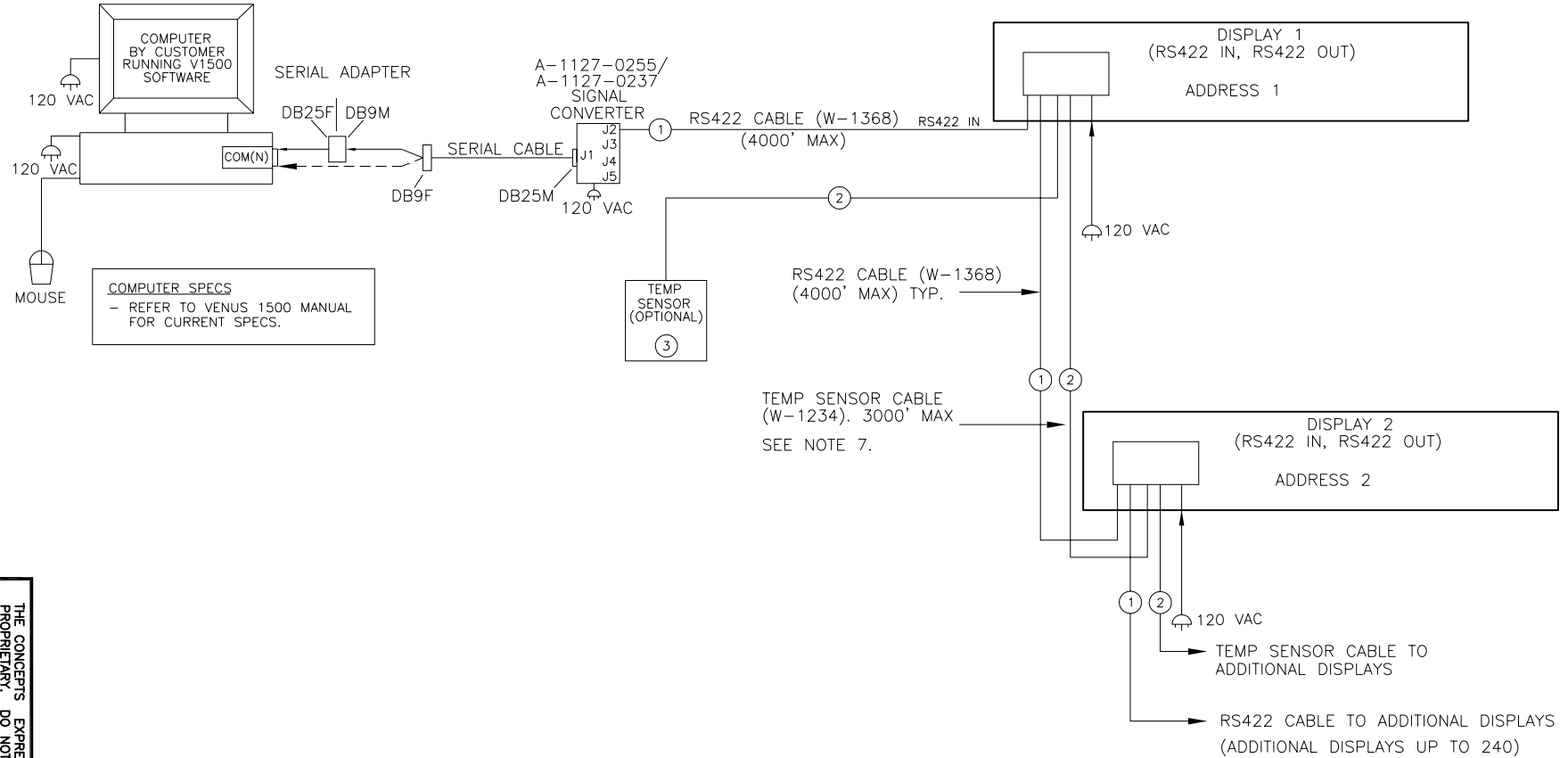
NOTES

- ① PHONE CABLE (PROVIDED BY CUSTOMER)
- ② 6 CONDUCTOR, 26 AWG, STRANDED SILVER SATIN FLAT LINE CORD. DAK. P.N. (W-1368) ANIXTER P.N. (6C26F19) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE RJ11. FIELD CABLES ARE "FLIPPED" FROM ONE END TO THE OTHER.
- ③ 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.
- ④ A-1151-0002 MOUNT PER ED-9469 (INCLUDED IN ASSEMBLY) INCLUDES 25' OF W-1234. OPTIONAL CABLE LENGTH (1000' MAX SINCE POWER IS CARRIED ALONG WITH SIGNAL)
5. USE EITHER THE DB9 OR DB25, DEPENDING ON YOUR PC'S REQUIREMENTS.
6. TOTAL LENGTH OF TEMP SENSOR CABLE CANNOT EXCEED 4000'.
7. ALL SIGNAL CABLES BY CUSTOMER. LABOR TO PULL CABLES BY CUSTOMER.
8. ALL POWER WIRES BY CUSTOMER. LABOR TO PULL WIRES BY CUSTOMER.
9. ALL WIRING TO MEET NEC AND LOCAL ELECTRICAL CODES. DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NATIONAL ELECTRICAL CODE.
10. THE NUMBER OF MODEM NETWORKS IS ONLY LIMITED BY THE NUMBER OF PHONE NUMBERS AVAILABLE.

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

PROJ: V1500 INDOOR PRODUCT LINE
 TITLE: V1500 SYSTEM RISER DIAGRAM; MODEM
 DES. BY: JCOOK
 DRAWN BY: AMEYER
 DATE: 20MAR97
 DAKTRONICS, INC. BROOKINGS, SD 57006
 REVISION
 APPR. BY:
 SCALE: 1=2
 1156-R01A-91386

REV.	DATE	DESCRIPTION	BY	APPR.
01	01FEB02	UPDATED RISER	TJN	
02	30MAY03	UPATED RISER. REMOVED ED-12717 BECAUSE FIS NO LONGER THE CURRENT MANUAL FOR V1500.	DJM	
03	25 MAR 04	REPLACED A-1127-0237 WITH A-1127-0255 (INCLUDES SURGE PROTECTION)	SAI	DJM



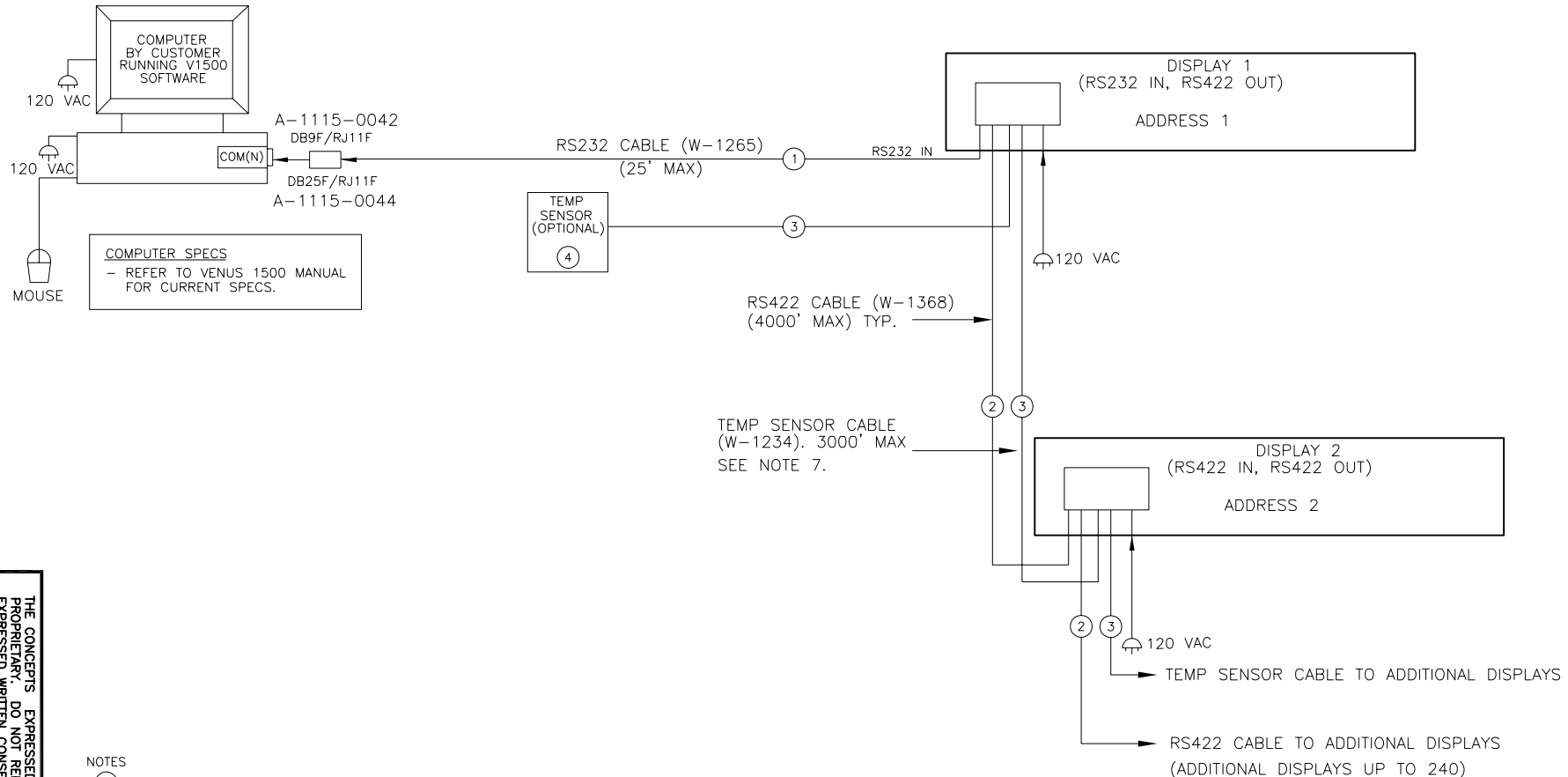
COMPUTER SPECS
 - REFER TO VENUS 1500 MANUAL FOR CURRENT SPECS.

NOTES

- ① 6 CONDUCTOR, 26 AWG, STRANDED SILVER SATIN FLAT LINE CORD. DAK. P.N. (W-1368) ANIXTER P.N. (6C26F19) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE RJ11. FIELD CABLES ARE "FLIPPED" FROM ONE END TO THE OTHER.
- 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.
5. RS/422 CONTROL EQUIPMENT KIT INCLUDES:
 W-1249.....SERIAL CABLE
 A-1603.....DB9 TO DB25 ADAPTER
 A-1127-0255.....SIGNAL CONVERTER
 A-1146-0005.....NETWORK/CABLE TESTER
6. USE EITHER THE DB9 OR DB25, DEPENDING ON YOUR PC'S REQUIREMENTS.
7. TOTAL LENGTH OF TEMP SENSOR CABLE CANNOT EXCEED 4000'.
8. ALL SIGNAL CABLES BY CUSTOMER. LABOR TO PULL CABLES BY CUSTOMER.
9. ALL POWER WIRES BY CUSTOMER. LABOR TO PULL WIRES BY CUSTOMER.
10. ALL WIRING TO MEET NEC AND LOCAL ELECTRICAL

THE CONCEPTS, EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS, INCLUDING ELECTRONICALLY WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2003 DAKTRONICS, INC.	
DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ.: V1500 INDOOR PRODUCT LINE TITLE: V1500 SYSTEM RISER DIAGRAM, RS/422 DES. BY: JCOOK DRAWN BY: AMEYER DATE: 20MAR97	REVISION 03 APPR. BY: SCALE: 1=2 1156-R01A-91387

REV.	DATE	DESCRIPTION	BY	APPR.
02	29MAY03	UPDATED RISER, REMOVED ED-12717 BECAUSE THIS IS NO LONGER THE CURRENT MANUAL FOR V1500.	DJM	
01	29JAN02	UPDATED RISER	TJN	



NOTES

- ① 6 CONDUCTOR, 26 AWG, STRANDED SILVER SATIN FLAT LINE CORD. DAK. P.N. (W-1265) REGAL P.N. (1012-6-25-VSS) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE RJ11. FIELD CABLES ARE "FLIPPED" FROM ONE END TO THE OTHER. (25' MAX)
 - ② 6 CONDUCTOR, 26 AWG, STRANDED SILVER SATIN FLAT LINE CORD. DAK. P.N. (W-1368) ANIXTER P.N. (6C26F19) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE RJ11. FIELD CABLES ARE "FLIPPED" FROM ONE END TO THE OTHER.
 - ③ 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.
 - ④ A-1151-0002 MOUNT PER ED-9469 (INCLUDED IN ASSEMBLY) INCLUDES 25' OF W-1234. OPTIONAL CABLE LENGTH (1000' MAX SINCE POWER IS CARRIED ALONG WITH SIGNAL)
5. RS/232 CONTROL EQUIPMENT KIT INCLUDES:
W-1265.....6 COND. CABLE, 25'
A-1115-0042.....DB9 TO RJ11
A-1115-0044.....DB25 TO RJ11
A-1146-0005.....NETWORK/CABLE TESTER
 6. USE EITHER THE DB9 OR DB25, DEPENDING ON YOUR PC'S REQUIREMENTS.
 7. TOTAL LENGTH OF TEMP SENSOR CABLE CANNOT EXCEED 4000'.
 8. ALL SIGNAL CABLES BY CUSTOMER. LABOR TO PULL CABLES BY CUSTOMER.
 9. ALL POWER WIRES BY CUSTOMER. LABOR TO PULL WIRES BY CUSTOMER.
 10. ALL WIRING TO MEET NEC AND LOCAL ELECTRICAL CODES. DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NATIONAL ELECTRICAL CODE.

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

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ.: V1500 INDOOR PRODUCT LINE

TITLE: V1500 SYSTEM RISER DIAGRAM, RS/232

DES. BY: JCOOK

DRAWN BY: AMEYER

DATE: 19MAR97

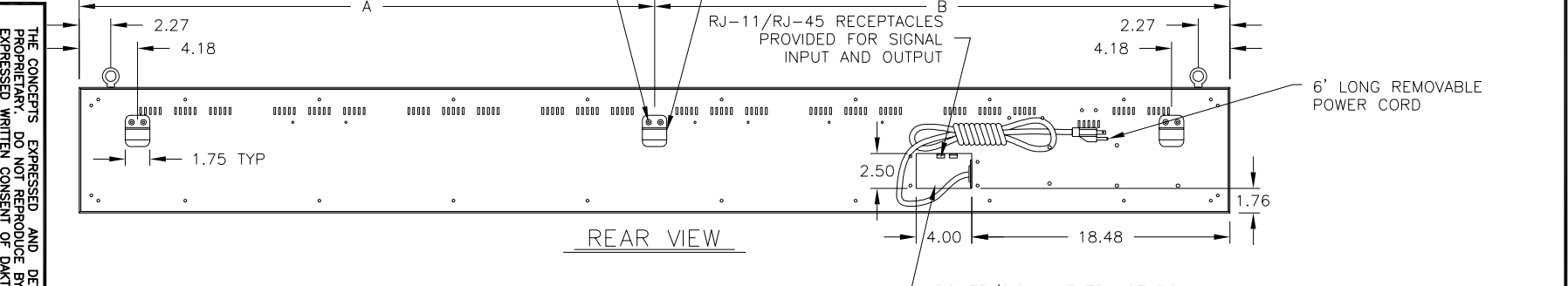
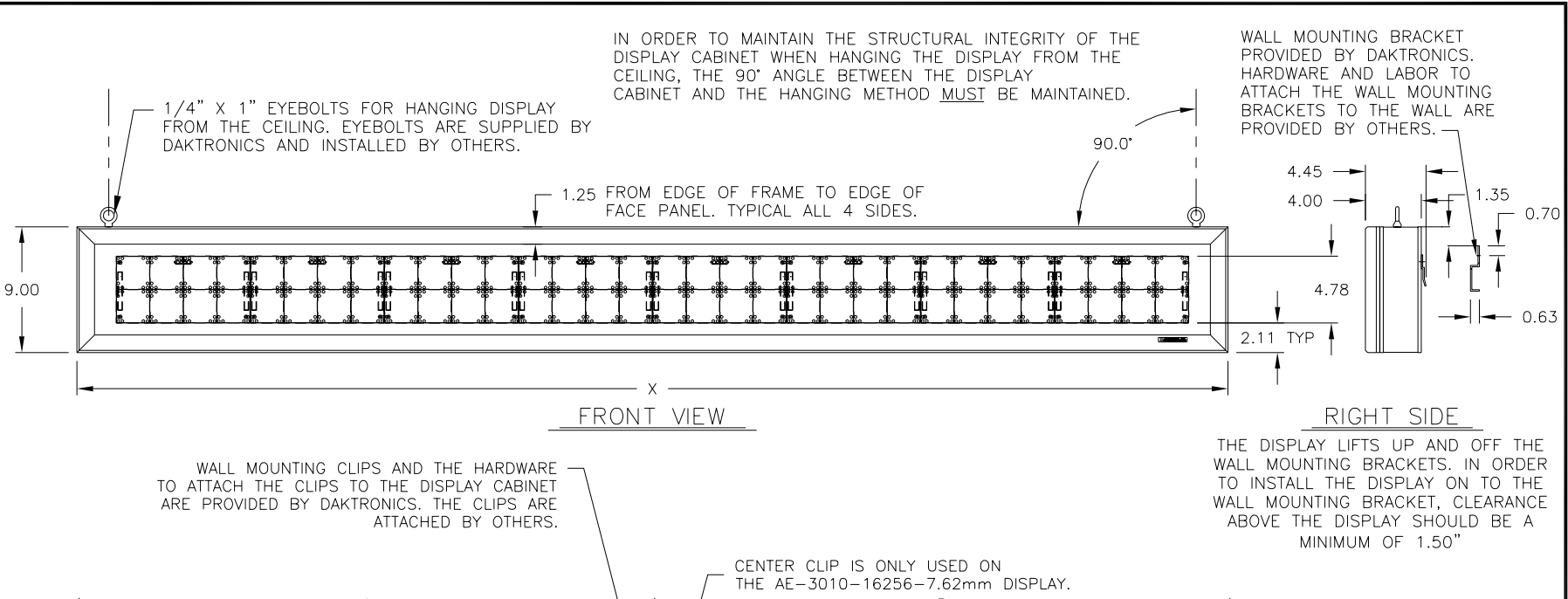
REVISION

APPR. BY:

1156-R01A-91388

SCALE: 1=2

REV.	DATE	DESCRIPTION	BY	APPR.
4	13MAR00	UPDATED POWER REQUIREMENTS	MAS	
5	22 OCT 02	UPDATED DISPLAY DESCRIPTIONS	MAS	
6	29 AUG 03	UPDATED DISPLAY WEIGHTS.	JMM	



NOTES:

- 1) ALL DIMENSIONS ARE IN INCHES.
- 2) DISPLAY CABINET COLOR IS FLAT BLACK.
- 3) DISPLAY L.E.D. COLOR: TRICOLOR (SUPERBRIGHT RED, GREEN, AMBER).
- 4) PIXEL CENTER-CENTER IS 7.62mm".
- 5) ALL ALUMINUM CONSTRUCTION.
- 6) FACE PANEL MATERIAL IS 0.125" ACRYLIC PANEL.
- 7) FACE PANEL COLOR: GREY.
- 8) FRONT ACCESS FOR SERVICING BY USING A 9/64" ALLEN (HEX) WRENCH SUPPLIED BY DAKTRONICS.
- 9) REFER TO DWG 1161-E10A-107655 FOR MOUNTING METHOD DETAILS.

DISPLAY	DIMENSIONS			APPROXIMATE			
	X	A	B	DISPLAY WEIGHT (LBS)	MAXIMUM POWER (WATTS)	AMPS @ 120VAC	AMPS @ 240VAC
AE-3010-1696-7.62mm	34.40	NA	NA	25	101	0.84	0.42
AE-3010-16128-7.62mm	44.00	NA	NA	31	131	1.09	0.55
AE-3010-16160-7.62mm	53.60	NA	NA	37	161	1.34	0.67
AE-3010-16192-7.62mm	63.20	NA	NA	43	191	1.60	0.80
AE-3010-16224-7.62mm	72.80	NA	NA	49	222	1.85	0.92
AE-3010-16256-7.62mm	82.40	41.20	41.20	55	252	2.10	1.05

SUBMITTAL REVIEW

APPROVED
 APPROVED AS NOTED
 APPROVED AS NOTED & RESUBMIT

COMPANY: _____
 SIGNED: _____
 TITLE: _____ DATE: _____

PROJ: GALAXY INDOOR MATRIX DISPLAYS
 TITLE: SHOP DWG; AE-3010-16***-7.62mm-SBRG
 DES. BY: MSOLHEIM
 DRAWN BY: MSOLHEIM
 DATE: 17SEPT98

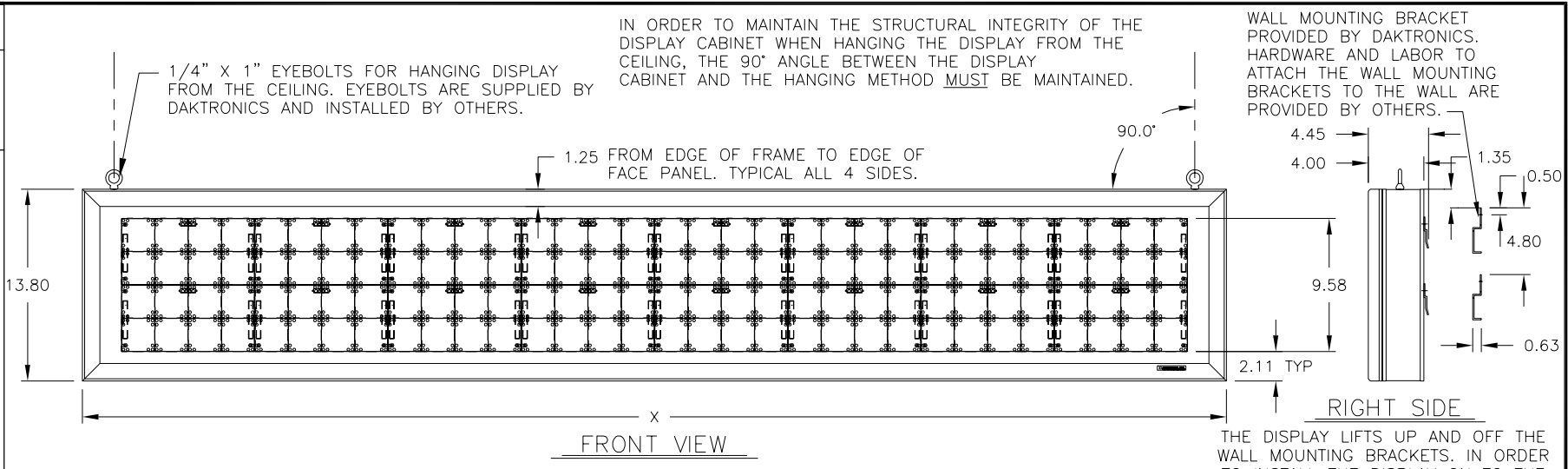
REVISION 06 SCALE: 1=12

1161-E10A-107618

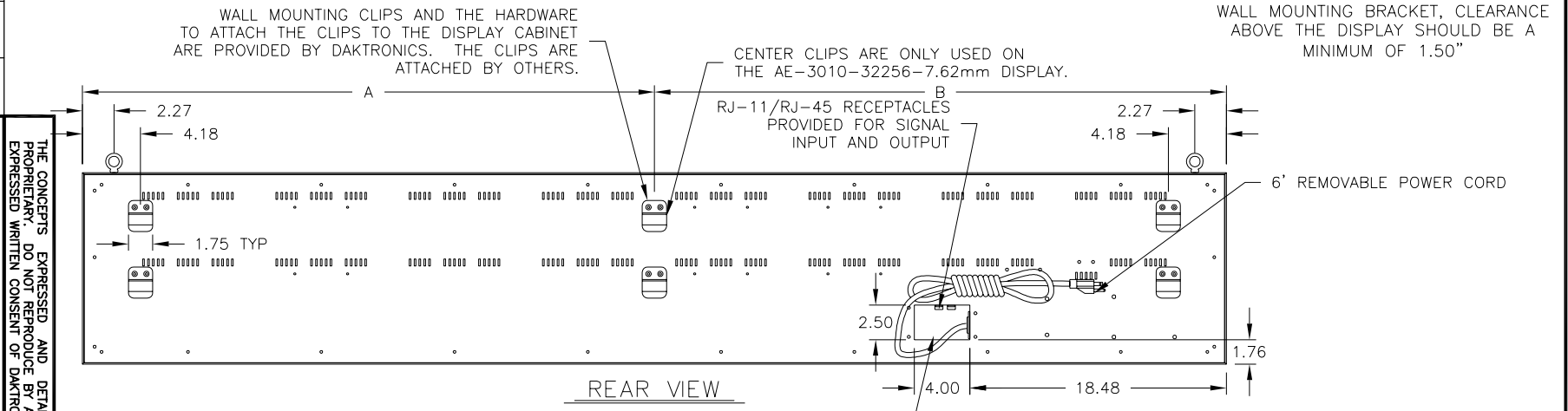
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DAKTRONICS, INC. BROOKINGS, SD 57006

REV.	DATE	DESCRIPTION	BY	APPR.
4	13MAR	UPDATED POWER REQUIREMENTS	MMS	
5	22 OCT 02	UPDATED DISPLAY DESCRIPTIONS	MMS	
6	29 AUG 03	UPDATED DISPLAY WEIGHTS.	JMM	



THE DISPLAY LIFTS UP AND OFF THE WALL MOUNTING BRACKETS. IN ORDER TO INSTALL THE DISPLAY ON TO THE WALL MOUNTING BRACKET, CLEARANCE ABOVE THE DISPLAY SHOULD BE A MINIMUM OF 1.50"



NOTES:

- ALL DIMENSIONS ARE IN INCHES.
- DISPLAY CABINET COLOR IS FLAT BLACK.
- DISPLAY L.E.D. COLOR: TRICOLOR (SUPERBRIGHT RED, GREEN, AMBER).
- PIXEL CENTER-CENTER 7.62mm.
- ALL ALUMINUM CONSTRUCTION.
- FACE PANEL MATERIAL IS 0.125" ACRYLIC PANEL.
- FACE PANEL COLOR: GREY.
- FRONT ACCESS FOR SERVICING BY USING A 9/64" ALLEN (HEX) WRENCH SUPPLIED BY DAKTRONICS.
- REFER TO DWG 1161-E10A-107655 FOR MOUNTING METHOD DETAILS.

SUBMITTAL REVIEW

APPROVED

APPROVED AS NOTED

APPROVED AS NOTED & RESUBMIT

COMPANY: _____

SIGNED: _____

DATE: _____

DISPLAY	DIMENSIONS			APPROXIMATE			
	X	A	B	DISPLAY WEIGHT (LBS)	MAXIMUM POWER (WATTS)	AMPS @ 120VAC	AMPS @ 240VAC
AE-3010-3296-7.62mm	34.40	NA	NA	35	191	1.60	0.80
AE-3010-32128-7.62mm	44.00	NA	NA	43	252	2.10	1.05
AE-3010-32160-7.62mm	53.60	NA	NA	52	312	2.60	1.30
AE-3010-32192-7.62mm	63.20	NA	NA	60	372	3.10	1.55
AE-3010-32224-7.62mm	72.80	NA	NA	69	432	3.60	1.80
AE-3010-32256-7.62mm	82.40	41.20	41.20	78	493	4.11	2.05

PROJ: GALAXY INDOOR MATRIX DISPLAYS

TITLE: SHOP DWG; AE-3010-32***-7.62mm-SBRG

DES. BY: MSOLHEIM

DAKTRONICS, INC. BROOKINGS, SD 57006

REVISION 06

APPR. BY: MSOLHEIM

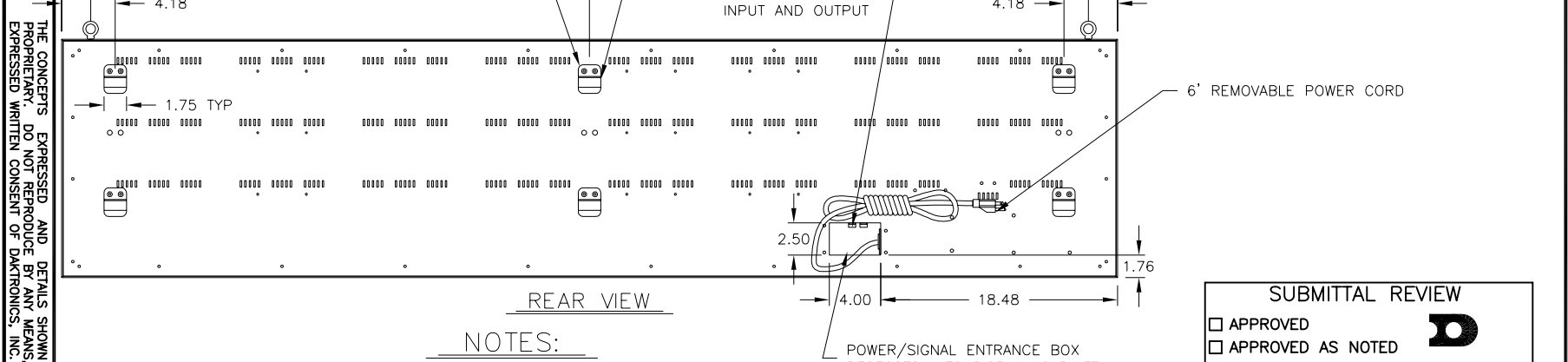
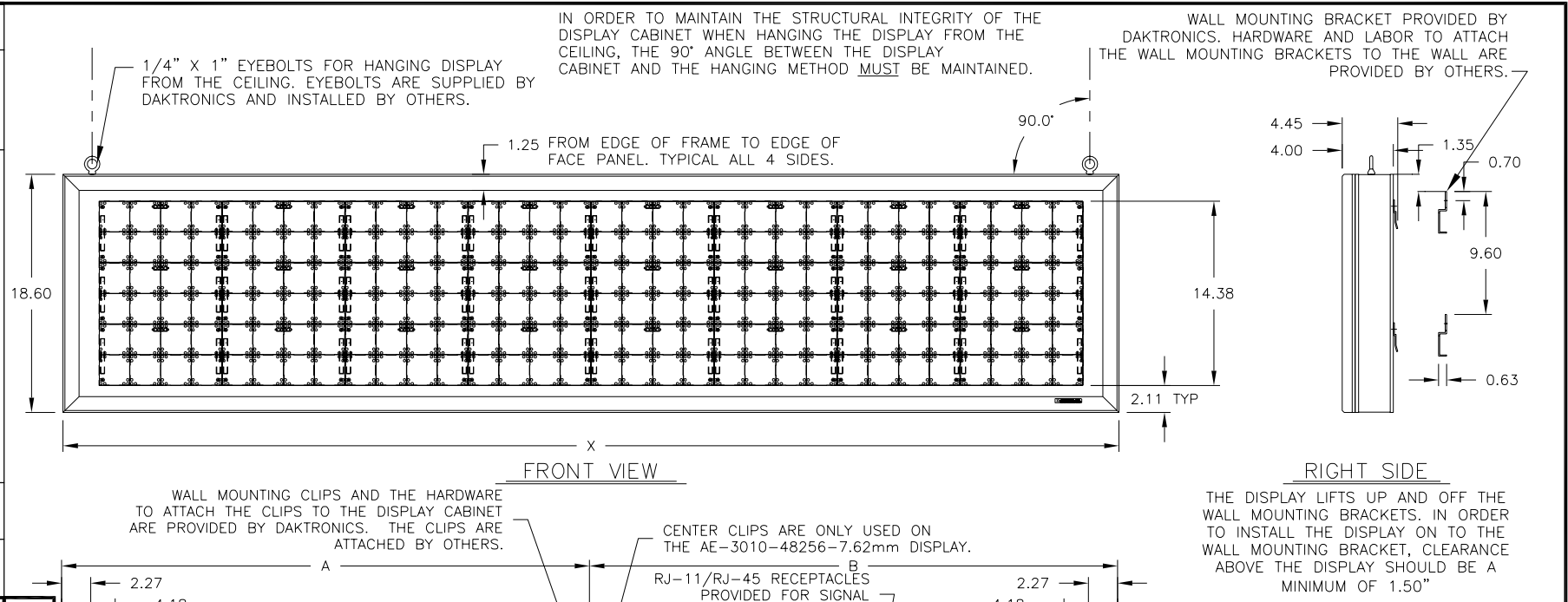
DATE: 17SEPT98

SCALE: 1=12

1161-E10A-107636

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REV.	DATE	DESCRIPTION	BY	APPR.
6	29 AUG 03	UPDATED DISPLAY WEIGHTS.	JMM	
5	22 OCT 02	UPDATED DISPLAY DESCRIPTIONS	MMS	
4	13 MAR 00	UPDATED POWER REQUIREMENTS	MMS	



NOTES:

- 1) ALL DIMENSIONS ARE IN INCHES.
- 2) DISPLAY CABINET COLOR IS FLAT BLACK.
- 3) DISPLAY L.E.D. COLOR: TRICOLOR (SUPERBRIGHT RED, GREEN, AMBER).
- 4) PIXEL CENTER-CENTER 7.62mm.
- 5) ALL ALUMINUM CONSTRUCTION.
- 6) FACE PANEL MATERIAL IS 0.125" ACRYLIC PANEL.
- 7) FACE PANEL COLOR: GREY.
- 8) FRONT ACCESS FOR SERVICING BY USING A 9/64" ALLEN (HEX) WRENCH SUPPLIED BY DAKTRONICS.
- 9) REFER TO DWG 1161-E10A-107655 FOR MOUNTING METHOD DETAILS.

DISPLAY	DIMENSIONS			APPROXIMATE			
	X	A	B	DISPLAY WEIGHT (LBS)	MAXIMUM POWER (WATTS)	AMPS @ 120VAC	AMPS @ 240VAC
AE-3010-4896-7.62mm	34.40	NA	NA	44	282	2.35	1.17
AE-3010-48128-7.62mm	44.00	NA	NA	55	372	3.10	1.55
AE-3010-48160-7.62mm	53.60	NA	NA	67	463	3.86	1.93
AE-3010-48192-7.62mm	63.20	NA	NA	77	553	4.61	2.30
AE-3010-48224-7.62mm	72.80	NA	NA	88	643	5.36	2.68
AE-3010-48256-7.62mm	82.40	41.20	41.20	100	734	6.11	3.06

SUBMITTAL REVIEW

APPROVED

APPROVED AS NOTED

APPROVED AS NOTED & RESUBMIT

COMPANY: _____

SIGNED: _____

TITLE: _____ DATE: _____

PROJ: GALAXY INDOOR MATRIX DISPLAYS

TITLE: SHOP DWG; AE-3010-48***-7.62mm-SBRG

DES. BY: MSOLHEIM

DRAWN BY: MSOLHEIM

DATE: 17SEPT98

REVISION 06

APPR. BY: _____

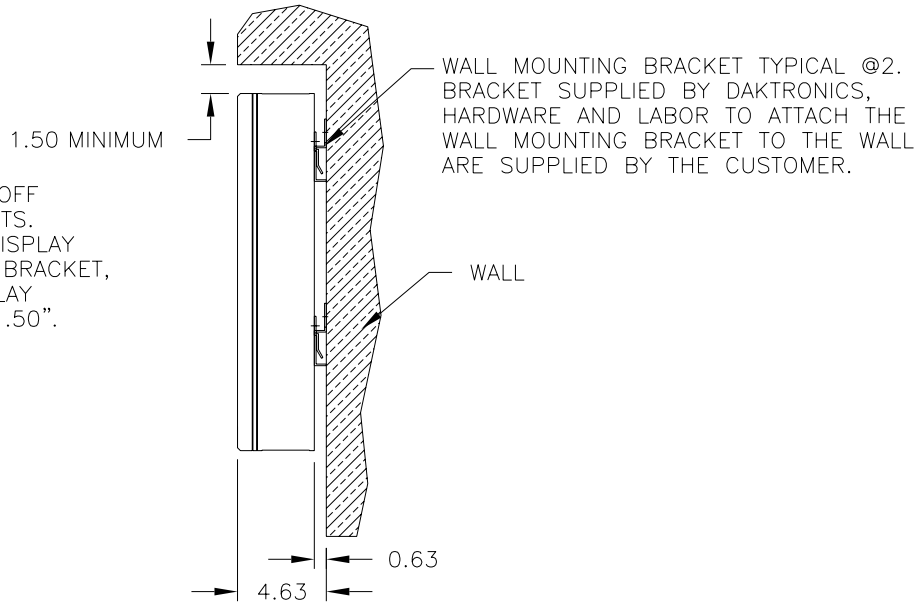
SCALE: 1=13

1161-E10A-107639

DAKTRONICS, INC. BROOKINGS, SD 57006

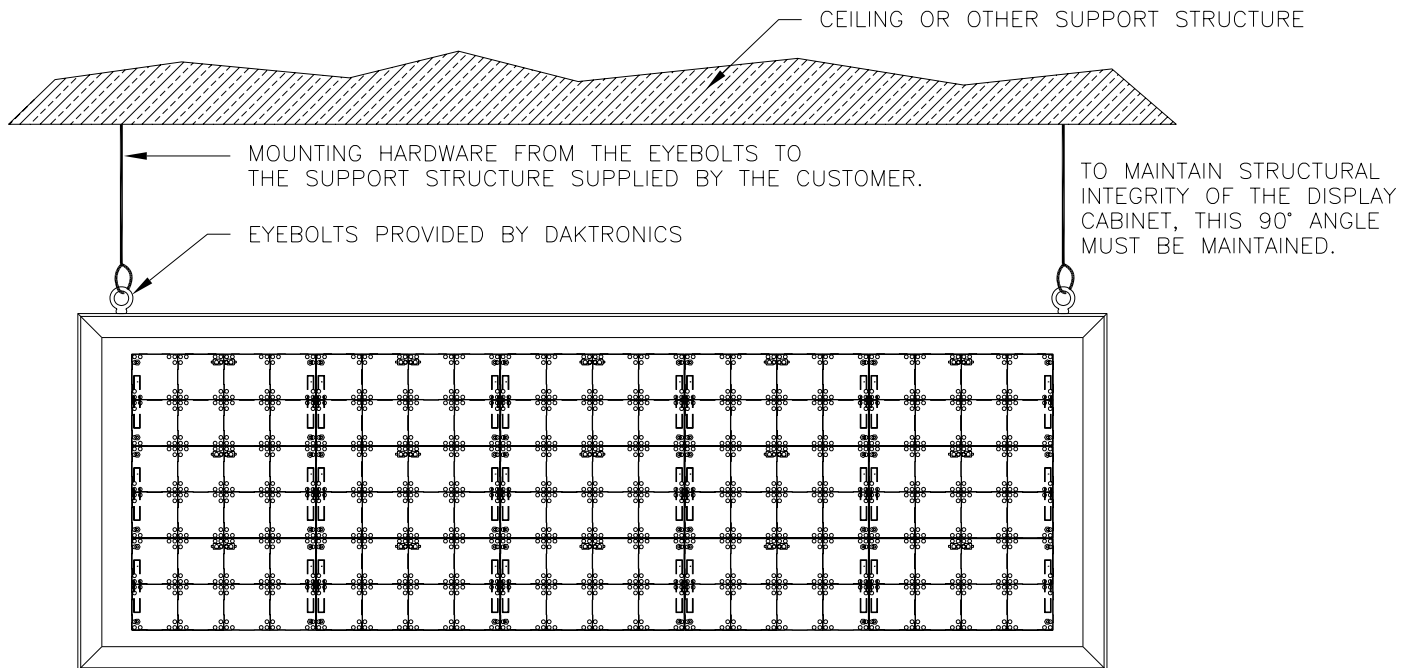
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THE DISPLAY LIFTS UP AND OFF THE WALL MOUNTING BRACKETS. IN ORDER TO INSTALL THE DISPLAY ON TO THE WALL MOUNTING BRACKET, CLEARANCE ABOVE THE DISPLAY SHOULD BE A MINIMUM OF 1.50".



RIGHT SIDE

WALL MOUNTING OPTION SHOWN



FRONT VIEW

CEILING MOUNTING OPTION SHOWN

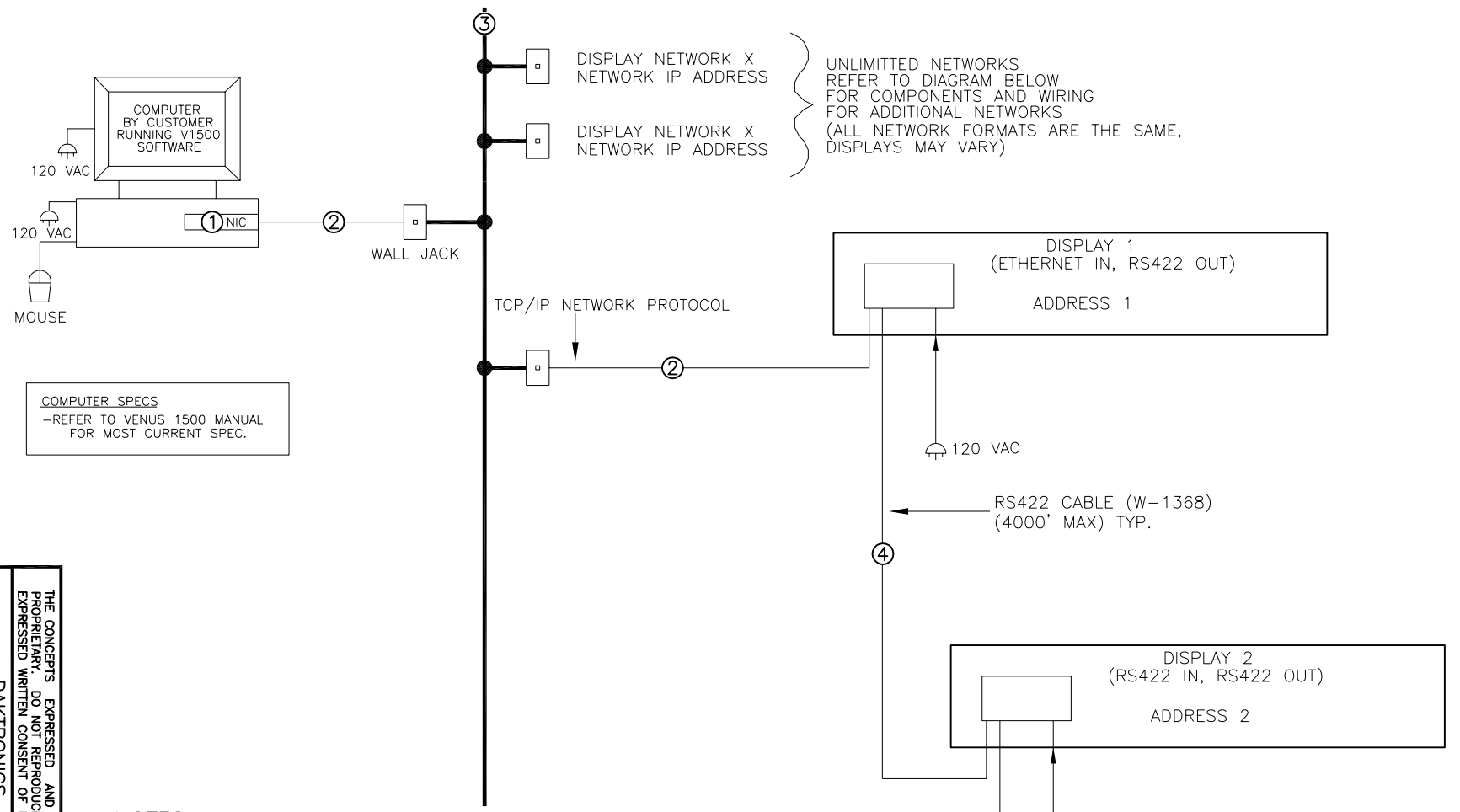
FOR INFORMATION SPECIFIC TO EACH DISPLAY REFER TO THE FOLLOWING SHOP DRAWINGS:

DISPLAY	DWG NUMBER
AE-3010-16***-7.62mm	A-107618
AE-3010-32***-7.62mm	A-107636
AE-3010-48***-7.62mm	A-107639

DAKTRONICS, INC. BROOKINGS, SD 57006		
PROJ: GALAXY INDOOR MATRIX DIPSLAYS		
TITLE: MOUNTING METHODS, AE-3010-****-7.62mm		
DES. BY: MSOLHEIM	DRAWN BY: MSOLHEIM	DATE: 17SEPT98
REVISION	APPR. BY:	1161-E10A-107655
	SCALE: 1=10	

REV.	DATE	DESCRIPTION	BY	APPR.

REV.	DATE	DESCRIPTION	BY	APPR.



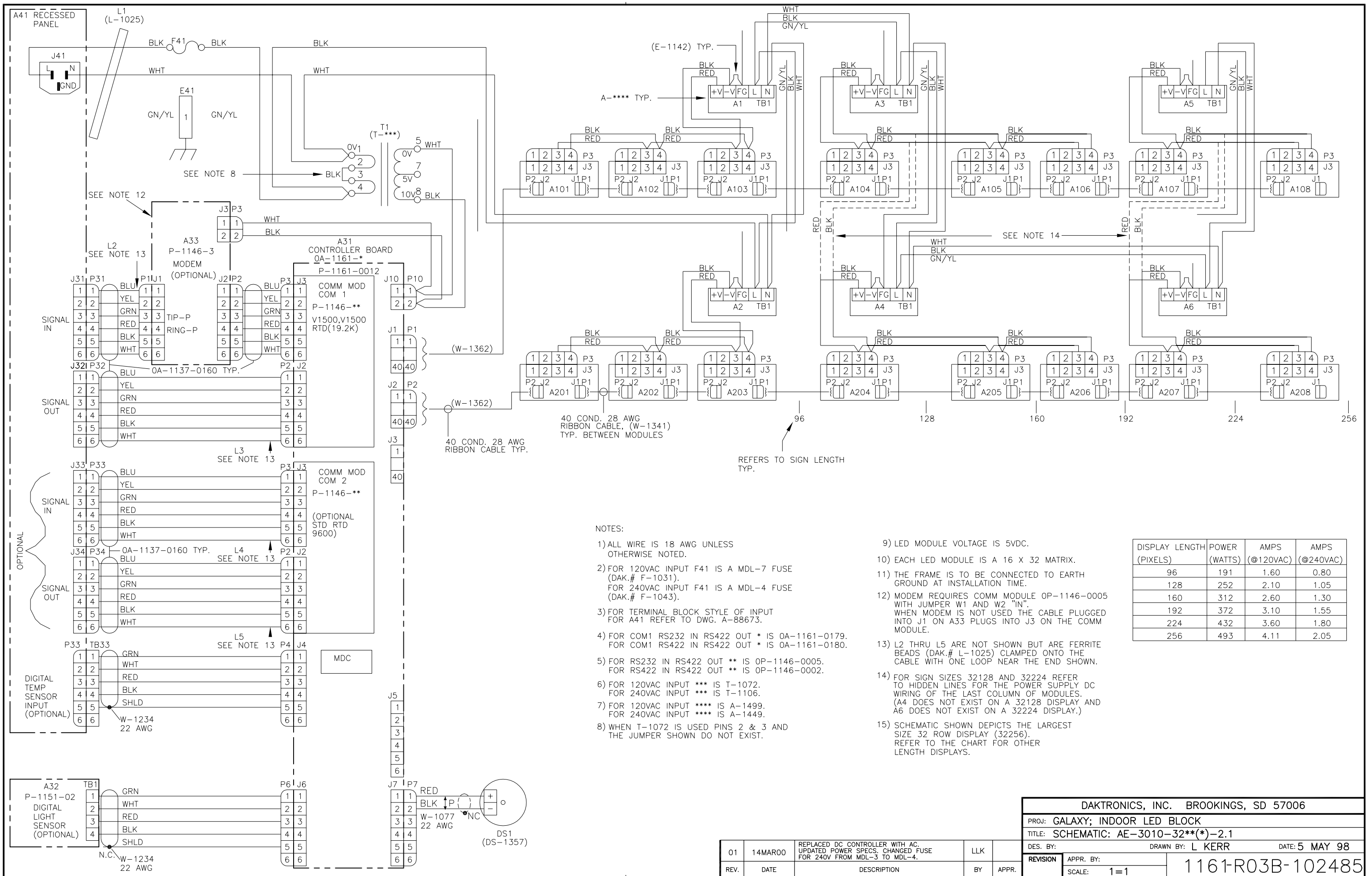
UNLIMITED NETWORKS REFER TO DIAGRAM BELOW FOR COMPONENTS AND WIRING FOR ADDITIONAL NETWORKS (ALL NETWORK FORMATS ARE THE SAME, DISPLAYS MAY VARY)

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

NOTES:

- ① ETHERNET CARD (BY CUSTOMER)
 - ② ETHERNET CABLE (BY CUSTOMER)
 - ③ ETHERNET NETWORK (BY CUSTOMER)
 - ④ 6 CONDUCTOR, 26 AWG, STRANDED SILVER SATIN FLAT LINE CORD. DAK. P.N. (W-1368) ANIXTER P.N. (6C26F19) OR EQUIV. IN CONDUIT WHERE REQUIRED. FIELD SIGNAL TERMINATIONS TO BE RJ11. FIELD CABLES ARE "FLIPPED" FROM ONE END TO THE OTHER.
- 5. MANY DIFFERENT DISPLAY SIZES OR TECHNOLOGIES MAY BE USED WITH IN NETWORK.
 - 6. ALL SIGNAL CABLES BY OTHERS. LABOR TO PULL CABLES BY OTHERS.
 - 7. ALL POWER WIRES BY OTHERS. LABOR TO PULL WIRES BY OTHERS.
 - 8. DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NATIONAL ELECTRICAL CODE.
 - 9. REFER TO DISPLAY INSTALLATION MANUAL FOR COMPLETE INSTALLATION INSTRUCTIONS.
 - 10. DISPLAY IP ADDRESS, SUBNET MASK, AND GATEWAY IP ADDRESS NEED TO BE SET USING VENUS 1500 TOOLS

PROJ:	V1500 PRODUCT LINE
TITLE:	V1500 SYSTEM RISER DIAGRAM: TCP/IP
DES. BY:	DMATHER
APPR. BY:	DJM
REVISION	00
SCALE:	NONE
DATE:	11 JAN 05
DRAWN BY:	WSCHNEI
DAKTRONICS, INC. BROOKINGS, SD 57006	
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1229-R01A-231373	



NOTES:

- 1) ALL WIRE IS 18 AWG UNLESS OTHERWISE NOTED.
- 2) FOR 120VAC INPUT F41 IS A MDL-7 FUSE (DAK.# F-1031). FOR 240VAC INPUT F41 IS A MDL-4 FUSE (DAK.# F-1043).
- 3) FOR TERMINAL BLOCK STYLE OF INPUT FOR A41 REFER TO DWG. A-88673.
- 4) FOR COM1 RS232 IN RS422 OUT * IS 0A-1161-0179. FOR COM1 RS422 IN RS422 OUT * IS 0A-1161-0180.
- 5) FOR RS232 IN RS422 OUT ** IS 0P-1146-0005. FOR RS422 IN RS422 OUT ** IS 0P-1146-0002.
- 6) FOR 120VAC INPUT *** IS T-1072. FOR 240VAC INPUT *** IS T-1106.
- 7) FOR 120VAC INPUT **** IS A-1499. FOR 240VAC INPUT **** IS A-1449.
- 8) WHEN T-1072 IS USED PINS 2 & 3 AND THE JUMPER SHOWN DO NOT EXIST.
- 9) LED MODULE VOLTAGE IS 5VDC.
- 10) EACH LED MODULE IS A 16 X 32 MATRIX.
- 11) THE FRAME IS TO BE CONNECTED TO EARTH GROUND AT INSTALLATION TIME.
- 12) MODEM REQUIRES COMM MODULE 0P-1146-0005 WITH JUMPER W1 AND W2 "IN". WHEN MODEM IS NOT USED THE CABLE PLUGGED INTO J1 ON A33 PLUGS INTO J3 ON THE COMM MODULE.
- 13) L2 THRU L5 ARE NOT SHOWN BUT ARE FERRITE BEADS (DAK.# L-1025) CLAMPED ONTO THE CABLE WITH ONE LOOP NEAR THE END SHOWN.
- 14) FOR SIGN SIZES 32128 AND 32224 REFER TO HIDDEN LINES FOR THE POWER SUPPLY DC WIRING OF THE LAST COLUMN OF MODULES. (A4 DOES NOT EXIST ON A 32128 DISPLAY AND A6 DOES NOT EXIST ON A 32224 DISPLAY.)
- 15) SCHEMATIC SHOWN DEPICTS THE LARGEST SIZE 32 ROW DISPLAY (32256). REFER TO THE CHART FOR OTHER LENGTH DISPLAYS.

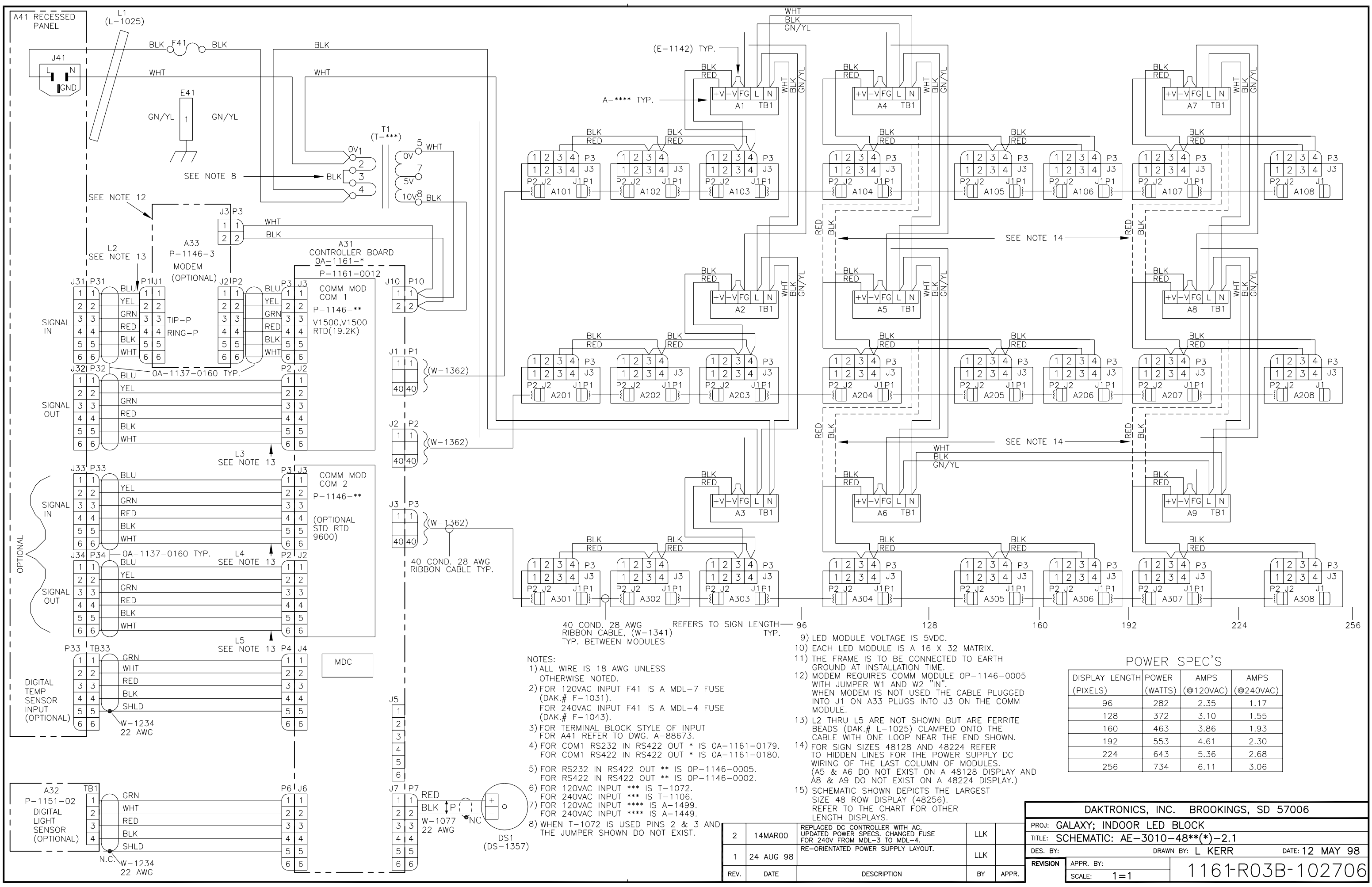
DISPLAY LENGTH (PIXELS)	POWER (WATTS)	AMPS (@120VAC)	AMPS (@240VAC)
96	191	1.60	0.80
128	252	2.10	1.05
160	312	2.60	1.30
192	372	3.10	1.55
224	432	3.60	1.80
256	493	4.11	2.05

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY; INDOOR LED BLOCK
 TITLE: SCHEMATIC: AE-3010-32**(*)-2.1
 DES. BY: DRAWN BY: L KERR DATE: 5 MAY 98

REVISION	APPR. BY:	1161-R03B-102485
SCALE: 1=1		

REV.	DATE	DESCRIPTION	BY	APPR.
01	14MAR00	REPLACED DC CONTROLLER WITH AC. UPDATED POWER SPECS. CHANGED FUSE FOR 240V FROM MDL-3 TO MDL-4.	LLK	



- NOTES:
- 1) ALL WIRE IS 18 AWG UNLESS OTHERWISE NOTED.
 - 2) FOR 120VAC INPUT F41 IS A MDL-7 FUSE (DAK.# F-1031). FOR 240VAC INPUT F41 IS A MDL-4 FUSE (DAK.# F-1043).
 - 3) FOR TERMINAL BLOCK STYLE OF INPUT FOR A41 REFER TO DWG. A-88673.
 - 4) FOR COM1 RS232 IN RS422 OUT * IS 0A-1161-0179. FOR COM1 RS422 IN RS422 OUT * IS 0A-1161-0180.
 - 5) FOR RS232 IN RS422 OUT ** IS 0P-1146-0005. FOR RS422 IN RS422 OUT ** IS 0P-1146-0002.
 - 6) FOR 120VAC INPUT *** IS T-1072. FOR 240VAC INPUT *** IS T-1106.
 - 7) FOR 120VAC INPUT **** IS A-1499. FOR 240VAC INPUT **** IS A-1449.
 - 8) WHEN T-1072 IS USED PINS 2 & 3 AND THE JUMPER SHOWN DO NOT EXIST.

- 9) LED MODULE VOLTAGE IS 5VDC.
- 10) EACH LED MODULE IS A 16 X 32 MATRIX.
- 11) THE FRAME IS TO BE CONNECTED TO EARTH GROUND AT INSTALLATION TIME.
- 12) MODEM REQUIRES COMM MODULE 0P-1146-0005 WITH JUMPER W1 AND W2 "IN". WHEN MODEM IS NOT USED THE CABLE PLUGGED INTO J1 ON A33 PLUGS INTO J3 ON THE COMM MODULE.
- 13) L2 THRU L5 ARE NOT SHOWN BUT ARE FERRITE BEADS (DAK.# L-1025) CLAMPED ONTO THE CABLE WITH ONE LOOP NEAR THE END SHOWN.
- 14) FOR SIGN SIZES 48128 AND 48224 REFER TO HIDDEN LINES FOR THE POWER SUPPLY DC WIRING OF THE LAST COLUMN OF MODULES. (A5 & A6 DO NOT EXIST ON A 48128 DISPLAY AND A8 & A9 DO NOT EXIST ON A 48224 DISPLAY.)
- 15) SCHEMATIC SHOWN DEPICTS THE LARGEST SIZE 48 ROW DISPLAY (48256). REFER TO THE CHART FOR OTHER LENGTH DISPLAYS.

POWER SPEC'S

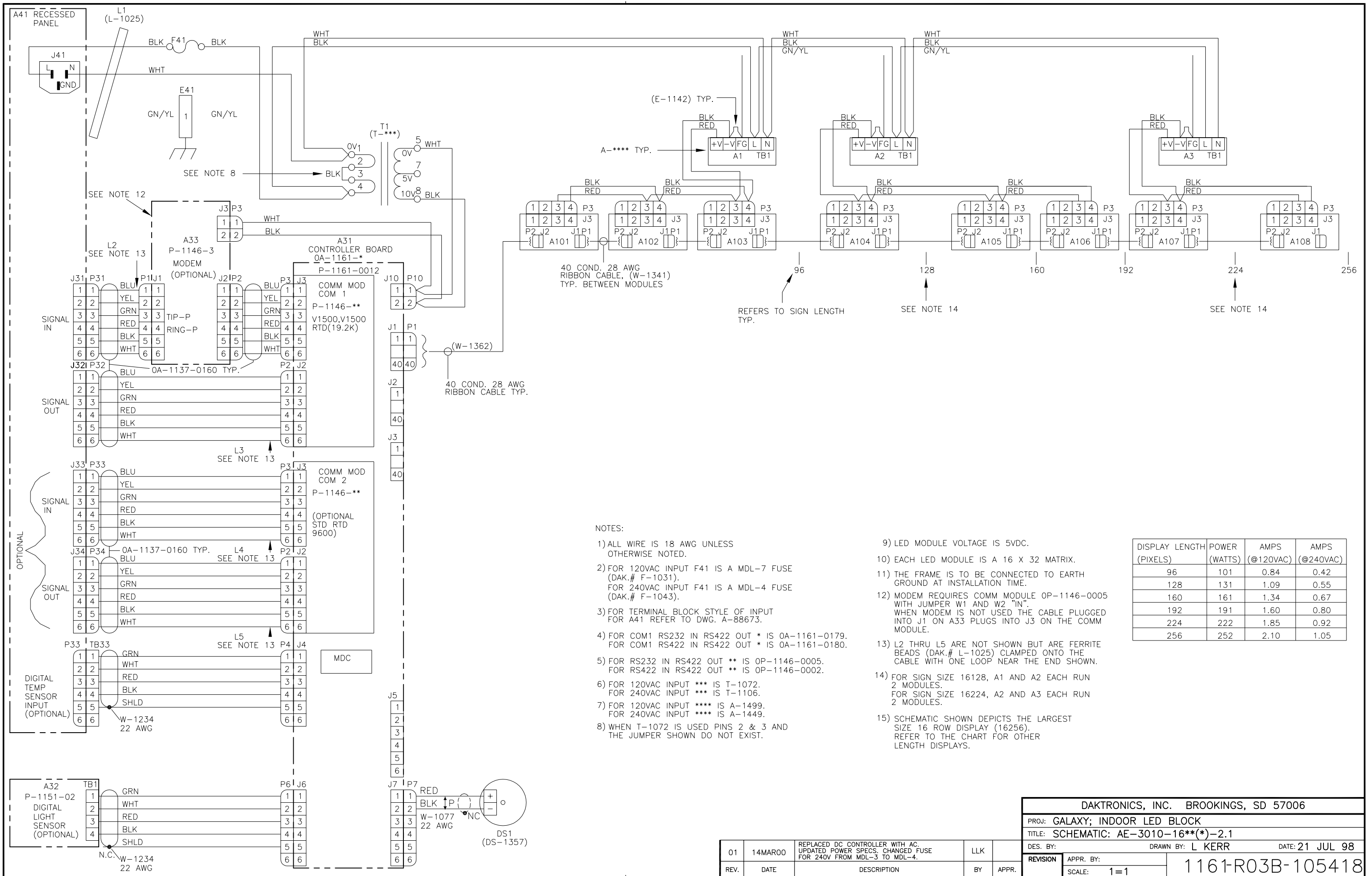
DISPLAY LENGTH (PIXELS)	POWER (WATTS)	AMPS (@120VAC)	AMPS (@240VAC)
96	282	2.35	1.17
128	372	3.10	1.55
160	463	3.86	1.93
192	553	4.61	2.30
224	643	5.36	2.68
256	734	6.11	3.06

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY; INDOOR LED BLOCK
 TITLE: SCHEMATIC: AE-3010-48**(*)-2.1
 DES. BY: DRAWN BY: L KERR DATE: 12 MAY 98

REVISION APPR. BY: SCALE: 1=1
 1161-R03B-102706

REV.	DATE	DESCRIPTION	BY	APPR.
2	14MAR00	REPLACED DC CONTROLLER WITH AC. UPDATED POWER SPECS. CHANGED FUSE FOR 240V FROM MDL-3 TO MDL-4. RE-ORIENTATED POWER SUPPLY LAYOUT.	LLK	
1	24 AUG 98		LLK	



NOTES:

- ALL WIRE IS 18 AWG UNLESS OTHERWISE NOTED.
- FOR 120VAC INPUT F41 IS A MDL-7 FUSE (DAK.# F-1031). FOR 240VAC INPUT F41 IS A MDL-4 FUSE (DAK.# F-1043).
- FOR TERMINAL BLOCK STYLE OF INPUT FOR A41 REFER TO DWG. A-88673.
- FOR COM1 RS232 IN RS422 OUT * IS OA-1161-0179. FOR COM1 RS422 IN RS422 OUT * IS OA-1161-0180.
- FOR RS232 IN RS422 OUT ** IS OP-1146-0005. FOR RS422 IN RS422 OUT ** IS OP-1146-0002.
- FOR 120VAC INPUT *** IS T-1072. FOR 240VAC INPUT *** IS T-1106.
- FOR 120VAC INPUT **** IS A-1499. FOR 240VAC INPUT **** IS A-1449.
- WHEN T-1072 IS USED PINS 2 & 3 AND THE JUMPER SHOWN DO NOT EXIST.
- LED MODULE VOLTAGE IS 5VDC.
- EACH LED MODULE IS A 16 X 32 MATRIX.
- THE FRAME IS TO BE CONNECTED TO EARTH GROUND AT INSTALLATION TIME.
- MODEM REQUIRES COMM MODULE OP-1146-0005 WITH JUMPER W1 AND W2 "IN". WHEN MODEM IS NOT USED THE CABLE PLUGGED INTO J1 ON A33 PLUGS INTO J3 ON THE COMM MODULE.
- L2 THRU L5 ARE NOT SHOWN BUT ARE FERRITE BEADS (DAK.# L-1025) CLAMPED ONTO THE CABLE WITH ONE LOOP NEAR THE END SHOWN.
- FOR SIGN SIZE 16128, A1 AND A2 EACH RUN 2 MODULES. FOR SIGN SIZE 16224, A2 AND A3 EACH RUN 2 MODULES.
- SCHEMATIC SHOWN DEPICTS THE LARGEST SIZE 16 ROW DISPLAY (16256). REFER TO THE CHART FOR OTHER LENGTH DISPLAYS.

DISPLAY LENGTH (PIXELS)	POWER (WATTS)	AMPS (@120VAC)	AMPS (@240VAC)
96	101	0.84	0.42
128	131	1.09	0.55
160	161	1.34	0.67
192	191	1.60	0.80
224	222	1.85	0.92
256	252	2.10	1.05

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: GALAXY; INDOOR LED BLOCK

TITLE: SCHEMATIC: AE-3010-16**(*)-2.1

DES. BY: DRAWN BY: L KERR DATE: 21 JUL 98

REVISION APPR. BY: SCALE: 1=1

1161-R03B-105418

REV.	DATE	DESCRIPTION	BY	APPR.
01	14MAR00	REPLACED DC CONTROLLER WITH AC. UPDATED POWER SPECS. CHANGED FUSE FOR 240V FROM MDL-3 TO MDL-4.	LLK	

Appendix B: Signal Converter

Daktronics RS 232-422 Signal Converter

Installation and Testing Manual

ED-14413

Rev 2

18 March 2005

DAKTRONICS

ED14413
Product 1146
Rev 2 – 17 March 2005



DAKTRONICS, INC.

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Section 1: Signal Converters and Loop-Back Testing for Direct Connections

The following table gives the typical state of the signal converter when the LEDs are either on or off. Refer to **Figure 1** and **Figure 2** for an illustration of the signal converters and the locations of the various components.

LED Indicators	Typical States		Troubleshooting
Power	ON	Signal Converter (SC) is receiving power	
	OFF	Signal Converter is not receiving power Internal 1 AMP fuse is bad	Check power/Replace fuse Replace fuse
TX	On Steady	Signal Converter is not connected to a serial port	Connect to open computer COM port
		1. Serial port or serial cable is bad 2. Computer COM port is in sleep mode	1. Try another port or replace serial cable 2. Communicate with display
	OFF Steady	Normal state, Signal Converter is not transmitting data	
	Brief Flicker	SC is transmitting data	
RX	ON Steady	1. Field cabling between Signal Converter and display is bad	1. Eliminate cabling by disconnecting wire/cable from SC to display controller 2. Check connections and terminations 3. Eliminate by disconnecting wire/cable to display controller
		2. Is connected to display output jack or terminated incorrectly	
	3. Bad COM port is on display controller		
	OFF Steady	Normal state, Signal Converter is not receiving data	
	Brief Flicker	SC is receiving data	
TX/RX	ON Steady	(If serial cable is connected) Bad Signal Converter	Replace Signal Converter

RS422 Wire Signal Converter

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

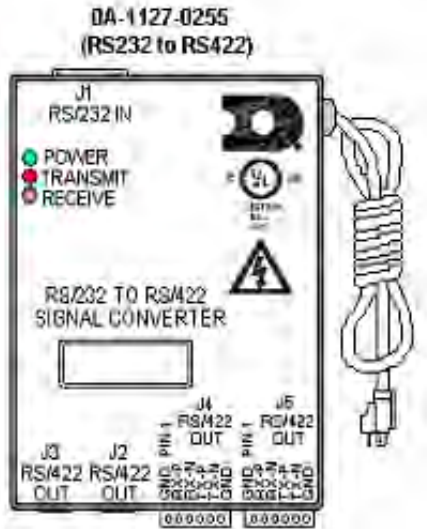


Figure 1: RS232/RS422 Signal Converter

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

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

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

Fiber Signal Converter

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

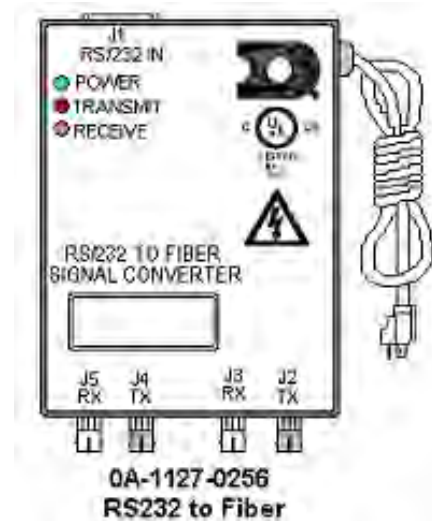


Figure 2: RS232/Fiber Signal Converter

1.1 RS422 Loop-Back Test (Outdoor Displays)

Note: Do not connect a loop-back to more than one jack at a time.

Serial Cable (W-1249)

To complete the test, the serial cable must be plugged into the signal converter. The table below lists the pin connections when using a serial cable (Daktronics part# W-1249).

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

Loop-Back Test: To perform a loop-back for testing purposes only, use the spare plug in the signal converter and connect the copper conductor jumpers using the following table. Refer to **Figure 3**. (To eliminate the display, pull out the phoenix plug with the signal wires connected into it.)

J2 and J3	OR	J4 and J5
(Pin 5) TX-N to (Pin 3) RX-N		(Pin 2) RX-P to (Pin 4) TX-P
(Pin 4) TX-P to (Pin 2) RX-P		(Pin 3) RX-N to (Pin 5) TX-N

When the wires are connected, perform the loop-back test using the Venus 1500 software as described in **Section 1.4**.

This test can also be done at the signal termination enclosure on the surge board assembly, as shown in **Figure 4**, or, on some displays, at the controller board input. In that case, the wires coming from the signal converter must remain connected, and the jumpers will be inserted along with them. **Leave the plug disconnected from the surge board while conducting the test.**

TB1 - RS422 In
(Pin 4) RX-P to (Pin 2) TX-P
(Pin 5) RX-N to (Pin 3) TX-N

When the wires are connected, perform the loop-back test using the Venus 1500 software as described in **Section 1.4**.

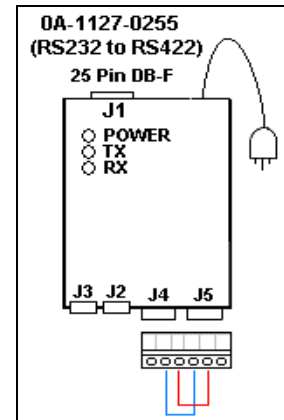


Figure 3: Jumpers at RS232/RS422 Signal Converter

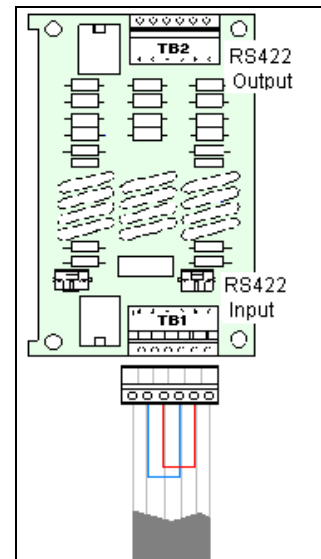


Figure 4: Jumpers at Surge Board

1.2 RS422 Loop-Back Test (Indoor/Outdoor Displays)

All indoor displays and some outdoor displays (AE-3010, AF-3010, AF-3020, and X-1000) use RJ11 plugs or connectors. In those cases, a “Network Cable Tester” (Figure 7) is provided to conduct the test.

The Network cable tester is used to test for two things:

1. That a flipped RJ11 cable is being used.
2. That there is good connection from a computer or signal converter.

The use of a flipped (reversed) or straight cable can be determined visually. Use the figures below as a guide, or use the Network Cable Tester box for assistance.

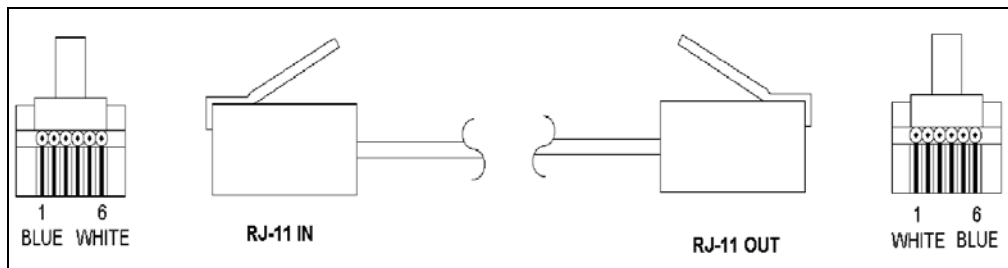


Figure 5: Flipped Cable (Reversed)

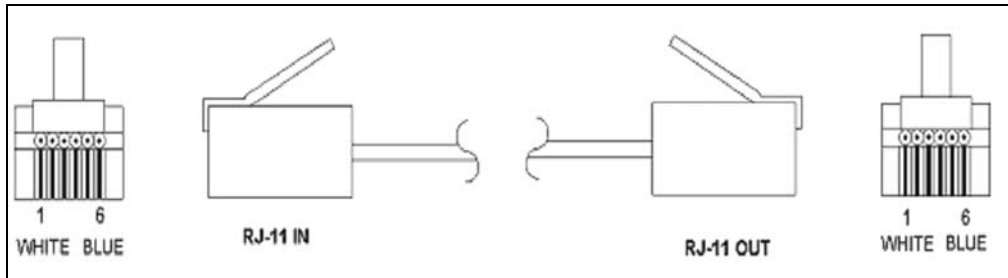


Figure 6: Straight Cable

1. Plug one end of the **flipped** cable into the output from the computer or signal converter.
2. Plug one end of the flipped cable into J2 (Loopback Connector) on the Network cable tester box.
3. When both ends are connected, perform the loop-back test using the Venus 1500 software as described in Section 1.4..

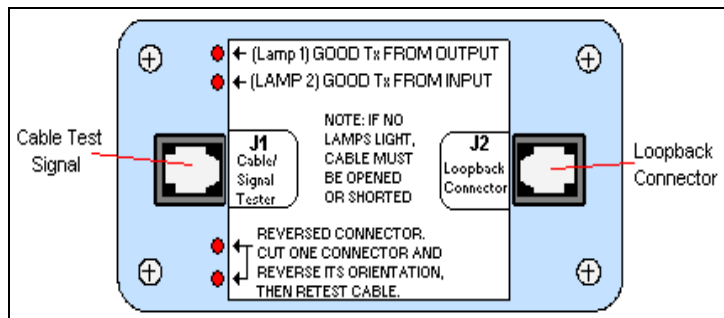


Figure 7: Network Cable Tester

4. For AE-3010, AF-3010, AF-3020, and X-1000 displays only, disconnect the cable going into the COM module input (J3) on the controller and connect to J2 on the loop-back box. See **Figure 8** for location of the RJ11 connector.

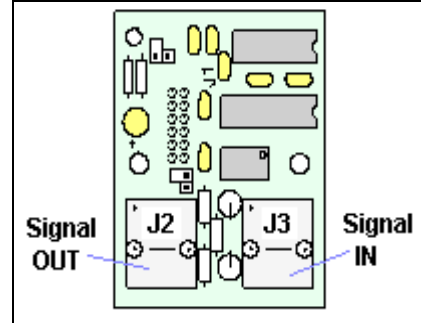


Figure 8: AF-3010/X-1000 COM Module

1.3 Loop-Back test with Fiber

1. Locate the signal termination enclosure or open the bottom left corner of the display
2. Locate the fiberboard, as shown in **Figure 9**, and label the fiber ends connected to the board.
3. Remove the ends from the board that are in jacks J5 and J4.
4. Connect the ends into the fiber splice (Daktronics part# P-1197), as shown in **Figure 10**.

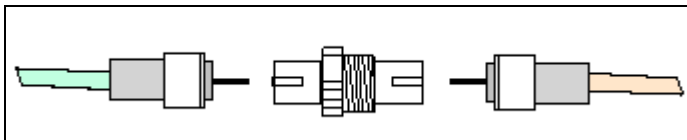


Figure10: Connecting TX and RX Fibers with Fiber Splice

5. When the fibers are connected, perform the loop-back test using the Venus 1500 software as described in **Section 1.4**.
6. For AF-3010 and X-1000 displays only, the cable that connects the fiberboard to the controller board input uses a RJ11 jack at the controller and can be connected to a loop-back box at J2 to run the test as usual.

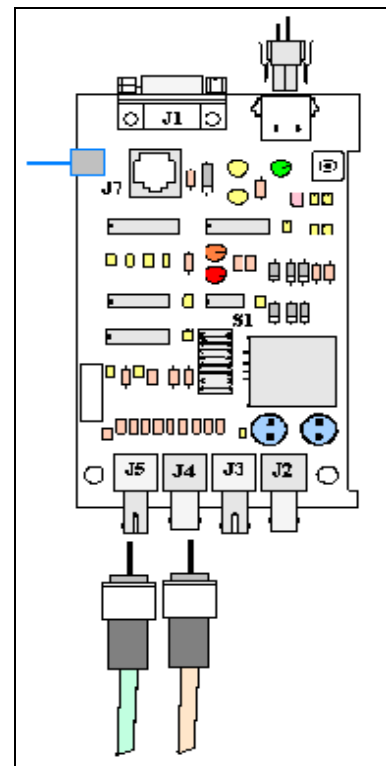
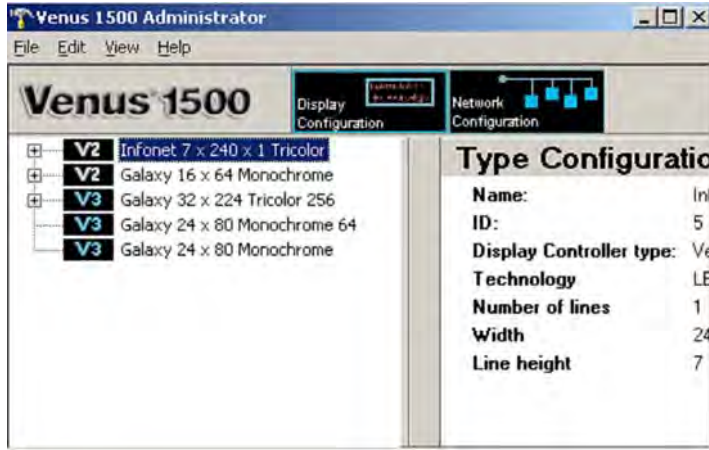


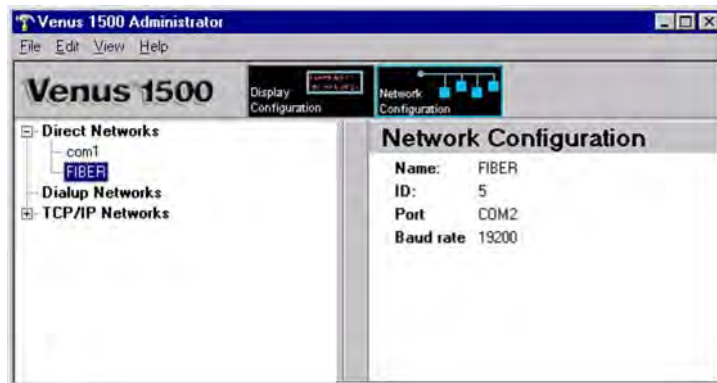
Figure 9: Fiber Optic Board

1.4 Conducting the Venus 1500 Software Test

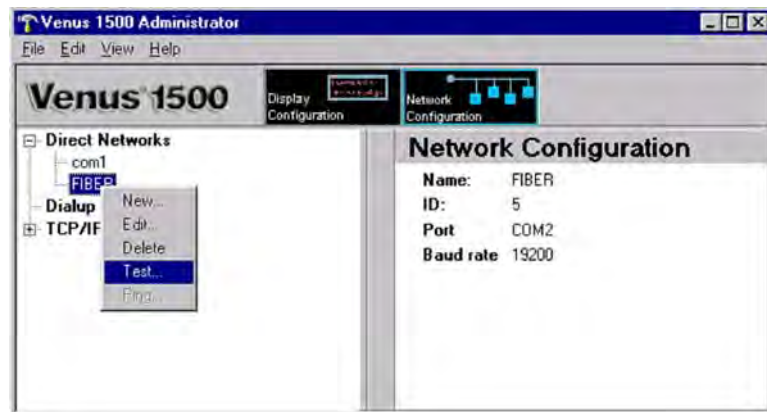
1. Open Venus 1500 Administrator.



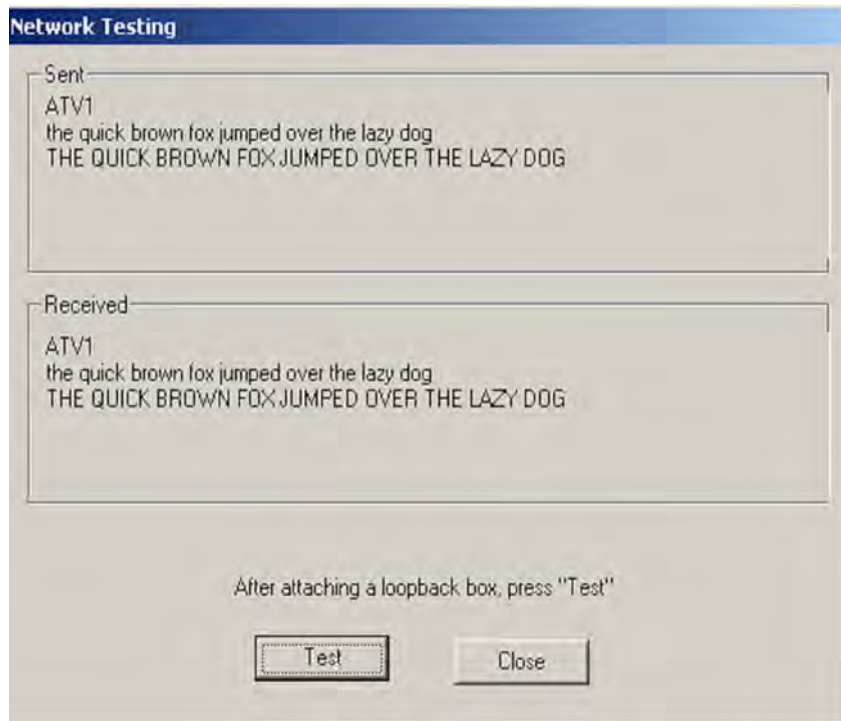
2. Click Network Configuration and open the direct network by clicking on the [+] in front of Direct Network.



3. Right click the network you want to test.



4. Click [TEST].



5. If the Transmit LED on the signal converter flickers, the signal is getting to the signal converter. That means that the right Com port is being used. However, if it does not flicker, the computer has either a software or hardware problem.
6. If you get the same message in the "Received" box as in the "Sent" box, the loop-back test was successful, implying that the cable has continuity to the point of the connection.
Note: Flipped and straight cables will provide the same results. Check for correct order of the wires.
7. If "No Response" appears in the "Received" box, the test failed due to one of the following problems:
 - a. The correct computer COM port is not being used, or USB port is not configured as a "serial" port. (If the Transmit LED flickered, this was not the problem.)
 - b. A communication problem exists:
 - The fiber or the ends on the fiber are bad.
 - (or) The wire or the terminations are bad.
 - c. There was a problem conducting the test:
 - The serial cable to the signal converter is bad or not plugged in.
 - The signal converter is not plugged in.
8. If the words "It appears as if this port has a modem attached" appear, the modem will need to be moved, or you need to use a different COM port.

After the test is complete:

1. Remove the wire jumpers and make sure terminations are correct.
2. (or) Remove the fiber splice, and reconnect fiber to fiberboard.
3. Run the test again without the jumpers, splice, or loop-back box. The test should fail.
4. Use Venus 1500 Display Manager to retrieve the status to ensure communication now works correctly.

Section 2: Electrical and Signal

WARNINGS:

- Never install telephone wiring during a lightning storm
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
- To reduce the risk of fire, use only 26AWG or larger telecommunication line cord.
- This product is to be used with UL and c-UL listed computers

2.1 Electrical Ratings

The Signal Converter is rated for 120 VAC of power in and a maximum draw of 39mA.

2.2 Power Disconnect

The power cord serves as the disconnect device and the socket outlet must be installed near the equipment and must be easily accessible.

2.3 Parts Listing

The following parts may need replacing during the life of the component. **Servicing should be conducted by qualified personnel only.**

Part Description	Part Number
Fuse; AGC-1, 1A, Glass Tube 250 V	F-1019
6 Pin Fem, 5 mm, TB Mate, Screw	P-1051

Section 3: Mounting Instructions

Reference Drawings:

Enclosure, Signal Converter, Base **Drawing B-200645**

The signal converter can be either wall or table mounted. Do not mount the signal converter from the ceiling or the underside of a table.

To mount the signal converter refer to drawing **B-200645**. Secure the signal converter using a screw through the mounting holes at the the back of the enclosure. Do not fully tighten the screws.

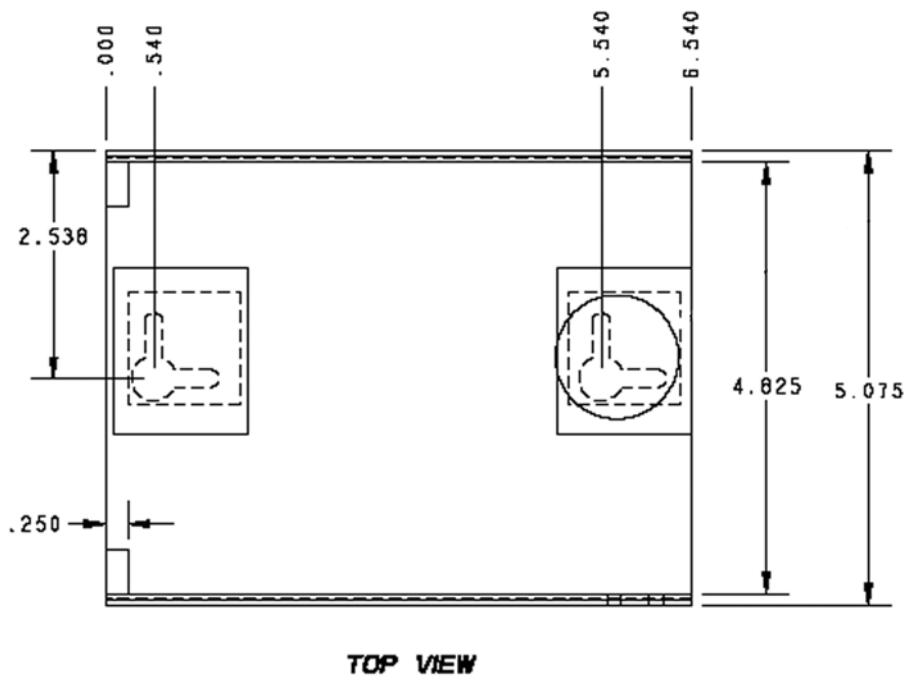


Figure 11: Signal Converter Enclosure

Section 4: Enviromental Ratings

The signal converter is made for indoor operations and is rated for indoor use only.

Appendix C: Optional Temperature Sensor

The optional temperature sensor can be mounted outside, but it requires a location away from the influence of chimneys, air conditioners, vents, tar roofs, concrete, and parking lots that 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.

The recommended location for the temperature sensor is a north eave or northern exposure away from direct sunlight 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, as seen in **Figure 36**.

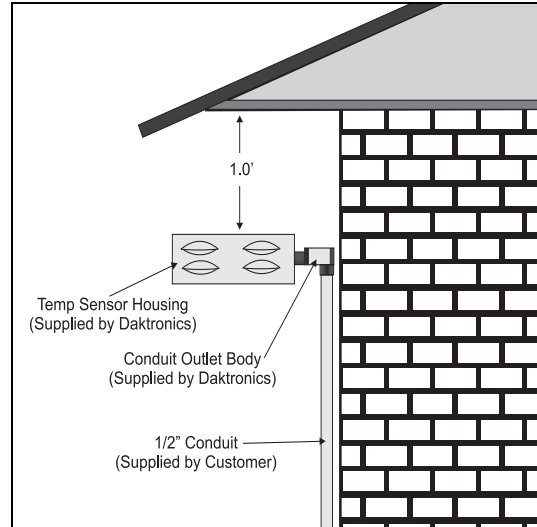


Figure 36: Temperature Sensor Eave/Wall Mount

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 1,000 feet (304.8 meters).

A 4-conductor cable with shield is used to connect the temperature sensor to the display. The cable is terminated in the green Phoenix plug in recessed signal termination jack on the back of the display. See **Figure 37** for location of the jack used for the temperature signal connection.

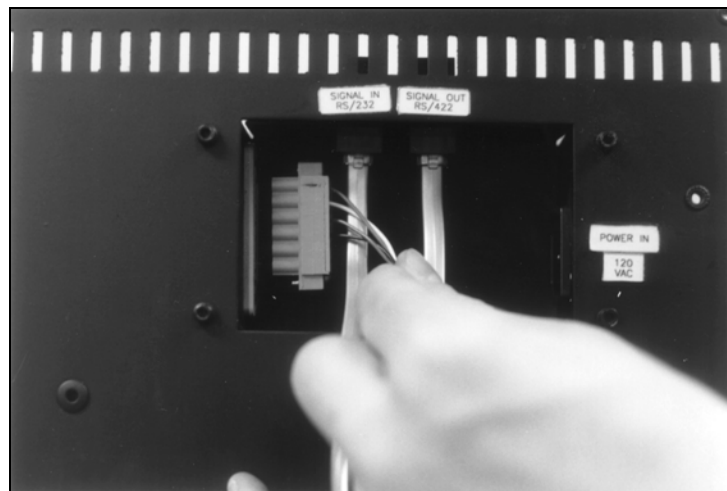


Figure 37: Temperature Sensor--Connection and Interconnection

The temperature sensor connects to the display through a 4-conductor shielded cable from the sensor to the display. The connections are pinned one-to-one, as shown in **Figure 38** and the provided table.

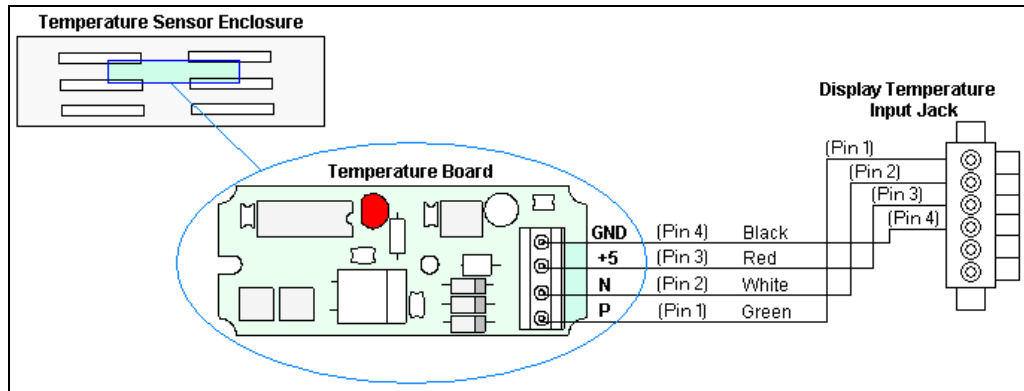


Figure 38: Signal Connection from Sensor to Display

Terminations from Display to Temperature Sensor

Display	Cable Wires	Temperature Sensor
Pin 1	Green	Temp RX-P (Pin 1)
Pin 2	White	Temp RX-N (Pin 2)
Pin 3	Red	Temp +5V (Pin 3)
Pin 4	Black	Temp GND (Pin 4)
Pin 5	Bare	N/A

Appendix D: Serial Server Configuration

Appendix E: Daktronics Warranty and Limitation of Liability (SL-02374)
