



The Leader in Event Critical Timing Electronics

Wireless Speed Trap

Model 5830/6530DW/6830DW

Rev E



RaceAmerica Corporation
P.O. Box 3469
Santa Clara, CA 95055-3469
(408) 988-6188
<http://www.raceamerica.com>
info@raceamerica.com

Copyright 2013 RaceAmerica Corporation

Table of Contents

LIMITED WARRANTY	3
PRODUCT OVERVIEW	4
PACKAGE COMPONENTS	4
LOCAL REQUIREMENTS.....	4
PRODUCT SPECIFICATIONS - 5830C	4
AVAILABLE OPTIONS.....	4
PRODUCT SPECIFICATIONS - 6X60DW	4
SPEED TRAP SETUP	5
TYPICAL TRACK SETUP.....	6
USING 6X30DW DIGITAL DISPLAY	6
6X30DW DIP SWITCH DEFINITIONS	6
Display Hold Time	6
Display as Master or Slave	7
Diagnostic Modes	7
USING PC CAPTURE SOFTWARE.....	7
OPERATION.....	7
USING SPARE T-LINKS	8
BATTERY CHARGE	8
TECHNICAL DETAILS	8
Connection to a PC or Timer	8
Data String Protocol	8
MAINTENANCE	8
SPARE PARTS	9
SUPPORT AGREEMENTS.....	9



LIMITED WARRANTY

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

The Wireless Speed Trap replaces track cables normally used to connect track sensors to the timing system. Model 5830 T-Link units manage the speed detection based on the trap length. The results are sent wirelessly to a Digital Display (available in 5/8/15/24 inch digits) and/or a PC.

The wireless T-Link units operate over a wide range of conditions. Optimal conditions are line of sight between sending and receiving units and six feet of ground clearance. Range can exceed one mile. High gain antennas can be utilized for greater distances or noisy environments.

The speed trap can be activated from either direction; an automatic reset function occurs if both beams are not tripped within four seconds.

Diagnostics such as Beam alignment, RF signal integrity, and Battery Level are available from the display or PC.

PACKAGE COMPONENTS

Each Speed Trap package includes:

- 1 - 5830C T-Link Wireless Speed Trap Unit ID 'C'
- 2 - IR Beam Emitters (5040)
- 2 - IR Track Sensors (5140)
- 1 - Track Sensor Cable - 66ft trap (06-5830)
- 1 - Owners Manual

LOCAL REQUIREMENTS

6530DW or 6830DW Digital Display and/or PC (with T-Link (ID 'Z') and 3123A Data Capture software) to collect and display results.

PRODUCT SPECIFICATIONS

Model 5830 T-Link

Frequency	900MHz band
Internal Battery	12VDC
T-Port Connections	
ID 'C'	Track Sensors
ID 'Z'	PC

Connection Type	RJ-45 Modular
Max Operating Range	-20°F to 120°F
Battery Life	24 hours
Minimum Speed 10ft Trap	1.70 MPH
66ft Trap	11.25 MPH

AVAILABLE OPTIONS

- 5890A Battery Charger
- 06-TL02 Cable T-Link to PC 25ft
- 6070B Blow Molded sensor case (2 ea)
- 6038P - Printer (connects to PC)
- 7540 Foam Stands (for emitters & sensors)
- 06-58ST Spare Reconfigure Jumper Kit
- 06-5810 Optional 10ft speed trap cable
- High gain antenna - increase range to miles
- 7606 Suspension Arm Stand (for displays)

Since Large Digital Displays will often be used with the Wireless Speed Trap, specifications are summarized below:

PRODUCT SPECIFICATIONS 6530DW

Display Type:	7-Segment
Digit Height:	Five Inch Tall
Number of digits:	Six
Dimensions:	11.5" x 27.6" x 3"
Mounting:	Top 3/16" Eyelets - 22" c
Housing:	Powder coated aluminum
View Filter:	Red Transparent acrylic
View Range:	200' in full sun

PRODUCT SPECIFICATIONS 6830DW

Display Type:	7-Segment
Digit Height:	Eight Inch Tall
Number of digits:	Six
Dimensions:	14-1/4" x 46-3/4" x 3"
Mounting:	Top 1/4" Eyelets - 30" c
Housing:	Powder coated aluminum
View Filter:	Red Transparent acrylic
View Range:	320' in full sun

5/8/15 inch displays are powered by 12VDC .
5/8 inch are available with an optional internal rechargeable battery. 24 inch requires 25VDC.

SPEED TRAP SETUP

Each Speed Trap T-Link unit is configured with a unique ID code and a wireless optimizer code. These codes are listed on the identity label located on the bottom of the T-Link unit. Valid T-Link ID codes are 'C' for Trap sensors and 'Z' for scoreboard and PC interfaces.. The wireless optimizer code is also listed on the identity label. The optimizer code identifies wireless communications optimization and compatibility with other T-Link units.

Install the antennas on all T-Link units. If the antenna is to be bent down for transport, loosen the antenna slightly and rotate the upper portion of the antenna into position. Hold the upper portion of the antenna while tightening the knurled area on the bottom portion of the antenna.

Position the T-Link unit with ID 'C' at the speed trap with the cable extended between the Speed and Finish sensors as shown in the diagram. Plug the Speed Trap into the T-Port connector on the 5830C T-Link unit.

NOTE: It is very important to set-up the speed trap electronics at exactly the designated spacing and in a perfect rectangle to make sure optimal accuracy will be attained. Positioning the infra red beams about six inches off the ground will minimize false trips.

Power on the T-Link (ID 'C'). The right LED will illuminate immediately. If the SPEED sensor is not aligned with the beam emitter, the left LED will be OFF; if the FINISH sensor is not aligned, the left LED will be ON. When both sensors are aligned, the left LED will blink at a regular interval (the 'heart beat') indicating proper operation. If the left LED blinks ON solid or OFF solid, the track sensor is out of alignment. Utilize the alignment functions included with the large display to monitor alignment.

For initial alignment, start with both beams out of alignment (LED ON). The LED will go out when the finish beam is in alignment; once the finish beam is aligned, the LED will pulse when the Speed beam is aligned.

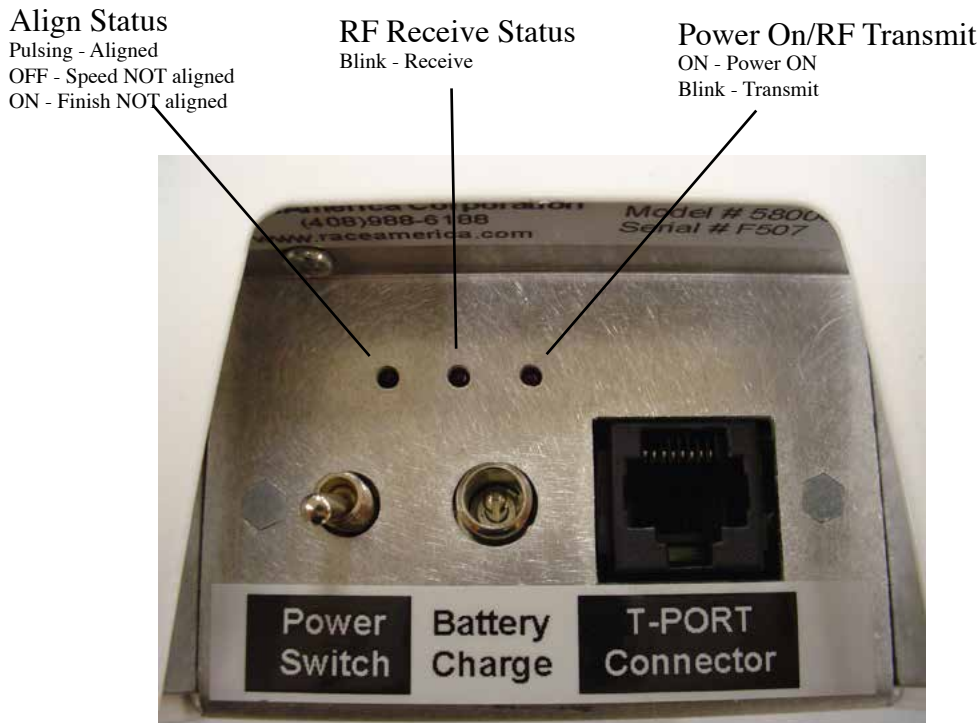
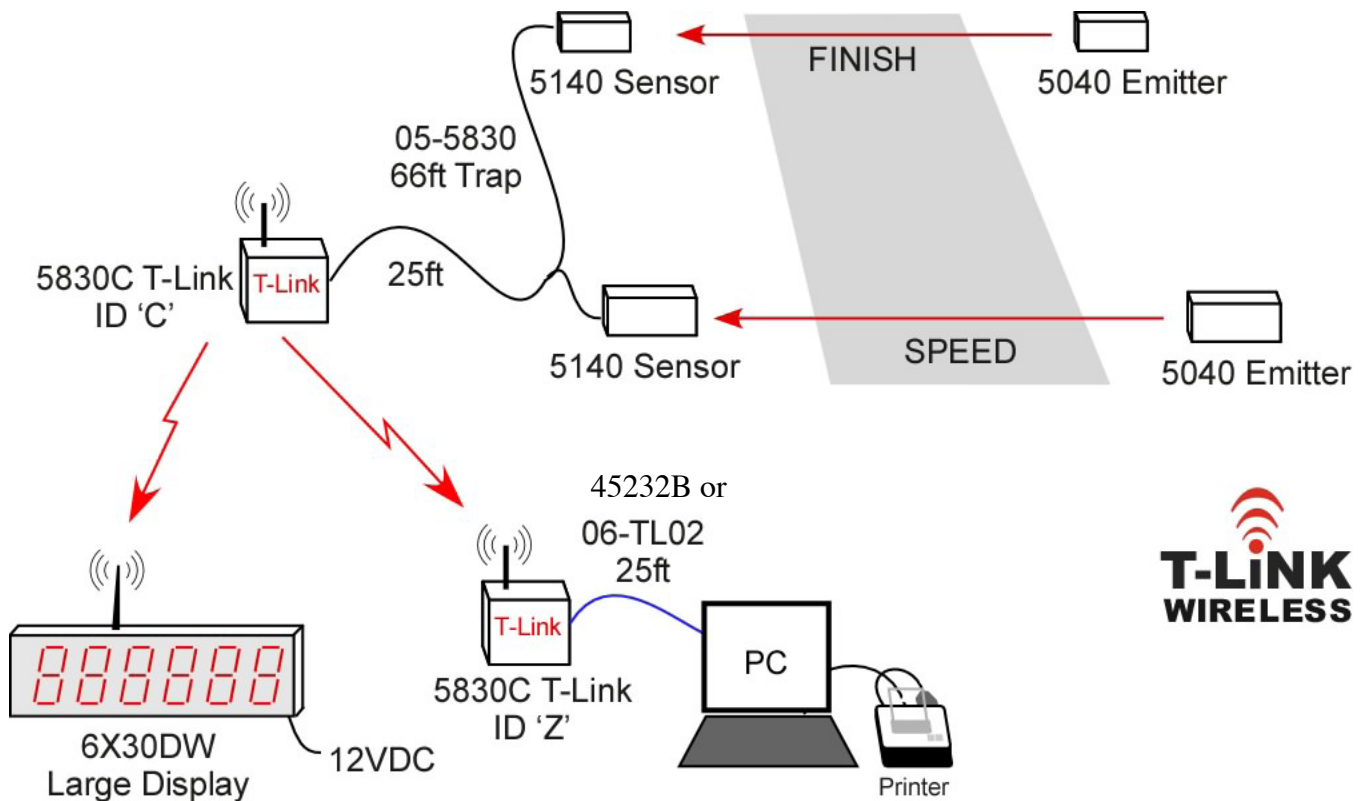


Figure 1 - T-Link power and external connections

TYPICAL SPEED TRAP SETUP

Model 5830C Wireless Speed Trap can be operated with either a Large Display or a PC or both. 15/24 inch models are only five digits.

The wireless speed trap requires either a digital display or a PC with data capture software to publish the speed trap results. Either method will utilize a T-Link ID 'Z' unit (internal to the display or external to the PC - see page 6).

USING 6X30D DIGITAL DISPLAYS

A 6X30DW Digital Display will receive the data to its internal ID 'Z' unit and display the speed. Use the DIP switches to set the speed trap length, display alignment status, display the RF signal integrity and set the display hold time when a speed is displayed.

DIP SWITCH DEFINITIONS

The 6X30 can operate in different modes dependent upon the DIP switch settings. The 8 DIP switches located on the back of the Large

Display 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.

Display Hold Time

Switches 4 and 5 determine the length of time to display the speed before clearing the display. When race results are displayed, the display will continue to display the results for the set time. If the display is sent new race results prior to the set time expiring, the display will be updated with the new results and the display hold time timer is reset to the set time.

Display Hold Time	4	5
15 seconds	ON	ON
30 seconds	ON	OFF
45 seconds	OFF	ON
60 seconds	OFF	OFF

Display as Master or Slave

Switch number 3 determines whether the 6X30DW is used in conjunction with a PC. When using the Display without a PC, it functions as a Master; when using the Display with a PC, it functions as a Slave. Multiple Slave Displays can exist in the race area.

<u>Display - Master/Slave</u>	3
Master	ON
Slave	OFF

Speed Trap Length

Switch number 6 determines whether race results are displayed based on a 10 foot or a 66 foot speed trap.

<u>Speed Trap Length</u>	6
10 foot	OFF
66 foot	ON

The minimum speeds that can be recorded are 1.7 MPH for the 10ft trap and 11.25 MPH for the 66ft trap.

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:

<u>Diagnostic Mode</u>	1
Disabled	ON
Enabled	OFF

NOTE: IF SWITCH NUMBER 1 IS SET TO THE '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.

The Display also has two diagnostic modes.

Alignment Mode - set DIP switches 1, 4, 5 & 6 to the OFF position; turn on power and the display will show #S--F# where **S** is **Start**, **F** is **Finish** and the adjacent # is a number. Alignment is accomplished when the numbers stop counting. Five digit models have only one center dash.

RF Integrity/Battery Level Mode - set DIP switches 1, 4 & 5 OFF, switch 6 ON; turn on power and the display will show -r**F**_b- where **rF** integrity is displayed by the digit to the left and **b** indicates the battery level for the ID 'C' Speed Trap T-Link unit is the digit to the right. In both cases, a dash (-) indicates 100%, '9' indicates 90%, '8' indicates 80% and so on. The system should operate well at '7' or above for both parameters.

USING PC CAPTURE SOFTWARE

Locate the T-Link unit identified as ID 'Z'. Locate the T-Port connector on the back of the T-Link unit. Connect this T-Port to a 9-pin serial PC port using the 06-TL02 data communications cable. Power on ID 'Z' and observe the right LED illuminates and blinks off, then on very quickly appearing as a flicker. If ID 'Z' is the only T-Link powered on, no other LEDs will illuminate. When other T-Links are powered on, the center LED will flash when a wireless signal is received from another T-Link unit. The left LED will flash very quickly indicating ID 'Z' is receiving a good signal from other T-Links.

Install the PC Capture Software, configure the software for the PC COM port receiving the data; use the software 'Help' sections as required.

OPERATION

When the speed trap is set up and aligned with either a Large Display or PC to capture data, it is time to make a pass. The vehicle can pass through the speed trap in either direction. As the vehicle breaks the first beam, a '_' dash appears in the first position indicating a sensor trip. Five digit models display a '*' dot between the second

and third digits

The system allows four seconds (4 sec) to complete the pass before resetting; if both beams have not been broken, the dash will disappear after four seconds and reset the trap. Upon completion of the pass, the speed will show on the display (_XXX.XX) and/or the PC.

After each pass, the trap is locked out for nine seconds to allow dirt and dust to settle. The dash turns OFF when the trap is reset for the next pass. New data will update the display with each successful pass.

BATTERY CHARGE

Charge the batteries using the external charger unit provided by RaceAmerica. All functional electronics are disabled during battery recharge to avoid damage. Typically battery charging will take 12 hours. The charger indicator LED will turn from red to green when charging is complete.

TECHNICAL DETAILS

Connection to a PC or Timer:

The T-Port is a RJ45 connector with 8 conductors. Viewing the T-Port, pin 1 is on the left side and pin 8 is on the right side of the connector. For RS232 serial data communications, pin two is ground and pin one is data sent from the T-Link unit. All other pins should not be connected to avoid damage to the T-Link unit.

Data String Protocol:

Data strings are sent from the ID Z T-Link unit to provide timing timestamps from each track sensor, battery charge level in each T-Link unit, and RF Data Integrity level of the wireless communications between the T-Link units. The data strings are always terminated by a 'carriage return' (cr) character and are 11 characters in total length.

<id> is the ID code of the T-Link - A thru G and Z are valid

<timestamp> is a 9-digit number for timing use

<error code> is a single digit number explained under Error Codes

<rev level> is a 3-digit number of the Revision Code of the T-Link

<batC> is a single digit number of the Battery Charge Level of a T-Link unit

<rfC> is a single digit number of the RF Integrity Level of a T-Link unit

<id> <timestamp> cr

ZB 00 <batC> 0000 <batZ> cr

ZW 00 <rfC> 00000 cr

<id> E <error code> 0000000 cr

<id> R <rev level> 00000 cr

All error messages are real time during normal operation with different levels of urgency. Errors E1, E3, and E5 indicate local interference effecting the wireless communications or loss of signal. These are error messages to alert the user of intermittent interference and do not effect the accuracy of the timing system unless the error codes continue for more than 10 seconds of operation. Errors E2 and E4 also indicate local interference effecting the wireless communications or loss of signal unless these error codes are preceded by 10 seconds of continuous error codes.

MAINTENANCE

To insure uninterrupted operation on race day, it is suggested to keep track of battery usage hours so as to have fully charged batteries. To maintain the highest level of timing accuracy and minimize false trips, annual preventive 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 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 Preventive 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.

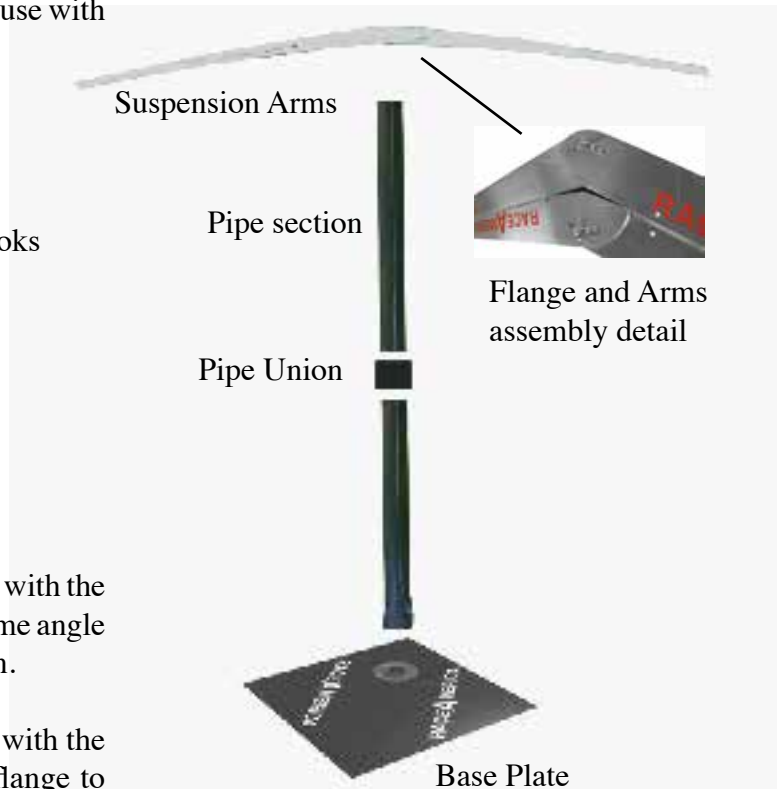
2) Connect the two pipe sections with the coupling and screw into the base plate flange to assemble the post.

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

REVISION HISTORY

- A - 12/06 - Initial release
- B - 01/07 - New cover picture; add display models; delete error code tech info.
- C - 02/09 - Add minimum speeds for 10ft and 66ft traps
- D - 08/12 - Add 15/24" 5 digit coverage
- E - 01/13 - Delete section on spare T-Links