CH-1421-H and CH-1521-H

Installation & Service Manual

ED-4765

ED-4765
Product#1081
Rev. 11 - 28July98

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Section 1: Introduction

Reference Drawing: Display, CH-1421-H & CH-1521-H ............ Drawing A-101804

This manual covers installation of the CH-1421-H and CH-1521-H scoring displays. It includes information for servicing the digits, wiring, and basic information about power consumption. Setup and operation of control equipment are not covered in this manual. For questions regarding the safety, installation, operation, or service of this system, please refer to the telephone numbers listed on the cover page of this manual. For display layouts, refer to Drawing A-101804.

The following table shows the approximate weights of the individual sections of the CH-1421-H and CH-1521-H display, as well as the maximum power requirement of each section:

<table>
<thead>
<tr>
<th>Section</th>
<th>Uncrated Weight</th>
<th>Crated Weight</th>
<th>Amp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L1</td>
</tr>
<tr>
<td>CH-1421-H</td>
<td>450 lbs.</td>
<td>800 lbs.</td>
<td>40</td>
</tr>
<tr>
<td>CH-1521-H</td>
<td>450 lbs.</td>
<td>825 lbs.</td>
<td>40</td>
</tr>
</tbody>
</table>

Important Safeguards:

1. Read and understand these instructions before installing.
2. Do not drop the control console or allow it to get wet.
3. Be sure that the display is properly grounded with a ground rod at the display location.
4. Disconnect power to the display when it is not in use.
5. Disconnect power when servicing the display.
6. Do not modify the display structure or attach any panels or coverings to the display without the express written consent of Daktronics, Inc.

The box below illustrates Daktronics drawing numbering system. Daktronics identifies individual drawings by drawing number (7087-P08A-69945, below), located in the title box in the lower right corner of the drawing. The manual refers to drawings by the last set of digits and the letter preceding them. The example below shows Drawing A-69945. Reference drawings are inserted at the end of each section.
NOTES:

- OVERALL DIMENSIONS FOR SCORING DISPLAY: 66"H X 210"W X 6"D.
- DIGITS ARE 21" HIGH, 4x7 LAMP MATRICES.
  DIGIT LAMPS ARE 25W FROSTED, MEDIUM BASE.
- LAP/TIME INDICATOR LAMPS ARE 30W REFLECTOR LAMPS.
- STATUS INDICATOR LAMPS ARE 85W-MISER FLOOD LAMPS.
- DIGITS MAY BE ORDERED WITH OPTIONAL 30W REFLECTOR, TYPE 3OR20 LAMPS.
Section 2: Mechanical & Electrical Installation

2.1 Mechanical Installation

Reference Drawing: Beam Spacing, CH-1421 / CH-1521-H . . . . Drawing A-38857

Table 1 contains recommendations for beams and footings. The distance in the first column is from the ground to the bottom of the display, regardless of which sections your display is comprised. The second column is wind velocities that are likely to occur at the display location in miles per hour.

The beams listed are W-section (wide flange) beams which provide maximum wind load strength for the weight and cost of the beams. Decide how high you want your display and what sort of wind it will be subject to. Read across the table to the appropriate column for your display, these are the beams and footings that are recommended. Drawing 38857 shows a typical installation of beams and footings.

The calculations for footing diameters and depths are based on the assumption that footings are in undisturbed soils, NOT FILL SOILS. Lateral bearing capacity of 300 psi/ft of depth horizontally. However, these recommendations are suggestions only and each installation complies with local codes and is suitable for your particular soil and wind conditions. Daktronics recommends that W-section grade 36 steel be used for beams, and that 28-day (strength 3000 psi) concrete be used for footings.

❖ Daktronics assumes no responsibility for structures installed by others. ❖

2.2 Display Mounting

Reference Drawing: Mounting Instructions, CH-1421 / CH-1521-H Drawing A-38856

The following table shows the approximate weights of the individual sections of the CH-1421-H and CH-1521-H displays. Use caution when lifting and mounting these displays.

<table>
<thead>
<tr>
<th>Section</th>
<th>Uncrated Weight</th>
<th>Crated Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH-1421-H</td>
<td>450 lbs</td>
<td>800 lbs</td>
</tr>
<tr>
<td>CH-1521-H</td>
<td>450 lbs</td>
<td>825 lbs</td>
</tr>
</tbody>
</table>

Drawing A-38856 shows the mounting procedure typical for the scoring display sections.

✓ NOTE: The bolts that secure the display sections do not go through the beams, but run along both sides of the beam to clamp the display to the beams.

A mounting kit is sent with each section, containing mounting angles and ½" hardware for securing that section to two beams.

Position the display section and secure the bottom of the section to both beams as shown in Drawing A-38856. Next, secure the top of the section.
Once mounting angles are attached, the display may be slid up or down to the desired height. When positioned as desired, tighten all bolts.

If other sections are used, position the other sections as desired and secure them in the same manner. The following table lists beam and footing recommendations for both CH-1421-H and CH-1521-H displays:

**Table 1: Beam and Footing Recommendations**

<table>
<thead>
<tr>
<th>Scoreboard</th>
<th>Footings</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIST TO BOTTOM OF SCBD (FT)</td>
<td>DESIGN WIND VELOCITY (MPH)</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>80</td>
</tr>
<tr>
<td>16</td>
<td>80</td>
</tr>
<tr>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>24</td>
<td>80</td>
</tr>
<tr>
<td>28</td>
<td>80</td>
</tr>
<tr>
<td>8</td>
<td>90</td>
</tr>
<tr>
<td>12</td>
<td>90</td>
</tr>
<tr>
<td>16</td>
<td>90</td>
</tr>
<tr>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>24</td>
<td>90</td>
</tr>
<tr>
<td>28</td>
<td>90</td>
</tr>
<tr>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>12</td>
<td>100</td>
</tr>
<tr>
<td>16</td>
<td>100</td>
</tr>
<tr>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>24</td>
<td>100</td>
</tr>
<tr>
<td>28</td>
<td>100</td>
</tr>
</tbody>
</table>

These footing recommendations are based on an allowable soil bearing pressure of 3000 psf vertically and 300 psf/ft of depth horizontally. However, these recommendations are suggestions only, and each installation should be treated individually. You must be sure that your installation complies with local codes and is suitable for your particular soil and wind conditions.

✧ **Daktronics assumes no responsibility for structures installed by others.** ✧

⚠️ **Information given is only for estimating purposes. Columns and footings must be designed by a state-licensed engineer. Daktronics assumes no liability for any installations derived from this information or for installations designed and installed by others.**
2.3 Electrical Installation

2.3.1 Control Signal Cable Selection

Reference Drawing: Sys Layout, CH-1421 / CH-1521-H  Drawing A-101822

For a scoring system alone, two conductors of 22 AWG minimum are required. Daktronics has the following cable available: Daktronics part no. W-1077 (Belden part no. 8451). This is a two conductor, 22 AWG cable that must be pulled through conduit.

Refer to Drawing A-101822 for an illustration of the system layout.

2.3.2 Control Signal Connection

Reference Drawings: Driver Enclosure, Power & Signal  Drawing A-37915
Comp Locations, CH-1421 / CH-1521 Drawing A-38854
Color Code, 25-pin, J-box ........... Drawing A-47207

At the control end of the cables, mount the signal J-box to a convenient location. Connect the wires to the wires leading from the connector in the cover of the scoring display J-box, as shown on Drawing A-47207.

Route signal cables to the display location. Open the hinged access door on the scoring display, as shown on Drawing A-38854. Remove the cover from the driver enclosure. Refer to Drawing A-37915 for an illustration of the components inside the enclosure. Connect the signal wires to TB31 as indicated in the table below.

<table>
<thead>
<tr>
<th>J-BOX TERMINAL NO.</th>
<th>WIRE COLOR</th>
<th>OUTPUT NO.</th>
<th>TB31 TERMINAL NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>RED/WHT</td>
<td>1*</td>
<td>1 (+)</td>
</tr>
<tr>
<td>15</td>
<td>GRN/WHT</td>
<td></td>
<td>2 (-)</td>
</tr>
</tbody>
</table>

*Auxiliary display(s) require(s) a different output no.(s). Consult the CHTS-300 console manual.

2.3.3 Power Wiring

Reference Drawings: System Layout ..................... Drawing A-101822
                Power Wiring and Grounding ....... Drawing A-101825

The display requires that four hot wires, two neutrals, and a separate earth-ground conductor be run into a load center from the electrical source. The load center is mounted on the support pole by others. The power demands for each display are listed in the table below.

<table>
<thead>
<tr>
<th>Model</th>
<th>Maximum Power Demand</th>
<th>Amps</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH-1421-H</td>
<td>8775 Watts</td>
<td>40</td>
</tr>
<tr>
<td>Model</td>
<td>Maximum Power Demand</td>
<td>Amps</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------------</td>
<td>------</td>
</tr>
<tr>
<td>CH-1421-H</td>
<td>8775 Watts</td>
<td>40</td>
</tr>
<tr>
<td>CH-1521-H</td>
<td>9375 Watts</td>
<td>40</td>
</tr>
</tbody>
</table>

Consult a qualified electrician to run the proper size of wire from your electrical source to the display location.

**If your system does not include a message center,** install a lockable safety disconnect and load center on the poles of the display. A three-conductor disconnect is recommended for proper protection from lightning strikes (refer to Drawing A-101825). Install a copper ground rod by each of the support poles for the display.

**The display must be connected to earth ground at the display location.** This is in addition to the separate earth-ground conductor in the power cable.

Route four "hot," two "neutral," and one "ground" wire, 12 AWG minimum, through conduit from the load center to the driver enclosure in the scoring display. Refer to Drawing A-101822 for component location. Connect the ground wire to terminal E41. Connect the two neutral wires to TB41-3 and TB41-4 inside the driver enclosure of the scoring display. Connect the hot wires to the load center and scoring display as listed below.

<table>
<thead>
<tr>
<th>Load Center Breaker Label</th>
<th>Scoring Display Term. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB401-1</td>
<td>TB41-1</td>
</tr>
<tr>
<td>TB401-2</td>
<td>TB41-2</td>
</tr>
<tr>
<td>TB401-5</td>
<td>TB41-5</td>
</tr>
<tr>
<td>TB401-6</td>
<td>TB41-6</td>
</tr>
</tbody>
</table>
A1
LAMP DRIVER

HARNESSES TO DIGITS
HARNESSES TO DIGITS

SEE DETAIL "A"
SEE DETAIL "B"

FRONT VIEW (COVER REMOVED)

CLEAR OR RED
BLACK

DETAIL "A" (SIGNAL)

BLACK
BLUE
WHITE
WHITE
RED
ORANGE

E41 (EARTH GND)

1 2 3 4 5 6
01 120 NEUT 02 120

TB-31

D A

D B

DETAIL "B" (POWER)
ACCESS DOOR REMOVED TO SHOW ENCLOSED DRIVER LOCATION.

REMOVE (6) SCREWS TO ACCESS DRIVER AND POWER & SIGNAL ENTRANCE COMPONENTS.

POS 1 2 3 4 5
4 5 6 7 8 9 10 11 12 13

TO GAIN ACCESS TO DRIVER ENCLOSED,
REMOVAL THE THREE SCREWS AT THE
BOTTOM OF THE ACCESS DOOR LOCATED
AT THE TOP LEFT CORNER OF THE DISPLAY.

FRONT VIEW
MODEL CH-1421-H

FRONT VIEW
MODEL CH-1521-H

12 = LAMP DRIVER CONNECTOR
WHICH DIGIT OR INDICATOR IS CONNECTED.

15D = LAMP DRIVER CONNECTOR AND
PIN (SEGMENT) NO. WHICH THE
INDICATOR IS CONNECTED TO.

DAKTRONICS, INC. BROOKINGS, SD 57006

WEBER
C. FICK
JUL

4 16APR98 CHANGED MODEL NO. CH-1421-GP TO CH-1421-H AND ADDED MODEL NO. CH-1521-H.

5 10 JUN 92 CHANGED FROM TO X SIZE DIA. CHANGED MODEL NO. CH-210P TO CH-1421P.

2 9 MAY 90 CORRECTED TEXT IN SEGMENTATION DESCRIPTION.

PROJECT: CHRONDEK
TITLE: COMPONENT LOCATIONS, CH-1421-H & CH-1521-H
DES. BY: DRAWN BY: HEIDERSCHEIDT DATE: 24 JUL 89
APPR. BY: 1081-R08A-38854

REV. DATE DESCRIPTION BY APPR.

SCALE: 1"=30
MOUNTING INSTRUCTIONS:

1.) LOCATE WHERE THE CENTER OF THE BEAMS WILL BE ON THE BACK OF THE DISPLAY.

2.) DRILL 6/16" HOLES IN THE VTO CHANNEL ON THE BACK OF THE DISPLAY AT A DISTANCE OF ± 3.50" OR 4.50" FROM THE CENTER OF EACH BEAM.

3.) LIFT THE DISPLAY IN PLACE.

4.) ATTACH MOUNTING HARDWARE AS SHOWN ABOVE.

5.) DISPLAY CAN BE SLID UP OR DOWN TO THE HEIGHT REQUIRED.

6.) TIGHTEN ALL MOUNTING HARDWARE SECURELY.
REAR OF CH-1421-GP DISPLAY

BEAMS: SEE FOOTING & BEAM CHART

FOOTING DEPTH SEE CHART

FOOTING DIAMETER SEE CHART

INFORMATION GIVEN IS FOR ESTIMATING PURPOSES ONLY. COLUMNS AND FOOTINGS MUST BE DESIGNED BY A STATE LICENCED ENGINEER. DAKTRONICS DOES NOT ASSUME ANY LIABILITY FOR ANY INSTALLATIONS DERIVED FROM THIS INFORMATION OR DESIGNED AND INSTALLED BY OTHERS.

Daktronics, Inc. Brookings, SD 57006

2 15APR98 CHANGED MODEL NUMBER FROM CH-1421GP TO CH-1421-H AND ADDITIONAL MODEL NUMBER TWEEDER
1 15JUL91 CHANGED MODEL NUMBER FROM CH-216P TO CH-1421-GP JIH

Rev. Date Description By Appr.

Scale: None

1081-R08A-38857
1.) STRIP WIRE ENDS 1/4".
2.) INSERT WIRE INTO CONNECTOR.
3.) SQUEEZE CONNECTOR SECURELY ONTO WIRE END WITH PLIERS OR CRIMPING TOOL.

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>WIRE COLOR</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BLACK</td>
<td>PHOTO 1—N</td>
</tr>
<tr>
<td>2</td>
<td>WHITE</td>
<td>PWR 1—P</td>
</tr>
<tr>
<td>3</td>
<td>RED</td>
<td>GND 1—N</td>
</tr>
<tr>
<td>4</td>
<td>GREEN</td>
<td>PHOTO 2—N</td>
</tr>
<tr>
<td>5</td>
<td>ORANGE</td>
<td>PWR 2—P</td>
</tr>
<tr>
<td>6</td>
<td>BLUE</td>
<td>GND 2—N</td>
</tr>
<tr>
<td>7</td>
<td>WHITE/BLACK</td>
<td>PHOTO 3—N</td>
</tr>
<tr>
<td>8</td>
<td>RED/BLACK</td>
<td>PWR 3—P</td>
</tr>
<tr>
<td>9</td>
<td>GREEN/BLACK</td>
<td>GND 3—N</td>
</tr>
<tr>
<td>10</td>
<td>ORANGE/BLACK</td>
<td>PHOTO 4—N</td>
</tr>
<tr>
<td>11</td>
<td>BLUE/BLACK</td>
<td>PWR 4—P</td>
</tr>
<tr>
<td>12</td>
<td>BLACK/WHITE</td>
<td>GND 4—N</td>
</tr>
<tr>
<td>13</td>
<td>RED/WHITE</td>
<td>1 SIG—P</td>
</tr>
<tr>
<td>14</td>
<td>GREEN/WHITE</td>
<td>1 SIG—N</td>
</tr>
<tr>
<td>15</td>
<td>BLUE/WHITE</td>
<td>2 SIG—P</td>
</tr>
<tr>
<td>16</td>
<td>BLACK/RED</td>
<td>2 SIG—N</td>
</tr>
<tr>
<td>17</td>
<td>WHITE/RED</td>
<td>3 SIG—P</td>
</tr>
<tr>
<td>18</td>
<td>ORANGE/RED</td>
<td>3 SIG—N</td>
</tr>
<tr>
<td>19</td>
<td>BLUE/RED</td>
<td>4 SIG—P</td>
</tr>
<tr>
<td>20</td>
<td>RED/GREEN</td>
<td>4 SIG—N</td>
</tr>
<tr>
<td>21</td>
<td>ORANGE/GREEN</td>
<td>NOT USED</td>
</tr>
<tr>
<td>22</td>
<td>BLK/WHT/RED</td>
<td>NOT USED</td>
</tr>
<tr>
<td>23</td>
<td>WHT/BLK/RED</td>
<td>NOT USED</td>
</tr>
<tr>
<td>24</td>
<td>RED/BLK/WHT</td>
<td>12 VAC</td>
</tr>
<tr>
<td>25</td>
<td>GRN/BLK/WHT</td>
<td>12 VAC</td>
</tr>
</tbody>
</table>

**PHOTOCELL POWER INPUTS**

**SCOREBOARD SIGNAL OUTPUTS**

**THESE PINS TYPICALLY NOT USED BY CHTS TIMER**
CH-142T-H OR CH-1521-H
POWER WIRES FOR TWO 120/240V, 20A CIRCUITS
(3 WIRE + GND BY CUSTOMER)

REAR VIEW

NOTES
120 VAC MINIMUM WIRE IS NEEDED FROM LOAD CENTER TO DISPLAY. CHECK WITH A QUALIFIED ELECTRICIAN FOR CORRECT WIRE FROM SOURCE TO LOAD CENTER.

CONTROL SIGNAL CABLE
1 PAIR, 24 AWG UP TO 1000 FT, OR 1 PAIR, 22 AWG, UP TO 1000 FT, IN CONDUIT (BY OTHERS) OR DIRECT BURIAL.

SIGNAL J-BOX

CABLES:
120 VAC

SIGNAL CABLE

CHTS-300 TIMING CONSOLE

TO POWER SOURCE BY CUSTOMER

FOR INSTALLATION REQUIREMENTS REFER TO ELECTRICAL INSTALLATION SECTION IN MANUAL

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: CHRONDEK
TITLE: SYSTEM LAYOUT CH-142T-H & 1521-H
DES: EBRAVEK
DRAWN: EBRAVEK
DATE: 17APR98

REV. DATE DESCRIPTION APPR.
1 22APR98 CORRECTED SPACING ERROR EB

REVISION APPR. SCALE
1 1=32 1081-R10A-101822
FOR NEW SERVICE INSTALLATIONS:
THE SCOREBOARD MUST BE CONNECTED TO EARTH–GROUND.
THE POWER CABLE MUST CONTAIN A SEPARATE EARTH–GROUND CONDUCTOR.
NATIONAL ELECTRICAL CODE REQUIRES A LOCKABLE POWER DISCONNECT NEAR THE SCOREBOARD.
WHEN A SEPARATE GROUND CONDUCTOR IS USED, DO NOT CONNECT NEUTRAL TO GROUND AT THE DISCONNECT OR AT THE SCOREBOARD.

FOR LIGHTNING PROTECTION, DAKTRONICS RECOMMENDS A THREE–CONDUCTOR DISCONNECT THAT CAN BREAK BOTH HOT LINES AND THE NEUTRAL.

FOR INSTALLATIONS WITH EXISTING ELECTRICAL SERVICE THAT DOES NOT CONTAIN A SEPARATE GROUND CONDUCTOR:
THE SCOREBOARD MUST BE CONNECTED TO EARTH–GROUND.
NATIONAL ELECTRICAL CODE REQUIRES A LOCKABLE POWER DISCONNECT NEAR THE SCOREBOARD.
WHEN A SEPARATE GROUND CONDUCTOR IS NOT AVAILABLE, CONNECT THE NEUTRAL TO THE EARTH–GROUND AT THE DISCONNECT.
Section 3: Maintenance & Troubleshooting

This section pertains to the scoring displays only. (For service information about the message center or other scoreboard components, refer to the manual that accompanied that particular component.)

Turn off power to the display at the lockable safety disconnect before servicing.

3.1 Lamp Replacement

Reference Drawing: Digit Service ................. Drawing A-27674

The primary service required by the CH-1421-H and CH-1521-H display is to replace burned-out lamps. Refer to Drawing 27674 for an illustration of how to access the digit lamps for replacement. Replacement lamps for the digits are either 120V, 25W frosted medium base or 120V, 30W reflector type 30R20. Lamps may be obtained at your local store or directly from Daktronics. The 25W frosted bulb is Daktronics part no. DS-1029, the 30W reflector lamp is Daktronics part no. DS-1126.

The Lap/Time indicators use 120V, 30W clear flood lamps, type 30R20 (Daktronics part no. DS-1126).

The Status indicators use 120V, 85W flood lamps, type 85PAR38. The Daktronics part nos. are as follows:

- Amber → DS-1184
- Green → DS-1185
- Red → DS-1186

<> Do not use lamps larger than those originally installed in the display. Using higher power lamps will likely cause fuse failures in the display and could exceed the current levels that the display’s circuits can safely handle.

3.2 Lamp Driver

Reference Drawings: Lamp Driver, 16 Col., w/Fan .............. Drawing A-37070
Component Locations, CH-1421 / CH-1521 Drawing A-38854

In the display, the task of switching lamps on and off is performed by the lamp driver. Drawing A-38854 (Section 2) shows the location of the lamp driver in the display. Drawing A-37070 is an illustration of the lamp driver and the fuses located in it. The lamp driver has 22 connectors, providing power and signal inputs and outputs to digits. The functions of these connectors are as follows:

<table>
<thead>
<tr>
<th>Connector #</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 16</td>
<td>Outputs to digits</td>
</tr>
<tr>
<td>17</td>
<td>Signal Input</td>
</tr>
<tr>
<td>18</td>
<td>Power input for outputs 1-8 (120V)</td>
</tr>
<tr>
<td>19</td>
<td>Power input for driver logic and fan (120V)</td>
</tr>
<tr>
<td>20</td>
<td>Power input for outputs 9-16 (120V)</td>
</tr>
<tr>
<td>24</td>
<td>Dim option selector</td>
</tr>
</tbody>
</table>
Please note that, on Drawing 38854 (Section 2), the numbers on the digits refer to the lamp driver output connector wired to each digit.

3.3 Digit Segmentation

Reference Drawing: Segments, 4x7 Lamp Matrix Digit ...... Drawing A-37685

In a digit, certain lamps always go on and off together. These groupings of lamps are known as "segments." Each digit has eight segments, referred to by letters A through H. Drawing A-37685 illustrates these segments and shows which connector pin and wire color are wired to which segment.

3.4 Schematic

Reference Drawings: Driver Enclosure, Power & Signal .... Drawing A-37915
Schematic; Pwr/Sig, CH-1421-H & CH-1521-Drawing A-38788

The schematic diagram in Drawing A-38788 shows the power and signal inputs into the display and to the lamp driver. The component numbers correspond to those shown on Drawing A-37915 (Section 2).

3.5 Troubleshooting

This section lists some symptoms that may occur with the scoreboard. For these symptoms, possible causes and corrective actions are indicated. This list does not include every possible problem, but does represent some of the more common situations that may occur.

<table>
<thead>
<tr>
<th>Observed Problem</th>
<th>Possible Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>One lamp won’t light</td>
<td>• Burned-out lamp</td>
</tr>
<tr>
<td>Digit segment won’t light</td>
<td>• Broken wire</td>
</tr>
<tr>
<td></td>
<td>• Poor contact at driver connector</td>
</tr>
<tr>
<td></td>
<td>• Internal driver malfunction</td>
</tr>
<tr>
<td>Entire digit won’t light</td>
<td>• Broken wire (black)</td>
</tr>
<tr>
<td></td>
<td>• Poor contact at connector, pin 7</td>
</tr>
<tr>
<td></td>
<td>• Fuse blown in driver</td>
</tr>
<tr>
<td>Half the display won’t light</td>
<td>• Service breaker tripped</td>
</tr>
<tr>
<td></td>
<td>• Main fuse blown</td>
</tr>
<tr>
<td></td>
<td>• Poor contact at main power connection</td>
</tr>
<tr>
<td></td>
<td>• P20 disconnected</td>
</tr>
<tr>
<td>Entire display won’t light</td>
<td>• Power disruption</td>
</tr>
<tr>
<td></td>
<td>• Poor signal connection</td>
</tr>
<tr>
<td></td>
<td>• Driver logic fuse blown</td>
</tr>
<tr>
<td></td>
<td>• Control not connected to display</td>
</tr>
<tr>
<td></td>
<td>• P18 disconnected</td>
</tr>
<tr>
<td>Segment stays lit</td>
<td>• Broken wire behind digit</td>
</tr>
<tr>
<td></td>
<td>• Internal driver malfunction</td>
</tr>
<tr>
<td>Garbled display</td>
<td>• Control malfunction</td>
</tr>
<tr>
<td></td>
<td>• Internal driver malfunction</td>
</tr>
</tbody>
</table>
If a problem is observed in one digit, the cause may be isolated by swapping plugs on the
driver. That is, connect the plug from the digit into a different jack.

If the same digit shows the same problem, the cause may be in the digit or wiring. If the
problem moves to another digit, then the cause is probably an internal driver problem.

Use a volt meter at driver inputs to determine if power is being supplied to the driver. An
ohmmeter can be helpful in finding broken wires and bad connections. Internal electronic
problems must be corrected by Daktronics or an authorized service center.

### 3.6 Replacement Parts

<table>
<thead>
<tr>
<th>Part Name or Description</th>
<th>Type</th>
<th>Daktronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp Driver</td>
<td></td>
<td>0A-1033-0122</td>
</tr>
<tr>
<td>J-Box, Signal, 25-Pin</td>
<td></td>
<td>0A-1067-56</td>
</tr>
<tr>
<td>Fuse, Lamp Driver, 10A</td>
<td>AGC-10</td>
<td>F-1006</td>
</tr>
<tr>
<td>Fuse, Driver Logic, ½A</td>
<td>AGC - ½</td>
<td>F-1000</td>
</tr>
<tr>
<td>Digit Lamp bank, 21&quot; 4X7</td>
<td></td>
<td>0A-1027-75</td>
</tr>
<tr>
<td>Socket, Med. Base</td>
<td></td>
<td>X-1046</td>
</tr>
<tr>
<td>Lamp, 25W Frosted</td>
<td></td>
<td>DS-1029</td>
</tr>
<tr>
<td>Lamp, 30W Reflector</td>
<td>30R20</td>
<td>DS-1126</td>
</tr>
<tr>
<td>Lamp, 85W Amber Flood</td>
<td>85PAR38</td>
<td>DS-1184</td>
</tr>
<tr>
<td>Lamp, 85W Green Flood</td>
<td>85PAR38</td>
<td>DS-1185</td>
</tr>
<tr>
<td>Lamp, 85W Red Flood</td>
<td>85PAR38</td>
<td>DS-1186</td>
</tr>
</tbody>
</table>

For parts not listed, or for more information about installation or service, please call Daktronics at
the numbers listed in Section 3.7.

### 3.7 Unit Exchange/Replacement Procedure

Daktronics’ unique exchange program offers our clients the quickest, most economical way of
receiving product repairs. If a component fails, Daktronics will send the customer a replacement.
The customer, in turn, sends the failed component to Daktronics. This not only saves money but
decreases the time that the display is inoperable. Daktronics offers repair and return on a timely
basis; in urgent situations, every attempt is made to ship by the fastest transit method available.

1. **Packaging for Return**: Package and pad the item well, so that it will not be damaged in
   shipment. Install electronic components, such as printed circuit boards, in an enclosure
   or put them in an anti-static bag before boxing.

   Enclose your name and address and list all the symptoms your product is demonstrating.
   Please be as specific as possible.

2. **Digits and Driver Packaging Instructions**: Place digits and drivers in a static-free
   enclosure for return shipping. Daktronics has an antistatic convoluted foam packing
   available (part number PK-1135) for your use if needed. Use the shipping box
   (Daktronics part number PK-1006) in conjunction with the foam.

3. **Where to Send**: To return parts for service, contact your local representative prior to
   shipment to acquire a Return Material Authorization Number (RMA#). This will
   expedite the repair of your unit.
For return of defective items under the exchange program, please utilize the UPS Blue Return Tags found in the package containing the exchange unit sent from Daktronics. This speeds the transaction and also avoids any confusion when the part reaches Daktronics. © Return the defective item within 15 days of receiving a replacement part. Using the UPS Blue Return Tag immediately eliminates the possibility of late charges being assessed against your account.

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

Phone: Toll Free: 1-800-843-9879
or 1-605-697-4400

Customer Service Fax: 1-605-697-4444

E-Mail: helpdesk@daktronics.com
DIGIT SERVICE DETAIL
BEFORE JANUARY 1998

LAMPPACK

LAMP

SHADESCREEN

SCREW

USE 1/4" SOCKET OR SCREWDRIVER TO REMOVE.

DISPLAY

DIGIT SERVICE DETAIL
AFTER JANUARY 1998

LAMPPACK

LAMP

SHADESCREEN

SCREW

USE 5/16" SOCKET OR SCREWDRIVER TO REMOVE.

DISPLAY
NOTE:
ALL WIRES ARE 12 AWG UNLESS OTHERWISE SPECIFIED.
Appendix A: Message Centers & Ad Panels

A.1 Introduction

Reference Drawing: Display, CH-1421-H ......................... Drawing A-39115

This Appendix covers Daktronics message centers and ad panels used in conjunction with the CH-1421-H and CH-1521-H displays. Drawing A-39115 shows a complete CH-1421-H display, consisting of three sections: the scoring display, a message center, and an Adv display--referred to from here on as an ad panel--for advertising or race track logo. The display can be comprised of only the scoring display, the scoring display with either the message center or the ad panel, or all three sections together.

The following table shows the approximate weights of the message center and ad panel sections of the CH-1421-H display, as well as the maximum power requirement of each.

<table>
<thead>
<tr>
<th>Section</th>
<th>Uncrated Weight</th>
<th>Crated Weight</th>
<th>Maximum Power Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Center</td>
<td>650 lbs.</td>
<td>1,100 lbs.</td>
<td>14784 Watts</td>
</tr>
<tr>
<td>Ad Panel</td>
<td>300 lbs.</td>
<td>500 lbs.</td>
<td>1200 Watts</td>
</tr>
</tbody>
</table>

A.2 Mechanical Installation

Reference Drawings: System Layout, CH-1421-H ................. Drawing A-38865
System Layout, CH-1421-H w/ MC  ................. Drawing A-39121
Mounting Instructions, CH-1421-H Message ... Drawing A-39212

Refer to Drawing A-38865 for general system layout of a CH-1421-H display without message center. Drawing A-39121 shows the general system layout of a CH-1421-H with a message center. The general procedure for installing the CH-1421-H display is as follows.

1. Select beam and footing recommendations from the following table. If the display consists of a scoreboard and message center instead of an ad panel, use the column labeled “Scoreboard W/42” Ad Panel.”

2. Dig the footing holes and install beams and footings.

3. Route power and signal cables to the display and control locations.

4. All three sections are mounted with no space between them. Drawing A-39212 shows how to mount the message center to the beams. Start with the scoring display, then attach the other sections above or below it accordingly.

5. Route power and signal wires into the displays as described in Section A.3.
BEAM & FOOTING RECOMMENDATIONS

CH-1421-H DISPLAY

<table>
<thead>
<tr>
<th>DIST TO BOTTOM OF SCBD (FT)</th>
<th>DESIGN WIND VELOCITY (MPH)</th>
<th>BEAM REQUIRED (2 EACH)</th>
<th>FOOTINGS</th>
<th>BEAM REQUIRED (2 EACH)</th>
<th>FOOTINGS</th>
<th>BEAM REQUIRED (2 EACH)</th>
<th>FOOTINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
<td>W6X12</td>
<td>3.00</td>
<td>W6X15</td>
<td>3.25</td>
<td>W8X17</td>
<td>4.50</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>W6X15.5</td>
<td>3.25</td>
<td>W6X24</td>
<td>4.50</td>
<td>W12X22</td>
<td>5.25</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>W6X20</td>
<td>3.50</td>
<td>W6X28</td>
<td>5.00</td>
<td>W12X27</td>
<td>5.25</td>
</tr>
<tr>
<td>20</td>
<td>80</td>
<td>W8X24</td>
<td>4.50</td>
<td>W8X35</td>
<td>5.00</td>
<td>W12X36</td>
<td>5.50</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>W8X28</td>
<td>4.50</td>
<td>W8X35</td>
<td>5.25</td>
<td>W12X45</td>
<td>6.00</td>
</tr>
<tr>
<td>28</td>
<td></td>
<td>W8X35</td>
<td>5.00</td>
<td>W12X53</td>
<td>6.00</td>
<td>W12X50</td>
<td>6.00</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>W6X15.5</td>
<td>3.00</td>
<td>W8X17</td>
<td>4.00</td>
<td>W8X20</td>
<td>4.75</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>W6X16</td>
<td>3.50</td>
<td>W8X28</td>
<td>5.50</td>
<td>W12X27</td>
<td>6.00</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>W8X20</td>
<td>4.00</td>
<td>W8X35</td>
<td>5.50</td>
<td>W12X31</td>
<td>6.00</td>
</tr>
<tr>
<td>20</td>
<td>90</td>
<td>W8X24</td>
<td>4.25</td>
<td>W12X36</td>
<td>5.00</td>
<td>W12X36</td>
<td>6.25</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>W8X28</td>
<td>4.25</td>
<td>W12X40</td>
<td>6.00</td>
<td>W12X45</td>
<td>6.25</td>
</tr>
<tr>
<td>28</td>
<td></td>
<td>W8X35</td>
<td>5.00</td>
<td>W12X53</td>
<td>6.00</td>
<td>W12X50</td>
<td>6.25</td>
</tr>
</tbody>
</table>

These footing recommendations are based on an allowable soil bearing pressure of 3000 psf vertically and 300 psf/ft of depth horizontally. However, these recommendations are suggestions only and each installation should be treated individually. Confirm that the installation complies with local codes and is suitable for the particular soil and wind conditions.

♦ Daktronics assumes no responsibility for structures installed by others. ♦

A.3 Electrical Installation

A.3.1 Control Signal Cable Selection

For a scoring system alone, two conductors of 22 AWG minimum are required. Daktronics has the following cable available: Daktronics part number, W-1077 (Belden part number, 8451). This is a two conductor, 22 AWG cable that must be pulled through conduit.

For a scoring system with a message center, ten conductors, 5 pairs, of 22 AWG minimum are required. Daktronics has the following two cables available:
### A.3.2 Control Signal Connection

**Reference Drawings:** Driver Enclosure, Power & Signal . . . **Drawing A-37915**  
Component Locations, CH-1421-H . . . **Drawing A-38854**  
Color Code, 25-Pin J-box . . . . . . . . . . **Drawing A-47207**

1. At the control end of the cables, mount the signal J-box (both J-boxes if a message center is included) to a convenient location.

2. Connect the wires to the wires leading from the connector in the cover of the scoring display J-box as shown in **Drawing A-47207** (Section 2).

3. *If a message center is present*, connect eight conductors to pins 1-8 of the message center J-box as shown in **Drawing A-47207**.

4. Route signal cables to display location.

5. *If no message center is present*, open the hinged access door on the scoring display, as shown in **Drawing A-38854** (Section 2).

6. Remove the cover from the driver enclosure. Refer to **Drawing A-37915** (Section 2) for an illustration of the components inside the enclosure.

7. Connect the signal wires to TB31 as indicated in the table below.

#### Signal Connections

<table>
<thead>
<tr>
<th>J-box Terminal #</th>
<th>Wire Color</th>
<th>Output #</th>
<th>Display End</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>RED/WHT</td>
<td>1*</td>
<td>TB31 Terminal #</td>
</tr>
<tr>
<td>15</td>
<td>GRN/WHT</td>
<td></td>
<td>1 (+)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 (-)</td>
</tr>
</tbody>
</table>

Auxiliary display(s) require(s) a different output number(s). Consult the CHTs-300 console manual.

**Warning:** *If your system includes a message center*, a signal termination box is located inside the message center, near the center, behind the two center lamp banks.
1. Route all ten signal wires (two for the scoring display and eight for the message center) into the rear of the message center to the signal termination box.

2. Connect to the left-hand screw of each terminal as listed in the following table.

<table>
<thead>
<tr>
<th>Message Center J-Box Pin No.</th>
<th>Scoring Display J-Box Pin No.</th>
<th>Termination Box Terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>A101+</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td>A101-</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>A102+</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>A102-</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
<td>A103+</td>
</tr>
<tr>
<td>6</td>
<td>-</td>
<td>A103-</td>
</tr>
<tr>
<td>7</td>
<td>-</td>
<td>A104+</td>
</tr>
<tr>
<td>8</td>
<td>-</td>
<td>A104-</td>
</tr>
<tr>
<td>-</td>
<td>14</td>
<td>A105+</td>
</tr>
<tr>
<td>-</td>
<td>15</td>
<td>A105-</td>
</tr>
</tbody>
</table>

*If a message center is present,* the power and signal wires for both the scoring display and the ad panel are connected to the load center and signal termination box inside of the message center. These power and signal wires are already present inside of the scoring display if the system was sold with a message center. Carry out these connections as follows:

1. Remove the 2" hole plug from the bottom of the scoring display.

2. Pull the bundle of wires located just inside the hole out through the hole. These wires carry electrical power and signal from the load center and signal termination box in the message center to the scoring display and the ad panel.

3. Pull these wires through the 2" hole in the top of the message center and route to the load center and signal termination box.

4. Connect to the *right-hand* terminals of the terminal block in the signal termination box inside the message center.

<table>
<thead>
<tr>
<th>Signal Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Termination Box Term. No.</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>A105+</td>
</tr>
<tr>
<td>A105-</td>
</tr>
</tbody>
</table>
A.3.3 Power Wiring

Reference Drawing: Electrical Installation, CH-1421-H . . . Drawing A-39119
Electrical Installation, CH-1421-H . . . Drawing A-39120
Color Code, 25-Pin J-box . . . . . . . . . . Drawing A-47207
Power Wiring and Grounding . . . . . . Drawing A-101825

The display requires that four "hot" wires, two "neutrals," and a separate earth-ground conductor be run into a load center from the electrical source. The load center should be mounted on the left-hand support pole if no message center is present. If a message center is present, a load center is provided inside the message center. The power demands for each display section are listed below. Add the values for each section included in your display to find the power required by each line.

<table>
<thead>
<tr>
<th>Display Section</th>
<th>Line 1 (amps)</th>
<th>Line 2 (amps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scoring Display</td>
<td>40.0</td>
<td>33.5</td>
</tr>
<tr>
<td>Ad Panel</td>
<td>-</td>
<td>10.0</td>
</tr>
<tr>
<td>Message Center</td>
<td>67.2</td>
<td>67.2</td>
</tr>
</tbody>
</table>

Consult a qualified electrician to run the proper size of wire from the chosen electrical source to the display location. *If your system does not include a message center:*

1. Install a lockable safety disconnect and load center on the left-hand (when viewed from front) pole of the display as shown in Drawing A-39120. A three-conductor disconnect is recommended for proper protection from lightning strikes. Refer to Drawing A-101825 (Section 2).

2. Install a copper ground rod by each of the support poles for the display.
   
   **The display must be connected to earth ground at the display location.**
   
   This is in addition to the separate earth-ground conductor in the power cable.

3. Route four hot, two neutral and one "ground" wire, 12 AWG minimum, through conduit from the load center to the driver enclosure in the scoring display. Refer to Drawing A-47207 (Section 2) for component locations.

4. Connect the ground wire to terminal E41.

5. Connect the two neutral wires to TB41-3 and TB41-4 inside the driver enclosure of the scoring display.

6. Connect the hot wires to the load center and scoring display as listed below.

<table>
<thead>
<tr>
<th>Load Center Breaker Label</th>
<th>Scoring Display Term. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB401-1</td>
<td>TB41-1</td>
</tr>
<tr>
<td>TB401-2</td>
<td>TB41-2</td>
</tr>
<tr>
<td>TB401-5</td>
<td>TB41-5</td>
</tr>
<tr>
<td>TB401-6</td>
<td>TB41-6</td>
</tr>
</tbody>
</table>
7. At the ad display, remove the screws around the sides and bottom of the face panel retainer. The retainer is hinged at the top and may be opened to access TB41 for power connection. TB41 is located in the lower left corner when viewed from the front.

8. Loosen the screw terminals TB31-1, TB31-2, and TB31-3.

9. Remove the power cord consisting of a black, white, and green wire from these terminals, this is used only if the system includes a message center. Discard the power cord.

10. Run a black hot wire from breaker 7 in the load center plus a white neutral conductor through the power conduit into the scoring display, up through the top of the scoring display (remove the 2" hole plug) and bottom of the ad panel to TB41 in the ad panel itself.

11. Run a green ground wire from E41 in the scoring display up into the ad panel to TB41. Connect the hot wire to TB41-1. Connect the neutral wire to TB41-2. Connect the ground wire to TB41-3.

*If your system includes a message center:*

1. Install a lockable safety disconnect on the right-hand (when viewed from front) pole of the display as shown in **Drawing A-39119** A three-conductor disconnect is recommended for proper protection from lightning strikes. Refer to **Drawing A-101825** (Section 2).

2. Install a copper ground rod by each of the support poles for the display. The display must be connected to earth ground at the display location. This is in addition to the separate earth-ground conductor in the power cable.

3. Run power cable (two hot lines, neutral, and a separate earth-ground conductor) from the source through conduit to the safety disconnect and then from the safety disconnect through conduit into the message center and connect to the load center according to the message center installation manual.

4. Connect the display to a ground-rod at the display location from either the load center or the lockable safety disconnect.

5. Remove the 2" hole plug in the bottom of the scoring display and pull the power and signal wires through the hole and route them into the top of the message center through the 2" hole there.

6. Connect the power and signal wires from the scoring display and the ad panel to the message center as described previously in **Section A.3.2**.

7. Remove the 2" hole plug from the top of the scoring display and pull the ad panel power cord through the bottom of the ad panel.

8. Plug the ad panel power cord into the power jack just inside the 2" hole in the top of the scoring display.
A.4 Maintenance & Troubleshooting (Lamp Replacement)

The ad panel uses 72 inch, 120V, 85W cool white fluorescent lamps, Daktronics part number DS-1037. Remove the screws from sides and bottom of the retainer and swing the face up to access the lamps for replacement.

A.5 Replacement Parts

<table>
<thead>
<tr>
<th>Lamp, 30 W Reflector</th>
<th>30R20</th>
<th>DS-1126</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp, 85 W Fluorescent</td>
<td>72&quot;</td>
<td>DS-1037</td>
</tr>
</tbody>
</table>

For parts not listed, or for more information about installation or service, please call Daktronics.
- OVERALL DIMENSIONS FOR SCORING DISPLAY: 66"H X 210"W X 6"D.
- OVERALL DIMENSIONS FOR ADV DISPLAY: 42"H X 210"W X 6"D.
- OVERALL DIMENSIONS FOR MESSAGE CENTER: 30"H X 210"W X 11"D
- DIGITS ARE 21" HIGH, 4X7 LAMP MATRICES.
- DIGIT LAMPS ARE 25W FROSTED, MEDIUM BASE.
- LAP/TIME INDICATOR LAMPS ARE 30W REFLECTOR, TYPE 30R20 LAMPS
- STATUS INDICATOR LAMPS ARE 85W—MISER FLOOD LAMPS.
- MESSAGE CENTER IS 7X64 MATRIX OF 33W MEDIUM BASE LAMPS. CHARACTER HEIGHT IS 21".
- MAXIMUM POWER DEMAND WITH ADV DISPLAY AND MESSAGE CENTER: 120/240VAC 120A CIRCUIT.
- BOTH DIGITS AND MESSAGE CENTER MAY BE ORDERED WITH OPTIONAL 30W REFLECTOR, TYPE 30R20 LAMPS.
12 AWG POWER WIRES FOR TWO 120/240V, 20A CIRCUITS AND ONE 120V, 20A CIRCUIT, AND ON PAIR OF 8GA WIRE FOR SIGNAL TO SCORING DISPLAY. (ALL PROVITED IN ADX SCORING DISPLAY.)

PULL WIRES FROM SCORING DISPLAY DOWN INTO MESSAGE CENTER AND CONNECT TO LOAD CENTER AND SIGNAL BOX AS LABELED.

- OVERALL DIMENSIONS FOR SCORING DISPLAY:
  86" H X 60" W X 6" D.
- OVERALL DIMENSIONS FOR ADV DISPLAY:
  42" H X 15" W X 6" D.
- OVERALL DIMENSIONS FOR MESSAGE CENTER:
  31.5" H X 209.2" W X 11" D.
- DIGITS ARE 21" HIGH, 4X7 LAMP MATRICES.
- DIGIT LAMPS ARE 30W, TYPE 30R20.
- LAP/TIME INDICATOR LAMPS ARE 85W METER FLOOD LAMPS.
- STATUS INDICATOR LAMPS ARE 85W METER FLOOD LAMPS.

MESSAGE CENTER IS A MATRIAL OF 4W LAMPS, TYPE 30R20. CHAMBER HEIGHT IS 21".

MAXIMUM POWER DEMAND WITH ADV DISPLAY AND MESSAGE CENTER IS 3000 WATTS.

FOR THE PROPER LOOKABLE SAFETY DISCONNECT AND WIRE FROM SOURCE TO THE MESSAGE CENTER.
ADV DISPLAY
POWER WIRE FOR ONE 120V, 20A CIRCUIT.
ROUTE FROM POWER CONDUIT THROUGH INSIDE OF SCORING DISPLAY INTO ADV DISPLAY.

SCORING DISPLAY
POWER WIRE FOR TWO 120/240V, 20A CIRCUITS AND ONE 120V, 20A CIRCUITS, 12 AWG MINIMUM

REAR VIEW
OVERALL DIMENSIONS FOR SCORING DISPLAY:
66" X 210" W X 6" D.

OVERALL DIMENSIONS FOR ADV DISPLAY:
42" H X 210" W X 6" D.

OVERALL DIMENSIONS FOR MESSAGE CENTER:
31.5" H X 108" W X 6" D.

- DIGITAL DISPLAYS ARE CHANNEL 103 DECIMAL DIGITAL DISPLAY.
- LAMP BULBS ARE TYPE 30R40, 45A, 120V, 240V VAC.
- MESSAGE CENTER IS 7X54 MATRIX OF 30W LAMPS, TYPE 30R40, CHARACTER HEIGHT IS 21".
- MAXIMUM POWER DEMAND WITH ADV DISPLAY AND MESSAGE CENTER: 120/240VAC 110A CIRCUIT.
MESSAGE CENTER MOUNTING INSTRUCTIONS

- LOCATE THE CENTER OF BEAMS ON THE REAR OF THE MESSAGE CENTER.
- PLACE MOUNTING ANGLE AGAINST DISPLAY TO USE AS A DRILLING GUIDE. DRILL 9/16" HOLES THROUGH WHichever TWO HOLES WILL BE CLOSEST TO THE BEAM. THE HOLES SHOULD BE PLACED 3/4" IN FROM THE TOP OR BOTTOM OF THE DISPLAY.
- POSITION DISPLAY.
- ATTACH MOUNTING ANGLES AS INDICATED.
  NOTE: THREADED RODS DO NOT GO THROUGH THE BEAMS, BUT RUN ALONG BOTH SIDES OF THE BEAM.
- SLIDE DISPLAY UP OR DOWN AS WANTED. TIGHTEN ALL BOLTS.