



The Leader in Event Critical Timing Electronics



2600 Series XL Advanced

Dual Lane Drag Timing System Owner's Manual

Rev K

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

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RACE **A** AMERICATM

T i m i n g S y s t e m s

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.

THEORY OF OPERATION

The 2600 Series Drag Timers are microprocessor controlled completely self contained race timing systems utilizing the latest CMOS technology circuit components to provide a highly accurate drag 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 timer console and track sensor components from the TREE.

The Beam Emitters and Track Sensors operate on invisible (to the unaided human eye) Infra-red light. The coded light frequencies are constantly received by the Track Sensors 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 the units critical. These units will operate over a wide range of conditions (full sun to total darkness) but should not be operated beyond the specification parameters (4 ft to 50 ft).

Once the system is properly set up and aligned on the racing surface, the timer console will 'monitor' the track sensors each time a run is made.

In racing mode, the system microprocessor takes control of checking for a valid set of start conditions (expected blocked and unblocked sensors), then starts the lights (with adjustment for Full and Pro formats as well as any bracket or index adjustments) while watching for a start in either lane (a foul start will freeze the tree at the point of foul), records Reaction Time for each lane as the racers start, then watches for subsequent beam interruptions at the 60 foot, Speed and Finish points; after all data is collected, NHRA rules are applied to determine the winner and display this on the TREE and console plus output to PCs, printers and Scoreboards connected to the system. Data includes RT, Redlights, ET, winner indication, Dial in times, breakouts



Competition
12VDC TREE



Professional
110/230VAC TREE

2600 XL Advanced Quick Start Guide

This Quick Start guide can be helpful to use as a set of steps to follow for relatively experienced operators of the XL Advanced system.

- 1 Set up timing system hardware and cabling on race surface
- 2 Power on all Infra-red Beam Emitter units
- 3 Connect all peripheral devices such as printers and scoreboards
- 4 Power on all printers and scoreboards; observe scoreboards for proper power up sequence.
- 5 Power on timing system at the Tree; observe light sequences for proper power up sequence; press # for Stage status.
- 6 Go into Alignment Mode (5) and check alignment at all sensor locations. No counting digits means everything is aligned. Exit Alignment Mode (#) when done.
- 7 Go into System Config (8) to set line feeds to eject a timeslip, timeslips to auto print, Pre-Stage light functionality, and to disable (enable) 60ft/Speed options; (#) to end.
- 8 Select PRO or FULL starting lights (3)
- 9 If running brackets on model 2600B, enter Dial-In times (6)
- 10 If printing results or sending to a PC, enter Car # (9)
- 11 Stage racers
- 12 Start race (2) or use optional Starter's Button
- 13 Press # to return to Stage status and clear last race
- 14 Next Race? Go to (8) or (11)

PACKAGE COMPONENTS

The standard Model 2600 XL Advanced dual lane drag package includes:

1 - 2600 Series Console Unit factory configured ships as follows:

- Heads-up (2600H) or Index (2600B) Starts
- Speed Trap length of 10', 66' or 20M
- Speed display in MPH or KPH
- Standard or Custom Timeslip Header

- 1 - 02-2503 Competition 12 VDC Tree w/Stage
- 1 - Base Plate Tree Stand/30" Iron Pipe
- 1 - Owner's Manual
- 1 - Console to Track Cable

- Centerline Cable Option includes:

- 1 -Interconnect Cable for 60'/SPEED/FINISH
- 1-Extension cable section for 1320' cabling
- 2 - 5040B IR Beam Emitters (Finish)
- 2 - 5140D IR Track Sensors (Finish)
- 2 - 5058B IR Beam Emitters (Stage/Start)
- 2 - 5158D IR Track Sensors (Stage/Start)

- Outside Cable Option includes:

- 1 -Interconnect Cable for 60'/SPEED/FINISH (cable is in three sections)
- 1-Extension cable section for 1320' cabling
- 1 - 5042B IR Beam Emitter (Finish)
- 2 - 5140D IR Track Sensors (Finish)
- 2 - 5058B IR Beam Emitters (Stage/Start)
- 2 - 5158D IR Track Sensors (Stage/Start)

With these parts, the system will provide staging, Reaction Time (RT), Elapsed Time (ET) and winner indication for two lanes.

Model 2600 Available Options:

Standard Cabling options:

- Centerline - 200', 330', 500, 660', 1320'
- Outside - 200', 330', 500, 660', 1320'
- 6013C - 60 Ft Detection - Centerline cable
- 6013D - 60 Ft Detection - Outside cables
- 6020C - Speed Detection - Centerline cable
- 6020D - Speed Detection - Outside cables

Tree Options:

- 02-2507 - Competition 12VDC Tree with Pre-Stage
- 02-2502 - Professional 110VAC Tree with Pre-stage*, Stage and Rear Facing Lights
- 02-2505 - Professional 230VAC Tree with Pre-stage*, Stage and Rear Facing Lights
- 7580Dx Flood lamp kit

Staging Options:

- 6026A Dual Beam Staging - add Guard
- 2-Dual IR Beam Emitters (5054LM/RM)
- 2-Dual IR Track Sensors (5156LM/RM)
- 6027A Staging Electronics - add Pre-Stage
- 2-Dual Emitters (5063L/R)
- 2-Dual Sensors (5163L/R)
- 6023A Pre-Stage Electronics - add Pre-Stage and Guard beams
- 2-Tri-Beam Emitters (5067L/R)
- 2-Tri-Beam Sensors (5167L/R)

7540B Foam Stands

06-26SB Starter's Button - 25 foot cable

6038S Dot-Matrix Timeslip Printer Package

6042A Thermal Timeslip printer (with logo)

3122A Custom Timeslip Header

3126A XLscore Data Capture Software for PCs

6528C/6828C/6628C/6624C Single Line Dual Lane Digital Scoreboard (5/8/15/24" digits respectively)

6810C/6610C/6410C Dual Line Dual Lane Digital Scoreboard (8/15/24" digits respectively)

4500B Data Communication PODs (for printers and displays greater than 25 ft from console)

4520A Wireless RF Data Link

6080A Heavy Duty Cable Winders

6085A Standard Duty Cable Winders

6070B Storage/Carry Case

*Pre-stage operates via console program button unless a Pre-Stage start option is available.

LOCAL REQUIREMENTS

Additional items required to operate the 2600 Series timing system package and options:

Batteries for Beam Emitters (see table pg 8)
DC TREE - 12VDC automotive battery

AC TREE - **See Proper wiring and phase checks**

1 -110VAC 20Amp circuit/230VAC 10Amp

1 - Surge Suppression Power Strip (20A)

8 - 60W 110VAC Stage/Pre-Stage Bulbs

20 - 100 W 110/230VAC Floodlights

(12 Yellow, 4 Green, 4 Red)

(bulb sets available from RaceAmerica)

Other options:

12VDC source for each printer or Scoreboard

(110/230 VAC with optional adapter)

PRODUCT SPECIFICATIONS

The following listing provides the designed performance specifications for the 2600 Series timing systems:

Start/Finish Lane Width	4 to 50 Feet
ET Timer Capacity	up to 90.000 sec
RT Timer Capacity	up to 9.999 sec
Time Accuracy	0.001 seconds
DC TREE Dimensions	75" X 20" X 20"
DC TREE Weight	~ 45 pounds
AC TREE Dimensions	82" X 20" X 20"
AC TREE Weight	~ 55 pounds
Power Requirements:	
DC TREE	12VDC Source
AC TREE	110 VAC - 20A
AC TREE	230 VAC - 10A
Emitters	AA/C batteries

OPERATION

Track Sensors and Beam Emitter Options

RaceAmerica utilizes a variety of Track Sensors and Beam Emitters in its timing systems. All operate on line-of-sight infra-red beam principles. The beam is created by the Beam Emitter and received by the Track Sensor. The operating specification is for a gap of between four and fifty feet between the Emitter and Sensor. These will operate in conditions ranging from full sun to total darkness without adjustment when properly aligned. The Beam Emitters require a power source (batteries or AC adapters) while the Track Sensors are powered from the cable to the Control Console. The infra-red beam is a coded frequency which is detected by the sensor. Different frequencies are used for different locations in different systems. Beam Emitter voltage should not fall below 4.5 Volts DC while operating.

The beam operates on a generally established condition (ie, the sensor senses the presence of the beam), and is interrupted (broken) by the racer (beam blocked). The beam will automatically reestablish after being blocked. The detection of vehicles passing through the beam rapidly highlights the sophistication of this technology. In fact, many small items such as leaves, water, snow can interrupt the beam. RaceAmerica tries to minimize the impact of these occurrences by requiring multiple short interruptions of the beam to indicate an interruption as well as verification of expected beam conditions before a race is allowed to start.

RaceAmerica Professional Dual Beam Sensors utilize multiple infra-red frequencies due to the close proximity of each sensor to positively insure the correct signal is broken or blocked. This is why track position and orientation is critical.

RaceAmerica Single Beam Staging/Start Sensors (5058B/5158D) operate in both blocked and unblocked modes depending on system conditions. The unblocked mode allows for alignment check. The mode is reversed once a car has staged (blocked the beam) and the system

is about to start a race. The ET timer for a lane with a blocked beam will start when the beam is re-established as the vehicle pulls away. The beam can re-establish in less than 0.0001 seconds.

RaceAmerica offers several different sensor and emitter models (see Beam Emitter and Sensor models); depending on a variety of requirements. See the table of Sensor/Emitter combinations which operate with the Model 2600 XL Advanced system. In general, non-similar sensor/emitter pairs will not function correctly. All start line sensor options connect to the same Start cable connections; make sure left and right lane positions are correct.



SET-UP STEPS - 2600 SERIES

The content of this manual is designed to assist the new system owner with the RaceAmerica system, 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 oneself with basic operation.

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 timer console, starting line, and finish line; cable drops are pre-configured for the Tree, a Starter's Button, 60 Foot times and a Speed trap. Track lengths greater than 500 foot will be in two cable

segments; outside cables will join at the starting line. The large round connector connects to the console and the smaller connectors (RJ11) connect to the Track Sensors at the start line, 60 foot, speed trap and finish line as indicated on the cable near each RJ11 connector. Ensure the correct sensor is connected at each position (with the matching emitter opposing it)

STEP 2 - Identify the emitter/sensor placement at the start line and finish line. The lane width should be set between four (4) and fifty (50) feet. Layout the Track Sensor Interconnect Cables on the track site as illustrated on the Track Sensors/Cabling Diagram pages based on the options included with the system. Route cables to avoid vehicle and pedestrian traffic. Additionally, avoid running any of the system cables in conduit with 110/230VAC power lines as intermittent failures may occur. Speed Trap sensor spacing is set to the system requirements to record accurate speeds. To help in determining initial beam emitter to track sensor alignment in wide track widths, use a string stretched between the beam emitter and track sensor or eyeball a straight line between units. The system Alignment Mode will be utilized to verify alignment after power-up.

STEP 3 - Assemble the TREE to the base as shown in the setup photos. Multiple base plates may be required for windy racing conditions. Install flood lamps in the AC TREE models.

STEP 4 - Route the cables, place the equipment in position. Connect the Track Interconnect cable. This cable has connector drops for the TREE, all Track Sensor positions (Start, 60 Ft, Speed and Finish), and the Starter's Button.

STEP 5 - Connect cables for optional Starter's Button, Printer(s), PC(s), PODs, Wireless Links and Scoreboards to the appropriate connectors. The system will operate without these options connected. See Connecting Peripheral Devices for details about these options.

Beam Emitter and Track Sensor Options

Model 5040/5042 - IR Beam Emitter

Standard



5140D Sensor



5040B Emitter



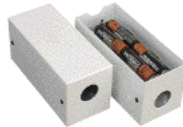
5042B

Used for 60Ft, Speed and Finish track locations. Emitters utilize 4 'AA' batteries each; 5042 uses 'C' batteries (with outside cables)

Standard



5158D Sensor



5058B Emitter

Standard Start Line Sensors and Emitters are used for single beam Stage/Start. Emitters use 4 'AA' batteries each.

6027 Option



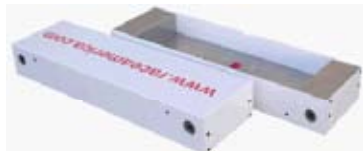
5163L/R Dual Beam Sensor



5063L/R Dual Beam Emitter

Add Pre-Stage
Use 4 'C' Batteries for each emitter

6026 Option



5156LM/RM Dual Beam Sensor



5054LM/RM Dual Beam Emitter

Professional Dual Beam Sensors and Emitters add Guard upgrade for ATV and Snowmobile applications. Use 4 'C' batteries for each emitter.

6023 Option



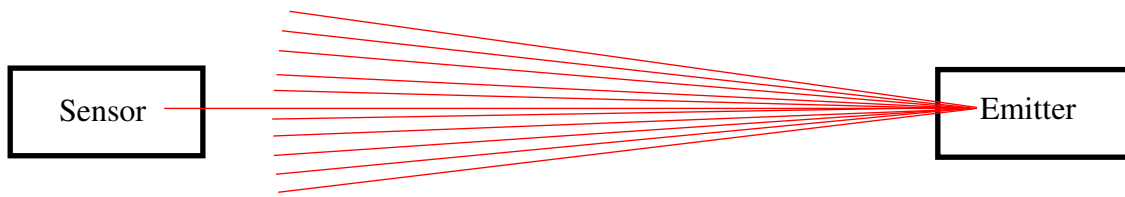
Model 5167L/R - Tri-Beam Sensor



Model 5067L/R - Tri-Beam Emitter

Professional Triple Beam Sensors and Emitters are an upgrade option used to add Pre-Staging and a Guard beam for all applications. Use 4 'C' batteries for each emitter.

Sensor and Emitter operation



The Emitter throws a spot light like beam of infra-red light; the Sensor should be aligned near the center of the beam for optimal reception and alignment.

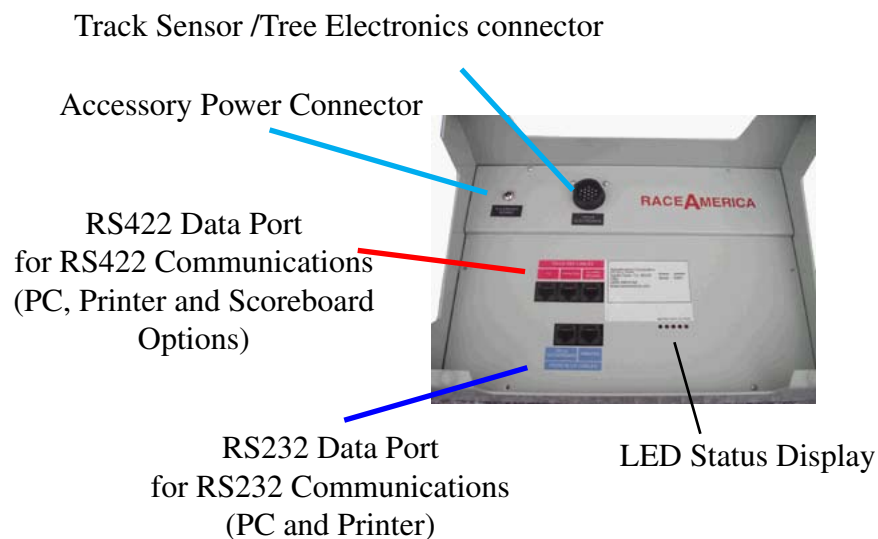
STEP 6 - Connect the system to the power source. For the DC TREE, connect the RED (+ or Positive) and BLACK (- or Negative) alligator clips to the 12VDC battery and you're ready to begin. **Operating the system from a battery connected to a charger or running car engine will result in an over voltage condition and damage the timer.**

AC power, verify all AC power is connected as shown on page 10 (have a qualified electrician verify the wiring if necessary - severe damage to the system can occur if the wiring is not correct). With AC power, a surge suppression power strip may be required at the TREE to compensate for line voltage fluctuations.

For the AC TREE option, connect the TREE to the AC power source. **If operating with optional**

Go to Power-on/Self-test section to familiarize with system operation.

XL Advanced Console Connectors



Cable connectors are on the underside of the XL Advanced enclosure.

110 VAC POWER CONNECTIONS - 2600 SERIES

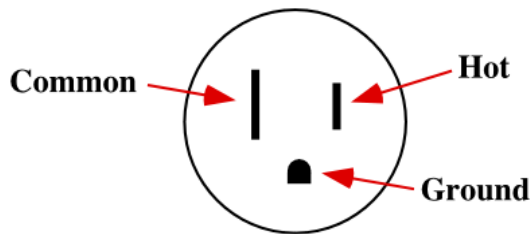
110VAC POWER OUTLETS

Severe damage to the timing system and peripheral devices can result if the AC power outlets and extension cord wiring is improperly wired or out of phase!

To insure correct AC power installation and operation, all electrical outlets and extension cords used with the timing system and peripheral devices (PC, Printer, Scoreboards) should be checked before power is applied to the system. All electrical outlets and extension cords should be wired correctly and using the same leg (same 110VAC phase) of incoming power.

A qualified electrician should use the following diagrams to confirm proper wiring and phase of all electrical outlets and extension cords.

-- Proper Wiring



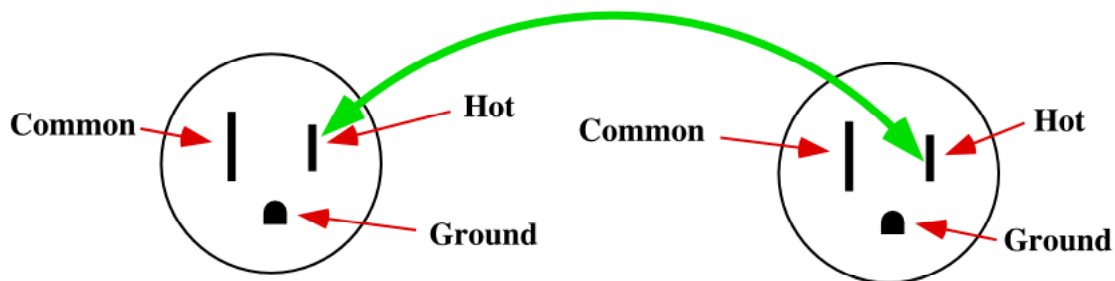
Typical Grounded Electrical Plug

AC Voltage Check - use voltmeter capable of measuring AC voltage

Between Common and Hot - 110 VAC
 Between Common and Ground - 0 VAC
 Between Hot and Ground - 110 VAC

-- Proper Phase

All devices connected to the timing system must be on the same phase of the AC cycle - in phase - before power is applied!



AC Voltage Check - use volt meter which can measure AC voltage

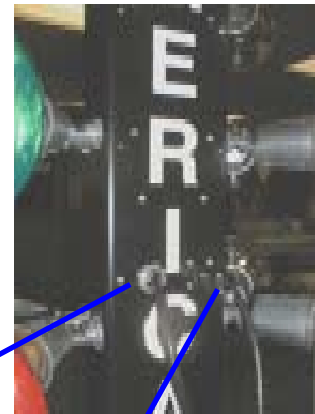
Between Hot and Hot - 220+ VAC - OUT OF PHASE
 Between Hot and Hot - 0 VAC - IN PHASE



Assembled Tree and Base Plate

The assembled Tree - note the base orientation is at a 45 degree angle to the tree for increased stability.

Multiple base plates can be screwed together to increase stability if required for windy environments.



Power
Cord

Tree Interconnect Cable

The TREE as seen from the back; do not connect the power until all cables have been connected and the system is ready for power up.

TREE CLAMP ASSEMBLY



The iron pipe is held in place by two clamps at the base of the tree. Assembly is easy if the pipe is inserted into the base of the tree with the tree sitting face up horizontally. Push up the clamp from the bottom to allow the pipe to go through each of the two clamps; a Stop bolt is in place to limit the pipe travel.



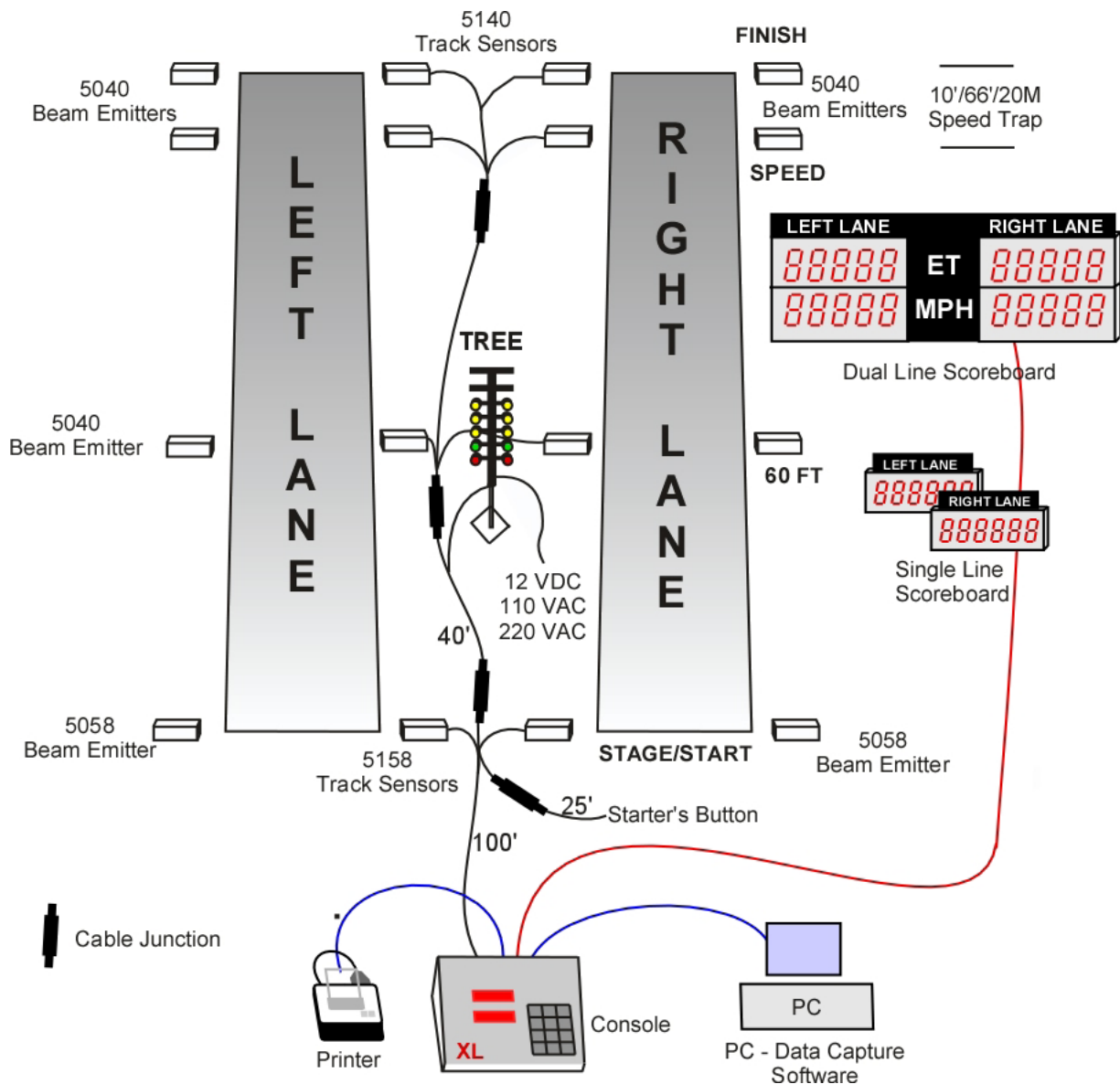
The iron pipe clamps from the back side - the nuts should be tightened to a little more than finger tight to hold the tree adequately in the vertical orientation.

Lamps can be aimed at the drivers on both the 12VDC and 110/230VAC TREES. On the 12V Tree, the light pods adjust front to back by pushing them to the desired position and can be aimed up/down by loosening the screw on the side of the Tree, moving the pod and retightening the screw. The 110/230VAC Trees can be aimed by loosening the thumbscrews and moving the floodlamp to the desired position.

TRACK SENSORS/CABLING DIAGRAM

Centerline cables

Single Beam Stage/Start with Speed Detection



NOTES:

Cable length between XL Advanced console and starting line is 100 feet.

Speed Trap distance is preset at the factory at 10 feet, 66 feet or 20 meters and programmed into the system. Connectors for 60 FT and Speed Options are on the cable even if they are not purchased with the system. Unpurchased options must be disabled in the console configuration setup.

Track cable lengths can be from 132' to 1320' as required. Cables can be routed down the center of the track or outside. Lengths of 500 feet or more are broken into segments. Cable winders are convenient for long lengths.

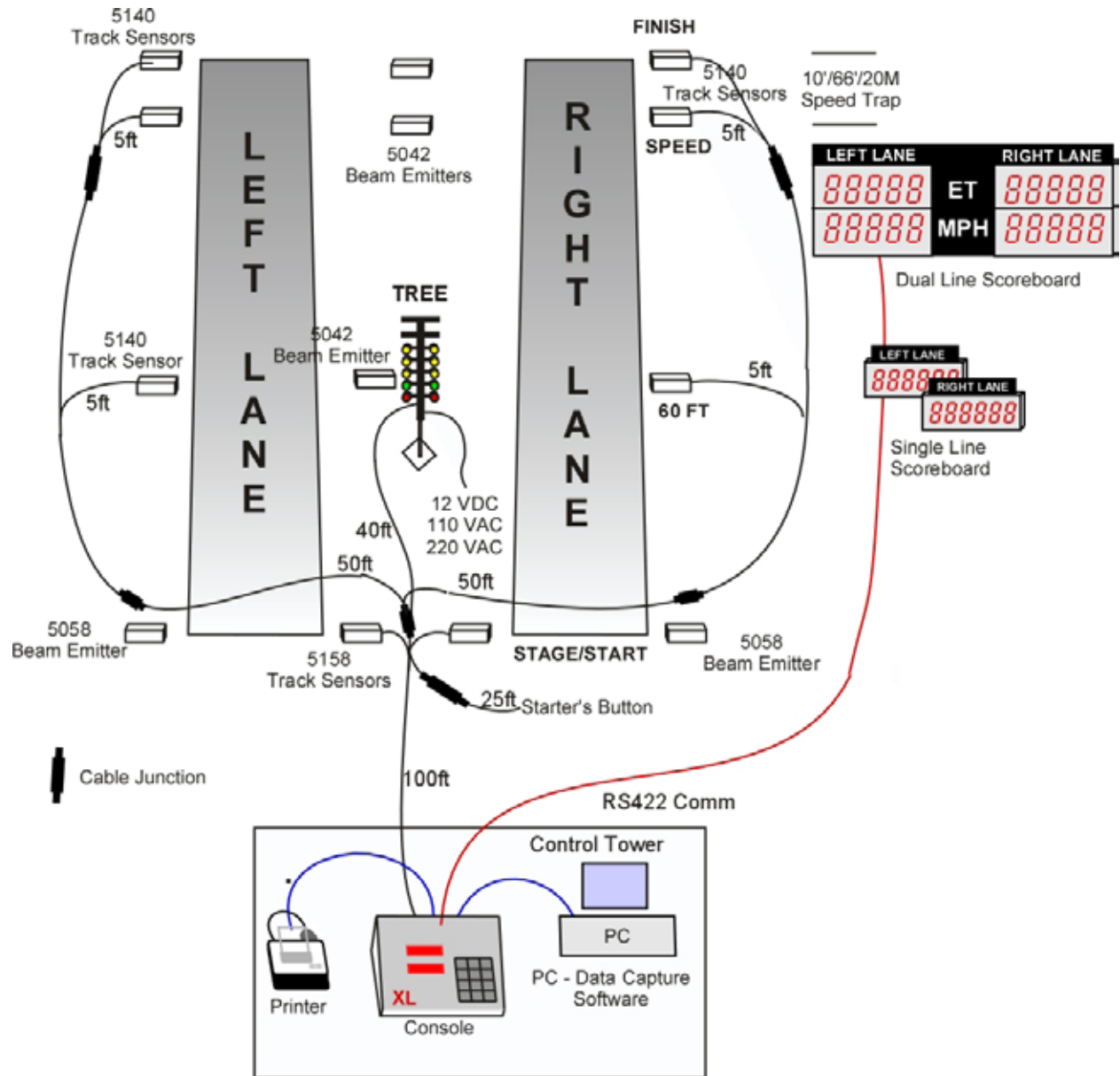
Peripheral devices such as Printers, PCs and Scoreboards can operate up to 25 feet on RS232 communications; conversion to RS422 communications (with 4500A PODs) allows placement at greater distances. Communication to scoreboards is by a RS422 port on the console. Wireless RF Links are also available for remote peripherals.

Pre-Stage and Guard Beam options can replace the standard start sensors and emitters (5158/5058).

TRACK SENSORS/CABLING DIAGRAM

Outside cables

Single Beam Stage/Start with Speed Detection



NOTES:

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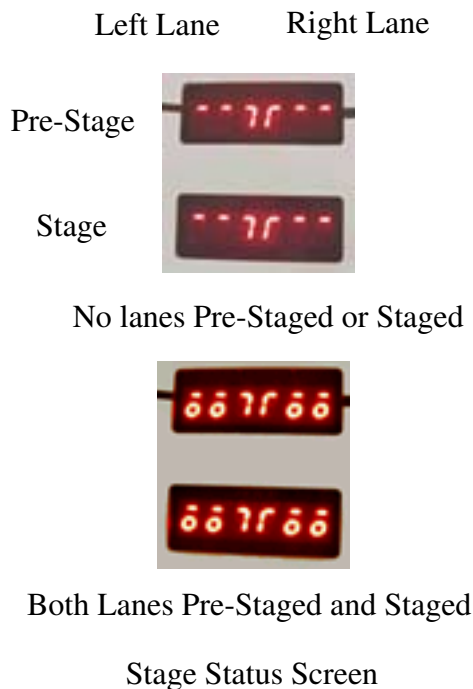
Pre-Stage and Guard Beam options can replace the standard start sensors and emitters (5158/5058).

POWER-ON/SELF-TEST

Connecting the power to the TREE turns on the system and places the RaceAmerica 2600 Series Timer into a self-test of the microprocessor circuitry, and the 'Christmas' Tree. This is an internal test as well as a visual check of the TREE lights. The upper console display shows the product model number [**2600**] and the lower display shows the code revision level [**E.00.0**] contained within the microprocessor.

The TREE sequences through a lamp test and circuitry test by illuminating the left red lamp and stepping up through the green and yellows, Stage and Pre-stage (Pre-Stage TREE only) on the left side, then on the right side to Stage and Pre-stage (Pre-Stage TREE). This repeats rapidly and then all lamps are flashed once to conclude the self-test. When the tree has completed the self-test display, the system is fully functional and ready for final configuration and setup. If the lights do not follow this sequence or some lights were not illuminated, check for insufficient power, defective bulbs or bad cable connections.

At the conclusion of the self-test, press the **ENTER (#)** key to display the Stage status screen. This is a graphic showing the Pre-Stage and Stage light positions for both lanes at the top of the TREE. If the Pre-Stage track electronics option is

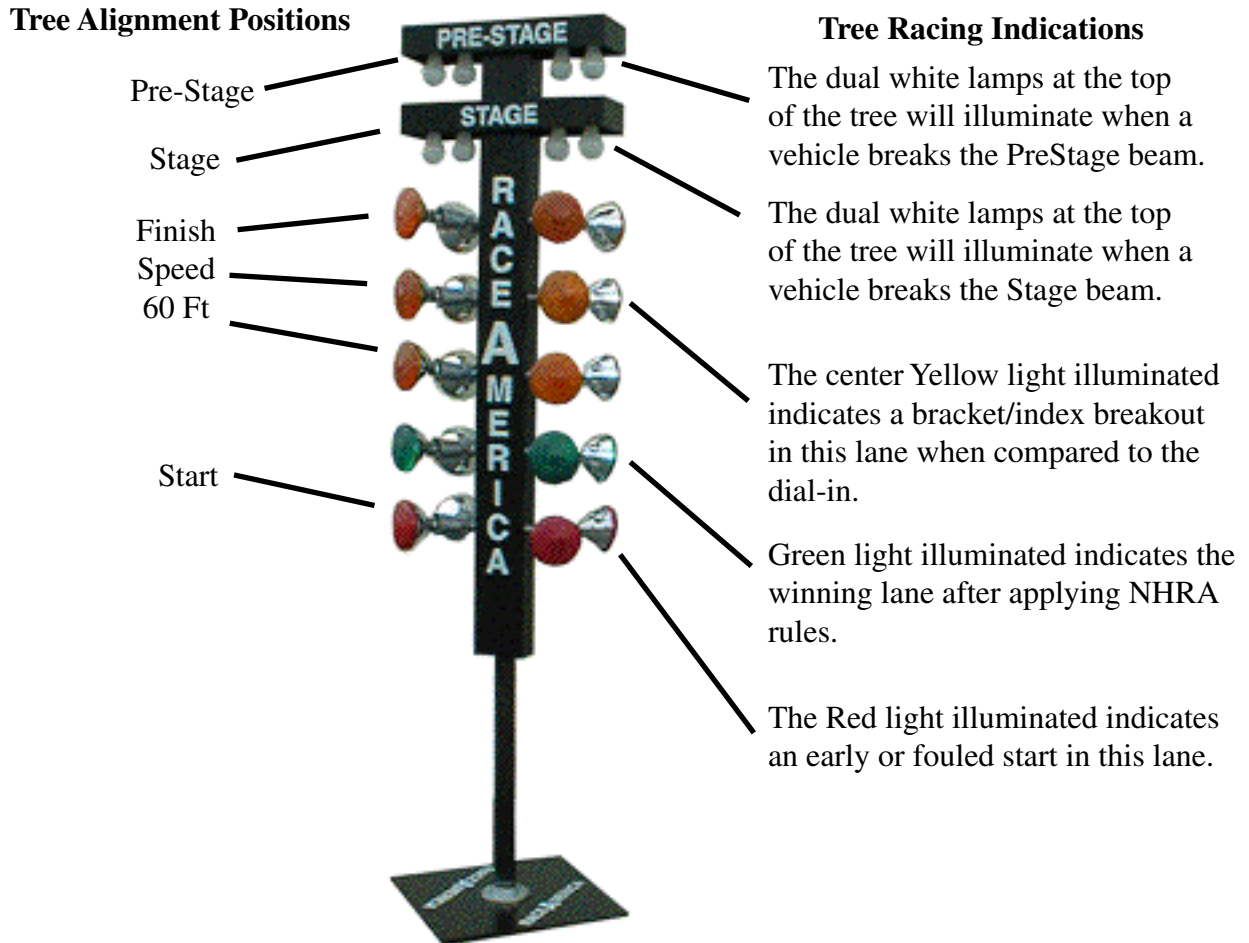


not installed in the system, the Pre-Stage lights will be on until they are reconfigured by the system. Once the system has powered up, the Pre-Stage and Stage sensors are active and indicate a vehicle present when blocked or misaligned.

ALIGNMENT MODE

All RaceAmerica timing systems have an alignment mode. This is very useful for verifying correct Emitter/Sensor alignment. After the track layout has been determined and the Sensors and Emitters placed in the proper positions, enter alignment mode on the console (press **[5] ALIGN** key) to verify correct alignment. Alignment conditions also display on the TREE as shown in the definitions of Tree Lights picture. The LED Display momentarily indicates the position of each sensor on the console display with letters representing each emitter/sensor pair **[PS-6SF]**. The digits indicate **P**re-Stage, **S**tage, **60** foot, **S**peed and **F**inish respectively. **L**eft lane sensors are monitored in the top display and **R**ight lane sensors in the lower display. The Status Display then changes each digit to a zero for each sensor being monitored **[00-000]**. If the Beam Emitter and Track Sensor are operating properly and aligned, the '0' digit will not change and the TREE lights will be OFF. If the Beam Emitter and Track Sensor are not properly aligned, the '0' digit for each emitter/sensor pair will count slowly if slightly out of alignment or continuously if they are not functioning properly or way out of alignment and the corresponding TREE light will be on or flickering. Once the emitter/sensor pair are aligned properly, the digit will stop counting and the TREE light will go out. If the alignment is off a little or intermittent, the digit for that emitter/sensor pair will count when they float out of alignment. Note that with the Stage/Start position, both the Stage light and the Red light will illuminate on the TREE when either is out of alignment. It should also be noted that once the zero digit has stated counting, it will never stop at zero again unless Alignment Mode is exited and reentered. This can be helpful for leaving the system in alignment mode for an extended period of time to check on an intermittent condition.

DEFINITIONS OF THE TREE LIGHTS



The TREE displays sensor alignment by illuminating a bulb for each sensor position when in alignment mode (left legend)

The TREE also displays a full variety of information during racing activity (right legend).

To maximize the alignment of the emitter/sensor pairs, it is suggested to rotate the beam emitter slowly left and right until the alignment for that pair begins to count. This technique will determine the maximum lateral detection angle. Rotating the beam emitter up and down until the alignment starts counting 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. Repeat this same process with the other beam emitters and track sensors. This will maximize the alignment accuracy.

Remember, the beam emitters and track sensors operate on a 'Line-of-Sight' concept and may require shims if they are installed on a street with a crown. Leaves, people, and other debris will also break the beams and could give false signals, so keep everyone and everything clear of the beam emitters and track sensors during racing activity. Lane width should be between four and fifty feet; a string stretched between the emitter and sensor may aid alignment or just eyeball a straight line.

Press the [#] ENTER key to exit Alignment Mode and return to Stage status mode.

SYSTEM CONFIGURATION

The system may need to be adjusted for options present each time the system is powered up. In this section, set the following parameters (defaults in parenthesis):

- Printer line feeds to eject timeslip (12)
- Number of timeslips to autoprint (1)
- Pre-stage functionality - (ON)
- Speed Detection (ON)
- 60 Foot (ON)

Parameters may be changed at any time but must be reconfigured each time power is turned on since all sensors are checked before a race can begin and if options are not present, they will fail alignment testing when a race is run. The default parameters do not need to be changed if the system is configured with Pre-Stage, 60 Foot and Speed. If not using a printer or Pre-Stage TREE, no action is required for those parameters.

Press the **[8] CONFIG** key on the Keypad to enter the system configuration section, the console displays **[LF] [12]** (Upper/Lower displays) and the user is prompted for the number of line feeds (blinking digit) to add to the end of the timeslip to properly eject the timeslip for tearoff. Enter the number of line feeds required and press the **[#] ENTER** key to confirm. Next **[AutoPr] [1]** will show the number of copies of timeslips to automatically print each time a race ends; press a number on the keypad (1-9) for desired number of copies; press **[#]** to save.

Following the print parameters, the setup will sequence through the **Pre-Stage** functioning. The Display will show **[PrE-St] [ON]** which means Pre-Stage is ON and will function with the track electronics option. Repeated presses of the **[8] CONFIG** key cycles the lower display through the other options. These include **[OFF]** which deactivates all Pre-Stage display, **[PUSH 2]** will turn on the Pre-Stage lights the first time the **[2] RUN** key (or Push-button) is pressed to manually control the Pre-Stage lights. This is useful to

tell the next set of drivers to come to the line. **[StAGE]** will turn on the Pre-Stage lights when the Stage light is turned on for each lane. Press the **[#] ENTER** key to accept the desired condition. These can be reconfigured at any time.

Next the display will show **[SPEED] [on]** indicating the Speed detection option is present; press the **[8]** key to toggle between **[ON]** and **[OFF]**. Select ON if the Speed option sensors are connected at the Speed cable ends, otherwise select OFF. Press the **[#]** key to accept the selection.

Next the display will show **[60 Ft] [on]** indicating the 60 Foot detection option is present; press the **[8]** key to toggle between **[ON]** and **[OFF]**. Select ON if the 60 Foot option sensors are connected at the 60 Ft cable ends, otherwise select OFF. Press the **[#] ENTER** key to accept the selection and return to the Stage Status display.

At this point the timer is ready to time the first run. It might be a good idea to recheck the sensor alignments after changing any configurations.

RUNNING A RACE

The system is now powered on, aligned and configured. Press the **[#] ENTER** key to clear any display condition and show the Stage status.

Next, race parameters for starting light sequence (Pro or Full - Pro is default), Dial-in times and Car numbers can be entered if time slips are to be printed or data capture software will be collecting race results. Select the desired starting sequence (Pro or Full) by pressing the **[3] TREE** key (the current light sequence will show in the lower display). This will toggle the starting sequence between the PRO format (all yellows then green at a 0.400 second interval) and the FULL or SPORTSMAN format (each yellow, then green at 0.500 second intervals). Each setup remains the starting setting until changed; this includes Car number and Dial-ins.

If running brackets on model 2600B, press the **[6] DIALIN** key to view the current Dial-in times; press the **[6]** key again to zero out the

existing times and receive the prompt to enter new numbers (top display is for left lane and bottom display is for right lane times); input the racers Dial-in times. Press the [#] **ENTER** key to accept the new times (all zeros will be heads-up format). Bracket racing is a form of handicapping where the expected Elapsed Time is entered for each racer, the starts are adjusted so if both racers have perfect reaction times and run their Dial-in, they will finish at the same time. If either racer runs faster than their Dial-in time, they 'Breakout' and this will be displayed after the race by illuminating the middle yellow light on the TREE; it will also show on the timeslip.

Press the [9] **CAR #** key to view the current Car numbers; press the [9] key again to zero out the existing times and enter new numbers (top display is for left lane and bottom display is for right lane times) input the racers Car numbers. Press the [#] **ENTER** key to accept the new numbers (all zeros is acceptable). This information will appear on timeslips and in data captured in PCs after the race.

Stage the race vehicles by moving them into the Pre-Stage (if present) and Stage beams (Pre-Stage and Stage lights on the TREE come on).

To start the race, press the [2] **RUN** key. If using an AC TREE and the Pre-stage has been configured in the '2' mode, the Pre-stage lights will illuminate the first time the [2] **RUN** key is pressed telling the racers to come to the line; then the TREE will come down when the [2] key is pressed again. The system will automatically check the alignment of all sensors and emitters prior to starting the TREE. If the alignments are all good after the [2] key was pressed, the TREE will begin the starting light sequence. If a driver interrupts the starting beam prior to the green lamp illuminating in that lane, the starting sequence will stop for that lane, freezing the tree and illuminating the red/yellow lamps indicating a redlight start in that lane. Once a driver crosses the starting line, they must cross the finish line to complete their run. The TREE will continue to illuminate the red or green lamps until both lanes have crossed the finish line (or only one lane crosses the finish line in the case of a BYE

run). When both vehicles cross the finish line, the Display will indicate the Elapsed Times (ET).

After both lanes have completed their runs, the TREE will display the redlight conditions of each lane. The green lamp will be illuminated for the winning lane after applying NHRA rules for reaction time, breakouts, redlights, and first to cross the finish line. If a printer option is present, the selected number of timeslips will print. [**Print**] [**SLiP**] will display in window after a race when printing is occurring. Additional prints can be made by pressing the [0] **PRINT** key. If a Scoreboard option is present, the Scoreboard will display the selected information (ET/MPH/RT).

The Console Display will show the **Left ET** in the upper display and the **Right ET** in the lower display; a dash [-] to the left of the ET indicates the winning lane. If the Speed option is present, pressing the [4] key will display Speed for both lanes (left upper display, right lower display). If the Speed sensor/emitter pair are not connected, the reading will be zeroes.

Press [7] to display RT. The LED displays the Reaction Times for both lanes.

Press [*] to display 60 Foot times for both lanes in the displays.

Press [1] to display ET. The LED displays the Elapsed Times for both lanes.

If an emitter/sensor pair were out of alignment when the [2] key was pressed, the console will display [**PS-6SF**] [**PS-6SF**] in the LED displays and flash the offending emitter/sensor pair(s). Pressing the [5] **ALIGN** key will enter alignment mode and the problem can be corrected by re-aligning the emitter/sensor pair. If sensors or emitters are damaged and there are no spares available, options such as 60 foot and Speed can be turned off and the sensors used on required positions (Finish).

Race results are available for recall and reprint until the [2] key is pressed for a new race.

Dial-in racing (available with the 2600B model) is started by pressing the [6] **DIALIN** key on the Keypad to display current Dial-ins, then press [6] again to enter the Dial-in for the Left and Right lanes; the next start will apply the appropriate differential to the starting sequence of

the race. At the end of a Dial-in race, the TREE will additionally indicate a bracket breakout if one occurs on either lane by illuminating the center yellow light. Dial-in selections can be checked by pressing the [6] key.

NOTE: As a general rule, if the TREE has a green or red lamp illuminated, one of the lanes has not completed its run and crossed the finish line. The [#] ENTER key must be pressed by the operator to end the race and capture the data up to the point of the problem. If a race ends immediately after pressing [2], a finish line sensor may have been bumped out of alignment after the start of the run. This would be indicated by an incorrectly low ET in one of the lanes.



Model 2600H Keypad (Heads Up)



Model 2600B Keypad (Dial-ins)

KEYPAD FUNCTIONS

The Model 2600 Drag System ships configured either for Heads-up (2600H) or Dial-in (2600B) options.

The following defines the keypad key functionality:

KEY 1

To display the ET results from the last run, press the [1] ET key to view ETs for both lanes; press [#] to clear.

KEY 2

The [2] RUN key is used to start a race. If using a Pre-Stage TREE and the system is configured to turn on the Pre-Stage lights before the start (PUSH 2); the first key press will illuminate the Pre-Stage lights, a second press will start the race.

KEY 3

Pressing the [3] TREE key toggles the starting light sequence from PRO mode (all yellows, then Green at a 0.400 second interval) to FULL (each yellow, then green at 0.500 second intervals) or SPORTSMAN mode. The LED Displays on the console will confirm which starting sequence will be used. To toggle back to PRO sequence, press the [3] key again. Repeated presses of the [3] key will toggle between these two starting sequences.

KEY 4

To display the Speed results from the last run, press the [4] SPEED key to display Speed results for both lanes; press [#] to clear.

KEY 5

To check or monitor the alignment of the IR Track Sensors and Beam Emitters in all four lanes, press the [5] ALIGN key to enter alignment mode. See the section on ALIGNMENT MODE earlier in this manual.

KEY 6

The **[6] DIALIN** key is used to enter the bracket or index for each lane on the 2600B dual lane system. Press the **[6]** key to view the current Dial-ins; press the **[6]** key again to change the times. Press the **[#] ENTER** key to accept the changes.

KEY 7

To display the Reaction Time results from the last run, press the **[7] RT** key to display reaction times in the display; press **[#]** to clear.

KEY 8

Press the **[8] CONFIG** key on the Keypad to enter the system configuration section, the console displays **[LF] [12]** (Upper/Lower displays) and the user is prompted for the number of line feeds (blinking digit) to add to the end of the timeslip to properly eject the timeslip for tearoff. Enter the number of line feeds required and press the **[#] ENTER** key to confirm. Next **[AutoPr] [1]** will show the number of copies to autoprnt; press a number on the keypad (1-9) for desired number to autoprnt; press **[#]** to save.

Following the print parameters, the setup will sequence through the **Pre-Stage** functioning. The Display will show **[PrE-St] [ON]** which means Pre-Stage is ON and will function with the track electronics option. Repeated presses of the **[8] CONFIG** key cycles the lower display through the other options. These include **[OFF]** which deactivates all Pre-Stage display, **[PUSH 2]** will turn on the Pre-Stage lights the first time the **[2] RUN** key (or Push-button) is pressed to manually control the Pre-Stage lights to tell the next set of drivers to come to the line and **[StAGE]** which will turn on the Pre-Stage lights when the Stage light is turned on for each lane. Press the **[#] ENTER** key to accept the desired condition. These can be reconfigured at any time.

Next the display will show **[SPEED] [on]** indicating the Speed detection option is present; press the **[8]** key to toggle between **[ON]** and **[OFF]**. Select ON if the Speed option sensors are

connected at the Speed cable ends, otherwise select OFF. Press the **[#]** key to accept the selection.

Next the display will show **[60 Ft] [on]** indicating the 60 Foot detection option is present; press the **[8]** key to toggle between **[ON]** and **[OFF]**. Select ON if the 60 Foot option sensors are connected at the 60 Ft cable ends, otherwise select OFF. Press the **[#]** key to accept the selection and return to the Stage Status display.

KEY 9

The **[9] CAR#** key is used to enter the Car number for each lane. Press the **[9]** key to view the current Car numbers; press the **[9]** key again to change the times. Press the **[#] ENTER** key to accept the changes.

KEY 0

To *manually* print the timeslip to the printer, press the **[0] PRINT** key. This can be done at any time to verify cabling and printer settings; race results in a test condition may all be zeros. Non-RaceAmerica printers connected to the XL Advanced system must be configured for RS232 serial communications, 9600 baud, No Parity, 1 Stop Bit, No Handshake; these parameters can be set on the printer (a custom cable may be required).

KEY*

To display the 60 Foot time results from the last run, press the **[*] 60FT** key to display 60 Foot times for both lanes; press **[#]** to clear.

KEY #

The **[#] ENTER** key is used to accept input values, end races without a finish or clear the

STATUS DISPLAY MESSAGES

During normal operation, messages will appear in the Status Display. These messages indicate status, mode of operation, or events occurring on the race track. Many of these messages are covered elsewhere in this manual and are alphabetically summarized in the following section as a reference:

ALiGn

This message indicates the system is entering the alignment mode for checking the alignment of the emitter/sensor pairs on the track.

AutoPr

Displays in the upper display during configuration for the number of timeslips to auto print after each race.

DiAL-in

Displays in upper display when selecting the starting Tree format if a Dial-in other than zero is entered.

End

This messages indicates all starting vehicles for that pair of lanes have crossed the finish line and the run is over.

Full

Full (Sportsman) starting format Tree is selected.

LF

During configuration of the printer, the user is prompted to enter the desired number of line feeds to be added to each timeslip to properly eject the paper for tearoff from the printer.

OFF

Displays for selection to disable various options.

on

Displays for selection to enable various options.

PrE-St

Displays in the upper display during configuration or Pre-Stage functionality.

PS-6SF

When entering Alignment Mode, this message will appear in sequence to indicate the alignment of the Track Sensors and Beam Emitters will be continuously monitored and the results displayed; left lane in upper display, right lane in lower display.

Print SLiP

Indicates timeslip data is being sent to the printer ports..

Pro

PRO starting format Tree is selected.

PUSH 2

Appears in Pre-Stage configuration; selection will allow the starter or race director to press the [2] RUN key to turn on the Pre-Stage lights to call the racers to the line, the next press of the [2] key starts the Tree.

SPEEd

Displays in configuration setup to enable or disable the Speed option. If sensors are not connected to the system, Speed must be OFF.

StAGE

Appears in the Pre-Stage configuration; selection of Stage will turn on the Pre-Stage lights when the Stage lights come on as a vehicle stages.

60 Ft

Displays in configuration setup to enable or disable the 60 Ft option. If sensors are not connected to the system, 60 Ft must be OFF.

CONNECTING PERIPHERAL DEVICES

The XL Advanced console can be connected to a variety of peripheral devices including PCs, Printers, Scoreboards and a Starter's Button. These devices can be connected via cable or wireless RF data links.

The **Starter's Button** (06-SB26) connects to the cable connector at the starting line. The Starter's Button functions exactly as the [2] RUN console key and in parallel with it.

For other peripherals, RaceAmerica provides several choices and make connection simple and easy to understand. For each race, run results are compiled and sent to peripheral device ports such as Printers, Scoreboards and PCs in formats each can understand. Further, this data is sent in RS232 communications protocol for short distances (<100') and in RS422 communication protocol for greater distances. RaceAmerica color codes cables to keep these two protocols separate - blue for RS232 and red for RS422 help track operators plug cables into the correct data ports on the console and peripheral devices. New wireless RF Link communications can be substituted for either of the data formats to eliminate the cables and communication PODs. Wireless RF Links work best with line of site operation and operate to distances in excess of a quarter mile.

RaceAmerica Scoreboards (models 6528, 6828, 6628, 6428,6810,6610 and 6410) can be connected directly to the system via the RS422 data port. A RS232/RS422 communications POD is required at the Scoreboard to convert the data to RS232 format for display. The 4500A communication PODs are used to convert data between RS232 and RS422 formats. Generally, RaceAmerica provides power to the PODs from the RS232 device it is closest to (via the cable 07-4554).

Scoreboard data is sent immediately and automatically at the conclusion of a race as the data is displayed on the console. Scoreboards contain internal 'smarts' to sort the data string and display the race results (selected by DIP switch settings on each display unit). Choices include Left/Right Lane data, ET, Speed, RT,

winner indication (flashing one lane) or alternating between Speed and ET (6528, 6828,6628 and 6428 models only).

A printer is a desirable peripheral to print timeslips for the participants. Printers receive a special output format transmitted serially at 9600 baud.

Race results can be sent to a PC with a serial port via either either protocol. RaceAmerica's XLSCORE software can receive the race results, add logic (such as driver's names, class, event date) and save to a file or print locally with a local printer. For communication to PCs, a RaceAmerica 06-PC05 cable will be required. If communication PODs are used, the POD will require a separate 9VDC power source at the PC.

For long length RS422 communications, a 07-3434 cable will be required. These are available in standard and custom lengths for any application.

If using wireless RF links, special cables will be required to connect between the console or peripheral device and the wireless RF link unit. RF link units are mounted in clear air away from sources of interference.

Left	WIN	Right
0088	CAR NUMBER	0711
10.476	ELAPSED TIME	10.465
69.24	VEHICLE SPEED	67.15
0.637	REACTION TIME	0.854
NO	REDLIGHT	NO
10.600	DIAL-IN/INDEX	10.800
YES	BREAKOUT	YES
2.878	60 FT TIME	0.000

Timed by RaceAmerica Corporation
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TROUBLE SHOOTING

Some operational conditions which may cause operational problems or be symptomatic of problems which should be addressed are listed here with solutions.

Alignment problems - Use new emitter batteries; interchange positions of similar units to isolate specific emitter, sensor or cable problems; disable positions to continue event.

Tree Light says ON/OFF - Using Alignment Mode, switch sensors to isolate the problem to the tree, cables or sensors.

Intermittent flickering of tree lights - check power supply for momentary over voltage condition.

System resets when the Tree comes down - Check power supply for low voltage condition; may manifest itself as a generator surging or bogging down; check for adequate cable gauge for long power runs.

Q-Mile Speed/ETs give false/very low values - Symptomatic of low voltage or insufficient current as the Tree comes down. Try disconnecting bulbs on back of tree; check power cable for gauge/distance from source.

MAINTENANCE

The 2600 Series Console, Beam Emitters, and Track Sensors do not require any maintenance beyond simple cleaning. Keep your system components dry between uses.

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 4.5VDC) will cause intermittent operation of the system resulting in intermittent cars detected at the starting line or the finish line as the batteries 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

To minimize race program interruptions, RaceAmerica recommends the purchase of spare parts. A spare emitter/sensor pair and end of track cable sections 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

ADDENDUM 1

OPTIONAL GUARD BEAM ALIGNMENT

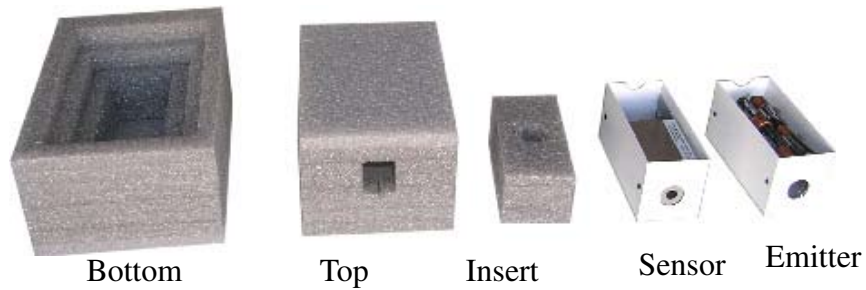
If optional Dual-Beam (16" with Guard beam) or Tri-Beam Start Line Track Electronics were purchased to add the True Guard Beam and Pre-stage beams to the Stage at the starting line, follow this alignment technique to properly align all beams.

Position the Dual/Tri-Beam Emitters and Sensors on the track and connect the start line cables as outlined in the timing system hardware manual. Power on the timing system and enter into alignment mode. Align the Pre-stage beams as usual and confirm Pre-stage beam alignment and operation. Next block the Stage beam on either the Dual/Tri-Beam Emitter or Sensor. With the Stage beam blocked, the Stage light on the tree will illuminate when the Guard beam is properly aligned. Rotating the Dual/Tri-Beam Sensor left or right on the track will cause the Guard beam to go out of alignment and the Stage light on the tree to go out. Position the Dual/Tri-Beam Sensor so the Pre-stage beam and the Guard beam are fully functional. This can be tested by blocking and unblocking the Pre-stage (if present) and Guard beams. Unblock the Stage beam and the Stage light on the tree will go out. If the Stage beam does not go out, fine tune the positioning by slowly rotating the Tri-Beam left or right until the Stage light goes out. Recheck the Pre-stage and Guard beams for alignment.

To final check all three beam are properly aligned, block the Pre-stage beam and the Pre-stage light on the tree will illuminate. Block the Stage beam and the Stage light on the tree will illuminate. With the Stage beam blocked, block the Guard beam also and the Stage light on the tree should go out.

If all three beams are not aligned, check the parallel position of the Dual/Tri-Beam Emitter then repeat the Dual/Tri-Beam Sensor alignment process on the above rotating the Dual/Tri-Beams in smaller increments left or right.

7540B - Foam Stand Assembly Instructions



'AA' Battery Emitter (5040B & 5050B)

1. Install batteries and turn on the Emitter.
2. Separate the Bottom of the Foam Stand from the Top.
3. Remove the Insert from the Top.
4. Place the 5040/5050 Emitter into the upper half with the bottom side showing.
5. Replace the Insert into the Top. Connect the cable to the Sensor
6. Insert the Top into the Bottom. Place on the track



Assemble an Emitter

Track Sensor (5140D)

1. Separate the Bottom of the Foam Stand from the Top.
2. Remove the Insert from the Top.
3. Run the cable through hole in top; plug into sensor
4. Push the sensor into the top (open end down)
5. Replace the Insert into the Top
6. Insert the Top into the Bottom. Place on track



Assemble a Sensor
Note cable routing

'C' Battery Emitter (5042B)

1. Same as above except place the 'C' Battery pack in the Bottom and connect the wire to the Emitter through the Insert.

Additional Stability - add weight to the Bottom

1. Place a weight into the Bottom well as required.



5042B Emitter



Complete Assembly