RACE A MERICA

INNOVATION. TECHNOLOGY. RELIABILITY.

Stopwatch Display Timer Owner's Manual

Models 4432SC & 6432SC Rev A

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PRODUCT OVERVIEW

The 4432SC and 6432SC Stopwatch Display Timer series (hereafter referred to as X432SC) of digital displays is a microprocessor controlled system based upon the 7-segment format display digit using the latest technology Ultra-Bright LEDs. The Stopwatch Display Timer is a standalone integrated Timer and Digital Display with live running time. The timer operates with a simple push-button for Start/Stop/Reset functions. The Stopwatch Timer is offered in 24" high digits and four or six digit models (5" and 8" are available also). The six digit timer is capable of counting up to 99 minutes, 59 seconds (MM:SS) or 999.999 seconds (SSS.FFF) and counting down from 64 pre-configured times. The four digit timer is capable of counting up to 99 minutes, 59 seconds (MM:SS) or 999.9 seconds (SSS.F) and counting down from 64 pre-configured times. The timer can also function as a time of day 12 hour clock.

The display is intended to be viewed at distances from 100 ft (30M) to 1000 ft (300M) in conditions from full sun to total darkness without adjustment.

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 CAMERA FLASHES.

4432SC PACKAGE COMPONENTS

4 - Display Units (individual digits)
10- Mounting Plates/Screws
1 - Push-button cable 25 ft
1 - Owner's Manual

6432SC PACKAGE COMPONENTS

6 - Display Units (individual digits)
14 - Mounting Plates/Screws
1 - Push-button cable 25 ft
1 - Owner's Manual

Model X432SC Available Options:

6524A 24VDC/2.5A AC Power Adapter
6401A Permanent Installation Kit (includes AC)
6501D External 24VDC Battery Kit
Cabling options:
    Up to 100' for Push-button

LOCAL REQUIREMENTS

Additional items required to operate the X32SC digital display and options:

1 - 24VDC/2.5A Power sources
1 - Mounting structures

Other requirements:
 AC power source for AC adapters

THEORY OF OPERATION

The Stopwatch Display Timer is a standalone elapsed time timer and large digital display operated by a hand-held push-button.

The timer is DIP switch configurable for count up or count down operation or use as a time of day clock. In the count down mode, the starting point can be set from one to 64 minutes.

Press and hold the push-button to reset the display; press the push-button to start the display counting (either up or down). Press the push-button again to stop the count.

DISPLAY SET-UP

PRODUCT SPECIFICATIONS

Model*	6432SC	4432SC
Display Type:	7-Segment	7-Segment
Digit Size (inches)	24" x 10"	24" x 10"
Number of digits:	Six	Four
Dimensions Std (inches)	135 x 29 x4"	90 x 29 x 4"
Mounting	Structure	Structure
Housing	----------------------- Powder Coated Aluminum -----------------------	
View Filter	-------------------------- Red transparent acrylic -------------------------	
View Range (ft)	100 to 1000	100 to 1000
Timing:		
Count UP (Min:Sec)	-------00:00.00 to 99:59.59-------	----------00:00 to 99:59----------
(Sec.Fractions)	--------000.000 to 999.999 -------	----------000.0 to 999.9----------
(Hour:Min:Sec)	-------00:00:00 to 99:59:59-------	----------00:00 to 99:59----------
Count DOWN	-------------------------- From 1 to 64 minutes --------------------------	
Operating Range	------------------------------ -20ºF to 120ºF -----------------------------	
Time of Day Clock	----------------------------------HH:MM----------------------------------	
(Hours:Minutes)		

Each display model has unique requirements; see suggestions and instructions with each respective model in this manual. Hanging or hard mounting suggestions are provided for each enclosure.

Twenty-four inch models are assembled using the digit position labels located on the top of each digit (segment is identified by the inverse printing of its number). A full display consists of segments one thru four (or six) assembled from left to right.

Connect the cable to the connector between each two digits as they are asssembled (Fig 1). A horizonal and vertical frame structure is required to mount each scoreboard (see page 10 Fig 3).

STEP 2 - Configure the Display

The display ships from the factory configured as a stop watch timer. See DIP switch definitions to change display options (Fig 2).

NOTE: IF DIP SWITCH NUMBER 1 (BANK S1) IS SET TO 'OFF' 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.

STEP 3 - Connect the power

Power is supplied to each scoreboard unit through the DC POWER INPUT connector located on the rear of the display. Connecting power to the display will set the display into a power-up self-test mode. Once the self-test has succesfully completed, the display is ready for use.

POWER-ON SELF-TEST

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

The self-test begins by stepping through each segment of all digits, one segment at a time including the colon and decimal points. The self-
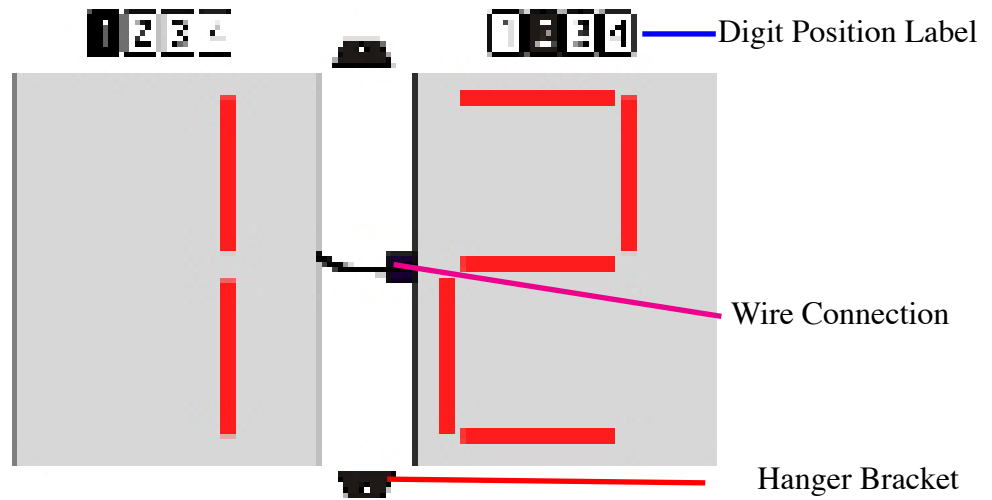
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Digit Position Label

Wire Connection

Hanger Bracket

Figure 1 - 24:" Cable and unit assembly

Power In - 24VDC/2A

DIP Switches Bank S2

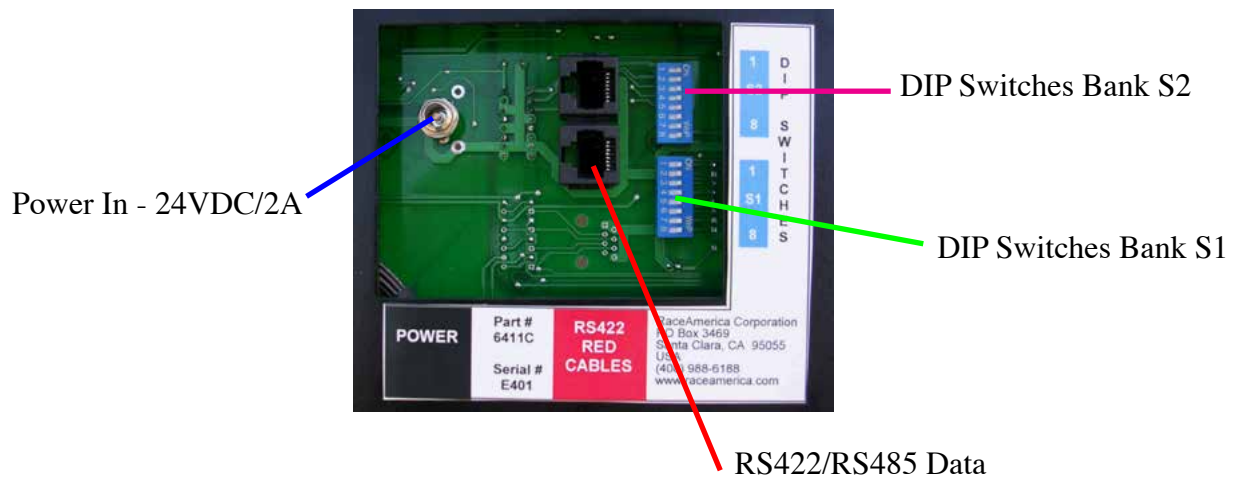DIP Switches Bank S1

RS422/RS485 Data

Figure 2 - 24" Scoreboard Cable connections and DIP Switches

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 (eg **[--J6--]**). 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.

If the display is set to count UP, the colon / decimal point will show the blank display format with colon/decimal point illuminated for the selected mode.

If the display is in count DOWN mode, the display will show the number of minutes **[XX:00.00]** (six digit) or **[XX:00]** (four digit).

If the display is set to clock mode, the display will show **[-XBBB-]**; where X is toggling between **0** and **1**, **B** is a blank position.

TIMER OPERATION

COUNT UP MODE

In the count up Stopwatch mode, the timer begins live counting when the push-button is pressed and will count in minutes/seconds format until the push-button is pressed again - when it will freeze the time. In the count up mode the six-digit display will show **MM:SS.FF** where the letters designate **M**inutes, **S**econds and **F**ractions **SSS. FFF or HH:MM:SS** (**H**ours, **M**inutes, **S**econds). The four-digit display will show **MM:SS**, **SSS.F** or **HH:MM**.

COUNT DOWN MODE

In the count down mode, the timer starts counting down from the pre-selected point when the push-button is pressed and stops the countdown the next time the push-button is pressed or when it reaches zero time. In the count down mode, the six-digit display shows **MM:SS. FF** where the letters designate **M**inutes, **S**econds and **F**ractions of a second. The four-digit display shows **MM:SS**.

CLOCK MODE

The time is set on the display and then enabled by one last press of the button; if the time needs to be coordinated with the actual time of day or other clocks, this will allow for either or both conditions. Figure out the start time for the clock (maybe a few minutes ahead of actual time to allow for setting). Set the Hours:Minutes (HH:MM) time of day as follows:

1) With the first digit toggling between **0** and **1** (the only possible choices for this position), press the push-button and release when the desired digit is displayed.

2) The first digit will freeze and the second digit will cycle between **0** and **2** (if the first position is a 1) or **1** and **9** (if the first position is **0**); press the push-button and release when the desired digit is displayed.

3) The second digit will freeze and the third digit will cycle between **0** and **5**; press the push-button and release when the desired digit is displayed.

4) The third digit will freeze and the fourth digit will cycle between **0** and **9**; press the push-button and release when the desired digit is displayed.

5) The fourth digit will freeze, the colon goes out and the display will look like **[-XXXX-]** (6-digit) or **[XXXX]** (4-digit). Press the push-button one last time to enable the clock; the colon will come back on. This allows the clock to be synched with multiple units or the actual time of day (or both).

The push-button can be removed from the connector in the back of the clock after the time has been set.

If the time needs to be reset for any reason (power failure), plug in the push-button if it is not already plugged in, then cycle power OFF, then ON and restart at Step 1.

In Count Up or Count Down mode, press and hold the push-button for 1 second to reset the timer, the timer will return to a start condition. In Count Up or Count Down modes, all DIP switches can be changed except #1 without cycling power to the unit, a reset will set the new condition.

DIP SWITCH DEFINITIONS

All display models have two banks of eight DIP switches (S1 and S2) 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.

The Stopwatch Timer can operate in three different modes, count up, count down and clock. The 8 DIP switches (Bank S1) located on the back of the Display Timer 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.

Mode/Display Selection

Switches 2/3/4 set either Count UP or Count DOWN and Clock operational modes.

Mode	2	3	4	5
Count UP				
6-digit MM:SS.FF	ON	ON	ON	ON
4-digit MM:SS				
6-digit SSS.FFF	ON	OFF	ON	ON
4-digit SSS.F				
6-digit HH:MM:SS	ON	OFF	ON	OFF
4-digit HH:MM				
Count DOWN				
6-digit MM:SS.FF	OFF	(See page 8)		
4-digit MM:SS				
Clock				
6-digit HH:MMBB	ON	ON	OFF	
4-digit HH:MM				

Diagnostic mode

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	OFF
Enabled	ON

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

Count DOWN Start Time

Switches 3 thru 8 set the Count DOWN starting time.

Time (min)		3	4	5	6	7	8
1	----------	ON	ON	ON	ON	ON	ON
2	----------	ON	ON	ON	ON	ON	OFF
3	----------	ON	ON	ON	ON	OFF	ON
4	----------	ON	ON	ON	ON	OFF	OFF
5	----------	ON	ON	ON	OFF	ON	ON
6	----------	ON	ON	ON	OFF	ON	OFF
7	----------	ON	ON	ON	OFF	OFF	ON
8	----------	ON	ON	ON	OFF	OFF	OFF
9	----------	ON	ON	OFF	ON	ON	ON
10	----------	ON	ON	OFF	ON	ON	OFF
11	----------	ON	ON	OFF	ON	OFF	ON
12	----------	ON	ON	OFF	ON	OFF	OFF
13	----------	ON	ON	OFF	OFF	ON	ON
14	----------	ON	ON	OFF	OFF	ON	OFF
15	----------	ON	ON	OFF	OFF	OFF	ON
16	----------	ON	ON	OFF	OFF	OFF	OFF
17	----------	ON	OFF	ON	ON	ON	ON
18	----------	ON	OFF	ON	ON	ON	OFF
19	----------	ON	OFF	ON	ON	OFF	ON
20	----------	ON	OFF	ON	ON	OFF	OFF
21	----------	ON	OFF	ON	OFF	ON	ON
22	----------	ON	OFF	ON	OFF	ON	OFF
23	----------	ON	OFF	ON	OFF	OFF	ON
24	----------	ON	OFF	ON	OFF	OFF	OFF
25	----------	ON	OFF	OFF	ON	ON	ON
26	----------	ON	OFF	OFF	ON	ON	OFF
27	----------	ON	OFF	OFF	ON	OFF	ON
28	----------	ON	OFF	OFF	ON	OFF	OFF
29	----------	ON	OFF	OFF	OFF	ON	ON
30	----------	ON	OFF	OFF	OFF	ON	OFF

Time (min)	3	4	5	6	7	8
31 ----------		ON	OFF	OFF	OFF	OFF	ON
32 ----------		ON	OFF	OFF	OFF	OFF	OFF
33 ----------	OFF	ON	ON	ON	ON	ON
34 ----------	OFF	ON	ON	ON	ON	OFF
35 ----------	OFF	ON	ON	ON	OFF	ON
36 ----------	OFF	ON	ON	ON	OFF	OFF
37 ----------	OFF	ON	ON	OFF	ON	ON
38 ----------	OFF	ON	ON	OFF	ON	OFF
39 ----------	OFF	ON	ON	OFF	OFF	ON
40 ----------	OFF	ON	ON	OFF	OFF	OFF
41 ----------	OFF	ON	OFF	ON	ON	ON
42 ----------	OFF	ON	OFF	ON	ON	OFF
43 ----------	OFF	ON	OFF	ON	OFF	ON
44 ----------	OFF	ON	OFF	ON	OFF	OFF
45 ----------	OFF	ON	OFF	OFF	ON	ON
46 ----------	OFF	ON	OFF	OFF	ON	OFF
47 ----------	OFF	ON	OFF	OFF	OFF	ON
48 ----------	OFF	ON	OFF	OFF	OFF	OFF
49 ----------	OFF	OFF	ON	ON	ON	ON
50 ----------	OFF	OFF	ON	ON	ON	OFF
51 ----------	OFF	OFF	ON	ON	OFF	ON
52 ----------	OFF	OFF	ON	ON	OFF	OFF
53 ----------	OFF	OFF	ON	OFF	ON	ON
54 ----------	OFF	OFF	ON	OFF	ON	OFF
55 ----------	OFF	OFF	ON	OFF	OFF	ON
56 ----------	OFF	OFF	ON	OFF	OFF	OFF
57 ----------	OFF	OFF	OFF	ON	ON	ON
58 ----------	OFF	OFF	OFF	ON	ON	OFF
59 ----------	OFF	OFF	OFF	ON	OFF	ON
60 ----------	OFF	OFF	OFF	ON	OFF	OFF
61 ----------	OFF	OFF	OFF	OFF	ON	ON
62 ----------	OFF	OFF	OFF	OFF	ON	OFF
63 ----------	OFF	OFF	OFF	OFF	OFF	ON
64 ----------	OFF	OFF	OFF	OFF	OFF	OFF

MAINTENANCE

The Stopwatch Timer Displays requires minimal maintenance.

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 a soft wet cloth being careful not to press when wiping to avoid scratching the red lens material.

SPARE PARTS

RaceAmerica recommends a spare push-button cable. 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.

24" Display Mounting Structure

Customer supplied structure

9mm (3/8") holes for mounting bolts/screws
X10

0.79m/31"

0.74m/29"

0.52m/20.5"
0.57m/22.5"

0.57m/22.5"

0.57m/22.5"

2.18m/86.0"
2.29m/90.0"

0.52m/20.5"
0.57m/22.5"

- Each enclosure is 10.2cm (4") deep
- A 15.2cm (6") X 22.9cm (9") box projects 5.1cm (2") out
  from the left digit for power/data connections
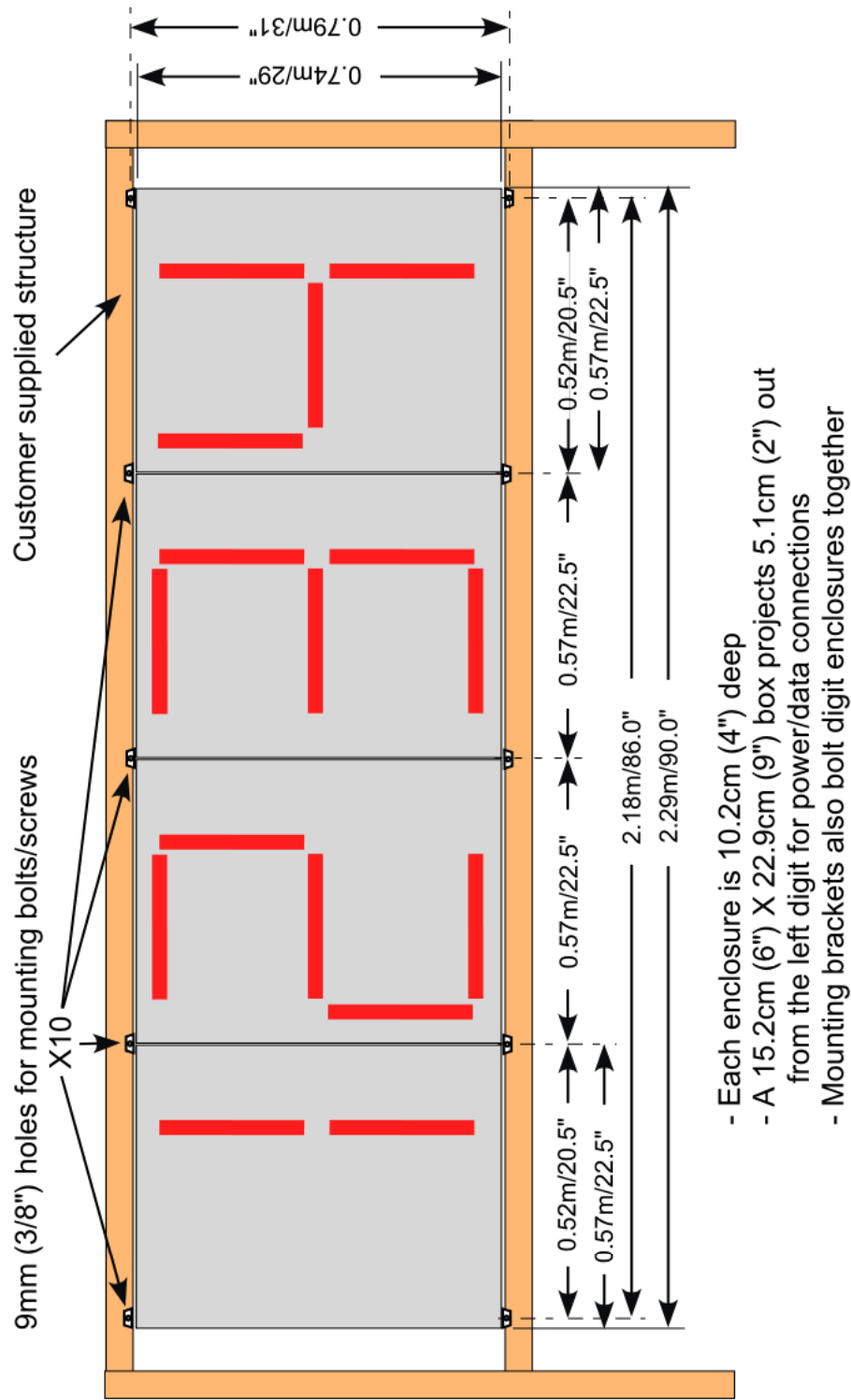- Mounting brackets also bolt digit enclosures together

Figure 3- Twenty-four inch scoreboard assembly and mounting
(Six digit display adds two sections)