

# **Richta GPS Checkpoints**

## **Rallymaster**



## **User's Guide**

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## **Introduction**

The Richta GPS Checkpoint systems is a collection of applications for Android and Apple phones (in the future) and tablets used to time contestants in a time-speed-distance road rally such as those sanctioned by the Sports Car Club of America (SCCA – [www.scca.org](http://www.scca.org)) .

## **About the Name Richta**

The name Richta (pronounced rik'-ta) is a play on words, combining the designer/author's first name (Rich) with name of the mechanical calculator used in rallying (the Curta calculator). The original Curta calculators were designed by Curt Herzstark and manufactured from 1946 through about 1966.

Several Android and Apple apps are available under this brand name including rally calculators, computers, odometers, and checkpoint clocks.

## **Precautions**

As with any piece of rally equipment, the rally team should be thoroughly familiar and comfortable with the apps prior to using them in an event.

## **Background**

These applications were written to automate the timing of competitors in time-speed-distance road rally events with no requirement for the traditional checkpoint crews to be physically present at the checkpoint locations. Timing and scoring data is automatically sent to the organizers.

This system is designed to provide these benefits to the organizers and competitors:

1. Checkpoint crews are not required to be at the checkpoint locations.
2. Timing and scoring feedback is provided to the competitors at each checkpoint.
3. Timing and scoring data is automatically sent to the organizers to speed scoring. A comma separated file suitable for loading into a spreadsheet is generated by the organizer and can be used to speed scoring.

## **Development Status**

Initial versions of the apps were released in January 2019. Frequent updates are planned throughout 2019. Check the web site for the most recent status.

<https://sites.google.com/site/richtarally>

## **Downloading the Apps**

The apps are distributed through the Google Play Store for Android devices and through Apple iTunes for iOS devices.

For Android devices, start the Google Play app on your device. Search for “Rallymaster – Richta GPS Checkpoints” or “Competitor – Richta GPS Checkpoints”. Install the app as any other.

For Apple (iOS) devices, start the App Store app. Search for “Competitor – Richta Checkpoints”. Install the app as any other.

## **Licensing Plans**

There is no charge to use these apps in 2019. A licensing model and costs will be finalized for 2020. It is anticipated that there will be a three-tier licensing model:

1. No charge tier: For up to perhaps 20 checkpoints.
2. Divisional Tier: Estimated at \$4 per car per event for 21 to 50 checkpoints.
3. National Tier: Estimated at \$8 per car per event for more than 50 checkpoints

## **Feedback Welcome**

Comments, questions, and suggestions for improvement can be sent to [rbireta@gmail.com](mailto:rbireta@gmail.com)

## Getting Started

These steps are provided as a guide to event organizers for them to learn how to use this system and determine its applicability for their club. The suggested steps for this evaluation are:

- 1) Design and write a short test rally.

Select roads convenient to use that are suitable for a short demonstration road rally. The course need not include an odometer check section. It should include a start checkpoint, two or more timing checkpoints, another start checkpoint and two more timing checkpoints, in that order. The checkpoint locations should be easy to identify, such as curve arrow signs, mailboxes, etc.

- 2) Register the test rally.

Send an email to [rbireta@gmail.com](mailto:rbireta@gmail.com) to register your event. It will be added to the event menu of the apps. You will receive an email when the registration is complete which includes a password to allow you to modify your event.

- 3) Download the Rallymaster app.

Download the Rallymaster app from the Google Play store. Select your event from the Event Menu and enter the provided password to validate you can edit the event.

- 4) Use the Rallymaster app to set the checkpoint locations.

Using your Android phone or tablet (V5 or later), turn on location services, the same service on your phone used for Google Maps. Drive to each checkpoint location and, when you are there, stop the car. Enter 1 for the checkpoint number. Wait for a few seconds for the displayed GPS location to stabilize and press the button “Set Checkpoint Here”, then the “Go” button. The checkpoint location is set. Press Cancel and then enter the next checkpoint number. Repeat for all checkpoint locations.

- 5) Measure the event and calculate the ideal leg times.

Set the app aside and then continue to layout your event. Mileage the event and determine the average speed for each section. Return home and using the mileages and speeds determine the ideal leg time for each timing control. Note: The ideal leg times can be set to use either the time at the start control or the time from the previous timing control.

- 6) Enter the leg times using the Rallymaster app.

Use the Rallymaster app to Set Checkpoint Time. This can be done from the comfort of your home. For each checkpoint, set the checkpoint type and time. There are four types of checkpoints.

CZT checkpoint – used at start controls. Competitors are due here at the specified car zero time plus their car number (in minutes).

Flying Start – used at start controls. Competitors are timed here when they pass the control. The time displayed on the Competitor app is used as their out time for this leg. Flying starts can be used as a convenience when testing an event and can be changed to at CZT checkpoint later. Flying Start controls are recommended for your initial testing of the app.

Time Control (Timed from previous CZT or Flying Start) – Competitors are timed here and receive a score. The ideal leg time uses the most recent previous CZT checkpoint or Flying Start checkpoint as the out time.

Time Control (Timed from previous checkpoint) – Competitors are timed here and receive a score. The ideal time uses the most recent checkpoint, be it a Time Control CZT checkpoint or Flying Start checkpoint as their out time for the leg.

7) Validate the event.

Using the Rallymaster app, press the Validate Event button to perform a consistency check of your event. You'll be prompted for an email address and you'll be sent a report on your event listing your checkpoint locations and types and ideal leg times. The data will be checked to ensure each checkpoint has a location, that each Time Control has a previous Start Control (CZT or Flying Start) and other consistency checks. Resolve any errors identified.

8) Download the Competitor app and test the rally.

Select your rally, enter a car number and give it a try by running the event.

9) Provide feedback to the app developer.

The author anticipates many suggestions for improving the function and usability of these apps. Your feedback is key to making these enhancements. Send your suggestions to [rbireta@gmail.com](mailto:rbireta@gmail.com).

## Frequently Asked Questions

- 1) How are these apps structured?

There is an app for the Rallymaster and an app for the competitor.

- 2) How does the Competitor App determine that a checkpoint has been passed?

The app uses your device's GPS information to monitor your location and determine when you pass each checkpoint.

- 3) Do the checkpoint locations have to be placed in an area where there is cell phone coverage?

No. The database used to store timing and scoring information automatically handles sending the data to the organizer when a data connection is available. A data connection at the start and end of the event is necessary.

- 4) How is the timing and scoring data sent to the organizers?

Google Cloud Firestore is used to store and replicate timing and scoring data.

- 5) How do I request enhancements to the apps?

Send an email to [rbireta@gmail.com](mailto:rbireta@gmail.com).

- 6) How much does this cost to use?

No charge during calendar year 2019. Final licensing will be determined later in the year. See the section "Licensing Plans" earlier in this document.

- 7) How do I determine if this system is right for my club?

See the "Getting Started" sections of this document.

- 8) How are time allowances handled?

Easily. There is a **TA+** button and a **TA-** button on the competitor app screen. When a competitor is delayed and needs to request a time allowance, they simply press the **TA+** button. The first press of the **TA+** button will grant a 10 second time allowance. A second press will increase this to 20 seconds. The third press increases it to 30 seconds. Every press after that will add 1 minute. The total time allowance is displayed next to the TA buttons.

Pressing the **TA-** button will reduce the time allowance by the same increments. The total Time Allowance will persist through multiple timing controls and will reset to zero at a CZT checkpoint and at a flying start checkpoint.

It is critical that the competitor enter the time allowance PRIOR to arriving at the next control. Once you arrive at a control, you'll see your leg score and then it's too late to enter a time allowance for that checkpoint. (Just like you can't submit a time allowance at an open control once you've received the leg data slip)

9) Can this system be set to time in either seconds or hundredths of a minute?

No. This app will only time in seconds. Enhancements are planned in 2019 to enable timing to the 0.1 second.

10) Can the rally route go past a point that is used later in the rally as a checkpoint location?

No. You can't tell the app when to "open" each checkpoint as you would with manned checkpoints. The app initially considers all checkpoints to be "open" and only removes a checkpoint from its "open" list when you pass that checkpoint. If the competitor passes a checkpoint location again later in the rally, the app knows that that checkpoint has already been attained and will ignore any subsequent arrivals at that location.

11) What happens if a competitor gets lost, and regains the rally but skips several checkpoints?

That's no problem. The app doesn't just look for the next checkpoint. It looks for all of the checkpoints that you have not yet encountered. So if a competitor skips one or more checkpoints, the app will still correctly record the arrival times once the competitor regains the rally route.

12) The competitor app shows a time of day clock. Should competitors set their clocks to that?

It depends on how accurate they want to be. The most accurate way to set a rally clock is to use the WWV radio time signal. The time of day that the GPS system reports (and the app uses) comes from the atomic clocks on the GPS satellites. These atomic clocks are set to the same time standard as WWV time signals. The clock shown on the competitor app will be very close to WWV time (within a few tenths of a second).

13) Can competitors use an external GPS receiver system such as the Dual SkyPro GPS or Garmin GLO?

Yes. It's a bit more complicated because you have to link the external receiver to the app, but once that's done, it works fine. If you leave your car and take your phone/tablet with you at a break, you'll have to be sure that you have relinked to your GPS antenna when you return to the car.

14) Will a competitor get better scores using an external GPS antenna rather than the phone/tablet's built-in GPS?



Preliminary testing indicates that competitors may see a slight advantage from using an external GPS receiver. For the majority of competitors on a majority of rallies, using your phone/tablet's built-in GPS will be just fine.


15) Should rallymasters use an external GPS receiver for recording checkpoint locations?

It depends. It's true that using a Dual SkyPro GPS or Garmin GLO receiver will produce more accurate checkpoint location information. We have typically seen the Dual SkyPro 160 report an accuracy of 1.8 meters compared to 3.0 meters for a phone's built-in GPS. If you're designing a Championship rally and are seeking the highest accuracy, using a Dual (or equivalent) is the way to go. For most rallies though, using your phone or tablet's built-in GPS will be just fine.

16) Should the rallymaster set the starting point of the rally as a CZT checkpoint?

It's not necessary to do this if there is a CZT or flying start checkpoint at the end of the odometer calibration leg. However, there is an advantage to setting the first checkpoint at the very beginning of the rally (i.e. the parking lot where everyone starts). In this way, competitors can verify that the app is running properly as they start the rally.

17) Should the rallymaster tell competitors where the checkpoints are?

That's entirely up to the rallymaster. The rallymaster can call out the checkpoints in the Route Instructions (for example: Checkpoint at ) Doing this allows competitors to adjust their speed to try to "zero" the control, as well as split their clock and compare that to the arrival time that the app reports.

Alternately the rallymaster can use "unmarked" controls where competitors only know they have passed a control by the "ding" of the app and the display of arrival time and leg score.

18) Where should the location of CZT checkpoints be located?

Experience with the apps suggests that it may be helpful to place the location of CZT restart checkpoints approximately 30 feet prior to the landmark. For example, if the rally instruction is "CZT restart at 10:30 plus your car number in minutes at "Stop Ahead"" then the location for the restart should be placed 30 feet prior to the Stop Ahead sign. This will call the Competitor app to ding as the contestant approaches the checkpoint. The app will display the correct restart time and the contestants can set their odometer and perform other tasks related to starting a leg at the sign.

## **Acknowledgements**

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## **Software Change Log**

1.0 – January 2019. Initial Release

## **Documentation Change Log**

Version 1.0 - January 29, 2019

Version 1.1 – March 27, 2019