

TSD Rally Computer

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Introduction

TSD Rally Computer is an iPad app designed to simplify computations necessary to navigate a traditional time-speed-distance (TSD) automobile rally.

A TSD rally is comprised of stages set along a route defined by written instructions. The first stage is the Odometer Check stage that allows you to calibrate your car's odometer with that of the Rallymaster's odometer. Calibration is necessary because it is unlikely that your car's odometer will match distances in the rally instructions that were computed by the Rallymaster.

In later stages you will follow a course at a particular average speed that will change from time to time at places that are generally unknown in advance. Each change in average speed marks the beginning of a new leg of the race within a stage.

In order to drive the course at the prescribed speeds, you must keep track of your odometer reading along the way. At each required change in average speed (abbreviated CAST for "change average speed to"), you must record the odometer reading as accurately as possible prior to pressing the button to start a new leg at a new average speed.

At unknown points along the way, there will be Checkpoints. When crossing the Checkpoint, your time will be recorded, so you must once again record the odometer reading at the Checkpoint before pausing the clock to end the stage.

At the Checkpoint the rally staff will indicate the time you crossed and will issue a departure time for the start of the next stage. There may be additional instructions affecting the running of the next stage.

At the end of the rally, you will be scored on how early or late you arrived at each Checkpoint. The team with the lowest score will be the winner.

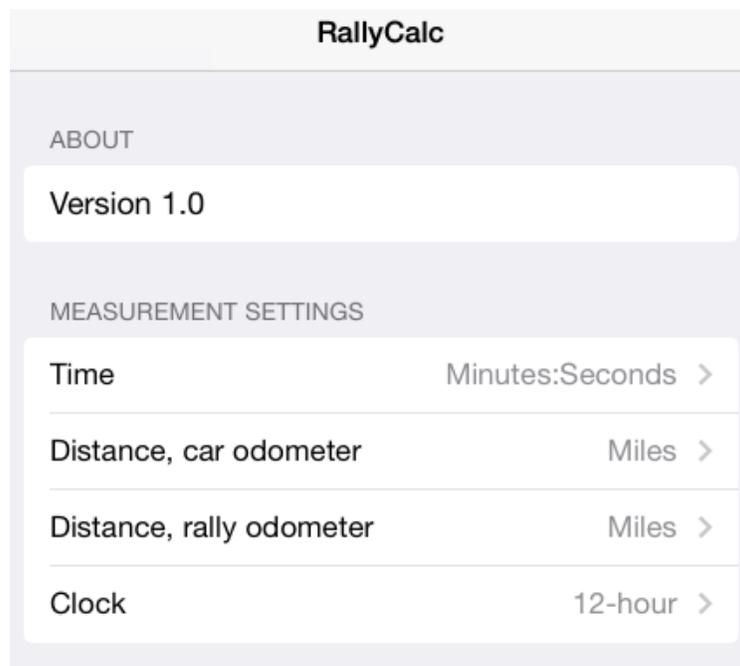
Getting started

Before you begin the rally you must initialize the TSD Rally Computer. There are several steps in the process.

First, rallies may use different measurements for time, speed, and distance. For example, the rally might use minutes measured in hundredths rather than seconds for time, or kilometers rather than miles for distance, or a 24-hour clock rather than a 12-hour clock with am and pm. You will find these measurement conventions in the written rally instructions.

Preferences

Set these measurements in the Preferences of the iPad Settings as follows:



Touch the appropriate measurements to toggle between choices and then open the app itself. You'll notice that various labels beside numbers will conform to the measurements you've set in the Preferences.

Notice that the distance measurement is in miles and that time is measured in minutes and seconds. The clock also shows am/pm rather than a 24-hour clock with no before or after noon indication. Also, note that you may use a different distance measurement for your car and for the rally instructions.

The screenshot shows the TSD Rally Computer app interface. At the top, it displays the current rally time as 05:14:43 pm and the rally odometer as 000.00 miles. A large '0' is shown in the center, representing the current rally odometer reading. Below this, the car odometer is shown as 1234.50 miles. The interface includes buttons for 'Pause', 'Resume', and 'Gain', and a 'Set Odo at Start Line' button. A 'Rally Clock' and 'Car Odometer' section shows stage and leg times and distances. A 'Start Leg & CAST' button is set to 45.0 mph. At the bottom, there is a 'Select CAST for Next Leg' table and a 'Current Leg' section.

Current Rally Time: 05:14:43 pm

Rally Odo in Miles: 000.00

Car Odo in Miles: 1234.50

Rally Clock: 0:00 (Stage min:sec), 0:00 (Leg min:sec)

Car Odometer: 0.00 (Stage miles), 0.00 (Leg miles)

Start Leg & CAST: 45.0 mph

Current Leg: Miles / Hour: 0.0, Min:Sec / Mile: 0:00

Select CAST for Next Leg:

| | |
|------|------|
| 45.0 | 1:20 |
| 35.0 | 1:43 |
| 25.0 | 2:24 |
| 15.0 | 4:00 |

Next Leg: 45.0 Miles / Hour, 1:20 Min:Sec / Mile

Next Starting Time: 00:00:00

Bottom Navigation: Next Starting Time, CAST Presets, TSD Calcs, Odometer Check

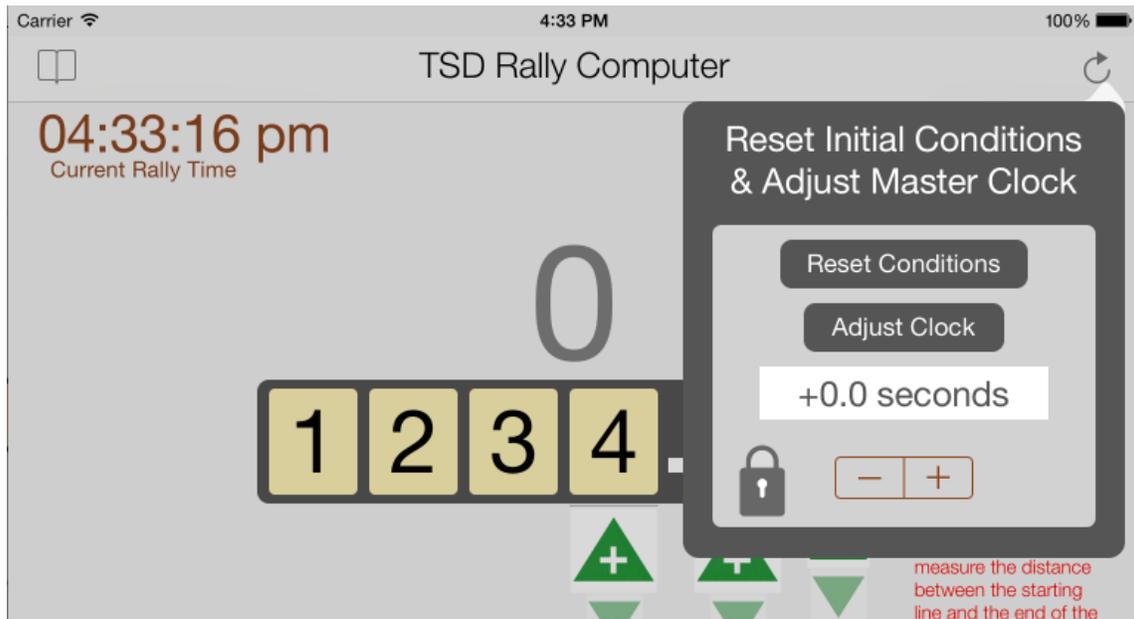
Instructions:

- STEP 1...For the computer to function, the car's odometer must be set at the starting line.
- STEP 2...Change the car's odometer to measure the distance between the starting line and the end of the odometer check stage.
- STEP 3...At end of the odometer check stage, calculate odometer adjustment in toolbar with actual car and rally odometer distances.
- STEP 4...To begin the timed rally, start leg & CAST as instructed.

The start-up screen

Reset popup

At the upper right-hand corner of the start-up screen, you will see an icon



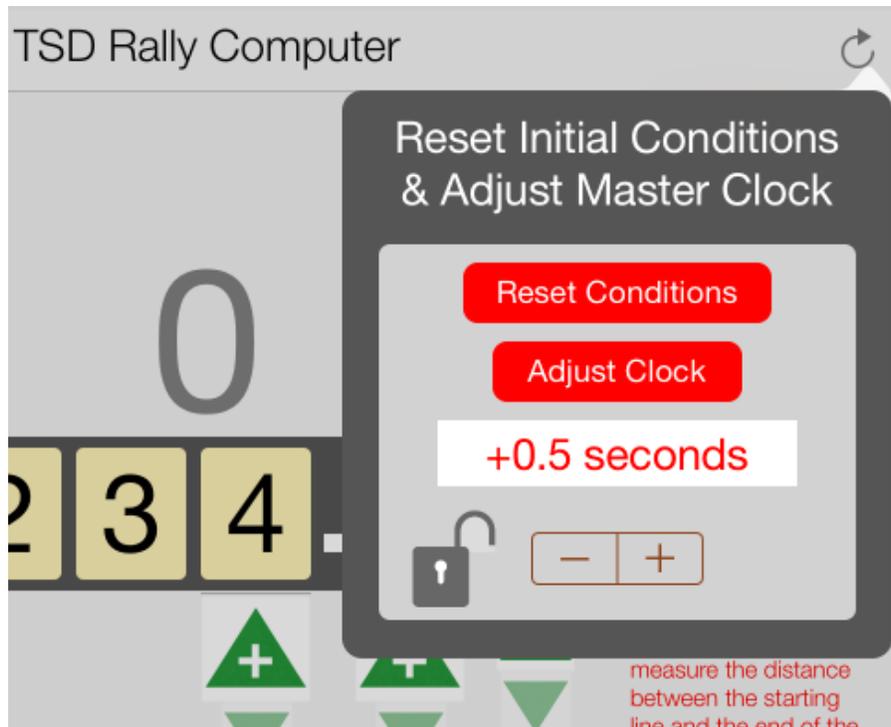
that will allow other computer settings to be set to their starting or initial conditions. Touch the icon to reveal the following popup:

Notice that there are two buttons labeled “Reset Conditions” and “Adjust Clock” as well as an icon that looks like a padlock.

In order to activate these buttons, you must touch the padlock icon. The red colored background on the buttons indicates that they are unlocked and active.

To reset conditions, simply touch the “Reset Conditions” button. The padlock will close and you may notice some numbers or objects on the full screen change.

At the start of each rally, teams are allowed to calibrate their clocks and stopwatches so that the time matches the clock used by the rally staff. In the popup you may use the “Adjust Clock” button as well as the plus/



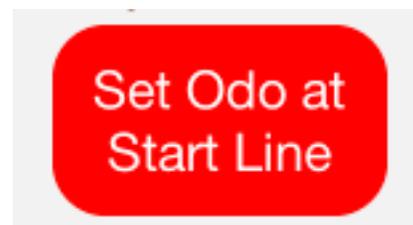
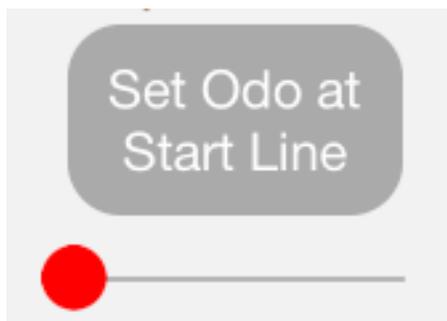
minus buttons to adjust the “Current Rally Time” to synchronize your clock with the master rally clock.

Be sure to touch the “Adjust Clock” button or to touch the padlock icon to set the master clock adjustment.

Setting your car’s odometer

You must set your car’s odometer at the rally starting line.

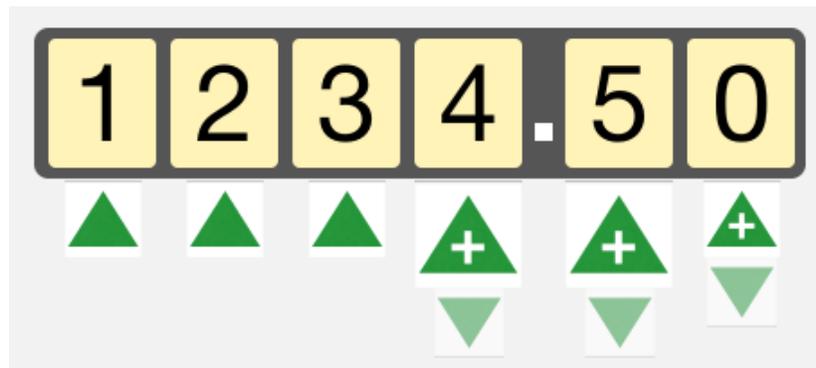
While waiting for the signal to depart on the odometer check stage, you will have time to set the computer’s odometer, but you must activate a button to perform this task.



At or before the starting line, slide the red circle below the grey button labeled “Set Odo at Start Line” to the right so that the button background turns red indicating that the button is activated and able to function.

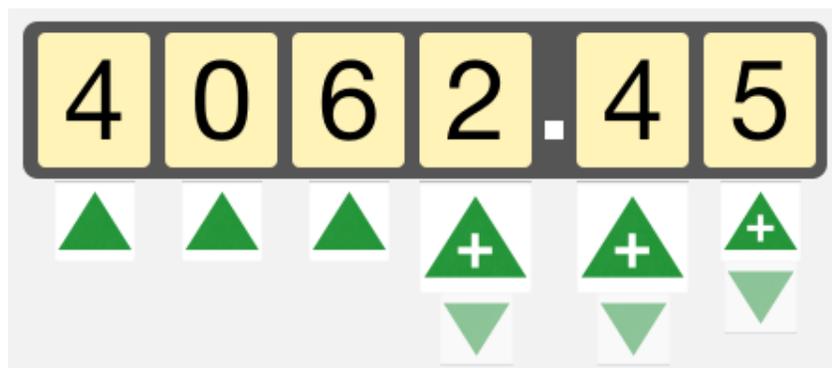
In the event that you inadvertently touch the red “Set Odo at Start Line” button, you will have to repeat the computer’s initialization by touching the reset popup icon in the upper righthand corner of the start-up screen.

Next, you will see green up and down arrows below six numbers representing your car’s odometer. At the starting line, touch these buttons to set the computer’s odometer as closely as possible to your car’s odometer. If your car’s odometer only measures to the nearest tenth of a mile, try to interpolate to the nearest one-hundredth.



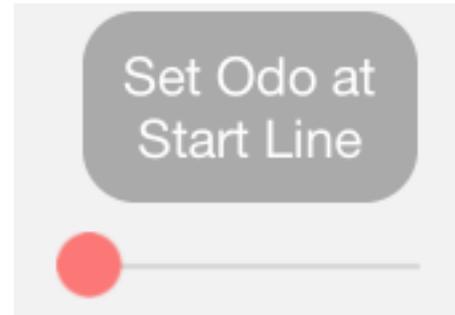
The computer’s odometer allows six digits from 0000.00 to 9999.99. You will ignore car odometer readings greater than 9999.99 and just work with these six digits during the rally.

Say, for example, that your car’s odometer reads 104,062.4+ miles at the starting line. Also, say that the 0.4 mile indicator is moving toward 0.5 so



that you estimate that the decimal reading is about 0.45. Then, after adjusting the numbers, your computer's odometer will look like this:

Now, touch the "Set Odo at Start Line" button. Notice that the red circle on the slider below the button is a light red color. This indicates that the



slider has been disabled. (NOTE: if you wish to enable the slider to reset the car's odometer, you must return to the reset popup by touching the icon in the upper righthand corner of the screen.)

Notice that the instructions on the screen for Step 1 and Step 2 have disappeared. That is because you have now completed two of the four steps necessary to begin the timed stages of the rally.

Let's discuss the four steps in brief before going into more detail about the operation of other features of the TSD Rally Computer.

Four steps to begin rally

Here are the four steps that you must complete before starting the first timed stage of the rally:

Step 1

For the computer to function, the car's odometer must be set at the starting line.

Step 2

Change the car's odometer to measure the distance between the starting line and the end of the odometer check stage.

Step 3

At the end of the odometer check stage, calculate the odometer adjustment in the toolbar with actual car and rally odometer distances.

Step 4

To begin the timed rally, start leg and change average speed (CAST) as instructed.

So far, you have completed Steps 1 and 2. The next section will describe the tasks necessary to compete Steps 3 and 4.

From the starting line

It is very important to calibrate your car's odometer with the odometer used by the Rallymaster when he or she created the course instructions. You may have to perform course changes or take other actions at precise distances along the course route but, unless you correct for differences between your odometer and the odometer of the Rallymaster, you may execute the instructions at the wrong location.

To compute the odometer correction factor, you will need to measurements. One is the distance from the starting line to the end of the odometer check stage. This distance will be provided in the course instructions.

The other measurement is the distance between the starting line and the end of the odometer check stage as shown on your car's odometer, the odometer that you will be using throughout the race.

You have already set the car's odometer in Step 1 above, so leave the starting line and begin the odometer check stage. When you get to the end of the odometer check stage, manually adjust the odometer reading on the computer and the distance from the starting line will be shown in the box in the center of the screen below the label "Car Odometer."

Stop at end of odometer check stage

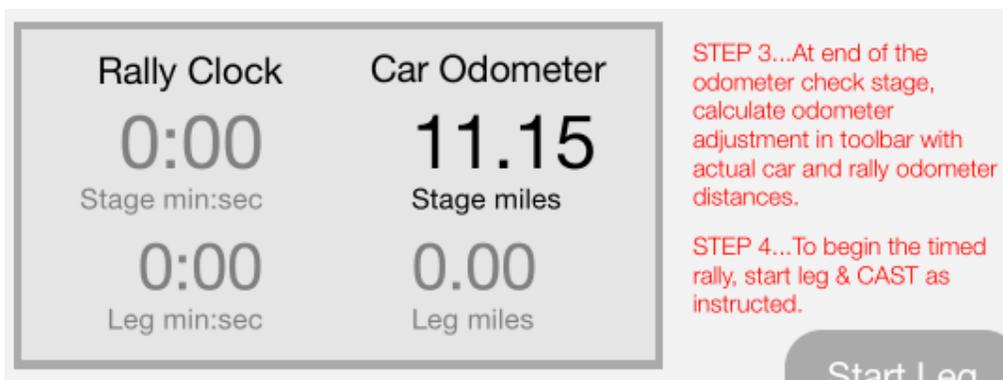
Stop the car at the end of the odometer check stage and do the following tasks before moving on:

1. Adjust car odometer on computer using the green up and down arrows
2. Open odometer check popup by touching the "Odometer Check" button in the toolbar
3. Unlock scroll wheels by touching the padlock icon on the popup
4. Set two odometer readings, one for your car's odometer and one for the Rallymaster's odometer is indicated in the course instructions

5. Close popup by touching anywhere outside the popup (or touch the padlock icon to lock the scroll wheels and then touch anywhere outside the popup)
6. Choose CAST for next leg from the table to speeds and times shown in the bottom center of the computer screen
7. Activate the “Start Leg & CAST...” button by sliding the red circle beneath the button until the button changes from grey to red indicating that it is now active
8. Touch button to start the first timed stage of the rally at the designated speed
9. Move away from the end of the odometer check to make room for other teams

This sounds like a lot to do, but the tasks are simple and easy to perform. You already know how to adjust the car odometer on the computer with the green up and down arrows. Do this to measure the distance between the starting line and the end of the odometer check stage. You’ll see the mileage in the grey box in the center of the screen:

Notice that there are four phrases at the bottom of the screen in what is called the toolbar: Next Starting Time, CAST Presets, TSD Calcs, and



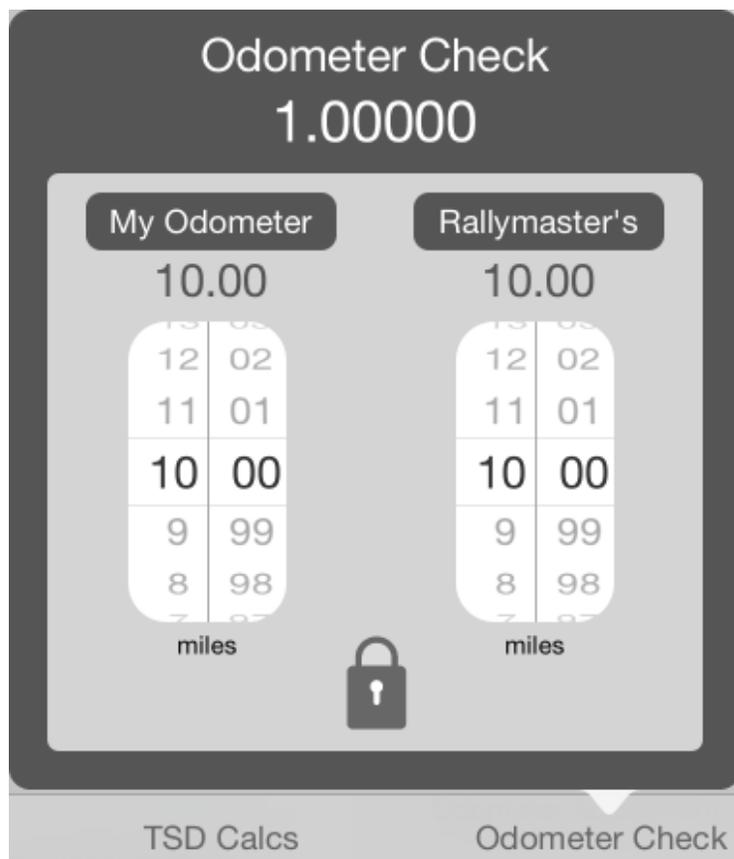
Odometer Check. (If you don’t see the toolbar, you will see the words “Double-click to Show/Hide Toolbar.” So, just double-click anywhere around these words and the toolbar will appear.)

Each of these phrases is actually a button that opens a popup window.



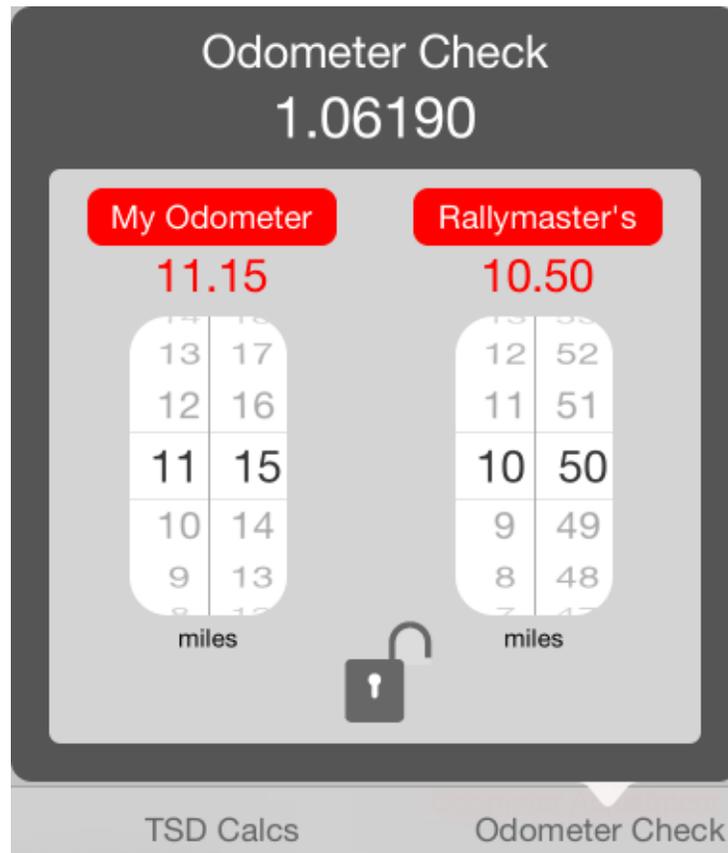
Odometer check popup

For now, just touch "Odometer Check" on the right of the toolbar to open the popup.



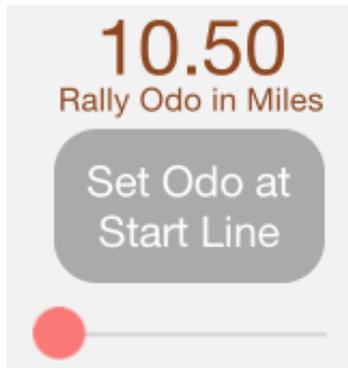
Touch the padlock icon to activate the scroll wheels that allow you to adjust the odometer settings. Just swipe your finger up or down in the scroll wheels and see the odometer settings change beneath each of the red buttons.

If, for example, you estimate your car's odometer reading to be 11.15 miles and the rally course instructions say that the distance between the starting line and the end of the odometer check stage is actually 10.50 miles according to the Rallymaster, then your odometer settings should look like this:



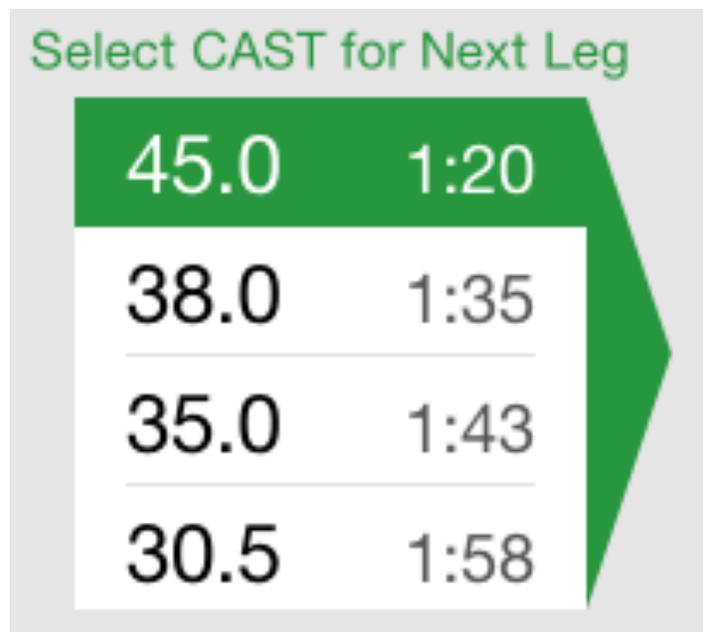
The computer had divided 11.15 by 10.50 to produce an odometer adjustment factor of 1.06190. This means that your car's odometer records distances 6.19% greater than distances measured by the Rallymaster's odometer. The computer will use this adjustment factor to translate your car's odometer readings into official rally odometer readings.

After closing this popup, the rally odometer distance of 10.50 miles will be displayed in the upper righthand corner of the screen. As you proceed with the rally and increment your car's odometer readings along the way, the rally odometer will also increment at a rate that takes the odometer correction factor into account.



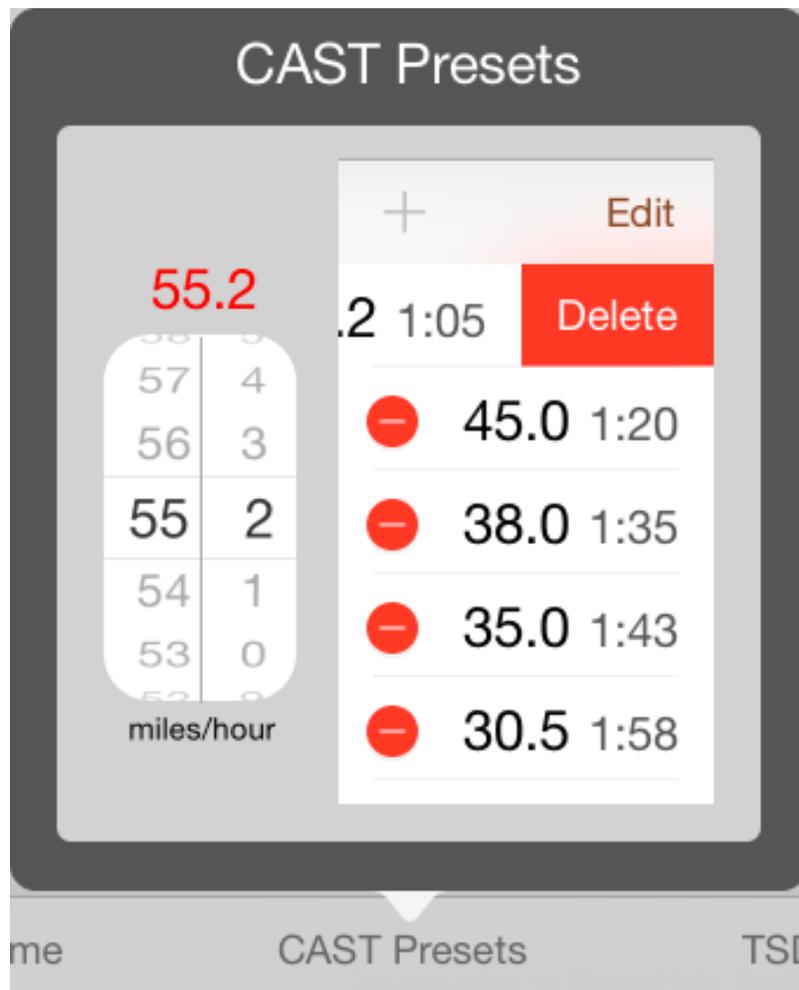
Create CAST speeds and times for each leg

The TSD Rally Computer allows you to create a series of average speeds and the corresponding times necessary to cover a mile or a kilometer at those speeds. As you look through the rally instructions, you will find many indications that you must change your average speed at particular landmarks or distances from the starting line. Rally instructions generally use the abbreviations CAS (Change Average Speed) or CAST (Change Average Speed To) followed by a speed in either miles per hour or kilometers per hour.



Touch the “CAST Presets” button on the toolbar to open a popup where you can add or delete CAST speeds for use during the course of the rally.

Add or delete as many as required. Use the scroll wheels on the left to select a speed; touch the plus (+) button to add the speed to the list along with its associated time to travel one mile or kilometer; or delete a speed from the table by touching the Edit button, the minus (-) button, and lastly the Delete button.



The list will be sorted in descending order by speed. When finished, just touch anywhere else on the computer screen and notice the list in the bottom center of the screen.

Select CAST for next leg

Now that you have a table with speeds and times, you can scroll the table to see the complete list and touch on any row in the table to set the CAST for the next leg. The speed and time will show up in green beneath the “Next Leg” heading also with a green background.

| Select CAST for Next Leg | |
|--------------------------|------|
| 35.0 | 1:43 |
| 30.5 | 1:58 |
| 25.0 | 2:24 |
| 21.8 | 2:45 |

Next Leg

25.0 Miles / Hour
2:24 Min:Sec / Mile

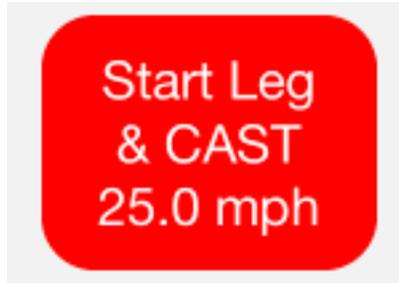
1.06

Also, notice that the speed you have chosen is displayed in the title of the “Start Leg & Cast...” button. In this example, the CAST speed is 25 miles per hour.

STEP 4...To begin the timed rally, start leg & CAST as instructed.

Start Leg & CAST
25.0 mph

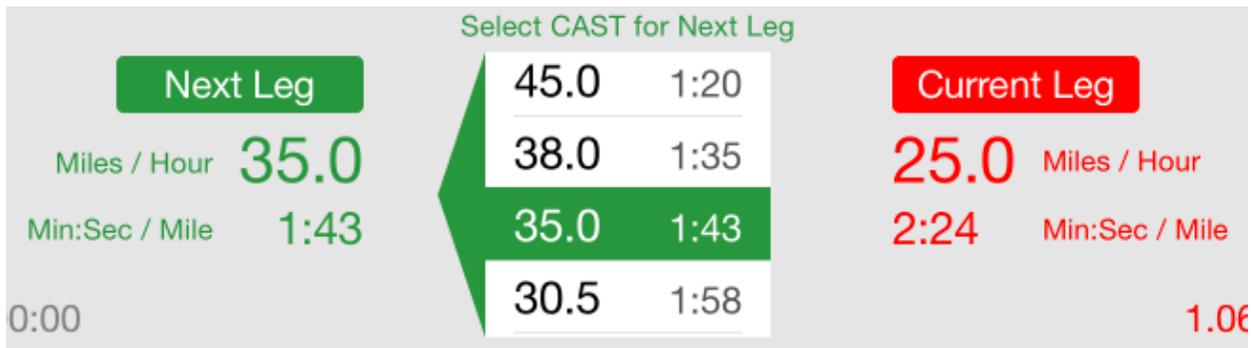
The final step to begin the first timed stage of the rally is to activate the “Start Leg & CAST...” button by sliding the red circle to the right. Then, touch the red button to CAST 25 mph.



After you touch the button, the “Next Leg” heading becomes a “Current Leg” heading with a red background and with the average speed and time also shown in red. The “Next Leg” heading flips to the other side of the screen where you can select a different CAST for the next leg.

Repeat this sequence at each CAST

You will use this sequence of selecting a speed for each CAST in the rally instructions.



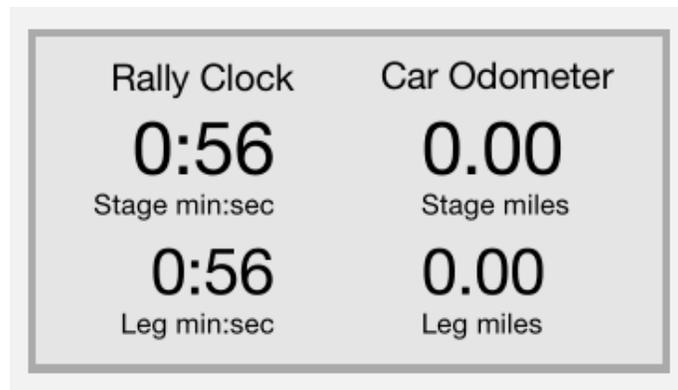
The screenshot displays the rally app interface. On the left, the 'Next Leg' section shows a green header, 'Miles / Hour 35.0', 'Min:Sec / Mile 1:43', and a timer '0:00'. In the center, a 'Select CAST for Next Leg' menu lists four options: 45.0 (1:20), 38.0 (1:35), 35.0 (1:43), and 30.5 (1:58). The 35.0 option is highlighted with a green arrow pointing left. On the right, the 'Current Leg' section shows a red header, '25.0 Miles / Hour', '2:24 Min:Sec / Mile', and a partially visible '1.06'.

At the point of each CAST be sure that your car’s odometer has been set to your best estimate of the distance. Then, activate the “Start Leg & CAST...” button to initiate the change in average speed. You may activate the button before you reach the point of each CAST, but be careful not to touch the red button too early.

Now you are racing

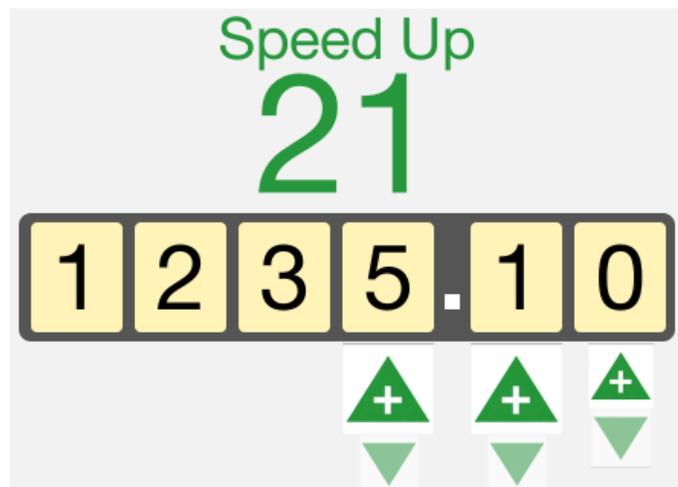
The key to success in a TSD rally is staying on course at the prescribed pace such that you end each stage with the fewest number of penalty points, generally assessed as one for each second or hundredth of a minute either early or late to the checkpoint.

Once you touch the “Start Leg & CAST...” button, the rally clock begins ticking. You can see the time pass by stage and by leg within stage in the grey box in the center of the screen under the title “Rally Clock.”



Now you begin driving and, as you drive, you should periodically update the car’s odometer setting by using the up and down green arrows. Try to get in a rhythm of incrementing the odometer every mile or every tenth of a mile or at some convenient time interval.

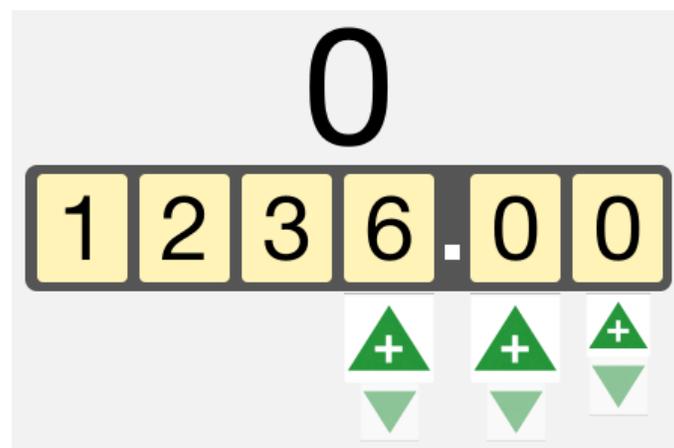
If you fall behind the pace established by the CAST, you’ll see an indication to speed up measured in seconds.



However, if you are driving ahead of the CAST speed for the leg, you'll see an indication to slow down to get back on pace.



The goal is to keep a steady pace so that the indicator above the car's odometer reads precisely zero. Now, you are driving at the perfect pace.



Naturally, this and other tasks for smooth and efficient operation of the TSD Rally Computer take practice. Typically, the driver will call out the odometer readings as you drive along and the navigator will handle the computer and call out the pace and myriad other course instructions to the driver.

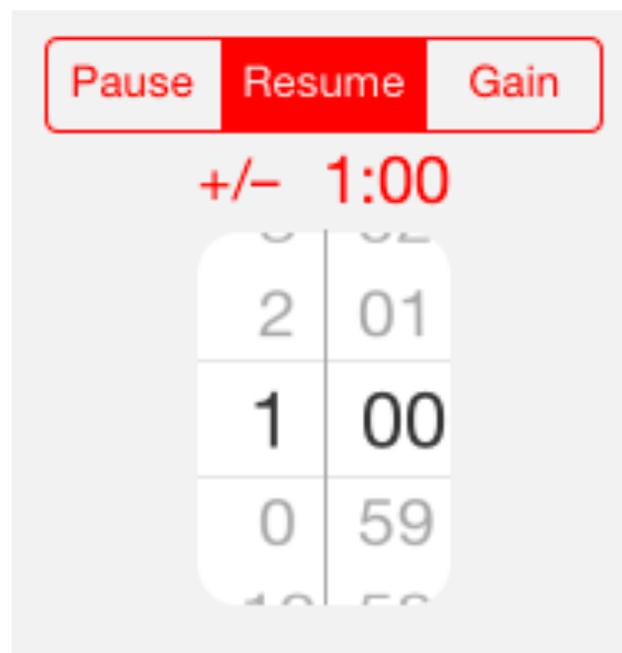
Practice, practice, practice. And, then, practice some more.

Pause or gain time

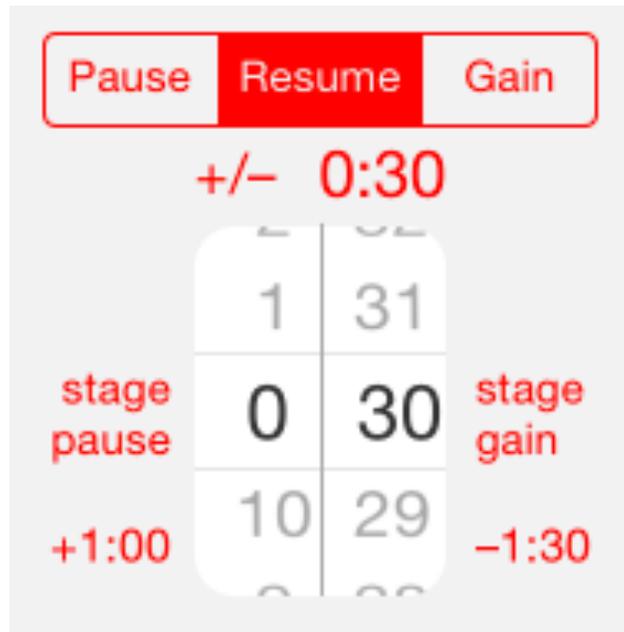
At times during the rally you may be asked to pause for a period of time, usually to pass through some stretch of the course where it would be difficult to maintain a steady rate of speed. For example, when passing through the center of a town there may be one or more stoplights or stop signs that could slow you down for an indeterminate period. In situations such as this, the rally instructions will often ask you to pause. A pause has the effect of adding allowable time for the stage.

Conversely, there are occasions when you may be asked to pick up the pace, not by some CAST to a faster speed, but rather by shortening the allowable time for the stage. This is called a "Gain" and is expressed in minutes, so it will be up to you to drive fast enough to regain the lost time.

These pauses and gains are handled with a scroll wheel for setting the time and a toggle button for either adding time, a Pause, or subtracting time, a Gain, for the stage. The "Pause / Resume / Gain" toggle button and time scroll wheel are found on the lefthand side of the computer screen near the center.



To add or subtract time for the stage, simply select the time from the scroll wheels and then touch either the “Pause” or the “Gain” toggle. After the amount of time has been added or subtracted, you will see a running total of all time added or subtracted for the current stage of the race.



There is no need to reset the scroll wheels if you happen to have a set of pause or gain instructions each for the same period of time, say 30 seconds. Repeated touching of either the “Pause” or the “Gain” toggle button will add more time to the running totals.

Once a stage has been completed and you have touched the “End Stage at Checkpoint” button, the running totals will be reset to zero.

Off course corrections

As long as you are following the course instructions, keep the “On Course / Off Course” toggle button set to “On Course” indicated by the red background on the button.



However, if you happen to take a wrong turn or fail to turn when you should have, you will have to find your way back to the course route and to make some odometer and leg time corrections.

Think of a deviation from the course route as two distances. The first distance is the off-course distance from the true course to the point at which you turn around to return to the true course. The second distance is the distance from the point at which you turn around to the point where you return to the true course.

When you realize you are off course, you cannot know how far you have traveled since you left the true course. So, you have to approximate the off-course distance by measuring the distance from the point you turn around to the point where you return to the true course. Thus, the off-course distance will be twice the distance from the point you turn around to the point you get back on course

The return distance may not be precisely the same as the off-course distance, but if you are careful to estimate the turn-around point and careful to retrace your route back to the true course, the estimate will be close.

Adjust the car's odometer and touch “Off Course” at the point at which you turn around. Then, adjust the car's odometer and touch “On Course”

at the point at which you get back on course. The time it takes to cover the total estimated distance that you traveled off course will be computed at the CAST speed.

| On Course | Off Course |
|-----------|------------|
| time | 0:29 |
| distance | 0.40 |

When you get back on course, the stage and leg odometer readings will be shortened by the total distance traveled off course. The master rally odometer will also be adjusted taking into account the odometer check adjustment.

Most importantly, having gone off course you are probably behind the pace needed to have zero error on the stage. The error time in seconds shown above the car's odometer reading will be adjusted for the time you would have spent off course for the distance at the current CAST speed.

Off course corrections are reset to zero at the start of each new rally stage.

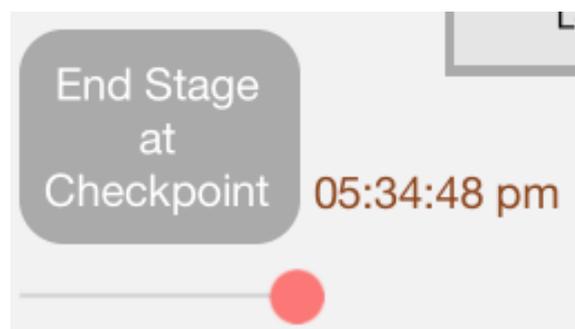
Crossing the checkpoint

When you see a checkpoint, update the car's odometer, drive faster or slower to get on pace, and make small adjustments in either tenths or hundredths to get as close to zero time error as possible.

Also, slide the red circle beneath the “End Stage at Checkpoint” button to the left until the button background becomes red indicating that the button is activated. Then, just as the front of your car crosses the checkpoint line, touch the button.



After the button is touched, you will see an indication of the rally clock time when you crossed just to the right of the button. Jot down this time or take the computer to the checkpoint to make sure that the timer has recorded your crossing time correctly.



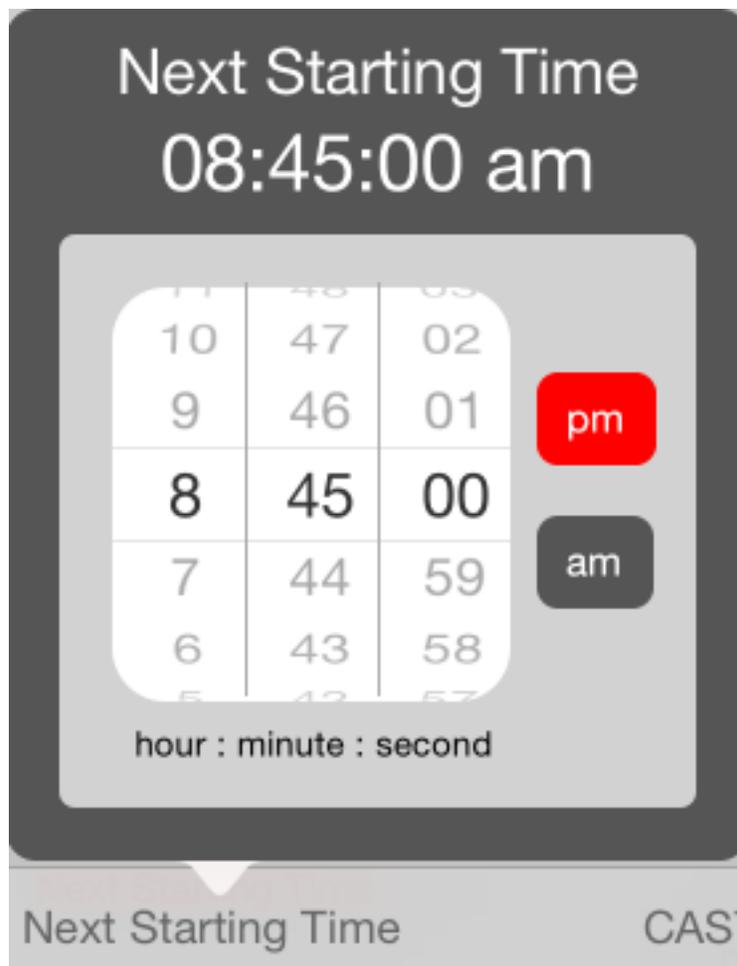
The next stage will begin at a particular time and at a particular CAST speed. Prepare those settings after you get instructions at the checkpoint.

Set departure time from checkpoint

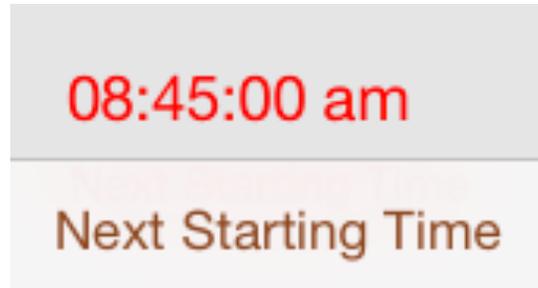
At each rally checkpoint, you will likely be given a new departure time, typically a few minutes after you crossed the line at the checkpoint.

Pay close attention to all the instructions you are given at the checkpoint as conditions for the next stage or definitions or other rule changes may be required as well.

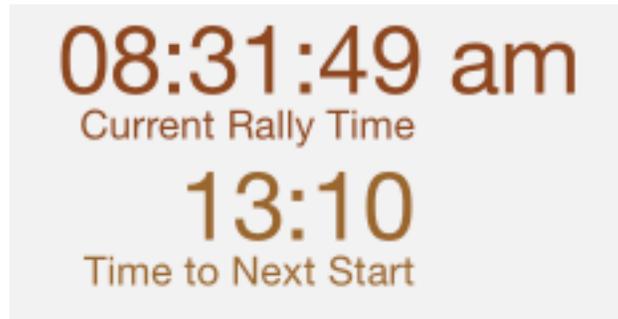
The “Next Starting Time” button in the toolbar opens a popup window in which you can set the new departure time. If the rally clock is a 12-hour clock, you will have to select either “pm” or “am” too.



After you select the time, just touch anywhere else on the screen to close the popup. You will see the departure time in the lower lefthand corner of the screen.



Notice that the difference between the current rally time and the time to start the next stage is shown at the upper lefthand corner of the screen. The time will count down to zero and then the “Time to Next Start” and the minutes will change from brown to red indicating that the departure time has passed.



To clear the departure time beneath the “Current Rally Time” and to reset it to zero in the lower left hand corner of the screen, simply open and close the “Next Starting Time” popup again.

TSD calculations

There is a popup for making ad hoc computations of time, speed, or distance based on inputs of the two variables not chosen. For example, you could calculate the time to travel one mile at a speed of 25 miles per hour by selecting the “Time” button and then moving the scroll wheels beneath the “Speed” and “Distance” buttons to 25.0 and 1.0 respectively. The answer is a time of 2:24.

These computations are not necessary for using the TSD Rally Computer during a race, but they might come in handy if you have to perform some calculations along the way to complete some tricky instruction that the Rallymaster has devised. It’s just a little calculator to use as you wish.

The distance measurement may be either “Miles” or “Kilometers.”

