RACEAMERICA

INNOVATION. TECHNOLOGY. RELIABILITY.

Large Digital Display Owner's Manual

Models 6650D/6450D
Code Rev H.4 and later

Rev J

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RACE AMERICA

INNOVATION. TECHNOLOGY. RELIABILITY.

LIMITED WARRANTY

To the original purchaser of this RaceAmerica product, RaceAmerica warrants the product to be in good working order for a period of ninety (90) days from the date of purchase from RaceAmerica or an authorized RaceAmerica distributor. Should this product malfunction during the warranty period, RaceAmerica will, at its option, repair or replace it at no charge, provided the product has not been subjected to misuse, abuse, or alterations, modifications, and/or repairs not authorized by RaceAmerica.

Any product requiring Limited Warranty service during the warranty period should be returned to RaceAmerica with proof of purchase. If return of merchandise is by mail or common carrier, the customer agrees to insure the product, prepay shipping charges, and ship the product to RaceAmerica, Inc. for service.

ALL EXPRESSED AND IMPLIED WARRANTIES FOR THIS PRODUCT ARE LIMITED IN DURATION TO THE ABOVE NINETY DAY PERIOD.

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PRODUCT OVERVIEW

The Model 6650/6450 Large Digital Displays (hereafter referred to as 6X50) are microprocessor controlled systems based upon the 7-segment format display digit using the latest technology Ultra-Bright LEDs. The display uses an RS422 serial link to receive data to be displayed. The 6X50 is capable of displaying numbers 0 through 9 and alpha letters A through Z with the exception of K, M, and W. Selected punctuation marks are also among the displayable character set listed in the back of this manual. The 6X50 is designed to connect to RaceAmerica timers, RaceAmerica custom timers, personal computers running race management software, and selected non-RaceAmerica timers. Timer selection and data format is selected through the DIP switch settings located on the rear of the display. Because of the long range viewing of this display, it can include an internal wireless data link eliminating long length cables.

NOTE: THIS PRODUCT USES ULTRA-BRIGHT LED TECHNOLOGY. DUE TO THE BRIGHTNESS LEVEL OF THIS DISPLAY, CARE SHOULD BE TAKEN, AS WITH ANY BRIGHT LIGHTING SOURCE,TO AVOID PROLONGED VIEWING AT CLOSE RANGE AND SHORT DISTANCES. AS WITH ANY BRIGHT LIGHTING SOURCE, VISION MAY BE AFFECTED SHORT TERM SIMILAR TO A CAMERA FLASH.

PACKAGE COMPONENTS

1 - Large Digital Display comprises
6650D/6450D - Hard wired model
6650DW/6450DW - 900mhz Wireless model
6650DX/6450DX - 2.4ghz Wireless model

1 - Power Patch Cord
1 - Owner's Manual

Model 6X50 Available Options:

07-3434 RS422 Data Cable
6501A 12V/2A AC Power Adapter (6650)
6524A 25V/2.5A AC Power Adapter (6450)
4520 Wireless RF Data Links - 900 Mhz
4620 Wireless RF Data Links - 2.4 Ghz
6601A Permanent installation kit (includes AC Adapter and rear cover)
4500 - RS232 to RS422 Data Comm POD
07-4554-5 RS232 Data Cable (timer to POD)
6033A - PC Cable for output from PCs

PRODUCT SPECIFICATIONS 6650

Display Type:	7-Segment
Digit Height:	Fifteen Inch Tall
Number of digits:	Five
Dimensions:	64"W x 22.25"H x 4"D
Mounting:	3/8-16 PEM nuts on back
Housing:	Powder coated aluminum
View Filter:	Red Transparent acrylic
View Range:	660' in full sun
Data Display:	0.000 sec to 99.999 sec
	0.00 sec to 999.99 sec
Power:	12VDC/2A
Data Comm:	RS422 Serial
Weight:	45#/21Kg

PRODUCT SPECIFICATIONS 6450

Display Type:	7-Segment
Digit Height:	Twenty-four Inch Tall
Number of digits:	Five
Dimensions:	98"W x 29"H x 4"D
Mounting:	3/8-16 PEM nuts on back
Housing:	Powder coated aluminum
View Filter:	Red Transparent acrylic
View Range:	1000' in full sun
Data Display:	0.000 sec to 99.999 sec
	0.00 sec to 999.99 sec
Power:	25VDC/2.5A
Data Cimm:	RS422 Serial

POWER REQUIREMENTS

The 6650 Large Display can be powered by a 12VDC automotive battery or any 12VDC power source capable of 2.0 ampere current load maximum. Average power consumption is approximately 0.85 ampere. Maximum voltage should never exceed 13.2VDC at the Power Input Connector (NO chargers or running cars).

The 6450 Large Display is powered by a 25VDC/2.5A souce; AC adapters are available from RaceAmerica.

LOCAL REQUIREMENTS

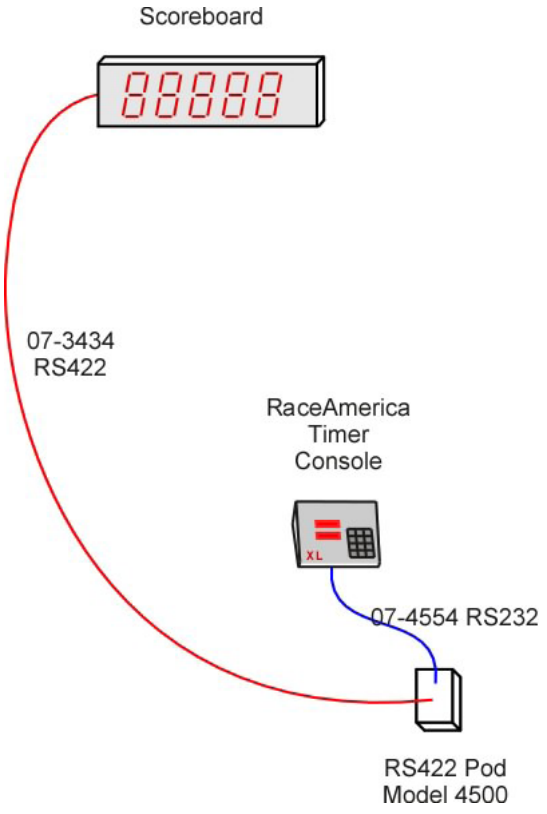
Additional items required to operate the 6X50 Series Digital Display and options:

1 - 12VDC automotive battery (6650)
1 - 25VDC Power source (6450)
1 - Data cable or Wireless Link Units

The 6450 scoreboard should be mounted in a structure for the five digits. This structure can then be suspended or secured to the ground.

Other options:
AC power source for AC adapters

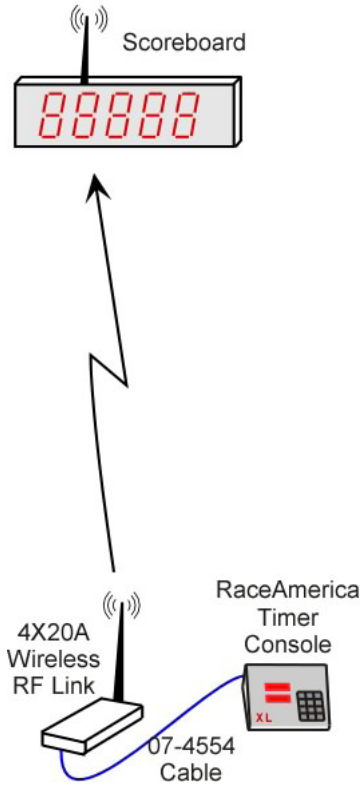
WIRING DIAGRAM FOR TIMER TO SCOREBOARD



Model 6X50D

The Scoreboard connects to the Timer through a RS422 Multidrop communication link as follows:

Connect the cables as shown above.



Models 6X50DW & 6X50DX

The Wireless Network Data Comm Link units replace the Cable and POD.

Figure 1 - Timer to scoreboard cabling

PRODUCT SET-UP

The model 6X50 Large Digital Display is designed to be mounted to a rigid strructure or poles using the 3/8-16 PEM nuts on the back side of the display. See Figure 2.

The model 6450 24" Large Display is assembled as five individual digits. Assembly bolts hold the individual digits together. See Figure 3.

Assemble using the digit position labels located on the top of each digit (segment is identified by the inverse printing of its number). A full unit will have segments one thru five assembled from left to right, digits facing forward.

Connect the cable to the connector between each two digits as they are assembled. A horizonal and vertical frame structure is required to mount the scoreboard (see figure 3).

The 6428 scoreboard should be mounted in a structure for each five digits. This structure can then be suspended or secured to the ground.

STEP 1 - Configure the Display

The 6X50 has two banks of DIP Switches located on the backside of the display (Figures 4 & 5). They are used to match the communications format and the display format to the data sent to the display from the paricular timing system or PC. To determine the correct switch settings, read the **DIP SWITCH SETTINGS** section of this manual. Switch settings have two positions, ON and OFF. The ON position is indicated on the DIP switch and is active when the switch button is moved to the right side when viewed from the back of the display. Switch 3 (bank S1) sets the display format to either SSS.FF or SS.FFF (Seconds.Fractions).

STEP 2 - Establish Data Interface

The 6X50 can receive date either via hard wire (Model 6X50D) or via an internal wireless data link (Model 6X50DW/6X50DX). See Figure 1.

For models 6X50D, an interface cable contains an RJ45 modular connector on one end of the cable and is connected to the display using the RS422 SERIAL PORT connector on the back of the display. When inserting this connector, press inward until a click is heard to lock the cable in place. If the cable remains loose and no click is heard, carefully bend outward the locking tab on the RJ45 connector approximately 45 degrees from the connector body. Re-insert the cable into the serial port until the click is heard and the cable remains locked in place. To remove this cable, pinch the locking tab against the body of the RJ45 connector and pull the connector out.

Depending upon the type of timer or PC connected to the display, the other end of the cable may contain an RJ45 connector for RaceAmerica timing systems. In this case, either end of the cable can be connected to the display or the RaceAmerica timer. If connecting to a PC or non-RaceAmerica timer, a 9-pin D-sub connector will terminate the other end of the cable and should be inserted into the serial communications port to be used to send data to the display. The Scoreboard requires RS422 format data input. PODs and wireless links convert RS232 format to RS422 format. This may require appropriate PODs,wireless links and cabling.

Multiple displays or RS422 devices can be daisy chained using the second RS422 port on the back of the display.

For models 6X50DW/6X50DX, an Internal Wireless Data Network is installed, simply install the antenna on the display and connect a standalone Wireless Data Transceiver at the data source.

STEP 3 - Connect the Power

Power is supplied to the display through the 12VDC POWER INPUT (6650) or 25VDC POWER INPUT (6450) connector located on the rear of the display. Connecting power to the display will start the power-up self-test mode.

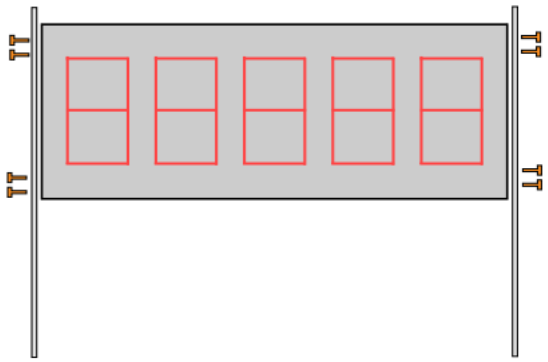
POWER-ON SELF-TEST

When the 6X50 power source is connected, the display begins an internal self-test and and external visual check of the display elements.

The self-test begins by stepping through each segment of all five digits, one segment at a time including the colon or decimal point which exist to the right of each digit except the right-most digit. The self-test continues by sequentially illuminating each segment until all segments, colons, and decimal points are on. The self-test continues by drawing a square frame by sliding a small square from left to right, then down and right to left. The square then collapses and the revision level of the code running in the microprocessor is displayed. When the internal self-test and external visual test is complete, **[rEAdy]** scrolls in from left to right and blanks out. The display is now ready for use.

NOTE: IF SWITCH NUMBER 1 ON THE LEFT BANK IS SET TO THE 'OFF' POSITION DURING THE POWER-UP SELF-TEST, THE DISPLAY WILL CONTINUOUSLY LOOP ON THE SELF-TEST UNTIL SWITCH NUMBER 1 IS SET TO THE 'ON' POSITION.

Scoreboard Mounting



Mounting the scoreboard with posts at each end secured to horizontal straps across the back. 3/8-16 bolts go into PEM nuts secured to the back of the display.

Figure 2 - Hanging/Mounting options

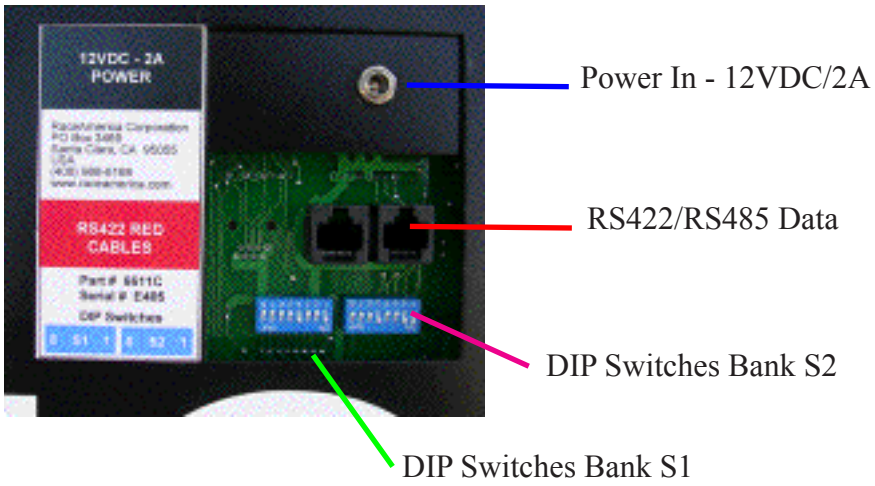


Figure 4 - 15" Scoreboard Cable connections and DIP Switches

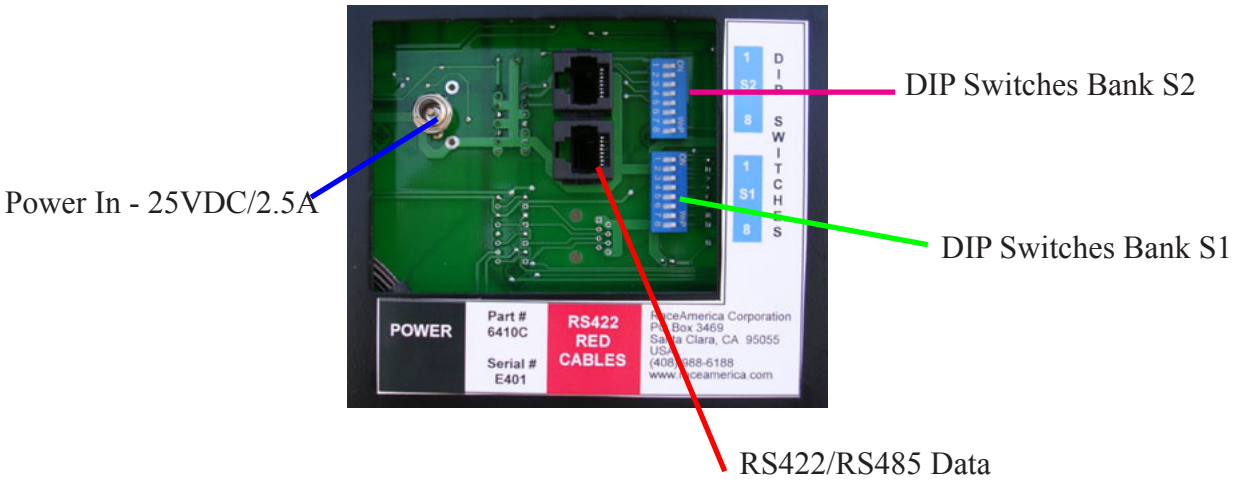


Figure 5 - 24" Scoreboard Cable connections and DIP Switches

DIP SWITCH SETTINGS

6X50 Large Display models have two banks of eight DIP switches (S1 (left-6650/lower-6450) and S2 (right-6650/upper-6450)) located on the back of the unit numbered from 1 to 8 and can be switched ON or OFF. The ON position is indicated on the switch itself. Each switch function and setting are discussed below.

Large Displays ship from the factory with the most likely DIP switch settings for the display model.

DIP Switch Bank S1

DIP S1 SWITCH SETTINGS for RACEAMERICA TIMER AC4 3800/3850

The 6X50 works with the Timer AC4 running F.xx.7 code (ss.fff, 3800, PC mode) and all revisions of 3850 systems as displayed on the Timer AC4 during power up, use the following switch settings:

Switch	Position
1	ON
2	ON
3	ON (ss.fff) or OFF (sss.ff)
4	ON
5	ON
6	OFF
7	ON
8	OFF

DIP S1 SWITCH SETTINGS for RACEAMERICA S-TRAP 3230D

When connected to a RaceAmerica Model 3230 S-Trap Timing System, use the following switch settings. Configuration of the printer and serial port of the S-Trap system should not be changed from its power up settings.

Switch	Position
1	ON
2	ON
3	ON
4	ON
5	OFF
6	OFF
7	ON
8	OFF

DIP S1 SETTINGS for CONNECTION TO PC'S, RACEAMERICA TIMER MB 3210D, RACEAMERICA LAPTIMERS 3900D/3905D and Display Timers XX32E

When the 6X50 Large Display is connected to a PC (or a 3800 AC4 in PC Mode) running race management software capable of interfacing to large displays using the Chronomix data string format, use the following switch settings for operation at 9600 baud and using a seconds format (ss.fff):

Switch	Position
1	ON
2	ON
3	ON
4	ON
5	ON
6	OFF
7	ON
8	OFF

DIP S1 SWITCH SETTINGS for RACEAMERICA TIMER SBD 3220D

When the 6X50 is connected to a RaceAmerica Timer SBD use the following switch settings for proper operation. The 6X50 must be running H.2 or later revision of code (displayed during the power up sequence) in order to display the LANE NUMBER and ELAPSED TIME when connected to the Large Display port on the console.

Switch	Position
1	ON
2	ON
3	ON
4	OFF
5	OFF
6	OFF
7	ET lane 1 -ON or ET lane 2 -OFF
8	OFF

DIP Switch Bank S2

The 6X50 model operates with RS422 data input; RS232 format output from a timer or PC will require a communications POD (4500) or Wireless Link Unit (4X20A) to convert the data format to RS422; call RaceAmerica for specific requirements.

DIP S2 SWITCH SETTINGS WIRELESS OR HARD WIRED DATA INPUT

The 6X50 works with wireless or hard wired RS422 data input; use the following switch settings for the Right Bank :

Switch	Wireless	Wired
5	OFF	ON
6	ON	OFF

Leave all other S2 switches as configured from the factory (1/2/7/8 OFF, 3/4 ON)

DIP SWITCH DEFINITIONS

The 6X50 can operate in different modes dependent upon the device sending the information and race results to be displayed. The 8 DIP switches located on the back of the Large Display (S1) are numbered from 1 to 8 and can be switched ON or OFF. The ON position is indicated on the switch itself. Each switch function and setting are discussed below as well as recommended settings when connected to RaceAmerica timing systems, non-RaceAmerica timers, PC's running race management software for auotcross, and devices conforming to established industry standard data formats.

Display Hold Time - S1

Switch number 2 determines the length of time to display the race results before clearing the display. When race results are displayed, the display will continue to display the results for either 15 seconds for fast paced action or 120 seconds for large viewing audiences. If the display is sent new race results prior to the 15 or 120 seconds expiring, the display will be updated with the new results and the display hold time timer is reset to 15 or 120 seconds.

Display Hold Time	2
15 seconds	ON
120 seconds	OFF

Data Sources - S1

Switches 4 and 5 are set to match the type of timing system connected to the Large Display in order for the Large Display to decode the information to be displayed. The following table is used to set the switches to select the type of data source hardware:

Data Source Type	4	5
S-Trap 3230D	ON	OFF
Timer SBD 3220D	OFF	OFF
Timer AC4 3850D	ON	ON
Custom Timer 3204	ON	ON
Timer MB 3210D	ON	ON
LapTimer 3900D/3905D	ON	ON
Display Timer XX32E	ON	ON
JA Circuits Timer	ON	ON
Chronomix Format	ON	ON
PC w/ AutoX/TS software	ON	ON
PC w/ AXware software	ON	ON
PC w/ GPSoftware	ON	ON
PC w/ Display Utility	ON	ON

Diagnostic mode - S1

Switch number 1 enables and disables the diagnostic capabilities of the Large Display. When enabled, the Large Display receives data and displays error codes when invalid data has been received. The following table is used to set switch number 1 to enable/disable the diagnostic feature:

Diagnostic Mode	1
Disabled	ON
Enabled	OFF

NOTE: IF SWITCH NUMBER 1 (LEFT BANK) IS SET TO THE 'OFF' POSITION DURING THE POWER UP SELF-TEST, THE DISPLAY WILL CONTINUOUSLY LOOP ON THE SELF-TEST UNTIL SWITCH NUMBER 1 IS SET TO THE 'ON' POSITION.

Display Formats - S1

Switch number 3 sets the display format to ss.fff format (where s is seconds and f is fractions of a second or sss.ff format. The format is set to match the format of the race results data sent to the Large Display. The following table is used to set the switches to select the desired display format on the Large Display.

Display Format	3
ss.fff	ON
sss.ff	OFF

DISPLAY UTILITY

RaceAmerica offers a Windows based Display Utility for download from it's web site (http://www.raceamerica.com) to handle some of the special functions discussed here without requiring knowledge of the specific character command sets.

The utility allows several functions to be sent from the PC to the display - a time of day clock, a countdown timer, a six digit time, a combination display of time and position summary and up to six word sentences. This is also helpful for troubleshooting.

The 6X50 will display ONLY the left-most five digits of text units sent from the utility and will correctly display five numeric digits based on the setting of DIP switch 8 (S1).

DISPLAY MAINTENANCE

The model 6X50 Large Digital Display does not require any maintenance to maintain proper operation. If the display is to be used in rainy or wet conditions, it is suggested to protect the back panel from direct moisture by shielding the connection to power and the serial port. RaceAmerica offers a Permanent Installation Kit which includes a cover and AC Adapter.

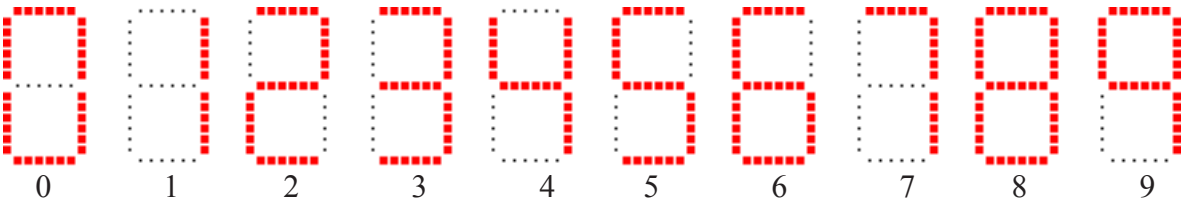
To clean the red lens, use a non-abrasive cleaner on a soft cloth. This will keep the protective lens clean and maximize visibility and clarity of the digits. If the red lens is soiled with mud or dirt, gently remove the grit using water and a soft cloth being careful not to press when wiping to avoid scratching the red lens material.

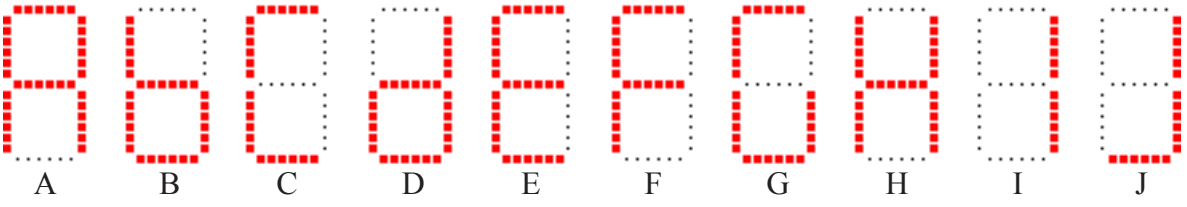
SPARE PARTS

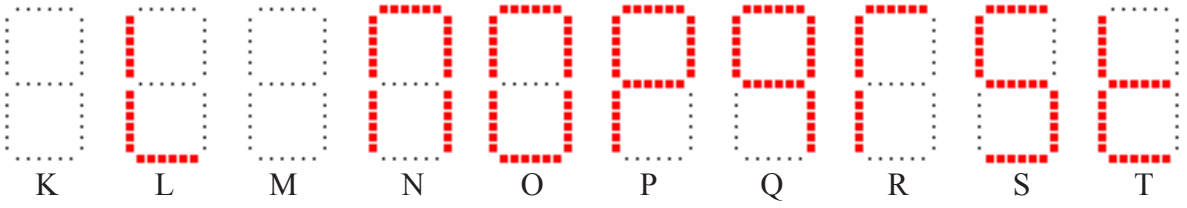
Further to minimize race program interruptions, RaceAmerica recommends some spare parts. While the Display may not shut down the racing action, a spare emitter/sensor pair and sensor cable should be available in the event of an unfortunate accident during a program. Related cables and PODs for the Display should be considered. Contact RaceAmerica for availability and pricing of spares items.

SUPPORT AGREEMENTS

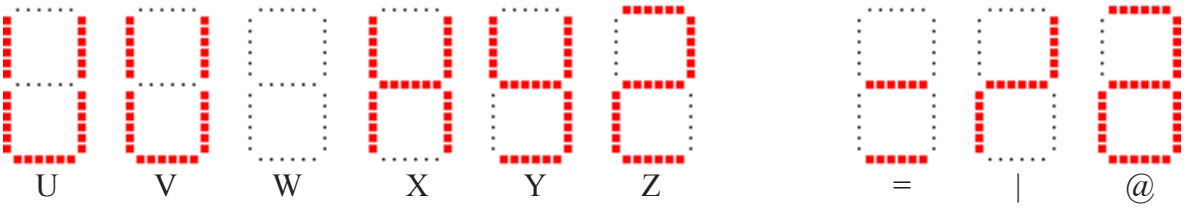
Support agreements are available from RaceAmerica providing Telephone Assistance on technical issues and operational questions, repair and/or replacement of hardware failures, Software and Firmware updates and bug reporting. Contact RaceAmerica for more information and pricing of Support Agreements.

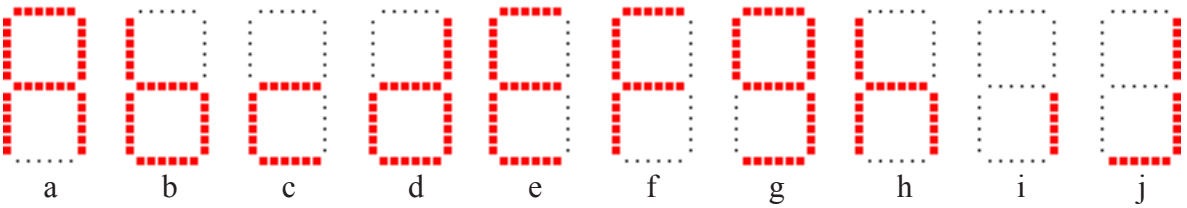


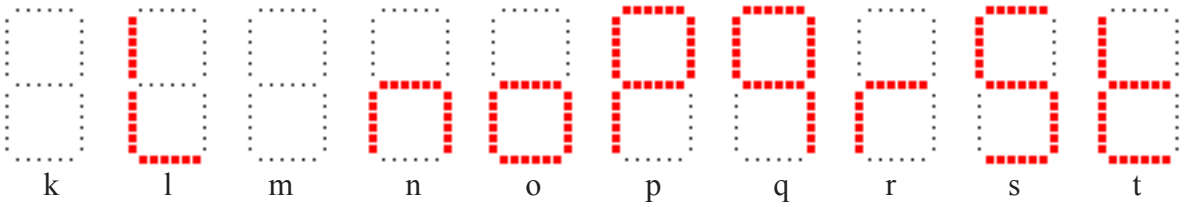




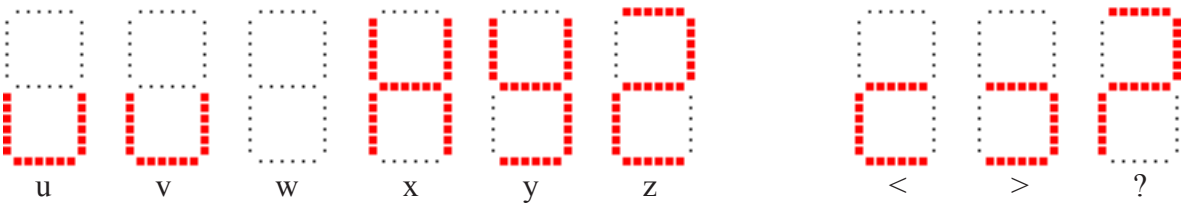
Uppercase Letters

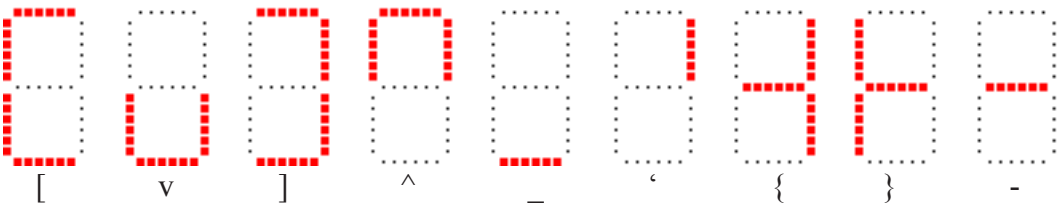






Lowercase Letters





REVISION HISTORY

Rev **A** - 05/05 - New release
06/05 - added sss.ff display setting to ss.fff display option.
Rev **B** - 07/05 - add corrections to DIP switches, add SS.FFF or SSS.FF and
add cabling diagrams and mounting options.
Rev C - 10/07 - Correct AC4 DIP 3 setting

Rev D - 11/07 - Add 24" LDD, convert to InDesign, add more diagrams (DIPs and wireless)
Rev E - 11/09 - Update for 'D' model timers and new display board (H.2 rev)
Rev F - 03/11 - Uudate for 3/8-16 PEM mounting 15"
Rev G - 08/11 - update 24" to 5x24al enclosure
Rev H - 11/12 - Update for code H.4 and later
Rev J - 01/13 - Correct DIP switch settings for new code