

# TSD Rally Computer

Carrier 8:09 AM 100%

About ◀◀ Reset Odo to Zero ▶▶ Initialize

08:09:54.6  
Rally Time of Day  
0:00  
My Rally Time

0.00  
Rally Odo Miles  
0.00  
Car Odo Miles

00.000

Distance +0.10

Distance +0.01

Dist -0.10

Dist -0.01

Calculate the Odometer Adjustment Factor in toolbar below using actual Car and Rally Odometer distances. Reset either the Car Odo only or both the Car & Rally Odos, depending upon how Rally distance is measured in the co...

Action	TOD	T	S	D	P/G	Error
Start	00:00:00	0:00	0.0	0.00		0

Pause / Gain

On / Off Course

00:00:00 Set NDT to Autostart & CAST

Miles / Hour 40.0  
Min:Sec / Mile 1:30.0  
Next Speed

Select CAST for Next Speed

20.0	3:00.0
10.0	6:00.0
40.0	1:30.0
30.0	2:00.0
25.0	2:24.0

Curr Speed

Miles / Hour 0.0  
Min:Sec / Mile 0:00

CAST 40.0 mph

Control

Set Odo Correction 1.00000

Next Departure Time CAST Presets TSD Calcs Odo Adj Factor

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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 typically the Odometer Check stage that allows you to calibrate your Car Odometer with that of the Rally Odometer. Calibration is necessary because it is unlikely that your Car Odometer will match distances in the Rally Instructions that were computed by the Rally Master using a different odometer.

In later stages, you will follow a course at average speeds 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 segment of the rally.

In order to drive the course at the prescribed speeds, you must keep track of your Car Odometer reading along the way. At each required change in average speed (abbreviated CAST for “change average speed to” or more simply CAS), you must record the Car Odometer reading as accurately as possible prior to pressing the button that initiates a new average speed.

At unknown points along the way, there will be Checkpoints that constitute the end of a stage. When crossing the Checkpoint, your time will be recorded, so you should once again update the Car Odometer before touching the “Control” button to end the stage and record the time.

At the Checkpoint, the rally staff will indicate the time you crossed and will issue a new Departure Time for the start of the next stage. There may be additional instructions affecting the running of the next stage, so read them carefully.

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.

# Steps to Run a Rally

Here are the steps that you will take along the rally route. Some are required to prepare the TSD Rally Computer for a new rally and others are particular circumstances that require non-routine computations.

## Step 1: Set Preferences and Initial Conditions

Whenever you start a new rally, initialize the TSD Rally Computer in two ways. First, in the iPad Settings under RallyCalc, set the Preferences for time and distance. Second, from the “Initialize” popup in the upper right-hand corner of the startup screen, touch “Reset Initial Conditions” after unlocking the padlock icon.

## Step 2: Create Table of Preset CASTs

At various points along the rally route, the Rally Instructions will call for changes in average speed usually abbreviated as CAST (Change Average Speed To) or CAS (Change Average Speed). Create a table of these CASTs in a popup labeled “CAST Presets.” Having CAST presets will make the internal computations resulting from switching from one average speed to the next automatic.

## Step 3: Calibrate Clock

Be sure that your iPad’s clock is calibrated as closely as possible to the official Rally clock. You can make adjustments as needed on the “Initialize” popup.

## Step 4: Reset Odometers

Initializing will reset both the Car and Rally Odometers to zero at the start of the rally. You may have other occasions to reset at least the Car Odometer to zero at Checkpoints or whenever starting a new timed Stage. The reset options are available in a popup up called “Reset Odo to Zero.”

## **Step 5: Set Next Departure Time (NDT)**

You will be given a rally starting time based in most instances on the number of your car and the official rally starting time, so place that time in the popup called "Next Departure Time." Once set, a clock will count down and initiate the first rally CAST when time reaches zero.

## **Step 6: Calculate Odometer Correction Factor**

Use the popup called "Odo Adj Factor" to adjust your Car Odometer to the official Rally Odometer. This task usually takes place at the end of the Odometer Check stage, typically the first stage of a rally. Touch the padlock icon to unlock it so that you can move the two scroll wheels to your Car Odometer and the official Rally Odometer readings. Locking the padlock icon will set the Odometer Correction Factor used by the app in all future TSD calculations. The Factor will be shown in red at the bottom right-hand corner of the screen.

## **Step 7: To Dos at End of Odometer Check Stage**

Notice that you will probably be given a Next Departure Time from the end of the Odometer Check stage and there may be a new point down the road a bit where the rally distance begins. Setting the Next Departure Time will also zero the Car Odometer. Note that no distance adjustment can be made while the clock is ticking down to the Next Departure Time. Proceed to the point where the next stage will begin.

## **Step 8: Reset Odometers as Needed**

With all the preliminary work finished, you are now ready to run the rally. You may wish to reset the Car Odometer to zero at the start of each new stage, the first of which is the end of the Odometer Check stage. Also, you may wish to reset the Rally Odometer at the end of the Odometer Check stage. It all depends on how distances are measured along the course: Are they cumulative from the starting line or are they separate for each stage? If cumulative, don't reset.

## **Step 9: Activate CAST to Start Rally Timing**

In reality, your rally time begins the moment to activate the first CAST, which as mentioned in Step 5 happens automatically when the countdown to Next Departure Time reaches zero. At any other time when you must CAST, slide the small red button beneath the “CAST...” button to the right to activate the “CAST...” button.

## **Step 10: Increment Car Odometer as Needed**

You may use any means of measuring distance: a standard car odometer, a specialized rally odometer, a GPS device, or some iPad or iPhone app that is able to compute distance traveled. Typically, you would increment the TSD Rally Computer by some convenient distance, say 1 mile or 1 kilometer. Then, when the measured distance is identical to the incremented distance, click the large “Control” button to get a time “split.” The error at the split will be shown in the Log as either behind (a negative error) or ahead (a positive error) or zero compared to the official rally time required to travel the same distance. The computation shown takes into account the Odometer Correction Factor, so you may see a difference between the Rally and Car Odometers at the split.

## **Step 11: Select the Next CAST**

To be ready for speed changes along the route, select the next CAST from the scroll wheel of Preset CASTs. You won't actually activate the next CAST until you reach the point in the Rally Instructions where you are called upon to do so, but you'll be ready. Don't forget to increment your Car Odometer to the distance at the next CAST so that the Log will record the time you make the CAST and the error, if any, at that point. Note that CAST can be changed while the clock is counting down to the Next Departure Date, if you select one after a check point, for example. CAST set before the Next Departure Time reaches zero will be the CAST for the start of the next leg.

## **Step 12: Pause or Gain Time as Needed**

Along the course you may be asked to Pause or Gain Time. A Pause is often inserted to allow you to get through a high-traffic area where stop signs may slow you down, for example. Make these Pauses or Gains from the popup entitled "Pause / Gain." located on the side of the screen.

## **Step 13: Make Off-Course Corrections as Needed**

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 time corrections. Make these corrections from the popup entitled "On/Off Course located on the side of the screen.

## **Step 14: Take Actions at Checkpoint**

At a Checkpoint you should increment the Car Odometer and touch the Control button to record the time and error, if any, when crossing the line. Verify this information with the Rally Staff. Take note of any changes in Instructions and set a Next Departure Time and new CAST as required.

## **Step 15: Repeat Steps 5 to 14 as Needed to the Finish Line**

Steps 5 through 14 include all the tasks that you may be called upon to perform at any stage of the rally up to the finish line where, if you've been careful and accurate, your trophy awaits.

The following sections will show you in greater detail how to accomplish the tasks outlined in these steps.

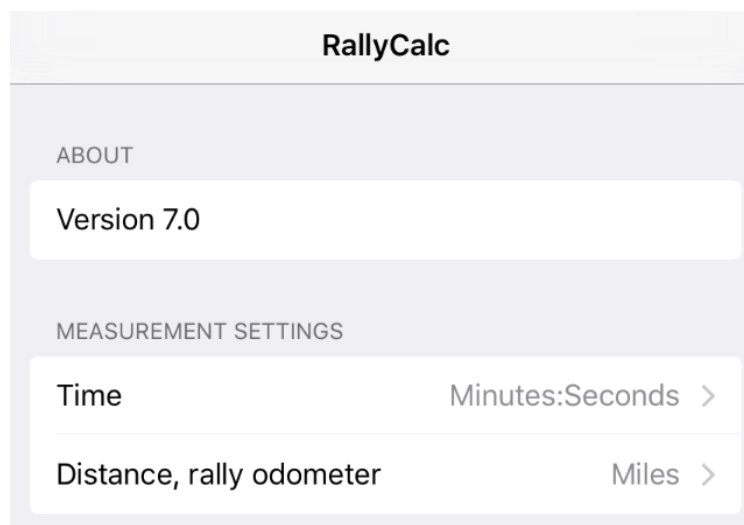
# Getting Started

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 and distance. For example, the rally might use minutes measured in hundredths rather than seconds for time, or kilometers rather than miles for distance. 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.

In this example, the distance measurement is in miles and the time is measured in minutes and seconds.

# The start-up screen

Carrier 8:09 AM 100%

About Reset Odo to Zero Initialize

08:09:48.1 Rally Time of Day  
0:00 My Rally Time

0.00 Rally Odo Miles  
0.00 Car Odo Miles

000.000

Distance +0.10 Distance +0.01  
Dist -0.10 Dist -0.01

Calculate the Odometer Adjustment Factor in toolbar below using actual Car and Rally Odometer distances. Reset either the Car Odo only or both the Car & Rally Odos, depending upon how Rally distance is measured in the co...

Action	TOD	T	S	D	P/G	Error
Start	00:00:00	0:00	0.0	0.00		0

Control CAST 40.0 mph

Pause / Gain On / Off Course

Select CAST for Next Speed

Next Speed	Miles / Hour	Min:Sec / Mile
20.0	3:00.0	
10.0	6:00.0	
40.0	1:30.0	
30.0	2:00.0	
25.0	2:24.0	

Curr Speed 0.0 Miles / Hour  
0:00 Min:Sec / Mile

00:00:00 Set NDT to Autostart & CAST

1.00000 Set Odo Correction

Next Departure Time CAST Presets TSD Calcs Odo Adj Factor

Carrier 8:09 AM 100%

About Reset Odo to Zero Initialize

08:09:54.6 Rally Time of Day  
0:00 My Rally Time

0.00 Rally Odo Miles  
0.00 Car Odo Miles

000.000

Distance +0.10 Distance +0.01  
Dist -0.10 Dist -0.01

Calculate the Odometer Adjustment Factor in toolbar below using actual Car and Rally Odometer distances. Reset either the Car Odo only or both the Car & Rally Odos, depending upon how Rally distance is measured in the co...

Action	TOD	T	S	D	P/G	Error
Start	00:00:00	0:00	0.0	0.00		0

Control CAST 40.0 mph

Pause / Gain On / Off Course

00:00:00 Set NDT to Autostart & CAST

1.00000 Set Odo Correction

Next Departure Time CAST Presets TSD Calcs Odo Adj Factor

Miles / Hour 40.0  
Min:Sec / Mile 1:30.0  
Next Speed

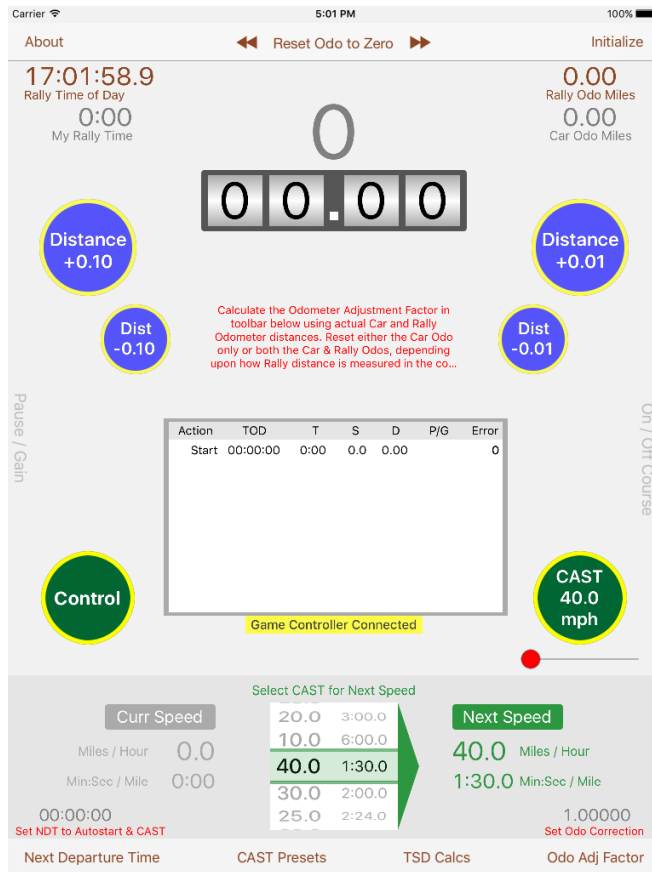
Next Speed	Miles / Hour	Min:Sec / Mile
20.0	3:00.0	
10.0	6:00.0	
40.0	1:30.0	
30.0	2:00.0	
25.0	2:24.0	

Select CAST for Next Speed

Curr Speed 0.0 Miles / Hour  
0:00 Min:Sec / Mile



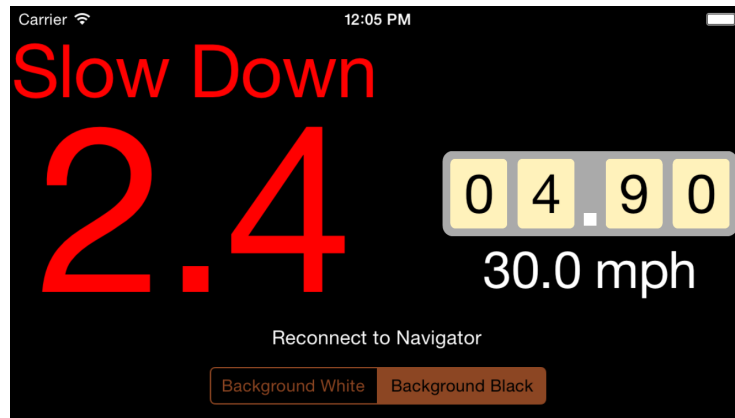
## The start-up screen when using a game controller



When the game controller is turned on and connected via Bluetooth, the words “Game Controller Connected” will appear in a yellow box beneath the log table. Also, the Distance, Control, and CAST buttons will have yellow margins and will be tinted in less saturated colors.

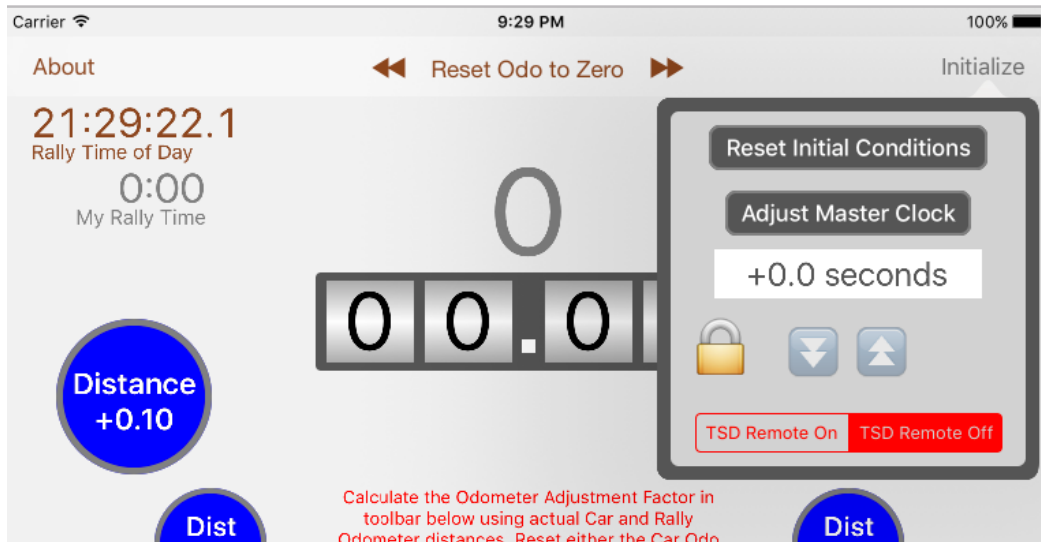


## RRemote heads-up display for driver




## Initialize popup


At the upper right-hand corner of the screen, you will see a popup called “Initialize” that will allow computer settings to be set to their initial conditions as well as two other tasks you may wish to perform.



Notice the two buttons labeled “Reset Initial Conditions” and “Adjust Master Clock” as well as an icon that looks like a padlock 🗝️. In order to activate the buttons, you must first 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 Initial Conditions” button. The padlock will close  and you may see some numbers or objects on the startup screen change.

At the start of each rally, teams are allowed to calibrate their clocks and stopwatches so that your time matches the time of the clock used by the Rally Staff. Use the “Adjust Master Clock” button as well as the plus/minus buttons to synchronize your “Rally Time of Day” to the Master Rally Clock.

Be sure to touch the “Adjust Master Clock” button or the padlock icon  to set the adjusted “Rally Time of Day.”

The TSD Rally Computer will always run in the background so you can close and reopen the app while retaining its most recent conditions or settings.



**If you wish to terminate running the app, you must double-click the iPad’s Home button and slide the app icon off the top of the screen.**

The TSD Rally Computer app has a companion iPhone app called “RC Remote” that provides a heads-up display for the driver. The current error, CAST speed, and distance are passed from the TSD Rally Computer to the RC Remote via Bluetooth. Both the iPad and the iPhone must have Bluetooth activated. Also, the control at the bottom of the “Initialize” popup allows you to select or deselect the RC Remote app.

## Setting/Resetting Odometers

While waiting for the signal to depart on the Odometer Check Stage, you will have time to set the Car Odometer to zero, if you have not already done so in the “Initialize” popup. Touch the “Reset Odo to Zero” popup at the top center of the screen.



Then, touch the padlock icon  to unlock the two buttons “Car Odo” and “Car & Rally Odos.” The buttons become blue indicating that they are activated. Chose to reset either the Car Odometer alone or both the Car and Rally Odometers. Lastly, touch the padlock icon  to actually reset one or both odometers.



## Odometer Adjustment popup

It is important to calibrate your Car Odometer with the official Rally Odometer used by the Rally Master when he or she created the Rally Instructions. You may have to perform course changes or change average speeds at precise distances along the course route but, unless you correct for differences between your Car Odometer and the Rally Odometer, you may execute the instructions at the wrong place or distance and thus make erroneous computations of time traveled.

To compute the Odometer Adjustment Factor, you need two measurements. One is the official distance from the Starting Line to the end of the Odometer Check Stage as indicated in the Rally Instructions.

The other measurement is the distance between the Starting Line and the end of the Odometer Check Stage as shown on your Car Odometer, the odometer that you will be using throughout the rally.

Once you have these two distance measurements, open the “Odo Adj Factor” popup at the bottom of the screen.


1.00000

Car Odo	Rally Odo
10.00	10.00
12 02	12 02
11 01	11 01
10 00	10 00
9 99	9 99
8 98	8 98
7 97	7 97

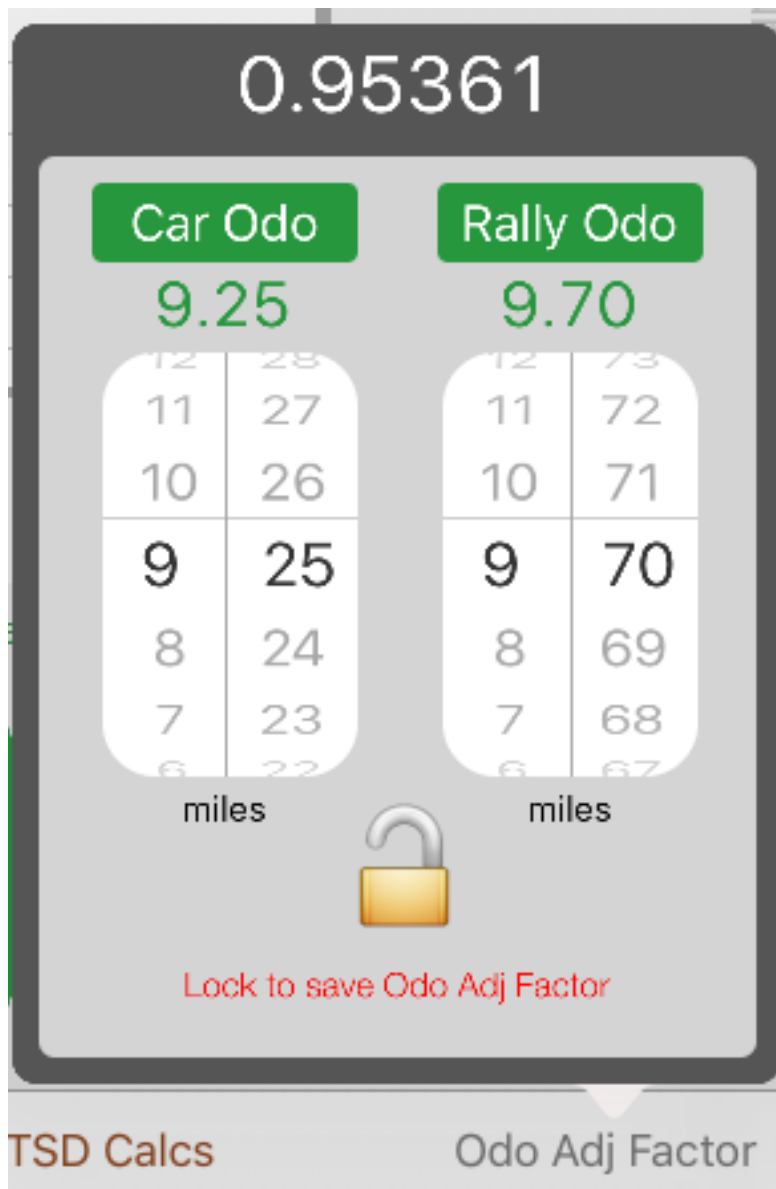
miles miles

Unlock to compute Odo Adj Factor

TSD Calcs Odo Adj Factor

Touch the padlock icon  to activate the scroll wheels that allow you to adjust the odometer distances. Just swipe your finger up or down in the scroll wheel and see the odometer settings change above the scroll wheels.

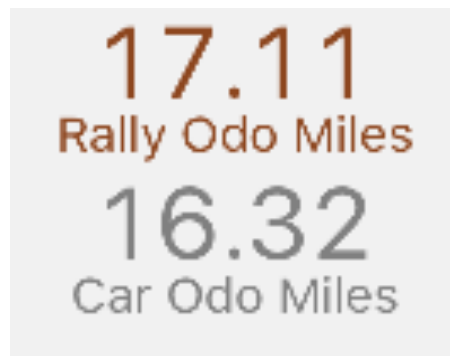
If, for example, you estimate your Car Odometer reading to be 9.25 miles and the Rally Instructions say that the distance between the Starting Line and the end of the Odometer Check Stage is actually 9.70 miles, then the scroll wheels should be changed to look like this:



The computer divided 9.25 by 9.70 to produce an Odometer Adjustment Factor of 0.95361 shown in white at the top. This means that your Car Odometer records distances 4.639% less than distances measured by the Rally Odometer. The computer will use this Odometer Adjustment Factor to translate your Car Odometer readings into official Rally Odometer readings.

As you proceed, both odometer readings will be shown in the upper right-hand corner of the screen. The Rally Odometer will show the cumulative official distance computed as the Car Odometer distance divided by the Odometer Adjustment Factor.

For example, a Car Odometer measurement of 16.32 miles divided by an Odometer Adjustment Factor of 0.95361 equals a Rally Odometer measurement of 17.11 miles.

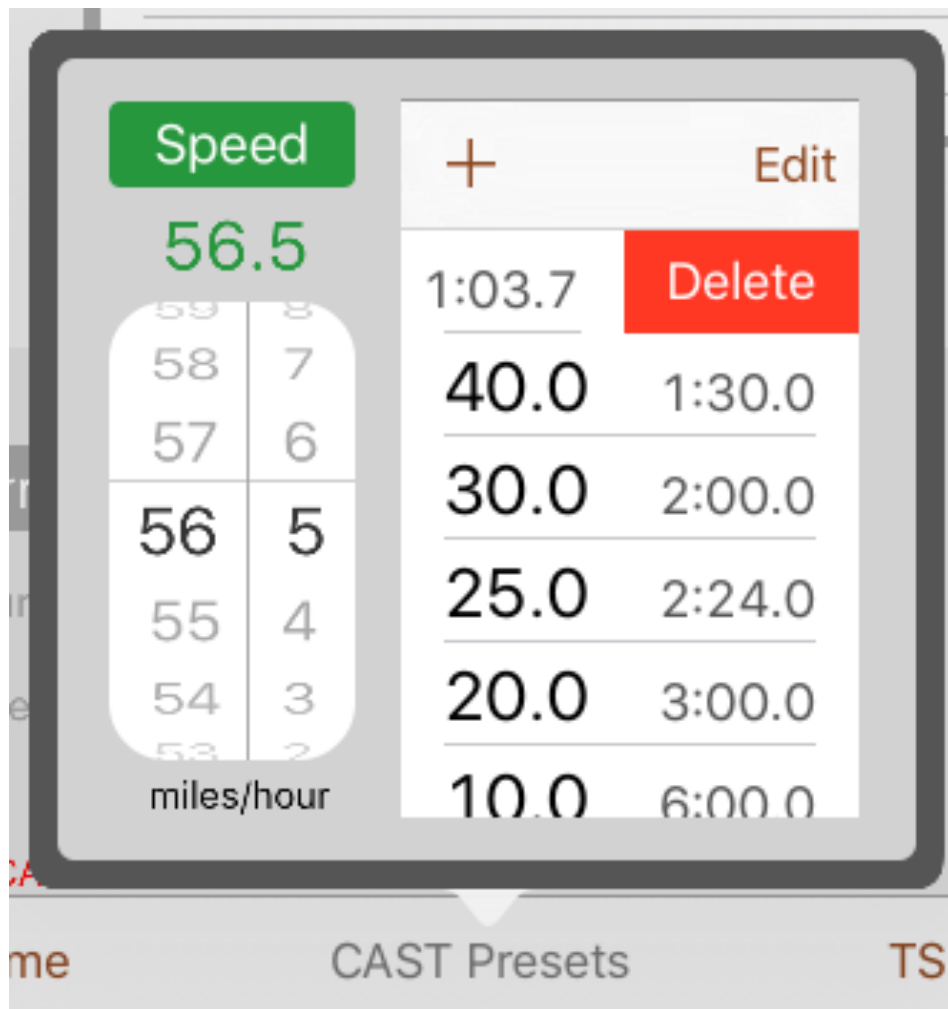


## Create CAST speeds and times for each leg

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 official 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” 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 or the Delete button if you touch and slide a row to the left as shown in this example.



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 a scroll wheel at the bottom center of the screen.



## CAST for Next Speed

Now that you have a scroll wheel with speeds and times, you can scroll to see the complete list. The speed in the green bar in the center of the wheel will be the next CAST as required. The speed and time will be displayed in green beneath the “Next Speed” heading also with a green background.

Select CAST for Next Speed

56.5	1:03.7
40.0	1:30.0
<b>30.0</b>	<b>2:00.0</b>
25.0	2:24.0
20.0	3:00.0

**Next Speed**

**30.0** Miles / Hour

**2:00.0** Min:Sec / Mile

**0.953**  
Set Odo Cor

CAST Presets      TSD Calcs      Odo Adj F

Also, notice that the speed you have chosen is displayed in the title of the “Cast 30.0 mph” button because, in this example, the CAST speed is 30 miles per hour.

**CAST 30.0 mph**

**Next Speed**

**30.0** Miles / Hour

## Begin Timed Stage with CAST

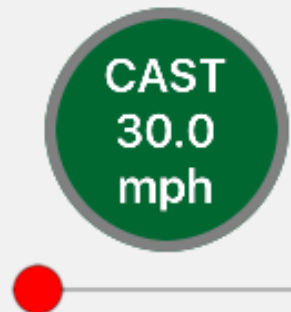
Begin the first timed stage of the rally by activating the “CAST...” button, which will happen automatically if a Next Departure Time is set and counts down to zero. At any other time, swipe the small red circle on the slider beneath the “CAST...” button to the right. Once you swipe about halfway along the slider, let up on the button and the “CAST...” button will change from faded green to dark green and the slider will disappear indicating that the “CAST...” button is active and ready to receive a touch.

Depending upon how quickly you swipe, the little red button may hang up on the right-hand edge of the slider. Just touch the little red button again and the “CAST...” button will be activated. Once you get the feel for the slider, you’ll seldom experience the hang up.

In this example, touch the large dark green button to “CAST 30 mph” and begin the timed leg. The Log will show that you’ve touched the “CAST...” button.



Action	TOD	T	S	D	P/G	Error
1 CAST	22:04:20	0:00	30.0	0.00		0
Start	00:00:00	0:00	0.0	0.00		0



Also, after you touch the “CAST...” button, the “Next Speed” heading becomes a “Current Speed” heading with a red background and with the average speed and time also shown in red. The “Next Speed” heading flips to the other side of the screen where you can select a different CAST for the next speed change segment you encounter, in this example, 25 mph.

The screenshot displays a speed selection interface. On the left, the 'Next Speed' section shows 'Miles / Hour 25.0' and 'Min:Sec / Mile 2:24.0'. Below this is a timer at '00:00:00' and the text 'Set NDT to Autostart & CAST'. In the center, a 'Select CAST for Next Speed' menu lists options: 40.0 (1:30.0), 30.0 (2:00.0), 25.0 (2:24.0), 20.0 (3:00.0), and 10.0 (6:00.0). The 25.0 option is highlighted with a green arrow. On the right, the 'Curr Speed' section shows '30.0 Miles / Hour' and '2:00.0 Min:Sec / Mile'. Below this is a value of '1.00000' and the text 'Set Odo Correction'. At the bottom, there are four menu items: 'Next Departure Time', 'CAST Presets', 'TSD Calcs', and 'Odo Adj Factor'.

## Repeat this sequence at each CAST

You will use this sequence of selecting a speed for each CAST in the Rally Instructions.

Alternatively, as mentioned previously, you could set a Next Departure Time which will automatically zero the odometers and automatically CAST at the speed you select when the countdown timer reaches zero. At Checkpoints, this procedure is generally preferable.

At the point of each CAST be sure that your Car Odometer has been set to your best estimate of the distance. Then, activate the “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 button too early as the time and distance and error measures will be inaccurate if the CAST is different than the current CAST.

# Now You Are Rallying...

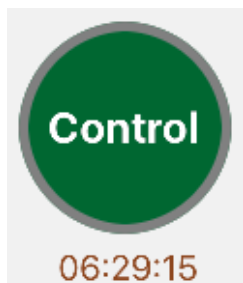
The key to success in a TSD rally is staying on course at the prescribed pace such that you end each stage and arrive at the Checkpoint with the fewest penalty points, generally assessed as one for each second or hundredth of a minute either early or late at the Checkpoint.

Once you touch the “CAST...” button manually or automatically with NDT, the My Rally Time clock begins ticking. This records the time traveled until the Checkpoint where you will reset the odometer to zero.

As you drive the course, you should periodically update the Car Odometer record by touching any of the four blue “Distance...” buttons that increment the odometer by +0.10, -0.10, +0.01, and -0.01 miles or kilometers.



Unless you are approaching a Checkpoint where you might wish to make small +/-0.01 distance increments to help the driver gauge the perfect speed to the Checkpoint, you might wish to increment the Car Odometer each mile or kilometer and wait until your GPS or other accurate distance measurement device or computer application to reach that distance. When the distances match, touch the large green “Control” button to record a “Split” time and error, if any.



If you had fallen behind the pace established by the CAST, you'll see an indication to Speed Up measured in seconds or hundredths of a minute.



If you had touched the "Control" button, a "Split" will show the error at a particular time of day, rally time, speed, and distance. A negative error will display as green to indicate that you should "Speed Up" to get back on ideal time for the course as shown in this example.

Action	TOD	T	S	D	P/G	Error
18 Split	06:31:41	9:07	56.5	7.62		-2.2

However, if you had been driving ahead of the CAST speed, you'll see an indication to "Slow Down" to get back on pace and the "Split" will show the error as a red number with a plus sign in front of it.

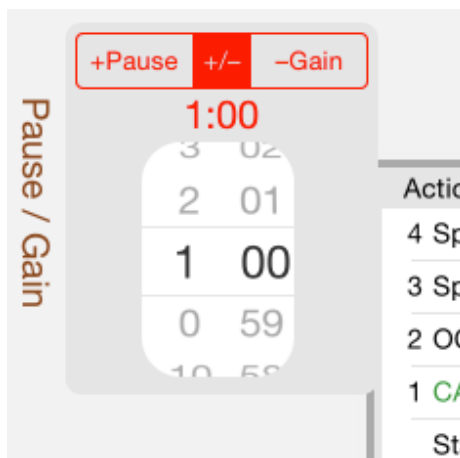
The goal is to keep a steady pace so that the indicator above the Car Odometer reads precisely zero and the "Split" reads zero too. Now, you are driving at the perfect pace.

Naturally, this and other tasks for smooth and efficient operation of the TSD Rally Computer take practice. 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 to effect of adding allowable time for the Stage and Leg.

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.



The means by which you can Pause or Gain time is shown by touching the "Pause/Gain" button arranged vertically on the lefthand side of the screen.

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.

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 the time added or subtracted in the Log.

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 a set of 30 second Pauses in a row. Repeated touching of either the "Pause" or the "Gain" toggle button will add more time to the running totals and the Log will show when you made the selection.

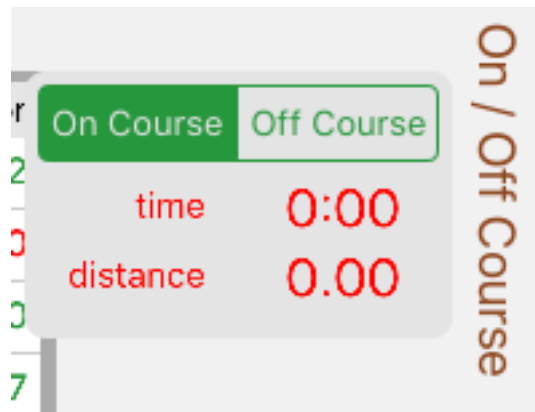
You can close the "Pause / Gain" popup by touching the "Pause / Gain" label once again.

## Off Course Corrections

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 time corrections.

To correct for Off Course travel, select a display that computes time traveled away from the intended route for a distance that you select by incrementing the Car Odometer from the point at which you turn around.

The display is made visible by clicking on the “On / Off Course” button arranged vertically along the righthand side of the screen (or along the lefthand side of the screen in landscape view).



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

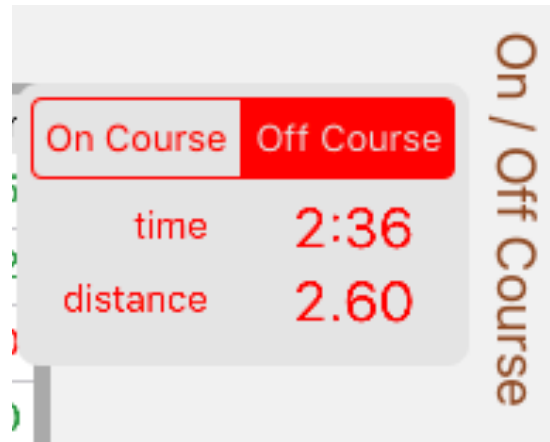
When you realize you are off course, you cannot know how far you have traveled since you left the Rally Route. So, you have to approximate the off-course distance by measuring the distance from the point you turn around to the point where you return to the Rally Route. Thus, the off-course distance will 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 reasonably close.

Adjust the Car Odometer and touch “Off Course” toggle button at the point at which you turn around. Then, adjust the Car Odometer and touch “On Course” at the point at which you get back on the Rally Course.

**CAUTION: be sure not to CAST while retracing your route back to the true course as the CAST will change the selection to “On Course.”**

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



When you get back on course, the Car Odometer reading will be shortened by the total distance traveled off course. The Rally Odometer will also be adjusted taking into account the Odometer Adjustment Factor.

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 Odometer reading will be adjusted for the time you would have spent off course for the distance at the current CAST speed.

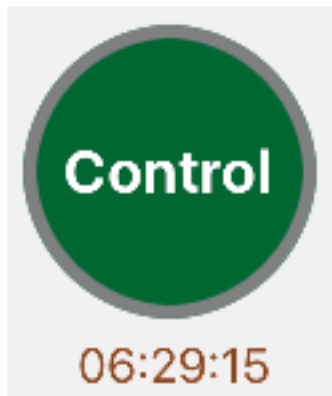
You may hide the display by touching the “On / Off Course” button a second time.

Off course corrections are reset to zero whenever the Car Odometer is reset using the “Reset Odo to Zero” popup as described previously.



# Crossing the Checkpoint

When you see a Rally Checkpoint, update the Car 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.



Then, just as the front of your car crosses the Checkpoint line or just as your front wheels cross a hose, touch the “Control” button to record the time and error. Look at the Rally Instructions for information about the precise point at which the time is recorded at the Checkpoint.

After the button is touched, you will see an indication of the Rally Clock Time when you crossed below the “Control” button. Jot down this time or take the computer to the Checkpoint staff to make sure that the official 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.

Pay particular attention to instructions that may indicate that the next stage will begin at some point beyond the Checkpoint. If this is the case and if distance is measured continuously, increment your Car Odometer accordingly before starting the first leg of the next stage.

## Set Next Departure Time at 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 or perhaps at the next whole minute plus your car’s number.

As always, refer to the Rally Instructions for the Next Departure Time rules for the rally. 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 Departure Time” button at the lower lefthand corner of the screen opens a popup window in which you can set the Next Departure Time after unlocking the padlock  .

**Set Next Departure Time (NDT)  
to automatically start rally or stage  
at selected CAST**

06:31:41

Minute  
+1:00

Secs  
+0:30

09	34	44
08	33	43
07	32	42
<b>06</b>	<b>31</b>	<b>41</b>
05	30	40
04	29	39
03	28	38

hour : minute : second


**Next Full Minute**

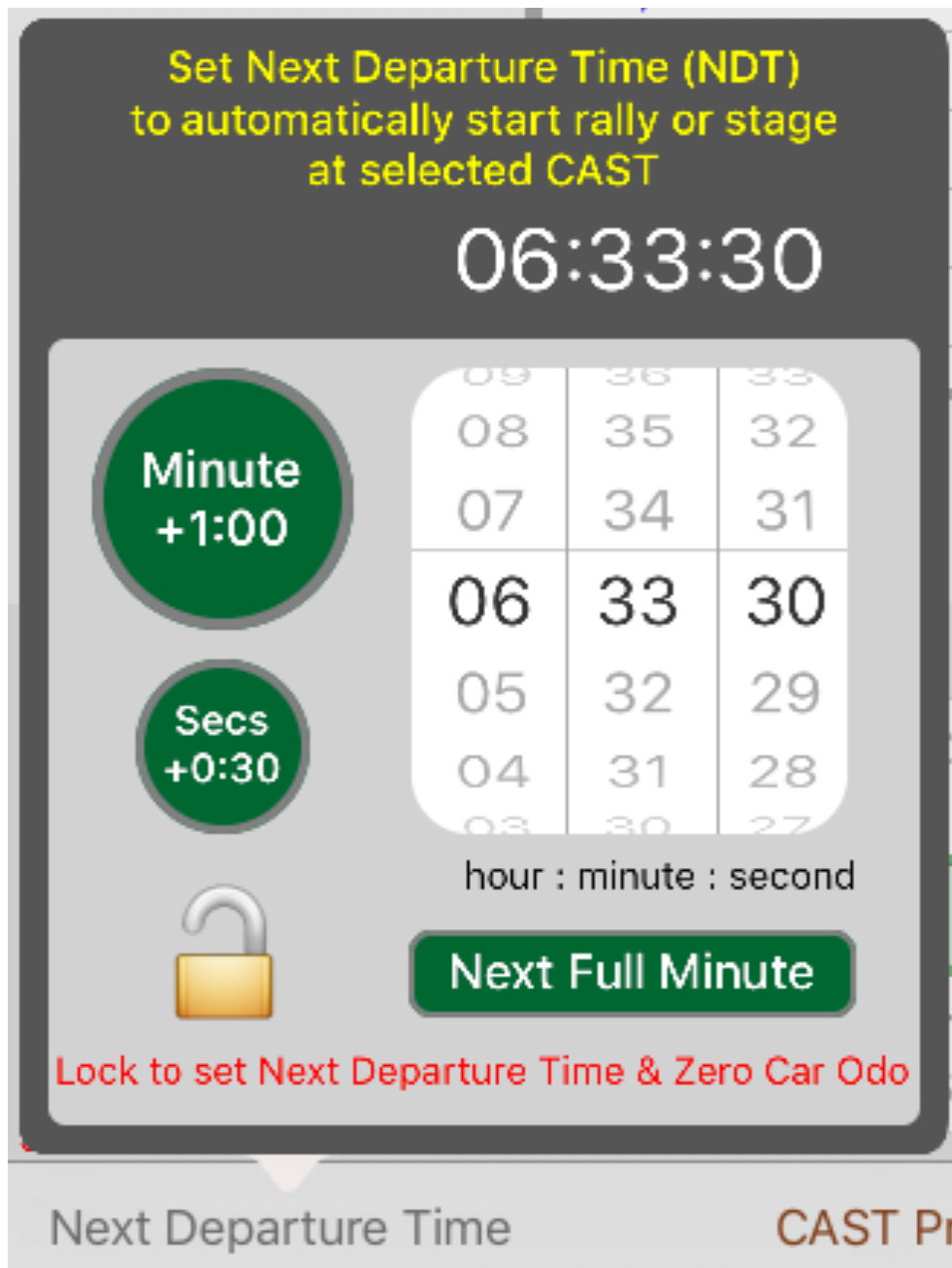
Unlock to select Next Departure Time

Next Departure Time

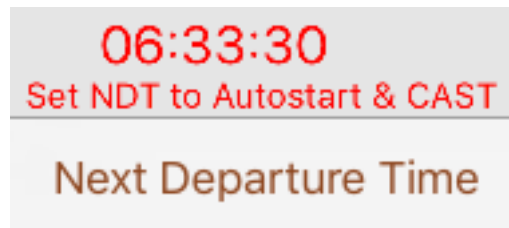
CAST Pr

For rapid incrementing of time, touch any of the green buttons one or more times. Also, slide the scroll wheels up or down to make other adjustments as required.

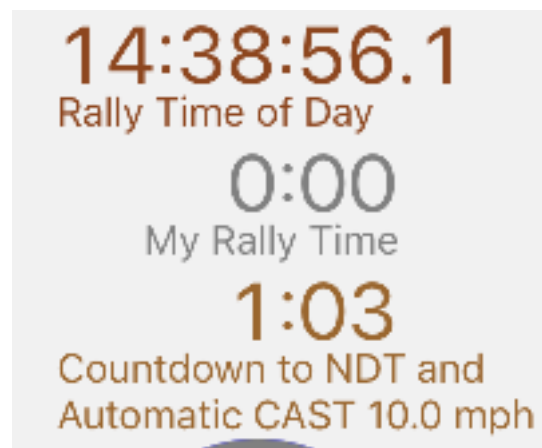
After you select the correct time, a time later than the current time when you touched the “Next Departure Time” button, touch the padlock  to save the time. Then, you may to close the popup by touching elsewhere on the screen.



You will see the Next Departure Time in the lower lefthand corner of the screen.



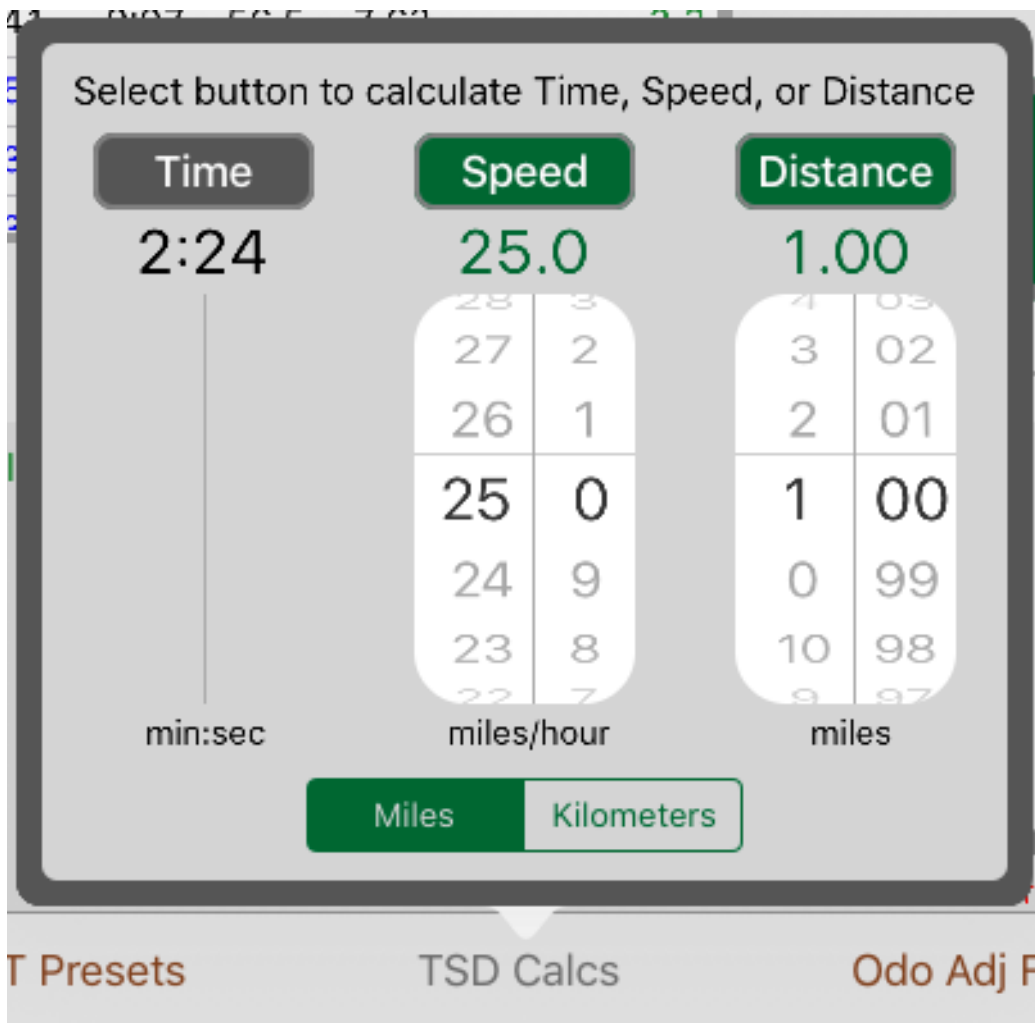
Notice that the “Countdown to NDT...” will also appear at the upper lefthand corner of the screen beneath “My Rally Time” that will have been set to zero. As the time counts down to zero, the “Countdown to NDT and...” minutes will change from brown to bold red when there are fewer than ten seconds until zero indicating that it is about time to leave the Checkpoint and resume the rally as instructed.



You may change the CAST to start a new Stage prior to the count down reaching zero. Once the count down has reached zero, the CAST that you have set will automatically start to compute errors from ideal time.

# 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 Rally Master has devised. It's just a little calculator to use as you wish.

# Using a Game Controller

The TSD Rally Computer can be paired wirelessly via Bluetooth with an Apple-specified MFi game controller. In particular, the app has been tested with Stratus Wireless Gaming Controllers from ([www.steelseries.com](http://www.steelseries.com)):



Be sure to turn on Bluetooth on the iPad and wait about 30 seconds for the connection to take affect.

Controls for the standard layout are mapped as follows:

Control:	Action Button:
Directional pad	Select next CAST
A or B button	Control button
X button	CAST button
Y button	Undo CAST
Left shoulder	Add 0.10 to car odometer
Right shoulder	Add 0.01 to car odometer

If available on the game controller, controls for the extended layout are mapped as follows:

Control:	Action Button:
Left thumbtack	Select next CAST
Left trigger	Subtract 0.10 from car odometer
Right trigger	Subtract 0.01 from car odometer

### Conversion Table: Seconds to Decimal Minutes

Seconds	Decimal Mins	Seconds	Decimal Mins
1	0.017	31	0.517
2	0.033	32	0.533
3	0.050	33	0.550
4	0.067	34	0.567
5	0.083	35	0.583
6	0.100	36	0.600
7	0.117	37	0.617
8	0.133	38	0.633
9	0.150	39	0.650
10	0.167	40	0.667
11	0.183	41	0.683
12	0.200	42	0.700
13	0.217	43	0.717
14	0.233	44	0.733
15	0.250	45	0.750
16	0.267	46	0.767
17	0.283	47	0.783
18	0.300	48	0.800
19	0.317	49	0.817
20	0.333	50	0.833
21	0.350	51	0.850
22	0.367	52	0.867
23	0.383	53	0.883
24	0.400	54	0.900
25	0.417	55	0.917
26	0.433	56	0.933
27	0.450	57	0.950
28	0.467	58	0.967
29	0.483	59	0.983
30	0.500	60	1.000



Conversion Table: Decimal Minutes to Seconds

Decimal Mins	Seconds	Decimal Mins	Seconds	Decimal Mins	Seconds	Decimal Mins	Seconds
0.01	0.6	0.26	15.6	0.51	30.6	0.76	45.6
0.02	1.2	0.27	16.2	0.52	31.2	0.77	46.2
0.03	1.8	0.28	16.8	0.53	31.8	0.78	46.8
0.04	2.4	0.29	17.4	0.54	32.4	0.79	47.4
0.05	3.0	0.30	18.0	0.55	33.0	0.80	48.0
0.06	3.6	0.31	18.6	0.56	33.6	0.81	48.6
0.07	4.2	0.32	19.2	0.57	34.2	0.82	49.2
0.08	4.8	0.33	19.8	0.58	34.8	0.83	49.8
0.09	5.4	0.34	20.4	0.59	35.4	0.84	50.4
0.10	6.0	0.35	21.0	0.60	36.0	0.85	51.0
0.11	6.6	0.36	21.6	0.61	36.6	0.86	51.6
0.12	7.2	0.37	22.2	0.62	37.2	0.87	52.2
0.13	7.8	0.38	22.8	0.63	37.8	0.88	52.8
0.14	8.4	0.39	23.4	0.64	38.4	0.89	53.4
0.15	9.0	0.40	24.0	0.65	39.0	0.90	54.0
0.16	9.6	0.41	24.6	0.66	39.6	0.91	54.6
0.17	10.2	0.42	25.2	0.67	40.2	0.92	55.2
0.18	10.8	0.43	25.8	0.68	40.8	0.93	55.8
0.19	11.4	0.44	26.4	0.69	41.4	0.94	56.4
0.20	12.0	0.45	27.0	0.70	42.0	0.95	57.0
0.21	12.6	0.46	27.6	0.71	42.6	0.96	57.6
0.22	13.2	0.47	28.2	0.72	43.2	0.97	58.2
0.23	13.8	0.48	28.8	0.73	43.8	0.98	58.8
0.24	14.4	0.49	29.4	0.74	44.4	0.99	59.4
0.25	15.0	0.50	30.0	0.75	45.0	1.00	60.0