



**CH-1618V**  
**Auto Racing Displays**

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**Installation/Maintenance Manual**

ED-9542

**ED-9542**  
**Product#1081**  
**Rev. 2 - 17November98**

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**DAKTRONICS, INC.**  
***Setting New Standards Worldwide***  
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# Table of Contents

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<b>1. Introduction</b>	<b>1-1</b>
1.1 How to Use This Manual	1-1
1.2 Display Overview	1-1
<b>2. Mechanical/Electrical Installation</b>	<b>2-1</b>
2.1 Mechanical Installation	2-1
2.2 Electrical Installation	2-1
2.2.1 Grounding	2-1
2.2.2 New Power Installation	2-2
2.2.3 Signal	2-2
2.2.4 Power Wiring	2-3
<b>3. Maintenance &amp; Troubleshooting</b>	<b>3-1</b>
3.1 Lamp Replacement	3-1
3.2 Lamp Driver	3-1
3.3 Fuses	3-2
3.4 Segmentation	3-2
3.5 Component Access	3-2
3.6 Troubleshooting	3-2
3.7 Replacement Parts List	3-3
3.8 Unit Exchange/Replacement Procedure	3-3
<b>Appendix A: Additional Drawings</b>	<b>A-1</b>



# 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 of Daktronics Auto Racing Display Model CH-1618V. Details for display maintenance are also given. 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 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 is an illustration of Daktronics drawing numbering system. The drawing number “7087-P08A-69945” is how Daktronics identifies individual drawings. This number is located in the bottom right corner of the title box in the lower right corner of the drawing. The manual will refer to drawings by calling out the last five digits and the letter preceding them. In the example, the drawing would be referred to as “Drawing A-69945”. All drawings referred to as such will be inserted at the *end of each section*.

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

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The Daktronics CH-1618V display, along with the use of the CHTS-300 timing console, will display the first eight car positions.



# Section 2: Mechanical/Electrical Installation

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## 2.1 Mechanical Installation

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**Reference Drawing:** Shop DWG, CH-1618-V . . . . . **Drawing A-82876**

**Note:** Ad panels may be attached to the display or beams. This **must** be taken into consideration when digging the beam holes and attaching the display. Daktronics is not responsible for work done by others. Refer to the **Appendix** for any additional drawings that may have been sent along if the display includes extra signs.

Refer to **Drawing A-82876**. A mounting kit consists of mounting angles and ½" hardware. To install the display, position the bottom display against the mounting beams and secure. Next position the top display and secure.

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

## 2.2 Electrical Installation

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### 2.2.1 Grounding

---

The scoreboard **must** be connected to earth-ground. Proper grounding is necessary for reliable equipment operation. It also served to provide protection to the equipment against damaging electrical disturbances and lightning. **If the following grounding methods are not adhered to, the warranty will be void.**

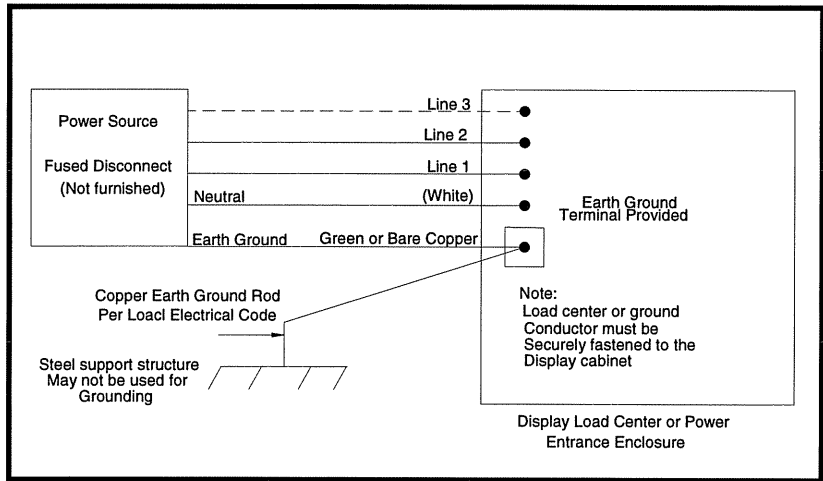
The steel support structure for the display cannot be used as grounding. The support is generally embedded in concrete, and if in earth, the steel is either primed or it corrodes, making it a poor ground. Use one ground rod at each scoreboard support column.

The National Electrical Code requires the use of a lockable power disconnect near the scoreboard. Provide a lockable disconnect switch (knife switch) at the scoreboard location so that all power lines can be completely disconnected. Use a 3-conductor disconnect so that both hot lines and the neutral can all be disconnected. This is important in protecting the scoreboard against lightning.

### 2.2.2 New Power Installation

---

The power cable **must** contain a separate earth-ground conductor. When a separate ground conductor is used, **do not** connect neutral to ground at the disconnect or at the scoreboard. To do so would violate electrical codes and void the warranty. Refer to **Figure 1**.



**Figure 1: New Power Installation**

### 2.2.3 Signal

Two conductors of 24 AWG for distances up to 600 feet, or 22 AWG for distances up to 1000 feet are required.

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 to the cover. Refer to the following table.

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 displays require a different output numbers. Refer to the CHTS-300 console manual.

At the display, open the hinged access door covering the lamp driver enclosure. Remove the cover from the lamp driver. Connect the signal wires to TB31 as indicated in the above table.

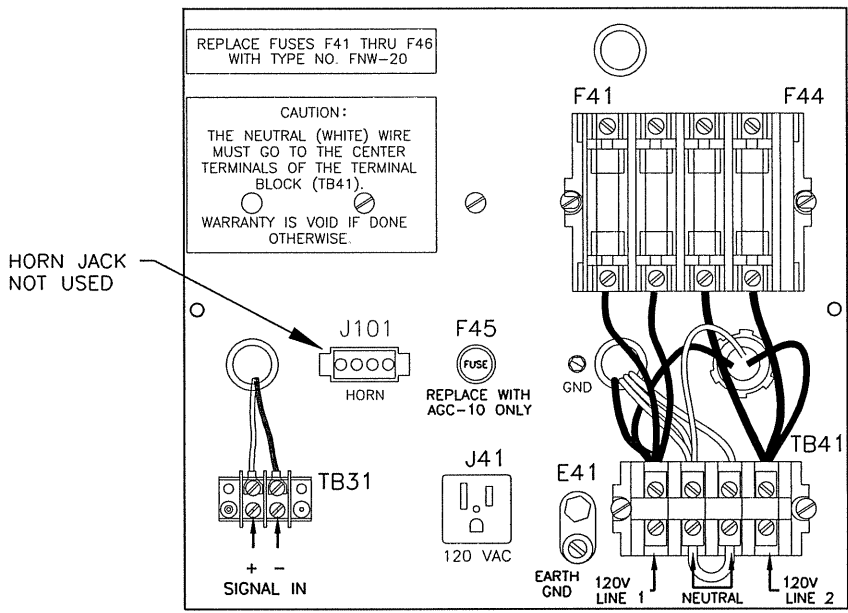
### 2.2.4 Power Wiring

**Reference Drawing: Pwr/Signal Entrance . . . . . Drawing A-46755**

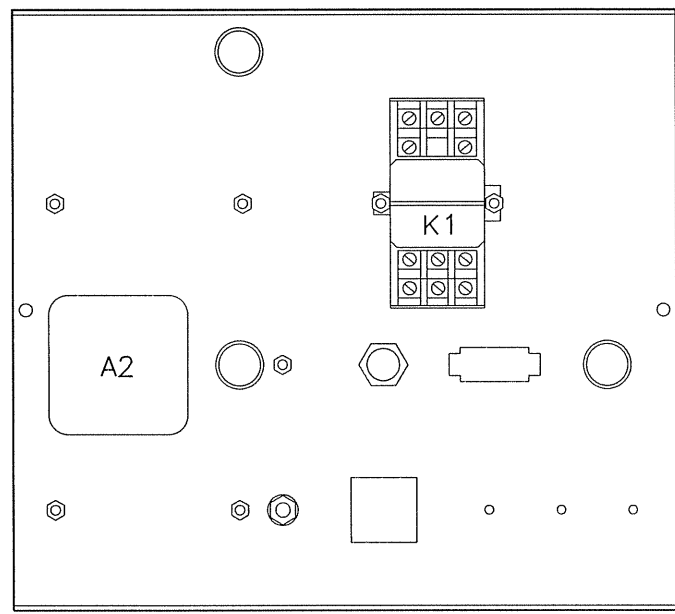
To gain access to the entrance panel, open the access door near the center of the lower sections of the scoreboard and remove the cover from the entrance enclosure.

Connect the power wires to the terminals of TB41 as marked on the plate and as shown in **Drawing A-46675**. Connect the ground terminal E41 to a ground rod at the display location. The neutral must connect to one of the center terminals of TB41. Connect the ground wire from the power cable to E41 and to the ground rod.



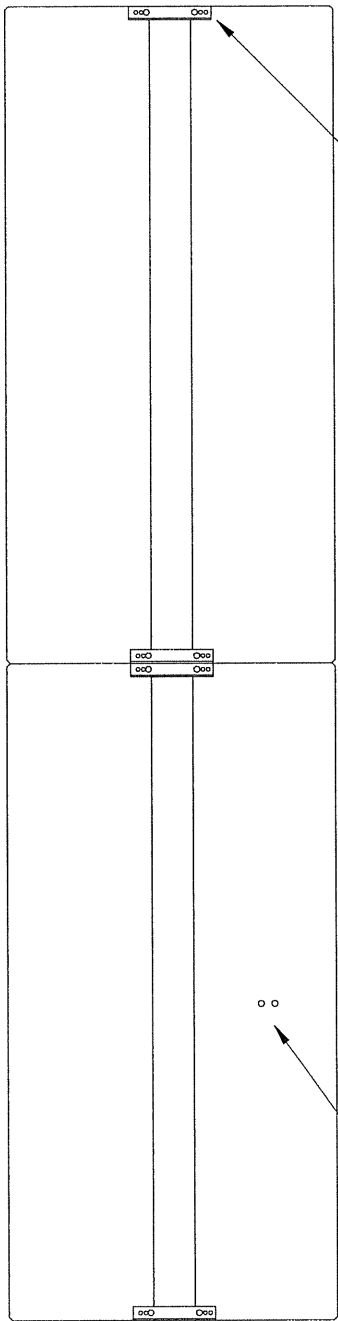


FRONT VIEW



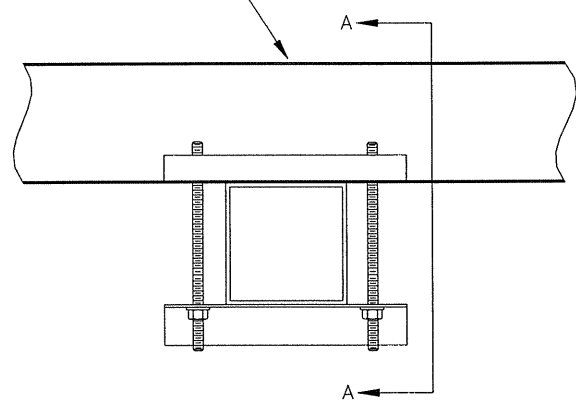
REAR VIEW

3	4 MAR 93	REMOVED LIST OF MODEL NO.'S	C FICK	DAKTRONICS, INC. BROOKINGS, SD 57006
2	27 MAY 92	ADDED CH-1036H TO LIST OF MODEL NO.'S.	C FICK	PROJ: CHRONDEK DISPLAYS
1	25 APR 91	CHANGED DWG TITLE AND ADDED MODEL NO.'S.	CF	TITLE: PWR/SIG ENTRANCE, 1 DRIVER DISPLAY
REV.	DATE	DESCRIPTION	BY	APPR.
				DES. BY: DRAWN BY: CF DATE: 27 MAR 91
				REVISION APPR. BY: SCALE: 1=3
				1081-R04A-46755



FASTEN DISPLAY TO BEAM  
AT 4 PLACES AS SHOWN BELOW.

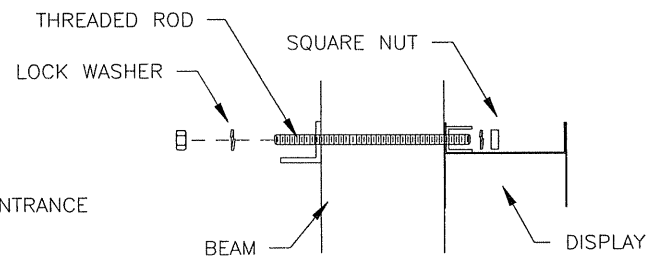
FRONT OF SCOREBOARD



TOP VIEW



POWER ENTRANCE



SECTION VIEW A-A

REAR VIEW

SQUARE OR RECTANGULAR  
SECTION BEAM SELECTED BY  
QUALIFIED ENGINEER

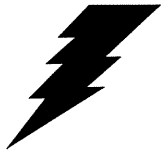
DAKTRONICS, INC. BROOKINGS, SD 57006	
PROJ: CHRONDEK DISPLAYS	
TITLE: SHOP DWG, CH-1618-V	
DES. BY:	DRAWN BY: M.MCMASTERS DATE: 6 JUNE 96
REVISION	APPR. BY:
	SCALE: 1=25
1081-E10A-82876	

REV.	DATE	DESCRIPTION	BY	APPR.

# Section 3: Maintenance & Troubleshooting

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## 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 Service ..... **Drawing A-27674**

The primary service required by Daktronics displays is to replace burned-out lamps. Refer to **Drawing A-27674** for an illustration on how to access the digit lamps. Refer to **Section 3.7** for replacement part numbers.

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

### 3.2 Lamp Driver

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**Reference Drawings:** Component Locations ..... **Drawing A-82909**  
Lamp Driver, 16 Col. w/Fan ..... **Drawing A-37070**

In the display, the task of switching lamps on and off is performed by the lamp driver. Refer to **Drawing A-82909** for the location of the lamp driver. Refer to **Drawing A-37070** for an illustration of the lamp driver and its fuses.

The lamp driver has 22 connectors, providing power and signal inputs and outputs to the digits. The following table lists the connectors and their functions:

Connector No.	Function
1-16	Outputs to digits and indicators
17	Control signal input
18	Power input for outputs 1-8
19	Power input (120V) for driver logic
20	Power input for outputs 9-16

Output connector 1 through 16 each have nine pins. Pin 7 provides power (hot) to the digit wired to the connector. The remaining eight pins provide switching connections. Designations are as follows:

A1 - 13                      A1 = Lamp Driver Number  
   13 = Connector Number

### 3.3 Fuses

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**Reference Drawing:** Lamp Driver, 16 Col. w/Fan . . . . . **Drawing A-37070**

Refer to **Drawing A-37070**. The lamp driver has 17 fuses. There is one fuse to protect each digit circuit. F1 through F16 are type AGC-10 and are located near each output connector under the driver's metal cover. The other lamp driver fuse, F17, is type AGC-1/2 and it protects the driver's logic circuit and fan.

### 3.4 Segmentation

---

**Reference Drawing:** Segmentation, 4x7 Digit . . . . . **Drawing A-26762**

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 by letters A through H. **Drawing A-26762** shows which connector pin number is wired to each digit segment and the wiring color code used throughout the display.

### 3.5 Component Access

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**Reference Drawing:** Component Locations . . . . . **Drawing A-82909**

Refer to **Drawing A-82909** for a front view of the display and the location of the access panels of the components.

### 3.6 Troubleshooting

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This section contains some symptoms that may be encountered with the display. For these symptoms, possible causes and corrective actions are given. The list is not inclusive of every possible problem, but does represent some of the more common situations that may occur.

Symptom/condition	Possible Cause
Display will not light.	<ol style="list-style-type: none"><li>1. Console not connected or poor connection.</li><li>2. No power to control console.</li><li>3. No power to scoreboard.</li><li>4. Bad relay or poor relay connection in signal circuit.</li><li>5. Driver logic fuse (F17) blown.</li><li>6. P17, P19 or P20 unplugged.</li></ol>
Half of the display will not light.	<ol style="list-style-type: none"><li>1. Circuit breaker tripped as service panel.</li><li>2. Once driver malfunctioning.</li><li>3. Poor signal contact at main power connection.</li></ol>
Garbled display.	<ol style="list-style-type: none"><li>1. Internal lamp driver malfunction.</li><li>2. Control console malfunction.</li></ol>
Digit will not light.	<ol style="list-style-type: none"><li>1. Fuse blown in driver.</li><li>2. Black wire to digit broken.</li><li>3. Poor contact at driver connector.</li></ol>

Segment will not light.	<ol style="list-style-type: none"> <li>1. Burned out lamps.</li> <li>2. Driver malfunction (bad triac).</li> <li>3. Broken wire between lamp driver and digit.</li> <li>4. Poor contact at driver connector.</li> </ol>
Segment stays lit.	<ol style="list-style-type: none"> <li>1. Driver malfunction (bad triac).</li> </ol>

### 3.7 Replacement Parts List

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DESCRIPTION	PART NUMBER
Digit Screen; 18" 4x7	0S-1064-0001
Digit Lampbank; 18" 4x7	0A-1027-0068
Fuse; Lamp Driver; AGC-10	F-1006
Fuse; Driver Logic; AGC-1/2	F-1000
J-box, CHTS-300 Timer	0A-1067-0056
Lamp Driver	0A-1033-0122
Lamp; 30W Clear	DS-1076
Socket; Med. Base	X-1046

### 3.8 Unit Exchange/Replacement Procedure

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Daktronics unique exchange program offers our clients the quickest, most economical way of receiving product repairs. If a component has failed, Daktronics will send the customer a replacement. The customer, in turn, sends the failed components to Daktronics. This not only saves money but also 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. **Lampbank and Driver Packaging Instructions:** Lampbanks and 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 for your use if needed. The shipping box (Daktronics part number PK-1006) should be used 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 speed up the repair of your unit.

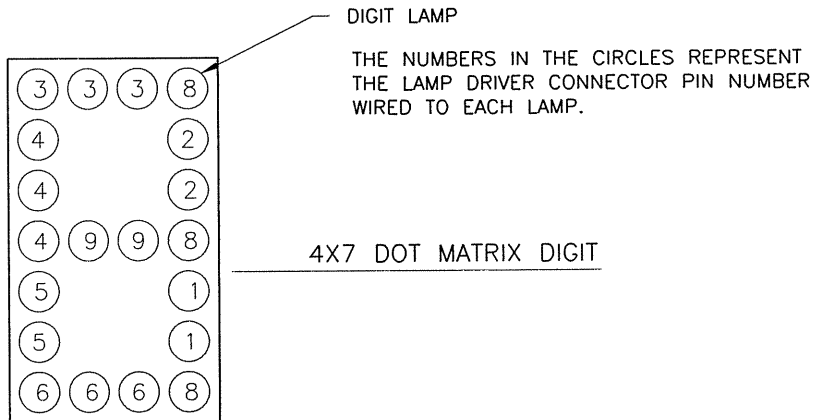
When returning defective items under the exchange program, please utilize the UPS Blue Return Tags found in the package containing the exchange unit sent from Daktronics. This will speed up the transaction and help avoid any confusion when the part is returned to Daktronics. **The defective item must 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](mailto:helpdesk@daktronics.com)



DIGIT LAMP

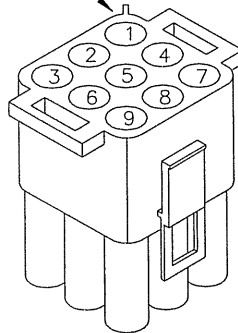
THE NUMBERS IN THE CIRCLES REPRESENT THE LAMP DRIVER CONNECTOR PIN NUMBER WIRED TO EACH LAMP.

4X7 DOT MATRIX DIGIT

LAMP DRIVER CONNECTOR

CONNECTOR PIN NUMBERING

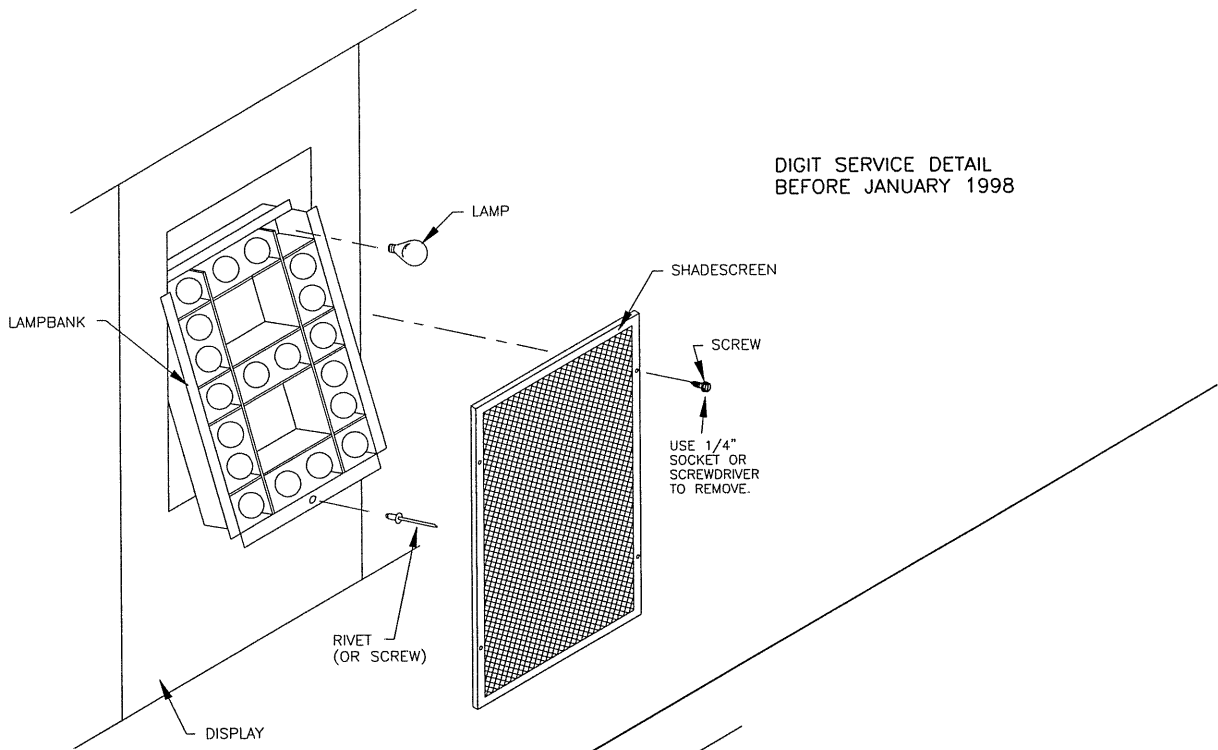
NOTE SPLINE NEAR NO. 1



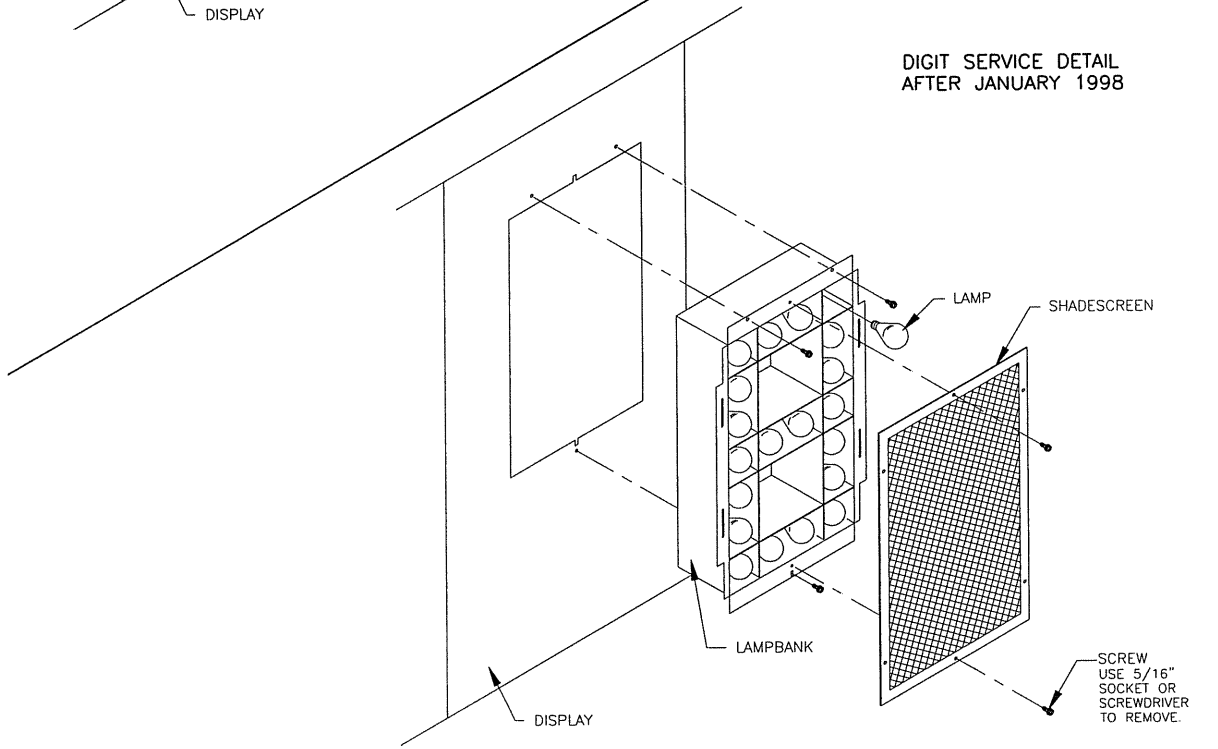
COLOR CODE		
PIN NO.	WIRE COLOR	DRIVER SEGMENT
1	ORANGE	C
2	RED	B
3	BROWN	A
4	BLUE	F
5	PINK	E
6	TAN	D
7	BLACK	COMMON
8	GRAY	H
9	VIOLET	G

DAKTRONICS, INC. BROOKINGS, SD 57006				
2	29JAN93	CHANGED TO ASIZE-V BORDER.	AVB	AVB
1	18APR89	REDRAWN ON CAD.	AVB	AVB
REV.	DATE	DESCRIPTION	BY	APPR.
PROJ: OUTDOOR SCOREBOARDS				
TITLE: SEGMENTATION, 4X7 DIGIT				
DES. BY:		DRAWN BY: WREDER		DATE: 10APR86
REVISION		APPR. BY:		1064-R04A-26762
		SCALE: NONE		

DIGIT SERVICE DETAIL  
BEFORE JANUARY 1998



DIGIT SERVICE DETAIL  
AFTER JANUARY 1998



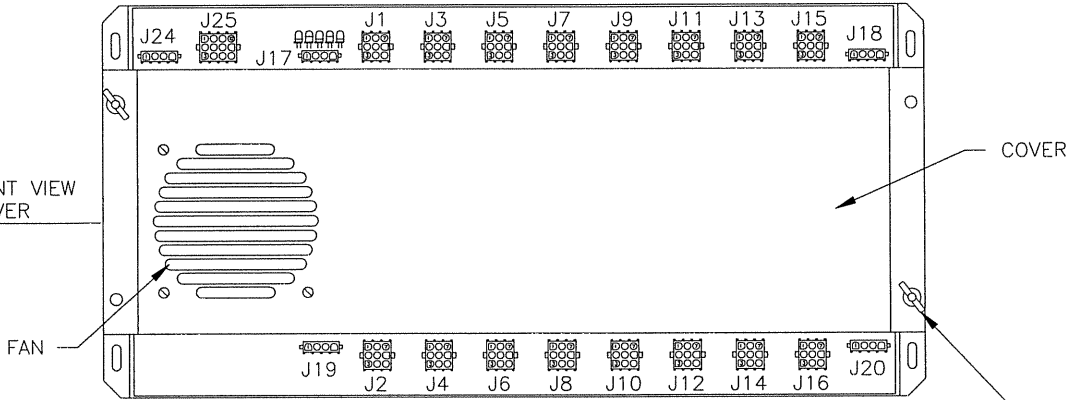
DAKTRONICS, INC. BROOKINGS, SD 57006

2	10 NOV 97	ADDED DIGIT SERVICE AFTER JANUARY 1998 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

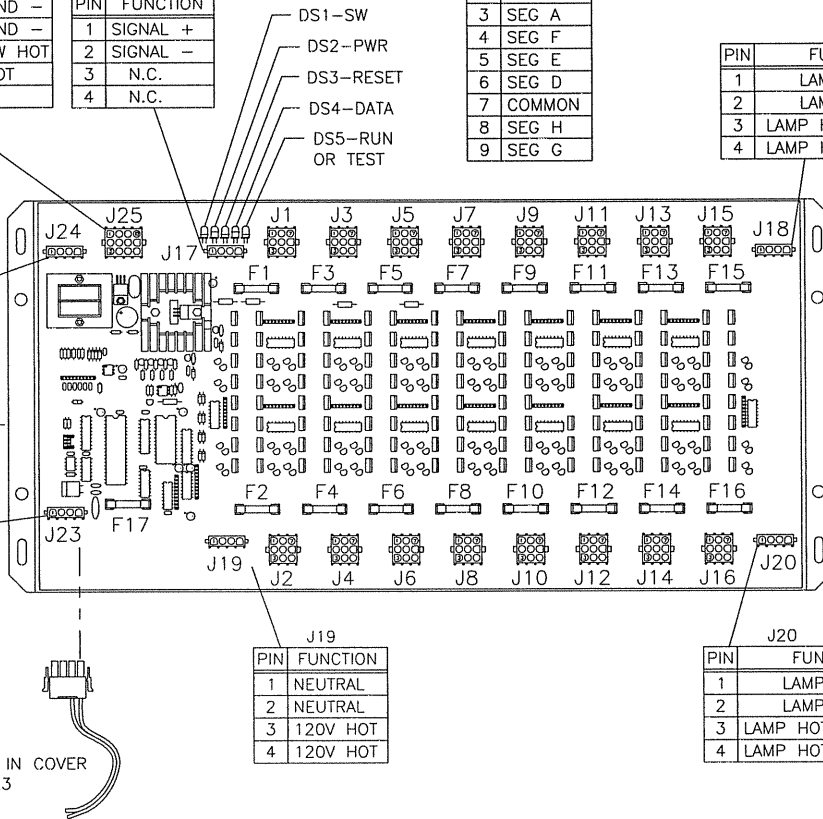
J18	
PIN	FUNCTION
1	LAMP NEUT
2	LAMP NEUT
3	LAMP HOT 1, 3, 5, 7
4	LAMP HOT 2, 4, 6, 8

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

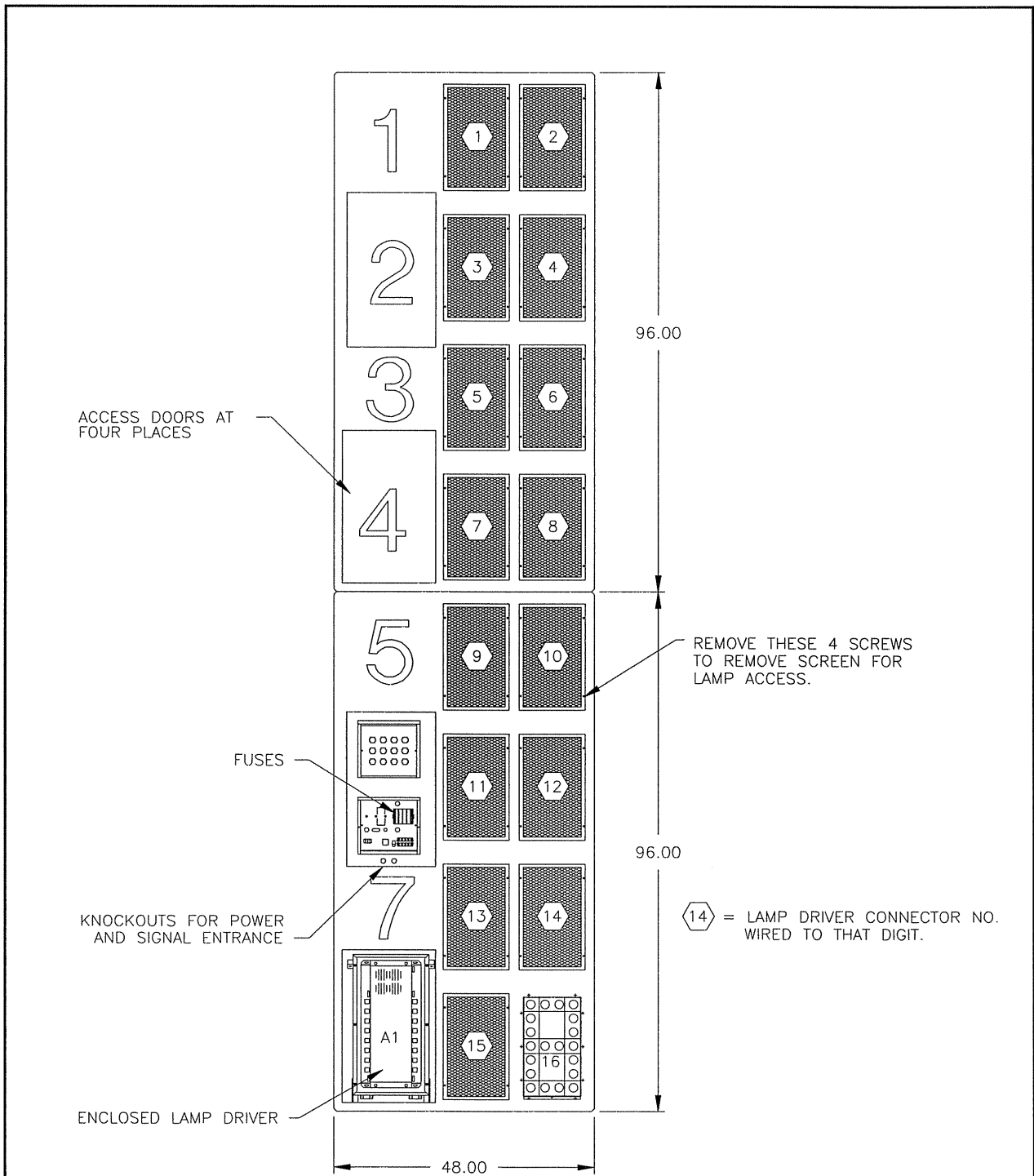
PLUG FROM FAN IN COVER CONNECTS TO J23



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			
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		

REV.	DATE	DESCRIPTION	BY	APPR.
2	29 APR 97	ADDED TABLES OF PINS AND FUNCTIONS	AVB	AVB
1	5 MAR 91	CHANGED FROM "B" TO "A" SIZE DWG.	CF	



ACCESS DOORS AT FOUR PLACES

FUSES

KNOCKOUTS FOR POWER AND SIGNAL ENTRANCE

ENCLOSED LAMP DRIVER

REMOVE THESE 4 SCREWS TO REMOVE SCREEN FOR LAMP ACCESS.

(14) = LAMP DRIVER CONNECTOR NO. WIRED TO THAT DIGIT.

DAKTRONICS, INC. BROOKINGS, SD 57006			
PROJ: CHRONDEK DISPLAYS			
TITLE: COMPONENT LOCATIONS, CH-1618-V			
DES. BY: MMCMASTERS		DATE: 6 JUNE 96	
REVISION	APPR. BY:	1081-E10A-82909	
	SCALE: 1=25		

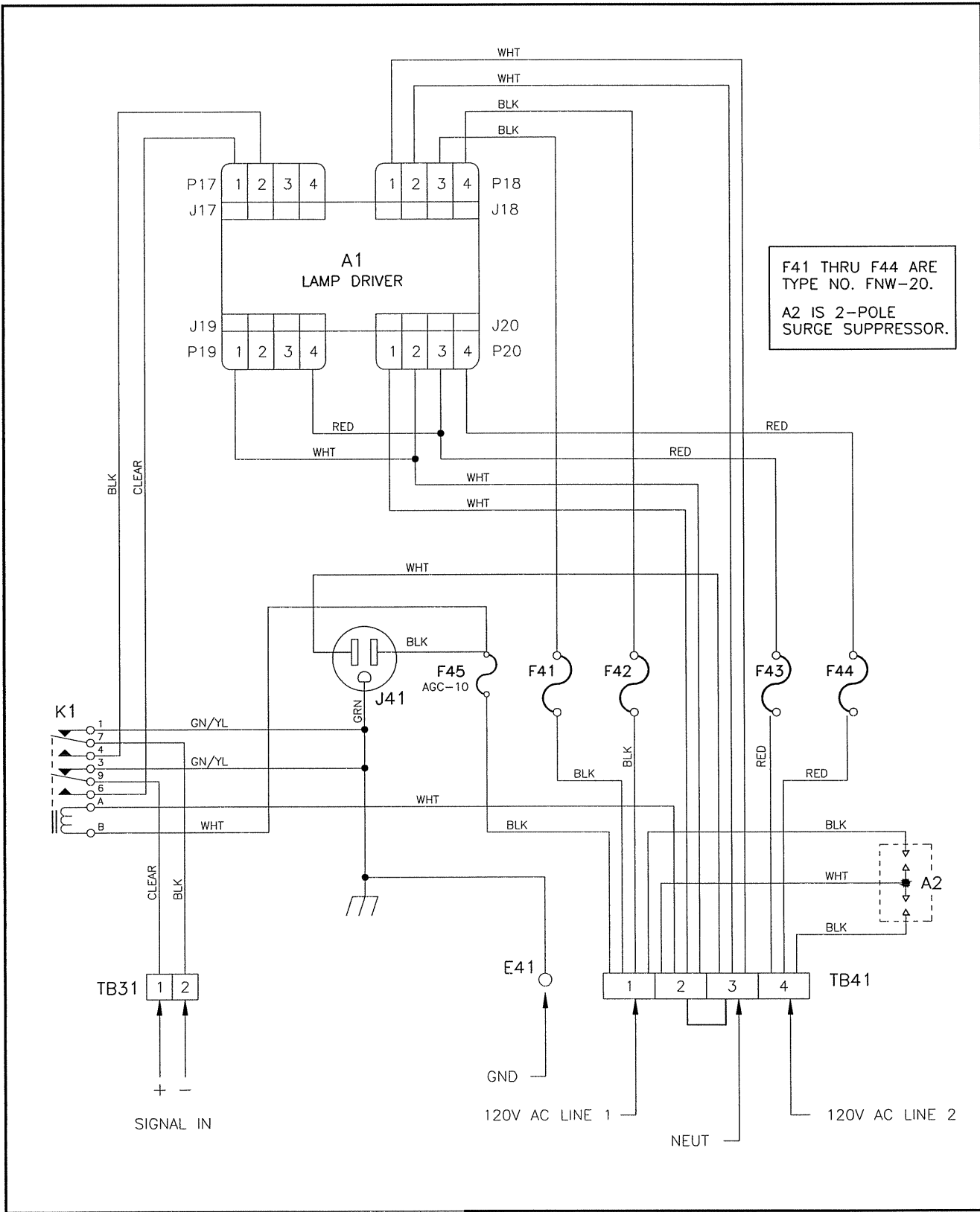
REV.	DATE	DESCRIPTION	BY	APPR.

# Appendix A: Additional Drawings

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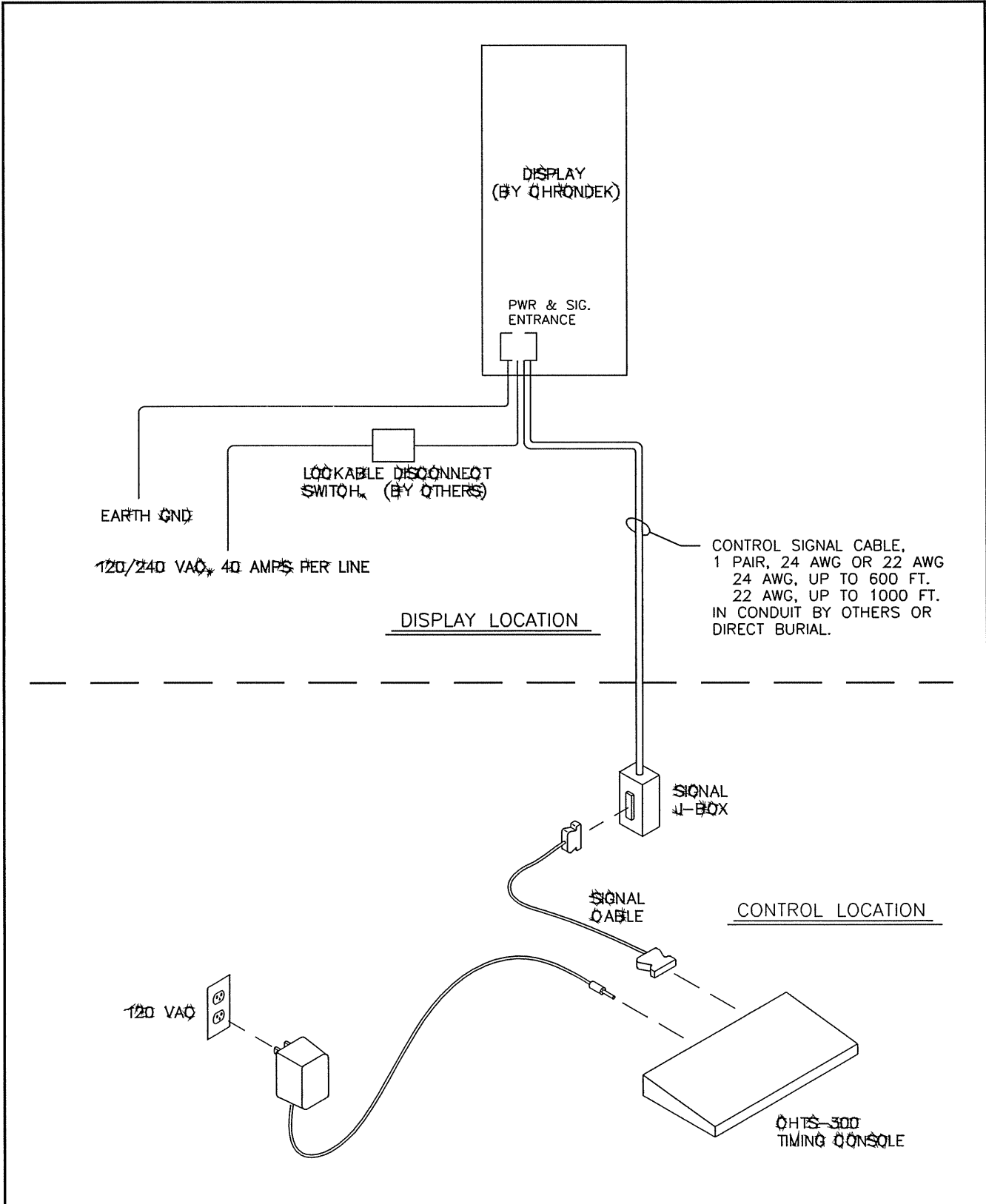
<b>Reference Drawings:</b> Schematic, Driver Display .....	<b>Drawing A-46754</b>
System Layout, CH-1624V .....	<b>Drawing A-46757</b>
Color Code, 25-Pin J-Box .....	<b>Drawing A-47207</b>





F41 THRU F44 ARE  
TYPE NO. FNW-20.  
A2 IS 2-POLE  
SURGE SUPPRESSOR.

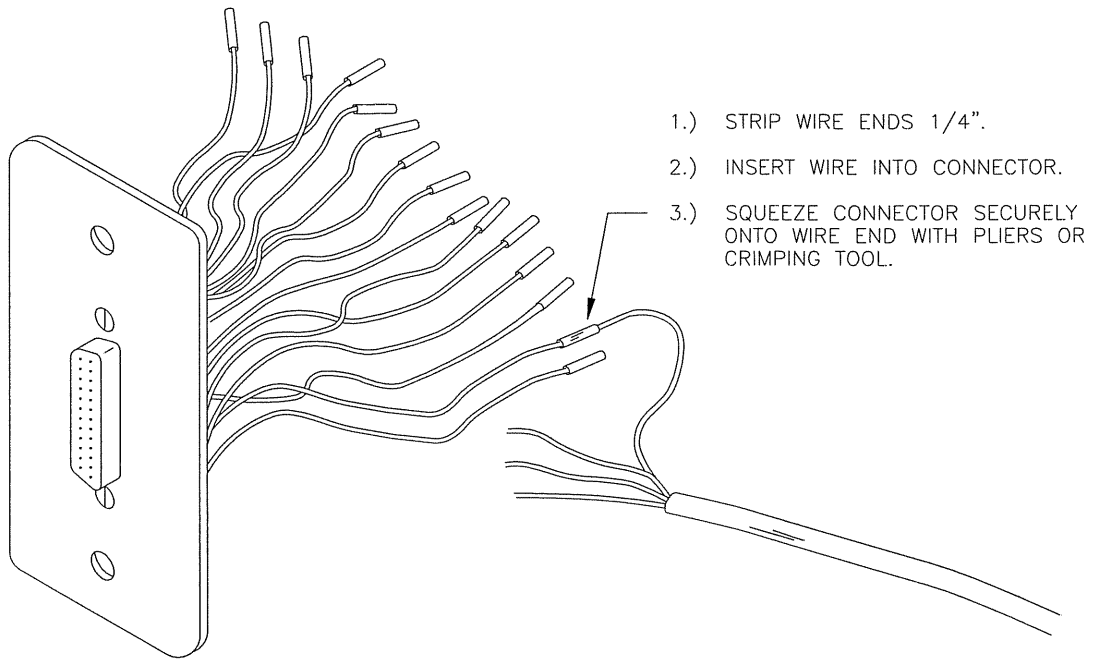
3	4 MAR 93	REMOVED MODEL NO.'S LIST.	C FICK	DAKTRONICS, INC. BROOKINGS, SD 57006	
2	26 MAY 92	ADDED MODEL CH-1036H TO LIST OF MODEL NO.'S.	C FICK	PROJ: CHRONDEK DISPLAYS	
1	25 APR 91	CHANGED DWG TITLE AND ADDED MODEL NO.'S	CF	TITLE: SCHEMATIC, 1 DRIVER DISPLAY	
REV.	DATE	DESCRIPTION	BY	DES. BY:	DATE: 27 MAR 91
			APPR.	DRAWN BY: CF	
				REVISION	APP. BY:
				SCALE: NONE	1081-R03A-46754



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

DAKTRONICS, INC. BROOKINGS, SD 57006				
PROJ: CHRONDEK DISPLAYS				
TITLE: SYSTEM LAYOUT, CH-1624V				
DES. BY: CF		DRAWN BY: CF		DATE: 27 MAR 91
REVISION	APPR. BY: AVB		1081-R04A-46757	
	SCALE: 1=1			

REV.	DATE	DESCRIPTION	BY	APPR.
1	30 APR 91	CHANGED SIGNAL CABLE SPEC.'S.	CF	



PIN NO.	WIRE COLOR	FUNCTION	
1	BLACK	PHOTO 1-N	PHOTOCELL 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 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	THESE PINS TYPICALLY NOT USED BY CHTS TIMER
23	RED/GREEN	4 SIG-N	
13	ORANGE/GREEN	NOT USED	
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	

