INSTALLATION & SERVICE MANUAL FOR CHRONDEK, INC.
AUTO RACING DISPLAY MODEL CH-936H

CHRONDEK, INC. P. O. BOX 586 BROOKINGS, SD 57006 (605) 692-5866 or (800) 854-6556

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1. INTRODUCTION

The illustration on the next page shows a Chrondek CH-936H display. The CH-936H display along with the use of the Chrondek CHTS-300 timing console will display the first three cars positions and lap number on the display.

This manual covers installation of the CH-936H display and provides information for servicing the digits and wiring. Setup of other control equipment or operation of the CHTS-300 timing console are not covered in this manual.

IMPORTANT SAFEGUARDS

- -Read and understand installation instructions before installing.
- -Do not drop the control console or allow it to get wet.
- -Do not disassemble the control console or the electronic controls of the display. If you do, the warranty will be void.
- -DISCONNECT POWER WHEN THE DISPLAY IS NOT IN USE, OR WHEN SERVICING. PROLONGED POWER-ON MAY SHORTEN THE LIFE OF ELECTRONIC COMPONENTS.

2. INSTALLATION

2.1 GENERAL SYSTEM

See the illustration on page 3 for general system layout.

The general procedure for installing the CH-936H display is as follows.

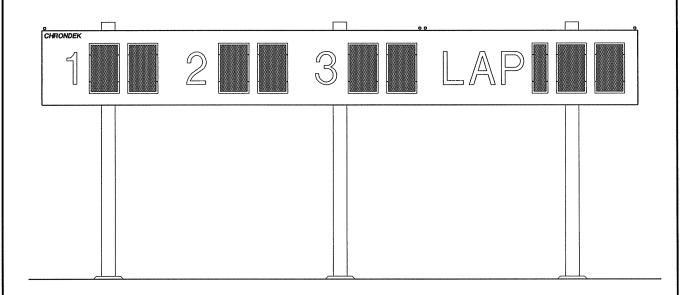
Select beam and footing recommendations from the table on page 4.

Dig the footing holes and install beams and footings.

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

Mount the displays to the beams as described on pages 5 through 8.

Route power and signal wires into the displays as described on pages 9 through 11.



OVERALL DIMENSIONS: 54" H x 432" W x 6" D

WEIGHT: 650 LBS

POWER REQUIREMENTS: 120/240 VAC, 30 AMPS PER LINE

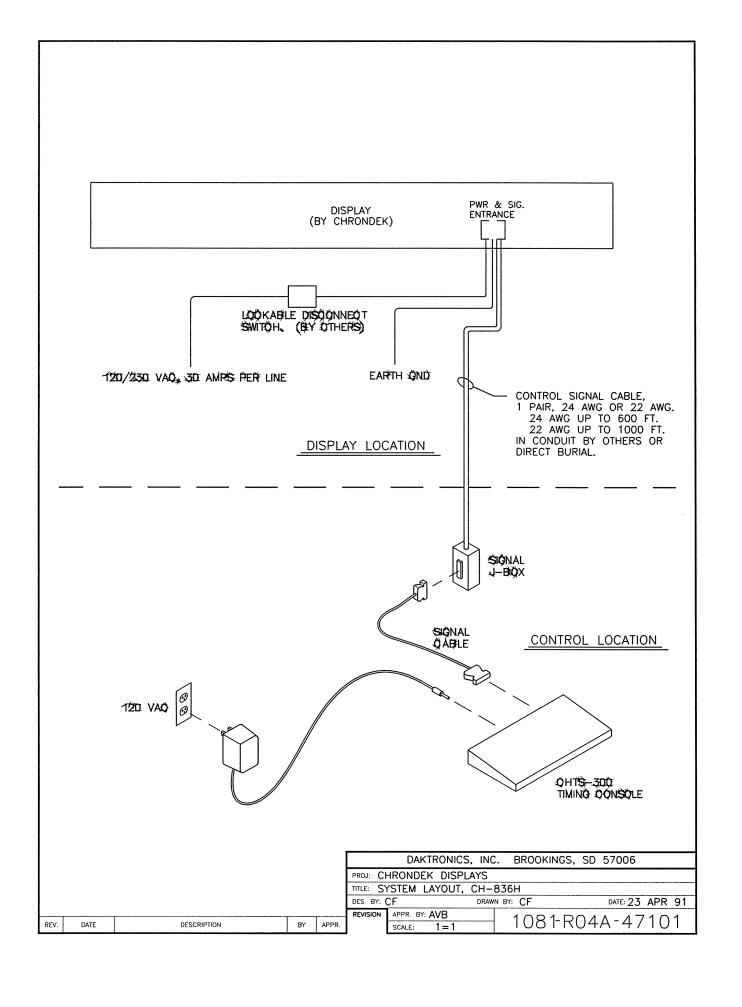
MAXIMUM POWER DEMAND: 4175 WATTS WITH 25W LAMPS. 5010 WATTS WITH 30W LAMPS.

DIGITS ARE 36" HIGH, 4 x 7 MATRICES, WITH 25W FROSTED MED. BASE OR 30W FROSTED, 30R20 REFLECTOR LAMPS.

DAKTRONICS, INC. BROOKINGS, SD 57006 PROJ: CHRONDEK DISPLAYS TITLE: DISPLAY, CH-936H DRAWN BY: C FICKBOHM DATE: 30 MAR 92 DES. BY: REVISION APPR. BY: 1081-R08A-51089

SCALE: 1=60

DESCRIPTION BY APPR. DATE



2.2 BEAM AND FOOTING SELECTION

The table below contains recommendations for W-shape beams and footings to support your display as shown on page 6. 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. Your choice from these columns depends upon your 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 DEPIH X DIA.
70	10	W 8 X 15	5 FT X 3 FT
MPH	15	W 6 X 20	6 FT X 3 FT
00	10	W 8 X 15	5 3/4 FT X 3 FT
70 —	15	W 8 X 20	7 FT X 3 FT
00	10	W 10 X 19	6 1/2 FT X 3 FT
1	15	W 10 X 25	7 3/4 FT X 3 FT

The calculations for footing diameters and depths ar 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. You must be sure that your installation complies with local codes and is suitable for your particular soil and wind conditions. CHRONDEK ASSUMES NO RESPONSIBILITY FOR STRUCTURES INSTALLED BY OTHERS. Chrondek 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, W6 x 25 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 (25) is the weight per foot in pounds. This numbering is a standard in the steel industry. Widths are from 6.25 to 10.25 inches in the chart on page 4.

2.3 DISPLAY MOUNTING

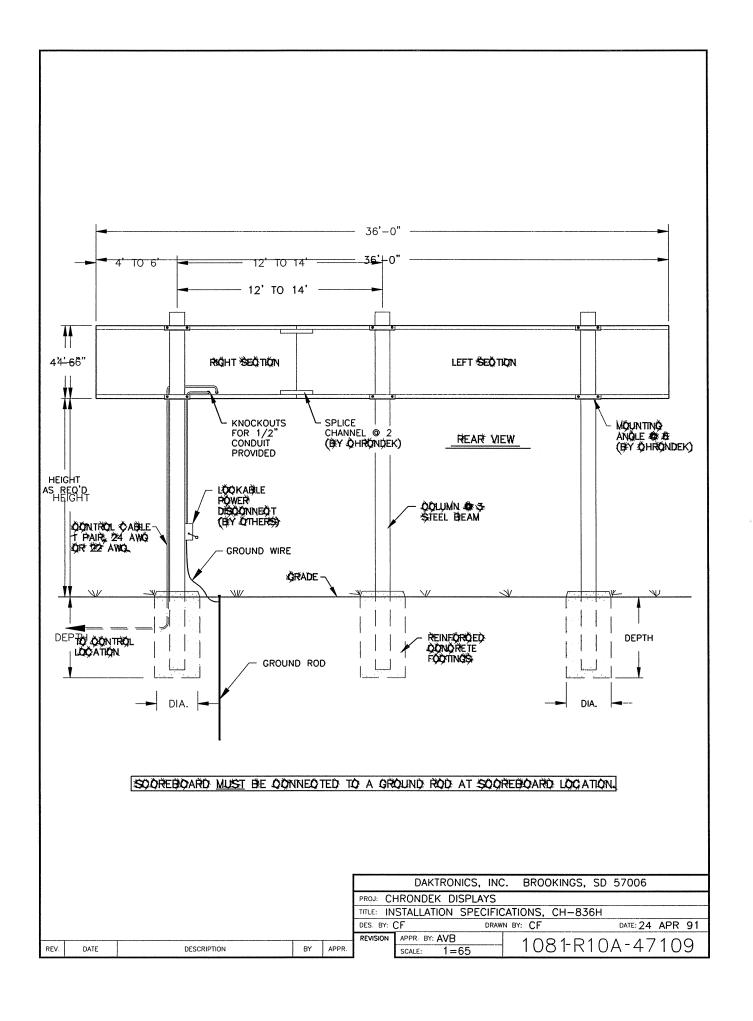
The illustration on Page 7 shows the typical mounting for your display.

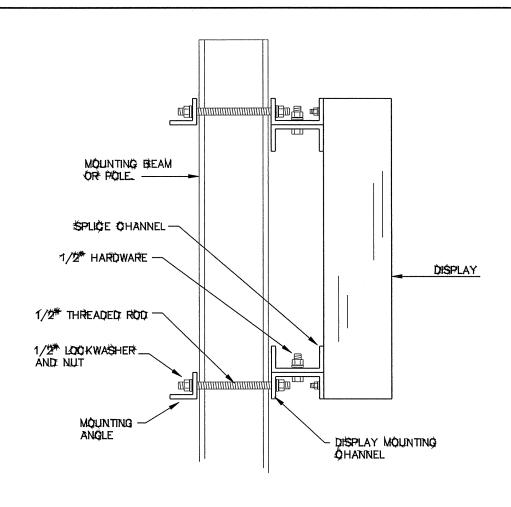
NOTE: The bolts that secure the display to the beams do not go through the beams, but run along both sides of the beam to clamp the display to the beams.

A mounting kit consisting of (6) mounting angles, (2) splice channels and 1/2" hardware are provided to mount your display.

Position the left display section against the mounting beams and secure the bottom of the display to both beams as shown on Page 7. Next, secure the top of the display section to the beams. Once mounting angles are attached, the display section may be slid up or down to the desired height. Once positioned as desired, tighten all nuts securely. Next position the right display section next to the left display section and secure to the beam the same way as the left display section was mounted.

Attach the (2) splice channels at the top and bottom of the display, where the two display sections meet, to secure the two sections together as shown on Page 8.



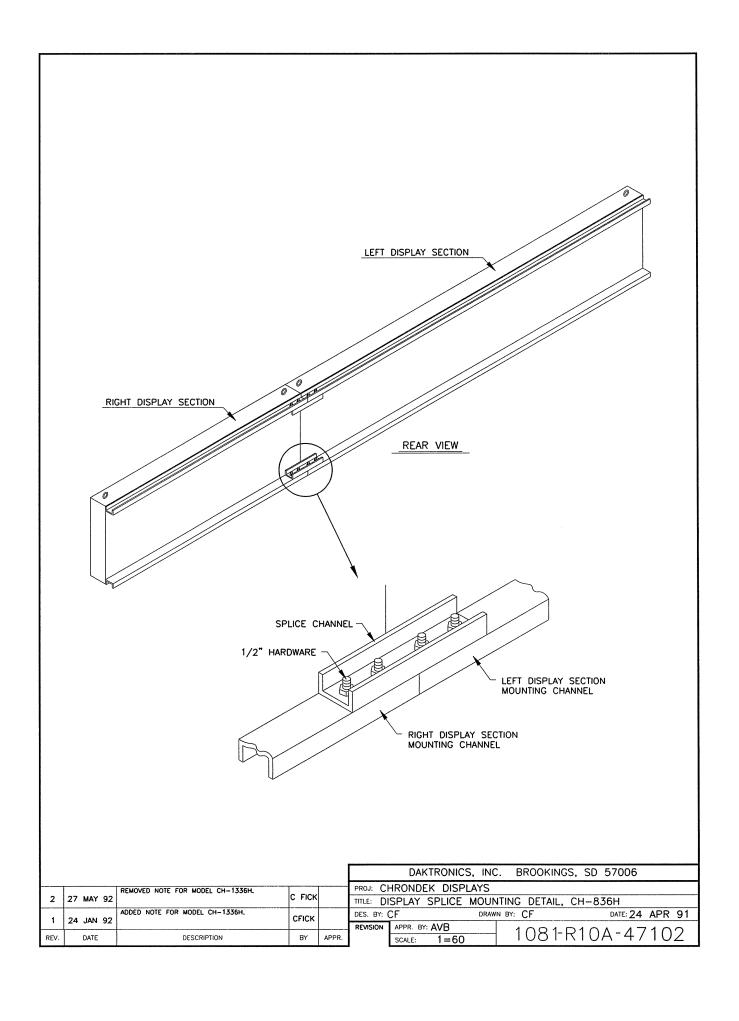


SIDE VIEW

MOUNTING INSTRUCTIONS

- 1.) LOOK ATE WHERE THE CENTER OF THE BEAMS WILL BE ON THE BAOK OF EACH DISPLAY SECTION.
- DISTANCE OF ± 3-50" TO 4-50" FROM CENTER OF EACH DISPLAY SECTION AT A DISTANCE OF ± 3-50" TO 4-50" FROM CENTER OF EACH BEAM.
- 3.) LIFT THE LEFT DISPLAY SECTION IN PLACE FIRST.
- 4.) ATTACH MOUNTING ANGLES AND 1/2" THREADED PODDS AS SHOWN ABOVE.
- 5.) DISPLAY OAN BE SLID UP OR DOWN TO THE HEIGHT REQUIRED.
- 5) TIGHTEN ALL MOUNTING HARDWARE SEQURELY.
- 7.) LIFT THE RIGHT DISPLAY SEQTION IN PLACE NEXT TO THE LEFT DISPLAY SEQTION AND ATTACH MOUNTING ANGLES AND 1/2" THREADED ROOS AS SHOWN ABOVE.
- ATTACH (2) SPILICE CHANNELS AT TOP AND BOTTOM OF DISPLAY TO MOUNTING CHANNELS ON BACK OF DISPLAY.
- E) TIGHTEN ALL MOUNTING HARDWARE SEQURELY.

						DAKTRONICS, IN	C. BROOKINGS,	SD 57006	
		REMOVED NOTE FOR CH-1336H	T	T	PROJ: C	HRONDEK DISPLAYS			
2	27 MAY 92		C FICK		TITLE: DISPLAY MOUNTING, CH-836H				
1	24 JAN 92	ADDED NOTE FOR MODEL CH-1336H	CFICK		DES. BY:	CF DRAV	WN BY: CF	DATE: 24 APR 91	
<u></u>	24 JAN 92		0	01.01		APPR. BY: AVB	100100	004 47400	
REV.	DATE	DESCRIPTION	BY	APPR.	İ	SCALE: 1 = 1	1 108 FRC)8A-47108	



2.4 ELECTRICAL INSTALLATION

2.4.1 Control Signal Cable

For the display, two conductors of 24 AWG, for distances up to 600 feet or 22 AWG, for distances up to 1000 feet are required. Daktronics has the following cables available: Daktronics part no. W-1105, this is a 6 conductor, 24 AWG direct burial cable. Also Daktronics part no. W-1107, this is a two conductor, 22 AWG cable that must be pulled through conduit before it is buried.

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 J-box cover, according to the table below and the illustration on Page 13.

At the display, open the hinged panel covering the entrance enclosure as shown on Page 10. Remove the cover from the entrance enclosure. See Page 11 for an illustration of the components inside the entrance enclosure. Connect the signal wires to TB31 as indicated in the table below.

Cont	Display End							
J-box Wire Terminal no. Color		Output TB31 No. Terminal r						
14	Red/Wht	1*	1 (+)					
15	Grn/Wht	Τ.,	2 (-)					

Signal Connections

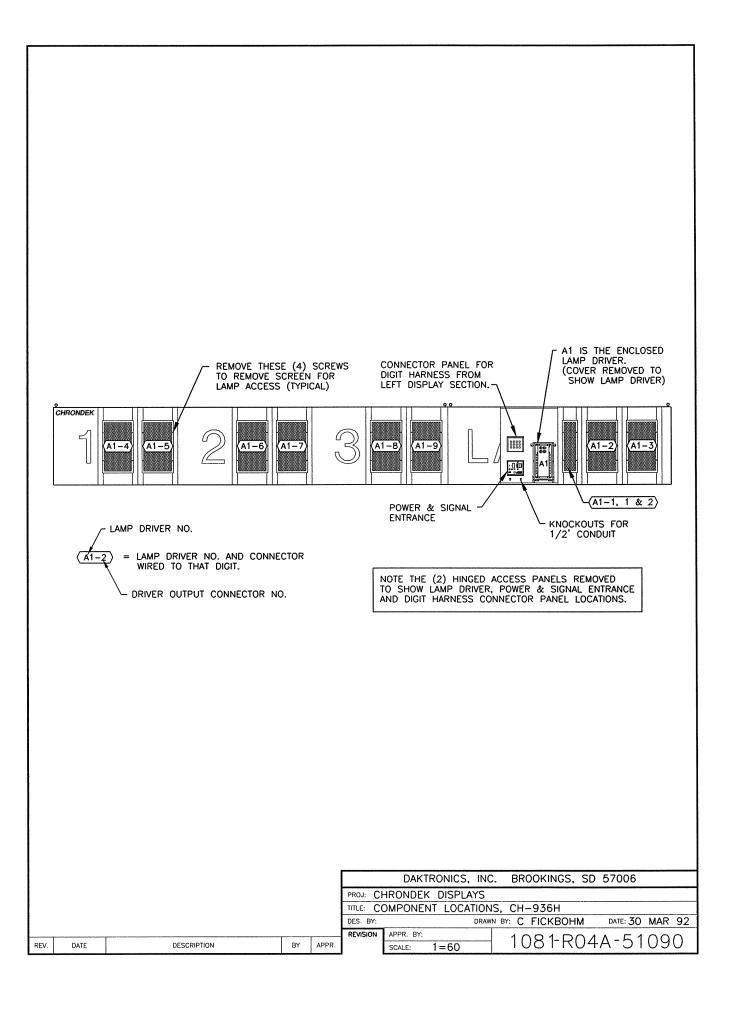
2.4.2 Power Wiring

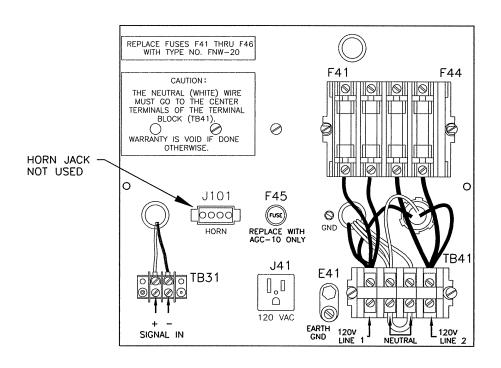
The CH-936H display requires a 120/240 VAC, 30 amp circuit per line. When equipped with 25W lamps, the maximum current draw is 33.33 amps. When equipped with 30W, 30R20 reflector lamps, the maximum current draw is 40 amps.

Route power wires into the display and connect to TB41 in the entrance enclosure, as shown on Page 11.

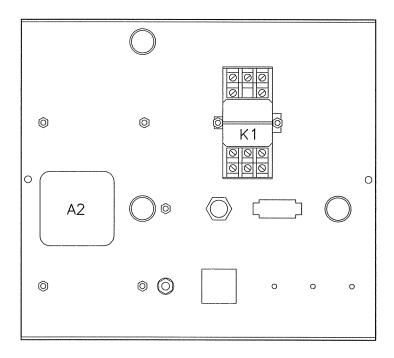
Connect the ground wire to E41 and to a ground rod near the display, according to your local codes.

^{*}Auxiliary display(s) require(s) a different output no.(s). Consult your CHTS-300 console manual.



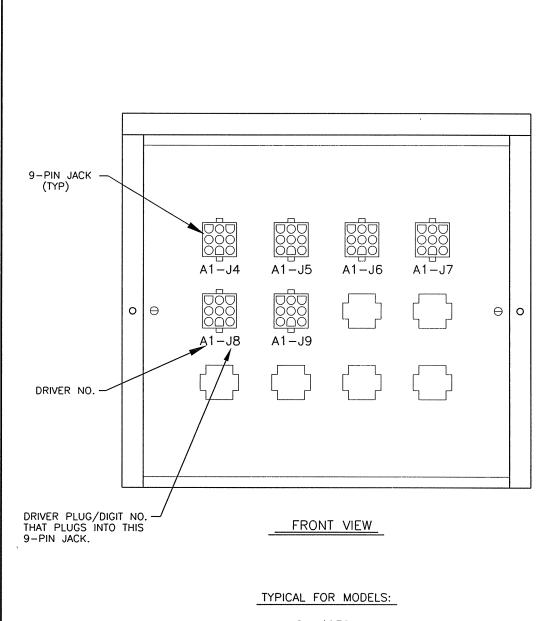


FRONT VIEW



REAR VIEW

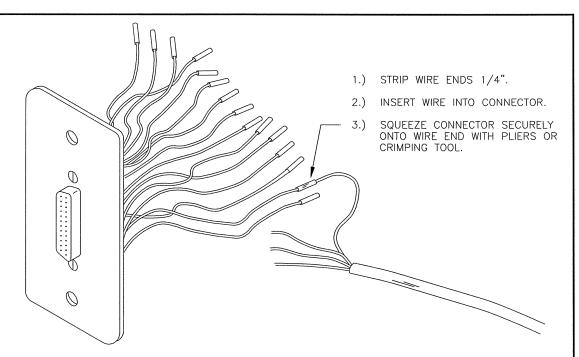
3	4 MAR 93	REMOVED LIST OF MODEL NO.'S	C FICK		D	AKTRONICS, INC. BROOKINGS, S	SD 57006
2	27 MAY 92	ADDED CH-1036H TO LIST OF MODEL NO.'S.	C FICK			DEK DISPLAYS IG ENTRANCE, 1 DRIVER DISPLAY	Y
1	25 APR 91	CHANGED DWG TITLE AND ADDED MODEL NO.'S.	CF		DES. BY:	DRAWN BY: CF	DATE: 27 MAR 91
REV.	DATE	DESCRIPTION	BY	APPR.	REVISION APPR. SCALE		4A-46755



CH-1036H CH-1336H

2	18 MAY 93	ADDED MODEL CH-1036H	C FICK	
1	20 JAN 91	ADDED CH-1336H NOTE	CFICK	
REV.	DATE	DESCRIPTION	BY	APPR.

		DAKTRONICS,	INC	. BROOKINGS,	SD 57006	;	
	PROJ: CI	HRONDEK DISPLA	YS				
	TITLE: C	ONNECTOR PLATE	, C	H-836H			
	DES. BY: (DRAW	N BY: CF	DATE: 2	5 APR	91
	REVISION	APPR. BY: AVB		100100)4A-4	710	0
PR.		COU. 5. 1 - 7			14H - 4	/ /	\circ



PIN NO.	WIRE COLOR	FUN	CTION
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	

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.

		DAKTRONICS,	INC.	BROOKINGS,	SD 57006		
_	PROJ: C	HRONDEK					
	TITLE: C	DLOR CODE, 25-	-PIN	J-BOX			
	DES. BY: CF DRAW			BY: CF	DATE: 1	MAY	91
PR.	REVISION	APPR. BY: AVB		1067-R1	IOA-4	720)7

3. SERVICE

DISCONNECT POWER FROM DISPLAY BEFORE SERVICING.

3.1 LAMP REPLACEMENT

The primary service required by the CH-936H display is to replace burn-out lamps. See Page 15 for an illustration of lamp changing. Replacement lamps are 120V, 25W frosted, medium base, available at your local store or directly from Chrondek, part number DS-1029. Some displays may be equipped with 120V, 30W reflector type 30R20 lamps, Chrondek part number DS-1126.

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

3.2 LAMP DRIVER

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 16 is an illustration of the lamp driver and the fuses located in it.

The lamp driver has 21 connectors, providing power and signal inputs and outputs to digits. The functions of these connectors are as follows:

Connector no.	<u>Function</u>
1 - 16	Outputs to digits
17	Signal Input
18	Power input for outputs 1-8 (120V)
19	Power input for driver logic and fan (120V)
20	Power input for outputs 9-16 (120V)
24	Dim option selector

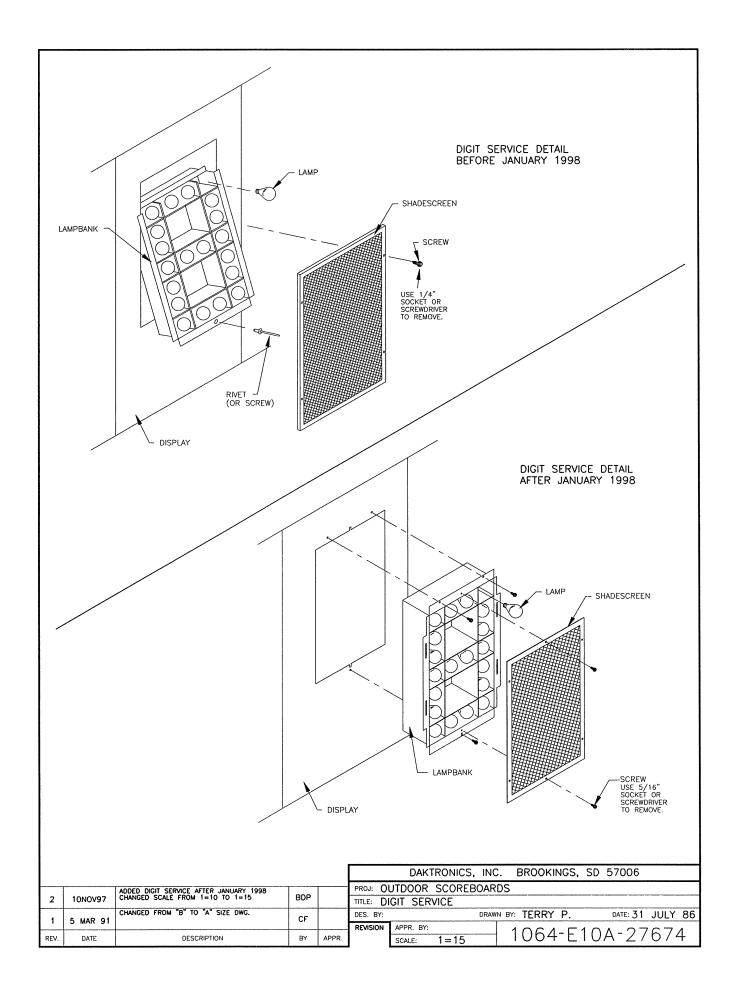
On page 10, the numbers on the digits refer to the lamp driver output connector wired to each digit.

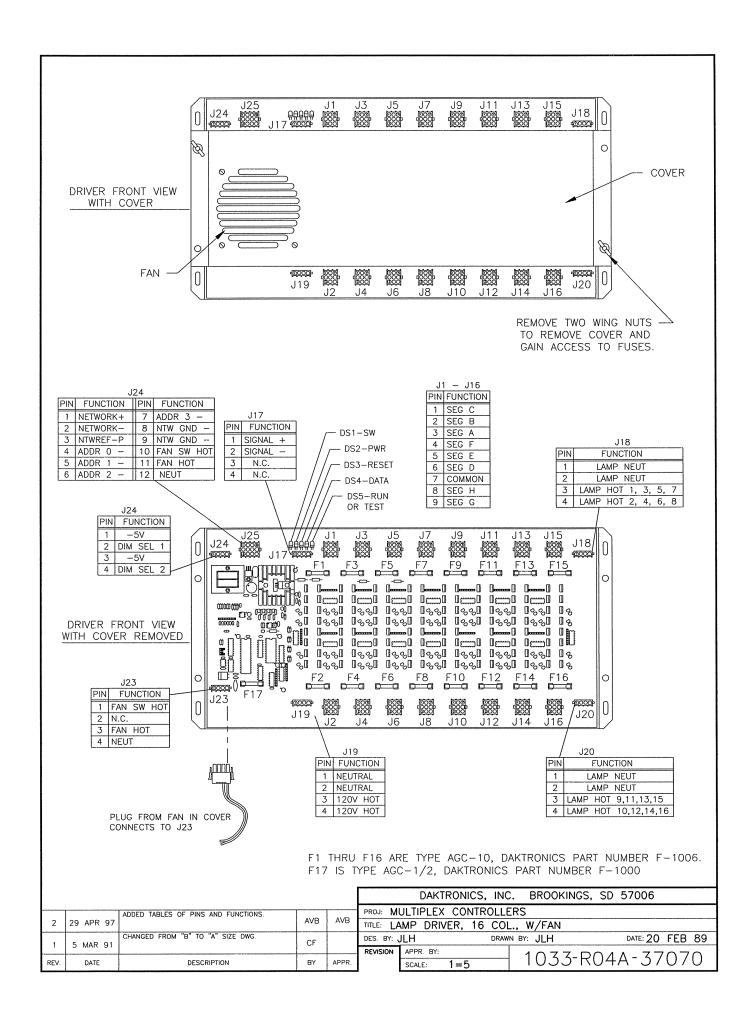
3.3 DIGIT SEGMENTATION

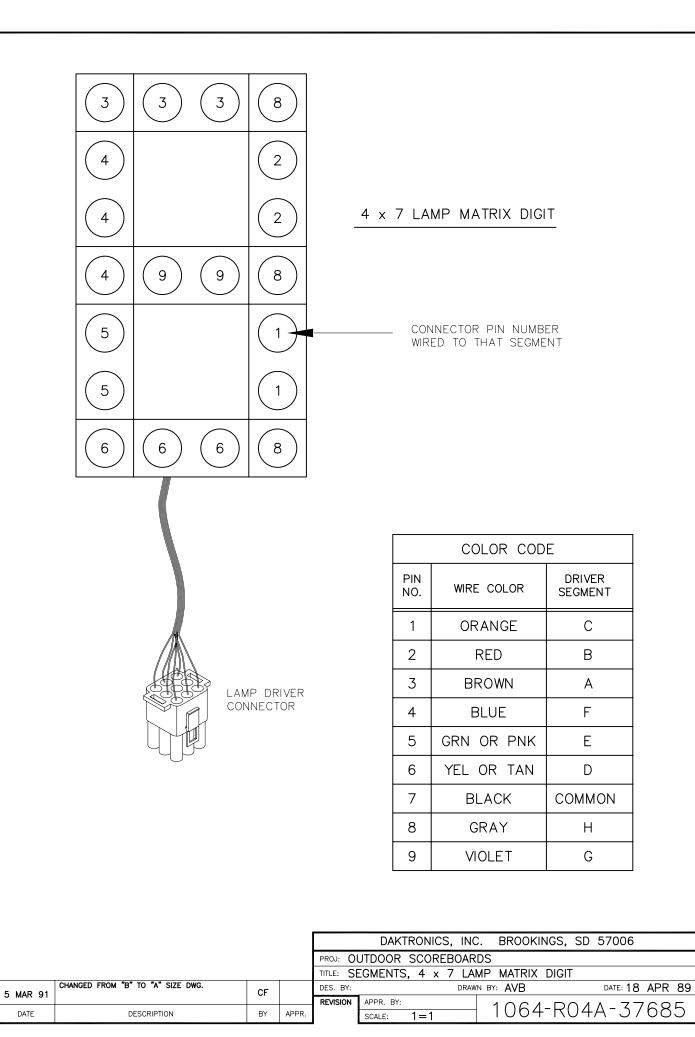
In a digit certain lamps always go on and off together. These groupings of lamps are known as "segments". Each digit has eight segments, referred by letters A through H. Page 17 illustrates these segments and shows which connector pin and wire color is wired to each segment.

3.4 SCHEMATIC

The schematic diagram on page 18 shows the power and signal inputs into the display and to the lamp driver. The component numbers correspond to those shown on page 10 and 11.

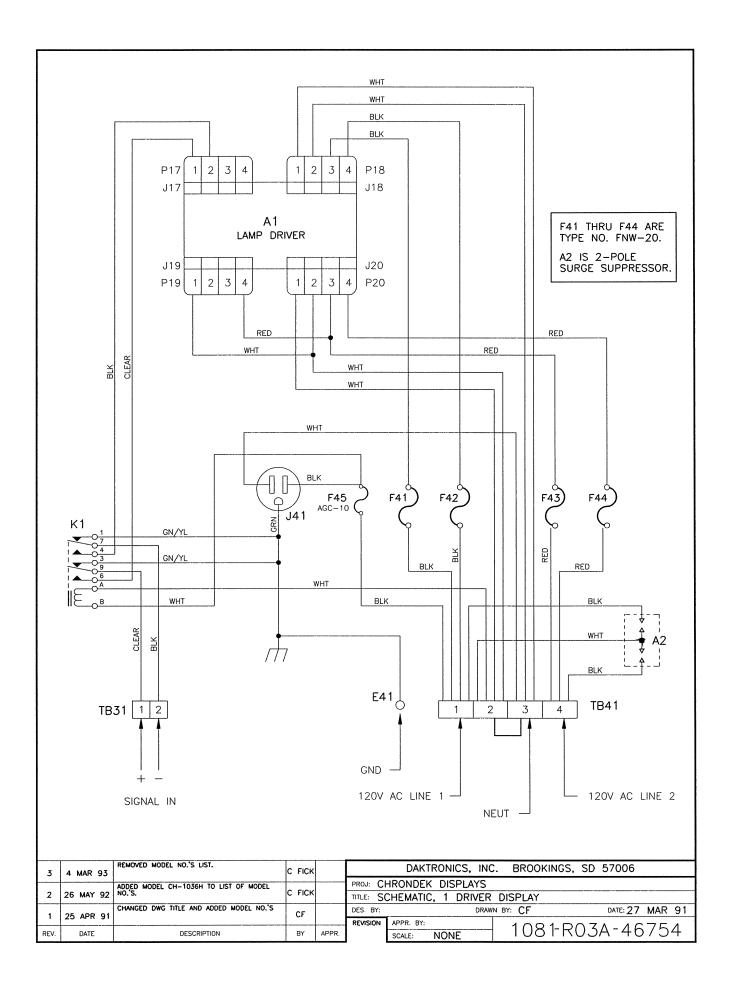






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REV.



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. That is, connect the plug from the digit into a different jack. If the same digit shows the same problem, the cause may be in the digit or wiring. If the problem moves to another digit, then the cause is probably an internal driver problem.

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

3.6 REPLACEMENT PARTS

Part Name or Description	<u>Type</u>	Chrondek <u>Part Number</u>
Lamp Driver		A-1033-42
J-Box, CHTS-300 Timer	A-1067-56	
Fuse, main power, 20A FNW-20		F - 1016
Fuse, Lamp Driver, 10A	AGC-10	F-1006
Fuse, Driver Logic, 1/2A	AGC-1/2	F-1000
Digit Lampbank, 36" 4 x 7	A-1081-73	
Digit Screen, 36" 4 x 7	S-1081-38	
Digit Lampbank, 36", 1 x 7	A-1081-101	
Digit Screen, 36", 1 x 7	S-1081-52	
Socket, Med. Base	X-1046	
Lamp, 30W Frosted, Reflector T	DS-1126	

For parts not listed, or for more information about installation 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.