



# **Auto Racing Display Model CH-1024H**

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## **Installation, Maintenance & Troubleshooting Manual**

ED-5891

**ED-5891  
Project #1081  
Rev. 8 – 16 November, 1999**

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THROUGH TECHNOLOGY**

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# Table of Contents

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|                   |                                                   |            |
|-------------------|---------------------------------------------------|------------|
| <b>Section 1:</b> | <b>Introduction.....</b>                          | <b>1-1</b> |
| 1.1               | How To Use This Manual .....                      | 1-1        |
| 1.2               | Display Overview .....                            | 1-1        |
| <br>              |                                                   |            |
| <b>Section 2:</b> | <b>Installation.....</b>                          | <b>2-1</b> |
| 2.1               | General System.....                               | 2-1        |
| 2.2               | Beam And Footing Selection.....                   | 2-2        |
| 2.3               | Display Mounting.....                             | 2-2        |
| 2.4               | Electrical Installation.....                      | 2-3        |
|                   | 2.4.1 Control Signal Cable.....                   | 2-3        |
|                   | 2.4.2 Power Wiring .....                          | 2-3        |
| <br>              |                                                   |            |
| <b>Section 3:</b> | <b>Maintenance &amp; Troubleshooting.....</b>     | <b>3-1</b> |
| 3.1               | Lamp Replacement.....                             | 3-1        |
| 3.2               | Lamp Drivers.....                                 | 3-1        |
| 3.3               | Digit Segmentation.....                           | 3-2        |
| 3.4               | Schematic .....                                   | 3-2        |
| 3.5               | Troubleshooting.....                              | 3-2        |
| 3.6               | Replacement Parts .....                           | 3-3        |
| 3.7               | Daktronics Exchange/Repair & Return Programs..... | 3-3        |



# Section 1: Introduction

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## 1.1 How to Use This Manual

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This manual is designed to explain installation and maintenance of the CHTS-1024H display system. Details for display maintenance are also given. Setup of other control equipment or operation of the CHTS-300 timing console 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.

### 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 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 scoreboard without the express written consent of Daktronics, Inc.

The box below illustrates Daktronics drawing numbering system. The drawing number A7087-P08A-69945 is how Daktronics identifies individual drawings. This number is located in the bottom right corner of the drawing. The manual refers to drawings by the last set of digits and the letter preceding them. In the example, the drawing would be referred to as **Drawing A-69945**. All reference drawings are inserted at the *end of the first section which references them*.

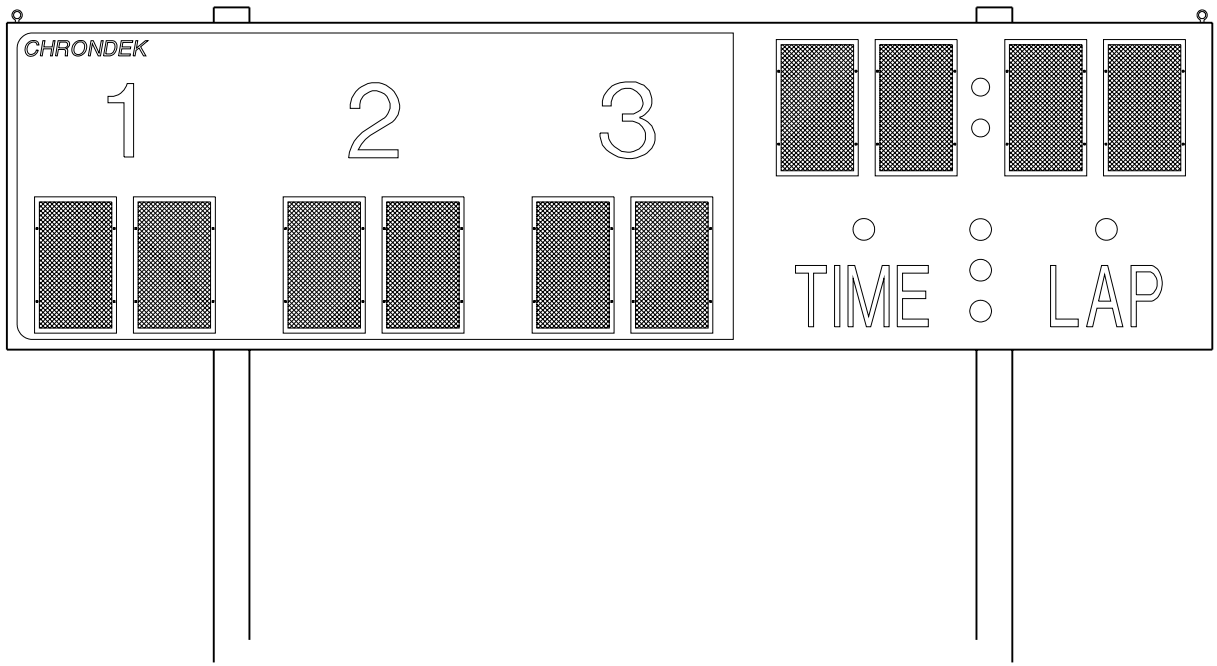
|                                      |                 |                |
|--------------------------------------|-----------------|----------------|
| DAKTRONICS, INC. BROOKINGS, SD 57006 |                 |                |
| PROJ:                                |                 |              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

## 1.2 Display Overview

---

**Reference Drawing:** Display, CH-1024H ..... **Drawing A-46433**

**Drawing A-46433** shows a Daktronics CH-1024H display. When used with the Daktronics CHTS-300 timing console, the Daktronics CH-1024H display will show the lap number or lap time and the first three car positions on the display.



OVERALL DIMENSIONS: 64" H x 236" W x 6" D

WEIGHT: 450 LBS.

POWER REQUIREMENTS: 120/240 VAC, 40 AMPS PER LINE

MAXIMUM POWER DEMAND: 5415 WATTS WITH 25W FROSTED LAMPS.  
6425 WATTS WITH 30W FROSTED, 30R20 REFLECTOR LAMPS.

DIGITS ARE 24" HIGH, 4 x 7 LAMP MATRICES, WITH 25W FROSTED LAMPS OR  
30W FROSTED, TYPE 30R20 REFLECTOR LAMPS.

LAP & TIME INDICATOR LAMPS ARE 55W FLOOD LAMPS.

RACE STATUS INDICATOR LAMPS ARE 85W MISER FLOOD LAMPS.

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: CHRONDEK DISPLAYS

TITLE: DISPLAY, CH-1024H

DES. BY: CF

DRAWN BY: CF

DATE: 6 MAR 91

| REV. | DATE     | DESCRIPTION                        | BY | APPR. |
|------|----------|------------------------------------|----|-------|
| 1    | 1 APR 91 | ADDED SPEC'S FOR 30W, 30R20 LAMPS. | CF |       |

REVISION

APPR. BY: AVB

SCALE: 1=35

1081-R08A-46433

# Section 2: Installation

## 2.1 General System

|                                                                   |                        |
|-------------------------------------------------------------------|------------------------|
| <b>Reference Drawings:</b> Driver Enclosure, Power & Signal ..... | <b>Drawing A-37915</b> |
| Mounting Instructions .....                                       | <b>Drawing A-38856</b> |
| System Layout .....                                               | <b>Drawing A-46448</b> |
| Footing and Beams .....                                           | <b>Drawing A-46451</b> |
| Electrical Installation .....                                     | <b>Drawing A-46458</b> |
| Component Locations .....                                         | <b>Drawing A-46464</b> |
| Color Code, 25-Pin J-Box .....                                    | <b>Drawing A-47207</b> |

Refer to **Drawing A-46448** for the general system layout. The general procedure for installing the CH-1024H display is as follows:

- Select beam and footing recommendations from the table below.
- Dig the footing holes to install beams and footings.
- Route power and signal cables to the display and control locations.
- Mount the displays to the beams as described in **Drawings A-38856** and **A-46451**, and in **Sections 2.2** and **2.3**.
- Route power and signal wires into the displays as described in **Drawings A-37915**, **A-46458**, **A-46464**, and **A-47207**, and in **Section 2.4**.

### BEAM AND FOOTING RECOMMENDATIONS

| DIST TO BTM SCBD | DSG WIND VELOC (MPH) | SCOREBOARDS           |           |            | SCOREBOARDS W/ 42" ADV PANEL |           |            | SCBD W/ 42" ADV PANEL & MESSAGE BRD |           |            |
|------------------|----------------------|-----------------------|-----------|------------|------------------------------|-----------|------------|-------------------------------------|-----------|------------|
|                  |                      | BEAM REQ-UIRED (2 EA) | FOOTINGS  |            | BEAM REQ-UIRED (2 EA)        | FOOTINGS  |            | BEAM REQ-UIRED (2 EA)               | FOOTINGS  |            |
|                  |                      |                       | DIAM (FT) | DEPTH (FT) |                              | DIAM (FT) | DEPTH (FT) |                                     | DIAM (FT) | DEPTH (FT) |
| 8                | 80                   | W6X12                 | 3.00      | 5.00       | W8x15                        | 3.25      | 6.00       | W8x17                               | 4.50      | 6.00       |
| 12               |                      | W6x15.5               | 3.25      | 5.50       | W8x24                        | 4.50      | 7.00       | W12x22                              | 5.25      | 7.00       |
| 16               |                      | W6x20                 | 3.50      | 6.50       | W8x28                        | 5.00      | 7.50       | W12x27                              | 5.25      | 8.00       |
| 20               |                      | W8x24                 | 4.50      | 6.50       | W8x35                        | 5.00      | 8.00       | W12x36                              | 5.50      | 8.50       |
| 24               |                      | W8x28                 | 4.50      | 7.00       | W8x35                        | 5.25      | 8.50       | W12x45                              | 6.00      | 9.00       |
| 28               |                      | W8x35                 | 5.00      | 7.50       | W12x53                       | 6.00      | 9.00       | W12x50                              | 6.00      | 10.00      |
| 8                | 90                   | W6x15.5               | 3.00      | 5.50       | W8x17                        | 4.00      | 6.50       | W8x20                               | 4.75      | 6.50       |
| 12               |                      | W6x16                 | 3.50      | 6.00       | W8x28                        | 5.50      | 7.00       | W12x27                              | 6.00      | 7.50       |
| 16               |                      | W8x20                 | 4.00      | 7.00       | W8x35                        | 5.50      | 8.00       | W12x31                              | 6.00      | 8.50       |
| 20               |                      | W8x24                 | 4.25      | 7.50       | W12x36                       | 5.00      | 9.00       | W12x36                              | 6.25      | 9.00       |
| 24               |                      | W8x28                 | 4.25      | 8.00       | W12x40                       | 6.00      | 9.00       | W12x45                              | 6.25      | 10.00      |
| 28               |                      | W8x35                 | 5.50      | 8.00       | W12x53                       | 6.00      | 10.00      | W12x50                              | 6.25      | 11.00      |
| 8                | 100                  | W6x15.5               | 3.00      | 6.00       | W8x24                        | 5.00      | 6.50       | W12x19                              | 5.00      | 7.00       |
| 12               |                      | W8x17                 | 3.50      | 6.50       | W8x35                        | 5.25      | 8.00       | W12x27                              | 6.50      | 8.00       |
| 16               |                      | W8x24                 | 4.25      | 7.50       | W12x31                       | 5.25      | 9.00       | W12x36                              | 6.50      | 9.00       |
| 20               |                      | W8x28                 | 4.50      | 8.00       | W12x36                       | 6.00      | 9.25       | W12x45                              | 6.00      | 10.00      |
| 24               |                      | W8x35                 | 4.75      | 8.50       | W12x40                       | 6.00      | 10.00      | W12x50                              | 6.00      | 11.00      |
| 28               |                      | W12x53                | 5.25      | 9.00       | W12x53                       | 6.00      | 11.00      | W12x58                              | 6.00      | 12.00      |

These footing recommendations are based on an allowable soil bearing pressure of 300 psf vertically and 300 psf/ft of depth horizontally. However, these recommendations are suggestions only and each installation should be treated individually. Be sure that the installation complies with local codes and is suitable for particular soil and wind conditions. **Daktronics assumes no responsibility for structures installed by others.**

**A note about beam nomenclature:** For a typical beam, W6x16 for example, "W" stands for "Wide-Flange Beam". The first number (6) is the approximate front to rear dimension of the beam in inches. The second number (16) is the weight per foot in pounds. This numbering is a standard in the steel industry. Widths are from 4.00 to 10.00 inches in the chart above.

## 2.2 Beam And Footing Selection

---

**Reference Drawing:** Footing and Beams.....**Drawing A-46451**

The above contains recommendations for beams and footings. The distance in the first column is from the ground to the bottom of the CH-1024H display, regardless if one or two extra sections, such as an ad panel and/or message center, are added to the CH-1024H scoring display. 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 A-46451** 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**, with a lateral bearing capacity of 300 psf/ft of depth horizontally. However, these recommendations are suggestions only and each installation must comply with local codes and be suitable for the particular soil and wind conditions. Daktronics recommends that W-section grade 36 steel be used for beam, and that 28-day (strength 3000 psi) concrete be used for footings. **Daktronics assumes no responsibility for structures installed by others.**

## 2.3 Display Mounting

---

**Reference Drawing:** Mounting Instructions.....**Drawing A-38856**

**Drawing A-38856** shows the typical mounting for your display.

**Note:** The bolts that secure the display sections do not go through the beams, but run along the sides of the beam, clamping the display to the beams.

A mounting kit with mounting angles and 2" hardware are provided to mount your display.

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



## 2.4 Electrical Installation

### 2.4.1 Control Signal Cable

**Reference Drawings:** Driver Enclosure, Power & Signal ... **Drawing A-37915**  
Component Locations ..... **Drawing A-46464**  
Color Code, 25-Pin J-Box..... **Drawing A-47207**

For the display, two conductors of 24 AWG are needed. For distances up to 600 ft. or 22 AWG, up to 1000 ft. are required. Daktronics has 24 AWG direct burial cable, Daktronics part no. W-1105 with 6 conductors, and 22 AWG cable that must be pulled through the conduit before burial, Daktronics part no. W-1077 with 2 conductors.

At the control location, mount the signal J-box to a convenient location. Route the cables and connect them to the wires leading from the connector in the cover, according to the table below and **Drawing A-47207**.

At the display, open the hinged access door covering the lamp driver enclosure as shown in **Drawing A-46464**. Remove the cover from the lamp driver enclosure. See **Drawing A-37915** for an illustration of the components inside the enclosure. Connect the signal wires to TB31 as indicated in the table below.

#### Signal Connections

| Control End        |            |            | Display End       |
|--------------------|------------|------------|-------------------|
| J-Box Terminal no. | Wire Color | Output No. | TB31 Terminal no. |
| 14                 | Red/Wht    | 1*         | 1 (+)             |
| 15                 | Grn/Wht    |            | 2 (-)             |

\*Auxiliary display(s) require(s) a different output number(s). Consult your CHTS-300 console manual.

### 2.4.2 Power Wiring

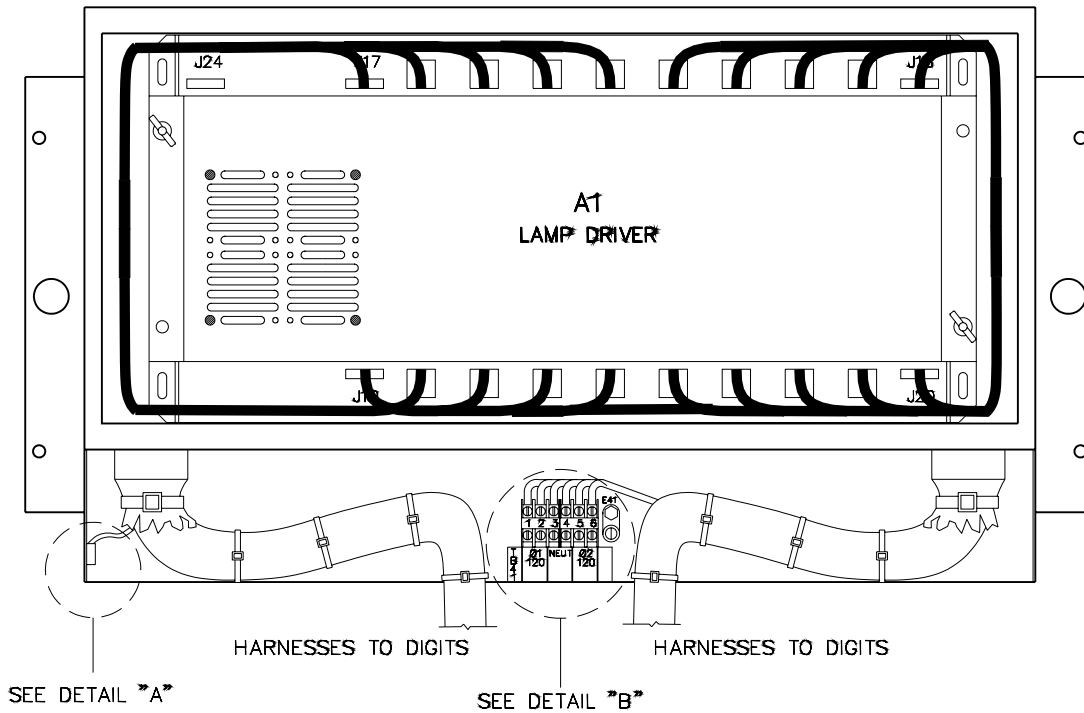
**Reference Drawings:** Driver Enclosure, Power & Signal ... **Drawing A-37915**  
Electrical Installation ..... **Drawing A-46458**

A 120/240 VAC circuit (two hot lines, one neutral, plus a ground) must be run into a load center. See **Drawing A-46458**. When equipped with 30W lamps, this display is capable of drawing a maximum of 40 amps on line 1 and 14 amps on line 2 when lighted.

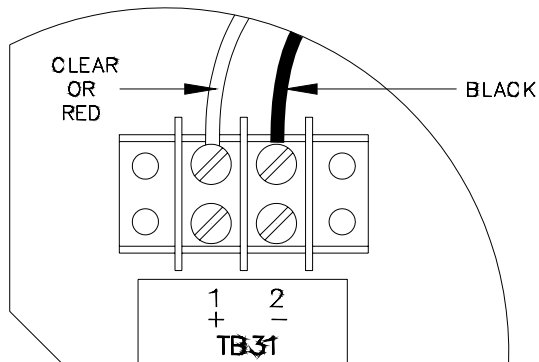
Route four "hot", two "neutral", and one "ground" wire, 12 AWG from the load center (**Drawing A-46458**) to the driver enclosure (**Drawing A-37915**) in the display. Connect the ground wire to terminal E41. Connect the two neutral wires to TB41-3 and TB41-4. Connect the hot wires to the load center and the display as in the example below.

| Load Center<br>Breaker No. | Display Terminal<br>No. |
|----------------------------|-------------------------|
| 1                          | TB41-1                  |
| 2                          | TB41-2                  |
| 3                          | TB41-5                  |
| 4                          | TB41-6                  |

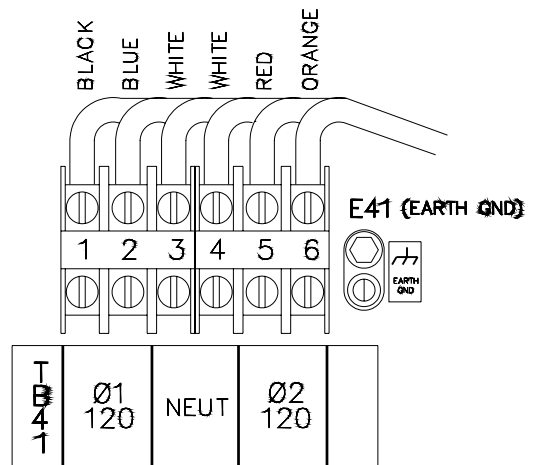
**Note:** Breaker numbers are examples only. Breaker numbers may be assigned as required. The objective is to have TB41-1 and TB41-2 on line 1. TB41-5 and TB41-6 should be on line 2.



FRONT VIEW (COVER REMOVED)

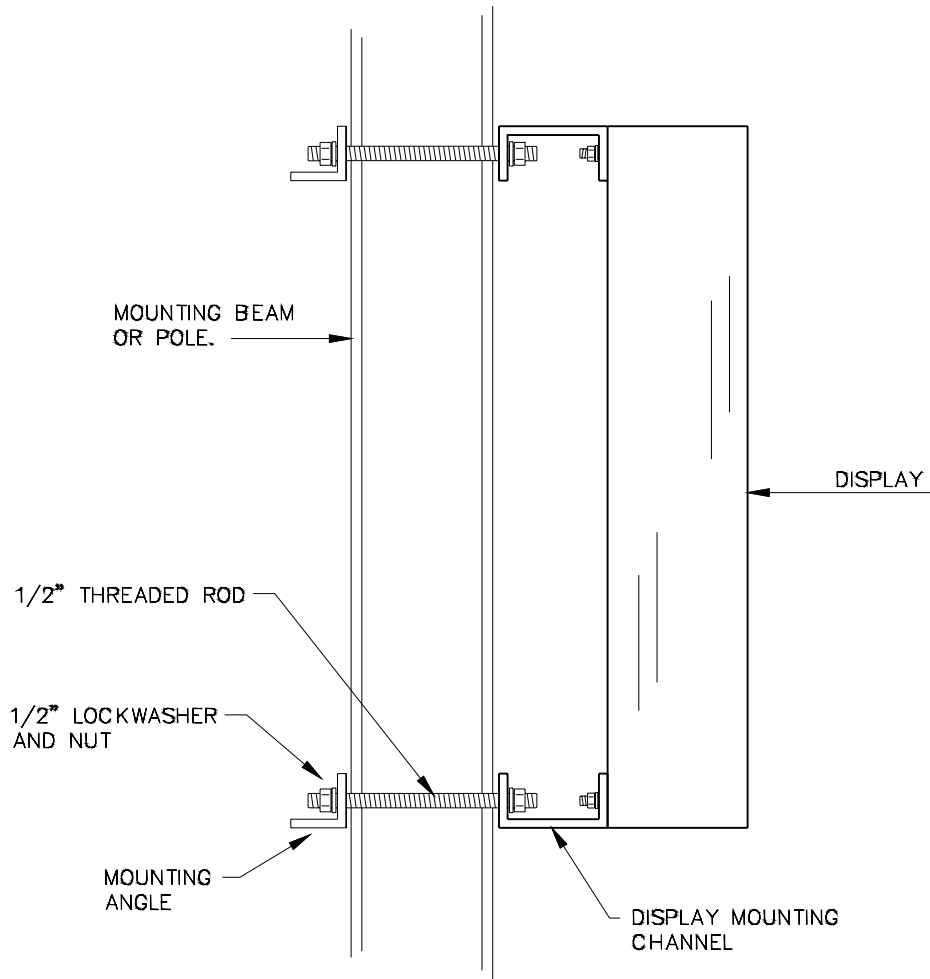


D  
A  
DETAIL "A" (SIGNAL)



D  
B  
DETAIL "B" (POWER)

|                                         |          |                                                 |    |       |                                                          |
|-----------------------------------------|----------|-------------------------------------------------|----|-------|----------------------------------------------------------|
| DAKTRONICS, INC. BROOKINGS, SD 57006    |          |                                                 |    |       |                                                          |
| PROJ: CHRONDEK DISPLAYS                 |          |                                                 |    |       |                                                          |
| TITLE: DRIVER ENCLOSURE, POWER & SIGNAL |          |                                                 |    |       |                                                          |
| 1                                       | 8 MAR 91 | ADDED E41 AND CHANGED FROM "B" TO "A" SIZE DWG. | CF | CF    | DES. BY: T. WOODARD DRAWN BY: T. WOODARD DATE: 10 MAY 89 |
| REV.                                    | DATE     | DESCRIPTION                                     | BY | APPR. | REVISION                                                 |
|                                         |          |                                                 |    |       | APPR. BY: SCALE: 1=5                                     |
|                                         |          |                                                 |    |       | 1081-R08A-37915                                          |

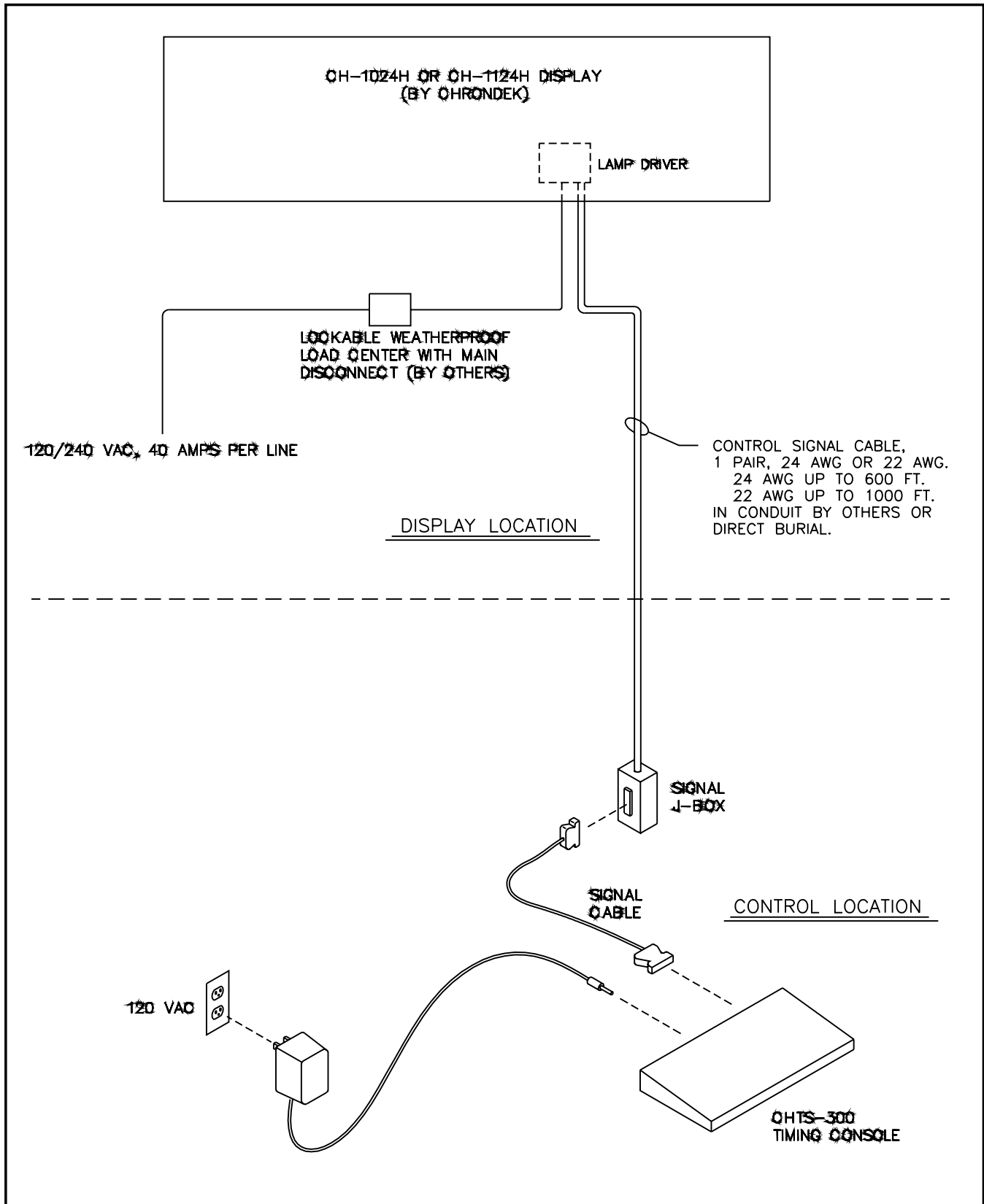


SIDE VIEW

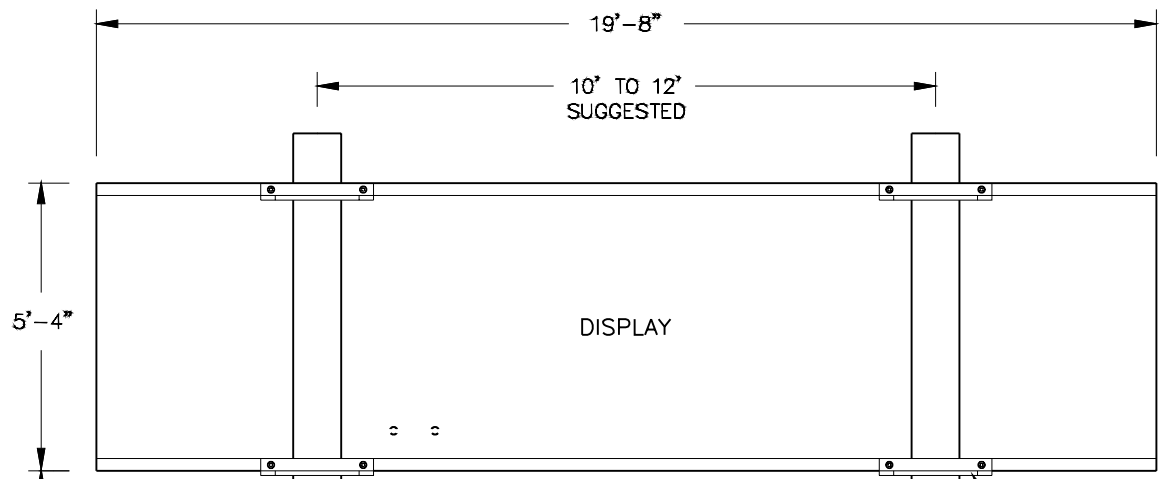
MOUNTING INSTRUCTIONS:

- 1.) LOCATE WHERE THE CENTER OF THE BEAMS WILL BE ON THE BACK OF THE DISPLAY.
- 2.) DRILL  $9/16$ " HOLES IN THE MTG CHANNEL ON THE BACK OF THE DISPLAY AT A DISTANCE OF  $\pm 3.50$ " 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.

|      |           |                                                                                         |        |       |                                                     |                               |
|------|-----------|-----------------------------------------------------------------------------------------|--------|-------|-----------------------------------------------------|-------------------------------|
| 8    | 16APR98   | CHANGED MODEL NO. CH-1421-GP TO CH-1421-H AND ADDED MODEL NO. CH-1521-H TO TITLE BLOCK. | TWEBER |       | DAKTRONICS, INC. BROOKINGS, SD 57006                |                               |
| 7    | 29 APR 93 | REMOVED LIST OF MODELS THIS MOUNTING TYPICAL FOR.                                       | C FICK |       | PROJ: CHRONDEK DISPLAYS                             |                               |
| 6    | 9 JUN 92  | CHANGED MODEL NO. "CH-21-HSM" TO "CH-1421-GP" IN DWG TITLE.                             | C FICK |       | TITLE: MOUNTING INSTRUCTIONS, CH-1421-H & CH-1521-H |                               |
| REV. | DATE      | DESCRIPTION                                                                             | BY     | APPR. | DES. BY: JLH                                        | DRAWN BY: JLH DATE: 24 JUL 89 |
|      |           |                                                                                         |        |       | REVISION                                            | APPR. BY: AVB                 |
|      |           |                                                                                         |        |       |                                                     | SCALE: 1=1                    |
|      |           |                                                                                         |        |       | 1081-R08A-38856                                     |                               |



|      |           |                                                                                                 |        |       |                                           |                 |
|------|-----------|-------------------------------------------------------------------------------------------------|--------|-------|-------------------------------------------|-----------------|
| 5    | 22 MAY 95 | CHANGED TO INCLUDE CH-1124H DISPLAYS                                                            | JJO    |       | DAKTRONICS, INC. BROOKINGS, SD 57006      |                 |
| 4    | 26 MAY 93 | REMOVED LOCKABLE SAFETY DISCONNECT, ADDED MAIN DISCONNECT TO LOAD CENTER.                       | C FICK |       | PROJ: CHRONDEK DISPLAYS                   |                 |
| 3    | 30 JAN 92 | ADDED LOCKABLE SAFETY DISCONNECT, CHANGED LOAD CENTER (BY CHRONDEK) TO LOAD CENTER (BY OTHERS). | CFICK  |       | TITLE: SYSTEM LAYOUT, CH-1024H & CH-1124H |                 |
| REV. | DATE      | DESCRIPTION                                                                                     | BY     | APPR. | DES. BY: CF                               | DRAWN BY: CF    |
|      |           |                                                                                                 |        |       | REVISION                                  | DATE: 6 MAR 91  |
|      |           |                                                                                                 |        |       | APPR. BY: AVB                             |                 |
|      |           |                                                                                                 |        |       | SCALE: 1=1                                | 1081-R04A-46448 |



REAR VIEW

MOUNTING ANGLE AND  
1/2" HARDWARE @ 4  
(BY CHRONDEK)

HEIGHT  
AS REQUIRED

STEEL BEAM  
COLUMN @ 2  
(SEE FOOTING  
& BEAM CHART)

GRADE

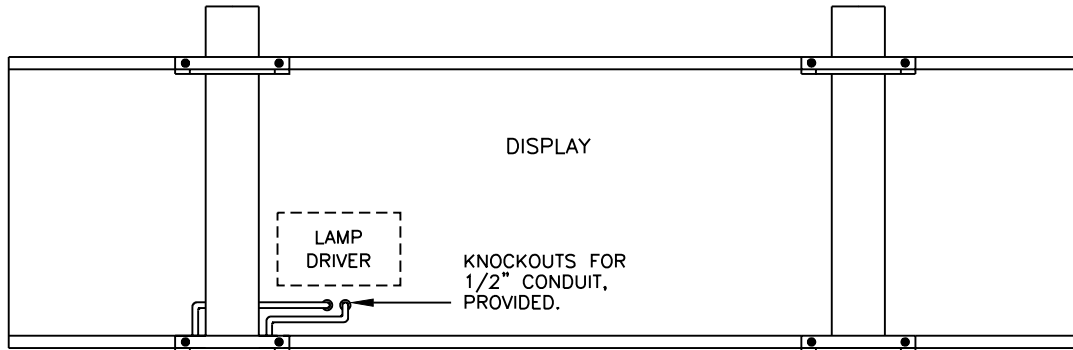
FOOTING DEPTH  
SEE CHART

REINFORCED  
CONCRETE  
FOOTING

FOOTING  
DIAMETER  
SEE CHART

|                                      |               |                 |  |
|--------------------------------------|---------------|-----------------|--|
| DAKTRONICS, INC. BROOKINGS, SD 57006 |               |                 |  |
| PROJ: CHRONDEK DISPLAYS              |               |                 |  |
| TITLE: FOOTING AND BEAMS, CH-1024H   |               |                 |  |
| DES. BY: CF                          |               | DRAWN BY: CF    |  |
|                                      |               | DATE: 7 MAR 91  |  |
| REVISION                             | APPR. BY: AVB | 1081-R08A-46451 |  |
|                                      | SCALE: 1=40   |                 |  |

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



REAR VIEW

POWER WIRES FOR (4)  
120/240V, 20A BREAKERS  
PLUS GROUND, 12 AWG MINIMUM.  
(BY OTHERS)

LOCKABLE WEATHERPROOF  
LOAD CENTER WITH MAIN  
DISCONNECT (BY OTHERS)  
BRING POWER WIRES  
INTO LOAD CENTER,  
120/240V, 40A, 3-WIRES  
PLUS GROUND.

SIGNAL CABLE, 1 PAIR,  
24 AWG OR 22 AWG,  
IN CONDUIT BY OTHERS  
OR DIRECT BURIAL.  
24 AWG UP TO 600 FT.  
22 AWG UP TO 1000 FT.

GROUND WIRE

GRADE

TO CONTROL  
LOCATION

TO POWER  
SOURCE

GROUND  
ROD

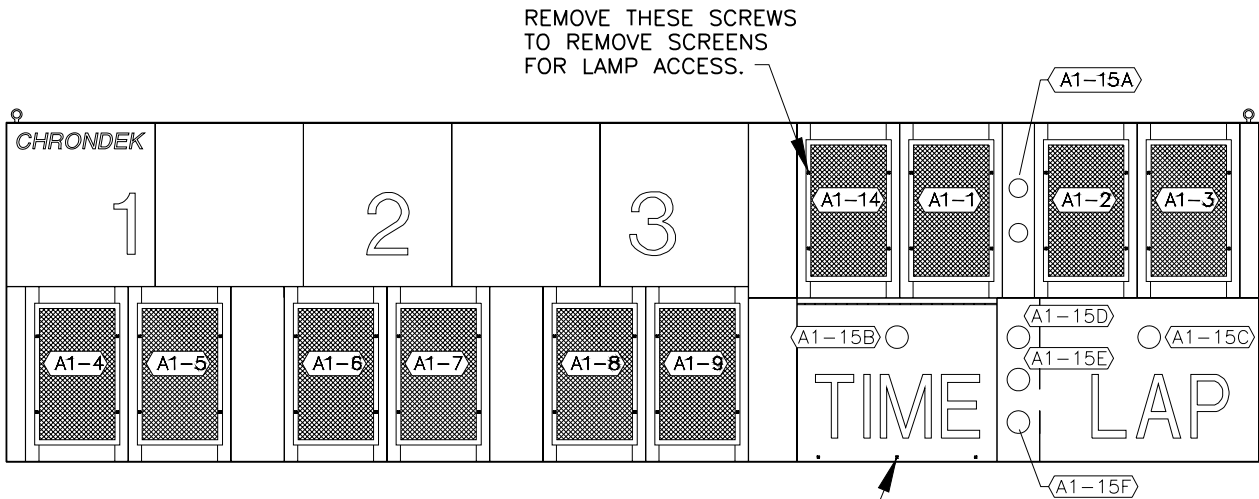
NOTE

12 AWG MINIMUM WIRE IS NEEDED FROM THE  
LOAD CENTER TO THE DISPLAY. CHECK WITH  
A QUALIFIED ELECTRICIAN FOR CORRECT WIRE  
SIZE FROM POWER SOURCE TO LOAD CENTER.

SCOREBOARD MUST BE CONNECTED TO A  
GROUND ROD AT SCOREBOARD LOCATION.

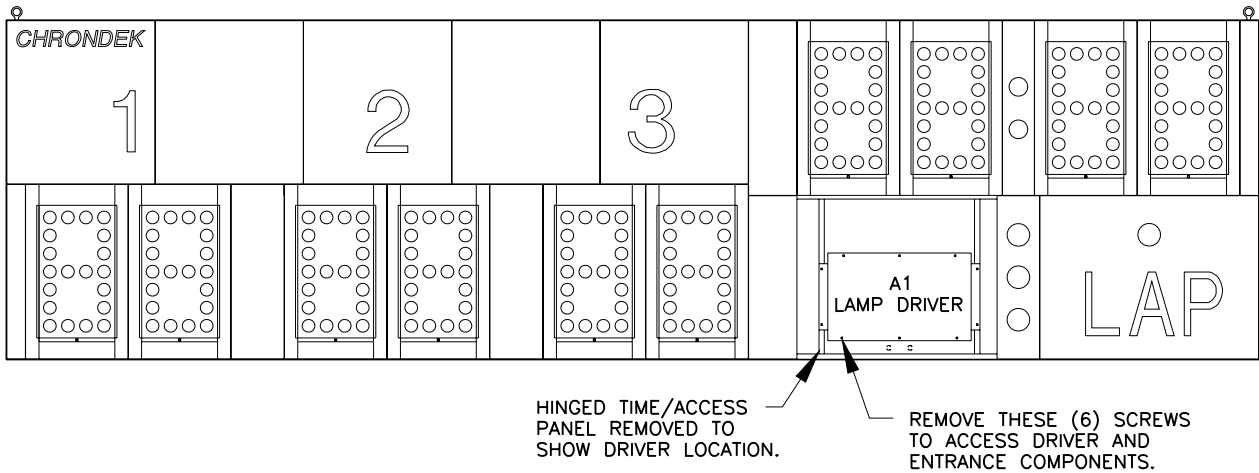
| REV. | DATE      | DESCRIPTION                                                                  | BY     | APPR. |
|------|-----------|------------------------------------------------------------------------------|--------|-------|
| 5    | 22 MAY 95 | CHANGED TO INCLUDE BOTH CH-1024H AND CH-1124H DISPLAYS.                      | JJO    |       |
| 4    | 26 MAY 93 | REMOVED LOCKABLE SAFETY DISCONNECT AND ADDED MAIN DISCONNECT TO LOAD CENTER. | C FICK |       |
| 3    | 30 JAN 91 | ADDED LOCKABLE SAFETY DISCONNECT.                                            | C FICK |       |

|                                                     |                 |
|-----------------------------------------------------|-----------------|
| DAKTRONICS, INC. BROOKINGS, SD 57006                |                 |
| PROJ: CHRONDEK DISPLAYS                             |                 |
| TITLE: ELECTRICAL INSTALLATION, CH-1024H & CH-1124H |                 |
| DES. BY: CF                                         | DRAWN BY: CF    |
| DATE: 7 MAR 91                                      |                 |
| REVISION                                            | APPR. BY: AVB   |
| SCALE: 1=40                                         | 1081-R10A-46458 |



LAMP DRIVER NO. → **A1-9** = LAMP DRIVER CONNECTOR NO. WIRED TO THAT DIGIT.  
 DRIVER OUTPUT CONNECTOR NO. →

LAMP DRIVER NO. → **A1-15C** = LAMP DRIVER CONNECTOR AND PIN NO.  
 DRIVER OUTPUT CONNECTOR NO. AND SEGEMENT NO. →



DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: CHRONDEK DISPLAYS

TITLE: COMPONENT LOCATIONS, CH-1024H

DES. BY: CF

DRAWN BY: CF

DATE: 8 MAR 91

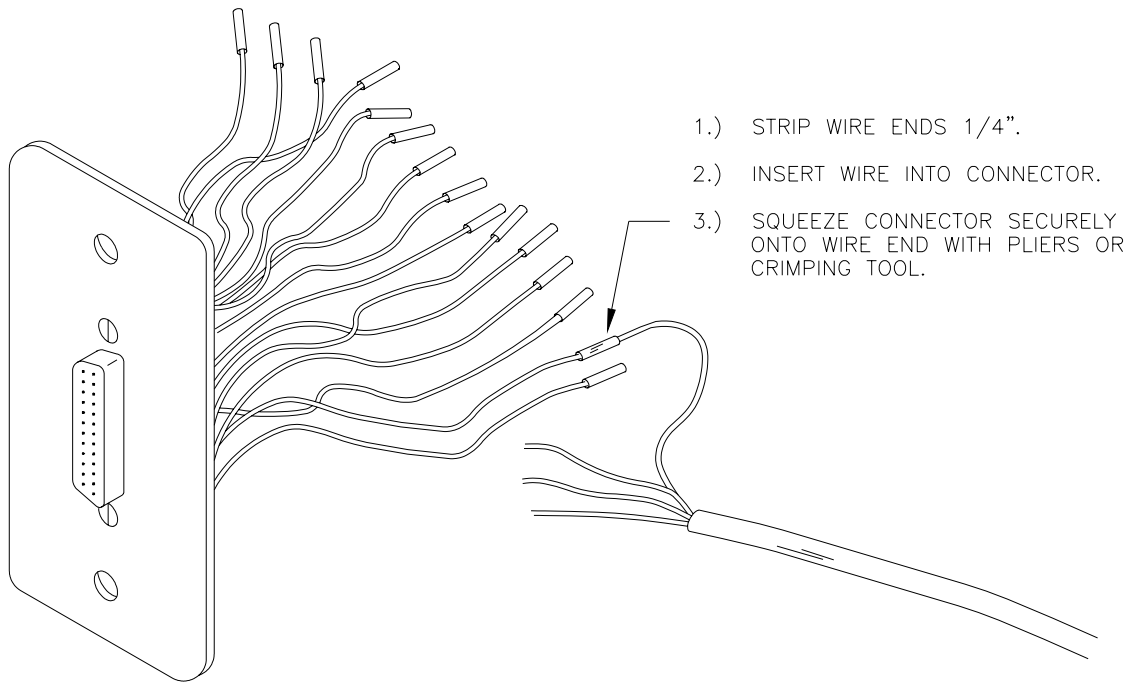
|      |          |                                           |    |       |
|------|----------|-------------------------------------------|----|-------|
| 1    | 7 MAY 91 | CHANGED DRIVER DIGIT DESIGNATION NUMBERS. | CF |       |
| REV. | DATE     | DESCRIPTION                               | BY | APPR. |

REVISION APPR. BY: AVB

SCALE: 1=35

1081-R08A-46464





| PIN NO. | WIRE COLOR   | FUNCTION  |                                                      |
|---------|--------------|-----------|------------------------------------------------------|
| 1       | BLACK        | PHOTO 1-N | PHOTOCELL<br>POWER INPUTS                            |
| 2       | WHITE        | PWR 1-P   |                                                      |
| 3       | RED          | GND 1-N   |                                                      |
| 4       | GREEN        | PHOTO 2-N |                                                      |
| 5       | ORANGE       | PWR 2-P   |                                                      |
| 6       | BLUE         | GND 2-N   |                                                      |
| 7       | WHITE/BLACK  | PHOTO 3-N |                                                      |
| 8       | RED/BLACK    | PWR 3-P   |                                                      |
| 9       | GREEN/BLACK  | GND 3-N   |                                                      |
| 10      | ORANGE/BLACK | PHOTO 4-N |                                                      |
| 11      | BLUE/BLACK   | PWR 4-P   |                                                      |
| 12      | BLACK/WHITE  | GND 4-N   |                                                      |
| 14      | RED/WHITE    | 1 SIG-P   | SCOREBOARD<br>SIGNAL OUTPUTS                         |
| 15      | GREEN/WHITE  | 1 SIG-N   |                                                      |
| 16      | BLUE/WHITE   | 2 SIG-P   |                                                      |
| 17      | BLACK/RED    | 2 SIG-N   |                                                      |
| 18      | WHITE/RED    | 3 SIG-P   |                                                      |
| 19      | ORANGE/RED   | 3 SIG-N   |                                                      |
| 22      | BLUE/RED     | 4 SIG-P   |                                                      |
| 23      | RED/GREEN    | 4 SIG-N   |                                                      |
| 13      | ORANGE/GREEN | NOT USED  | THESE PINS<br>TYPICALLY<br>NOT USED<br>BY CHTS TIMER |
| 20      | BLK/WHT/RED  | NOT USED  |                                                      |
| 21      | WHT/BLK/RED  | NOT USED  |                                                      |
| 24      | RED/BLK/WHT  | 12 VAC    |                                                      |
| 25      | GRN/BLK/WHT  | 12 VAC    |                                                      |

|                                      |               |                                             |                 |                |
|--------------------------------------|---------------|---------------------------------------------|-----------------|----------------|
| DAKTRONICS, INC. BROOKINGS, SD 57006 |               |                                             |                 |                |
| 2                                    | 10MAR97       | ADDED WIRES TO PINS 13,20,21,24,25          | EB              |                |
| 1                                    | 4 JUN 92      | CHANGED "SIGNAL INPUTS" TO "SIGNAL OUTPUTS" | C FICK          |                |
| REV.                                 | DATE          | DESCRIPTION                                 | BY              | APPR.          |
| PROJ: CHRONDEK                       |               |                                             |                 |                |
| TITLE: COLOR CODE, 25-PIN J-BOX      |               |                                             |                 |                |
| DES. BY: CF                          |               | DRAWN BY: CF                                |                 | DATE: 1 MAY 91 |
| REVISION                             | APPR. BY: AVB |                                             | 1067-R10A-47207 |                |
|                                      | SCALE: 1=2    |                                             |                 |                |



# Section 3: Maintenance & Troubleshooting

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## IMPORTANT NOTES:

1. Disconnect power before any repair or maintenance work is done on the CH-1024H display!
2. Any access to internal display electronics must be made by qualified service personnel.
3. Disconnect power when the CH-1024H display is not in use.

### 3.1 Lamp Replacement

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

The primary service required by the CH-1024H display is to replace burned-out lamps. See **Drawing A-27674** for how to access the digit lamps for replacement. Standard replacement lamps for the digits are 120V, 25W frosted medium base and may be obtained at your local store or directly from Daktronics, part number DS-1029. Some displays may be equipped with 120V, 30W reflector type 30R20 lamps, Daktronics part number DS-1126.

The Lap/Time indicators use 120V, 55W clear flood lamps, type 55PAR38, Daktronics part number DS-1101.

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

- Amber - Daktronics Part No. DS-1184
- Green - Daktronics Part No. DS-1185
- Red - Daktronics Part No. DS-1186

Do not use lamps larger than those originally installed in the display. Using higher powered 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 Drivers

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**Reference Drawing:** Multiplex Controllers..... **Drawing A-37070**  
Component Location..... **Drawing A-46464**

In the scoreboard, the task of switching lamps on and off is performed by the lamp drivers. **Drawing A-46464** in **Section 2** shows the location of the lamp driver in the display. **Drawing A-37070** shows the lamp driver and the fuses located in it.

The lamp driver has 22 connectors providing power and signal inputs to the circuit and outputs to the digits.

| Connector No. | Function                            |
|---------------|-------------------------------------|
| 1-16          | Output to digits                    |
| 17            | Signal input                        |
| 18            | Power input for outputs 1-8         |
| 19            | Power input (120V) for driver logic |
| 20            | Power input for outputs 9-16 (120V) |
| 24            | Dim option selector                 |

**Drawing A-46464** in **Section 2** shows the numbers on the digits that refer to the lamp driver output connector wired to each digit

### 3.3 Digit Segmentation

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**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 can have up to eight segments, referred to by letters A through H.

**Drawing A-37685** shows which connector pin number is wired to each digit segment and the wiring color code used throughout the display.

### 3.4 Schematic

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**Reference Drawing:** Schematic, Power & Signal..... **Drawing A-38788**  
 Driver Enclosure, Power & Signal..... **Drawing A-37915**

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

### 3.5 Troubleshooting

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This section lists some symptoms that may be encountered with the scoreboard. For these symptoms, possible cause 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.

| Symptom/Condition                      | Possible Cause or Corrective Action                                                                                                                                                                                                                                                                                               |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| One lamp won't light                   | <ul style="list-style-type: none"> <li>• Burned-out lamp</li> </ul>                                                                                                                                                                                                                                                               |
| Scoreboard will not light.             | <ul style="list-style-type: none"> <li>• Console not connected or poor connection.</li> <li>• No power to the control console.</li> <li>• No power to the scoreboard.</li> <li>• Bad relay or poor relay connection in signal circuit.</li> <li>• Driver logic fuse (F17) blown.</li> <li>• P17, P19 or P20 unplugged.</li> </ul> |
| Half of the scoreboard will not light. | <ul style="list-style-type: none"> <li>• Circuit breaker tripped at service panel.</li> <li>• Driver malfunction.</li> <li>• Poor signal contact at main power connection.</li> <li>• Driver logic fuse blown</li> </ul>                                                                                                          |
| Garbled display.                       | <ul style="list-style-type: none"> <li>• Control console malfunction.</li> </ul>                                                                                                                                                                                                                                                  |

|                         |                                                                                                                                                                                                                         |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | <ul style="list-style-type: none"> <li>• Internal lamp driver malfunction.</li> </ul>                                                                                                                                   |
| Digit will not light.   | <ul style="list-style-type: none"> <li>• Fuse blown in driver.</li> <li>• Black wire to the digit is broken.</li> <li>• Poor contact at driver connector.</li> </ul>                                                    |
| Segment will not light. | <ul style="list-style-type: none"> <li>• Lamps are burned out.</li> <li>• Driver malfunction (bad triac).</li> <li>• Broken wire between lamp driver and digit.</li> <li>• Poor contact at driver connector.</li> </ul> |
| Segment stays lit.      | <ul style="list-style-type: none"> <li>• Driver malfunction (bad triac).</li> <li>• Broken wire behind digit</li> </ul>                                                                                                 |

If a problem is observed in one digit, the cause may be isolated by swapping plugs on the driver (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 the 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 by an authorized service center.

### 3.6 Replacement Parts

| Part Name or Description            | Type    | Part Number  |
|-------------------------------------|---------|--------------|
| Lamp Driver                         |         | 0A-1033-0122 |
| J-Box, CHTS-300 Timer               |         | 0A-1067-0056 |
| Fuse, Lamp Driver, 10A              | AGC-10  | F-1006       |
| Fuse, Driver Logic, 1/2A            | AGC-1/2 | F-1000       |
| Digit Lampbank, 24"4x7<br>S-1064-02 |         |              |
| Socket, Med. Base<br>X-1046         |         |              |
| Lamp, 25W Frosted<br>DS-1029        |         |              |
| Lamp, 30W Reflector                 | 30R20   | DS-1126      |
| Lamp, 55W Clear Flood               | 55PAR38 | DS-1101      |
| Lamp, 85W Amber Flood               | 85PAR38 | DS-1184      |
| Lamp, 85W Green Flood               | 85PAR38 | DS-1185      |
| Lamp, 85W Red Flood                 | 85PAR38 | DS-1186      |

### 3.7 Daktronics Exchange/Repair & Return Programs

To serve customers' repair and maintenance needs, Daktronics offers both an exchange and a repair and return program. The exchange program reduces down time by providing timely replacement of key components. This service is provided to qualified customers who follow the program guidelines explained below. It is our pleasure to provide this service to ensure you get the most from your Daktronics products. Please call our Help Desk (1-800 / 843-9879) if you have any questions regarding the exchange program or any other Daktronics service.

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

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

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

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

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

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

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

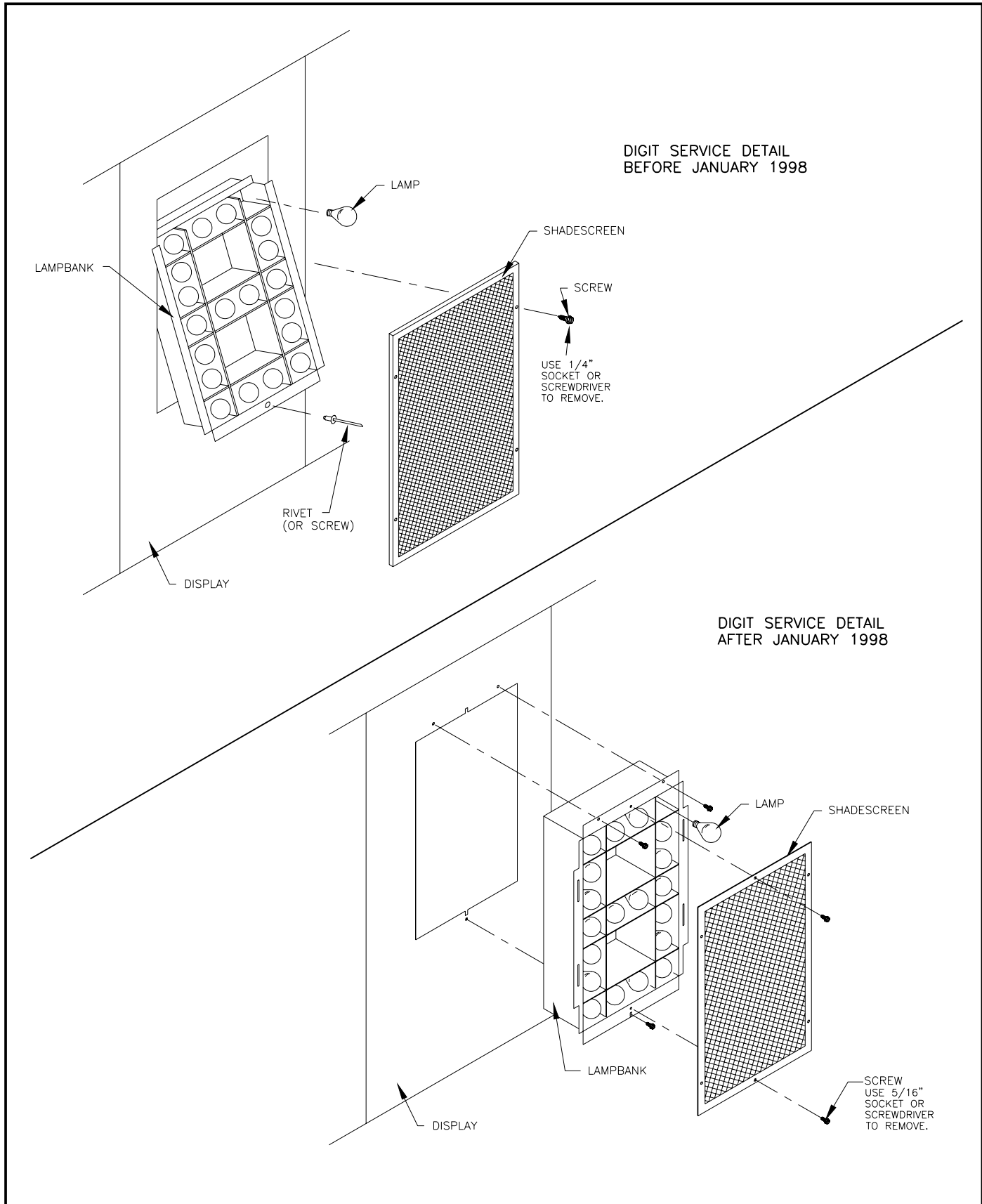
**Packaging for Return:** Package and pad the item well so that it will not be damaged in shipment. Electronic components such as printed circuit boards should either be installed in an enclosure or should be put in an anti-static bag before boxing. Please enclose your name, address, phone number and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

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

**Phone:** Daktronics Help Desk: 1-800/843-9879  
or 1-605/697-4400

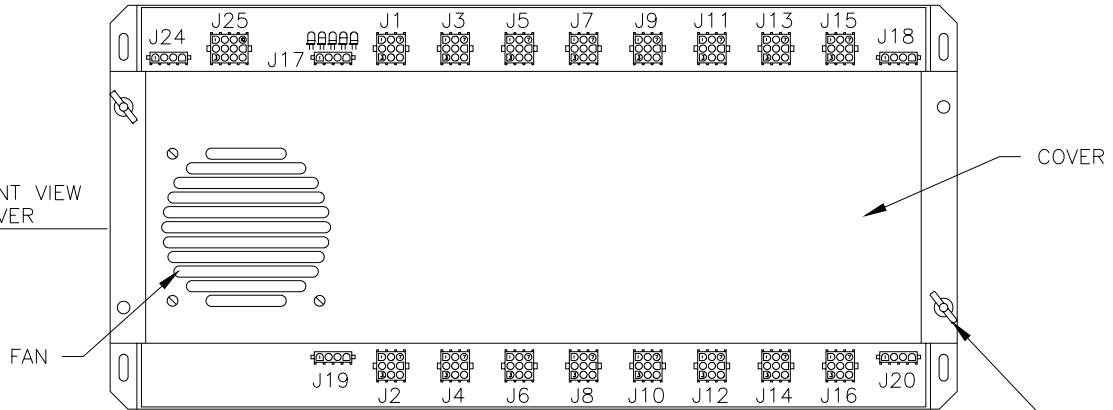
**Customer Service Fax:** 1-605-697-4444

**e-mail:** [helpdesk@daktronics.com](mailto:helpdesk@daktronics.com)



|                                      |           |                                                                           |     |                  |
|--------------------------------------|-----------|---------------------------------------------------------------------------|-----|------------------|
| DAKTRONICS, INC. BROOKINGS, SD 57006 |           |                                                                           |     |                  |
| 2                                    | 10 NOV 97 | ADDED DIGIT SERVICE AFTER JANUARY 1998<br>CHANGED SCALE FROM 1=10 TO 1=15 | BDP |                  |
| 1                                    | 5 MAR 91  | CHANGED FROM "B" TO "A" SIZE DWG.                                         | CF  |                  |
| REV.                                 | DATE      | DESCRIPTION                                                               | BY  | APPR.            |
| PROJ: OUTDOOR SCOREBOARDS            |           |                                                                           |     |                  |
| TITLE: DIGIT SERVICE                 |           |                                                                           |     |                  |
| DES. BY:                             |           | DRAWN BY: TERRY P.                                                        |     | DATE: 31 JULY 86 |
| REVISION                             |           | APPR. BY:                                                                 |     | 1064-E10A-27674  |
|                                      |           | SCALE: 1=15                                                               |     |                  |

DRIVER FRONT VIEW WITH COVER



REMOVE TWO WING NUTS TO REMOVE COVER AND GAIN ACCESS TO FUSES.

J24

| PIN | FUNCTION | PIN | FUNCTION   |
|-----|----------|-----|------------|
| 1   | NETWORK+ | 7   | ADDR 3 -   |
| 2   | NETWORK- | 8   | NTW GND -  |
| 3   | NTWREF-P | 9   | NTW GND -  |
| 4   | ADDR 0 - | 10  | FAN SW HOT |
| 5   | ADDR 1 - | 11  | FAN HOT    |
| 6   | ADDR 2 - | 12  | NEUT       |

J17

| PIN | FUNCTION |
|-----|----------|
| 1   | SIGNAL + |
| 2   | SIGNAL - |
| 3   | N.C.     |
| 4   | N.C.     |

J1 - J16

| PIN | FUNCTION |
|-----|----------|
| 1   | SEG C    |
| 2   | SEG B    |
| 3   | SEG A    |
| 4   | SEG F    |
| 5   | SEG E    |
| 6   | SEG D    |
| 7   | COMMON   |
| 8   | SEG H    |
| 9   | SEG G    |

J18

| PIN | FUNCTION            |
|-----|---------------------|
| 1   | LAMP NEUT           |
| 2   | LAMP NEUT           |
| 3   | LAMP HOT 1, 3, 5, 7 |
| 4   | LAMP HOT 2, 4, 6, 8 |

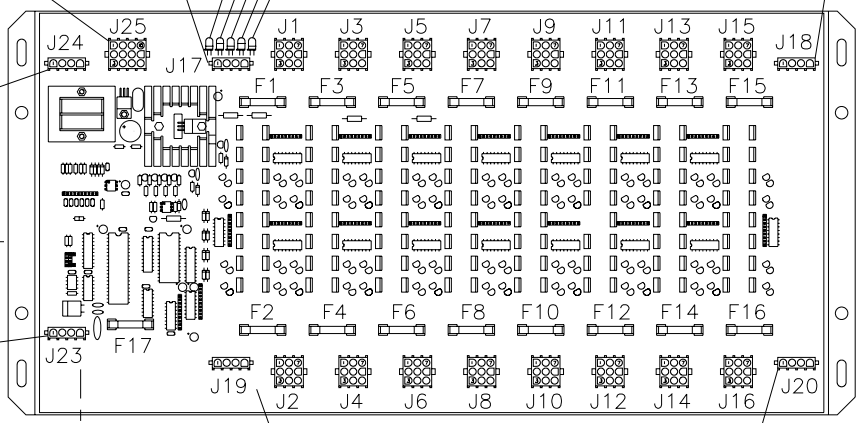
J24

| PIN | FUNCTION  |
|-----|-----------|
| 1   | -5V       |
| 2   | DIM SEL 1 |
| 3   | -5V       |
| 4   | DIM SEL 2 |

DRIVER FRONT VIEW WITH COVER REMOVED

J23

| PIN | FUNCTION   |
|-----|------------|
| 1   | FAN SW HOT |
| 2   | N.C.       |
| 3   | FAN HOT    |
| 4   | NEUT       |



J19

| PIN | FUNCTION |
|-----|----------|
| 1   | NEUTRAL  |
| 2   | NEUTRAL  |
| 3   | 120V HOT |
| 4   | 120V HOT |

J20

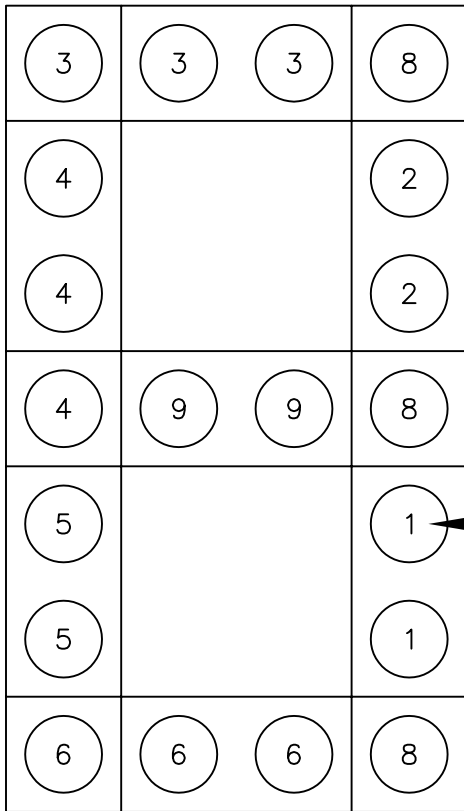
| PIN | FUNCTION             |
|-----|----------------------|
| 1   | LAMP NEUT            |
| 2   | LAMP NEUT            |
| 3   | LAMP HOT 9,11,13,15  |
| 4   | LAMP HOT 10,12,14,16 |

PLUG FROM FAN IN COVER CONNECTS TO J23

F1 THRU F16 ARE TYPE AGC-10, DAKTRONICS PART NUMBER F-1006. F17 IS TYPE AGC-1/2, DAKTRONICS PART NUMBER F-1000

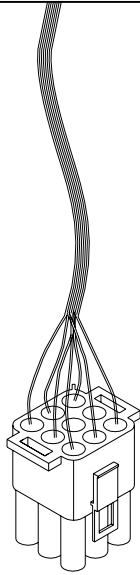
|                                      |            |                                     |     |                 |
|--------------------------------------|------------|-------------------------------------|-----|-----------------|
| DAKTRONICS, INC. BROOKINGS, SD 57006 |            |                                     |     |                 |
| 2                                    | 29 APR 97  | ADDED TABLES OF PINS AND FUNCTIONS. | AVB | AVB             |
| 1                                    | 5 MAR 91   | CHANGED FROM "B" TO "A" SIZE DWG.   | CF  |                 |
| REV.                                 | DATE       | DESCRIPTION                         | BY  | APPR.           |
| PROJ: MULTIPLEX CONTROLLERS          |            | TITLE: LAMP DRIVER, 16 COL., W/FAN  |     |                 |
| DES. BY: JLH                         |            | DRAWN BY: JLH                       |     | DATE: 20 FEB 89 |
| REVISION                             | APPR. BY:  | 1033-R04A-37070                     |     |                 |
|                                      | SCALE: 1=5 |                                     |     |                 |





4 x 7 LAMP MATRIX DIGIT

CONNECTOR PIN NUMBER  
WIRED TO THAT SEGMENT

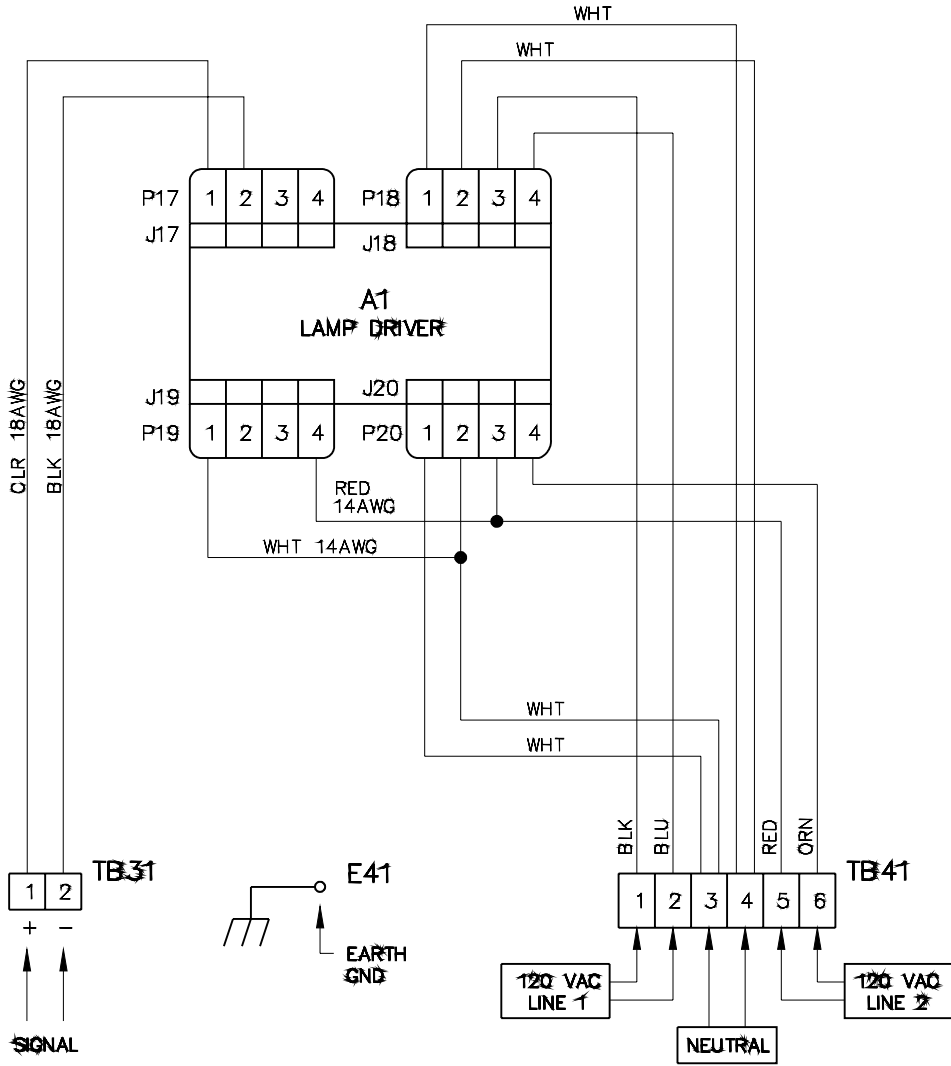


LAMP DRIVER  
CONNECTOR

| COLOR CODE |            |                |
|------------|------------|----------------|
| PIN NO.    | WIRE COLOR | DRIVER SEGMENT |
| 1          | ORANGE     | C              |
| 2          | RED        | B              |
| 3          | BROWN      | A              |
| 4          | BLUE       | F              |
| 5          | GRN OR PNK | E              |
| 6          | YEL OR TAN | D              |
| 7          | BLACK      | COMMON         |
| 8          | GRAY       | H              |
| 9          | VIOLET     | G              |

|                                          |               |                 |
|------------------------------------------|---------------|-----------------|
| DAKTRONICS, INC. BROOKINGS, SD 57006     |               |                 |
| PROJ: OUTDOOR SCOREBOARDS                |               |                 |
| TITLE: SEGMENTS, 4 x 7 LAMP MATRIX DIGIT |               |                 |
| DES. BY:                                 | DRAWN BY: AVB | DATE: 18 APR 89 |
| REVISION                                 | APPR. BY:     | 1064-R04A-37685 |
|                                          | SCALE: 1=1    |                 |

|      |          |                                   |    |       |
|------|----------|-----------------------------------|----|-------|
| 1    | 5 MAR 91 | CHANGED FROM "B" TO "A" SIZE DWG. | CF |       |
| REV. | DATE     | DESCRIPTION                       | BY | APPR. |



**NOTE:**  
 ALL WIRES ARE 12 AWG UNLESS OTHERWISE SPECIFIED.

|      |           |                                                                      |        |       |
|------|-----------|----------------------------------------------------------------------|--------|-------|
| 10   | 30APR98   | CHANGED MODEL NUMBER FROM CH-21GP TO CH-1421-H & CH-1521-H           | RDA    | RDA   |
| 9    | 11 MAR 93 | REMOVED LIST OF DISPLAY MODELS.                                      | C FICK |       |
| 8    | 01 JUL 92 | ADDED MODEL CH-1024V TO NOTE.                                        | TWEBER |       |
| 7    | 18 JUN 92 | ADDED CH-1421V, CH-1421GP, CH-1424WB AND CH-36-DS TO LIST OF MODELS. | C FICK |       |
| REV. | DATE      | DESCRIPTION                                                          | BY     | APPR. |

|                                                 |               |                 |  |
|-------------------------------------------------|---------------|-----------------|--|
| DAKTRONICS, INC. BROOKINGS, SD 57006            |               |                 |  |
| PROJ: CHRONDEK DISPLAYS                         |               |                 |  |
| TITLE: SCHEMATIC; PWR/SIG CH-1421-H & CH-1521-H |               |                 |  |
| DES. BY:                                        | DRAWN BY: JLH | DATE: 19JUL89   |  |
| REVISION                                        | APPR. BY:     | 1081-R03A-38788 |  |
|                                                 | SCALE: 1=1    |                 |  |