

Auto Racing Display Model CH-1624V

Installation & Service Manual

ED 5942

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Installation

Table of Contents

1.	Intro	troduction1-		
	1.1	How To Use This Manual	1-1	
	1.2	Display Overview	1-1	
2.	Insta	allation	2-1	
	2.1	General System	2-1	
	2.2	Beam and Footing Selection	2-1	
	2.3	Display Mounting		
	2.4	Electrical Installation	2-3	
		2.4.1 Control Signal Cable		
		2.4.2 Power Wiring	2-3	
3.	Main	ntenance & Troubleshooting	3-1	
	3.1	Lamp Replacement		
	3.2	Lamp Driver		
	3.3	Digit Segmentation		
	3.4	Schematic		
	3.5	Troubleshooting		
	3.6	Replacement Parts		
	3.7	Unit Exchange/Replacement Procedure		

1.1 How To Use This Manual

This manual explains the installation and maintenance of the CH-1624V Auto Racing Display. 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 display without the written consent of Daktronics, Inc.

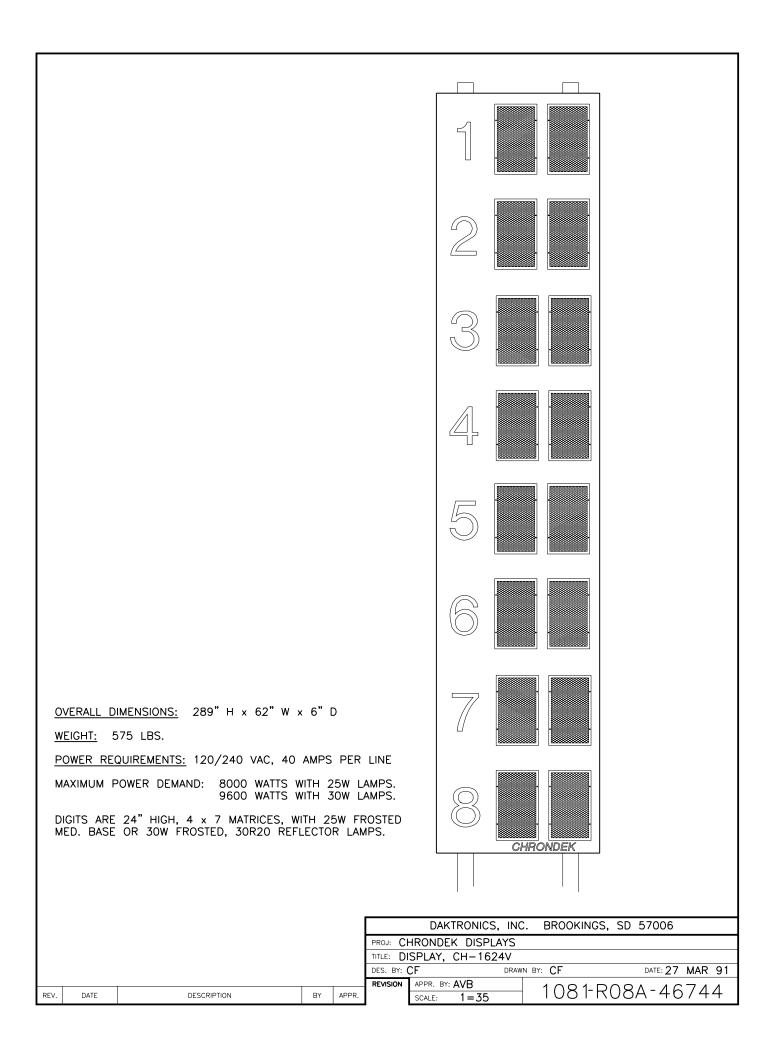
The box below illustrates Daktronics drawing numbering system. The drawing number "7087-P08A-69945" is how Daktronics identifies individual drawings. This number is located in the lower-right corner of the drawing. This manual refers to drawings by listing the last set of digits and the letter preceding them. In the example below, the drawing would be referred to as **Drawing A-69945**. Referenced drawings are inserted at the *end of the first section which references them*.

		DAKTRONICS, IN	C. BRC	IOKING9, 9D (57006
PROJ:					
TITLE:					
DES. BY:	_	DRAV	VN BY: DOK		DATE: 04-20-95
	APPR. BY:		70		
SCALE: 1=80		7087-P08A-69945			

1.2 Display Overview

Reference Drawing: Display, CH-1624V Drawing A-46744

Drawing A-46744 shows a Daktronics CH-1624V display. The CH-1624V along with the use of the Daktronics CHTS-300 timing console will display the car positions on the display.



2.1 General System

Reference Drawings:	Pwr/Sig Entrance, 1 Driver Display Component Locations, CH-1624V	•
	System Layout, CH-1624V	•
	Display Mounting, CH-1624V	Drawing A-46774
	Footing & Beam, CH-1624V	Drawing A-46784
	Color Code, 25 Pin J-Box	Drawing A-47207
	Electrical Installation, CH-1624V	Drawing A-47270

Refer to **Drawing A-46757** for a general system layout.

The general procedure for installing the CH-1624V display is as follows:

- 1. Select beam and footing recommendations from the table below.
- **2.** Dig the footing holes and install beams and footings. Refer to the table in **Section 2.2** for the correct beam and footing selections.
- 3. Route power and signal cables to the display and control locations.
- 4. Mount the displays to the beams as described in **Drawings A-46774** and **A-46784** and in **Section 2.3**.
- 5. Route power and signal wires into the displays as described in Drawings A-46755, A-46756, A-47207 and A-47270 and in Section 2.4.

2.2 Beam and Footing Selection

Reference Drawing: Footing & Beam, CH-1624V Drawing A-46784

The table below contains recommendations for W-shape beams and footings to support the display as shown in **Drawing A-46784**. The first column is wind velocity in miles per hour. The distance in the second column is from the ground to the bottom of the display. The choices from these columns depend upon the display location.

The beams listed below are beams which provide maximum wind load strength for the weight and cost of the beams.

Wind Speed	Height (ft)	Beam Section	Footing Depth x Diameter
70	10	W 10x19	7 ½ ftx3 ft
MPH	15	W 10x25	8 ¼ ftx3 ft
80	10	W 10x25	8 ½ ftx3 ft
MPH	15	W 10x29	9 ¼ ftx3 ft
90	10	W 14x26	9 ½ ftx3 ft
MPH	15	W 12x31	10 ½ ftx3 ft

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 psf per foot of depth in natural grade was used to derive these figures.

The footings recommendations are based on the allowable soil bearing pressure of 3000 psf vertically and 300 psf/ft of depth horizontally. However, these recommendations *are suggestions only* and soil bearing pressure at the site must be determined by a sample test prior to specifying actual footings. 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*. Daktronics recommends that W-sections of grade 36 steel be used for beams, and that 28-day (strength 3000 psi) concrete be used for footings.

A note about beam nomenclature: For a typical beam, W8x28 for example, "W" stands for "Wide-Flange Beam". The first number (8) is the approximate front to rear dimension of the beam in inches. The second number (28) is the weight per foot in pounds. This numbering is a standard in the steel industry. Widths are from 10.125 to 13.87 inches in the chart above.

Note: Recommendations for a single rectangular structural steel tube and footing to support the display as shown in **Drawing A-46784** must be determined by a qualified structural engineer using data from a soil sample test at the site.

2.3 Display Mounting

Reference Drawing:	Display Mounting, CH-1624V	Drawing A-46774
	Footing and Beam, CH-1624V	Drawing A-46784

Drawings A-46774 and A-46784 show the typical mounting for the display.

Note: The bolts that secure the display to the beam(s) do not go through the beam(s), but run along both sides of the beam, clamping the display to the beam(s).

A mounting kit consisting of mounting angles and 1/2" hardware are provided to mount the display.

- **1.** Position the display against the mounting beam(s) and secure the bottom of the display to the beam(s) as shown.
- **2.** Secure the top of the display and then the middle of the display. Once mounting angles are attached, the display may be slid up or down to the desired height. Once the display is positioned as desired, tighten all bolts.

2.4.1 Control Signal Cable

Reference Drawings: Pwr/Sig Entrance, 1 Driver Display.. Drawing A-46755 Component Locations, CH-1624V... Drawing A-46756 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 to the wires leading from the connector in the cover according to the table below and **Drawing A-47207**.

At the display, open the bottom hinged panel covering the entrance enclosure as shown in **Drawing A-46756**. Remove the cover from the entrance enclosure. Refer to **Drawing A-46755** for an illustration of the components inside the entrance enclosure. Connect the signal wires to TB31 as indicated in the table below.

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 the CHTS-300 console manual.

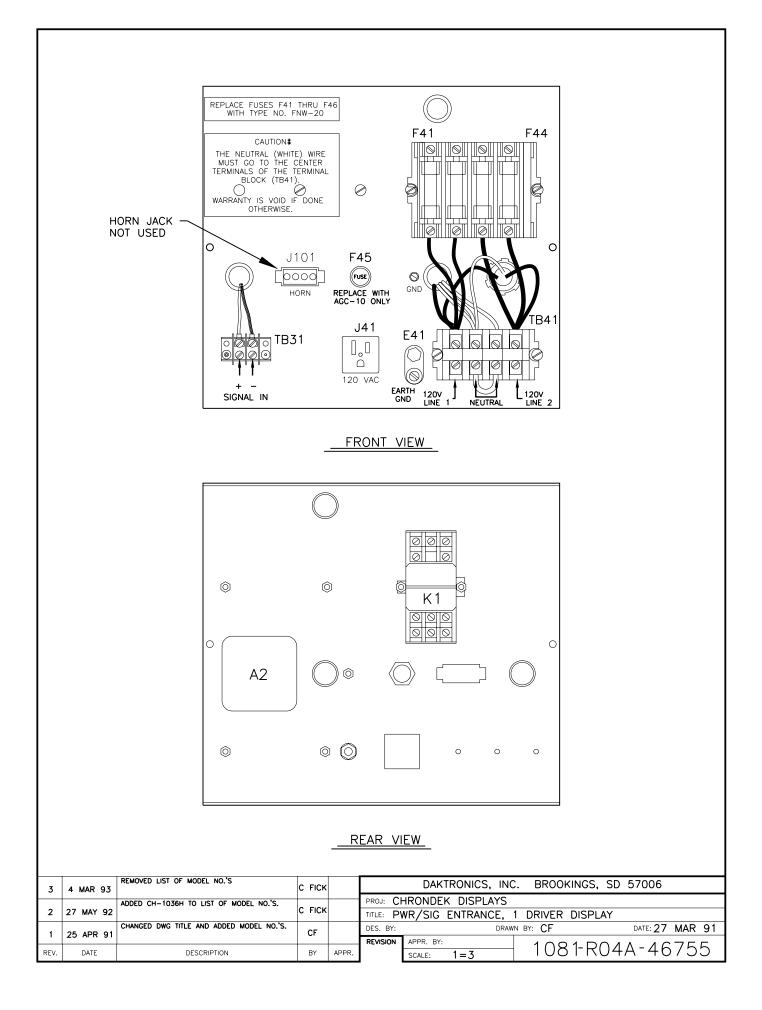
2.4.2 Power Wiring

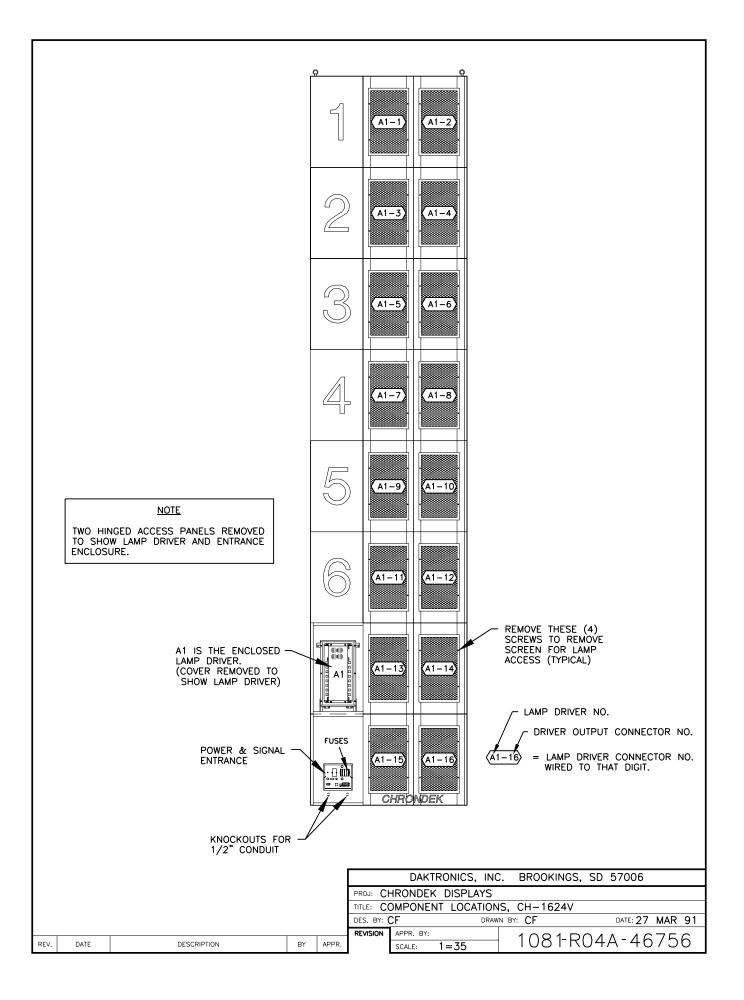
Reference Drawing: Pwr/Sig Entrance, 1 Driver Display.... Drawing A-46755

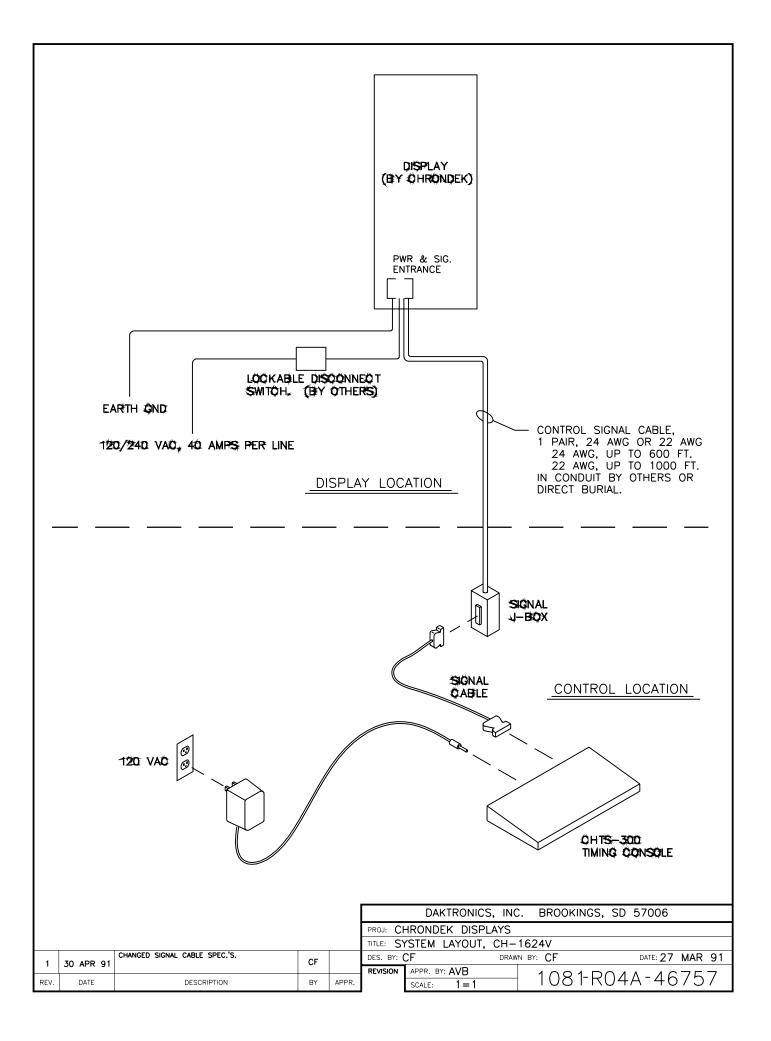
The CH-1624V display requires a 120/240 VAC, 40 amp circuit per line. When equipped with 25W lamps, the maximum current draw is 66.67 amps. When equipped with 30W, 30R20 reflector lamps, the maximum current draw is 80 amps.

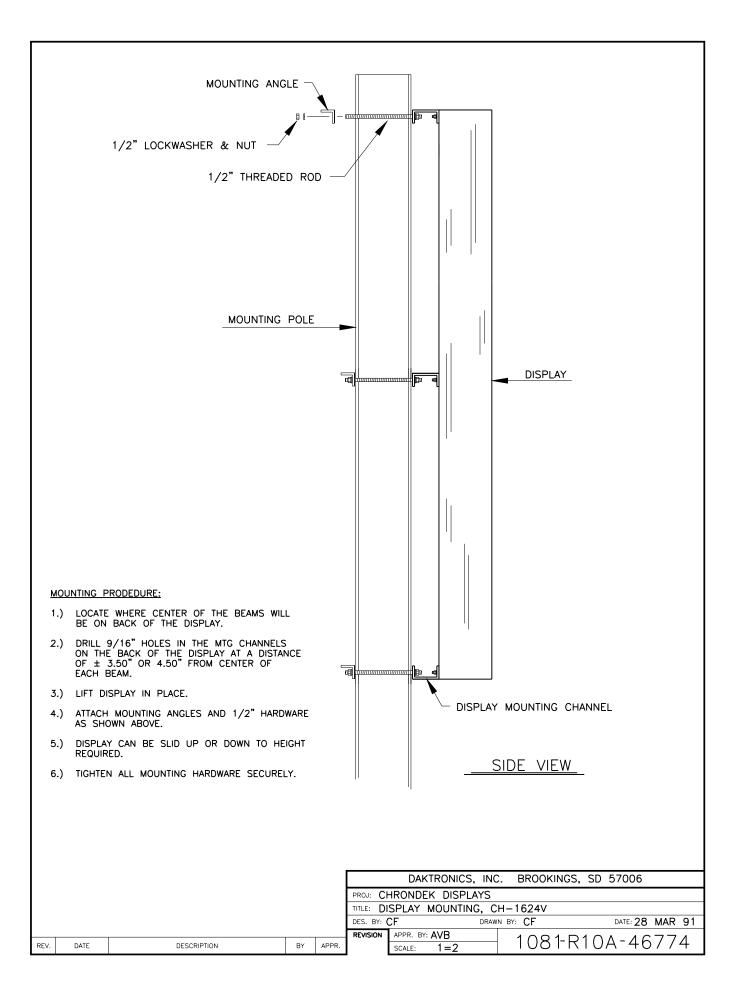
Route power wires into the display and connect to TB41 in the entrance enclosure, as shown in **Drawing A-46755**.

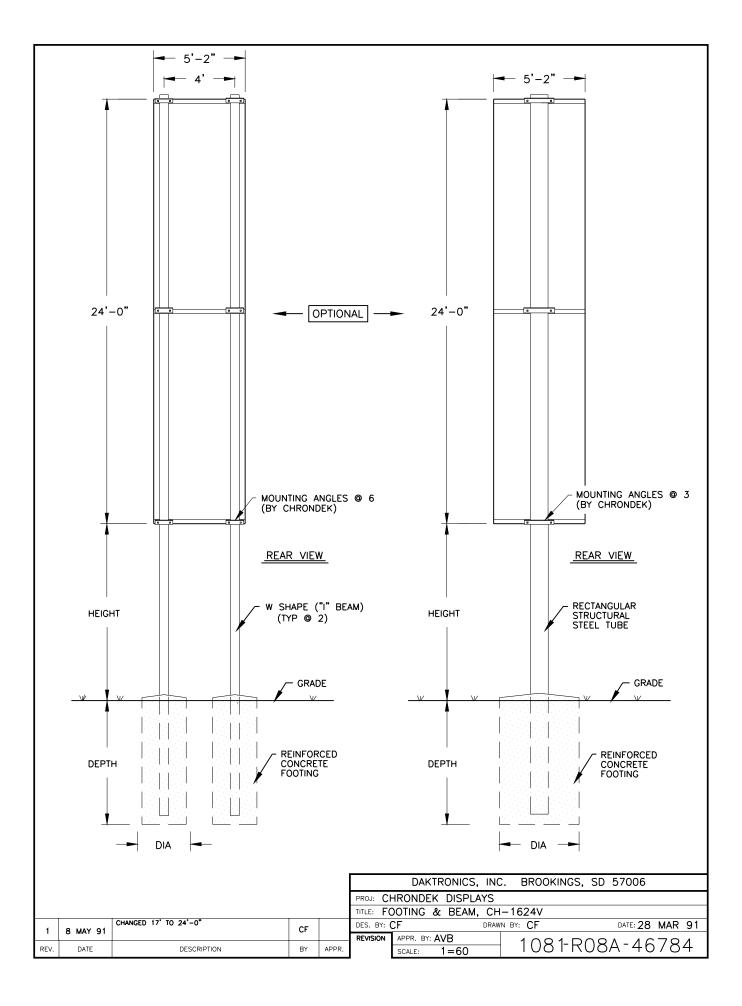
Connect the ground wire to E41 and to a ground rod near the display, according to local codes.



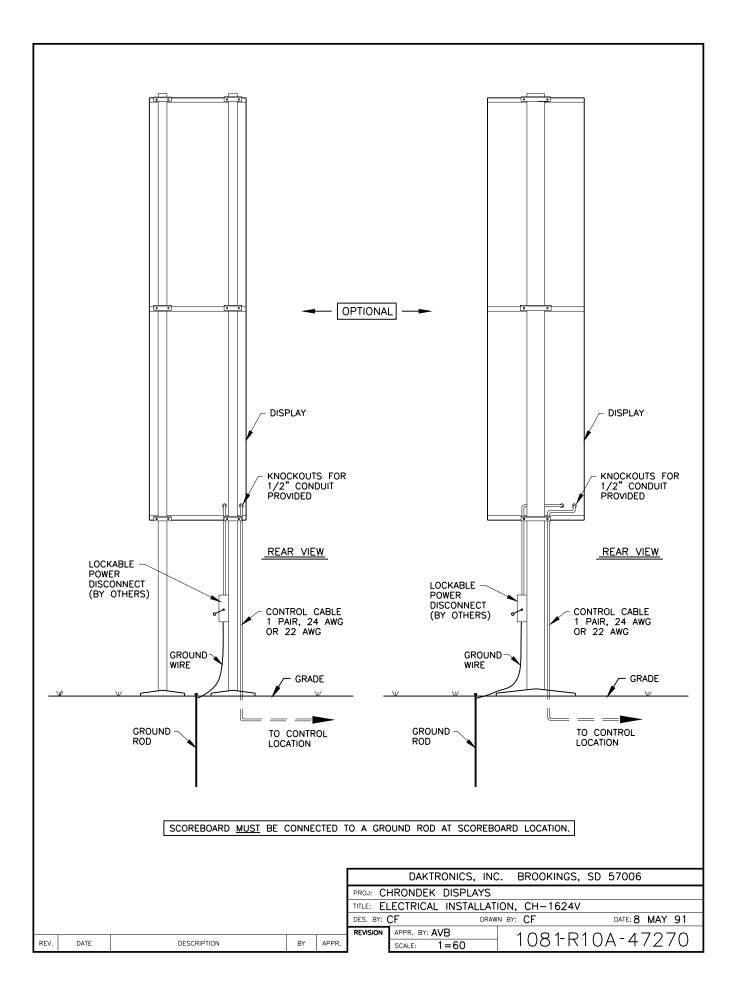








					 STRIP WIRE ENDS 1/4". INSERT WIRE INTO CONNECTOR. SQUEEZE CONNECTOR SECURELY ONTO WIRE END WITH PLIERS OF CRIMPING TOOL. 	
		PIN NO.	WIRE COLOR	FUI	ICTION	
		1	BLACK	PHOTO 1-N		
		2	WHITE	PWR 1-P	-	
		3	RED	GND 1-N	_	
		4	GREEN	PHOTO 2-N	-	
		5	ORANGE	PWR 2-P	-	
		6	BLUE	GND 2-N	- PHOTOCELL	
		7	WHITE/BLACK	PHOTO 3-N	POWER INPUTS	
		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		
		15	GREEN/WHITE	1 SIG-N		
		16	BLUE/WHITE	2 SIG-P		
		17	BLACK/RED	2 SIG-N	SCOREBOARD	
		18	WHITE/RED	3 SIG-P	SIGNAL OUTPUTS	
		19	ORANGE/RED	3 SIG-N		
		22	BLUE/RED	4 SIG-P		
		23	RED/GREEN	4 SIG-N		
		13	ORANGE/GREEN	NOT USED		
		20	BLK/WHT/RED	NOT USED	THESE PINS	
		21	WHT/BLK/RED	NOT USED	– TYPICALLY – NOT USED	
		24	RED/BLK/WHT	12 VAC	BY CHTS TIMER	
		25	GRN/BLK/WHT	12 VAC		
		ADDED WIRES TO PINS 13,20,21,24,25	F	DAKTRO PROJ: CHRONDEK	NICS, INC. BROOKINGS, SD 57006	
2	10MAR97			TITLE: COLOR CODE		
1	4 JUN 92	CHANGED "SIGNAL INPUTS" TO "SIGNAL		DES. BY: CF REVISION APPR. BY: AVE	DRAWN BY: CF DATE: 1 MAY 91	
REV.	DATE	DESCRIPTION	BY APPR.	SCALE: 1 =		7



Section 3 : Maintenance & Troubleshooting



IMPORTANT NOTES:

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

3.1 Lamp Replacement

Reference Drawing: Digit ServiceDrawing A-27674

The primary service required by the CH-1624V display is to replace burned-out lamps. Refer to **Drawing A-27674** for an illustration of lamp changing. Replacement lamps are 120V, 25W frosted, medium base, available 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.

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 Driver

Reference Drawings: Lamp Driver,16 Col. w/ Fan......Drawing A-37070 Component Locations,CH-1624VDrawing A-46756

In the display, the task of switching lamps on and off is performed by the lamp driver. **Drawing A-46756** in **Section 2** shows the location of the lamp driver in the display. **Drawing A-37070** shows an illustration of the lamp driver and the fuses located in it. The lamp driver has 21 connectors with power and signal inputs and outputs to the digits. The functions of these connectors are as follows:

Connector Number	Function
1-16	Outputs to digits
17	Signal Input
18	Power input for outputs 1-8 (120 V)
19	Power input for driver logic and fan (120V)
20	Power input for outputs 9-16 (120V)
24	Dim option selector

In **Drawing A-46756** the numbers on the digits refer to the lamp driver output connector wired to each digit.

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

In a digit certain lamp 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 is wired to each segment.

3.4 Schematic

Reference Drawings:	Schematic, 1 Driver Display	Drawing A-46754
-	Pwr/Sig Entrance, 1 Driver Display	Drawing A-46755
	Component Locations, CH-1624V	Drawing A-46756

The schematic diagram in **Drawing A-46754** shows the power and signal inputs into the display and to the lamp driver. The component numbers correspond to those shown in **Drawings A-46756** and **A-46755**.

3.5 Troubleshooting

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

Observed Problem	Possible Cause
One lamp won't light	Burned-out lamp
	Broken wire behind digit
Digit segment won't light	Broken wire
	 Poor contact at driver connector
	 Internal driver malfunction
Entire digit won't light	Broken wire (black)
	Poor contact at connector, pin 7
	Fuse blown in driver
Half the display won't light	 Service breaker tripped
	Main fuse blown
	 Poor contact at main power
	connection
	P18 disconnected
Entire display won't light	 Power disruption
	 Poor signal connection
	 Driver logic fuse blown
	 Control not connected to display
	P20 disconnected
Segment stays lit	Broken wire behind digit
	Internal driver malfunction
Garbled display	Control malfunction
	 Internal driver malfunction

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 an authorized service center.

Part Name or Description	Туре	Daktronics Part Number
Lamp Driver		0A-1033-0122
J-Box, CHTS-300 Timer		0A-1067-0056
Fuse, Main Power, 20A	FNW-20	F-1016
Fuse, Lamp Driver, 10A	AGC-10	F-1006
Fuse, Driver Logic, ½ A	AGC-1/2	F-1000
Digit Lampbank, 24" 4x7		0A-1027-0071
Digit Screen, 24" 4x7		0S-1064-0002
Socket, Med. Base		X-1046
Lamp, 25W Frosted		DS-1029
Lamp, 30W Reflector Type	30R20	DS-1126

3.6 Replacement Parts

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 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 to prevent damage during shipment. Electronic components, such as printed circuit boards, should either be installed in an enclosure or placed in an anti-static bag before boxing.

Please enclose your name and address along with a list of all the symptoms. Please be as specific as possible.

- 2. Driver Packaging Instructions: Drivers should be placed in a static-free enclosure for return shipping. An anti-static convoluted foam packing is available from Daktronics (part number PK-1135). The shipping box (Daktronics part number PK-1006) should be used along with the foam.
- **3.** Where to Send: Contact your local representative prior to shipment to acquire a Return Material Authorization Number (RMA#). This will speed up the repair of your unit.

When returning defective items under the exchange program, please use the UPS Blue Return Tags found in the package containing the exchange unit sent from Daktronics. This will speed up the transaction and help avoid confusion when the part is returned to Daktronics. **The defective item must be returned within 15 days of receiving a**

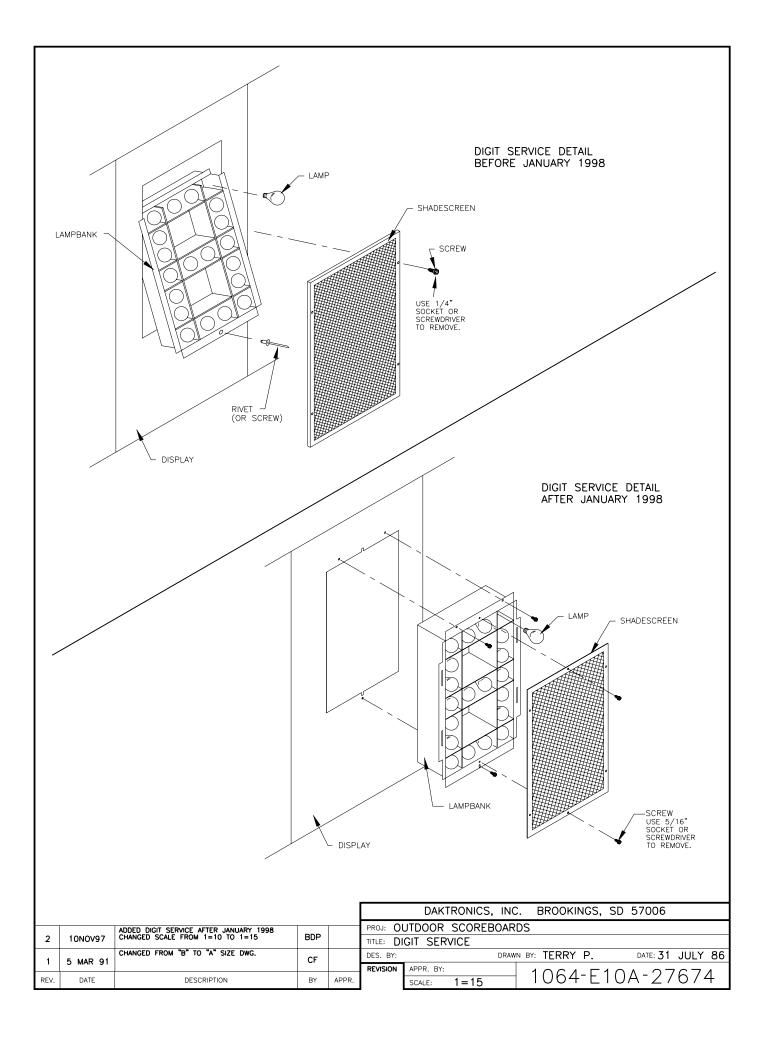
replacement part. Using the UPS Blue Return Tag immediately will eliminate the possibility of late charges being assessed against your account.

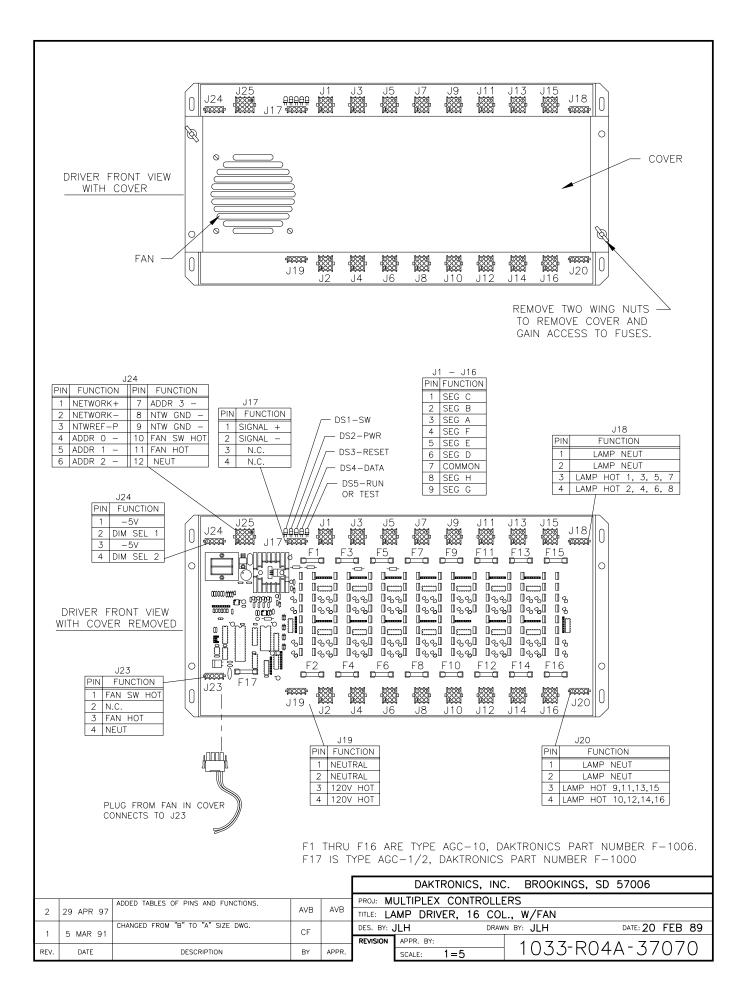
Mail: Daktronics, Inc., Customer Service PO Box 5128 331 32nd Avenue Brookings, SD 57006

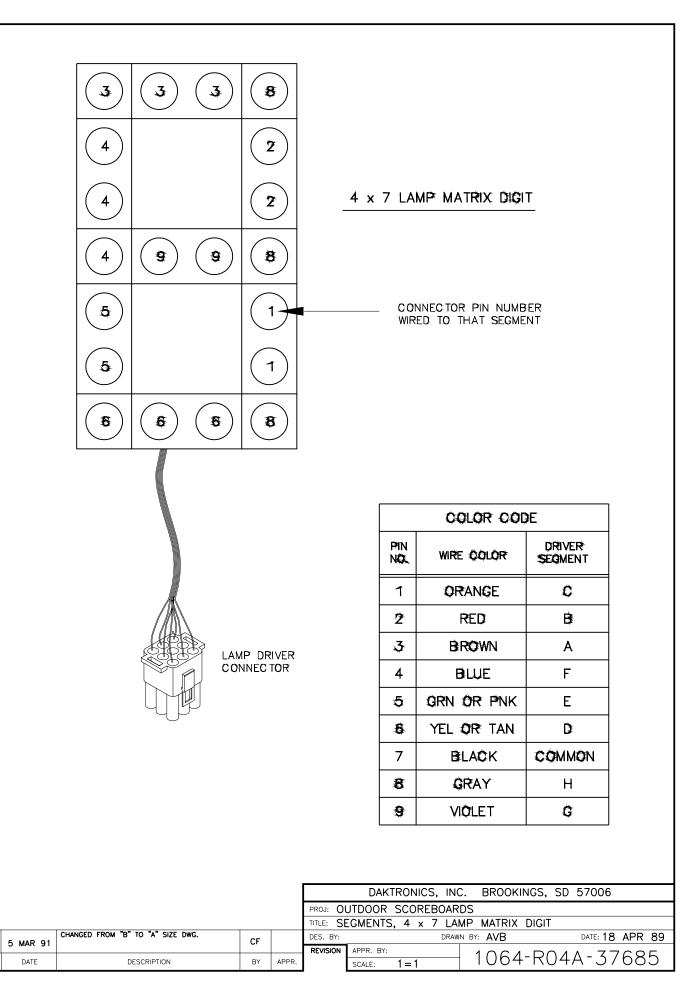
Phone: Toll Free: 1-800-843-9879 or 1-605-697-4400

Customer Service Fax: 1-605-697-4444

E-Mail: helpdesk@daktronics.com







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REV.

