

Daktronics Tuff Sport[®] Four-Sided Hockey LED Scoreboards

Display Manual

ED-13442

Rev 4 – 19 November 2012

DAKTRONICS

Models			
	H-2105	*	H-2109
	H-2107		H-2112

* Discontinued

Please fill in the information below for your display; use it for reference when calling Daktronics for assistance.

Scoreboard Serial No. _____

Scoreboard Model No. _____

Date Installed _____

DAKTRONICS, INC.

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Section 1: Introduction

This manual explains the installation and maintenance of Daktronics Tuff Sport® Four-Sided Indoor Hockey LED Scoreboards. For additional information regarding the safety, installation, operation, or service of these displays, refer to the telephone numbers listed in **Section 0**. This manual is not specific to a particular installation.

Important Safeguards:

- Please read and understand all instructions before beginning the installation process.
- Do not drop control equipment or allow it to get wet.
- Do not disassemble control equipment or electronic controls of the display; failure to follow this safeguard will make the warranty null and void.
- Disconnect display power when not in use or when servicing.
- Disconnect display power before servicing power supplies to avoid electrical shock. Power supplies run on high voltage and may cause physical injury if touched while powered.
- Do not modify the scoreboard structure or attach any panels or coverings to the scoreboard without the express written consent of Daktronics, Inc.

Project-specific information takes precedence over any other general information found in this manual.

1.1 Scoreboard Controllers

Daktronics four-sided Tuff Sport scoreboards are designed for use with the All Sport® 5000 series control consoles. This console uses keyboard overlays (sport inserts) to control numerous sports and scoreboard models. Refer to the following manual for operating instructions:

- **All Sport 5000 Series Control Console Operation Manual (ED-11976)**

This control console manual is available online at www.daktronics.com/manuals.

1.2 Scoreboard Label

Serial and model numbers of a Daktronics scoreboard can be found on the ID label on the display, similar to that shown in **Figure 1**.



Figure 1: Display ID Label

Please list the model number, display serial number, and the date this display became operational in the blanks provided on the second page of this manual. When calling Daktronics customer service, please have this information available to ensure the request is serviced as quickly as possible.

1.3 Model Number

Daktronics scoreboards are differentiated by their model numbers and prefixes for each sport. Most Daktronics scoreboards also carry a two-number suffix that refers to indoor-outdoor status, power supply, and digit color.

H	Hockey	-13	indoor scoreboards, 120 V, PanaView® digits
		-14	indoor scoreboards, 230 V, PanaView® digits
		-15	indoor scoreboards, 120 V, UniView® digits
		-16	indoor scoreboards, 230 V, UniView® digits

1.4 Resources

Figure 2 illustrates a Daktronics drawing label. The drawing number is located in the lower-right corner of a drawing. This manual refers to drawings by listing the last set of digits and the letter preceding them. In the example, the drawing would be referred to as **Drawing C-325405**.

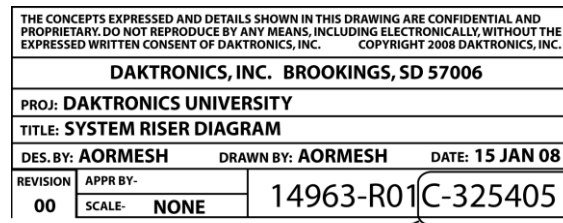


Figure 2: Daktronics Drawing Label

Reference Drawing:

System Riser Diagram.....**Drawing C-325405**

Daktronics identifies manuals by the DD or ED number located on the cover page of each manual. For example, this manual would be referred to as **ED-13442**.

1.5 Daktronics Nomenclature

Most components within this display carry a white label that lists the part number of the unit. If a component is not found in the Replacement Parts List in **Section 5.8**, use the label to order a replacement. **Figure 3** illustrates a typical label. The part number is in bold.

Main Component Labels	
Part Type	Part Number
Individual circuit board	0P-XXXX-XXXX
Assembly; a collection of circuit boards	0A-XXXX-XXXX
Wire or cable	W-XXXX
Fuse	F-XXXX
Transformer	T-XXXX
Metal part	M-XXX
Fabricated metal assembly	0S-XXXXXX
Specially ordered part	PR-XXXXX-X

Accessory Labels	
Component	Label
Termination block for power or signal cable	TBXX
Grounding point	EXX
Power or signal jack	JXX
Power or signal plug for the opposite jack	PXX

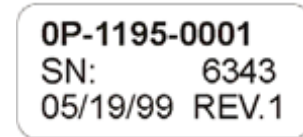


Figure 3: Typical Label

Following the Replacement Parts List is the Daktronics Exchange Policy and the Repair & Return Program. Refer to these instructions if replacing or repairing any display component.

1.6 Product Safety Approval

Daktronics Tuff Sport scoreboards are ETL-listed, tested to CSA standards and CE-labeled for indoor use. Contact Daktronics with any questions regarding the testing procedures.

Note: The four-sided scoreboards detailed in this manual are designed to be suspended above players or spectators, and that creates serious liability considerations. It is imperative that the roof support system be able to bear the weight of the scoreboard and all other attachments. Consequently, a licensed engineer must certify the roof support system. Suspension cables and hoist or attachment structures must also be designed and certified by a licensed engineer.

Daktronics is not responsible for structures and suspension systems designed or installed by others.

Section 2: Specifications

The chart on the following pages details all of the mechanical specifications, circuit specifications, and power requirements for each display in this manual. Models are listed in alphanumeric order.

Notes:

- 1) All displays require a 120 VAC, 15 A circuit; models with 230 VAC power are also available.
- 2) Values in [Brackets] indicate scoreboards with Team Name Message Centers (TNMC).
- 3) Dimensions include corner shrouding and flooring.
- 4) Optional sheet metal flooring adds 100 lb (45 kg) to total weight.

Model	Dimensions: Height, Width, Depth	Uncrated Weight	Watts	Amps 120/230 VAC	Driver # & Address
H-2105	5'-0" H, 12'-10" W, 12'-10" D (1524 mm, 3912 mm, 3912 mm)	1065 lb 483 kg [1125 lb 510 kg]	2400 W [2800 W]	20 / 23.3 A [10.4 / 12.2 A]	A1 71 A2 72 A3 73
H-2107	5'-0" H, 12'-10" W, 12'-10" D (1524 mm, 3912 mm, 3912 mm)	1065 lb 483 kg [1125 lb 510 kg]	2400 W [2800 W]	20 / 23.3 A [10.4 / 12.2 A]	A1 71 A2 72 A3 73
H-2109	5'-0" H, 12'-10" W, 12'-10" D (1524 mm, 3912 mm, 3912 mm)	1065 lb 483 kg [1125 lb 510 kg]	1600 W [2000 W]	13.3 / 7 A [16.7 / 8.7 A]	A1 71 A2 72
H-2112	4'-0" H, 10'-10" W, 10'-10" D (1219 mm, 3302 mm, 3302 mm)	780 lb 354 kg [840 lb 381 kg]	800 W [1200 W]	6.7 / 3.5 A [10 / 5.2 A]	A1 71

Section 3: Mechanical Installation

Mechanical installation consists of lifting and permanently mounting the scoreboard and any optional advertising panels or message centers. The mechanical specification drawings listed in **Appendix A** show measurements, cable attachment points, and mounting weights for each scoreboard model.

Be sure that the installation complies with local building codes.

Note: Daktronics does not assume any liability for any installation derived from the information provided in this manual or installations designed and installed by others.

Below is a general overview of the entire installation process. Each step is detailed in the sections that follow, and the instructions are presented in the general order in which events should occur.

1. Plan and install the hoist or static-suspension structure.
2. Provide power circuit(s) and outlet(s) at the scoreboard location.
3. Provide a power outlet at the control location.
4. Route signal cable from the control location to the scoreboard location, and install the junction box (if the system is not controlled by radio).
5. Assemble the scoreboard frame.
6. Attach the lower ad panel supports to the frame, if required, and mount the lower ad panels.
7. Mount the scoreboard sections to the frame and join them at the top.
8. Route and connect all power cords and signal cables around the top of the scoreboard.
9. Mount the upper ad panels or message centers, if required.
10. Mount ad panels atop the message center, if required.
11. Make power and signal connections between message center sections and/or power connections for backlit ad panels, if required.
12. Attach the corner shrouds.
13. Lift the scoreboard assembly and static-mount, or lower the hoist and attach it to the scoreboard assembly.
14. Make the final power and signal hookup to each tier of the display (scoreboard tier, backlit ad panel tier, message center tier).

3.1 Lifting the Scoreboard

Daktronics Tuff Sport scoreboards are shipped equipped with a single eyebolt for lifting the display into place. The eyebolt is located in the center of the top of the scoreboard cabinet. Daktronics indoor scoreboards use $\frac{3}{8}$ " eyebolts. Use the single eyebolt at the top of the scoreboard section only to lift the display into position for assembly.

Note: Eyebolts are intended for lifting only. Do not attempt to permanently support the display by its eyebolt. Daktronics assumes no liability for damages resulting from incorrect setup or lifting methods.

3.2 Four-Sided Scoreboard Suspension Options

The method by which the scoreboard is to be suspended must be determined at the time of purchase. There are two primary methods of installing a center-hung scoreboard: creating a static-hung system or using a hoist. Each method has its own benefits and drawbacks. Refer to the suspension publication, **DD1627665**, in **Appendix F**, and call Daktronics for help in making the best choice for your installation.

Note: Do not attach items to the scoreboard without prior approval.

To properly review and approve a proposed attachment, Daktronics requires information on the size, weight, and method by which the item will be attached to the scoreboard. (Engineering time to review attachments will be charged at a "time and expenses" rate.)

Static Mounting

Static-mounted displays are typically hung with two or four static cables. Two cables may be used when mounting the scoreboard below a large beam or when the display is centered between a pair of beams. Four cables are used to further distribute weight.

Note: For either method, the mounting cables must be symmetrically distributed to maintain a level and a square configuration.

Cable assemblies must have a strength greater than six times the actual load. All other rigging components must be sized within the working load limits published by the component manufacturer.

Note: Daktronics strongly recommends that only components from reputable domestic suppliers be used to permanently suspend the scoreboard.

Remove immediately and do not use any assemblies that show evidence of excessive wear or broken wires as defined by the component manufacturer.

Follow these procedures for installation:

1. Have a structural engineer certify that the building can safely support the additional display loading and that the connection points are designed to safely carry the scoreboard weight.
2. Attach the cable sling to the scoreboard assembly while it is on the arena floor.
3. Hang ends that attach to the ceiling over the sides of the scoreboards. If an end is too short, attach a rope to the end temporarily so it can be returned from the top.
4. The scoreboard can be lifted into place in a number of different ways.

Note: It is the installer's responsibility to ensure that the installation is safe and that the display meets OSHA or local regulations.

Lifting Method Example: A common method of *temporarily* lifting the scoreboard is to use a pair of chain-lift motors mounted on the ceiling. Secure prior approval from the facility management regarding location and acceptable loads for each rigging point.

1. Attach the chain hoist hooks to the sling master link, or sling to the corner lift tubes. Be sure the angle of the sling is greater than 45°.
2. Use the chain hoist to lift the scoreboard to the appropriate height.
3. From the lift, retrieve the sling cables draped over the sides of the scoreboard and attach them to the appropriate locations in the ceiling.
4. Connect to power outlets (and signal junction boxes, if required) in the ceiling.
5. Level the scoreboard by adjusting the turnbuckle on the sling.
6. Lower the scoreboard weight onto the slings.
7. Remove the chain motors.

Electric Hoist System

Installing an electric hoist system is more complex and may expose the customer to greater liability. Publication **SL-03610** in **Appendix F** discusses recommended minimum hoist specifications and points that must be considered when selecting a hoist system.

- A building engineer must review and approve the combined weight of the scoreboard, hoist, and a minimum impact factor of 15 percent.
- The hoist must be accessible for periodic inspections and maintenance as required by ANSI and OSHA.

Note: Records of periodic inspections must be on file to be accessible for OSHA (refer to **Section 5.7**).

- Electrical service and control wiring must be run to the hoist location.
- Additional structures in the ceiling are often required to accommodate the hoist.
- If an existing hoist is to be used, or if a hoist is to be purchased directly by the end user, the user assumes all responsibility and liability for the hoist system.
- The hoist must be inspected and certified in writing by the hoist manufacturer, manufacturer's representative, or other qualified hoist inspector.
- Daktronics will inspect hoists installed by Daktronics.
- Daktronics will certify the scoreboard weight but will require a liability waiver signed by the customer before the scoreboard is shipped.
- Once the hoist is installed according to the specifications of the hoist manufacturer and the building engineer, refer to **Section 3.10** for more information about attaching the scoreboard to the hoist.

WARNING!

- Never ride in or work on or below the scoreboard while the hoist is powered up. Daktronics recommends having an audible horn warning to indicate that the hoist system is ON.
- Never operate the hoist system during public events or when people are below the scoreboard.
- When running the hoist, the operator must have an unobstructed view from ceiling to floor (to ensure free scoreboard travel). Hoist operators should be trained according to the hoist manufacturer's specifications.

3.3 Assembly Overview

The assembly kit includes the following:

- Floor frame – 2 halves, 2 side splice plates, and 4 top & bottom splice plates
- Corner shrouds @ 4
- Shroud brackets @ 8
- Top corner brackets @ 4
- Assorted bolts, nuts, washers, and screws

In addition to the scoreboard pieces, an installation may also include:

- Upper and lower ad panels
- A message center at the top or bottom of the scoreboard

Each scoreboard face section is one piece and must be attached to the structural frame. The frame is shipped in two parts and requires some assembly. Corner shrouds, which provide cosmetic covering only, are attached to the display last.

Ad panels may simply be painted metal cabinets that do not need power, or they may be backlit, requiring a 120 V circuit. An LED message center requires power as well as signal wiring. The scoreboard itself requires power and signal wiring. The scoreboard tilts outward at approximately 10°, while the ad panels or message centers are vertical. Refer to **Section A-A** shown on the mechanical specification drawings in **Appendix A**.

3.4 Frame Assembly

Reference Drawing:

Optional 4-Side Canvas Assembly	Drawing A-173611
Field Assembly; 8' x 8' Bolted Frame.....	Drawing B-1101988
Field Assembly; 10' x 10' Bolted Frame.....	Drawing B-1102115

The scoreboard frame is shipped in two sections (refer to **Drawings B-1101988** and **B-1102115** in **Appendix E**). Note that each section has two corners with a brace across the corner and two corners without a brace. The lift tubes in the braced corners will be on the top side. An optional sheet metal floor may be attached to the top side of the frame sections during manufacturing.

1. Lay out the two sections with the unbraced sides facing each other and the corner lift tubes facing up.
2. Connect the sections together in the middle using 1/2" hardware.
3. Attach all six section splice plates using 1/2" hardware. Two splice plates will go on the sides, while two smaller splice plates will go on both the top and bottom.

Note: If an optional canvas was ordered, attach it to the bottom of the frame using the provided hook and loop fastener strips and self-drilling screws. Refer to **DWG-173611** in **Appendix C** for more information on this option.

3.5 Optional Lower Ad Panel Attachment

Reference Drawing:

Bottom 4-Side Ad Panel Mounting **Drawing A-107664**

This step is required only if the scoreboard has ad panels or auxiliary scoreboard displays to be attached to the bottom. Refer to **Drawing A-107664** in **Appendix C**.

Support brackets are attached to the bottom of the frame, and the ad panel sections are to be attached to these brackets. The support brackets are designed to be able to support the weight of the whole scoreboard while sitting on the arena floor.

Note: The bottom ends of the supports should extend about $\frac{1}{16}$ " beyond the bottom of the lower ad panels so that the scoreboard's weight is not resting on the ad panels.

1. Raise the assembled frame and support it on sturdy blocks or stands.
2. There are four holes in each corner of the frame on the bottom side. Secure a support bracket in all four corners using $\frac{3}{8}$ " hardware.
3. Attach the rear flanges of the ad panels to the support brackets with $\frac{3}{8}$ " hardware.

3.6 Mounting Scoreboard Sections to the Frame

Reference Drawing:

4-Side Installation Details **Drawing A-154598**

Each side of the frame has two mounting angles to which the bottom of each scoreboard section will be attached. The tops of the scoreboard sections will be joined at their corners by brackets. Refer to **Drawing A-154598** in **Appendix E** for an illustration of the parts used in this procedure.

1. Lift one scoreboard section into place on the frame, with the mounting angles *inside* the bottom channel of the scoreboard section.
2. Align the holes along the bottom of the scoreboard's rear flange with the $\frac{1}{4}$ " threaded inserts on the mounting angles, and install the $\frac{1}{4}$ " bolts as shown in **Detail A** of **Drawing A-154598**.
3. Ask for assistance as needed to support the scoreboard section and prevent it from tipping as the second section is lifted into place adjacent to the first and secured to the frame.
4. Join the two scoreboard sections at their common top corner using a top bracket and $\frac{3}{8}$ " hardware as shown in **Detail B** of **Drawing A-154598**. Once the two sections are joined, they will not require additional support during assembly.
5. Attach the third scoreboard section to the frame at the bottom and to the second section at the top corners.
6. Attach the fourth scoreboard section to the frame at the bottom and to the third section at the top corners.

3.7 Optional Top Ad Panel or Message Center Attachment

Reference Drawing:

Top 4-Side Ad Panel Mounting.....**Drawing A-107665**

Note: Make sure all power and signal wires are connected on top of the scoreboard before mounting an ad panel/message center – it will be very difficult to make these connections once upper display tiers have been added. Refer to **Section 4.2**.

Drawing A-107665 in **Appendix E** illustrates the parts used in this procedure. The ad panels or the message centers are attached to the top of the scoreboard with mounting strips, and then joined at the top with brackets.

1. Attach the mounting strips to the top of the scoreboard. The mounting strips are fitted with 1/4" threaded inserts. Two mounting strips are required for each ad panel/message center.
 - a. Position a mounting strip *inside* the top channel of the scoreboard section, aligned with the holes in the rear flange.
 - b. Use the 1/4" bolts and tapered washers to attach the mounting strips to the scoreboards. The tapered washers allow the ad panels/message centers to be supported in a vertical position while the scoreboard remains tilted out 10°.
2. Lift one ad panel/message center into place atop the scoreboard section, and align the holes along the bottom of the rear flange with the threaded inserts in the mounting strips.
3. Insert and tighten 1/4" bolts along the rear flange of the ad panel.
4. Ask for assistance as needed to support the ad panel/message center section and prevent it from tipping as the second ad panel/message center is lifted into place adjacent to the first and secured to the frame.
5. Join the two ad panel/message center sections at their common top corner using a top bracket and 3/8" hardware. Once the two sections are joined at the top, they will not require additional support during assembly.
6. Attach the third ad panel/message center section to the mounting strips on the top of the scoreboard and to the second section at the top corners.
7. Attach the fourth ad panel/message center section to the mounting strips on the top of the scoreboard and to the third section at the top corners.

3.8 Optional Ad Panels on Message Centers

Repeat the mounting procedures detailed in the section above, with one major difference: the ad panels and message centers are both vertical and do not require the alignment angle change provided by the tapered washers, and therefore tapered washers will not be used. +

3.9 Attaching Corner Shrouds

Reference Drawing:

4-Side Installation Details**Drawing A-154598**

Note: Make sure all power and signal wires are connected on top of the scoreboard before attaching the corner shrouds. Refer to **Section 4.2**.

The corner shrouds are metal panels that cover the outside corners of the four-sided assembly and hide the wiring between sections. Separate shrouds are provided for each display tier. Refer to **Detail C of Drawing A-154598 in Appendix E** for corner shroud installation details.

1. Position and attach angle brackets to the side channel of each scoreboard, ad panel, or message center section with the #10 screws provided.
2. Position each corner shroud across the appropriate corner and mark the locations of the holes on the angle brackets.
3. Drill $\frac{5}{32}$ " holes as a guide for the screws.
4. Secure the corner shrouds to the corners with the #10 screws provided.

3.10 Attaching Suspension Cables

Reference Drawings:

Sling Set: Standard 10' Square 4-Side Scoreboards	Drawing A-181903
Sling Set: Standard 8' Square 4-Side Scoreboards	Drawing A-181935

The roof of the facility and any structures fabricated for suspending the scoreboard, as well as the suspension cable slings, must be designed by or inspected and approved by a qualified engineer. **Drawing A-181903** and **Drawing A-181935** in **Appendix E** show recommended component specifications of cable slings (these are not typically provided by Daktronics).

If the scoreboard is to be static mounted, that is, suspended from fixed cables without a hoist:

1. Attach the cables to the four lift tubes on the corner braces of the frame. The cables may be connected together to make two attachment points, or all four cables may attach to the roof trusses or the mounting structure.
2. Hang the top ends of the cables over the sides of the scoreboard to get them out of the way yet keep them accessible when hooking up.
3. Lift the scoreboard using an appropriate means, such as a chain hoist, to the correct suspension height.
4. Attach the top ends of the cables to the previously prepared mounting points.
5. Remove the temporary lifting apparatus and level the scoreboard by adjusting the turnbuckles built into the slings.

If the scoreboard is to be suspended from a hoist:

1. Attach the cable sling to the four lift tubes on the corner braces of the frame.
2. Lower the hoist cables and attach them to the master links.
3. Raise the scoreboard 1-2' (305-610 mm) from the floor, and level the scoreboard by adjusting the turnbuckles built into the slings.
4. The hoist installer must set upper and lower primary limits and all safety limits. Daktronics recommends maintaining a minimum of 2' (610 mm) between the scoreboard and the nearest obstruction.

WARNING! Never raise or lower the scoreboard with personnel or equipment underneath!

Section 4: Electrical Installation

CAUTION: Only qualified individuals should access the electrical components of the display and its associated equipment. It is the responsibility of the electrical contractor to ensure that all electrical work meets or exceeds local and national codes.

Daktronics engineering staff must approve all changes or the warranty will be void.

4.1 Installation Overview

Electrical installation for four-sided scoreboards involves routing power and control signal wiring through separate conduit or wire ways to the scoreboard location, as well as routing power and signal wiring from section to section.

The diagram shown in **Figure 4** illustrates a typical wired setup between the first scoreboard section and the control system. Daktronics part numbers are shown in parentheses.

Note: Control signal cable and some junction boxes are not provided as part of this system and can be purchased locally or from Daktronics.

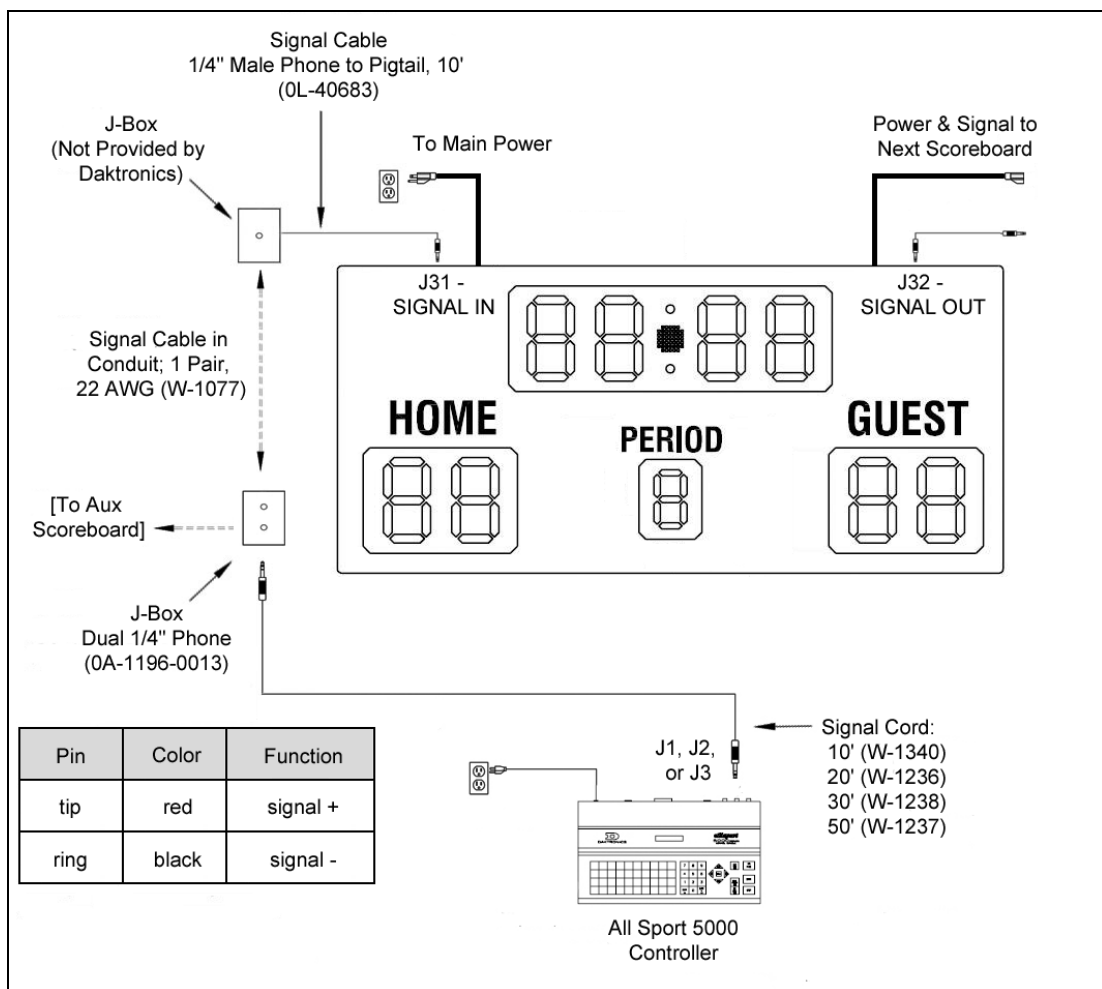


Figure 4: Wired Installation

The diagram shown in **Figure 5** illustrates a typical wireless setup between the first scoreboard section and the control system. Refer to **Section 6.2** for more information about the wireless radio option.

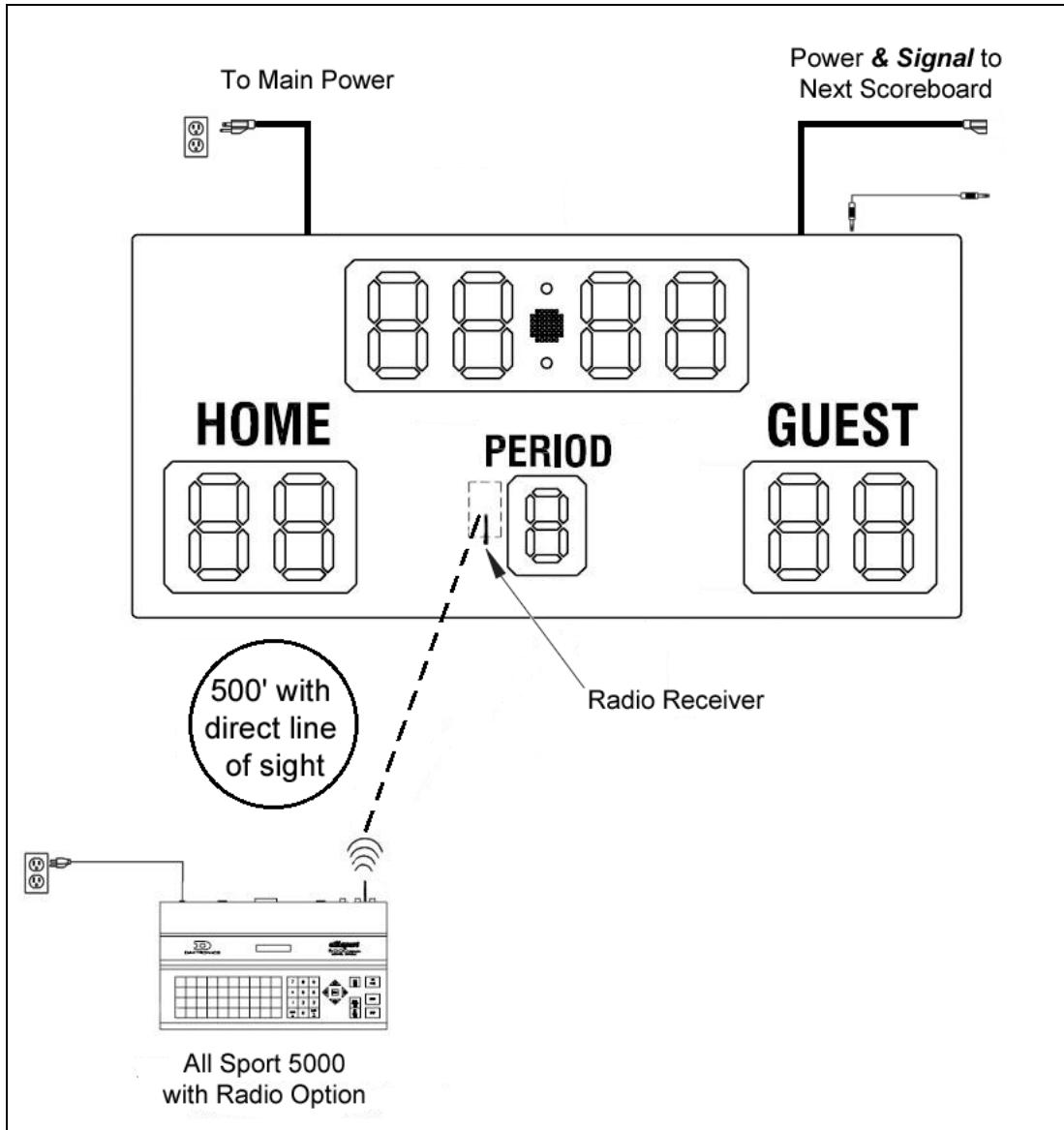


Figure 5: *Wireless Installation*

4.2 Power/Signal Connections Between Sections

Reference Drawing:

Ad Panel/Message Center Hookup Overview, 4-Side**Drawing A-154599**

Note: Be sure to make sectional power connections before connecting main power! It is also recommended that these connections are made before the corner shrouds or optional top ad panels/message centers are mounted into place.

- Scoreboard power and signal connectors are located on top of the scoreboard cabinet. Input cables should be routed to the left, and output cables should be routed to the right (as viewed from the front). The scoreboard section that will receive main power/signal is designated "Face A"; all other sections are named in relation to it.

Power and signal flows to the right around the display from face output to face input. **Figure 7** shows the power and signal flow between sections. Main power and signal are terminated last (refer to **Sections 4.3** and **4.5**, respectively).

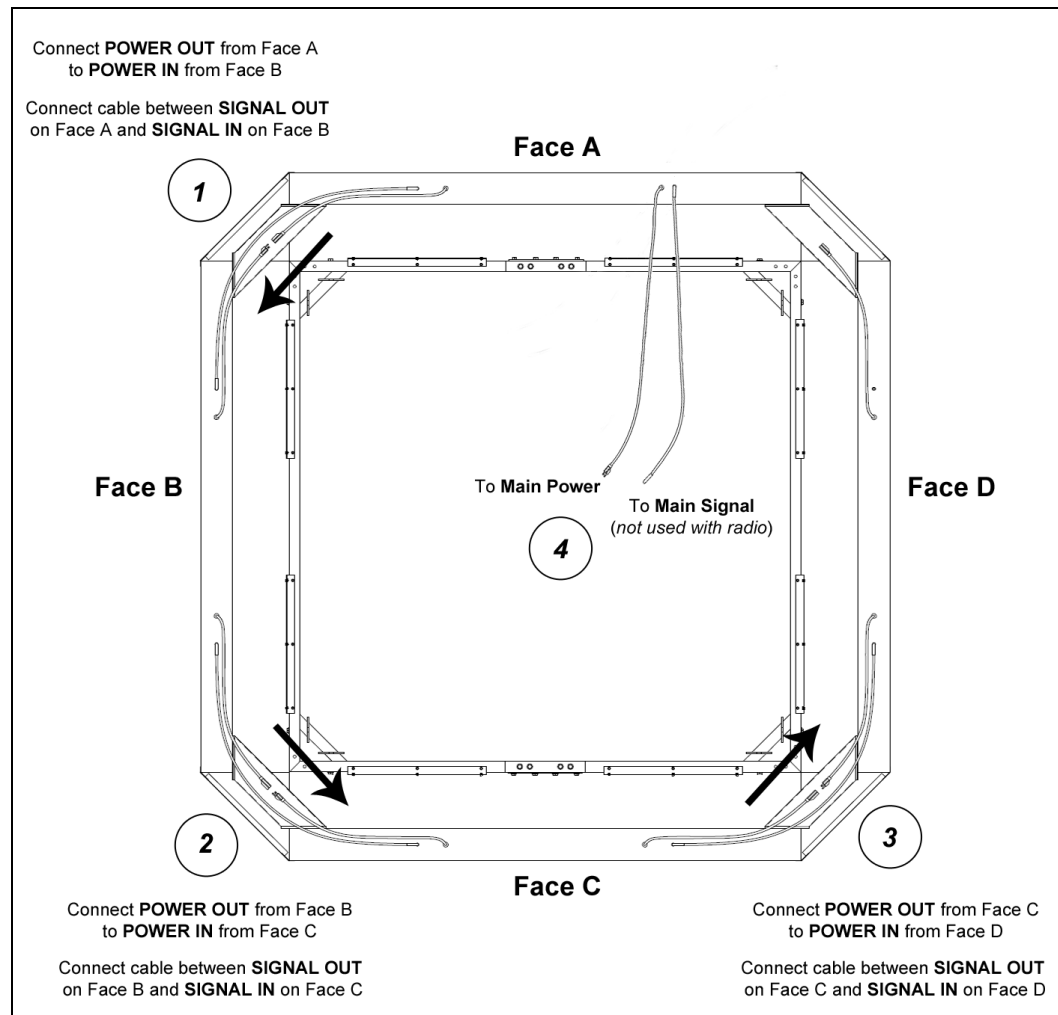


Figure 6: Scoreboard Power & Signal Connection, Top View

- Backlit ad panel and message center connectors are located on the sides of the cabinets. Inputs are on the left, and outputs are on the right (as viewed from the front). Each message center requires its own power input, while backlit ad panels may be daisy-chained together for power, like scoreboards. Message center signal connections use 6-pin RJ45 quick connect cables; main signal may be wired or wireless.

Refer to **Drawing A-154599** in **Appendix E** for connection details of power and signal from one backlit ad panel or message display section to the next.

Note: Standard power cords and signal cables are about 10' (3 m) long. If a hoist is used for this installation, all main power/signal cables must be long enough to allow the display to be lowered. An optional sheet metal floor may contain the cables when the scoreboard is raised. If the scoreboard is static-mounted, the cables only need to be long enough to provide service. Neatly tie excess lengths out of the way.

4.3 Main Power Connection

Note: Be sure to make sectional power connections before connecting main power!

Each scoreboard section includes two 120 VAC power cords: one for Power In and one for Power Out.

1. Install a grounded 120 VAC receptacle near the scoreboard/backlit ad panel location (each message center will require its own power receptacle). Try to mount it so that the power cord is easily accessible to plug in and hidden from view, such as centered above the display.
2. Determine which scoreboard/backlit ad panel section is closest to the grounded receptacle, and plug in its power cord.

The control console requires a 120 VAC receptacle and uses less than 1 A of power. Displays operating on 230 VAC are also available, and they are shipped equipped with universal power plugs.

Grounding

Connect the scoreboard to earth ground. Proper grounding assures reliable equipment operation and protects the equipment against damaging electrical disturbances and lightning. Daktronics recommends a resistance-to-ground of 10 ohms or less. The electrical contractor performing the electrical installation can verify ground resistance. Daktronics Sales and Service personnel can also provide this service. The grounding connection on the power cord's three-prong plug connects to the shell of the scoreboard.

Note: The customer must properly ground the outlet according to local and national codes. Failure to ground the outlet voids the warranty for the scoreboard.

4.4 Power-On Self-Test (POST)

The scoreboard performs a self-test each time that power is turned on and the control console is powered off or not attached to the scoreboard. If the control console is attached and powered on, the self-test does not run, and data from the control console is displayed on the scoreboard after a brief period of time. Each scoreboard self-test pattern will vary depending on the scoreboard model, the number of drivers and types of digits. **Figure 7** shows an example of the LED bar test pattern that each digit performs.

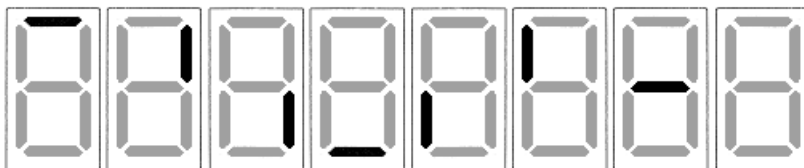


Figure 7: Digit Segment POST

Radio Settings

If a radio receiver is installed (see **Section 6.2**), the radio broadcast settings (“b1”) and the channel settings (“C1”) will be displayed in the clock digits during the POST. These values must match the settings in the control console (refer to the appropriate control console manual listed in **Section 1.1**).

4.5 Main Signal Connection

Signal installation (for systems without radio control) requires routing control cable from the scoreboard control console to a signal junction box (J-box) near the display. Refer to **Drawing A-28124** and **Drawing A-125316** in **Appendix E** for signal wire connection.

Note: For message center signal installation, refer to the **SS Series 20mm Indoor Scoreboard Message Centers Installation & Operation Manual (DD1564453)**.

1. At a minimum, use a paired, 22 AWG shielded cable (Daktronics part # W-1077) and connect the cable to a dual 1/4" J-box at the control console end.

Using a dual J-box for separate Main and Auxiliary scoreboards lets operators control several displays with one controller, and they can also switch jacks to control individual boards using multiple controllers.

2. Install a J-box near the scoreboard location. Try to mount it so that the signal cable is easily accessible to plug in and hidden from view, such as centered above the display.
3. Route signal cable from the J-box on the control console end to the J-box at the display end.
4. Install the 1/4" phone plug (Daktronics part # 0L-40683) to the display end of the cable. Be sure to connect the cable shielding only in the J-box on this end.
5. Insert the plug into the J31 - SIGNAL IN jack located on the top of the scoreboard section closest to the J-box.
6. Connect a signal cable from the J-box on the control console end to the J1, J2, or J3 jack on the back of the All Sport 5000 console.

If using a Main Clock Start/Stop Switch (Daktronics part # 0A-1166-0003), connect it to the J4 jack on the All Sport 5000 console.

Section 5: Maintenance & Troubleshooting

IMPORTANT NOTES:

1. Disconnect power before doing any repair work on the scoreboard.
2. Allow only qualified service personnel access to internal display electronics.
3. Disconnect power when not using the scoreboard.

5.1 Troubleshooting Table

The table below lists potential problems with the scoreboard and indicates possible causes and corrective actions. This list does not include every symptom that may be encountered, but it does present several of the most common situations that may occur.

Many of the solutions offered below provide references to other sections within this manual or to supplemental product manuals with further detail on how to fix the problem.

If a problem occurs that is not listed or that cannot be resolved using the solutions in the following table, contact Daktronics using the information provided in **Section 0**.

Problem	Possible Cause	Solution/Items to Check
Scoreboard doesn't light and console doesn't work	No power to the scoreboard	Check that the main circuit breaker for the scoreboard is on.
		Check that the scoreboard is receiving 120 (or 230) VAC power.
	No power to console	Ensure the console is plugged into a 120 (or 230) VAC power supply.
		Swap the console with one known to work correctly, and enter the proper sport code to test. Replace console if necessary.
Scoreboard digits don't light, but console works	No wired signal from console	Check that the scoreboard is receiving 120 (or 230) VAC power.
		Check that the red DS2 LED on the driver lights up when sending commands from the control console (see Section 5.4).
	No radio signal from console	Cycle power to the scoreboard and watch for radio receiver broadcast/channel settings (see Section 4.4).
		Check that the green POWER and amber RADIO IN RANGE indicators on the radio receiver in the scoreboard light up when the control console is powered on. Keep the console between 20 to 500 feet from the scoreboard.

Problem	Possible Cause	Solution/Items to Check
		Move the console 20-30 feet from the scoreboard and test again. Verify that both the console and scoreboard antennae are securely tightened and in a vertical position.
		Replace the radio receiver.
	No signal to driver	Check that the scoreboard is receiving 120 (or 230) VAC power.
		Check that the red DS2 LED on the driver lights up when sending commands from the control console (see Section 5.4). Swap the driver with one known to work correctly and with the same part number to verify the problem. Replace if necessary (see Section 5.4).
No power to driver	Check that the green DS1 LED on the driver is always lit up when the scoreboard is powered on (see Section 5.4).	
Scoreboard digits light, but not in the correct order	Incorrect sport code	Ensure the correct sport code is being used for the scoreboard model. Refer to the control console operation manual (see Section 1.1).
	Incorrect driver address	Check that the scoreboard driver(s) are set to the correct address(es) (see Section 5.4).
Scoreboard digits light, console works, but no display on scoreboard	No wired signal from console	(See solution on previous page)
	No radio signal from console	(See solution on previous page)
	Bad/damaged wiring	Check that the red DS2 LED on the driver lights up when sending commands from the control console (see Section 5.4).
Scoreboard works, but some LEDs always stay on	Short in digit or indicator circuit	Swap the digit/indicator with one known to work correctly to verify the problem. Replace if necessary (see Section 5.3).
Scoreboard works, but some LEDs do not light or they blink	Bad connection	Verify the power/signal connector on the back of the digit circuit board is secure (see Section 5.3).
	Bad digit or driver	Swap the digit/driver with one known to work correctly to verify the problem. Replace if necessary (see Section 5.3 for digits or Section 5.4 for drivers).

Problem	Possible Cause	Solution/Items to Check
Scoreboard works, but some digits do not light	Bad digit or driver	(see solution on previous page)
	Incorrect sport code	(see solution on previous page)
	Incorrect driver address	(see solution on previous page)
	Wrong console controlling scoreboard	Another console's radio signal could be transmitting to the scoreboard.
	Radio interference	There may be other radio transmissions in the area that overpower the console. If it is not possible to disable the interfering device, It may be necessary to run a wired signal connection instead.

5.2 Component Location & Access

All Tuff Sport indoor hockey displays are front-access scoreboards, meaning that internal electronic components and digits are reached by opening a face panel, an access door, or a digit panel on the front of the display.

Digit panels are typically held in place on the scoreboard face by two screws. To remove a digit, simply unfasten the screws and carefully lift it from the cabinet. The power/signal plug can then be removed from the connector on the back of the digit to completely free the digit and access internal components.

Remove non-digit access panels by unfastening the top, side or bottom screws holding it in place. Some panels are hinged and swing open when the screws are removed or loosened.

Component location varies with each scoreboard model, but drivers and power and signal components are typically mounted inside the scoreboard behind a digit panel. To locate the driver(s), look for a warning label similar to that shown in **Figure 8**.

Refer to the electrical and signal specification drawings in **Appendix B** for model-specific component layouts and access locations.



Figure 8: Power Warning Label

5.3 Replacing Digits

LEDs are embedded in a circuit board that is mounted to the back of the digit panel. Do not attempt to remove individual LEDs. In the case of a malfunctioning LED or digit segment, replace the entire digit circuit board.

The process of replacing digits varies by whether it is a PanaView digit or UniView digit (**Figure 9**).

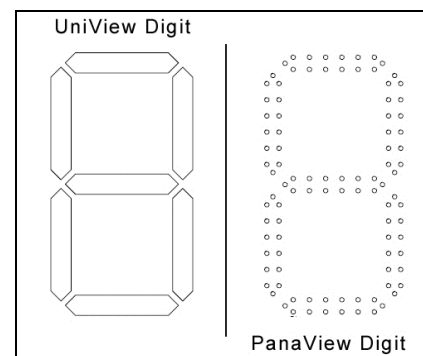


Figure 9: Digit Types

PanaView

To replace a PanaView digit circuit board (**Figure 10**):

1. Open the digit panel as described in **Section 5.2**.
2. Disconnect the power/signal connector from the back of the digit by squeezing together the locking tabs and pulling the connector free.
3. Use a $\frac{9}{32}$ " nut driver to remove the nuts securing the digits to the inside of the panel, and then lift the digit off the stud inserts.
4. Position a new digit over the studs (making sure the small plastic spacers are still in place) and tighten the nuts.
5. Reconnect the power/signal connector.

Note: This is a keyed connector and it will attach in one way only. Do not attempt to force the connection.

6. Secure the digit panel to the display with the two screws, then power up and test the display to see if changing the digit has resolved the problem.

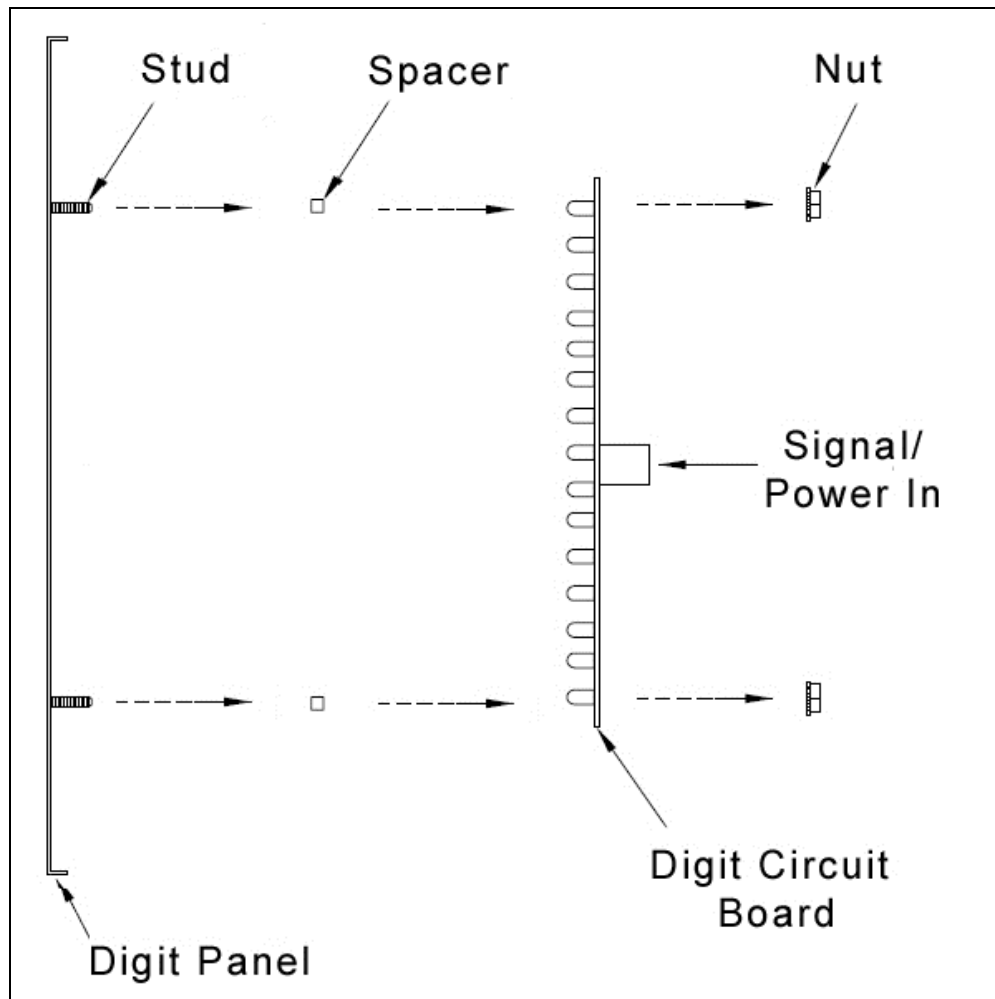


Figure 10: PanaView Digit Assembly

UniView

To replace a UniView digit circuit board (**Figure 11**):

1. Open the digit panel as described in **Section 5.2**.
2. Disconnect the power/signal connector from the back of the digit by squeezing together the locking tabs and pulling the connector free.
3. Use a $\frac{9}{32}$ " nut driver to remove the nuts securing the digits to the aluminum standoffs, and then lift the digit off the standoff/diffuser assembly.
4. Position a new digit over the standoffs, and tighten the nuts. It may be necessary to also tighten the standoffs if they became loose while removing the nuts.
5. Reconnect the power/signal connector.

Note: This is a keyed connector and it will attach in one way only. Do not attempt to force the connection.

6. Secure the digit panel to the display with the two screws, then power up and test the display to see if changing the digit has resolved the problem.

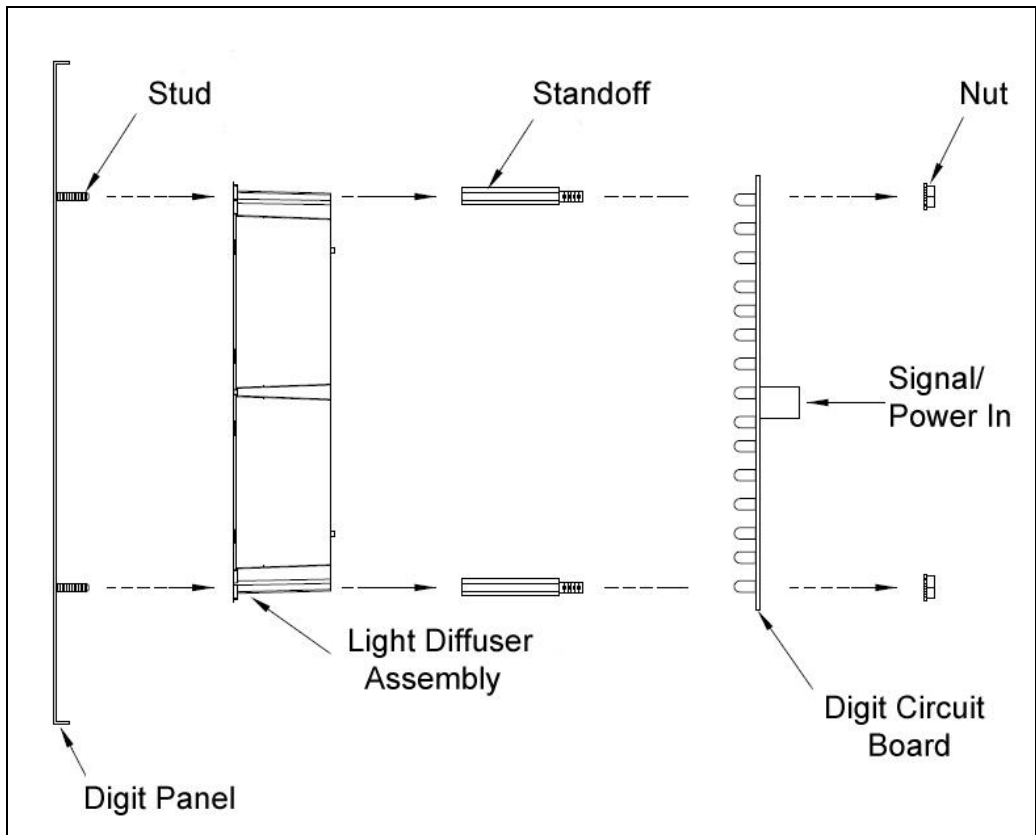


Figure 11: UniView Digit Assembly

5.4 LED Drivers

In each scoreboard, one or more LED drivers perform the task of switching LEDs on and off. LED drivers are located inside of a driver enclosure. Refer to **Figure 12** to view the location and components of a Tuff Sport driver enclosure.

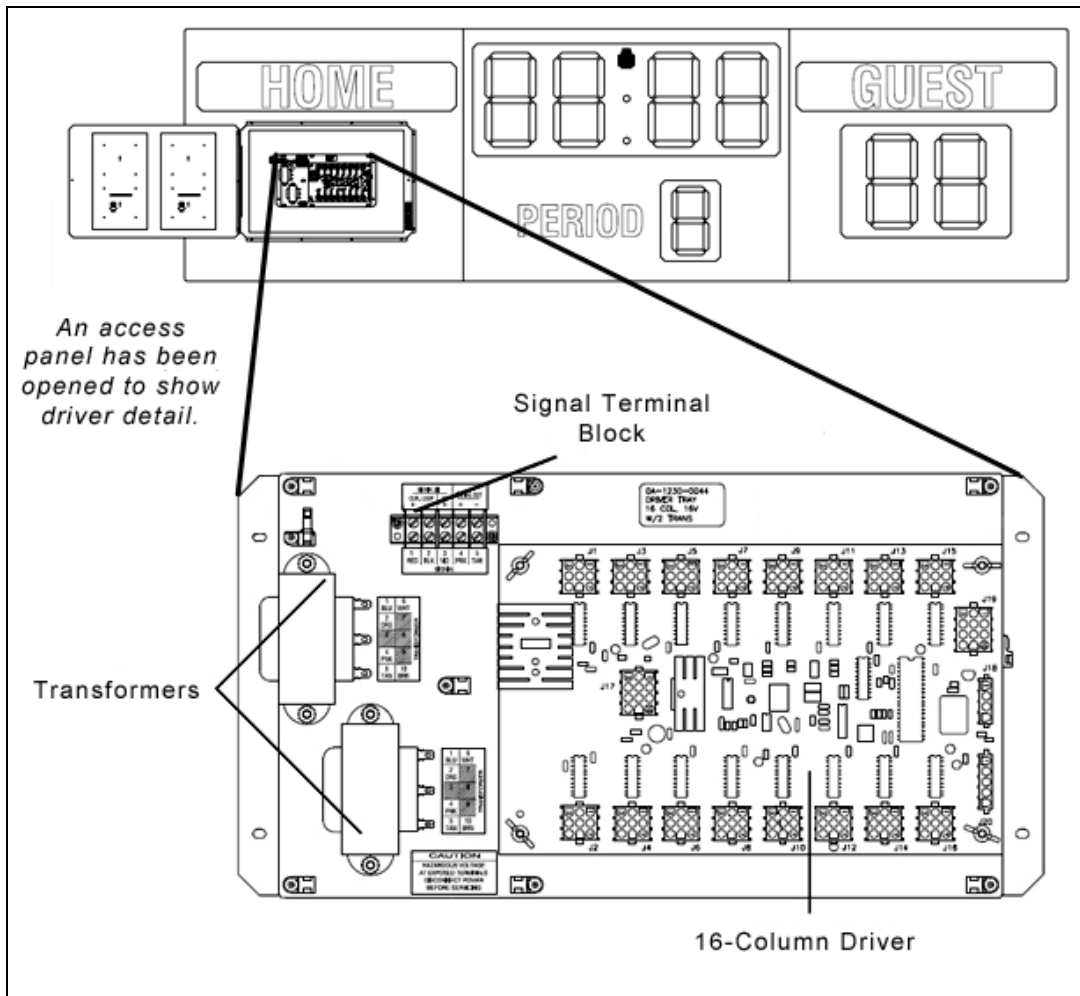


Figure 12: Driver Enclosure Location & Components

All scoreboards in this manual use 16-column drivers (**Figure 12**). Some scoreboard models contain more than one driver to accommodate all of the digits and indicators. Refer to the electrical and signal specifications in **Appendix B** to determine the type and number of drivers for a particular scoreboard model.

Each driver has numerous connectors providing power and signal inputs and outputs to the scoreboard digits and indicators. The table on the following page shows the function of these connectors for a 16-column driver:

Connector #	Function
1-16	Output to digits and indicators
17	Control signal
18	Control for horn
19	Address

Refer to **Drawing A-126174** in **Appendix E** for detailed driver pin out/switch specifications.

When troubleshooting driver problems, three LEDs labeled **DS1**, **DS2**, and **DS3**, provide the following diagnostic information:

LED	Color	Function	Operation	Summary
DS1	Green	Power	Steady on	DS1 will be on and steady to indicate the driver has power.
DS2	Red	Signal RX	Steady on or blinking	DS2 will be on or blinking when the driver is receiving a signal and off when there is no signal.
DS3	Amber	Status	Blinking	DS3 will be blinking at one second intervals to indicate the driver is running.

Note: While it is necessary to have the scoreboard powered on to check the LED driver status indicators, always disconnect scoreboard power before servicing.

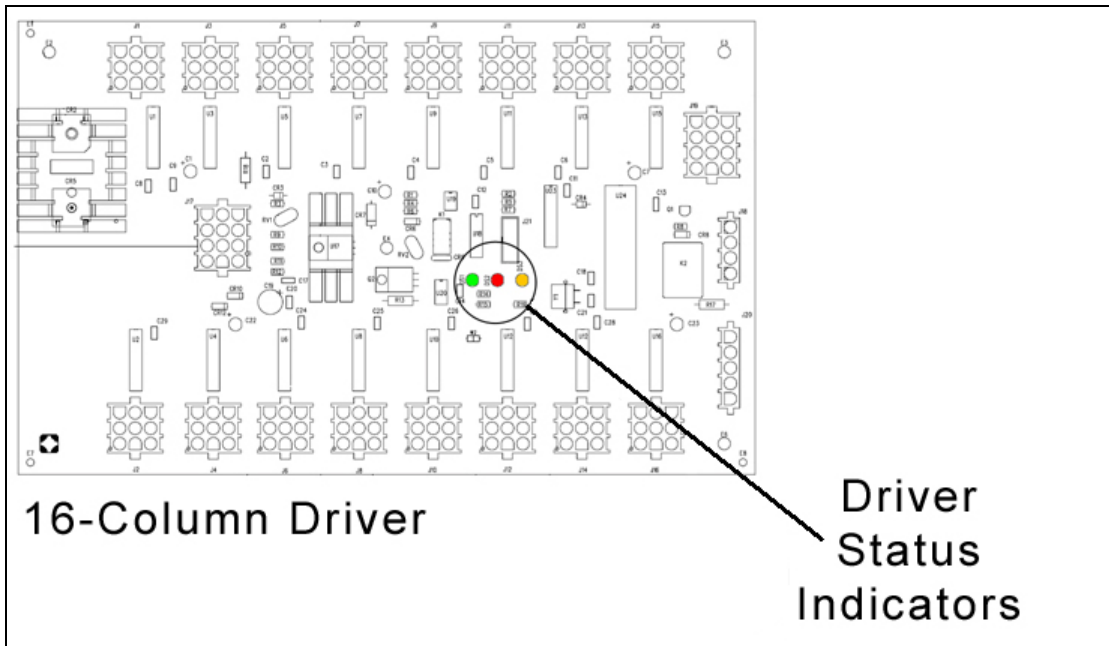


Figure 13: Driver Status Indicators

Replacing a Driver

If the driver status indicators do not appear to be working correctly, it may be necessary to replace the driver.

1. Open the digit panel or scoreboard face panel as described in **Section 5.2**.
2. Disconnect all connectors from the driver by squeezing together the locking tabs and pulling the connectors free.

Note: It may be helpful to label the cables to know which cable goes to which connector when reattaching the driver.

3. Remove the wing nuts securing the driver to the driver tray.
4. Carefully lift the driver from the display and place it on a clean, flat surface.
5. Position a new driver over the screws and tighten the nuts.
6. Reconnect all power/signal connectors.

Note: The connectors are keyed and will attach in one way only. Do not attempt to force the connections.

7. Ensure the driver is set to the correct address (refer to **Setting the Driver Address**).
8. Close and secure the access panel, then power up and test the scoreboard to see if changing the driver has resolved the problem.

Setting the Driver Address

Since the same LED drivers can be used for many scoreboard models, each driver must be set to receive the correct signal input, or address, for the model being used. This address is set with jumper wires in a 12-pin plug which mates with jack J19 on the driver (**Figure 14**).

It may be possible to reuse the same address plug from the driver that was replaced. If not, first refer to the specifications table in **Section 2** to find the correct driver address(es) for a particular scoreboard model. Then refer to **Drawing A-115078** in **Appendix E** for a listing of the wire/pin connections for driver addresses 1 – 128.

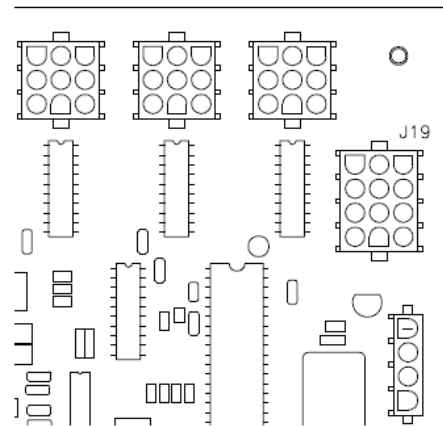


Figure 14: Address Jack J19

Multiple Drivers

Scoreboards that require multiple drivers operate using a master/slave driver configuration. Master and slave drivers function identically, but slave units lack the power/signal termination blocks. The two drivers have been designed to simply plug into one another, and this is done at the factory, so no additional on-site connection is necessary.

If it appears as though only a certain group of digits on the scoreboard is not functioning, there may be a problem with the slave driver(s) or the power/signal connection from the other driver(s).

5.5 Segmentation and Digit Designation

In each digit, certain LEDs always go on and off together. These groupings of LEDs are called segments. **Drawing A-38532** in **Appendix E** details which connector pin is wired to each digit segment and the wiring color code used throughout the display.

The electrical and signal specification drawings in **Appendix B** specify the driver connectors controlling the digits. Numbers shown in hexagons in the upper half of each digit indicate which connector is wired to that digit.

5.6 Schematics

For advanced scoreboard troubleshooting and repair, it may be necessary to consult the schematic drawings. Located in **Appendix D**, schematic drawings show detailed power and signal wiring diagrams of internal display components such as drivers, horn interface cards, and transformers as well as optional components like TNMCs and radio receivers.

Model	Drawing Title	Drawing Number
H-2112	Schematic- 16V 1 Driver- 120 or 230VAC	A-158348
H-2109	Schematic, 16V 2 Driver, 120 or 230 VAC	B-158859
H-2105 H-2107	Schematic; 16V 3 Driver, 120 or 230 VAC	B-158894

5.7 Suspension System Periodic Inspections

Suspension systems need to be inspected periodically. Listed below are instructions and information about such inspections.

Static System

A static-hung system should be inspected one year after initial installation and once every five years thereafter.

- Inspect cable assemblies for broken wires, crushes, or kinks.
- Inspect components, per manufacturer's recommendations, for deformations.
- Inspect the four-sided scoreboard for any loose or missing bolts.
- Inspect the attachment bracket for loose bolts or cracks in members or welds.
- Check torque on all wire rope clips.

Hoist System

Hoist systems must be inspected annually per OSHA requirements. Some local governing bodies require more frequent inspections. See the hoist manufacturer's manual for inspection procedures.

- Inspect cable assemblies for broken wires, crushes, or kinks.
- Inspect connections for loose bolts or cracks in members or welds.

Be sure to document all inspections. Any irregularities must be addressed immediately. For installation problems, call the original installer; for hoist problems, contact the hoist manufacturer.

5.8 Replacement Parts List

Refer to the following table for Daktronics scoreboard replacement parts.

Description	Daktronics Part #
Horn, 120V with capacitor	0A-1152-0332
Main clock, start/stop switch	0A-1166-0003
Shot clock, start/stop switch	0A-1196-0031
LED driver, 16-column	0P-1150-0126
16 V AC LED VHI	0P-1150-0233
PanaView Digit, 7" red LED, 7-seg	0P-1230-0048
PanaView Digit, 7" amber LED, 7-seg	0P-1230-0049
PanaView Digit, 10" red LED, 7-seg	0P-1230-0050
PanaView Digit, 10" amber LED, 7-seg	0P-1230-0051
PanaView Digit, 13" red LED, 7-seg	0P-1230-0052
PanaView Digit, 13" amber LED, 7-seg	0P-1230-0053
PanaView Colon, Red	0P-1230-0070
PanaView Colon, Amber	0P-1230-0071
UniView Digit, 7" Red LED, 7-seg	0P-1230-0023
UniView Digit, 7" Amber LED, 7-seg	0P-1230-0024
UniView Digit, 10" Red LED, 7-seg	0P-1230-0025
UniView Digit, 10" Amber LED, 7-seg	0P-1230-0026
UniView Digit, 13" Red LED, 7-seg	0P-1230-0027
UniView Digit, 13" Amber LED, 7-seg	0P-1230-0028
UniView Colon, Red	0P-1230-0068
UniView Colon, Amber	0P-1230-0069
Transformer, 120P/16S, 6.3 A	T-1066
Cable, 20' phone plug	W-1236
Cable, 50' phone plug	W-1237
Cable, 30' phone plug	W-1238
Cable, 10' phone plug	W-1340

5.9 Daktronics Exchange and Repair & Return Programs

Exchange Program

The Daktronics Exchange Program is a quick, economical service for replacing key components in need of repair. If a component fails, Daktronics sends a replacement part to the customer who, in turn, returns the failed component to Daktronics. This not only saves money but also decreases equipment downtime. Customers who follow the program guidelines explained below will receive this service.

Before Contacting Daktronics

Identify these important numbers:

Display Serial Number: _____

Display Model Number: _____

Job/Contract Number: _____

Date Installed: _____

Daktronics Customer ID Number: _____

To participate in the Exchange Program, follow these steps.

1. Call Daktronics Customer Service.

Market Description	Customer Service Number
Schools (including community/junior colleges), religious organizations, municipal clubs and community centers	877-605-1115
Universities and professional sporting events, live events for auditoriums and arenas	866-343-6018

2. When the new exchange part is received, mail the old part to Daktronics.

If the replacement part fixes the problem, send in the problem part being replaced.

- a. Package the old part in the same shipping materials in which the replacement part arrived.
- b. Fill out and attach the enclosed UPS shipping document.
- c. Ship the part to Daktronics.

3. The defective or unused parts must be returned to Daktronics within 5 weeks of initial order shipment.

If any part is not returned within five (5) weeks, a non-refundable invoice will be presented to the customer for the costs of replenishing the exchange parts inventory with a new part.

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

Repair & Return Program

For items not subject to exchange, Daktronics offers a Repair & Return Program. To send a part for repair, follow these steps:

- 1. Call or fax Daktronics Customer Service:**
Refer to the appropriate market number in the chart listed on the previous page.
Fax: 605-697-4444
- 2. Receive a case number before shipping.**
This expedites repair of the part.
- 3. Package and pad the item carefully to prevent damage during shipment.**
Electronic components, such as printed circuit boards, should be placed in an antistatic bag before boxing. Daktronics does not recommend using packing 'peanuts' when shipping.
- 4. Enclose:**
 - name
 - address
 - phone number
 - the case number
 - a clear description of symptoms

Shipping Address

Daktronics Customer Service
[Case #]
201 Daktronics Drive, Dock E
Brookings, SD 57006

Daktronics Warranty and Limitation of Liability

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

Section 6: Scoreboard Options

6.1 Horns

Daktronics Tuff Sport scoreboards are equipped with a 120 VAC vibrating horn mounted behind the scoreboard face. The horn sounds automatically when the period clock counts down to zero, or when manually triggered by the operator using the control console.

Installation of an optional 12 VDC horn is detailed in **Drawing A-148960** in **Appendix C**. Louder trumpet horns are also available. Contact Daktronics for information and pricing.

Adjusting Horn Volume

CAUTION: The scoreboard horn is a 120 VAC device. Turn off the power to the scoreboard before adjusting the horn.

The volume for the electronic, buzzer-type horn is set at its maximum level at the factory. If the horn is too loud, reduce its volume by adjusting the setscrew mounted in the front of the horn. A plastic tip on the screw touches the horn's diaphragm, reducing the volume. Turn the screw clockwise and test the volume by operating the horn from the scoreboard control console. Continue adjusting and testing until the desired volume level is obtained.

Note that with the noise of spectators, the horn will not seem as loud as when it is being tested in an empty area, so be sure to set the volume according to the acoustics of the facility.

6.2 Radio Control

Radio control is an option for Daktronics Tuff Sport scoreboards. The system provides scoreboard control via a 2.4 GHz, extra-high frequency FM signal.

The radio transmitter and receiver are not standard equipment. This setup requires a control console equipped with a radio transmitter as well as a radio receiver plugged into the driver/power enclosure and mounted internally to the front panel of the scoreboard.

For additional information about this option, contact a Daktronics representative; for complete information on setting up radio communication control, refer to the **Gen V Radio Installation Manual (ED-13831)** or the **Gen VI Radio Installation Manual (DD2362277)**, both available online at www.daktronics.com/manuals.

6.3 Visual Horn Indicator (VHI)

In addition to the horn, Daktronics offers both incandescent and LED visual horn indicators that light up when the buzzer sounds. To install the VHI, users must tap into the existing horn wiring to provide power and signal. For more information about installing the VHI options, refer to the **Visual Horn Indicator Installation Instructions (ED-13397)** or the **BB-2133 LED Indicator Installation Instructions (ED-13806)**. Both manuals are available online at www.daktronics.com/manuals.

6.4 Changeable Captions

Team name and statistics caption kits contain hardware for one caption only and consist of an upper caption retainer, a lower caption retainer, a changeable caption panel and screws.

The standard HOME and GUEST captions are applied directly to the face of the scoreboard. Team name captions are on changeable panels that fit into retainers mounted above and below the standard captions. If these retainers are not already present, attach the retainers included with the caption kit.

Refer to **Drawing A-150021** in **Appendix C** for changeable caption installation instructions.

6.5 Goal Lights

For installations involving optional goal lights, refer to the Indoor Hockey Goal Lights Manual (ED-13358), available online at www.daktronics.com/manuals.

6.6 Team Name Message Centers

Refer to **Section 7** for more information about Team Name Message Centers.

Section 7: TNMC Troubleshooting & Maintenance

IMPORTANT NOTES:

1. Always disconnect scoreboard power before doing any repair/maintenance work on the message centers.
2. Permit only qualified service personnel to access internal display electronics.
3. Disconnect power when not using the scoreboard.

7.1 Display Overview

Team Name Message Centers (TNMCs) are programmable LED displays that allow users to show custom Home and Guest names or messages of ~15 characters on the scoreboard in place of static vinyl captions. TNMCs are typically ordered factory-installed, but they may also be field-mounted after the scoreboard is in place. Characters are shown on one line using single- or double-stroke fonts.

Primary matrix size is 8x48 with 0.75" pixel spacing. **Figure 15** shows an example of TNMCs.

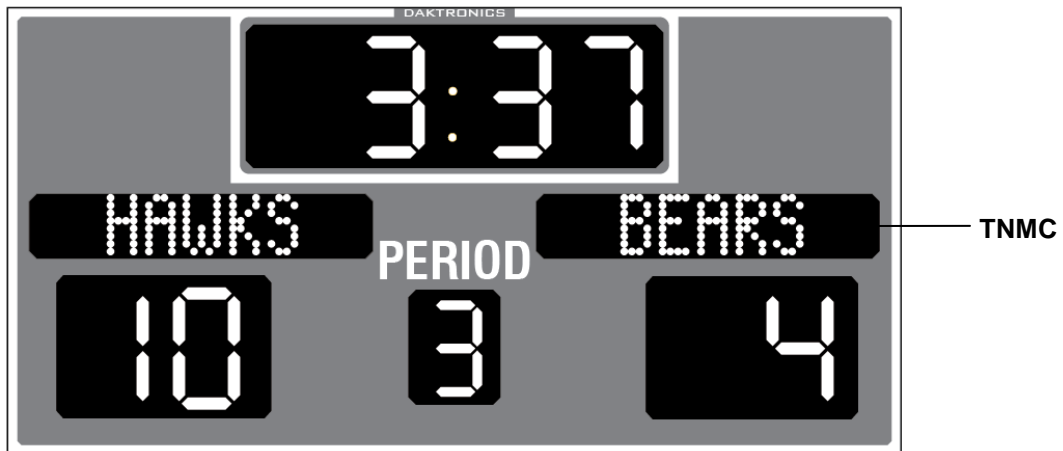


Figure 15: Hockey Scoreboard with TNMCs

Matrix Size	Number of Modules	Pixel Spacing	Active Display Area	Weight*
8x48	3	19 mm (0.75")	6" x 36" (152 mm x 914 mm)	15 lb (7 kg)

* Weight shown is for a pair of displays.

7.2 Initialization Information at Startup

Every time the display is powered up and there is no All Sport® signal present, the display will run through an initialization process, during which it will test all LEDs and addresses. First, the message center will display the proper address number.

If the entire display fails at startup, power may not be properly connected, or the address setting may not be correct on the display driver. Check both in the event of a failure.

7.3 Display Troubleshooting Table

The table below lists potential problems with the display and indicates possible causes and corrective actions. This list does not include every symptom that may be encountered, but it does present several of the most common situations that may occur.

Many of the solutions offered below provide references to other sections within this manual with further detail on how to fix the problem.

If a problem occurs that is not listed or that cannot be resolved using the solutions in the following table, contact Daktronics using the information provided in **Section 0**.

Symptom/Condition	Possible Remedy
One or more LEDs on a single module fails to light	Check/replace the ribbon cables on the module.
	Replace the module (see Section 7.7).
One or more LEDs on a single module fails to turn off	Check/replace the ribbon cables on module.
	Replace the module (see Section 7.7).
A section of the display not working; section extends all the way to the right side of the display	Check/replace the ribbon cables running to the first module that is not working.
	Replace the first module on the left side of the first module that is not working (see Section 7.7).
	Replace the second module that is not working (see Section 7.7).
	Replace the power supply assembly on the first module that is not working (see Section 7.8).
One row of modules does not work or is garbled	Replace the first module (see Section 7.7).
	Replace the display driver (see Section 7.6).
A group of modules that share the same power supply assembly fails to work	Replace the power supply assembly (see Section 7.8).
Entire display fails to work	Check for proper line voltage into the power termination panel.
	Check/replace the ribbon cable from the display driver to the modules.
	Check the voltage settings on the power supplies.
	Check/replace the signal cable to the driver.
	Repair/replace the driver (see Section 7.6).

7.4 Power & Signal Summary

Reference Drawings:

Schematic: 3/4" and 1" DC TNMC's **Drawing B-146975**

Refer to **Drawing B-146975** in **Appendix D** for detailed schematics about display power and signal routing.

Display signal routing can be summarized as follows:

1. Data from the All Sport® controller travels via signal cable (or radio) into the scoreboard.
2. The signal then travels through the driver, typically re-driven from the driver TB-31 to the current loop interface (CLI) cards located on the right-hand module of each display.
3. A ribbon cable harness carries the signal to the first LED module, and the signal relays from module to module via ribbon cable in daisy-chain style until it reaches the last module in the display.

Display power routing can be summarized as follows:

1. Incoming power from the power cord terminates at the main scoreboard LED driver tray.
2. Using interconnect harnesses, the power is passed from the driver tray to the Home display power supply, and then to the Guest display power supply.
3. Power from the power supplies is relayed to all display modules.
4. The modules draw their power directly from the power supply assemblies; the display driver receives power out from the first module via ribbon cable.

7.5 Component Locations & Access

Reference Drawings:

Installation, 6" Amber 8x48 TNMC..... **Drawing A-148701**

To access the internal components of the display, simply remove the two screws on either side of the face panel that secure it to the scoreboard. Carefully remove the face panel from the scoreboard, as there will be several cables connected to it.

Drawing A-148701 in **Appendix C** provides a detailed view of each display component and the connections between them.

7.6 Display Drivers

Reference Drawings:

A/S 5000 Capable TNMC Shift Card; Specifications **Drawing A-123794**

Display drivers, also known as controllers or shift cards, use a 12-pin plug that mates with jack J4 to set the address. For TNMCs, the address plug is set to 1 (221). Pin 11 on the address plug selects whether the display shows Guest (default) or Home data. Refer to **Drawing A-123794** in **Appendix E** for addressing information.

Figure 16 illustrates some of the primary jacks and indicators of a display driver.

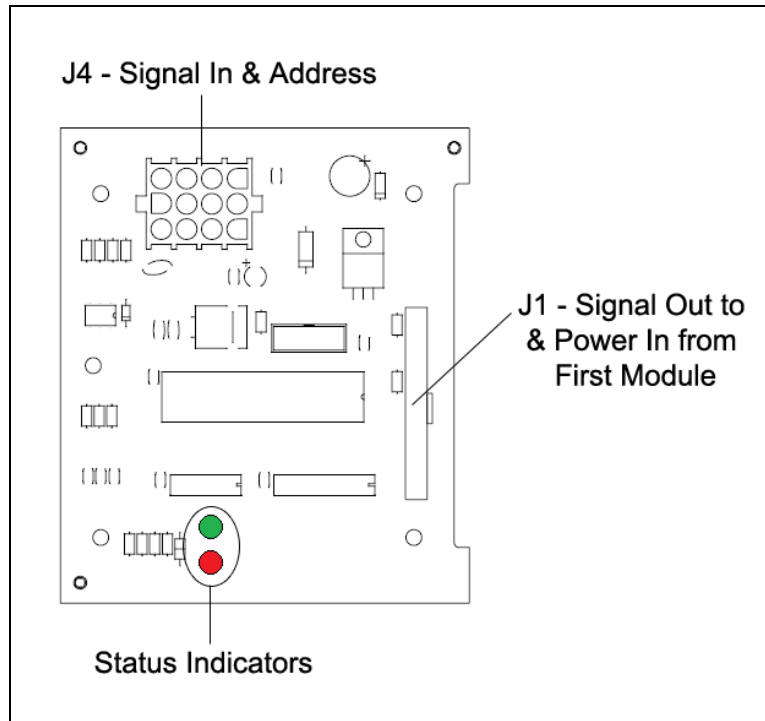


Figure 16: Display Driver

Diagnostic LEDs

The following table explains the functions of the primary diagnostic LEDs on the drivers:

LED Name	Color	Illumination Summary
DS1 PWR	Green	Steady on or blinking when the driver has power
DS2 RX	Red	Steady on or blinking when the driver is receiving and off when there is no current loop (CL) signal

Replacing a Driver

1. Access the internal components as described in **Section 7.5**.
2. Disconnect all power and signal connectors from the driver by squeezing together the locking tabs and pulling the connectors free.

Note: It may be helpful to label the cables to know which cable goes to which connector when reattaching a driver.

3. Remove the four screws securing the driver to the module. This will be the right-most module, when viewing the display from the front.
4. Position a new driver over the standoffs on the module and tighten the screws.
5. Reconnect all power/signal connectors.
6. Power up and test the scoreboard/display to see if the problem has been resolved.

Refer to **Figure 17** for an overview of driver (and module) replacement.

7.7 Modules

Display modules consist of LEDs embedded in a circuit board. One or more circuit boards are mounted to the back of a display face panel. Do not attempt to remove individual LEDs. In the case of malfunctioning LEDs, replace the entire module circuit board.

Replacing Modules

1. Access the internal components as described in **Section 7.5**.
2. Carefully disconnect all ribbon cables from the driver by squeezing together the locking tabs and pulling the connectors free.

Note: It may be helpful to label the cables to know which cable goes to which connector when reattaching.

3. Remove the nuts securing the module circuit board to the face panel. If a display driver is attached to the module, remove it along with the screws and standoffs.
4. Position a new module on the front of the face panel and reconnect all ribbon cables.
5. Reattach the module to the face panel. If a display driver was previously removed from the module, reattach it at this time too.
6. Power up and test the scoreboard/display to see if the problem has been resolved.

Refer to **Figure 17** for an overview of module (and driver) replacement.

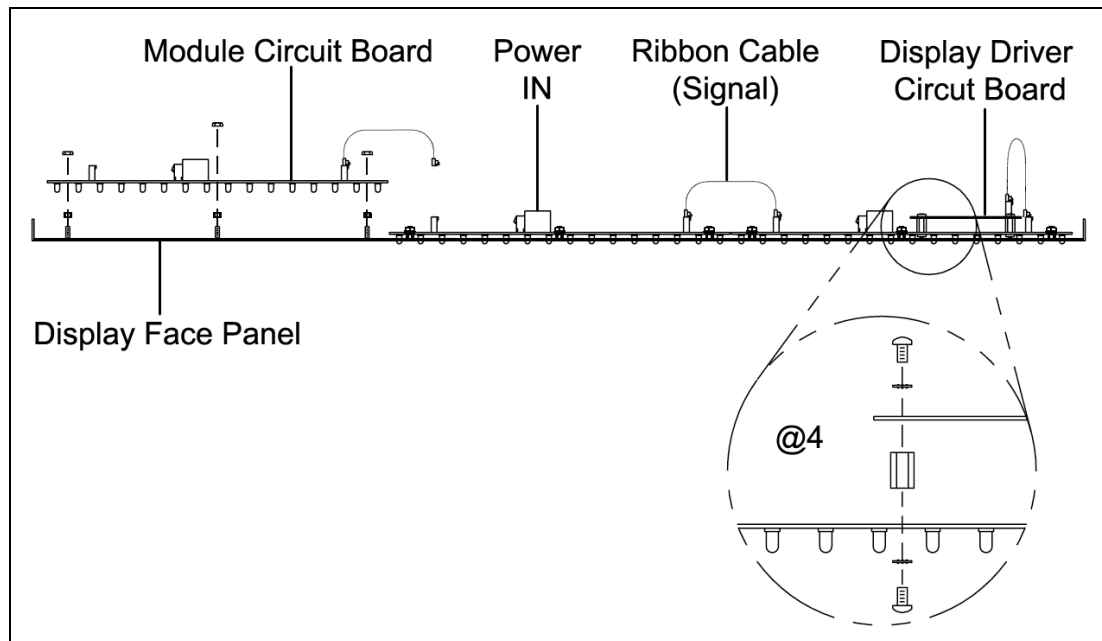


Figure 17: Replacing a Module or Driver, Top View

7.8 Power Supplies

Replacing a Power Supply

1. Access the internal components as described in **Section 7.5**.
2. Remove the two screws securing the power supply bracket, and remove it from the display cabinet.
3. Disconnect all the wires connected to the power supply.

Note: It may be helpful to label the cables to know which cable goes to which connector when reattaching.

4. Remove the three screws securing the power supply to the bracket, and attach the new power supply to it.
5. Reconnect all wires, and mount the power supply bracket inside the display cabinet.

7.9 Display Maintenance

Complete a yearly inspection to maintain safe and dependable display operation. This inspection should address the following issues:

- **Loose Hardware:** Verify that fasteners, such as bolts and rivets, have not come loose. Check and tighten or replace fasteners as required.
- **Excessive Dust Buildup:** It may be necessary to occasionally vacuum the inside of the display cabinet to remove dust/dirt buildup that may interfere with airflow.
- **Corrosion:** Check the paint, and look for possible corrosion.

Note: If any of the preceding conditions are discovered, make the necessary repairs or take corrective action immediately.

7.10 Replacement Parts List

The following tables contain display components that may have to be replaced. Many of the components within the display itself have attached part number labels.

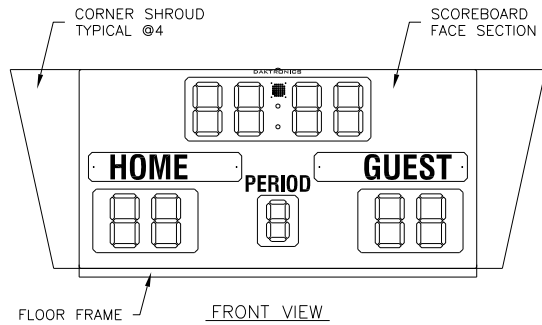
Part Description	Part Number
Indoor TNMC Card	0P-1150-0206
Module; 8x16, Amber	0P-1186-0112
Power Supply; 5V @ 10A, 85-264VAC	A-1568
Cable; 18 pos, Ribbon, 6"	W-1320

See **Section 0** for information on Daktronics Exchange and Repair and Return program.

Appendix A: Mechanical Specification Drawings

<i>Drawing Title</i>	<i>Drawing Number</i>
Mechanical Spec, H-2112.....	B-167842
Mechanical Spec- H-2105	B-168559
Mechanical Spec, H-2107.....	B-168569
Mechanical Spec, H-2109.....	B-168570

H-2112

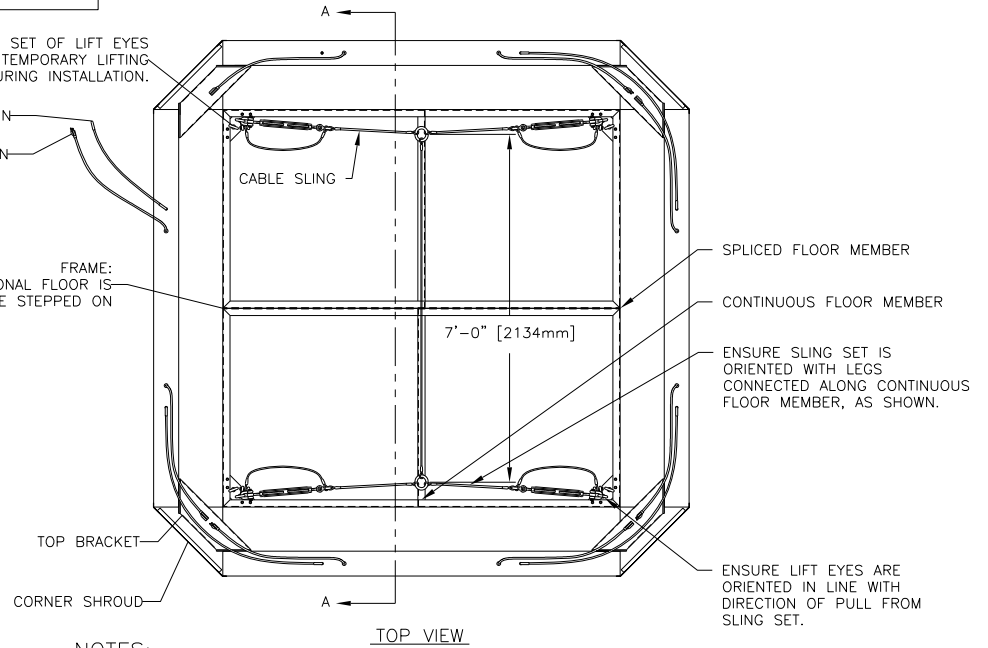


SECOND SET OF LIFT EYES ARE FOR TEMPORARY LIFTING DURING INSTALLATION.

SIGNAL IN

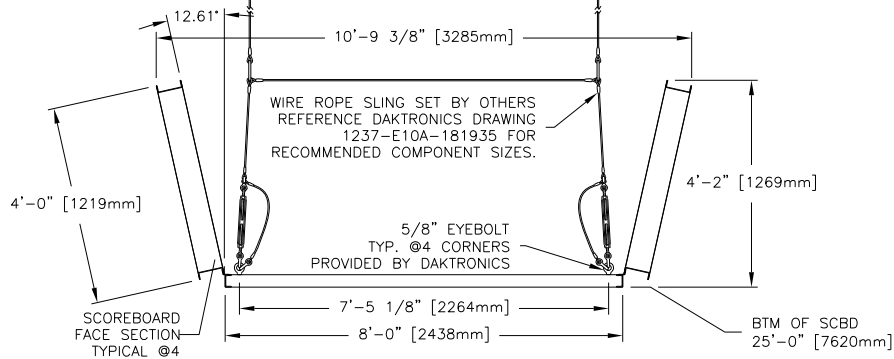
POWER IN

FRAME: THE OPTIONAL FLOOR IS NOT TO BE STEPPED ON



ATTACH THE CABLES TO THE MOUNTING STRUCTURE OR

ATTACH HOIST HOOKS TO MASTER LINKS.



NOTES:

- SCOREBOARD MAY BE SUSPENDED IN ONE OF TWO WAYS:
 - STATIC-HUNG FROM ROOF TRUSSES OR A MOUNTING STRUCTURE AS SHOWN TO THE LEFT.
 - SUSPENDED FROM A HOIST (NOT SHOWN)
- CABLE SLINGS (WIRE ROPE AND FITTINGS), TURNBUCKLES, ETC. ARE NOT PROVIDED BY DAKTRONICS, UNLESS CONTRACTED OTHERWISE. REFERENCE DAKTRONICS DRAWING 1237-E10A-181935 FOR RECOMMENDED COMPONENT SIZES.
- ALL SUPPORT STRUCTURES AND HOISTS MUST BE APPROVED BY A LICENSED ENGINEER.
- DAKTRONICS IS NOT RESPONSIBLE FOR HOISTS OR STRUCTURES SPECIFIED OR INSTALLED BY OTHERS.
- SCOREBOARD IS SHIPPED IN SEVERAL PARTS: EACH FACE SECTION IS ONE PIECE, THE FLOOR FRAME IS IN TWO PARTS AND NEEDS SOME ASSEMBLY. TOP BRACKETS ARE ATTACHED DURING ASSEMBLY. CORNER SHROUDS ARE ATTACHED LAST, AND PROVIDE COSMETIC COVERING ONLY.
- CONNECT THE FIRST SECTION TO POWER AND SIGNAL. EACH SECTION CONNECTS TO THE NEXT, PROVIDING POWER AND SIGNAL FOR ALL FOUR SECTIONS.
- ESTIMATED WEIGHT: 780 LBS (355 KG)

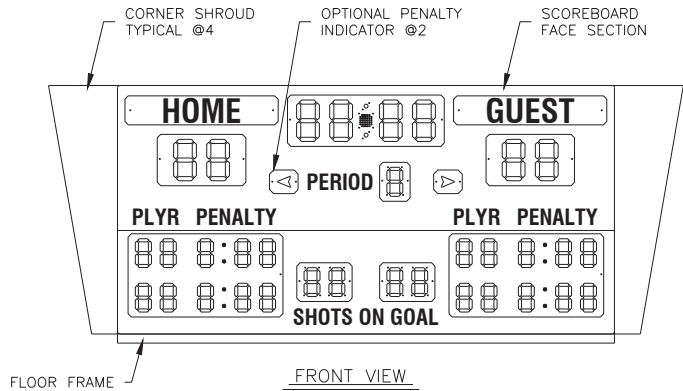
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DAKTRONICS, INC. BROOKINGS, SD 57006

REV.	DATE	DESCRIPTION	BY	APPR.
02	23 JAN 03	UPDATED VIEW OF SLING SET AND LISTED REFERENCE DRAWING FOR SLING SET. ADDED MINIMUM HEIGHT REQUIREMENTS.	RJN	
01	5 JUN 02	ADDED DIMENSIONS.	JJS	

PROJ: TUFF SPORT™ SCOREBOARDS		
TITLE: MECHANICAL SPEC, H-2112		
DES. BY: BPETERSON	DRAWN BY: JJSYRSTAD	DATE: 28 MAY 02
REVISION	APPR. BY:	
SCALE: 1=30	1237-E10B-167842	

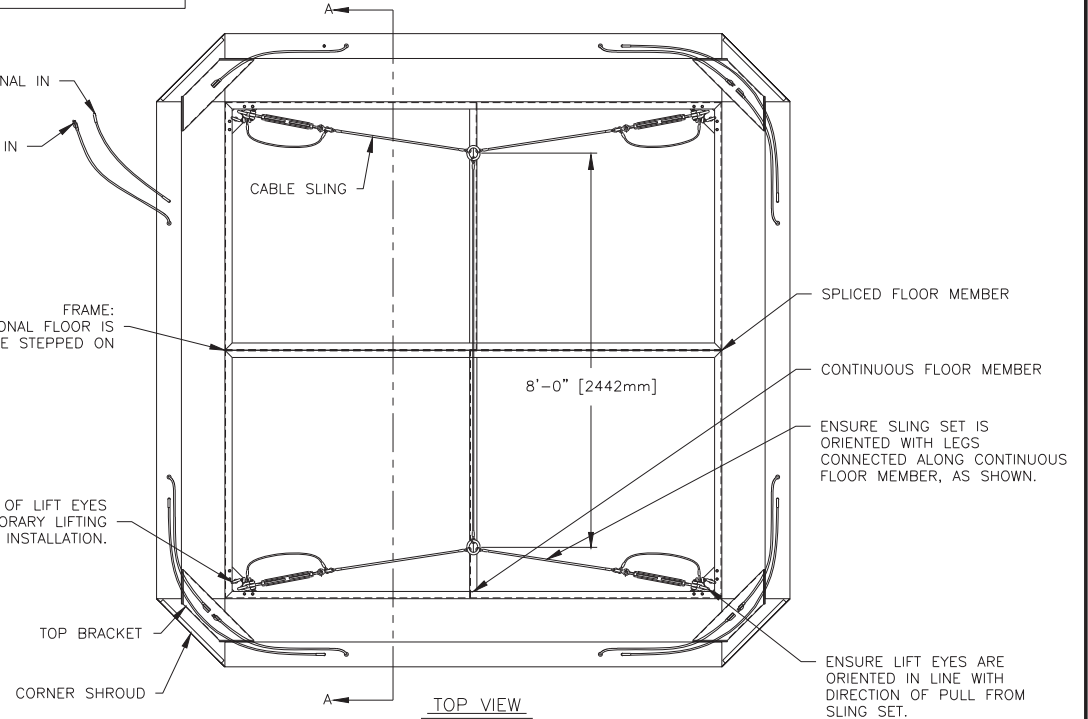
H-2105



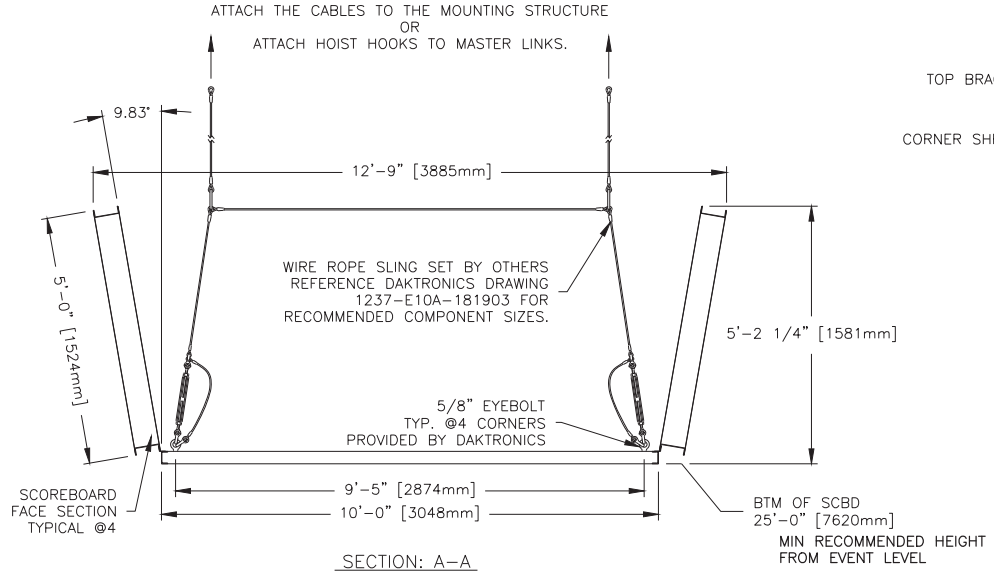
SIGNAL IN
 POWER IN

FRAME:
 THE OPTIONAL FLOOR IS NOT TO BE STEPPED ON

SECOND SET OF LIFT EYES ARE FOR TEMPORARY LIFTING DURING INSTALLATION.



- NOTES:**
- SCOREBOARD MAY BE SUSPENDED IN ONE OF TWO WAYS:
 A. STATIC-HUNG FROM ROOF TRUSSES OR A MOUNTING STRUCTURE AS SHOWN TO THE LEFT.
 B. SUSPENDED FROM A HOIST (NOT SHOWN)
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 - DAKTRONICS IS NOT RESPONSIBLE FOR HOISTS OR STRUCTURES SPECIFIED OR INSTALLED BY OTHERS.
 - SCOREBOARD IS SHIPPED IN SEVERAL PARTS: EACH FACE SECTION IS ONE PIECE, THE FLOOR FRAME IS IN TWO PARTS AND NEEDS SOME ASSEMBLY. TOP BRACKETS ARE ATTACHED DURING ASSEMBLY. CORNER SHROUDS ARE ATTACHED LAST, AND PROVIDE COSMETIC COVERING ONLY.
 - CONNECT THE FIRST SECTION TO POWER AND SIGNAL. EACH SECTION CONNECTS TO THE NEXT, PROVIDING POWER AND SIGNAL FOR ALL FOUR SECTIONS.
 - ESTIMATED WEIGHT: 1065 LBS (483 KG)



DAKTRONICS, INC.
 BROOKINGS, SD 57006
 DO NOT SCALE DRAWING

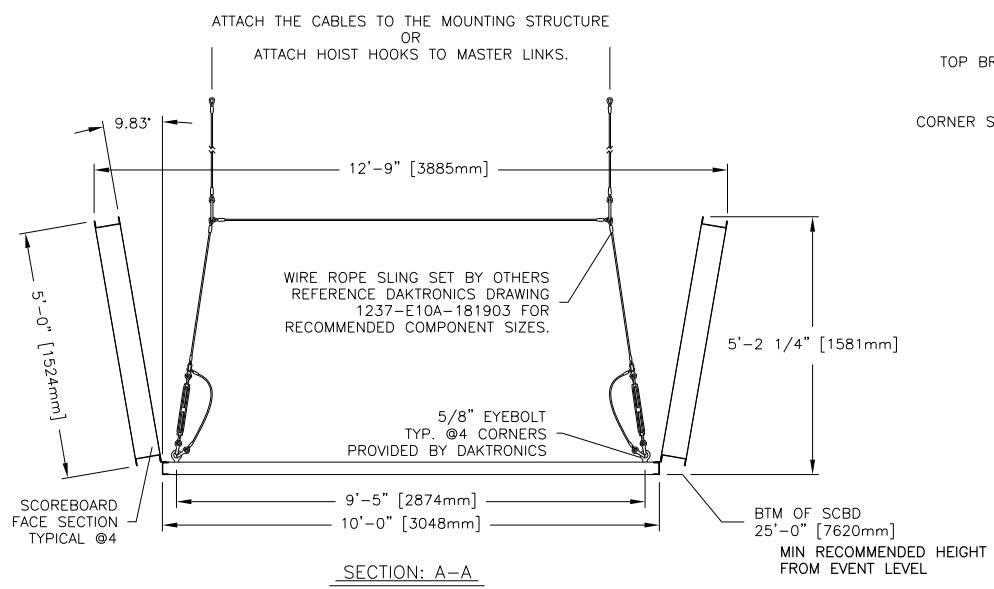
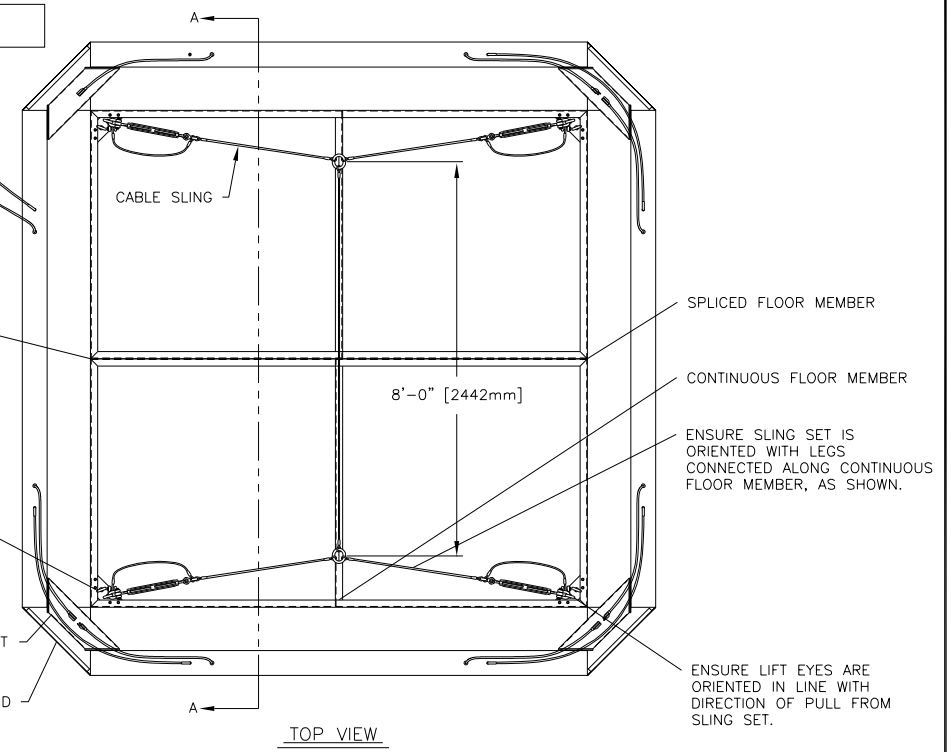
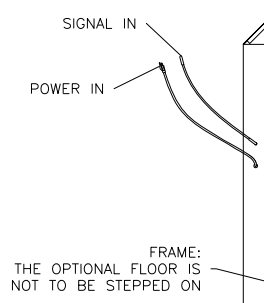
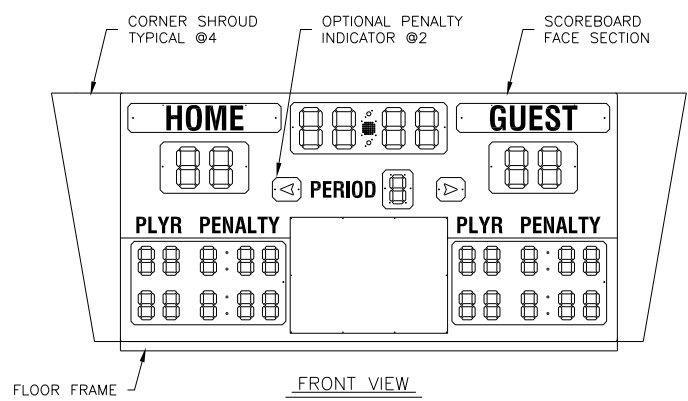
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REV 03	DATE: 18 OCT 11	MOVED POSITION OF SOG CAPTION	BY: LMG
REV 02	DATE: 13 NOV 07	ADDED OPTIONAL PENALTY INDICATORS AND NOTE.	BY: KJB
REV 01	DATE: 23 JAN 03	UPDATED VIEW OF SLING SET AND LISTED REFERENCE DRAWING FOR SLING SET. ADDED MINIMUM HEIGHT REQUIREMENTS.	BY: RJN

PROJ: TUFF SPORT SCOREBOARDS			
TITLE: MECHANICAL SPEC - H-2105			
DESIGN: A VANBEMMEL	DRAWN: JJSYRSTAD	DATE: 10 JUN 02	
SCALE: 1=30			
SHEET	REV	JOB NO:	FUNC-TYPE-SIZE
	03	P1237	E-10-B

168559

H-2107



- NOTES:**
- SCOREBOARD MAY BE SUSPENDED IN ONE OF TWO WAYS:
 A. STATIC-HUNG FROM ROOF TRUSSES OR A MOUNTING STRUCTURE AS SHOWN TO THE LEFT.
 B. SUSPENDED FROM A HOIST (NOT SHOWN)
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 - ALL SUPPORT STRUCTURES AND HOISTS MUST BE APPROVED BY A LICENSED ENGINEER.
 - DAKTRONICS IS NOT RESPONSIBLE FOR HOISTS OR STRUCTURES SPECIFIED OR INSTALLED BY OTHERS.
 - SCOREBOARD IS SHIPPED IN SEVERAL PARTS: EACH FACE SECTION IS ONE PIECE, THE FLOOR FRAME IS IN TWO PARTS AND NEEDS SOME ASSEMBLY. TOP BRACKETS ARE ATTACHED DURING ASSEMBLY. CORNER SHROUDS ARE ATTACHED LAST, AND PROVIDE COSMETIC COVERING ONLY.
 - CONNECT THE FIRST SECTION TO POWER AND SIGNAL. EACH SECTION CONNECTS TO THE NEXT, PROVIDING POWER AND SIGNAL FOR ALL FOUR SECTIONS.
 - ESTIMATED WEIGHT: 1065 LBS (483 KG)

THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS, INCLUDING ELECTRONICALLY WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2002 DAKTRONICS, INC.

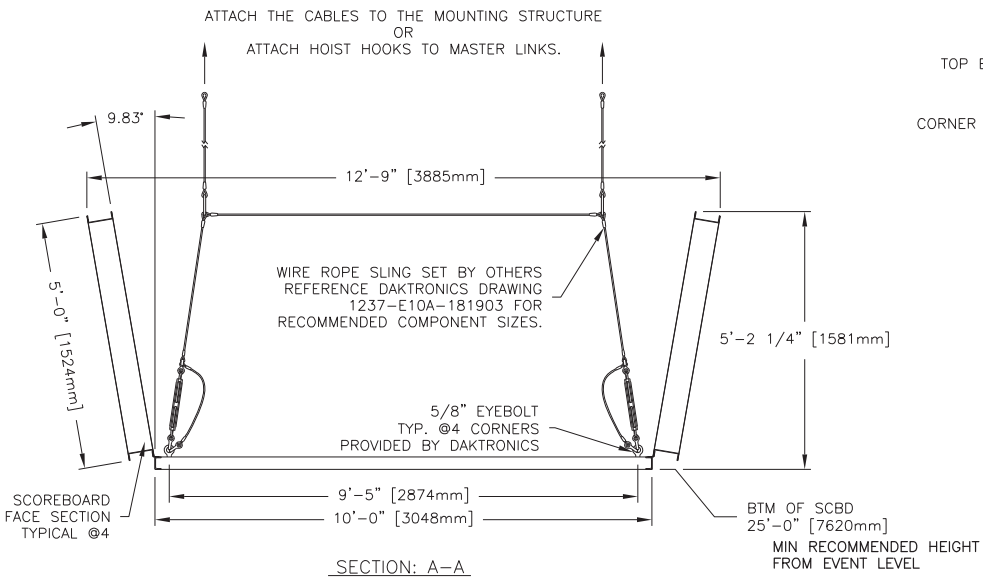
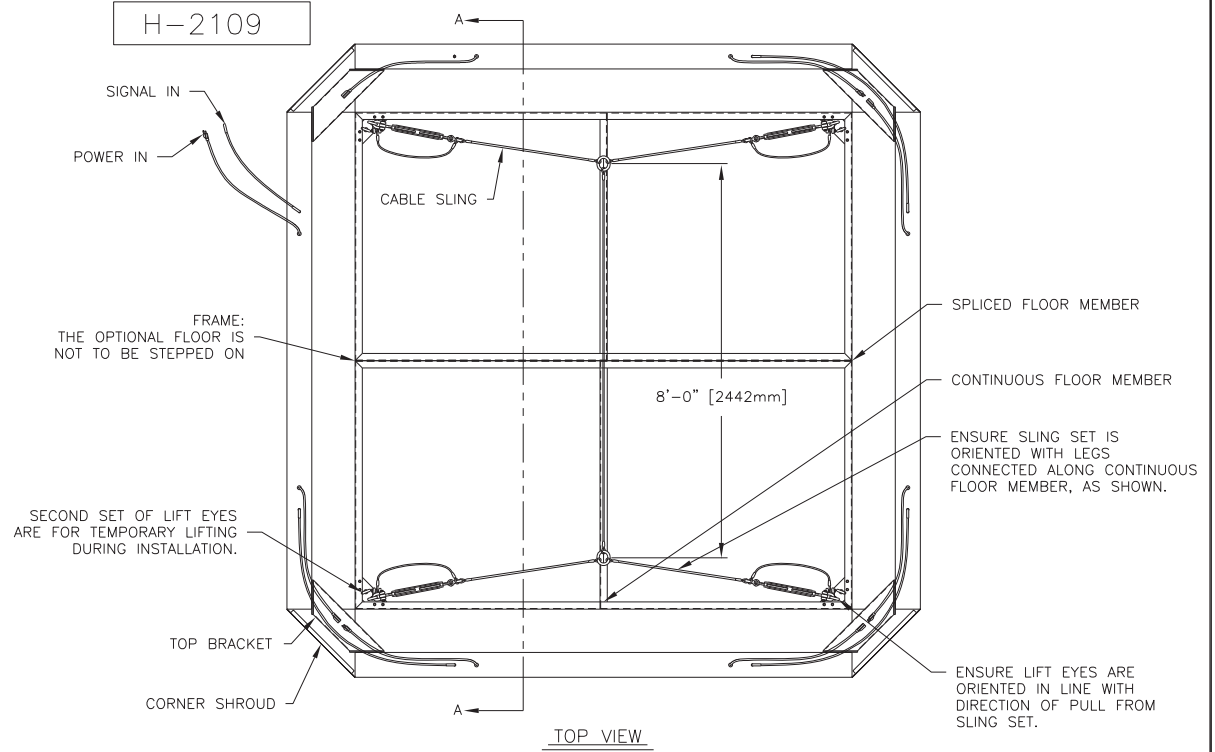
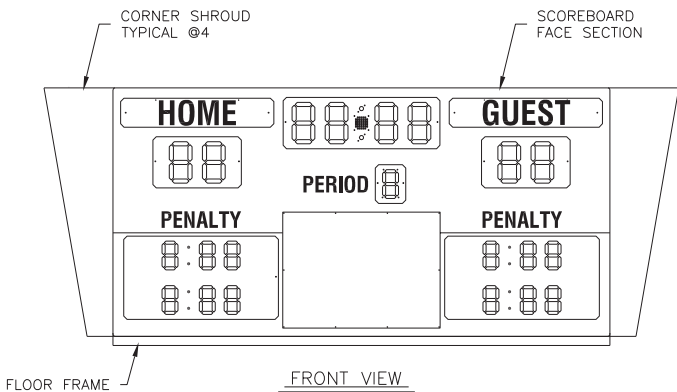
DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: TUFF SPORT SCOREBOARDS
 TITLE: MECHANICAL SPEC, H-2107
 DES. BY: A VANBEMMEL DRAWN BY: JJSYRSTAD DATE: 10 JUN 02

REVISION	APPR. BY:	SCALE:	1237-E10B-168569
02		1=30	

REV.	DATE	DESCRIPTION	BY	APPR.
02	13 NOV 07	ADDED OPTIONAL PENALTY INDICATORS AND NOTE.	KJB	
01	23 JAN 03	UPDATED VIEW OF SLING SET AND LISTED REFERENCE DRAWING FOR SLING SET. ADDED MINIMUM HEIGHT REQUIREMENTS.	RJN	

H-2109



- NOTES:
- SCOREBOARD MAY BE SUSPENDED IN ONE OF TWO WAYS:
 - STATIC-HUNG FROM ROOF TRUSSES OR A MOUNTING STRUCTURE AS SHOWN TO THE LEFT.
 - SUSPENDED FROM A HOIST (NOT SHOWN)
 - CABLE SLINGS (WIRE ROPE AND FITTINGS), TURNBUCKLES, ETC. ARE NOT PROVIDED BY DAKTRONICS, UNLESS CONTRACTED OTHERWISE. REFERENCE DAKTRONICS DRAWING 1237-E10A-181903 FOR RECOMMENDED COMPONENT SIZES.
 - ALL SUPPORT STRUCTURES AND HOISTS MUST BE APPROVED BY A LICENSED ENGINEER.
 - DAKTRONICS IS NOT RESPONSIBLE FOR HOISTS OR STRUCTURES SPECIFIED OR INSTALLED BY OTHERS.
 - SCOREBOARD IS SHIPPED IN SEVERAL PARTS: EACH FACE SECTION IS ONE PIECE, THE FLOOR FRAME IS IN TWO PARTS AND NEEDS SOME ASSEMBLY. TOP BRACKETS ARE ATTACHED DURING ASSEMBLY. CORNER SHROUDS ARE ATTACHED LAST, AND PROVIDE COSMETIC COVERING ONLY.
 - CONNECT THE FIRST SECTION TO POWER AND SIGNAL. EACH SECTION CONNECTS TO THE NEXT, PROVIDING POWER AND SIGNAL FOR ALL FOUR SECTIONS.
 - ESTIMATED WEIGHT: 1065 LBS (483 KG)

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: TUFF SPORT SCOREBOARDS

TITLE: MECHANICAL SPEC, H-2109

DES. BY: A VANBEMMEL DRAWN BY: JJSYRSTAD DATE: 10 JUN 02

REVISION	APPR. BY:	SCALE: 1=30	1237-E10B-168570
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01	23 JAN 03	UPDATED VIEW OF SLING SET AND LISTED REFERENCE DRAWING FOR SLING SET. ADDED MINIMUM HEIGHT REQUIREMENTS.	RJN	
REV.	DATE	DESCRIPTION	BY	APPR.

Appendix B: Electrical Specification Drawings

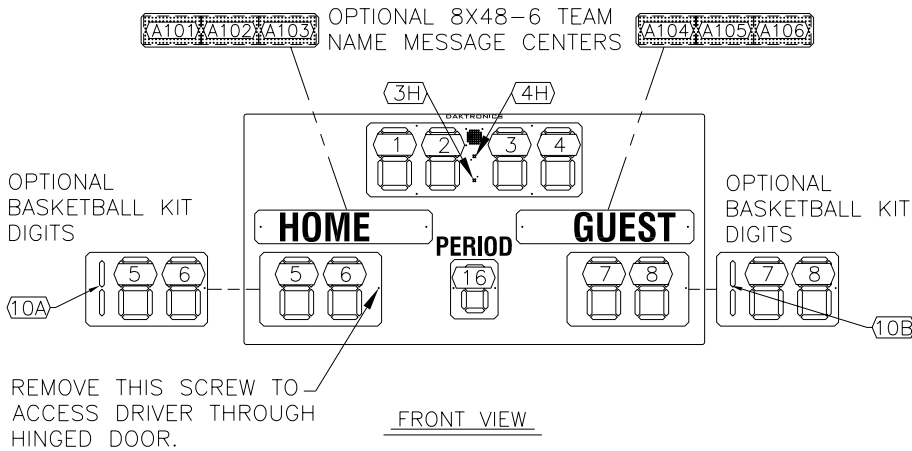
<i>Drawing Title</i>	<i>Drawing Number</i>
Electrical & Signal Spec, H-2111 & H-2112.....	A-165771
Electrical & Signal Spec, H-2106.....	A-167359
Electrical and Signal Spec- H-2104	A-168387
Electrical & Signal Spec- H-2109.....	A-168440

H-2111 & H-2112 FACE

DIGIT, SIGNAL AND POWER SPECIFICATIONS:

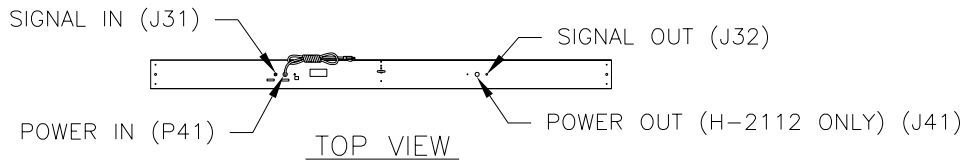
NOTES:

1. USE MINIMUM OF 24AWG, SHIELDED, TWO CONDUCTOR CABLE FOR SIGNAL TERMINATION.
2. THE NUMBER LISTED BY EACH DIGIT INDICATES THE DIGIT DESIGNATION IN RELATION TO THE LED DRIVER.
3. **DO NOT WORK ON ENERGIZED DISPLAY UNLESS YOU ARE A CERTIFIED ELECTRICIAN OR DIRECTED BY DAKTRONICS.**
4. THE SCOREBOARD IS SHOWN WITH UNIVIEW DIGIT TECHNOLOGY. SEE DRAWING A-158550 FOR MORE DETAILS.



ADDRESS INFORMATION	
DRIVER:	A1
ADDRESS:	71

COMPONENT LOCATIONS:



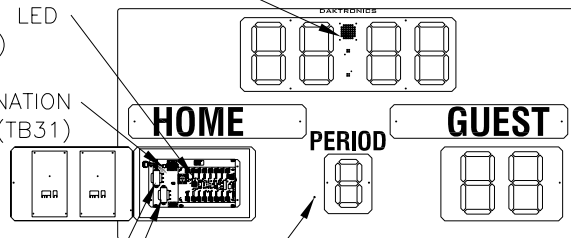
INTERNALLY MOUNTED BUZZER HORN (LS1)

16 COLUMN LED DRIVER (A1)

SIGNAL TERMINATION BLOCK (TB31)

TRANSFORMER (T1)
TRANSFORMER (T2)

HOLE FOR OPTIONAL RADIO CONTROL ANTENNA



DIGITS:

CLOCK: 13" AMBER
SCORE: 13" RED
PERIOD: 10" AMBER

TUFF SPORT™, UNIVIEW™, & PANAVIEW™ ARE TRADEMARKS OF DAKTRONICS

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: TUFF SPORT™ SCOREBOARDS

TITLE: ELECTRICAL & SIGNAL SPEC, H-2111 & H-2112

DES. BY: BPETERSON

DRAWN BY: BPETERSON

DATE: 19APR02

REVISION

APPR. BY:

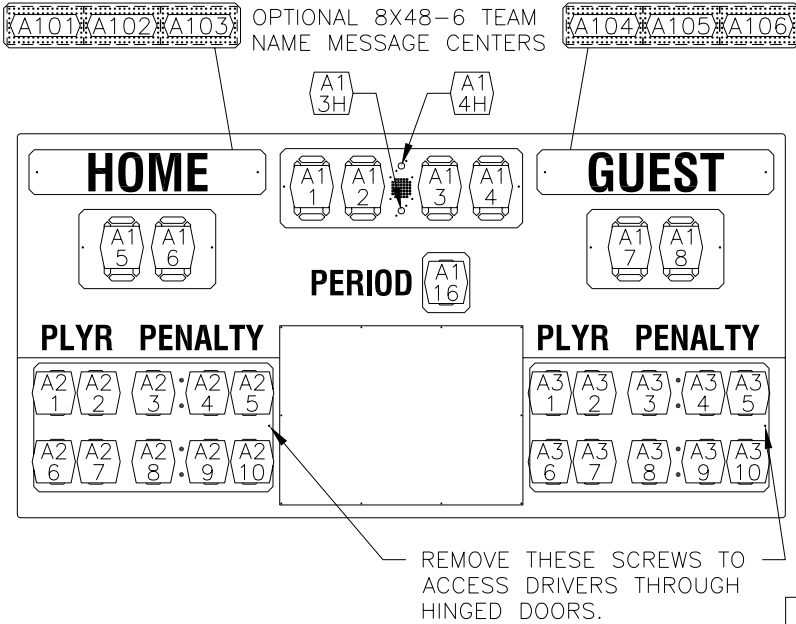
SCALE: 1=40

1237-E10A-165771

REV.	DATE	DESCRIPTION	BY	APPR.

H-2106 & H-2107 FACE

DIGIT, SIGNAL AND POWER SPECIFICATIONS:



FRONT VIEW

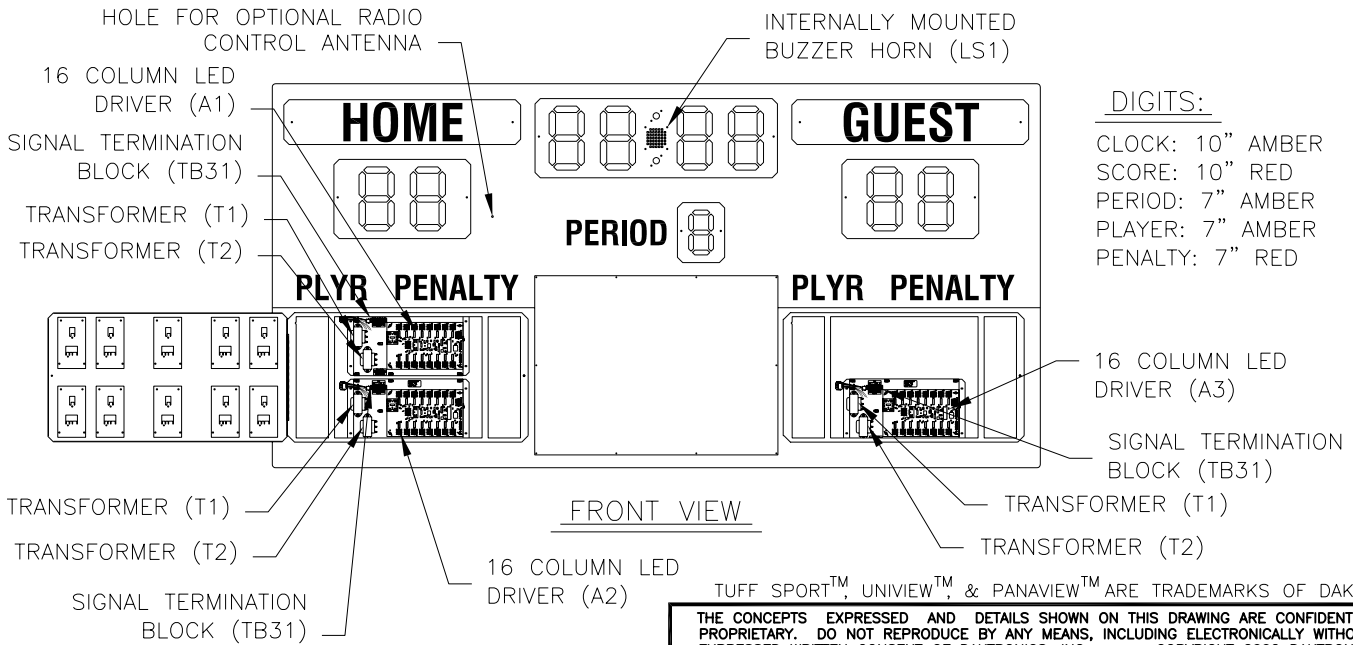
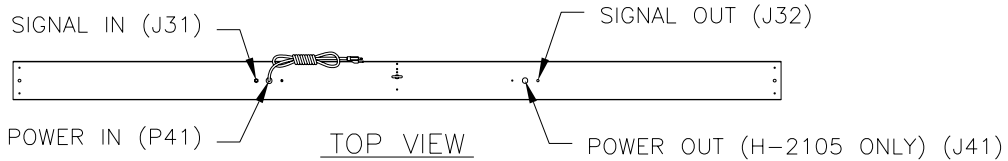
NOTES:

1. USE MINIMUM OF 24AWG, SHIELDED, TWO CONDUCTOR CABLE FOR SIGNAL TERMINATION.
2. THE NUMBER LISTED BY EACH DIGIT INDICATES THE DIGIT DESIGNATION IN RELATION TO THE LED DRIVER.
3. **DO NOT WORK ON ENERGIZED DISPLAY UNLESS YOU ARE A CERTIFIED ELECTRICIAN OR DIRECTED BY DAKTRONICS.**
4. THE SCOREBOARD IS SHOWN WITH UNIVIEW DIGIT TECHNOLOGY. SEE DRAWING A-158550 FOR MORE DETAILS.

ADDRESS INFORMATION

DRIVER:	A1	A2	A3
ADDRESS:	71	72	73

COMPONENT LOCATIONS:



DIGITS:

- CLOCK: 10" AMBER
- SCORE: 10" RED
- PERIOD: 7" AMBER
- PLAYER: 7" AMBER
- PENALTY: 7" RED

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: TUFF SPORT™ SCOREBOARDS

TITLE: ELECTRICAL & SIGNAL SPEC, H-2106

DES. BY: A VANBEMMEL

DRAWN BY: JJSYRSTAD

DATE: 6 JUN 02

REVISION

APPR. BY:

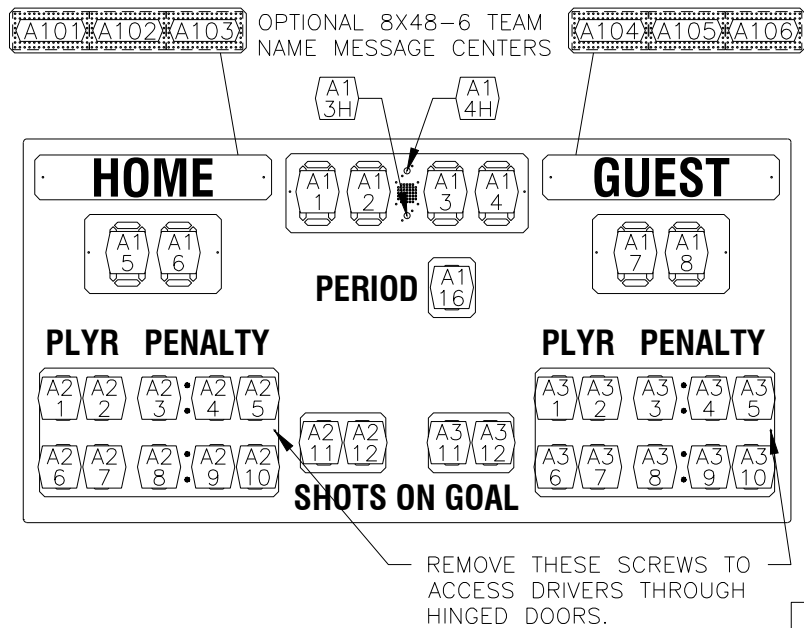
SCALE: 1=30

1237-E10A-167359

REV.	DATE	DESCRIPTION	BY	APPR.

H-2104 & H-2105 FACE

DIGIT, SIGNAL AND POWER SPECIFICATIONS:



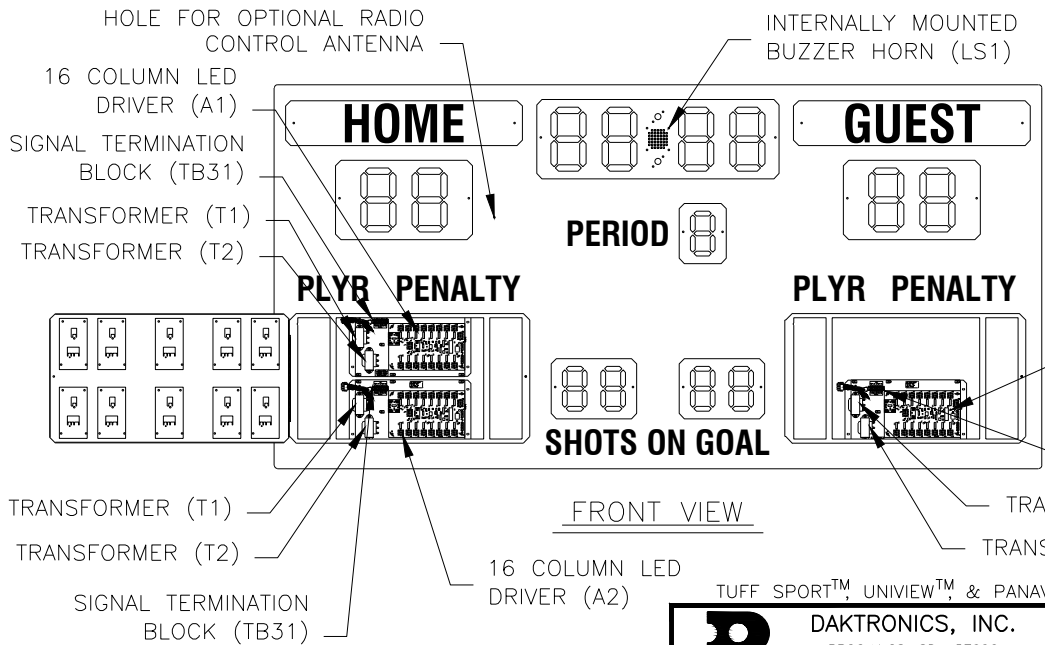
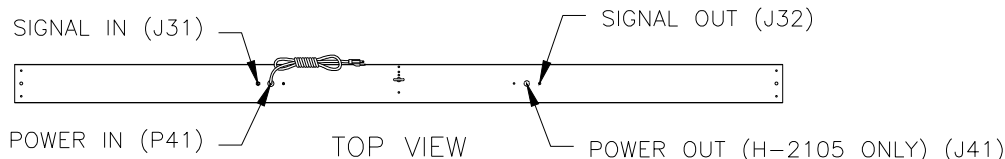
FRONT VIEW

NOTES:

1. USE MINIMUM OF 24AWG, SHIELDED, TWO CONDUCTOR CABLE FOR SIGNAL TERMINATION.
2. THE NUMBER LISTED BY EACH DIGIT INDICATES THE DIGIT DESIGNATION IN RELATION TO THE LED DRIVER.
3. **DO NOT WORK ON ENERGIZED DISPLAY UNLESS YOU ARE A CERTIFIED ELECTRICIAN OR DIRECTED BY DAKTRONICS.**
4. THE SCOREBOARD IS SHOWN WITH UNIVIEW DIGIT TECHNOLOGY. SEE DRAWING A-158550 FOR MORE DETAILS.

ADDRESS INFORMATION			
DRIVER:	A1	A2	A3
ADDRESS:	71	72	73

COMPONENT LOCATIONS:



DIGITS:

- CLOCK: 10" AMBER
- SCORE: 10" RED
- PERIOD: 7" AMBER
- PLAYER: 7" AMBER
- PENALTY: 7" RED
- SHOTS ON GOAL: 7" AMBER

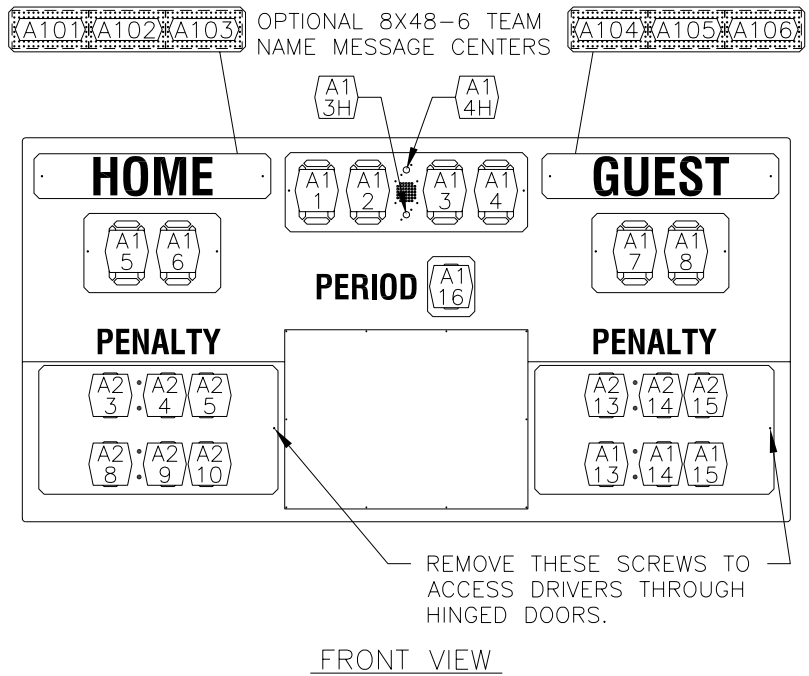
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	DO NOT SCALE DRAWING		
PROJ: TUFF SPORT SCOREBOARDS			
TITLE: ELECTRICAL AND SIGNAL SPEC- H-2104			
DESIGN: A VANBEMMEL		DRAWN: JJSYRSTAD	
SCALE: 1 = 30		DATE: 6 JUN 02	
SHEET	REV	JOB NO:	FUNC-TYPE-SIZE
01	01	P1237	E-10-A
			168387

REV	DATE:	MOVED POSTION OF SOG CAPTION	BY:	LMG
01	18 OCT 11			

H-2108 & H-2109 FACE

DIGIT, SIGNAL AND POWER SPECIFICATIONS:

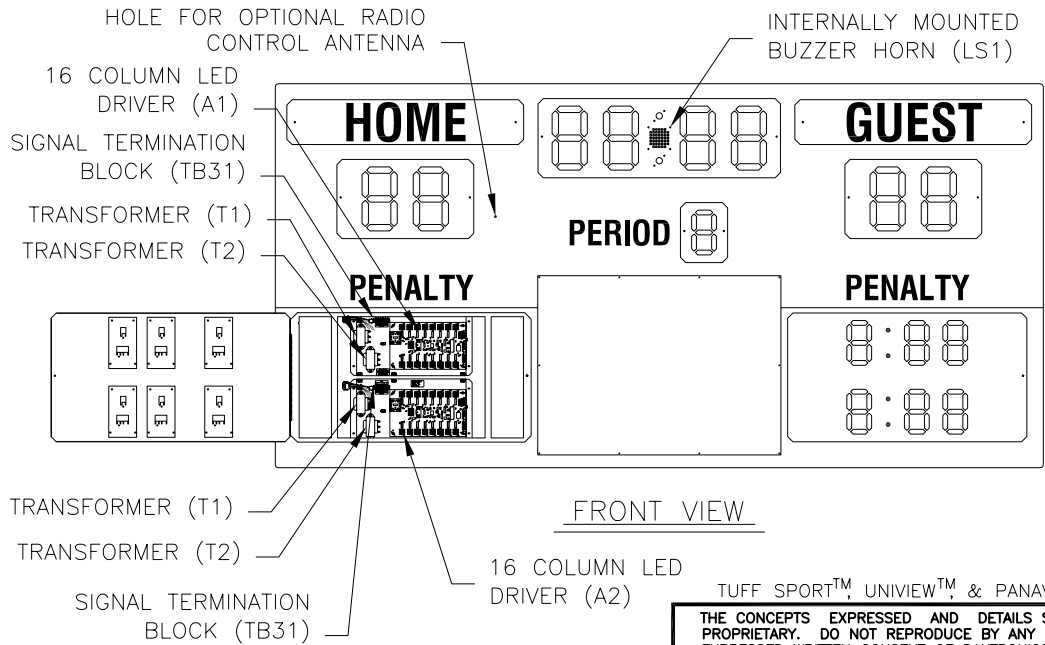
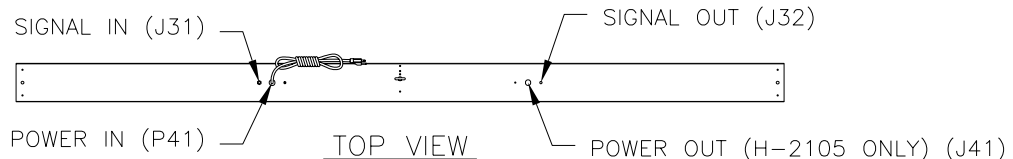


NOTES:

1. USE MINIMUM OF 24AWG, SHIELDED, TWO CONDUCTOR CABLE FOR SIGNAL TERMINATION.
2. THE NUMBER LISTED BY EACH DIGIT INDICATES THE DIGIT DESIGNATION IN RELATION TO THE LED DRIVER.
3. **DO NOT WORK ON ENERGIZED DISPLAY UNLESS YOU ARE A CERTIFIED ELECTRICIAN OR DIRECTED BY DAKTRONICS.**
4. THE SCOREBOARD IS SHOWN WITH UNIVIEW DIGIT TECHNOLOGY. SEE DRAWING A-158550 FOR MORE DETAILS.

ADDRESS INFORMATION		
DRIVER:	A1	A2
ADDRESS:	71	72

COMPONENT LOCATIONS:



DIGITS:

- CLOCK: 10" AMBER
- SCORE: 10" RED
- PERIOD: 7" AMBER
- PENALTY: 7" RED

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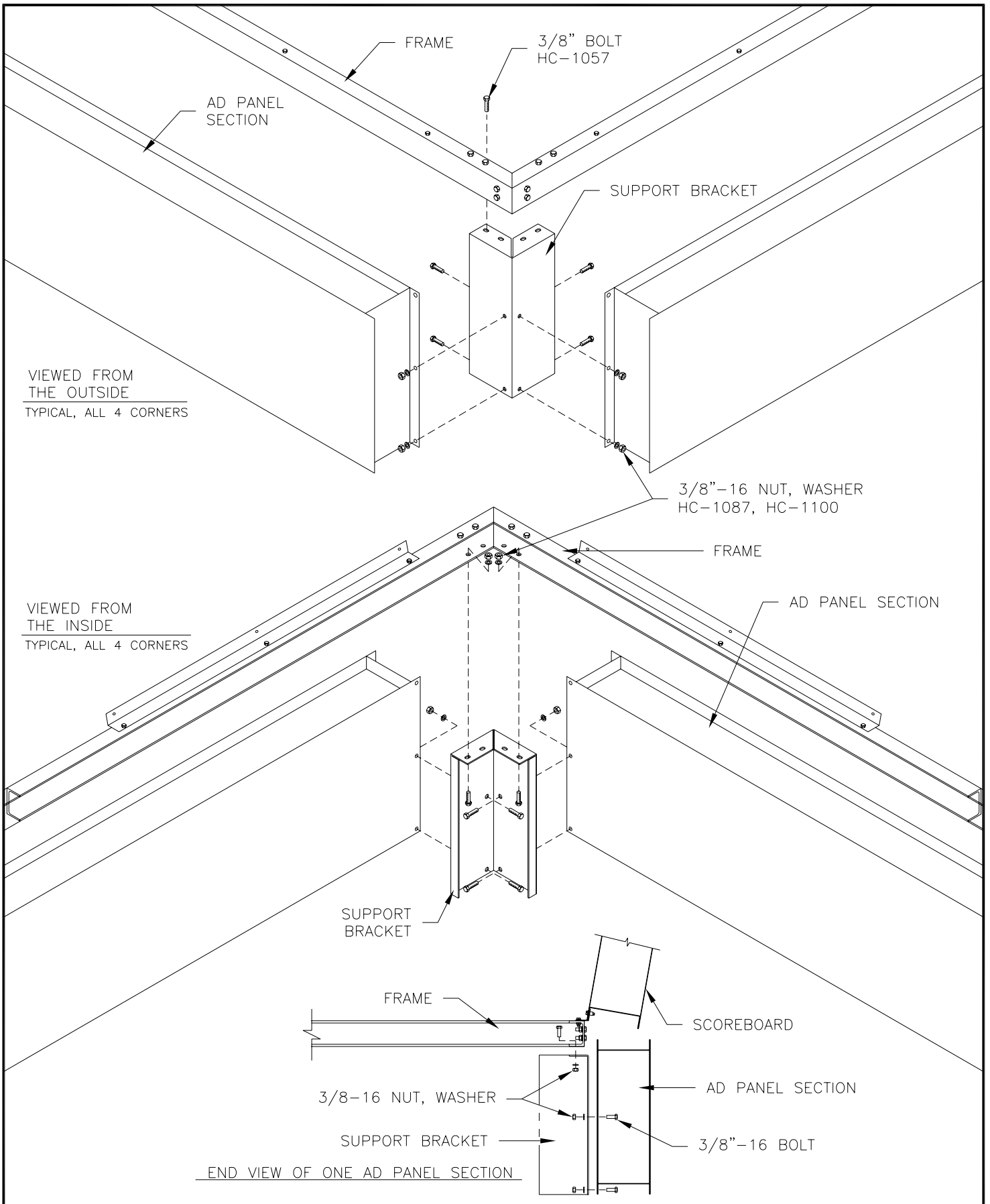
DAKTRONICS, INC. BROOKINGS, SD 57006		
PROJ: TUFF SPORT™ SCOREBOARDS		
TITLE: ELECTRICAL & SIGNAL SPEC, H-2108		
DES. BY: A VANBEMMEL	DRAWN BY: JJSYRSTAD	DATE: 6 JUN 02

REV.	DATE	DESCRIPTION	BY	APPR.

REVISION	APPR. BY:	1237-E10A-168440
	SCALE: 1=30	

Appendix C: Scoreboard Options

<i>Drawing Title</i>	<i>Drawing Number</i>
Bottom 4-Side Ad Panel Mounting.....	A-107664
Top 4-Side Ad Panel Mounting.....	A-107665
Installation, 6" Amber 8x48 TNMC	A-148701
12V DC Horn Option Installation.....	A-148960
Changeable Team Name Caption Installation	A-150021
Optional 4-Side Canvas Assembly	A-173611



DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ:			
TITLE: BOTTOM 4-SIDE AD PANEL MOUNTING			
DES. BY: AVB		DRAWN BY: A VANBEMMEL	
		DATE: 12 OCT 98	
REVISION	APPR. BY:	1009-E10A-107664	
01	SCALE: 1=15		

01	26 APR 06	REMOVED LIFT EYE	JNR	
REV.	DATE	DESCRIPTION	BY	APPR.

ASSEMBLY PROCEDURE:

THIS DRAWING DEPICTS THE ADDITION OF AN AD PANEL TO A CENTERHUNG SCOREBOARD. REFER TO DWG-1237-E10A-154598 FOR SCOREBOARD ASSY. INSTRUCTIONS.

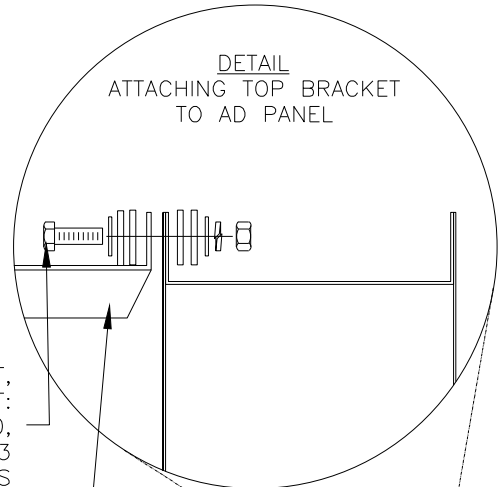
POSITION THE MOUNTING STRIPS INSIDE THE TOP OF THE SCOREBOARD FRAME AND ATTACH WITH THE 1/4" BOLTS, USING THE TAPERED SQUARE WASHERS TO TILT THE STRIP 10° TO THE SCOREBOARD.

MOUNT THE BOTTOM OF THE AD PANEL TO THE STRIPS.

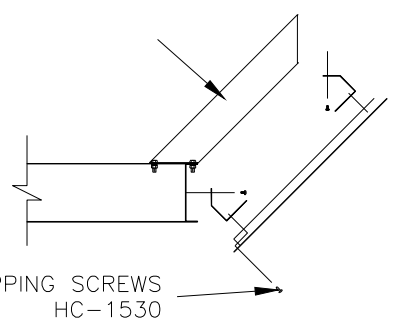
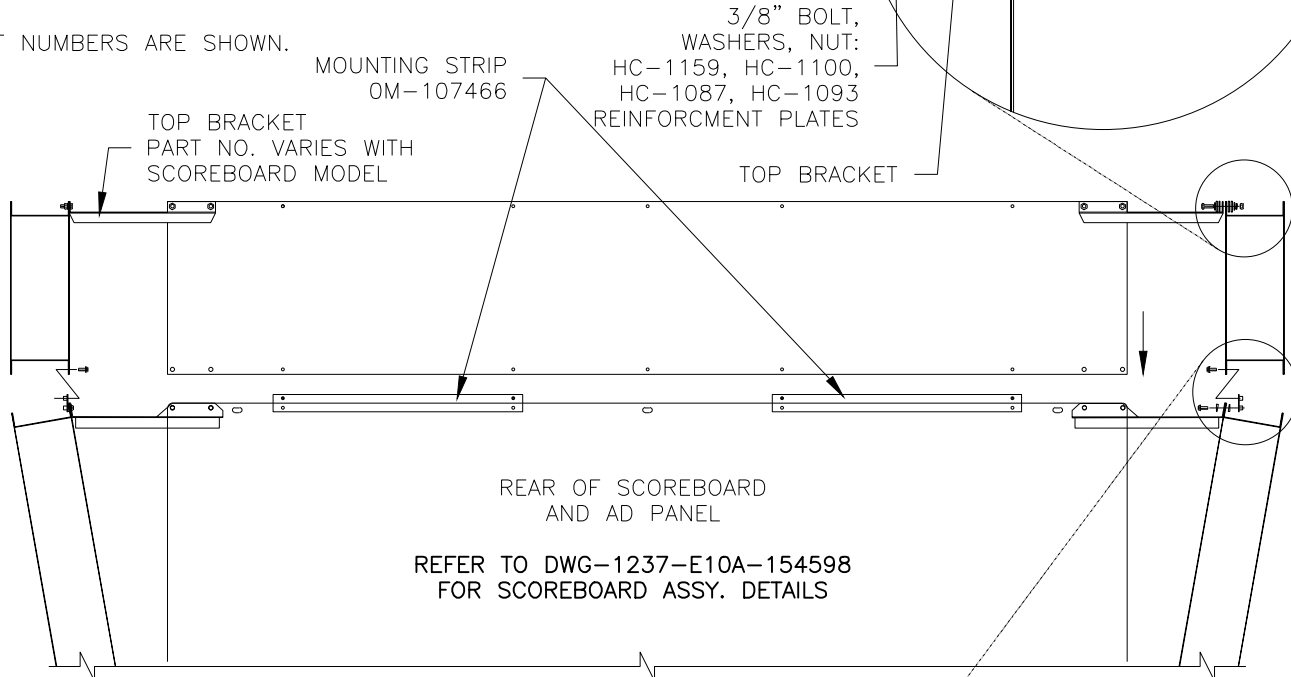
JOIN THE TOPS OF TWO AD PANEL SECTIONS USING THE TOP BRACKETS AND 3/8" BOLTS, WASHERS, AND NUTS.

ATTACH THE CORNER SHROUDS TO THE CORNERS AFTER ALL REAR ASSEMBLY IS COMPLETE.

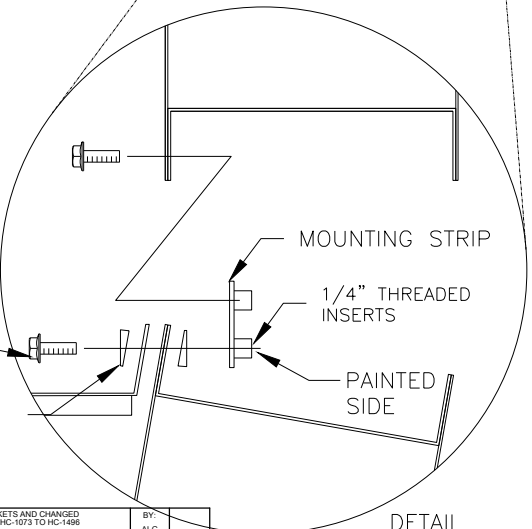
PART NUMBERS ARE SHOWN.



DETAIL
ATTACHING TOP BRACKET
TO AD PANEL



CORNER SHROUD
PART NO. VARIES



DETAIL
JOINING AD PANEL TO
TOP OF SCOREBOARD

MOUNT THE ANGLE BRACKETS TO THE AD PANEL THEN POSITION THE CORNER SHROUD AGAINST THE ANGLE BRACKETS, MARK AND DRILL 9/64" Ø HOLES. SECURE CORNER SHROUD WITH TAPPING SCREWS PROVIDED.

REV 03	DATE: 07 AUG 02	UPDATED ANGLE BRACKETS AND CHANGED TAPPING SCREW FROM HC-1073 TO HC-1496	BY: ALG
REV 02	DATE: 12 DEC 01	LABELLED ANGLE BRACKETS, AND MODIFIED MOUNTING INSTRUCTIONS	BY: ALG
REV 01	DATE: 10 NOV 00	FIXED CORNER SHROUDDING ATTACHMENT.	BY: EPR

REV 08	DATE: 29 JUN 12	ADDED FLAT WASHERS AND REINFORCEMENT PLATES TO CORNER MOUNTING BRACKET ATTACHMENT	BY: DRO
REV 07	DATE: 07 JUL 11	ADDED PAINTED SIDE NOTE	BY: LMG
REV 06	DATE: 07 JAN 10	CHANGE HC-1496 TAPPING SCREWS TO HC-1530 TAPPING SCREWS FOR ATTACHING CORNER SHROUDS	BY: LMIX
REV 05	DATE: 16 JAN 09	ADDED DRAWING REFERENCE NOTES	BY: CJH
REV 04	DATE: 15 JAN 09	ADDED SCOREBOARD CORNER BRACE	BY: CLS

DAKTRONICS, INC. BROOKINGS, SD 57006		THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2011 DAKTRONICS, INC.	
DO NOT SCALE DRAWING			
PROJ: BASKETBALL SCOREBOARDS			
TITLE: TOP 4-SIDE AD PANEL MOUNTING			
DESIGN: AVB	DRAWN: A VANBEMMEL	DATE: 08 OCT 98	
SCALE: 1=20			
SHEET	REV	JOB NO:	FUNC-TYPE-SIZE
	08	P 1009	E - 10 - A
			107665

TNMC INSTALLATION INSTRUCTIONS

1. REMOVE THE HOME/GUEST FACE PANELS FROM THE DISPLAY.
REFERENCE FIGURE 1
2. MOUNT THE POWER SUPPLY ASSEMBLY TO THE BACK OF THE TNMC PAN WITH HC-1470 SCREWS. THE WIRES ARE ALREADY CONNECTED TO THE POWER SUPPLY.
REFERENCE FIGURE 2
3. ROUTE THE 5V DC WIRES FROM THE POWER SUPPLY THROUGH THE OPENING TO THE TNMC LOCATIONS. ROUTE THE 120V POWER INTERCONNECT CABLE BETWEEN THE POWER SUPPLIES AND CONNECT. ROUTE THE POWER INPUT CABLE FROM THE HOME TNMC'S POWER SUPPLY TO THE 2-PIN PLUG AT THE DRIVER.
REFERENCE FIGURE 3
4. INSTALL THE SIGNAL HARNESS. ROUTE THE SIGNAL HARNESS FROM TB-31 AT THE DRIVER TO THE TNMC LOCATIONS.
REFERENCE FIGURE 3
5. CONNECT THE POWER AND SIGNAL TO THE TNMCS.
REFERENCE FIGURE 3

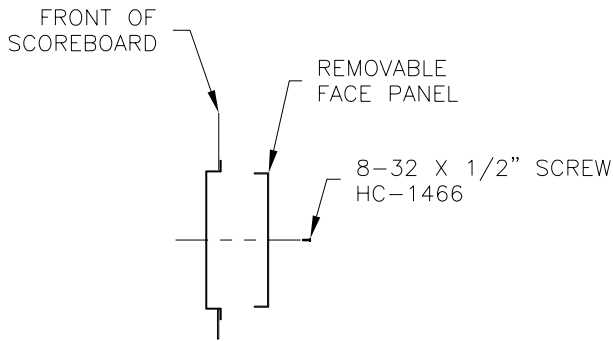


FIGURE 1

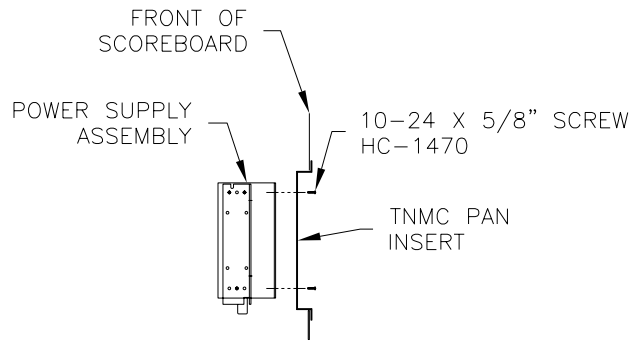
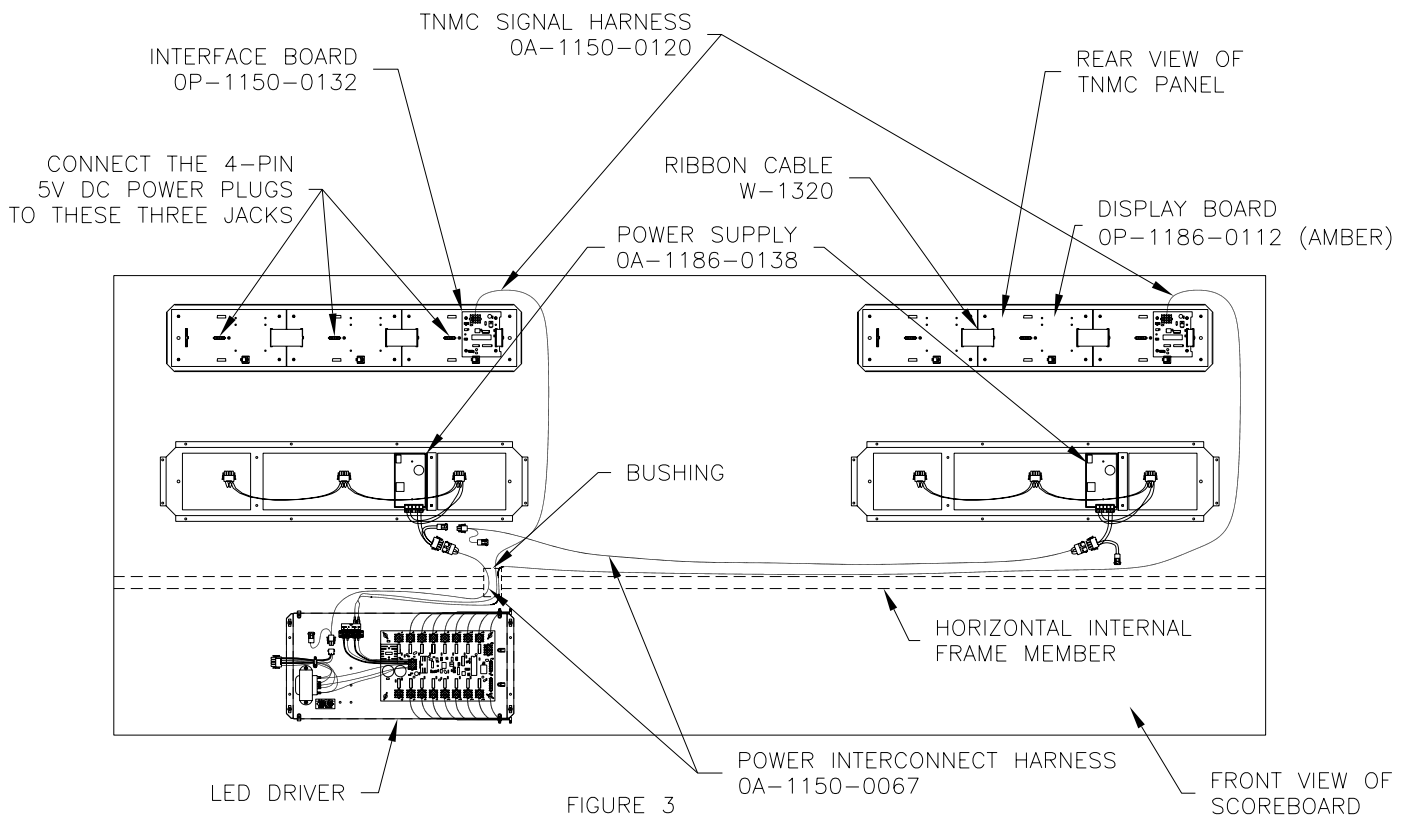


FIGURE 2

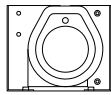


DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ: TUFF SPORT SCOREBOARDS	
TITLE: INSTALLATION, 6" AMBER 8X48 TNMC	
DES. BY: E REBHAWN	DATE: 10 MAY 01
DRAWN BY: E REBHAWN	
REVISION	APPR. BY:
	SCALE: 1=20
1237-E10A-148701	

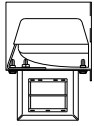
REV.	DATE	DESCRIPTION	BY	APPR.

12V DC HORN OPTION INSTALLATION PROCEDURE

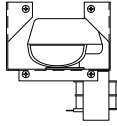
12V DC HORN
IN BRACKET:



TOP VIEW



SIDE VIEW



FRONT VIEW

REMOVE THE FOUR SCREWS SECURING THE CLOCK PANEL. DISCONNECT THE PLUGS AT THE BACK OF THE DIGITS, AND UNPLUG THE EXISTING BUZZER TYPE HORN.

REMOVE THE SCREWS THAT ATTACH THE BUZZER HORN TO THE CLOCK PANEL.

MOUNT THE 12V DC HORN TO THE CLOCK PANEL USING THE SCREWS PROVIDED WITH IT. IF MOUNTING HORN IN A UNIVIEW APPLICATION, THE TRANSFORMER WILL HIT THE DIGITS SO NOTE THE FOLLOWING. CUT THE CABLE TIE OFF THE TRANSFORMER HARNESS AND REMOVE TRANSFORMER FROM HORN ASSEMBLY (SAVE HC-1470 SCREWS AS THEY WILL BE REUSED). IN ALTERNATE TRANSFORMER LOCATION MARKED BELOW, DRILL 0.203" (13/64") HOLES @2 IN BACKSHEET FOR TRANSFORMER. USING HC-1470 @2 (SAVED FROM ABOVE) AND HC-1243 @2 (FORWARDED WITH HORN ASSEMBLY), MOUNT TRANSFORMER TO BACKSHEET. MOUNT HORN ASSEMBLY TO CLOCK PANEL AS PREVIOUSLY NOTED.

TAKE THE HORN INTERFACE CARD, WITH HARNESSES CONNECTED TO IT, AND USE THE TAPE TO SECURE IT TO THE BACKSHEET. MAKE SURE IT IS AN OPEN SPOT SO IT DOESN'T GET TOUCHED WHEN THE PANEL IS PLACED BACK ON.

RUN THE TWO NEW HARNESSES TO THE DRIVER. DISCONNECT EXISTING PLUG IN J18 ON DRIVER. CONNECT NEW ONE. DISCONNECT EXISTING PLUG IN THE J43 POWER JACK ON DRIVER TRAY HARNESS THAT WAS FOR THE OLD HORN, AND PLUG IN THE NEW ONE.

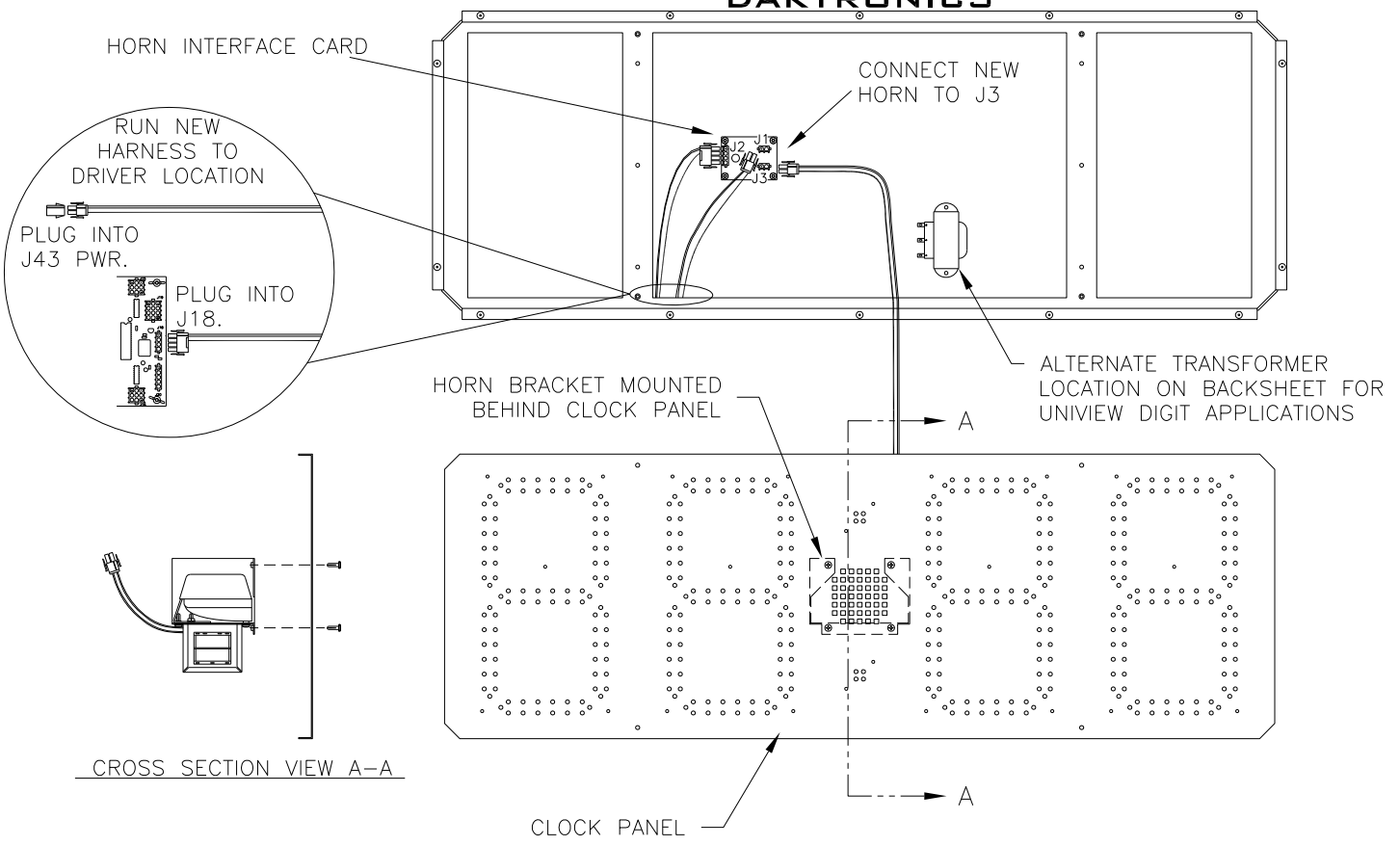
CONNECT THE 2-PIN PLUG FROM THE HORN ASSEMBLY TO J3 ON THE HORN INTERFACE CARD.

PLUG THE DIGIT CABLES INTO THE BACKS OF THE DIGITS AND RE-INSTALL THE CLOCK PANEL.

TEST THE HORN BY OPERATING THE SCOREBOARD AND PRESSING THE HORN BUTTON ON THE CONTROL CONSOLE.

FRONT OF SCOREBOARD, CLOCK AREA:

DAKTRONICS

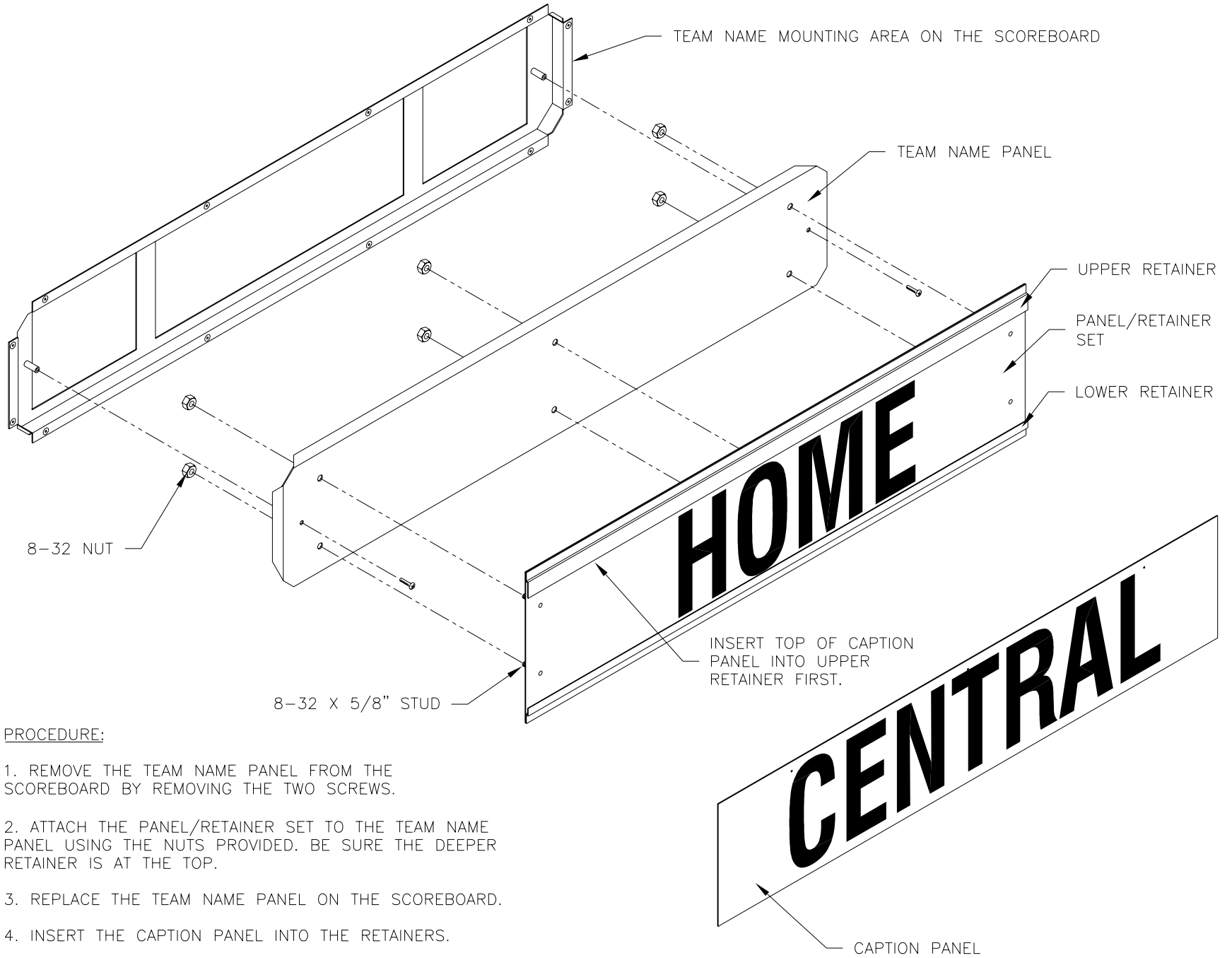


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DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: TUFF SPORT™ INDOOR SCOREBOARDS			
TITLE: 12V DC HORN OPTION INSTALLATION			
DES. BY: AVB		DRAWN BY: A VANBEMMEL DATE: 16 MAY 01	
REVISION	APPR. BY:	1237-R10A-148960	
03	SCALE: 1=10		

REV.	DATE	DESCRIPTION	BY	APPR.
03	07 JAN 10	UPDATED INSTALL DRAWING WITH HORN INTERFACE CARD DETAILS AND STEPS.	MWM	
02	20 JUN 06	UPDATED COLON AND HORN LAYOUT. REPLACED UNIVIEW DIGITS WITH PANAVIEW TO SHOW HORN MOUNTING. ADDED UNIVIEW HORN MTG NOTES. CHANGED DIGITS TO UNIVIEW.	JLF	CW
01	20 JUN 02		ALG	

REV.	01	20 MAY 02	REPLACED THE 6-32 X 3/8" FLAT HEAD SCREW WITH 8-32 X 5/8" STUD.	DESCRIPTION	BY	JUS	APPR.
------	----	-----------	---	-------------	----	-----	-------

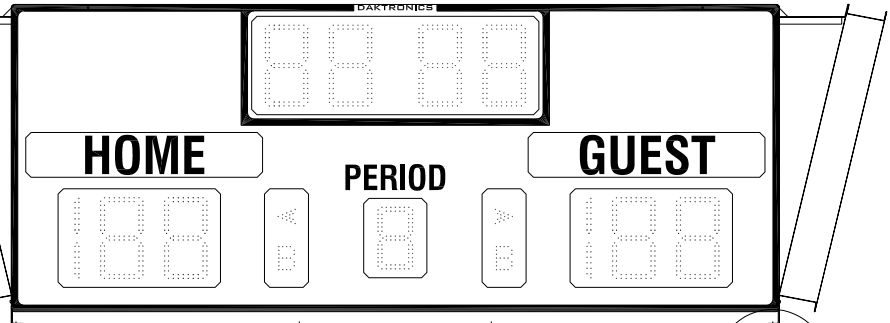
PROJ.: TUFT SPORT SCOREBOARDS		DAKTRONICS, INC. BROOKINGS, SD 57006	
TITLE: CHANGEABLE TEAM NAME CAPTION INSTALLATION		DRAWN BY: A VANBEMMEL DATE: 06 JUN 01	
DES. BY: AVB	APPR. BY:	REVISION	SCALE: 1=8
01			1237-E10A-150021



PROCEDURE:

1. REMOVE THE TEAM NAME PANEL FROM THE SCOREBOARD BY REMOVING THE TWO SCREWS.
2. ATTACH THE PANEL/RETAINER SET TO THE TEAM NAME PANEL USING THE NUTS PROVIDED. BE SURE THE DEEPER RETAINER IS AT THE TOP.
3. REPLACE THE TEAM NAME PANEL ON THE SCOREBOARD.
4. INSERT THE CAPTION PANEL INTO THE RETAINERS.

FOUR SIDE SCOREBOARD
(SIZE AND DISPLAY MAY VARY)

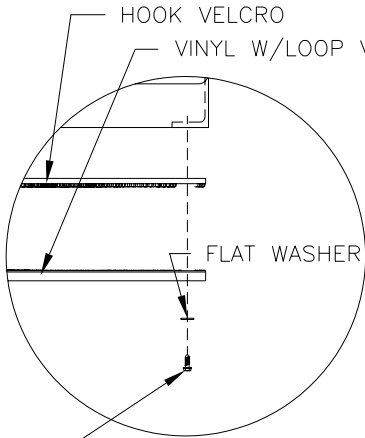


VINYL CANVAS WITH LOOP
PORTION OF VELCRO

FRONT VIEW

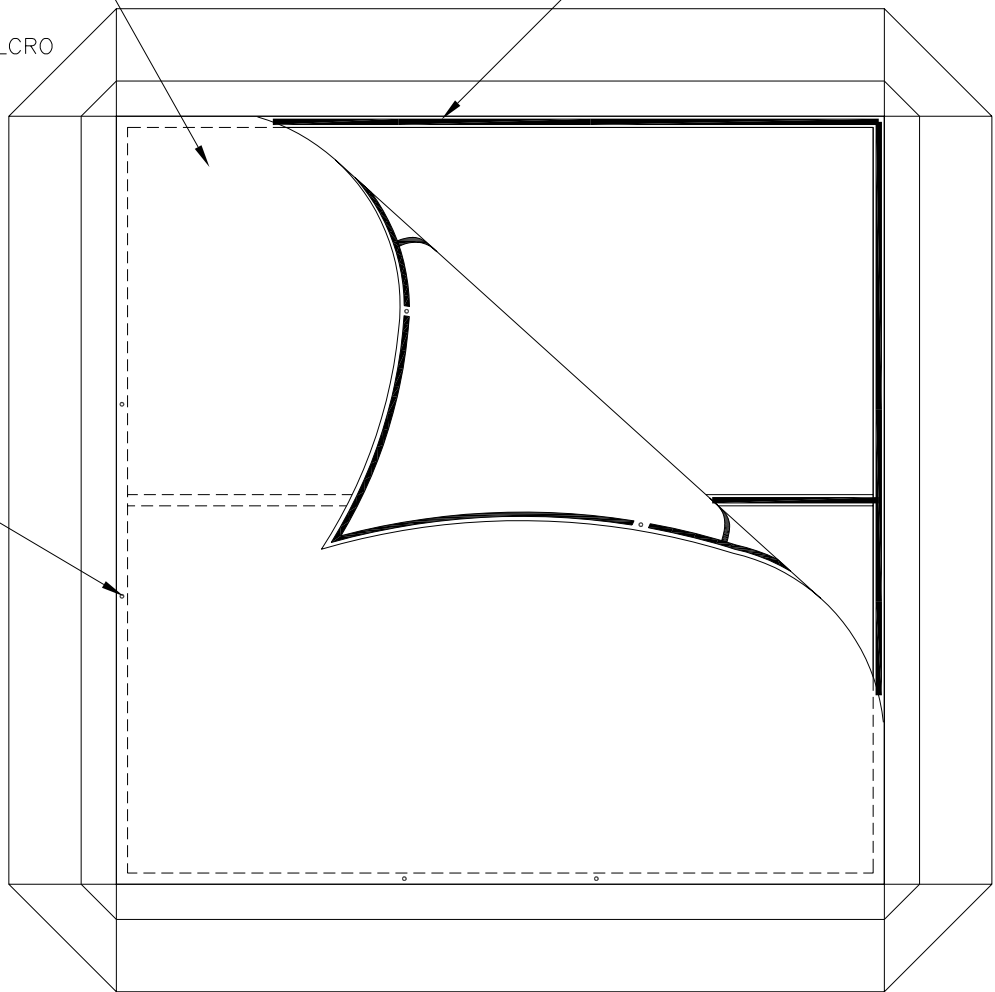
SEE DETAIL A

HOOK PORTION OF VELCRO
WITH ADHESIVE BACKING



10-16 X 3/4" SELF
DRILLING SCREW AT
GROMMET LOCATIONS

DETAIL: A



BOTTOM VIEW

WITH CORNER OF
CANVAS TURNED BACK

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DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: TUFF SPORT SCOREBOARD

TITLE: OPTIONAL 4-SIDE CANVAS ASSEMBLY

DES. BY: BPETERSON

DRAWN BY: AGIBSON

DATE: 20 AUG 02

REVISION

APPR. BY:

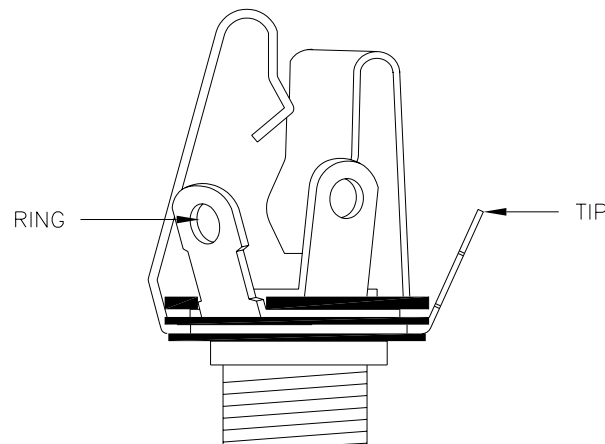
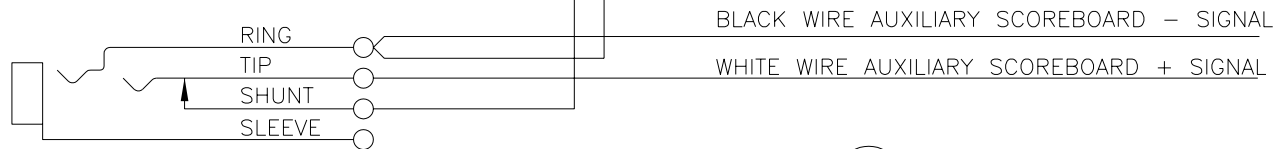
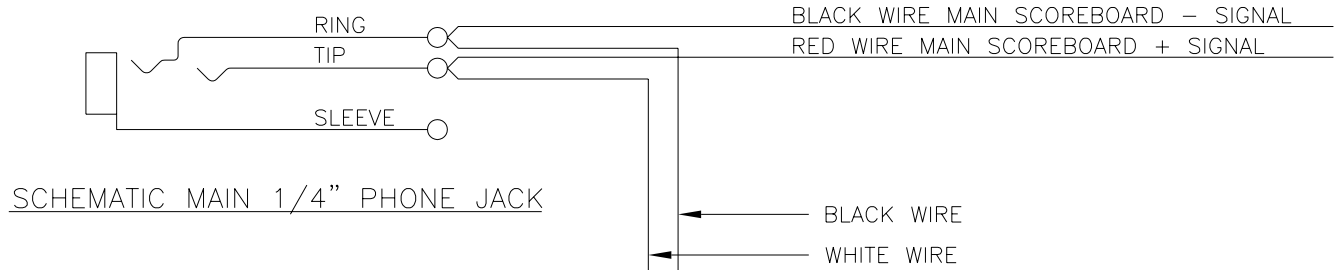
SCALE: 1=30

1237-E10A-173611

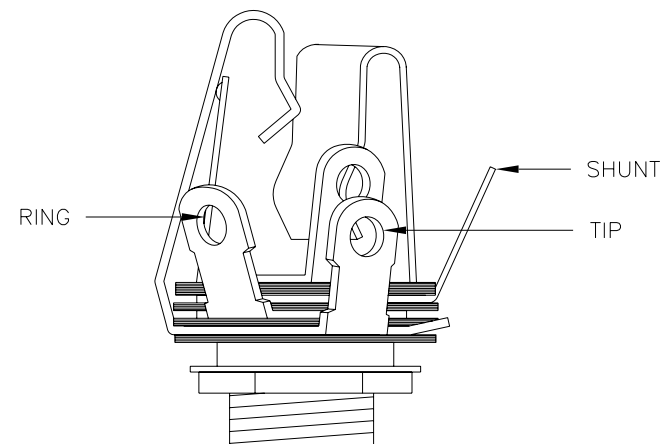
REV.	DATE	DESCRIPTION	BY	APPR.

Appendix D: Schematic Drawings

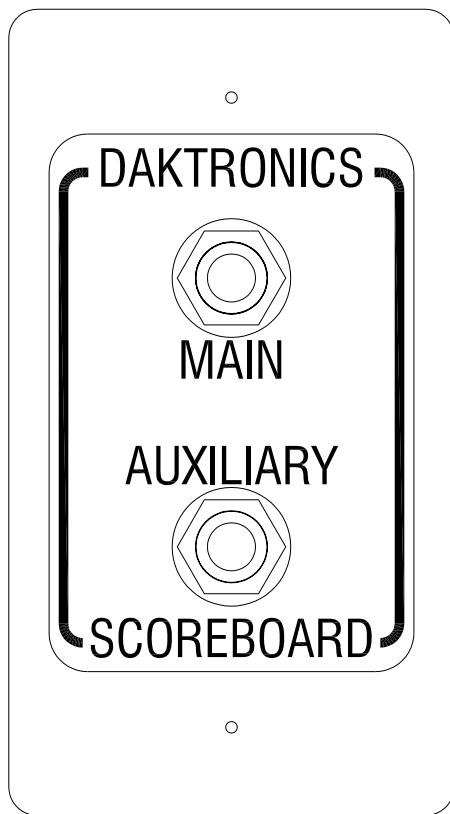
<i>Drawing Title</i>	<i>Drawing Number</i>
Schematic; Dual 1" Phone J-box w/ Shunt Jack.....	A-125316
Schematic: 3/4" and 1" DC TNMCs.....	B-146975
Schematic- 16V 1 Driver- 120 or 230VAC.....	A-158348
Schematic, 16V 2 Driver, 120 or 230 VAC.....	B-158859
Schematic, 16V 3 Driver, 120 or 230 VAC.....	B-158894



MAIN
PHONE JACK
J-1003



AUXILIARY
PHONE JACK
J-1131

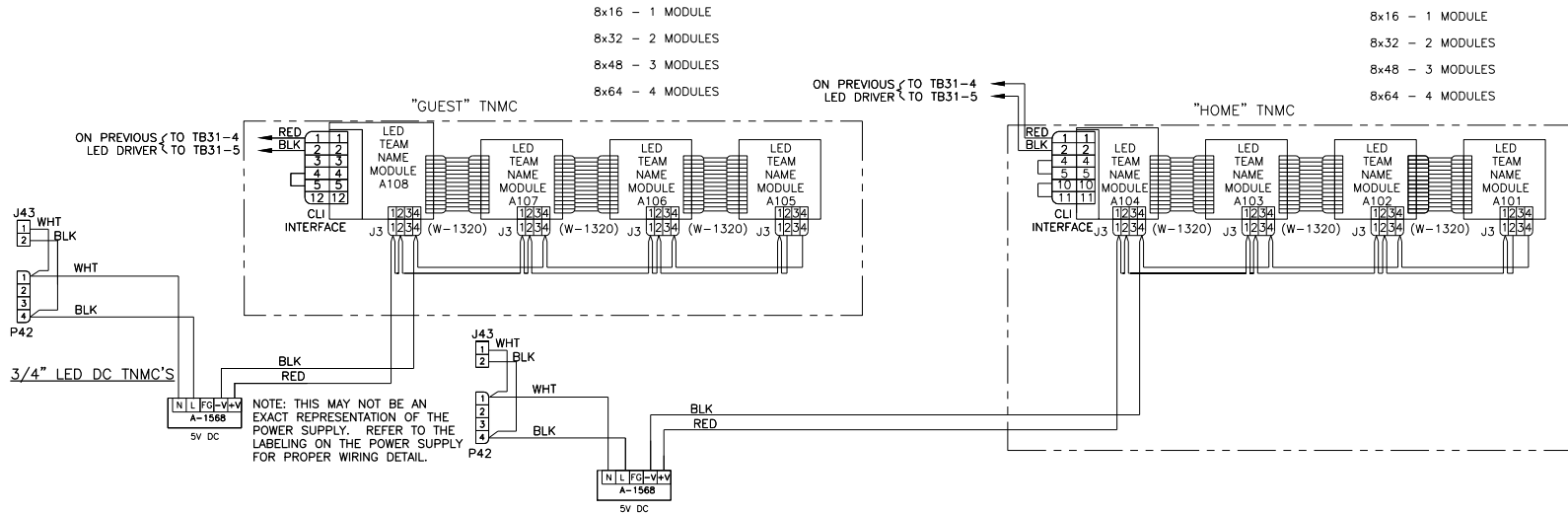


0A-1196-0013

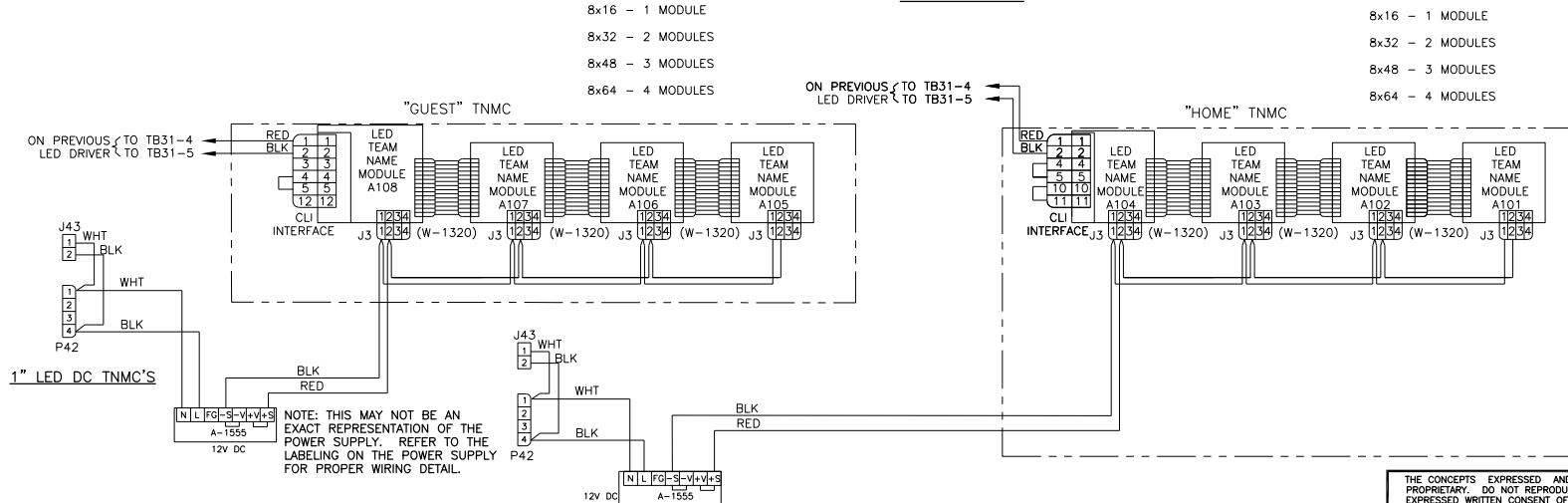
DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ:			
TITLE: SCHEMATIC; DUAL 1/4" PHONE J-BOX W/SHUNT JACK			
DES. BY: E BRAVEK		DRAWN BY: E BRAVEK	
		DATE: 15 DEC 99	
REVISION	APPR. BY:	1196-R03A-125316	
00	SCALE: NONE		

REV.	DATE	DESCRIPTION	BY	APPR.

REAR VIEW



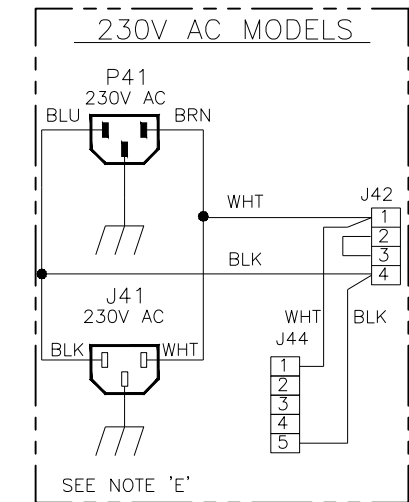
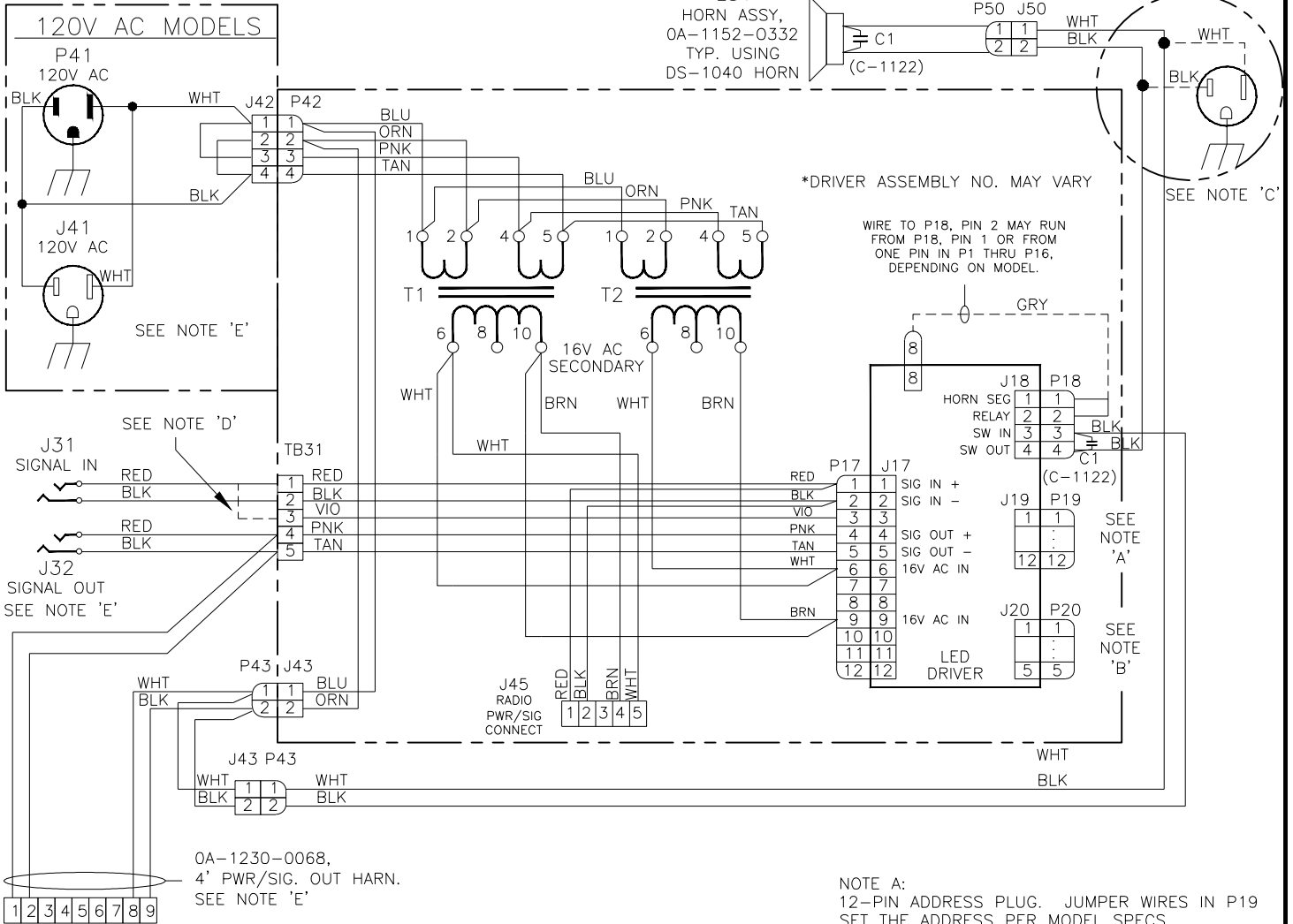
REAR VIEW



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03		29 DEC 08	REVISE DETAIL OF P42 PER ECO 65496. MOVED PIN 2 TO PIN 4. ORIGINAL CHANGE WAS MADE ON 5 OCT 04	DKD		DAKTRONICS, INC. BROOKINGS, SD 57006	
02		06 AUG 03	CHANGED TO B SIZE DWG ADDED 3RD MODULE TO SHOW 8X64 CONFIGURATION	TLH	MWM	PROJ:	
01		25 JUN 03	SWAPPED N & L ON A-1568 PER ECO #31661	RASMUS	CMC	TITLE: SCHEMATIC: 3/4" AND 1" DC TNMC'S	
REV.	DATE		DESCRIPTION	BY	APPR.	DES. BY: DRAWN BY: JSPAHR DATE: 29 MAR 01	
						REVISION: 03	APPR. BY: SCALE: NONE 1152-R03B-146975

120V AND 230VAC MODELS



120V AC MODELS

SPECIFICATION LABEL DATA

MODEL NO: (PER ORDER)
 VOLTS: 120 VAC, SINGLE PHASE
 WATTS: 200
 AMPS: 1.7

230V AC MODELS

SPECIFICATION LABEL DATA

MODEL NO: (PER ORDER)
 VOLTS: 230 VAC, SINGLE PHASE
 WATTS: 200
 AMPS: .9

NOTE A:
 12-PIN ADDRESS PLUG. JUMPER WIRES IN P19
 SET THE ADDRESS PER MODEL SPECS.

NOTE B:
 5-PIN PROTOCOL PLUG. JUMPER WIRES IN P20
 SET THE PROTOCOL PER SYSTEM SPECS.

NOTE 'C':
 J-1041 @1 & E-1047 @2, USED FOR
 EXTERNAL HORN APPLICATIONS. NOT AVAILABLE
 ON SOME MODELS.

NOTE D:
 FOR SWIM SYSTEMS CONTROLLED BY POWER
 TIME.

NOTE 'E':
 NOT USED IN SOME MODELS.

REV 05	DATE: 13 FEB 03	MOVED TAP 8 TO A DOUBLE CRIMP ON TAP 10 ON TRANSFORMER T1 CONNECTED TO J45. UPDATED TITLE TO SAY 230VAC ALSO	BY: CME
REV 04	DATE: 15 APR 02	ADDED 4" PWR/SIG OUT HARN. THAT IS IN SOME TUFF SPORT MODELS.	BY: MWM
REV 03	DATE: 23 JAN 02	CHANGED TITLE FROM SCHEMATIC, 16V LED DRVR TO SCHEMATIC, 16V 1 DRIVER, 120 VAC	BY: ALG
REV 02	DATE: 17 DEC 01	CHANGED DRIVER BLOCK LAYOUT.	BY: MWM
REV 01	DATE: 11 NOV 01	UPDATED NOTES AND 230V POWER BLOCK	BY: MWM

DAKTRONICS, INC.
 BROOKINGS, SD 57006

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PROJ: INDOOR UNIFORM LED DIGIT
 TITLE: SCHEMATIC- 16V 1 DRIVER- 120 OR 230VAC

DESIGN: MMILLER DRAWN: MMILLER DATE: 02 NOV 01

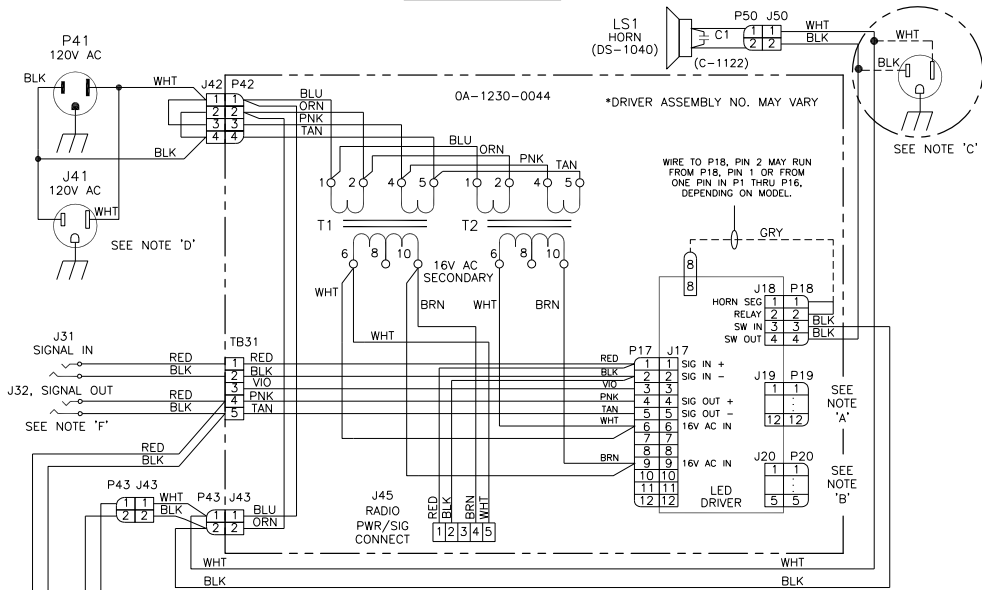
SCALE: 1 = 1

SHEET	REV	JOB NO:	FUNC-TYPE-SIZE
	07	P1230	R-03-A

158348

REV 07	DATE: 01 JUN 11	ADDED CAP DETAIL ON P18 AT DRIVER LOCATION FOR THE HORN HARNESS. UPDATED LS1 TEXT	BY: MWM
REV 06	DATE: 11 JAN 05	ADDED WIRE COLORS TO 230V PLUG PER ECO# 042552	BY: RT

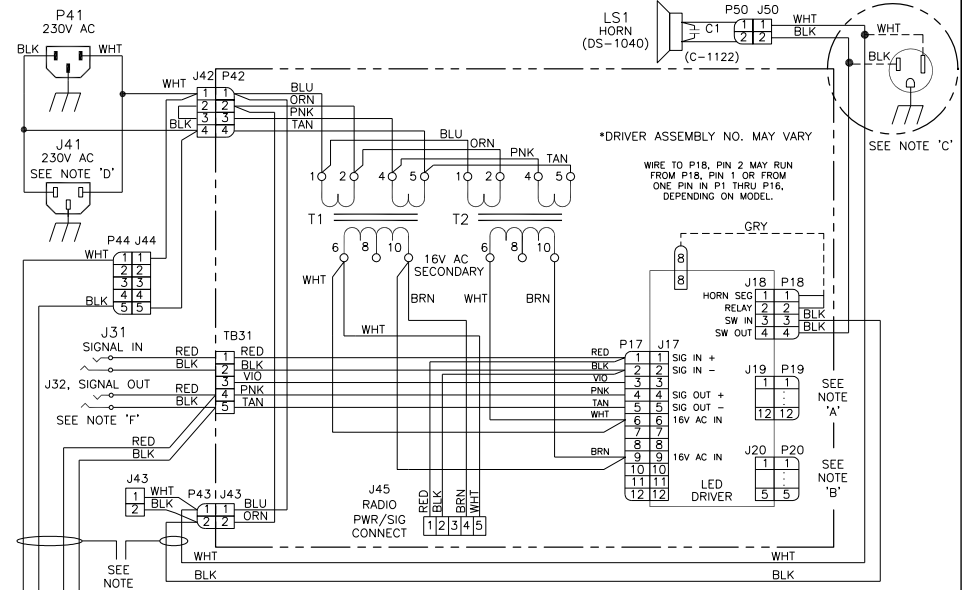
120V MODULE



- NOTE A:
12-PIN ADDRESS PLUG. JUMPER WIRES IN P19 SET THE ADDRESS PER MODEL SPECS.
- NOTE B:
5-PIN PROTOCOL PLUG. JUMPER WIRES IN P20 SET THE PROTOCOL PER SYSTEM SPECS.
- NOTE C:
J-1041 @1 & E-1047 @2, USED FOR EXTERNAL HORN APPLICATIONS. NOT AVAILABLE ON SOME MODELS.
- NOTE D:
POWER OUTLET IN 4-SIDED CONFIGURATION ONLY
- NOTE E:
THIS SCHEMATIC SHOWS THE INTERCONNECTION OF MULTIPLE DRIVERS. REFER TO THE FINAL ASSY PACKET FOR THE HARNESS PART NUMBERS.
- NOTE F:
NOT USED ON SOME MODELS.

SPECIFICATION LABEL DATA	
MODEL NO:	(PER ORDER)
VOLTS:	120 VAC, SINGLE PHASE
WATTS:	400
AMPS:	3.3

230V AC MODELS



SEE ABOVE BLOCK DIAGRAM FOR DRIVER SPECIFIC INFORMATION.

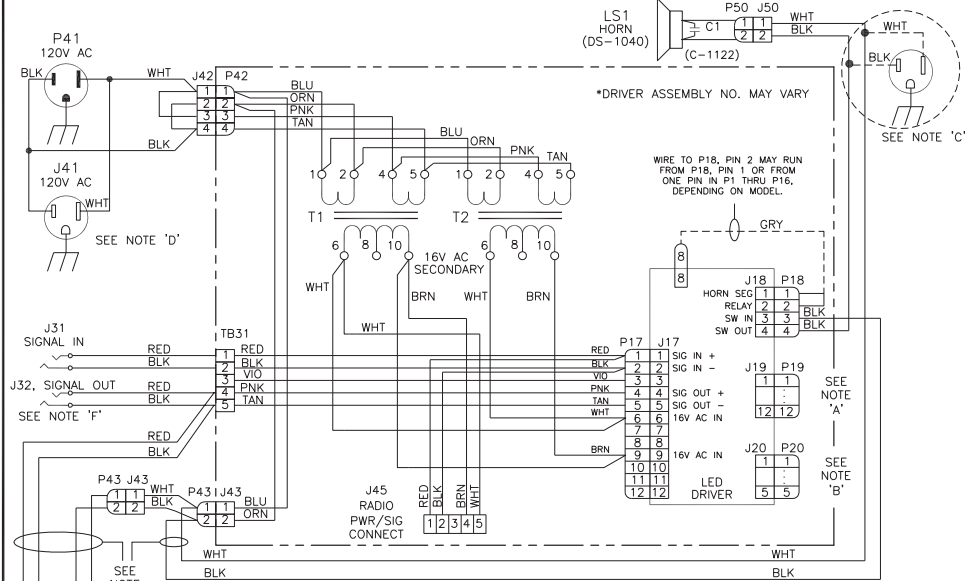
- NOTE A:
12-PIN ADDRESS PLUG. JUMPER WIRES IN P19 SET THE ADDRESS PER MODEL SPECS.
- NOTE B:
5-PIN PROTOCOL PLUG. JUMPER WIRES IN P20 SET THE PROTOCOL PER SYSTEM SPECS.
- NOTE C:
J-1041 @1 & E-1047 @2, USED FOR EXTERNAL HORN APPLICATIONS. NOT AVAILABLE ON SOME MODELS.
- NOTE D:
POWER OUTLET IN 4-SIDED CONFIGURATION ONLY
- NOTE E:
THIS SCHEMATIC SHOWS THE INTERCONNECTION OF MULTIPLE DRIVERS. REFER TO THE FINAL ASSY PACKET FOR THE HARNESS PART NUMBERS.
- NOTE F:
NOT USED ON SOME MODELS.

SPECIFICATION LABEL DATA	
MODEL NO:	(PER ORDER)
VOLTS:	230 VAC, SINGLE PHASE
WATTS:	400
AMPS:	1.7

REV.	DATE	DESCRIPTION	BY	APPR.
04	12 MAR 03	CHANGED FROM A TO B SIZE INSERT 230 VAC SCHEMATIC.	RDS	MWM
03	13 FEB 03	MOVED TAP 8 TO A DOUBLE CRIMP ON TAP 10 ON TRANSFORMER T1 CONNECTED TO J45.	CME	
2	22NOV02	ADDED A SIGNAL OUT JACK FROM TB31.	NMB	
01	23 JAN 02	CHANGED TITLE FROM SCHEMATIC, 2 DRIVER TO SCHEMATIC, 16V 2 DRIVER, 120 VAC	ALG	

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DAKTRONICS, INC. BROOKINGS, SD 57006				
PROJ: INDOOR UNIFORM LED DIGIT				
TITLE: SCHEMATIC, 16V 2 DRIVER, 120 OR 230 VAC				
DES. BY: MMILLER		DRAWN BY: MMILLER		DATE: 20 NOV 01
REVISION	APPR. BY:	SCALE: 1=1		
				1230-R03B-158859

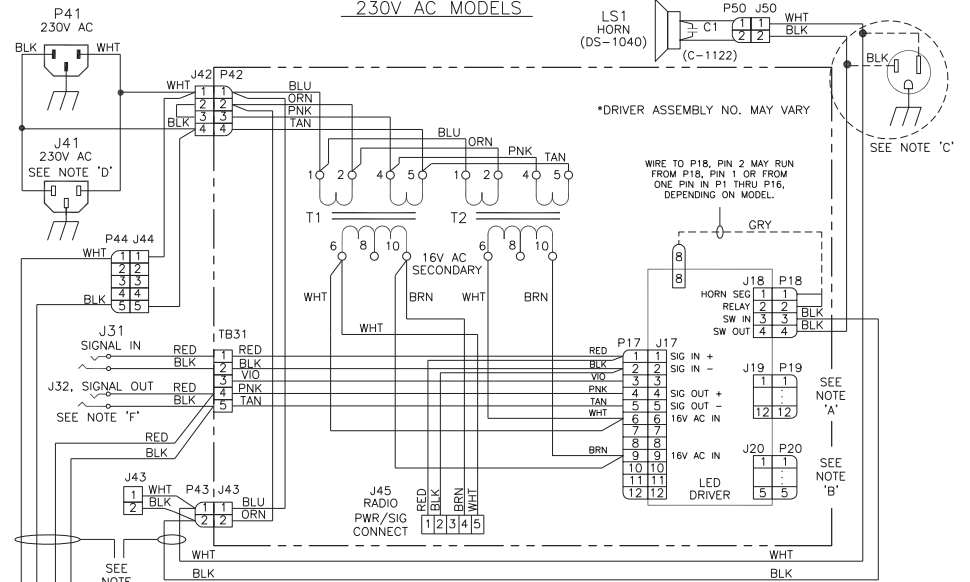
120V AC MODELS



- NOTE A:
12-PIN ADDRESS PLUG. JUMPER WIRES IN P19 SET THE ADDRESS PER MODEL SPECS.
- NOTE B:
5-PIN PROTOCOL PLUG. JUMPER WIRES IN P20 SET THE PROTOCOL PER SYSTEM SPECS.
- NOTE C:
J-1041 @1 & E-1047 @2, USED FOR EXTERNAL HORN APPLICATIONS. NOT AVAILABLE ON SOME MODELS.
- NOTE D:
POWER OUTLET IN 4-SIDED CONFIGURATION ONLY
- NOTE E:
THIS SCHEMATIC SHOWS THE INTERCONNECTION OF MULTIPLE DRIVERS. REFER TO THE FINAL ASSY PACKET FOR THE HARNESS PART NUMBERS.
- NOTE F:
NOT USED IN SOME MODELS.

SPECIFICATION LABEL DATA
 MODEL NO: (PER ORDER)
 VOLTS: 120 VAC, SINGLE PHASE
 WATTS: 600
 AMPS: 5

230V AC MODELS



- NOTE A:
12-PIN ADDRESS PLUG. JUMPER WIRES IN P19 SET THE ADDRESS PER MODEL SPECS.
- NOTE B:
5-PIN PROTOCOL PLUG. JUMPER WIRES IN P20 SET THE PROTOCOL PER SYSTEM SPECS.
- NOTE C:
J-1041 @1 & E-1047 @2, USED FOR EXTERNAL HORN APPLICATIONS. NOT AVAILABLE ON SOME MODELS.
- NOTE D:
POWER OUTLET IN 4-SIDED CONFIGURATION ONLY
- NOTE E:
THIS SCHEMATIC SHOWS THE INTERCONNECTION OF MULTIPLE DRIVERS. REFER TO THE FINAL ASSY PACKET FOR THE HARNESS PART NUMBERS.
- NOTE F:
NOT USED IN SOME MODELS.

SPECIFICATION LABEL DATA
 MODEL NO: (PER ORDER)
 VOLTS: 230 VAC, SINGLE PHASE
 WATTS: 600
 AMPS: 2.6

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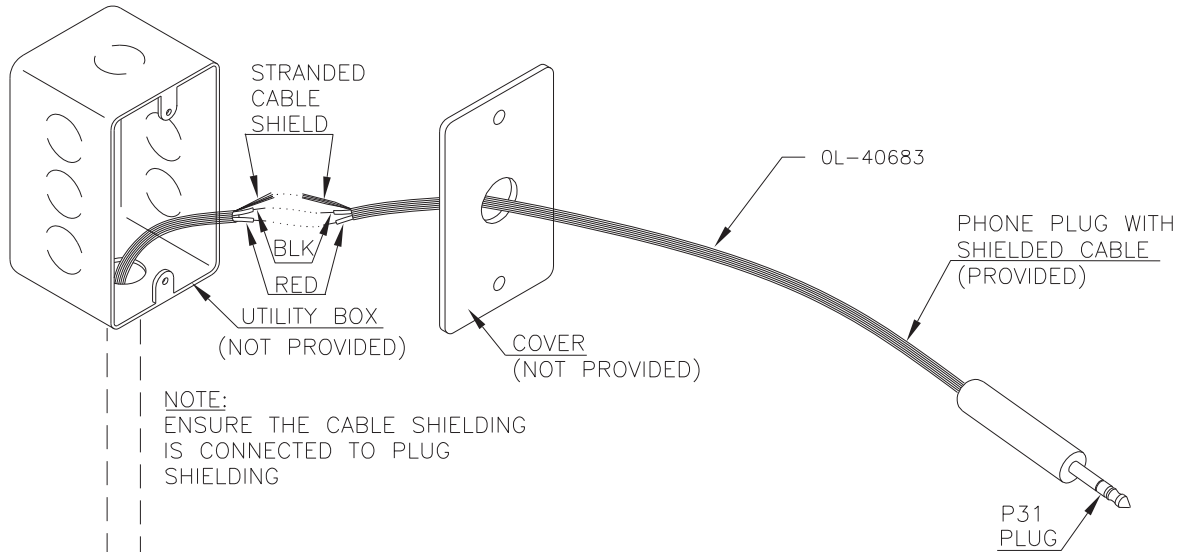
03	12 MAR 03	CHANGED FROM A TO B SIZE INSERT 230 VAC SCHEMATIC	RDS	MWM	DAKTRONICS, INC. BROOKINGS, SD 57006
02	13 FEB 03	MOVED TAP 8 TO A DOUBLE CRIMP ON TAP 10 ON TRANSFORMER T1 CONNECTED TO J45.	CME		PROJ: INDOOR UNIFORM LED DRGT
01	23 JAN 02	CHANGED TITLE FROM SCHEMATIC, 3 DRIVER TO SCHEMATIC, 16V 3 DRIVER, 120 VAC	ALG		TITLE: SCHEMATIC, 16V 3 DRIVER, 120 OR 230 VAC
REV.	DATE	DESCRIPTION	BY	APPR.	DES. BY: MMILLER DRAWN BY: MMILLER DATE: 21 NOV 01
					REVISION APPR. BY: SCALE: 1=1

1230-R03B-158894

Appendix E: Additional Reference Drawings

<i>Drawing Title</i>	<i>Drawing Number</i>
Signal Connection, Installation.....	A-28124
Segmentation, 7 Segment Bar Digit	A-38532
Address Table, 1 Through 128	A-115078
Protocol Table, 1 Through 15	A-115081
A/S 5000 Capable TNMC Shift Card; Specifications	A-123794
16 Column LED Driver II Specifications.....	A-126174
4-Side Installation Details	A-154598
Ad Panel/Message Center Hookup Overview, 4-Side	A-154599
Sling Set: Standard 10' Square 4-Side Scoreboards.....	A-181903
Sling Set: Standard 8' Square 4-Side Scoreboards.....	A-181935
Field Assembly; 8' x 8' Bolted Frame.....	B-1101988
Field Assembly; 10' x 10' Bolted Frame.....	B-1102115

DISPLAY LOCATION



NOTE:
ENSURE THE CABLE SHIELDING
IS CONNECTED TO PLUG
SHIELDING

PROCEDURE

1. ROUTE CONDUIT BETWEEN CONTROL AND DISPLAY LOCATIONS.
2. MOUNT BOXES.
3. PULL CABLE THROUGH CONDUIT.
4. CONNECT CABLE TO J31 AND P31

J31: USE CONNECTORS PROVIDED.
INSERT WIRES INTO CONNECTOR
AND SQUEEZE CONTACT DOWN
WITH PLIERS. SNAP PLASTIC
COVER SHUT.

P31: CONNECT WIRES TO CABLE AS
FOLLOWS:

- J31 RED TO P31 RED (+)
- J31 BLK TO P31 BLK (-)
- J31 SHIELD TO P31 SHIELD

NOTE!!

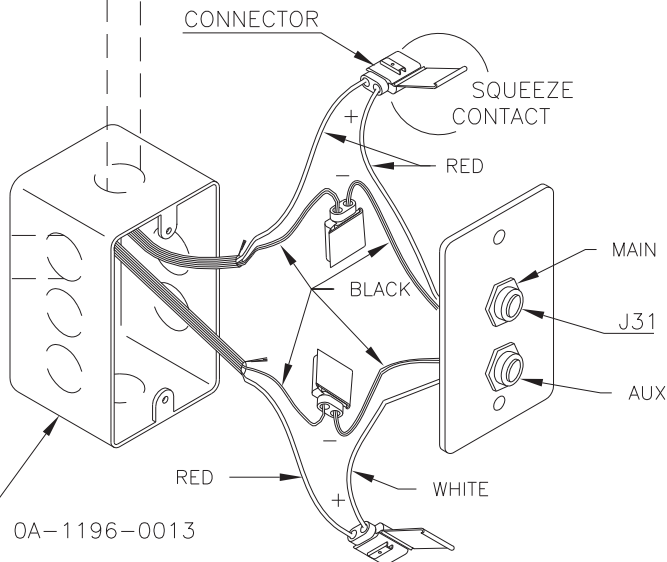
DO NOT CONNECT
CABLE SHIELD AT
CONTROL CONSOLE END

SHIELDED CABLE
IN CONDUIT
(NOT PROVIDED)

TO MAIN BOARD

TO AUX BOARD

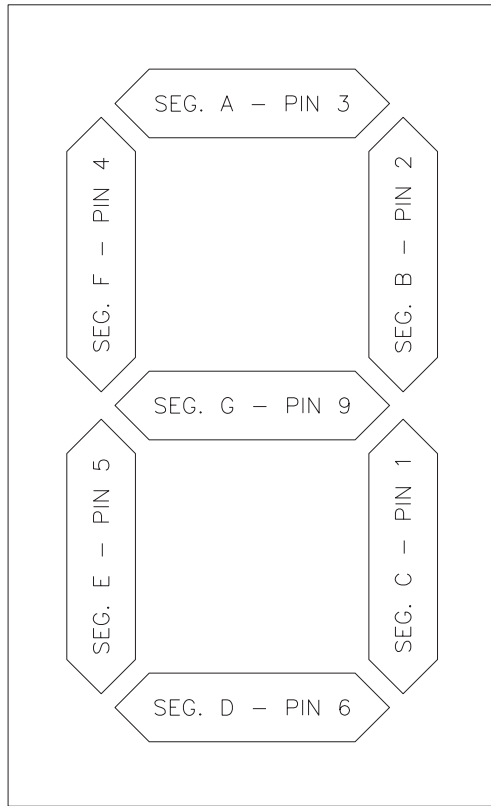
J-BOX
(PROVIDED)



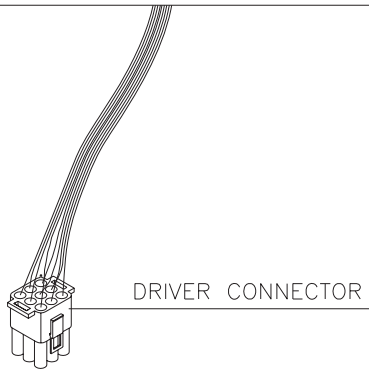
CONTROL LOCATION

05	30 JUL 03	BOLD FACED GROUNDING NOTE	TLH	
04	17 JUN 03	CHANGED GROUING PROCEDURES	JJC	MWM
3	17 JAN 02	ADDED AUX TO J-BOX	JJS	
2	25 MAR 92	CHANGED WHITE TO RED	JTC	
1	05 NOV 91	REDREW ON A-SIZE ON ACAD.	JLH	
REV.	DATE	DESCRIPTION	BY	APPR.

DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: BASKETBALL			
TITLE: SIGNAL CONNECTION; INSTALLATION			
DES. BY: AVB		DRAWN BY: MHART	
		DATE: 15SEP86	
REVISION	APPR. BY: AVB	1009-R10A-28124	
05	SCALE: NONE		



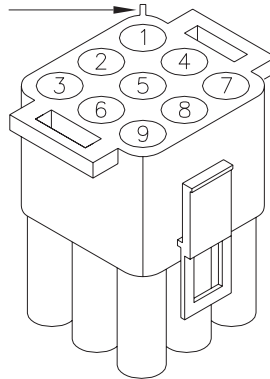
7 SEGMENT BAR DIGIT
FRONT VIEW



COLOR CODE		
PIN NO.	WIRE COLOR	DRIVER SEGMENT
1	ORN	C
2	RED	B
3	BRN	A
4	BLU	F
5	PNK	E
6	TAN	D
7	BLK	COM.
8	GRY	H
9	VIO	G

CONNECTOR PIN NUMBERING

NOTE SPLINE NEAR NO. 1



NOTE: "H" SEGMENT, GRAY WIRE IS NOT USED ON 7 SEGMENT BAR DIGIT.

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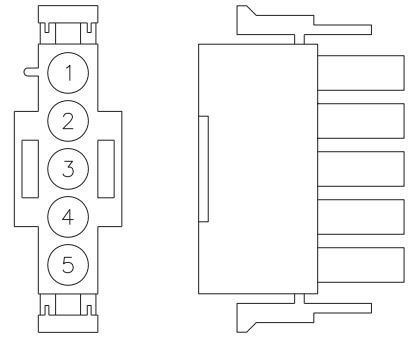
PROJ: BASKETBALL
TITLE: SEGMENTATION, 7 SEGMENT BAR DIGIT
DES. BY: _____ DRAWN BY: HEIDERSCHIEDT DATE: 5 JUN 89
REVISION 02 APPR. BY: AVB SCALE: 1=4
1009-R04A-38532

REV.	DATE	DESCRIPTION	BY	APPR.
2	30 APR 97	ADDED SEGMENT DESIGNATIONS TO DIGIT FIGURE.	AVB	AVB
1	2 JAN 92	CHANGED FROM B-SIZE TO A-SIZE DWG.	C FICK	

PROTOCOL ADDRESS TABLE

	PIN 5	PIN 4	PIN 3	PIN 2
DECIMAL ADDRESS				BINARY ADDRESS
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1

KEY:
0 = WIRE NOT CONNECTED
1 = WIRE IS CONNECTED



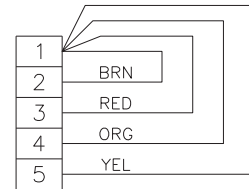
PROTOCOL PLUG
WIRE SIDE

SIDE VIEW

TIME OF DAY ENABLE

	PIN 5	PIN 4	PIN 3	PIN 2
8	1	0	0	0

WIRING DIAGRAM
 PROTOCOL PLUG
 WITH ALL WIRES
 CONNECTED



PROTOCOL ADDRESS NUMBER	PROTOL FUNCTION
1	DAKTRONICS / OMEGA MULTILINE SWIM
2	CTS MULTILINE SWIM
3-7	NOT DEFINED
8	STAND ALONE TIME OF DAY ENABLE

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ:

TITLE: PROTOCOL TABLE, 1 THROUGH 15

DES. BY: AVB

DRAWN BY: A VANBEMMEL

DATE: 28 APR 99

REVISION

APPR. BY:

SCALE: NONE

1150-R04A-115081

01	29 DEC 99	ADDED TOD ENABLE ADDRESS 8	EB	
REV.	DATE	DESCRIPTION	BY	APPR.

KEY: 0 = WIRE NOT CONNECTED 1 = WIRE IS CONNECTED TO ANY GROUND PIN (4,7,10)

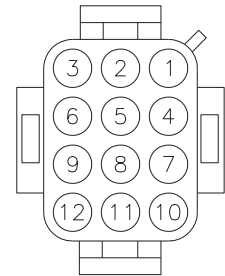
J4 ADDRESS AND NAME SWAP SELECT JACK

SEE NOTE BELOW →

DECIMAL ADDRESS	PIN 9	PIN 8	PIN 6	PIN 5
	1 (221)	0	0	0
2 (222)	0	0	1	0
3 (223)	0	0	1	1
4 (224)	0	1	0	0
5 (225)	0	1	0	1
6 (226)	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

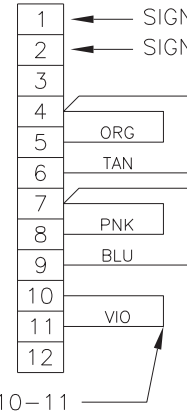
NAME SELECT	
BOTH HOME & GUEST	0
HOME/GUEST ONLY	1

PIN 11
0
1
PIN 11



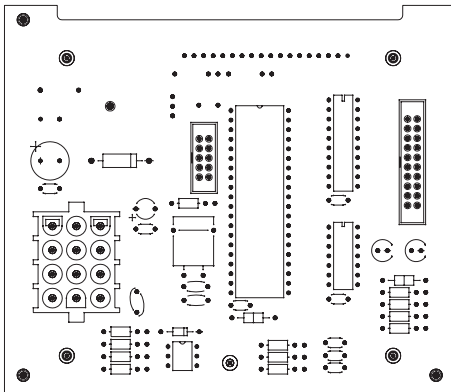
ADDRESS PLUG
WIRE SIDE

WIRING DIAGRAM
ADDRESS PLUG
WITH ALL WIRES
CONNECTED

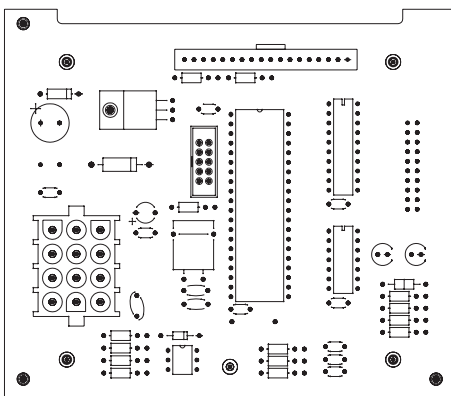


TEAM NAME SWAP PINS 10-11

OP-1176-0011; 1 1/2" & 2 1/2"
OUTDOOR TEAM NAME MESSAGE CENTER SHIFT CARD



OP-1150-0132; 1" & 3/4"
INDOOR INCANDESCENT AND LED TEAM NAME MESSAGE,
CENTER SHIFT CARD



NOTES

-WITH NO ADDRESS PINS SELECTED THE TNMC SHIFT CARD WILL DEFAULT TO A/S 4000 PROTOCOL

-NAME SWAP PIN WORKS FOR EITHER A/S 4000 OR A/S 5000 PROTOCOL

-# (###) THE NUMBER IN PARENTHESIS IS THE ADDRESS OF THE DATA RECEIVED FROM THE A/S 5000 SERIES CONSOLE

-# (###) THE NUMBER BEFORE THE PARENTHESIS IS THE PHYSICAL ADDRESS SET BY THE JUMPERS ON THE J4 ADDRESS PINS

-CARD RECEIVES POWER FROM THE MODULE THAT IT IS PLUGGED INTO.

-GREEN LED INDICATES THAT THE CARD HAS POWER

-RED LED WILL BE ON OR BLINKING WHEN THE CARD IS RECEIVING SIGNAL.

-OP-1176-0011, OUTDOOR TEAM NAME CARD SHIFTS FROM LEFT TO RIGHT (HOME SIDE TO GUEST SIDE) NAME SWAP PIN CHANGES CARD FROM DEFAULTING TO HOME TO DEFAULTING TO GUEST SIDE DATA.

-OP-1150-0132, INDOOR TEAM NAME CARD SHIFTS FROM RIGHT TO LEFT (GUEST SIDE TO HOME SIDE), NAME SWAP PIN CHANGES CARD FROM DEFAULTING TO GUEST TO DEFAULTING TO HOME SIDE DATA.

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ:

TITLE: A/S 5000 CAPABLE TNMC SHIFT CARD; SPECIFICATIONS

DES. BY: EB

DRAWN BY: E BRAVEK

DATE: 08 NOV 99

REVISION

APPR. BY:

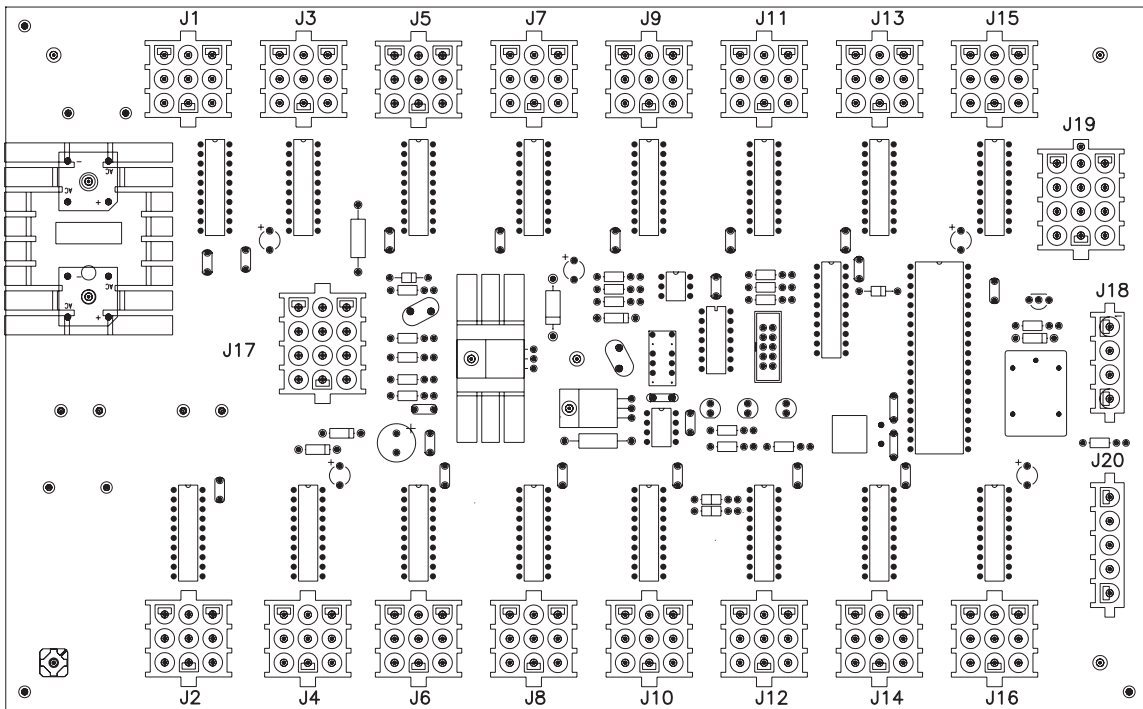
01

SCALE: NONE

1150-R04A-123794

REV.	DATE	DESCRIPTION	BY	APPR.
01	2 OCT 00	EDITED TEXT "HOME ONLY" TO "HOME/GUEST ONLY"	NSW	

OP-1150-0126 UNCOATED OR OP-1150-0127 COATED
16 COLUMN LED DRIVER II



J17 MAIN	
PIN	FUNCTION
1	SIG-P
2	SIG-N
3	SIG2-P
4	CLOUT-P
5	CLOUT-N
6	16VAC-N
7	GND-N
8	EARTH-N
9	16VAC-P
10	GND-N
11	+VDD-P
12	+VBB-P

J1-16 DIGIT	
PIN	FUNCTION
1	SEGC-N
2	SEGB-N
3	SEGA-N
4	SEGF-N
5	SEGE-N
6	SEGD-N
7	+VCC-P
8	SEGH-N
9	SEGG-N

J19 ADDRESS	
PIN	FUNCTION
1	GND-N
2	ADD0-N
3	ADD1-N
4	GND-N
5	ADD2-N
6	ADD3-N
7	GND-N
8	ADD4-N
9	ADD5-N
10	GND-N
11	ADD6-N
12	ADD7-N

J18 RELAY	
PIN	FUNCTION
1	HORNOUT-N
2	AUXOUT-N
3	120SW-P
4	120SW-N

J20 PROTOCOL	
PIN	FUNCTION
1	GND-N
2	PRO-N
3	PR1-N
4	PR2-N
5	TOD-N

NOTE

-WITH NO ADDRESS PINS SELECTED THE DRIVER WILL DEFAULT TO A/S 4000 PROTOCOL

-GREEN LED INDICATES THE DRIVER HAS POWER

-RED LED WILL BE ON OR BLINKING WHEN THE DRIVER IS RECEIVING SIGNAL

-AMBER LED INDICATES LED DRIVER STATUS, LED WILL BE BLINKING TO INDICATE THAT THE DRIVER IS RUNNING, IF THE LED IS OFF OR ON SOLID ALL OF THE TIME, THEN THE DRIVERS CPU IS NOT FUNCTIONING AND MAY NEED TO BE RESET OR REPLACED.

-REFER TO DRAWINGS A-115078 & A-115079 FOR J19 ADDRESS SETTINGS FOR THIS DRIVER.

-REFER TO DRAWING A-115081 FOR J20 PROTOCOL SETTINGS FOR THIS DRIVER.

-REDRIVE CIRCUIT IS PROCESSOR REFRESHED (REFER TO DWG A-128429 FOR FURTHER INFORMATION ON THE CURRENT LOOP REDRIVE CIRCUIT SPECIFICATIONS)

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ:

TITLE: 16 COLUMN LED DRIVER II SPECIFICATIONS

DES. BY: EB

DRAWN BY: EBRAVEK

DATE: 11 JAN 00

REVISION

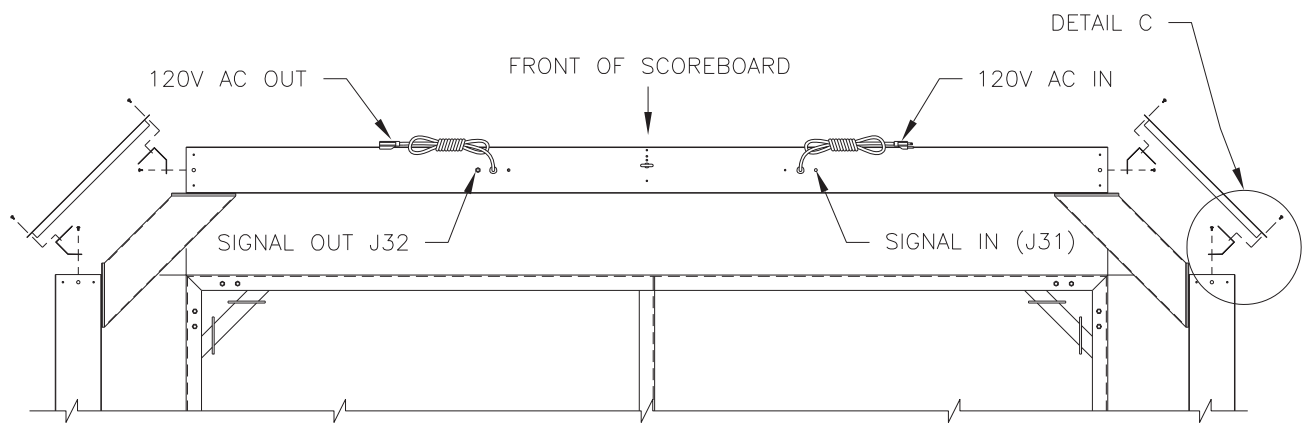
APPR. BY:

01

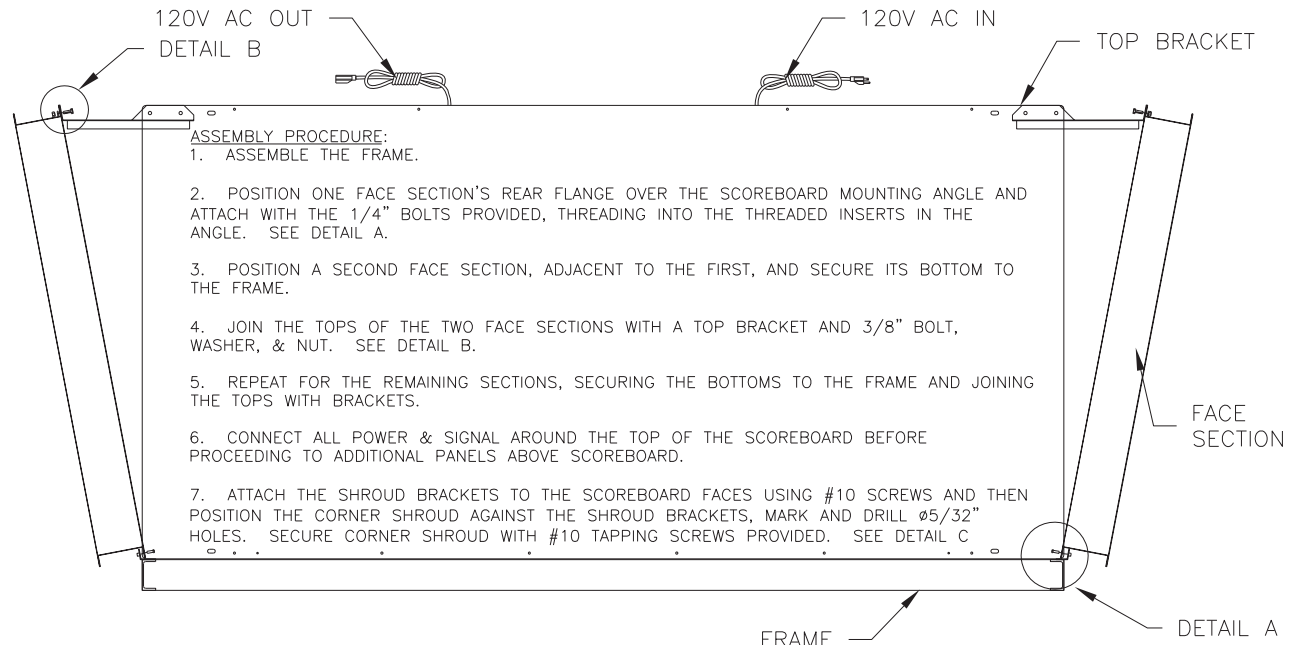
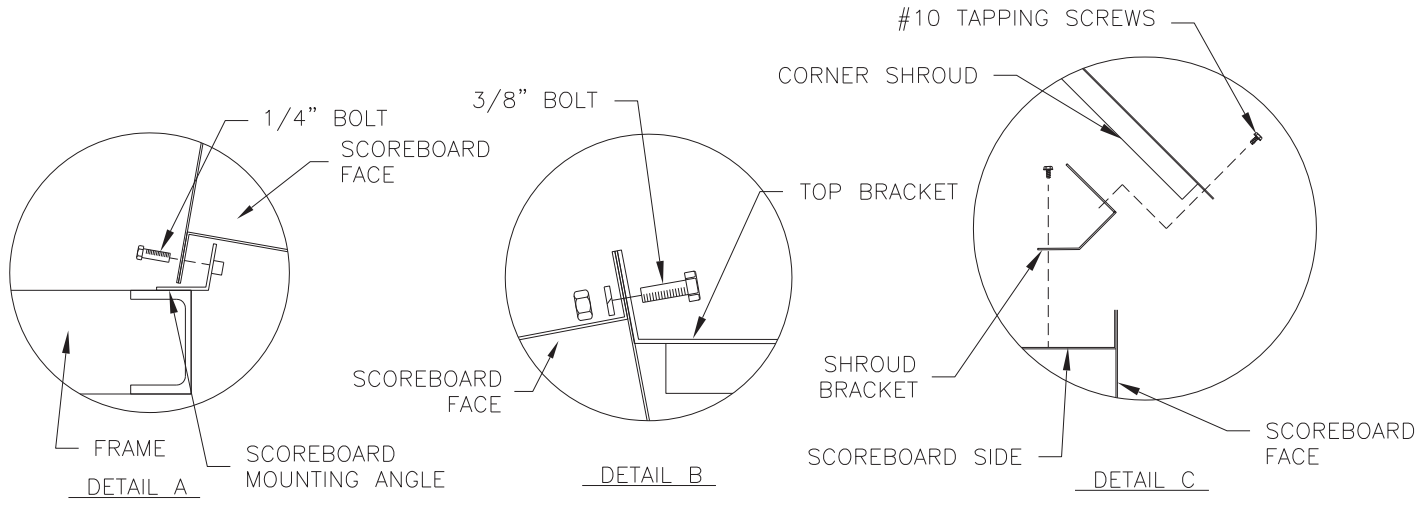
SCALE: 1=2

1150-R07A-126174

REV.	DATE	DESCRIPTION	BY	APPR.
01	2 OCT 00	UPDATED NOTES SECTION	NSW	



TOP VIEW



- ASSEMBLY PROCEDURE:**
1. ASSEMBLE THE FRAME.
 2. POSITION ONE FACE SECTION'S REAR FLANGE OVER THE SCOREBOARD MOUNTING ANGLE AND ATTACH WITH THE 1/4" BOLTS PROVIDED, THREADING INTO THE THREADED INSERTS IN THE ANGLE. SEE DETAIL A.
 3. POSITION A SECOND FACE SECTION, ADJACENT TO THE FIRST, AND SECURE ITS BOTTOM TO THE FRAME.
 4. JOIN THE TOPS OF THE TWO FACE SECTIONS WITH A TOP BRACKET AND 3/8" BOLT, WASHER, & NUT. SEE DETAIL B.
 5. REPEAT FOR THE REMAINING SECTIONS, SECURING THE BOTTOMS TO THE FRAME AND JOINING THE TOPS WITH BRACKETS.
 6. CONNECT ALL POWER & SIGNAL AROUND THE TOP OF THE SCOREBOARD BEFORE PROCEEDING TO ADDITIONAL PANELS ABOVE SCOREBOARD.
 7. ATTACH THE SHROUD BRACKETS TO THE SCOREBOARD FACES USING #10 SCREWS AND THEN POSITION THE CORNER SHROUD AGAINST THE SHROUD BRACKETS, MARK AND DRILL $\phi 5/32$ " HOLES. SECURE CORNER SHROUD WITH #10 TAPPING SCREWS PROVIDED. SEE DETAIL C.

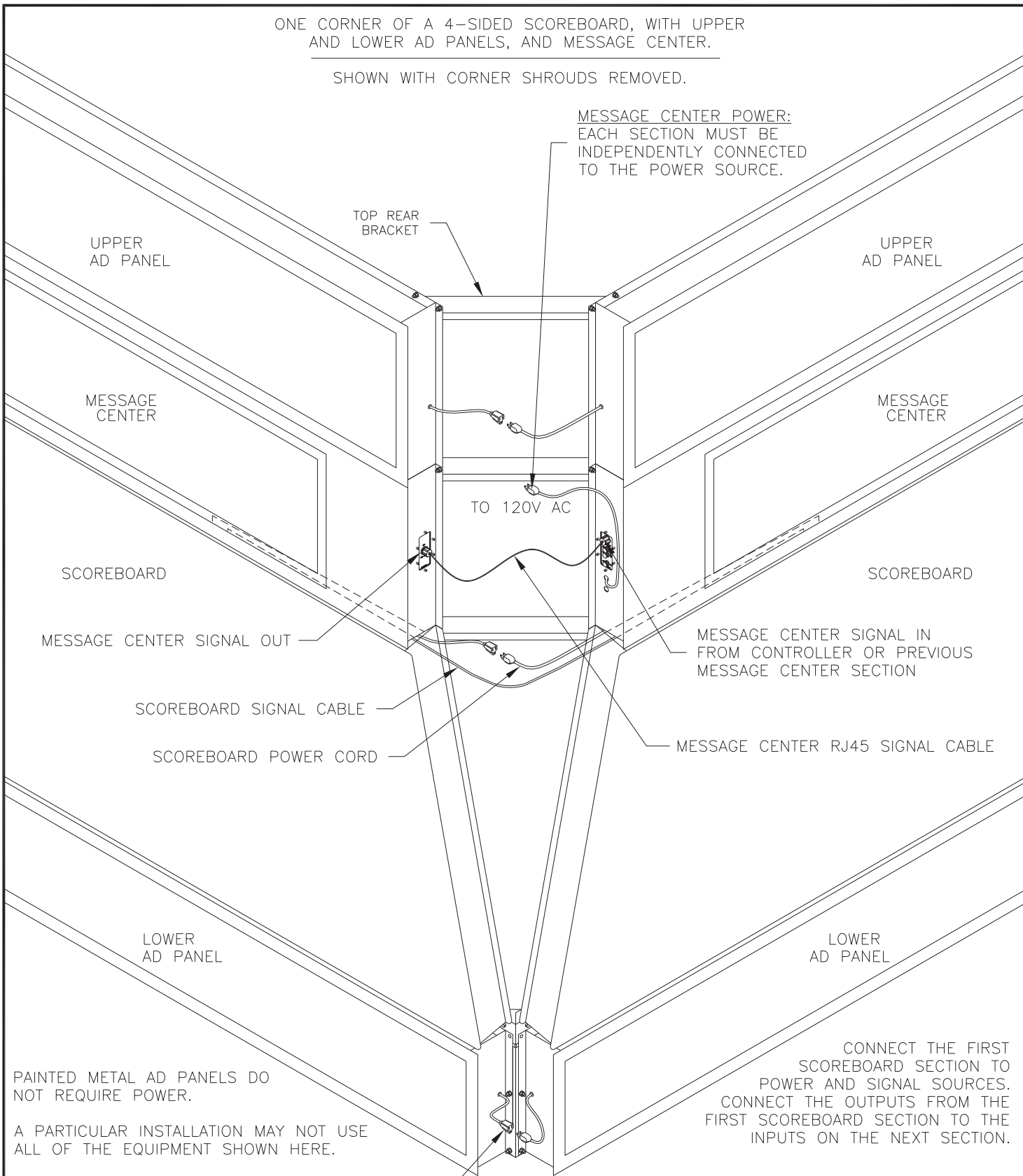
CROSS SECTION OF ASSEMBLED SCOREBOARD

03	27 APR 06	UPDATED LIFT TUBE CHANGED FRAME SIZE TO 4X2	JNR	DAKTRONICS, INC. BROOKINGS, SD 57006	
02	4 JUN 02	UPDATED CORNER SHROUD MOUNTING.	JJS	PROJ: TUFF SPORT SCOREBOARDS	
01	14MAR02	ENHANCED TOP VIEW ADDED DETAIL C AND ASSEMBLY STEP 7.	BDP	TITLE: 4-SIDE INSTALLATION DETAILS	
REV.	DATE	DESCRIPTION	BY	APPR.	DES. BY: BPETERSON DRAWN BY: JJSYRSTAD DATE: 15 AUG 01
					REVISION APPR. BY: DATE: SCALE: 1=25
					1237-E10A-154598

ONE CORNER OF A 4-SIDED SCOREBOARD, WITH UPPER AND LOWER AD PANELS, AND MESSAGE CENTER.

SHOWN WITH CORNER SHROUDS REMOVED.

MESSAGE CENTER POWER:
EACH SECTION MUST BE
INDEPENDENTLY CONNECTED
TO THE POWER SOURCE.



PAINTED METAL AD PANELS DO NOT REQUIRE POWER.

A PARTICULAR INSTALLATION MAY NOT USE ALL OF THE EQUIPMENT SHOWN HERE.

CONNECT THE FIRST SCOREBOARD SECTION TO POWER AND SIGNAL SOURCES. CONNECT THE OUTPUTS FROM THE FIRST SCOREBOARD SECTION TO THE INPUTS ON THE NEXT SECTION.

CONNECT AD PANEL POWER CORDS.

REV.	DATE	DESCRIPTION	BY	APPR.
05	02 SEP 09	UPDATED FOR NEW SS MESSAGE CENTERS	MBC	
04	18 JUL 08	ADDED SIDE HEYCOS	KZB	
03	27 APR 06	REMOVED LIFT EYE ON FRAME	JNR	
02	29 OCT 02	UPDATED NOTE AND SIGNAL INFORMATION	BDP	
01	10 SEP 02	CHANGED MESSAGE CENTER POWER AND SIGNAL CONNECTORS. REMOVED POWER OUTPUT ON MESSAGE CENTER.	AVB	

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DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ: TUFF SPORT SCOREBOARDS	
TITLE: AD PANEL/ MESSAGE CENTER HOOKUP OVERVIEW- 4-SIDE	
DES. BY: BPETERSON	DRAWN BY: JJSYRSTAD
DATE: 15 AUG 01	
REVISION 05	APPR. BY: SCALE: 1=20
1237-R10A-154599	

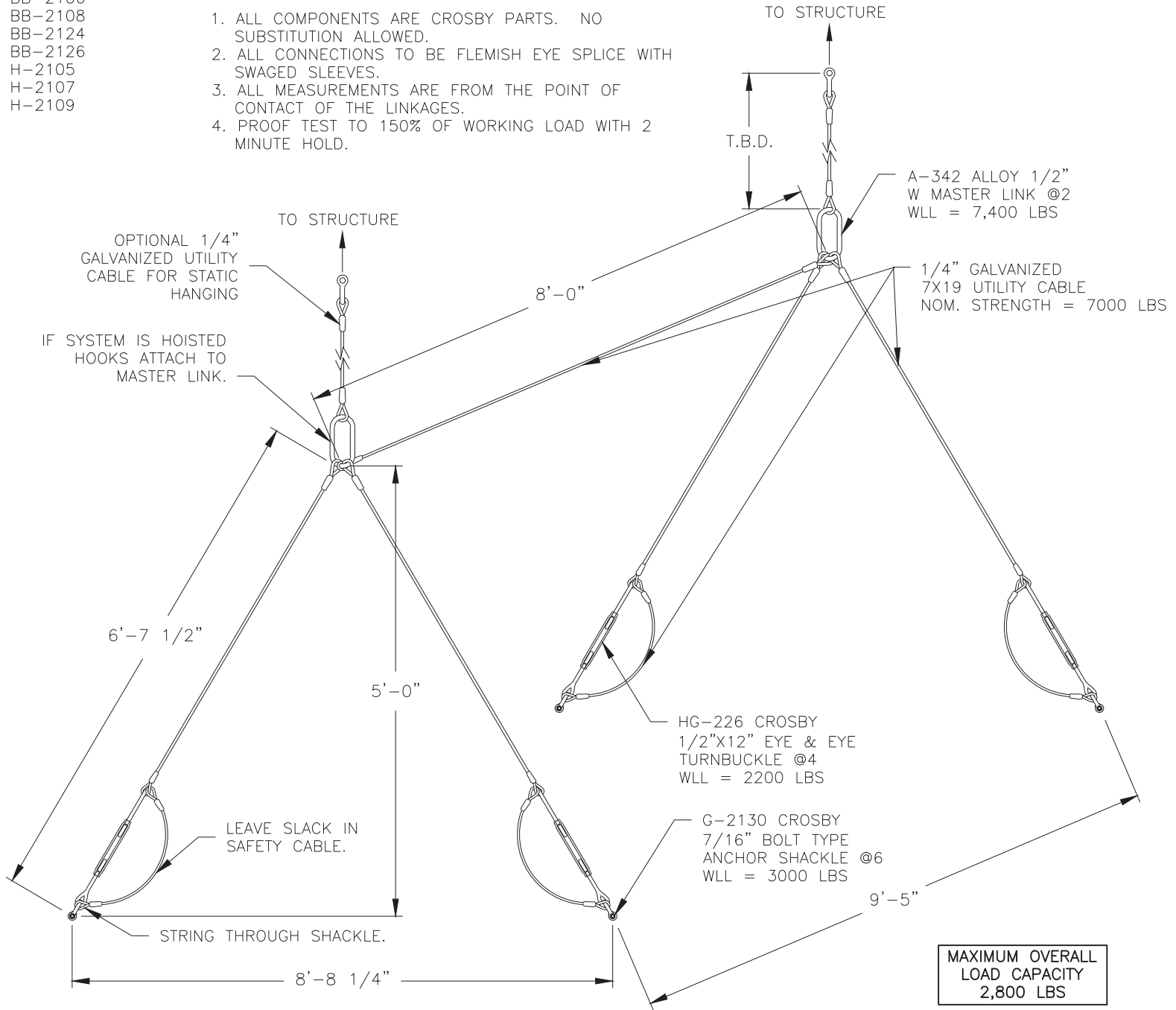
REV 01	DATE: 10 JUL 03	CHANGED TURNBUCKLE & SHACKLE	BY: RJS
REV 02	DATE: 30 JUL 03	UPDATED LAYOUT OF SLING SET. UPDATED VIEWS OF COMPONENTS.	BY: RJM
REV 03	DATE: 26 APR 04	TO 6"-9", CHANGED TURNBUCKLE FROM 6" TO 12". ADDED 2 MINUTE HOLD NOTE.	BY: JJS
REV 04	DATE: 29 JUN 04	CHANGED LEG LENGTH FROM 6'-4 5/8" TO 6'-9". CHANGED TURNBUCKLE FROM 6" TO 12". ADDED 2 MINUTE HOLD NOTE.	BY: JJS
REV 05	DATE: 6 OCT 10	ADJUSTED LENGTH OF CABLES TO BETTER FIT CENTERHUNG	BY: KCS
REV 06	DATE:	ADDED OVERALL LOAD CAPACITY.	BY:

USE WITH MODELS:

- BB-2106
- BB-2108
- BB-2124
- BB-2126
- H-2105
- H-2107
- H-2109

NOTES:

1. ALL COMPONENTS ARE CROSBY PARTS. NO SUBSTITUTION ALLOWED.
2. ALL CONNECTIONS TO BE FLEMISH EYE SPLICE WITH SWAGED SLEEVES.
3. ALL MEASUREMENTS ARE FROM THE POINT OF CONTACT OF THE LINKAGES.
4. PROOF TEST TO 150% OF WORKING LOAD WITH 2 MINUTE HOLD.



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PROJECT: TUFF SPORT SCOREBOARDS	PROJ. NO: 181903
TITLE: SLING SET: STANDARD 10' SQUARE 4-SIDE SCOREBOARDS	DATE: 22 JAN 03
DESIGNER: RNIELSEN	DRAWN: RNIELSEN
SCALE: N.T.S.	SHEET NO: 06
JOB NO: P1237	REV: 06
FUNC-TYPE-SIZE: E-10-A	

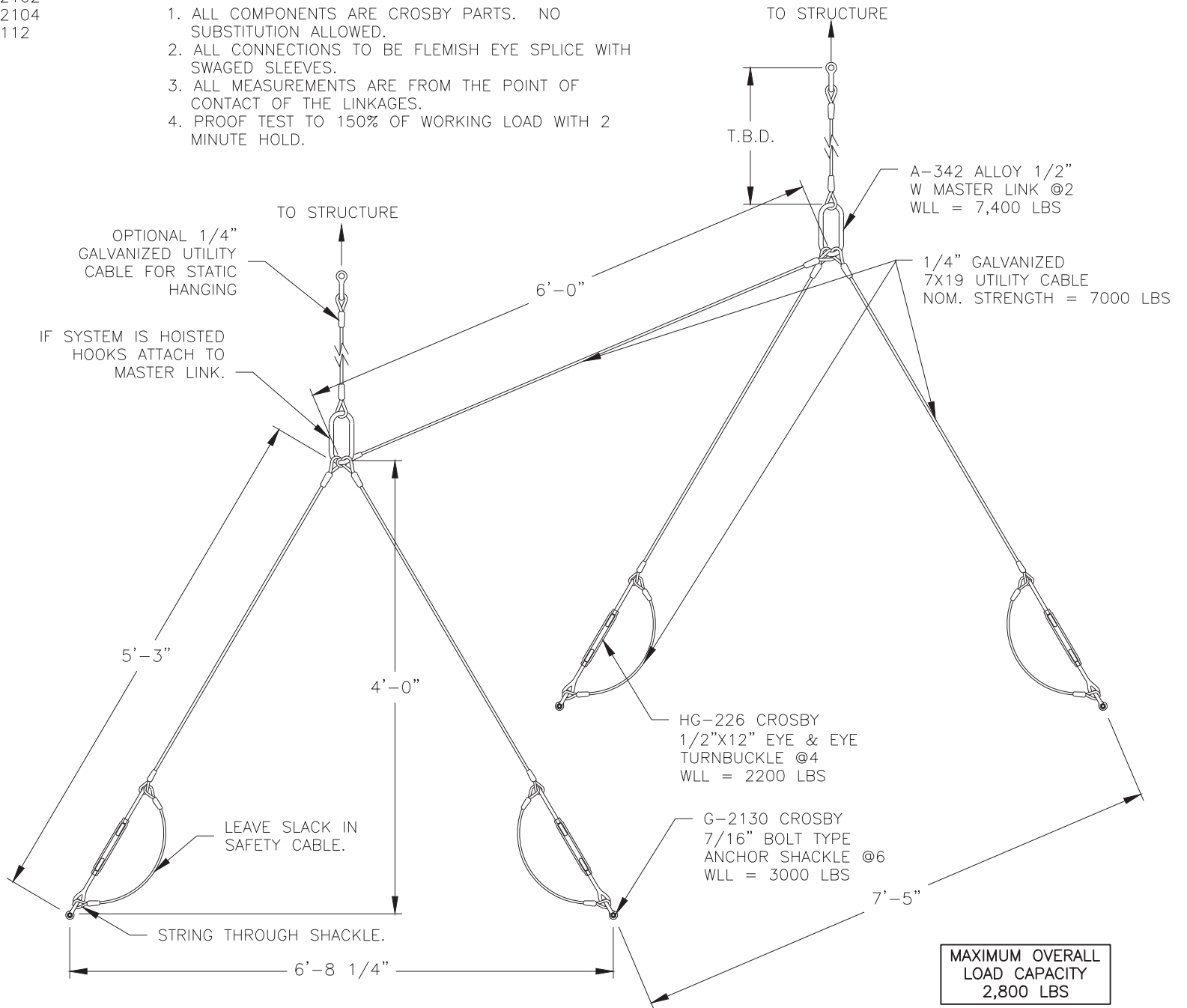
REV 01	DATE: 26 APR 04	ADDED NOTES, CHANGED TURNBUCKLE FROM 3/8"x6" TO 1/2"x12" AND SHACKLE FROM 3/8" TO 7/16". UPDATED SAFETY CABLE LAYOUT.	BY: JJS
REV 02	DATE: 29 JUN 04	ADDED OVERALL LOAD CAPACITY	BY: JJS
REV 03	DATE: 27 APR 06		BY: JNR
REV 04	DATE: 6 OCT 10	UPDATED HOIST CENTERS	BY: KCS
REV 05	DATE: 10 OCT 10	UPDATED LENGTH OF CABLES TO BETTER FIT CENTERHUNG	BY: KCS

USE WITH MODELS:

BB-2102
BB-2104
H-2112

NOTES:

1. ALL COMPONENTS ARE CROSBY PARTS. NO SUBSTITUTION ALLOWED.
2. ALL CONNECTIONS TO BE FLEMISH EYE SPLICE WITH SWAGED SLEEVES.
3. ALL MEASUREMENTS ARE FROM THE POINT OF CONTACT OF THE LINKAGES.
4. PROOF TEST TO 150% OF WORKING LOAD WITH 2 MINUTE HOLD.



DAKTRONICS, INC.
BROOKINGS, SD, 57006

DO NOT SCALE DRAWING

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PROJ: TUFF SPORT SCOREBOARDS

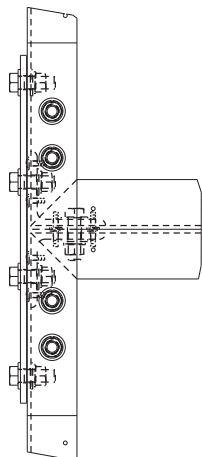
TITLE: SLING SET: STANDARD 8' SQUARE 4-SIDE SCOREBOARDS

DESIGN: RNI/ELSEN DRAWN: RNI/ELSEN DATE: 22 JAN 03

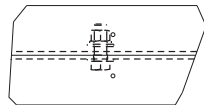
SCALE: N.T.S.

SHEET	REV	JOB NO:	FUNC-TYPE-SIZE
	05	P1237	E-10-A
181935			

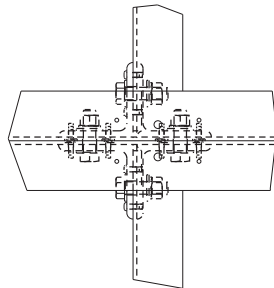
NOTES:
 USE FOR FIELD INSTALLATION ONLY
 BOLT 2 FRAME HALVES TOGETHER
 THE 1.75" BOLTS GO THROUGH 2 CHANNELS AND
 2 CORNER ANGLES 15" BOLTS EVERYWHERE ELSE
 FLAT WASHER GOES ON EACH SIDE,
 LOCK WASHER ON NUT SIDE



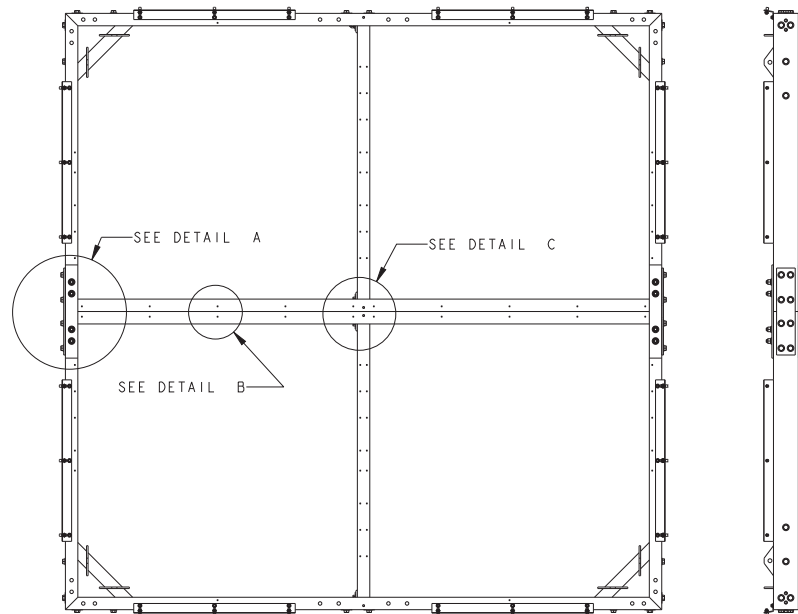
DETAIL A
 SCALE 1/5



DETAIL B
 SCALE 1/5



DETAIL C
 SCALE 1/5

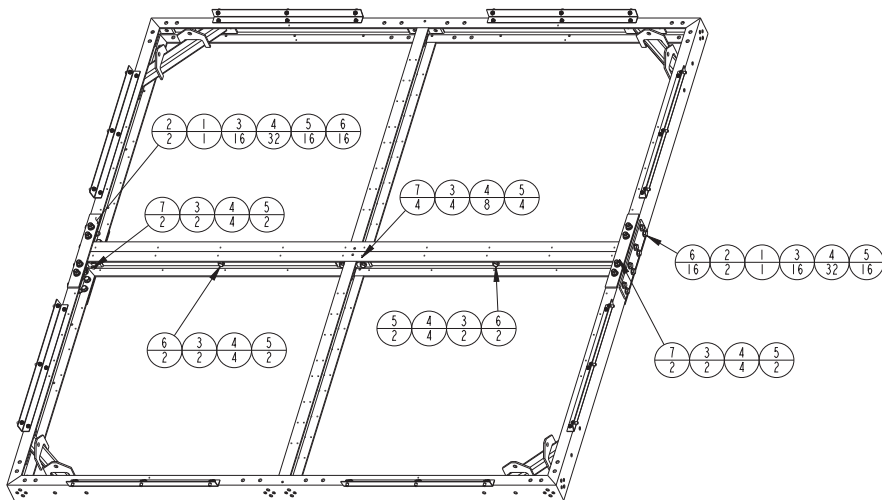


TOP VIEW

SIDE VIEW



FRONT VIEW



ISO VIEW

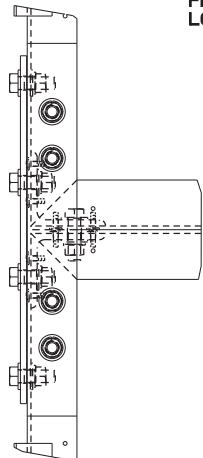
INDEX	NAME	QTY	DESCRIPTION
1	OM-219695	2	SIDE SPLICE PLATE, 4-SIDE FRAME
2	OM-219696	4	TOP/BOTTOM SPLICE PLATE, 4-SIDE FRAME
3	HC-1088	44	Nut; 1/2-13 Hex, Plated, Grade 5
4	HC-1095	88	WASHER, 1/2 FLAT, ZN PLTD, SAE
5	HC-1101	44	WASHER, 1/2 SPLIT LOCK, ZN PLTD, MEDIUM
6	HC-1152	36	Bolt; 1/2-13x1 1/2 Hex Head, Plated, Grade 5 Fully Threaded
7	HC-1444	8	BOLT, 1/2-13X1.75", HEX HEAD, GRADE 5, ZN PLTD

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		PROJ: INDOOR TUFF SPORT SCOREBOARDS TITLE: FIELD ASSEMBLY; 8' X 8' BOLTED FRAME	
DESIGN: DOPPELT		DRAWN: DOPPELT	
SCALE: 1/20		DATE: 19-JUL-12	
SHEET:	REV	JOB NO:	FUNC-TYPE-SIZE
1 OF 1	01	P 1237	E-07-B

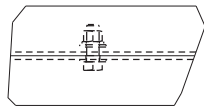
01	19 JUL 12	PER EC-6475 ADDED FIELD INSTALLATION NOTE	ZR	
REV	DATE:		BY:	

1101988

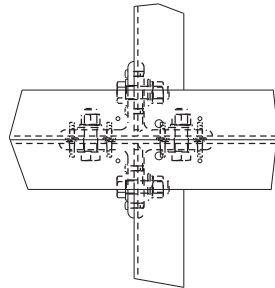
NOTES:
 USE FOR FIELD INSTALLATION ONLY
 BOLT 2 FRAME HALVES TOGETHER
 THE 1.75" BOLTS GO THROUGH 2 CHANNELS AND
 2 CORNER ANGLES 1.5" BOLTS EVERYWHERE ELSE
 FLAT WASHER GOES ON EACH SIDE,
 LOCK WASHER ON NUT SIDE



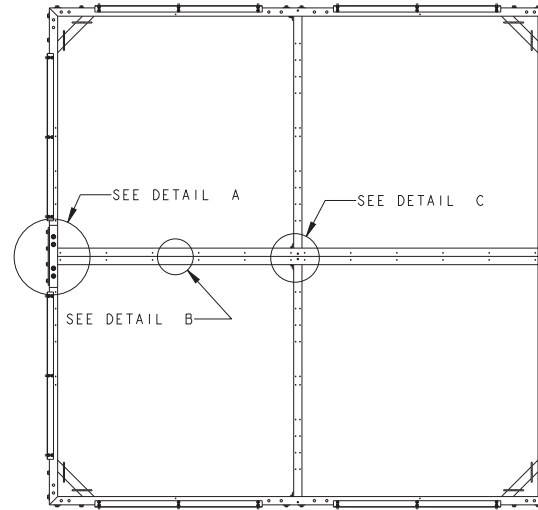
DETAIL A
SCALE 1/5



DETAIL B
SCALE 1/5



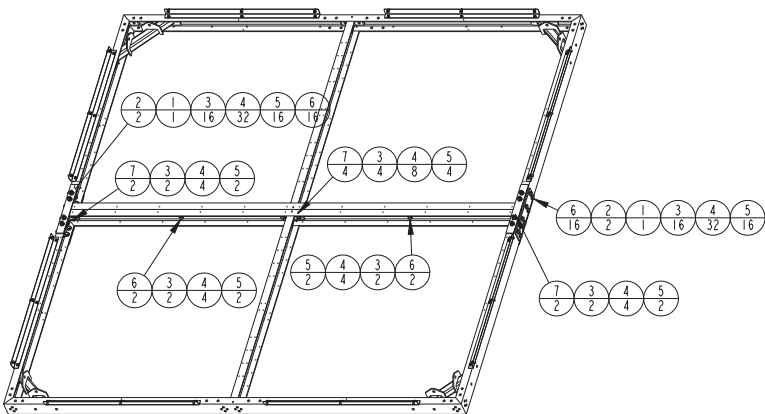
DETAIL C
SCALE 1/5



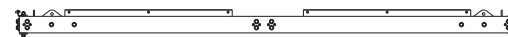
TOP VIEW



SIDE VIEW



ISO VIEW



FRONT VIEW

INDEX	NAME	QTY	DESCRIPTION
1	OM-219695	2	SIDE SPLICE PLATE, 4-SIDE FRAME
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		PROJ: INDOOR TUFF SPORT SCOREBOARDS TITLE: FIELD ASSEMBLY; 10' X 10" BOLTED FRAME	
DESIGN: MJOHNSO		DRAWN: DOPPELT	
SCALE: 1/20		DATE: 18-JUL-12	
SHEET:	REV	JOB NO:	FUNC-TYPE-SIZE
1 OF 1	01	P 1237	E-07-B

01	18 JUL 12	PER EC-6475 ADDED FIELD INSTALLATION NOTE	ZR
REV	DATE:		BY:

1102115

Appendix F: Hoist Suspension Systems

<i>Document Title</i>	<i>Document Number</i>
Scoreboard Hoist Suspension System Specifications	SL-03610
Suspension Systems for Centerhung Scoreboards.....	DD1627665

SCOREBOARD HOIST SUSPENSION SYSTEM SPECIFICATIONS

The objective of these specifications is to design to single component failure prevention principals. This means that the system has been analyzed for reasonable failure possibilities and a means of backing up the possible failing component is designed into the system.

THE HOIST SYSTEM INCLUDES:

- The hoist, which includes all components necessary for a complete and safe installation.
- All necessary components, brackets, required to mount the hoist to the building infrastructure.
- Hoist control pendant.
- Hoist installation including scoreboard hookup and setting of safety limits, and maintenance/operator training.
- Hoist provider shall provide customer with detailed building loading information.

THE BASE BUILDING WILL PROVIDE:

- Verification that the system and its integration into the building structure compose a thoroughly designed and adequately engineered system to support all anticipated static and dynamic loads.

HOIST SPECIFICATIONS:

- Shall be designed to support the scoreboard load 100 % of the time
- Shall have automatic failure-protection safety brake one per drum to slow, stop and hold the rated load with a maximum impact of 150% of rated load.
- Shall automatically disable hoist motor functions when an over speed condition is detected.
- Shall have key ways designed to eliminate possibility of keys walking or escaping.
- Shall have reeving of lifting cables with maximum of 2-degree fleet angle.
- Shall have 8:1 factor of safety on any single leg of a reeved cable.
- Shall have sheave, cable, and cable to drum connections with 8:1 factor of safety to design load.
- Shall have continuously engaged mechanical braking system, which runs in parallel to the electro-magnetic motor brake
- Shall have gear reducer manufactured to AGMA specification, rated to support the scoreboard at a minimum service factor of 1.
- Shall have lifting speed range of 5-20 fpm.
- Shall have 2 separate cables per pick point on 2 pick point systems.
- Shall have integral motor disc brake rated in excess of 150% of full load motor torque.

CONTROL SPECIFICATIONS:

- Low Voltage Push Button Control Station (Standard)
- The manual control center for the Daktronics S Series self-contained rigging system shall be wall mountable and contain two momentary control push buttons for direction and a hoist enable selector switch for each hoist in the system. Maximum number of motors permitted to run simultaneously shall be limited to power availability or customer preference. A power on indicator and a keyed system maintained Emergency Stop mushroom head push button shall come standard with all control options. The manual control center shall house all hardware necessary to control each hoist module in the system independently.
- Each hoist shall operate in open loop permitting the hoist to travel within its allowable trim limits.
- Each hoist shall be tested and commissioned at the factory to configure upper and lower soft limits as specified. Fine hard limit adjustment shall be done on site by a certified Daktronics representative.
- Each hoist will be equipped with hard struck over travel limits as well as a redundant ground out circuit designed to set the motor brake in the event of a switch failure.
- Hard struck switches shall only be used as the first line of defense to prevent an over travel occurrence. Under normal operation, the hoist will be permitted to travel within its hard struck limits. If a hard struck limit is engaged, the hoist must come to a complete stop and automatically disable any further movement in that direction.

SCOREBOARD HOIST SUSPENSION SYSTEM SPECIFICATIONS

JOB SPECIFIC SPECIFICATIONS:

- Weight of scoreboard system load
- Vertical lift required
- Hook blocks as required for reeving
- Vertical reach if required
- Quantity and type of elevation detection
- Number of remote pendants
- Pickup points to scoreboard
- Type of mounting
- Hook centers
- Voltage
- Tentative installation start and completion date
- Mounting drawings required from hoist supplier for customer engineers approval
- Hoist weight certification required
- Hoist to include interface steel/fasteners required for mounting to structure

DOCUMENTATION REQUIRED FROM HOIST MANUFACTURER:

- Signed Certification by PE/Company CEO that the design meets the specifications for this application.
- Auxiliary fail-protection secondary braking system to have been installed and functional on at least 2 installations for a period of one year or be field testable for functionality.
- Recommended inspection schedule.
- Calculations for hoist design must be available on demand with PE signature.
- Certificate of Conformance to metallurgical, drawing and general manufacturing processes of the gear drive manufacturer.
Document must originate from the gear drive manufacturer
- Calculations on maximum impact load to structure if secondary brakes are activated.

HOIST INSTALLATION SCOPE OF WORK:

Provide all labor, materials, and equipment to perform the following

- Accept, lift, and remove hoist from freight carrier. Coordinate all shipments with Daktronics. You are responsible for coordinating delivery, offloading, and staging and on site transportation of all equipment and materials provided by your company.
- Provide all necessary labor, equipment and material required for the installation of the hoist system.
- Responsible for providing any/all-rigging steel required for the installation of the hoist system.
- Responsible for removing any grating that may interfere with the hoist system.
- All welds are to be performed by a certified welder. All slag must be chipped and welds must be cleaned.
- All welding rod stubs, slag and other misc. materials must be cleaned up and disposed of properly.
- All steel and welds, shop and field, must be primed, cover coated and finish coated after cleaning.
- Lift and install hoist onto customer provided hoist platform
- Reeve hook blocks and attach to scoreboard hook points.
- Lift and level scoreboard.
- Set all safety limits.
- Verify hoist is fully operational and meets all safety requirements.
- Provide operation/maintenance training to building support staff. Obtain a list of the trainees with their signatures and submit a copy to Daktronics for file.
- Provide a copy of installation checklist to Daktronics for file.

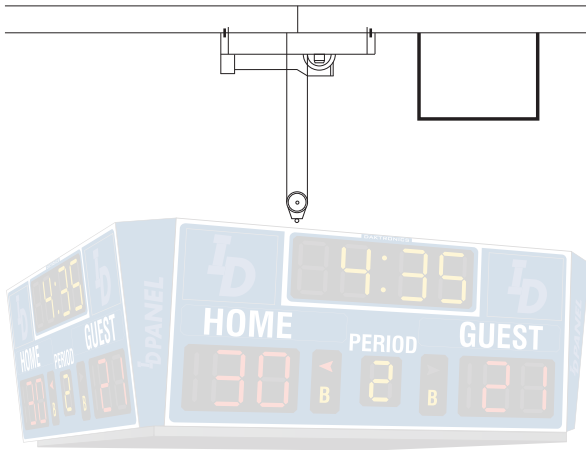
SUSPENSION SYSTEMS FOR CENTERHUNG SCOREBOARDS

Daktronics centerhung scoreboards can be suspended in two different ways.

A **static suspension system** holds the scoreboard securely in place using cables attached to the structural framework of a building. This technique works well with smaller scoreboards and in applications where the scoreboard has no need for lowering and raising. A portable elevating work platform is required to service the scoreboard.

An **electronic hoist system** offers more options. This technique uses multiple drums attached to the arena's structure which wind (or unwind) cables attached to the scoreboard which enable it to be lowered and raised. A hoist system works best in larger facilities and in applications where the scoreboard needs to be lowered for service or moved to allow additional clearance for events.

ELECTRONIC HOIST SYSTEM



Scoreboard is lowered to floor for service

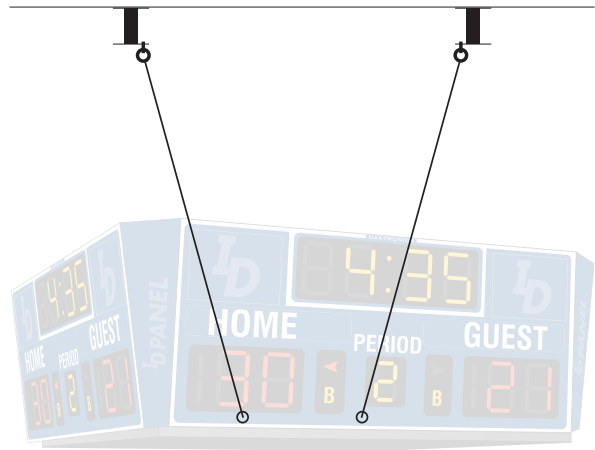
ADVANTAGES

- Allows scoreboard to be lowered and serviced from the floor
- Can move scoreboard to various heights for different events and when not in use or allow scoreboard to be lowered and removed from arena entirely

DISADVANTAGES

- Higher purchase cost
- Higher installation costs*
- Maintenance requirements (semi-annual inspection required by local or state inspectors)
- Additional liability issues
- Additional stress on roof structure

STATIC SUSPENSION SYSTEM



Service personnel must use elevating lift to access scoreboard

ADVANTAGES

- Lower purchase cost
- No hoist maintenance necessary
- Easier to get engineering approval

DISADVANTAGES

- Cannot lower and raise scoreboard to different levels
- Must have or purchase lift to service scoreboard
- Scoreboard may be in the way for concerts and events

*Installation of an electrical hoist system often requires increased structural work for mounting. Engineering approval is required as well as installation of electrical service for the hoist.

Appendix G: Daktronics Warranty and Limitation of Liability

**DAKTRONICS
WARRANTY AND LIMITATION OF LIABILITY**

This Warranty and Limitation of Liability (the "Warranty") sets forth the warranty provided by Daktronics with respect to the Equipment. By accepting delivery of the Equipment, Purchaser agrees to be bound by and accept these terms and conditions. All defined terms within the Warranty shall have the same meaning and definition as provided elsewhere in the Agreement.

DAKTRONICS WILL ONLY BE OBLIGATED TO HONOR THE WARRANTY SET FORTH IN THESE TERMS AND CONDITIONS UPON RECEIPT OF FULL PAYMENT FOR THE EQUIPMENT.

1. Warranty Coverage

A. Daktronics warrants to the original end-user that the Equipment will be free from Defects (as defined below) in materials and workmanship for a period of one (1) year (the "Warranty Period"). The warranty period shall commence on the earlier of: (i) four weeks from the date that the equipment leaves Daktronics' facility; or (ii) Substantial Completion as defined herein. The warranty period shall expire on the first anniversary of the commencement date.

"Substantial Completion" means the operational availability of the Equipment to the Purchaser in accordance with the Equipment's specifications, without regard to punch-list items, or other non-substantial items which do not affect the operation of the Equipment.

B. Daktronics' obligation under this Warranty is limited to, at Daktronics' option, replacing or repairing, any Equipment or part thereof that is found by Daktronics not to conform to the Equipment's specifications. Unless otherwise directed by Daktronics, any defective part or component shall be returned to Daktronics for repair or replacement. Daktronics may, at its option, provide on-site warranty service. Daktronics shall have a reasonable period of time to make such replacements or repairs and all labor associated therewith shall be performed during regular working hours. Regular working hours are Monday through Friday between 8:00 a.m. and 5:00 p.m. at the location where labor is performed, excluding any holidays observed by either Purchaser or Daktronics.

C. Daktronics shall pay ground transportation charges for the return of any defective component of the Equipment. If returned Equipment is repaired or replaced under the terms of this warranty, Daktronics will prepay ground transportation charges back to Purchaser; otherwise, Purchaser shall pay transportation charges to return the Equipment back to the Purchaser. All returns must be pre-approved by Daktronics before shipment. Daktronics shall not be obligated to pay freight for any unapproved return. Purchaser shall pay any upgraded or expedited transportation charges.

D. Any replacement parts or Equipment will be new or serviceably used, comparable in function and performance to the original part or Equipment, and warranted for the remainder of the Warranty Period. Purchasing additional parts or Equipment from the Seller does not extend this Warranty Period.

E. Defects shall be defined as follows. With regard to the Equipment (excepting LEDs), a "Defect" shall refer to a material variance from the design specifications that prohibit the Equipment from operating for its intended use. With respect to LEDs, "Defects" are defined as LED pixels that cease to emit light. The limited warranty provided by Daktronics does not impose any duty or liability upon Daktronics for partial LED pixel degradation. Nor does the limited warranty provide for the replacement or installation of communication methods including but not limited to, wire, fiber optic cable, conduit, trenching, or for the purpose of overcoming local site interference radio equipment substitutions.

THIS LIMITED WARRANTY IS THE ONLY WARRANTY APPLICABLE TO THE EQUIPMENT AND REPLACES ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SPECIFICALLY, EXCEPT AS PROVIDED HEREIN, THE SELLER UNDERTAKES NO RESPONSIBILITY FOR THE QUALITY OF THE EQUIPMENT OR THAT THE EQUIPMENT WILL BE FIT FOR ANY PARTICULAR PURPOSE FOR WHICH PURCHASER MAY BE BUYING THE EQUIPMENT. ANY IMPLIED WARRANTY IS LIMITED IN DURATION TO THE WARRANTY PERIOD. NO ORAL OR WRITTEN INFORMATION, OR ADVICE GIVEN BY THE COMPANY, ITS AGENTS OR EMPLOYEES, SHALL CREATE A WARRANTY OR IN ANY WAY INCREASE THE SCOPE OF THIS LIMITED WARRANTY.

THIS LIMITED WARRANTY IS NOT TRANSFERABLE.

2. Exclusion from Warranty Coverage

The limited warranty provided by Daktronics does not impose any duty or liability upon Daktronics for:

A. Any damage occurring, at any time, during shipment of Equipment unless otherwise provided for in the Agreement. When returning Equipment to Daktronics for repair or replacement, Purchaser assumes all risk of loss or damage, and agrees to use any shipping containers that might be provided by Daktronics and to ship the Equipment in the manner prescribed by Daktronics;

B. Any damage caused by the unauthorized adjustment, repair or service of the Equipment by anyone other than personnel of Daktronics or its authorized repair agents;



C. Damage caused by the failure to provide a continuously suitable environment, including, but not limited to: (i) neglect or misuse, (ii) a failure or sudden surge of electrical power, (iii) improper air conditioning or humidity control, or (iv) any other cause other than ordinary use;

D. Damage caused by fire, flood, earthquake, water, wind, lightning or other natural disaster, strike, inability to obtain materials or utilities, war, terrorism, civil disturbance or any other cause beyond Daktronics' reasonable control;

E. Failure to adjust, repair or replace any item of Equipment if it would be impractical for Daktronics personnel to do so because of connection of the Equipment by mechanical or electrical means to another device not supplied by Daktronics, or the existence of general environmental conditions at the site that pose a danger to Daktronics personnel;

F. Any statements made about the product by salesmen, dealers, distributors or agents, unless such statements are in a written document signed by an officer of Daktronics. Such statements as are not included in a signed writing do not constitute warranties, shall not be relied upon by Purchaser and are not part of the contract of sale;

G. Any damage arising from the use of Daktronics products in any application other than the commercial and industrial applications for which they are intended, unless, upon request, such use is specifically approved in writing by Daktronics; or

H. Any performance of preventive maintenance.

3. **Limitation of Liability**

Daktronics shall be under no obligation to furnish continued service under this Warranty if alterations are made to the Equipment without the prior written approval of Daktronics.

It is specifically agreed that the price of the Equipment is based upon the following limitation of liability. In no event shall Daktronics (including its subsidiaries, affiliates, officers, directors, employees, or agents) be liable for any special, consequential, incidental or exemplary damages arising out of or in any way connected with the Equipment or otherwise, including but not limited to damages for lost profits, cost of substitute or replacement equipment, down time, lost data, injury to property or any damages or sums paid by Purchaser to third parties, even if Daktronics has been advised of the possibility of such damages. The foregoing limitation of liability shall apply whether any claim is based upon principles of contract, tort or statutory duty, principles of indemnity or contribution, or otherwise.

In no event shall Daktronics be liable to Purchaser or any other party for loss, damage, or injury of any kind or nature arising out of or in connection with this Warranty in excess of the purchase price of the Equipment actually delivered to and paid for by the Purchaser. The Purchaser's remedy in any dispute under this Warranty shall be ultimately limited to the Purchase Price of the Equipment to the extent the Purchase Price has been paid.

4. **Assignment of Rights**

The Warranty contained herein extends only to the original end-user (which may be the Purchaser) of the Equipment and no attempt to extend the Warranty to any subsequent user-transferee of the Equipment shall be valid or enforceable without the express written consent of Daktronics.

5. **Dispute Resolution**

Any dispute between the parties will be resolved exclusively and finally by arbitration administered by the American Arbitration Association ("AAA") and conducted under its rules, except as otherwise provided below. The arbitration will be conducted before a single arbitrator. The arbitration shall be held in Brookings, South Dakota. Any decision rendered in such arbitration proceedings will be final and binding on each of the parties, and judgment may be entered thereon in any court of competent jurisdiction. This arbitration agreement is made pursuant to a transaction involving interstate commerce, and shall be governed by the Federal Arbitration Act.

6. **Governing Law**

The rights and obligations of the parties under this warranty shall not be governed by the provisions of the United Nations Convention on Contracts for the International Sales of Goods of 1980. Both parties consent to the application of the laws of the State of South Dakota to govern, interpret, and enforce all of Purchaser and Daktronics rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Warranty, without regard to conflict of law principles.

7. **Availability of Extended Service Agreement**

For Purchaser's protection, in addition to that afforded by the warranties set forth herein, Purchaser may purchase extended warranty services to cover the Equipment. The Extended Service Agreement, available from Daktronics, provides for electronic parts repair and/or on-site labor for an extended period from the date of expiration of this warranty. Alternatively, an Extended Service Agreement may be purchased in conjunction with this warranty for extended additional services. For further information, contact Daktronics Customer Service at 1-800-DAKTRONics (1-800-325-8766).