



*The Leader in Event Critical Timing Electronics*

*Live Counting  
Display Lap Timer  
Owner's Manual*

Rev E



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# RACE AMERICA

*T i m i n g   S y s t e m s*

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## LIMITED WARRANTY

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To the original purchaser of this RaceAmerica product, RaceAmerica warrants it 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, the customer agrees to insure the product, prepay shipping charges, and ship the product to RaceAmerica, Inc., 280 Martin Avenue Unit 1, Santa Clara, CA 95050.

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

UNDER NO CIRCUMSTANCES WILL RACEAMERICA BE LIABLE TO THE USER FOR DAMAGES, INCLUDING ANY LOST PROFITS, LOST SAVINGS, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF, OR INABILITY TO USE, SUCH PRODUCT.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY FROM STATE TO STATE.

## PRODUCT OVERVIEW

Display Lap Timers (hereafter referred to as Model XX32L) are microprocessor controlled systems based upon the 7-segment format display digit using the latest technology Ultra-Bright LEDs. The XX32L Display Lap Timer is a standalone integrated Timer and Digital Display with live running time. A Model 5140C Infra-red Track Sensor located on the race track relays start and stop signals to the XX32L for timing purposes. The system operates on a simple push-button operation for Reset (Clear), Sensor alignment and dimming.

The Display Lap Timer is offered in 5", 8", 15" and 24" tall digits. The display is viewable at wide angles and in full sun conditions up to 1000 ft away. The Sensors operate in a wide range of conditions from total darkness to full sun without adjustment and at a range up to 50 ft.

**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

Each Large Digital Display Lap Timer package includes:

- 1 - Lap Timer Display Unit
- 1 - Power Patch Cord
- 1 - Sensor Cable with Push-button
- 1 - Infra-red Beam Emitter, model 5040B
- 1 - Infra-red Track Sensor, model 5140D
- 1 - Owner's Manual

## AVAILABLE OPTIONS

Cabling options:

- Up to 1320 ft between Timer and sensor
- Internal Rechargeable Battery ('B' suffix)
- 7540B Foam Stands
- 7606A 40" Tall Display Stand (8" only)
- 3122A Custom Timeslip Header
- 110/230VAC Adapters
- 6075A Carry Case (for 5" Display)
- 6076A Carry Case (for 8" Display)

## POWER REQUIREMENTS

The Display Lap Timer operates on any 12VDC power source (24"/24VDC) Maximum voltage should never exceed 13.2VDC at Power Input Connector (24"/25.2VDC). An automotive battery is ideal. Do not operate the system connected to an operating automobile or battery charger as the voltage may cause damage.

The model 5040B IR Emitters require four AA-size batteries. Batteries may be alkaline or NiCad rechargeable.

## PRODUCT SPECIFICATIONS

See table on page 5 for available models and individual specifications.

**PRODUCT SPECIFICATIONS**

The following listing provides the designed performance specifications for the XX32L Display Lap Timer models.

<b>Model</b>	<b>5432L</b>	<b>6632L</b>	<b>6832L</b>	<b>6532L</b>	<b>4832L</b>	<b>4532L</b>
Digits	5	5	6	6	4	4
Height (in)	24	15	8	5	8	5
View Range (ft)	1000	660	320	200	320	200
Display format Seconds. Fractions	SS.FFF	SS.FFF	SSS.FFF	SSS.FFF	S.FFF	S.FFF
Power Input (Volts DC)	24	12	12	12	12	12
Enclosure Dimensions (in)						
Width	98	64	46.75	29.63	32.25	20.25
Height	29	22.25	14.25	11.5	14.25	11.5
Depth	4	4	3	3	3	3

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Internal Battery Option available

Notes:

- Display Format represents relative decimal placement between Seconds and Fractions of a second; four-digit displays are auto-ranging which means they will display the four most significant digits, adjusting the decimal point placement for correct data display.
- All digits are of the seven segment format
- 110/230VAC power adapters available for all models
- All models are built into powder coated aluminum enclosures with a red transparent view filter
- Display mounting provided is to hang 5"/8"/15" models; 24" models include mounting brackets and are shipped as individual digits for on site assembly

## THEORY OF OPERATION

The XX32L Large Display Lap Timer is a microprocessor controlled completely self contained lap timing system utilizing the latest CMOS technology circuit components to provide a highly accurate timing solution. The system contains an internal quartz crystal clock to maintain time accuracy and display of race results to one thousandth of a second.

Power is supplied to the display and track sensor from a 12/24VDC source.

The beam emitter and track sensor operate on invisible (to the unaided human eye) Infra-red light. The coded light frequencies are constantly received by the track sensor until a car interrupts reception ('breaks' the beam).

The IR beam emitter to track sensor transmission operates on Line-of-Sight principles. This makes alignment of these units critical.

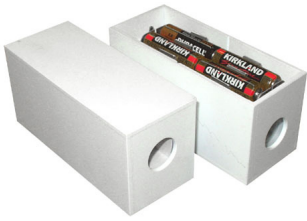
Once the system is properly set up and aligned on the racing surface, the timer display is reset to start timing the first driver/car.

After the system is reset, the first beam interruption starts the timer, each subsequent beam interruption (lap completed) freezes the time on the display for the configured number of seconds, and immediately starts the next lap in the background. Live counting then continues until the next finish or the system is reset for another driver.

## PRODUCT SET-UP

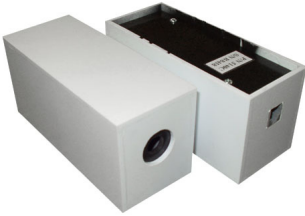
Model XX32L Large Display Lap Timer is designed to hang free using the top eyelets supplied with the display. A display stand is also available from RaceAmerica to hang the display at a good viewing level 40" above ground level (5" & 8").

RaceAmerica has tried to make use of the display timer as simple as possible, however, it is strongly suggested that the system be set up in a race simulation area without stretching the cables all out to gain familiarity with basic operation of the components prior to race day. This can be done in a driveway or garage. Walking through beams can simulate vehicles for purposes of familiarizing one with basic operation.



### Model 5040B - Infra-red Beam Emitter

Note On/Off switch and placement for four AA batteries for each Beam Emitter. All Beam Emitters are fully interchangeable with one another.



### Model 5140D - Infra-red Track Sensor

Note cable connector is located in the side facing away from the track. All Track Sensor are fully interchangeable with one another.

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### STEP 1 -

Familiarize yourself with the components pictured in this manual and how they interconnect. The Track Sensor Interconnect Cable is configured for connection between the start/finish line and the timer. The large round connector connects to the display and the smaller connector (RJ11) connects to the Track Sensor at the start/finish line as indicated on the cable near the RJ11 connector.

### STEP 2 -

Identify the emitter/sensor placement at the start/finish line. The lane width should be set between four (4) and fifty (50) feet. Layout the Track Sensor Interconnect Cable on the track site as illustrated on the Track Sensors/Cabling Diagram page.

### STEP 3 - Connect the Power

Power is supplied to the display through the 12/24VDC power input connector. Connecting power to the display will set the display into a power-up self-test mode.

#### POWER-ON SELF-TEST

When the XX32L power source is connected, the display timer 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 or decimal point which exist to the right of each digit except the right most digit. The self-test continues until the revision level of the code (e.g. [--L2--]) running in the microprocessor is displayed, then the display blanks out. The display then advances to Alignment Mode.

#### ALIGN/HOLD TIME MODE

On initial system power-up, the system automatically enters Align/Hold Time Mode; the display shows Align [ALIGN] in a flashing attention drawing mode, press the button to see [-0000-] is displayed. The four digits will be counting until the alignment condition is corrected.

If the Beam Emitter and Track Sensor are operating properly and aligned, the '0' digit will not change. If the Beam Emitter and Track Sensor are not properly aligned, the four center digits for the emitter/sensor pair will count (1-2-3....8-9-1-2...) slowly if slightly out of alignment or continuously if they are not functioning properly or way out of alignment. Once the emitter/sensor pair are aligned properly, the digits will stop counting. If the alignment is off a little or intermittent, the digit for that emitter/sensor pair will count when they float out of alignment.

To maximize the alignment of the emitter/sensor pair, it is suggested to rotate the beam emitter slowly left and right until out of align-

ment, to detect the left/right limits of alignment. Viewing the display to establish these limits will help establish the extremes of the emitter/sensor alignment. This technique will determine the maximum lateral detection angle. Rotating the beam emitter up and down until out of alignment determines the maximum vertical detection angle. Once these extremes are established, position the beam emitter in the center of the left/right detection angle and up/down detection angle. This will maximize the alignment accuracy.

Exit Align mode by pressing the push-button; this takes you to Hold Time Mode where the display will show [Hold-x] where 'x' is the number of seconds each laps time will be displayed before resuming live counting; press the button to increment and select one to nine (1-9) seconds. then [--2-] with the third digit slowly counting; press the push-button when the desired number of seconds of display hold time is on. The Hold time is the amount of time each laps time will freeze on the display before resuming live counting.

#### CONFIGURE MODE

Press and hold the button when the display is powered on to enter Config Mode. Hold Time will display first as [HOLD-X] where 'X' is the number of seconds the lap result is frozen before resuming live counting (1-9). When the desired selection is displayed, press/hold the button to see [xxxx--] where xxxx will cycle through the display brightness levels available (1-3-5-7) with '1' being the brightest and '7' the dimmest; press/hold the timer enters Run Mode. To return to alignment mode, press and hold the button until the Align sequence is displayed.

The display will retain the hold time setting when powered off. Brightness returns to '1' each time the power is turned on.

#### OPERATION

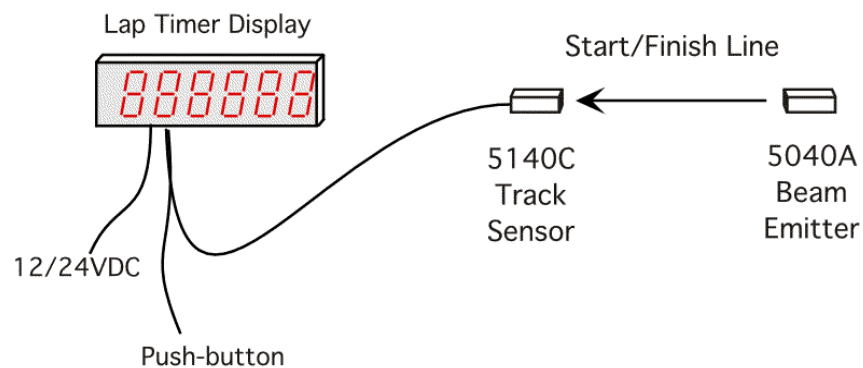
Enter the Run Mode by pressing the push-button, the display shows a progressive sequence of dashes [-----], then the timer blanks everything except the decimal point [\_\_\_\_.] indicating it

is ready to time a run. When an object breaks the beam, the timer will immediately begin to count live and display elapsed time. When an object breaks the beam again, the timer freezes the lap time for selected number of seconds and then resumes counting the next lap. This process continues and assumes the vehicle continues on the track. Press the push-button to reset the timer for another run.

The sensor is checked for proper alignment before the timer is reset and allowed to start. If the sensor is out of alignment, the display will show [ALIGN] flashing. Go to Align/Hold Mode (press and hold the button), correct the problem, exit align and start the next run.

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## TRACK SENSORS/CABLING DIAGRAM



### NOTES:

Track sensor cable lengths can be from 50' to 1320' as required (100 ft is standard)  
 Displays are available in four, five and six digit models  
 Only the 24" digits use 24VDC.

## **MAINTENANCE**

The XX32 Series Display Timer, Beam Emitter, and Track Sensor require minimal maintenance.

Periodically clean off the red acrylic front of the display with a soft wet rag; be careful not to scratch the surface with dust or sand which may be on the front or in the rag.

To insure uninterrupted operation on raceday, it is suggested to keep track of battery usage hours so as to have fully charged batteries. Plan to replace the alkaline AA cells in the Beam Emitters after about 60 hours use. If you are using rechargeable AA cells, recharge them each day. Low battery voltage (Emitters below 4.0VDC; display below 11.5/22VDC) will cause intermittent operation of the system resulting in intermittent vehicles detected at the start/finish line as the battery power weakens.

To maintain the highest level of timing accuracy and minimize false trips, annual preventative maintenance and calibration should be performed on all system track sensors and beam emitter units.

## **SPARE PARTS**

Further to minimize race program interruptions, RaceAmerica recommends some spare parts. A spare emitter/sensor pair and end of track sensor cable should be available in the event of an unfortunate accident during a program. 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, and Annual Preventative Maintenance on all system track sensors and beam emitter units. Contact RaceAmerica for more information and pricing of Support Agreements.

## DISPLAY STAND ASSEMBLY INSTRUCTIONS

This assembly instruction is intended for use with six digit eight inch digital displays.

### 7606B Stand Kit Contents

- 2 - Suspension Stand Arms with 'J' hooks
- 1 - Pipe Flange
- 2 - 20 in pipe sections
- 1 - Pipe union
- 1 - Base Plate with Pipe Flange
- 2 - 1/4-20 bolts with wing nuts

### Assembly

1) Assemble the suspension arms with the pipe flange and 1/4-20 bolts at most extreme angle setting. Orient flange and 'J' hooks down.

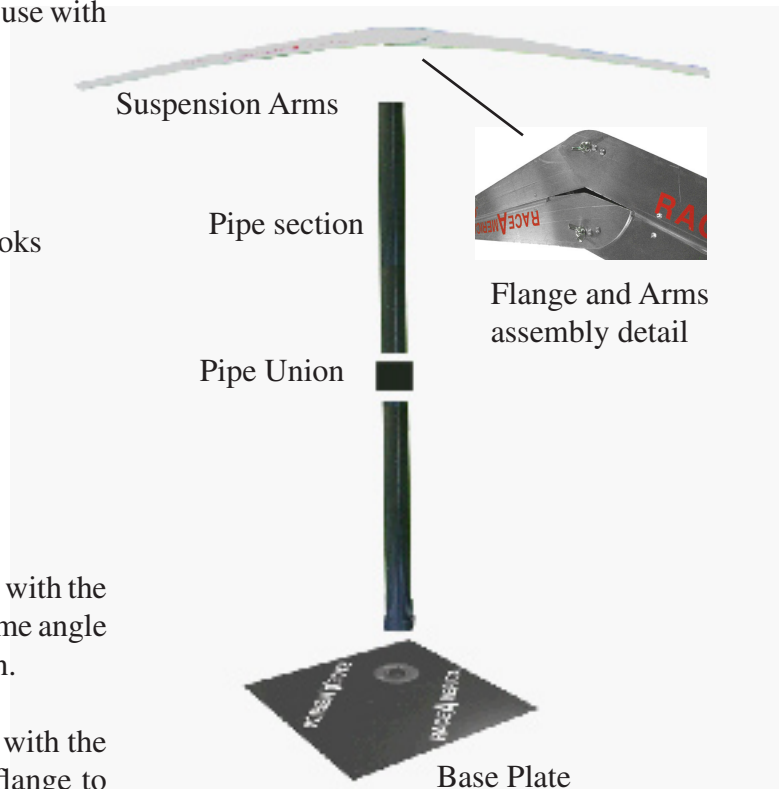
2) Connect the two pipe sections with the coupling and screw into the base plate flange to assemble the post.

3) Carefully screw the suspension arm assembly onto the post. Align such that arms will suspend the display over the center of the base plate on the diagonal for maximum stability.

4) Hang the display on the 'J' hooks; some droop is normal; the display will swing in the wind.

### Additional Stability - (if required)

1) Place a weight onto the base plate or stake it into the ground



Assembled Suspension Stand