INSTALLATION MANUAL
FOR
CHRONDEK, INC.
FINISH LIGHT SYSTEMS

CHRONDEK, INC.
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(800) 854-6556

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1. INTRODUCTION

This manual covers the installation of both finish light systems offered by Chrondek, Inc. The first is designed to be used with Chrondek scoring displays and timing systems. It is attached to the display and is run off of the addressable lamp driver in the display.

The other system is the independent finish light. This system is for installations having scoring displays not built by Chrondek, but using Chrondek timing equipment. It is self-contained and contains its own addressable lamp driver which receives its control signal from the Chrondek timing system.

The following table shows the approximate weights of the two types of finish light displays:

<table>
<thead>
<tr>
<th>Display Type</th>
<th>Unpackaged Weight (lbs)</th>
<th>Packaged Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finish Light</td>
<td>40</td>
<td>55</td>
</tr>
<tr>
<td>Independent Finish Light</td>
<td>60</td>
<td>80</td>
</tr>
</tbody>
</table>

Both displays are capable of drawing a maximum of 340 watts if all lamps are lit at the same time.

2. CHRONDEK DISPLAY FINISH LIGHT

The finish light for use with a Chrondek scoring display may be used on either the CH-24-DS or the CH-36-DS. This section will describe the installation procedure for this model.

2.1 CH-24-DS

The drawing on page 5 describes the installation of a finish light on a CH-24-DS display.

Drill a 1 1/4" diameter hole in the bottom of the 5-digit MPH display, just inside whichever pole you wish to mount the finish light on.

Attach the mounting hardware to the pole as shown in detail A of the drawing. Note that the bolts do not go through the pole. They run on each side of the pole.

The finish light can be positioned as indicated, rotated 180° to reverse the lamps for the other side of the track, or inverted and mounted on one end.
Place the finish light in place on the brackets and slide the display up or down to the desired height. Tighten bolts to clamp display in place.

Loosen screws in bottom of digit number 11 and open upwards to access the connector plate.

Route cable from finish light through hole in bottom of MPH display and plug into jack #10 on the connector plate, see detail B. Coil excess cable and lay in bottom of MPH display.

Close and secure digits.

2.2 CH-36-DS

The drawing on page 6 describes the installation of a finish light on a CH-36-DS display.

Drill a 1 1/4" diameter hole in the bottom of the rear enclosure on the 5-digit MPH display.

Attach the mounting hardware to whichever pole you wish to mount the finish light on as shown in detail A of the drawing. Note that the bolts do not go through the pole. They run on each side of the pole.

The finish light can be positioned as indicated, rotated 180° to reverse the lamps for the other side of the track, or inverted and mounted on one end.

Place the finish light in place on the brackets and slide the display up or down to the desired height. Tighten bolts to clamp display in place.

Remove the screws holding the cover on the rear enclosure and remove the cover.

Route cable from finish light along signal or power conduit through hole in bottom of rear enclosure on MPH display and plug into jack #110 on the connector plate, see page 7. Use cableties to secure cable to conduit. Coil any excess cable and lay in bottom of rear enclosure.

Replace cover of rear enclosure and secure.
3. INDEPENDENT FINISH LIGHT

See page 8 for a diagram of a typical system layout using the independent finish lights.

22 AWG signal cable will need to be run from the Display Interface location to the finish light display location. This will need to be direct burial or in conduit. The display may be mounted on an existing pole as shown on page 9.

Attach the mounting hardware to whichever pole you wish to mount the finish light on as shown. Note that the bolts do not go through the pole. They run on each side of the pole.

Place the finish light in place on the brackets and slide the display up or down to the desired height. Tighten bolts to clamp display in place.

The finish light cannot be rotated or inverted. To reverse the order of the lamps for the other side of the track, remove the wing nuts securing the lamp bracket. Pull bracket clear of the sun visor and rotate it 180°. Replace the bracket and secure with the wing nuts.

Connect power and signal wires to finish light as shown on pages 10 and 11.

4. SERVICE

Disconnect power to the display before servicing.

4.1 Lamp Replacement

The primary service required by either finish light display is to replace burned-out lamps. The lamps are 120V, 85W flood lamps, type 85PAR38. The Chrondek numbers are as follows:

Red - Chrondek Number, DS-1186
Blue - Chrondek Number, DS-1187
Green - Chrondek Number, DS-1185
Amber - Chrondek Number, DS1184

Do not use lamps larger than those originally installed in the display.
4.2 Lamp Driver (Independent Finish Light only)

In the display, the task of switching lamps on and off is performed by the lamp driver. Page 10 shows the location of the lamp driver in the display. Page 12 is an illustration of the lamp driver and the fuses located in it.

The lamp driver has 15 connectors, providing power and signal inputs to the driver and outputs to the digits and indicators. The connector functions are as follows:

<table>
<thead>
<tr>
<th>Connector No.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 10</td>
<td>Outputs to digits and indicators</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>

On page 10, the letters on the lamps refer to the lamp driver segment of connector 10 that is wired to each lamp.

4.3 Schematic

The schematic diagrams on pages 5 and 6 show the power wiring of the finish light for Chrondek scoring displays. The Schematic on page 11 shows the power and signal inputs into the display and to the lamp driver. The component numbers correspond to those shown on page 10.
PUNCH OR DRILL A 1.25" MINIMUM DIAMETER HOLE IN BOTTOM OF DISPLAY.

ROUTE CABLE FROM FINISH LIGHT THROUGH HOLE IN BOTTOM OF MPH DISPLAY.

PLUG INTO JACK #10 ON CONNECTOR PLATE, SEE DETAIL B.

THE LETTER ON EACH LAMP IS THE SEGMENT WHICH THAT LAMP IS CONNECTED TO ON THE DRIVER. THE NUMBER ON THE DIGITS AND FINISH LIGHT IS THE DRIVER CONNECTOR IT IS CONNECTED TO.

MOUNT FINISH LIGHT SLIGHTLY TO THE INSIDE OF CENTER ON THE POLE SO THE POWER CABLE CLEAR THE POLE.

<table>
<thead>
<tr>
<th>LAMP LETTER</th>
<th>LAMP COLOR</th>
<th>CHRONDEK PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>RED</td>
<td>DS1186</td>
</tr>
<tr>
<td>B</td>
<td>BLUE</td>
<td>DS1187</td>
</tr>
<tr>
<td>C</td>
<td>GREEN</td>
<td>DS1185</td>
</tr>
<tr>
<td>D</td>
<td>AMBER</td>
<td>DS1184</td>
</tr>
</tbody>
</table>

FINISH LIGHT SCHEMATIC

DAKTRONICS, INC. BROOKINGS, SD 57006

PROJ: CHRONDEK DISPLAYS
TITLE: INSTALLATION, FIN-LIGHT, CH-24-DS
DES. BY: J. Heiderscheidt DRAWN BY: J. Heiderscheidt DATE: 13 JUL 90

REV DESCRIPTION BY APPR

1-20  1081-R10A-43387
PUNCH OR DRILL A 1.25" MINIMUM DIAMETER HOLE IN BOTTOM OF REAR ENCLOSURE.

ROUTE CABLE FROM FINISH LIGHT THROUGH HOLE IN BOTTOM OF REAR ENCLOSURE.

REMOVE SCREWS ON COVER OF REAR ENCLOSURE TO ACCESS DRIVER AND COMPONENTS.

PLUG INTO JACK #110 ON CONNECTOR PLATE, INSIDE DRIVER ENCLOSURE, INSIDE DRIVER BOX.

THE LETTER ON EACH LAMP IS THE SEGMENT WHICH THAT LAMP IS CONNECTED TO ON THE DRIVER. THE NUMBER ON THE FINISH LIGHT IS THE DRIVER CONNECTOR IT IS CONNECTED TO.

MOUNT FINISH LIGHT SLIGHTLY TO THE INSIDE OF CENTER ON THE POLE SO THE POWER CABLE CLEAR THE POLE.

<table>
<thead>
<tr>
<th>LAMP LETTER</th>
<th>LAMP COLOR</th>
<th>CHRONODEK PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>RED</td>
<td>DS1186</td>
</tr>
<tr>
<td>B</td>
<td>BLUE</td>
<td>DS1187</td>
</tr>
<tr>
<td>C</td>
<td>GREEN</td>
<td>DS1185</td>
</tr>
<tr>
<td>D</td>
<td>AMBER</td>
<td>DS1184</td>
</tr>
</tbody>
</table>
REAR ENCLOSURE
(A1 LAMP DRIVER IS LOCATED INSIDE)

REAR VIEW MPH DISPLAY

J24  J17  J1  J3  J5  J7  J9  J11  J13  J15  J18
J19  J2  J4  J6  J8  J10  J12  J14  J16  J20

A1 LAMP DRIVER

Jack Panel

DRIVER ENCLOSEMENT LAYOUT

SECTION A-A
TB 301 SIGNAL

SECTION B-B
E41 EARTH GROUND

BREAKER A @ 20A
BREAKER A @ 20A
NEUTRAL
NEUTRAL
BREAKER B @ 20A
BREAKER B @ 20A

TB 401 POWER

1081-R08A-37773
FINISH LIGHT
BY CHRONDEK

120 VAC
15A PER DISPLAY

CONTROL SIGNAL CABLE
ONE PAIR, 22 AWG IN CONDUIT

FINISH LIGHT
BY CHRONDEK

C-33 TIMER

SIGNAL J-BOX

INTERFACE CABLE

120 VAC

DISPLAY INTERFACE

TIMING EQUIPMENT:
EQUIPMENT SENDING DATA
TO TIMER IS NOT SHOWN.
LAMP PLUG BEHIND THIS FLANGE.

WING NUTS MOUNTING LAMP BRACKET AT BOTH ENDS.

NOTES:
MOUNT DISPLAY ON EXISTING POLE AS INDICATED.
DISPLAY CANNOT BE ROTATED OR INVERTED.
TO REVERSE ORDER OF LAMPS, REMOVE WING NUTS SECURING LAMP BRACKET. PULL BRACKET CLEAR OF SUN VISOR AND ROTATE 180°.
REMOVE WING NUTS AND UNPLUG LAMP HARNESS AT P110 TO REMOVE LAMP BRACKET FOR ACCESS TO DRIVER AND ENTRANCE COMPONENTS.

FRONT VIEW OF DISPLAY SHOWING SEGMENT DESIGNATION

REMOVE THESE 4 SCREWS TO GAIN ACCESS TO ENTRANCE COMPONENTS.

REMOVE ALL SCREWS IN COVER TO GAIN ACCESS TO DRIVER.

FRONT VIEW OF DISPLAY WITH LAMP BRACKET AND ENTRANCE COVER REMOVED

WHEN INSTALLING DISPLAY, ROUTE INCOMING POWER AND SIGNAL CABLES THROUGH KNOCKOUTS IN BACK OF DISPLAY AND ATTACH TO DESIGNATED ENTRANCE COMPONENTS AS INDICATED IN THE SCHEMATIC.

INCOMING POWER (HOT, NEUT, GND)
INCOMING SIGNAL
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

PROJ. MULTIPLEX CONTROLLERS
TITLE LAMP DRIVER, 16 COL., W/FAN
DES. BY JLH DRAWN BY JLH DATE 20 FEB 89
REVISION APPR. BY
SCALE: 1=5

1033-R04A-37070
4.4 Troubleshooting

This is a list of possible problems that may occur and their possible solutions.

<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></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>No lamps will 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></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>P20 disconnected.</td>
</tr>
<tr>
<td>Lamp stays lit</td>
<td>Broken wire behind digit.</td>
</tr>
<tr>
<td></td>
<td>Internal driver malfunction.</td>
</tr>
<tr>
<td>Erratic display</td>
<td>Control malfunction.</td>
</tr>
<tr>
<td></td>
<td>Internal driver malfunction.</td>
</tr>
</tbody>
</table>

Use a voltmeter 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 Chrondek or an authorized service center.
4.5 Replacement Parts

<table>
<thead>
<tr>
<th>Part Name or Description</th>
<th>Type</th>
<th>Chrondek Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp Driver</td>
<td></td>
<td>A-1033-50</td>
</tr>
<tr>
<td>J-Box, Signal, 16-Pin</td>
<td></td>
<td>A-1010-26</td>
</tr>
<tr>
<td>Fuse, Lamp Driver, 10A</td>
<td>AGC-10</td>
<td>F-1006</td>
</tr>
<tr>
<td>Fuse, Driver Logic, 1/2A</td>
<td>AGC-1/2</td>
<td>F-1000</td>
</tr>
<tr>
<td>Socket, Med. Base</td>
<td></td>
<td>X-1046</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>
<tr>
<td>Lamp, 85W Blue Flood</td>
<td>85PAR38</td>
<td>DS-1187</td>
</tr>
</tbody>
</table>

For parts not listed, or for more information about installation or service, please call Chrondek. Our phone number is (605) 692-5866, or call toll-free 1-800-854-6556.

Chrondek, Inc. is a subsidiary of Daktronics, Inc.