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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.
PACKAGE COMPONENTS

The standard Model 2200 PRO TREE JR dual lane drag package includes:

1 - 2200 Series Console Unit
1 - 12VDC PRO TREE ‘Christmas’ Tree
1 - Base Plate Tree Stand w/ 1.5” Iron Pipe
4 - IR Beam Emitters
4 - IR Track Sensors
1 - Interconnect Cable Assembly for Track Sensors
1 - Interconnect Cable Assembly for Console to Tree
1 - Owners Manual

Model 2200 Available Options:

6013B Speed Detection: (MPH or KPH)**
   2 - IR Beam Emitters (5040A)
   2 - IR Track Sensors (5140C)
6025B Staging Option: **
   2 - Dual IR Beam Emitters (less 2 5140C)
   2 - Dual IR Track Sensors (less 2 5040A)
7110A 110V AC TREE with Pre-Stage and Rear Facing Lights*
5040D IR Beam emitter (4xD-size)
6789A Starters Button 50 foot cable
6038S Dot-Matrix Timeslip Printer Package
6042A Thermal Timeslip Printer Package
6860A Large Digital Display
4500A Data Communication POD (for printers and displays greater than 100ft from console)

* Pre-Stage operates via program button options.
** Either Speed Detection or Staging can be used with one system but not both concurrently.

LOCAL REQUIREMENTS

Additional items required to operate the 2200 Series timing system package and options:

1 - 12VDC automotive battery (DC TREE)
4 - AA-size batteries per Beam Emitter (4)

Staging Option
4 - D-size batteries per Dual Emitter (2)

AC TREE
1 - 110V AC 20Amp circuit
   (Note - Power Common is Data Ground)
1 - Surge Suppression Power Strip (20A)
8 - 60W 110VAC Stage/Pre-Stage Bulbs
20 - 100W 110VAC Floodlights (12 Yellow, 4 Green, 4 Red)

Other options
12VDC source for each printer or display board
   (AC adapters available)

PRODUCT SPECIFICATIONS

The following listing provides the designed performance specifications for the 2200 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

Power Requirements:
DC TREE 12VDC Source
AC TREE 110 VAC - 20A
IR Beam Emitter AA-size batteries
Dual-Beam Emitter D-size batteries

2200 JR System showing Console, Sensors, Emitters and Dual Beam Stage/Start enclosures
THEORY OF OPERATION

The 2200 Series Drag Timers are completely self contained race timing systems made with the latest technology CMOS 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. Under normal conditions, a properly charged auto battery will operate for an entire day of racing without requiring a recharge.

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 these units critical. Tips are provided to aid alignment on surfaces that are other than ideal. These units will operate over a wide range of conditions but should not be operated beyond the specification parameters (less than 4 ft or more than 50 ft).

Once the system is properly set up and aligned on the racing surface, the timer console will 'monitor' the track sensor each time a run is made.
SET-UP STEPS - 2200 SERIES

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 starting line, the finish line and the timer console.

All connectors are keyed for proper orientation. The 12VDC battery is connected with the RED alligator clip to plus (+) terminal of the battery and the BLACK alligator clip to (-) terminal of the battery. Do not connect power until all other setup steps are complete.

The free standing battery powered Model 5040A IR Beam Emitters are placed on one side of the start line and finish line and the Model 5140C IR Track Sensors are placed on the other side of the start line and finish line. Each of the Beam Emitter and Track Sensor units are fully interchangeable with each other. The Track Sensor Interconnect Cable is keyed to match the start line and finish line track sensor, position identified at the track sensor end of the cable.

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. To help in determining initial Beam Emitter to Track Sensor alignment in larger track widths, use a string stretched between the beam emitter and track sensor or eyeball a straight line between units.

STEP 3 -
There are two cables connecting the console to the Pro Tree electronics and Track Sensors. Layout the Track Sensor Interconnect Cables on the track site as illustrated on the next pages based on the options included with the system. The large round connector connects to the console and the two or three smaller connectors (RJ11) connect to the Track Sensors at the start line and the finish line and speed trap (optional) as indicated on the cable near the RJ11 connector. Speed Trap sensor spacing should be ten (10) feet to record accurate
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.

**STEP 4 -**
Attach the tree to the base as shown in the setup photos. Multiple base plates may be required for windy racing conditions.

**STEP 5 -**
Connect cables for optional Starter’s Button, Printers, PODs and Large Digital Displays to the appropriate connectors.

**STEP 6 -**
Connect the RED and BLACK alligator clips to the 12VDC battery and you’re ready to begin. If using the optional AC TREE, connect the TREE to the AC power source. With AC power, a surge suppression power strip may be required at the TREE to compensate for line voltage fluctuations.

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.

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**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 Console connector panel; an External Ground is recommended for all AC operations.

The AC 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.
CABLING DIAGRAM WITH SPEED DETECTION

Measure Ten Feet (10') between Speed and Finish Sensors and Emitters for accurate speeds.
CABLING DIAGRAM WITH DUAL BEAM STAGING
POWER ON/SELF TEST

Connecting the power to the TREE turns on the system and places the RACEAMERICA 2200 Series Timer into a selftest of the microprocessor circuitry, the LED display (Light Emitting Diode) and the PRO TREE Christmas tree. This is an internal test as well as a visual check of each display and tree. The LED Displays sequence through each segment of all four digits, then illuminates each segment and decimal point of all four digits until the number 8 is illuminated with the decimal point. The LED Display then places an 8 with decimal point in the far right digit and shifts the display to the left through all four digits.

The LED Displays then sequence through the PRODuct number and the CODE revision level contained within each microprocessor.

Next, 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 on the left side, then on the right side to Stage and Pre-Stage. The tree then illuminates all top Stage (Pre-Stage with AC Option) lamps and steps down through each set of lamps for both lanes. The final power-on self test is the lamps are all sequenced on starting with the red up the left side, then the red up the right side. All lamps are then flashed once to conclude the self test. When the tree has completed the self test display, the system is fully functional and ready to run dual lane drag racing. If the lights do not follow this sequence or some lights were not illuminated, check for insufficient power or defective bulbs.

ALIGNMENT MODE

To verify all Track Sensors are properly aligned with their Beam Emitters, the LED Displays enter into the Alignment Mode when the operator selects the Alignment Mode by pressing the [0] key on the Keypad. The LED Display momentarily indicates the position on each sensor on the display with letters represent each emitter/sensor pair [LSSF]. The leftmost [S] indicates the START emitter/sensor pair, the center [S] indicates the SPEED emitter/sensor pair (not present if staging option is present), the [F] indicates the FINISH line emitter/sensor pair. The [L] indicates the LEFT lane is being monitored. The Status Display then changes each digit to a zero for each sensor being monitored [L000]. 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 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. Once the emitter/sensor pair are aligned properly, the digit 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. The alignment will also be displayed on the TREE by illuminating a bulb when the beam is not aligned. See the picture for which bulb corresponds to which position on the track.

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 Sensor during racing activity.

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 Emitter and both Track Sensors. This will maximize the alignment accuracy.

Press the [#] pound sign key to exit Alignment Mode.
DEFINITIONS OF THE TREE LIGHTS

The TREE displays sensor alignment by illuminating a bulb for each sensor position when in alignment mode.
The TREE also displays a full variety of information during racing activity.

PRINT SETUP (if a Printer is present)
Press the [5] key on the Keypad to configure the communications baud rate, line feeds and number of copies to autoprint after each race. See keypad functions for exact setup options.

PRE-STAGE LIGHT SETUP
(for AC TREES)
Select the Pre-Stage light function by pressing the [8] key on the Keypad. The options include always OFF, ON before Start and ON with Stage. See the Keypad functions section for exact setup sequences.

At this point the timer is ready to time the first run.
RUNNING A RACE - DUAL LANE

To begin racing, select the desired starting sequence (Pro or Full) by pressing the [3] key. 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). To start a race, press the [2] key. The system will automatically check the alignment of all sensors and emitters prior to starting the tree. If an emitter/sensor pair are out of alignment, the console will display [LSSF] or [rSSF] in the LED Displays and flash the offending emitter/sensor pair. Pressing the [0] key will enter alignment mode and the problem can be corrected by realigning the emitter/sensor pair. If the alignments are all good after the [2] key was pressed, the PRO TREE will begin the starting lights 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 lamp 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 PRO 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 LED Display will indicate the end of that run by displaying [End] and the PRO TREE will blank out.

Once both lanes have completed their runs, the PRO 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 prints will print. If a Display option is present, the display will cycle through the selected information.

The Console Display will show L--r with one blinking indicating the winner. Pressing [7] will display [L Et] followed by the elapsed time in seconds for the left lane; press any button and the display will show [r Et] followed by the elapsed time in seconds for the right lane. If a lane did not finish, the elapsed time is replaced by [ .dnF] for that lane. If a lane did not start, the elapsed time is replace by [ .dnS] for that lane. If the Speed option is present, pressing the [8] button will display Speed for both lanes; the LED display will then sequence through the Speed readings by displaying [LSPd], then the speed in miles per hour for left lane; press any button, then [rSPd] followed by the speed in miles per hour for right lane. If the Speed sensor/emitter pair are not connected, the reading will be zeroes. If the staging capabilities are present, the staging replaces the speed detection and speed will not be displayed.

Press [9] to display RT. The LED displays the Reaction Times by displaying [L rt], then the reaction time in seconds for the left lane, then [r rt] followed by the reaction time in seconds for the right lane. If a lane did not start, the reaction time is replace by [ .dnS] for that lane.

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

Dial-in racing (available with the 2200B model) is started by pressing the [1] button on the Keypad and entering 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 [4] key. Use the [*] key to move the decimal point for times greater than 9.999 sec.

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 [#] pound sign key must be pressed by the operator to end the race as a safety precaution. 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.
The Model 2200 Drag System ships configured either for the Speed Option or the Stage Option. The Keypads above depict the key functions for the Heads-Up, Dial-In, Speed and Stage Options.

**KEY 0**

To check or monitor the alignment of the IR Track Sensors and Beam Emitters in all four lanes, press the [0] key to enter alignment mode. See the section on ALIGNMENT MODE earlier in this manual.

**KEY 1**

Press the [1] key to enter the bracket or index for each lane on the 2200B dual lane system. The LED display momentarily displays [Lbrt] then prompt the user to enter the bracket or index for the left lane. To enter numbers greater than 9,999 seconds, press the [*] key to toggle the decimal point to enable entry above 9,999 seconds. Press the [#] pound sign key to enter the bracket/index for the left lane. [rbrt] momentarily displays and the user is prompted for the right lane’s bracket/index value. Press the [#] pound sign key to enter the bracket/index for the right lane.
KEY 2
The [2] button is used to start a race. If using an AC TREE and the system is configured to turn on the Pre-Stage lights before the start; the first button press will illuminate the Pre-Stage lights, a second press will start the race.

KEY 3
Pressing the [3] key toggle the starting lights sequence from PRO mode to FULL 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
Pressing the [4] key will display the current bracket/index values for the next run (2200B Models)

KEY 5
To change the configuration of the printer port, press the [5] key. The console displays [bAud] then [9600] for 9600 baud rate. To toggle through the other baud rates, press any key except [#] the pound sign key. Once the desired baud rate appears in the LED display, press the [#] pound sign key to enter. The console then displays [LF] and the user is prompted for the number of line feeds 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 [#] pound sign key to enter. [Auto] will show the number of copies to autoprint; press a number on the keypad (1-9) for desired number to autoprint; press [#] to save all of the config options. [Prnt] will display in window after a race when printing is occurring.

The default parameters (9600 baud, 12 line feeds, 1 auto-print) will function with RACEAMERICA supplied printers.

Other printers must be configured for RS232 serial communications with No Parity, 1 Stop Bit; the above parameters can be matched to the printer.

KEY 6
To manually print the timeslip to the printer, press the [6] key.

KEY 7
To display the ET results from the last run, press the [7] key.

KEY 8
Pressing the [8] key will define the Pre-Stage functioning (AC TREE Option ONLY). The Display will show [OFF] which means Pre-Stage is OFF; pressing the [#] key accepts this mode. Press any key other than [#] to turn on Pre-Stage; the Display will show [StAg] which will turn on the Pre-Stage lights when the Stage lights come on; press any key again and the display will show [-2- ] to redefine how the [2] button works to manually control the Pre-Stage lights to tell the next set of drivers to come to the line.

KEY 9
To recall only the right lane results from the last run, press the [9] key.

KEY *
To toggle the decimal point position for Dial-In racing (2200B Models).

KEY #
The [#] pound key is used to accept input values, end races without a finish or clear the TREE.
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:

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

**Baud**
During configuration of the printer, the user is prompted to enter the desired baud rate of the printer attached to the console.

**CodE**
This message appears during the power-up sequence and indicates the software code level running in the RACEAMERICA timer.

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

**Lbrt**
During entry of the bracket/index values for the left lane, this message is displayed to indicate the left lanebracket/index.

**L Et**
During recall of the race results, this message indicates the left lane elapsed time is being displayed.

**L rt**
During recall of the race results, this message indicates the left lane reaction time is being displayed.

**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.

**LSPd**
During recall of the race results, this message indicates the left lane vehicle speed is being displayed.

**LSSF**
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 for the left lane.

**null**
During configuration of the printer, the user is prompted to enter the desired number of null character required for the printer attached to the console.

**Prod**
This message appears during the power-up sequence and indicates the product number of the RACEAMERICA timer.

**rbrt**
During entry of the bracket/index values for the left lane, this message is displayed to indicate the right lanebracket/index.

**r Et**
During recall of the race results, this message indicates the right lane elapsed time is being displayed.

**r rt**
During recall of the race results, this message indicates the right lane reaction time is being displayed.

**rSPd**
During recall of the race results, this message indicates the right lane vehicle speed is being displayed.

**rSSF**
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 for the right lane.
MAINTENANCE

The 2200 Series Console, Beam Emitters, and Track Sensors do not require any maintenance.

To insure uninterruptted 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 4.0V DC) 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.

Beyond these items, you should not encounter any routine maintenance with the operation of your timing system.

SPARE PARTS

RACEAMERICA recommends a spare set emitter and sensor be available in the event of an unfortunate accident. Contact RACEAMERICA for availability and pricing of spares items.