Richta GPS Checkpoints

Rallymaster

User's Guide

June 5, 2020

This page intentionally left blank.

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) .

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. It is important that the organizer or scorer be familiar with the apps. Run the Competitor app during a pre-check of the event. Test your scoring process to ensure you understand how to generate the scoreboard and integrate it with your scoring system.

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

June 5, 2020

Initial versions of the apps were released in January 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

The licensing model and costs for 2020 are based on the entry fee for the event and are as follows:

1. $5 per car per event for an entry fee greater than $50.
2. $3 per car per event for an entry fee from $30 to $49.
3. For and entry fee under $30, please contact me at rbireta@gmail.com,

Sample Language for General Instructions

The following language was used on the Spring Scamper 2019 to instruct competitors on the use of the apps.

9. This rally will utilize an entirely new procedure for timing at checkpoints. All checkpoints will be identified in the route instructions. For example: Checkpoint at "Speed Limit 45". The Richta app on your smartphone will monitor your car's location using GPS and will know when you pass each checkpoint. The app will record your time of arrival, compute your score, make a ringy-dingy sound, and display this information to you a few moments after you pass each checkpoint.

If you are running late and need to submit a time allowance, be sure that you have submitted it on the app BEFORE you arrive at the next control. It is best to approach and cross the checkpoint line at the assigned average speed. Do not stop, creep, or back up in sight of a checkpoint. If you do so, the app may time you in before you arrive at the checkpoint. Consider this a penalty for creeping.

June 5, 2020

Checkpoints will NOT be identified by a traditional checkpoint sign. Do not stop at checkpoints. Continue rallying as if there had been no checkpoint. If you arrive early at a control, you should then slow your speed in order to get back on time for the subsequent control. Conversely, if you are late at a checkpoint, or should either speed up (safely and legally) or take a time allowance before the next checkpoint. You should continue to rally and maintain the assigned average speeds until you reach the next restart point.

Restart points are identified in the route instructions with the words "Restart here at x:xx plus your car number in minutes". You should have a couple of minutes to stop and relax at each restartpoint. Your phone should make a ringy-dingy sound and display your restart time as you approach each restart point that begins a timed section. There is a 0.25 mile Free Zone (no checkpoints) aftereach restart point.

If you are delayed along the rally route for any reason, you may submit a time allowance without any penalty. If you are delayed due to road blockage, slow traffic, getting lost, nature call, or any other reason, do not speed to try to make up the lost time. You submit a time allowance directly in the Richta app by pressing the TA+ button. Each press of the TA+ button adds more time allowance time. The increments of time allowances are 10 seconds, 20 seconds, 30 seconds, 1.5 minutes, then in one minute increments up to 19.5 minutes. You can remove some or all of the time allowance by pressing the TA- button. Your time allowance will automatically reset to zero at the next time of day restart point that begins a timed section. You will have a maximum time allowance of 19.5 minutes at any time during the rally. If you need to submit a time allowance, it is critically important that you do so in the Richta app BEFORE you reach the next checkpoint. Once you have arrived at a checkpoint, it is too late to submit a time allowance for that leg.

Penalty points are: 1 point for each second early or late at a control, up to a maximum of 120 points (2 minutes) per control. Penalty for missing a control, or failure to be timed in at a control: 120 points.

Awards will be presented afterwards to the teams with the fewest penalty points.

10. Loading the Richta GPS Checkpoints app on an Android smartphone

Contestants that compete with an Android smartphone will need to be running Android version 5.0 or above on their phone. To check this, go to Settings/About phone and scroll down to see the Android version. Go to the Google Play Store on your phone and search for "Competitor Richta GPS Checkpoints." You may have to scroll down multiple times to find this app in the search results. Download this app to your phone. There is no cost to you for this app. Once downloaded, open the app. If you get a message saying "App requires location permission," you'll need to grant permission for the app to use location information from your phone. To do this, go to Settings/Apps/Competitor. Grant the permissions it requires (location). Open the app. You'll be asked to select an event. Choose "Spring Scamper." You'll then be asked for a car number and a password. Enter the car number you've been assigned. Create a password for yourself and enter it.

Press "Save." Then press "Add" when it appears. You do not need to enter anything in the other fields. You should see a screen that looks similar to the Android example below.

11. Loading the Richta GPS Checkpoints app on an Apple smartphone

Go to the Apple App Store on your Apple smartphone and search for "Competitor Richta Checkpoint." Download the app. There is no cost to you for this app. Open the app. Choose "Spring Scamper." Enter the car number that you have been assigned. Create a password and enter it. Press "Done." Press "Continue." Press "Submit Info." You do not have to enter any info in the other fields.

12. General information for all phones about the Richta app

You cannot run any other apps on your smartphone during the rally. If you are planning to use another app during the rally, you'll need to do that on a different device. When you download the Competitor Richta GPS Checkpoints app, you will also be downloading specific data about the rally (checkpoint locations and leg times), although this data will not be visible to you. Your phone will NOT need to have cell phone service during the rally in order for this app to work. You will have downloaded all necessary information prior to starting the rally. The app only needs location information from the GPS signals. We have tested this app many times on this rally course and found that it is reliable at all checkpoint locations and in a wide variety of weather conditions.

If the app should happen to crash during the rally, simply pull off the road in a safe location, reboot the app and then continue to rally. Take a time allowance if necessary. The app will remember all of your arrival time and score information and will simply pick up where it left off. Just be sure that you don't pass a checkpoint or a restart point while the app is not running. You MUST keep an eye on your smartphone to make sure that the Richta checkpoint app is still running and is on your phone's screen. If your phone reverts to its home screen, then the Richta app cannot sense your arrival at a checkpoint.

If you encounter any trouble with downloading the app and registering your car number, please call

the rallymaster at xxx-xxx-xxxx.

Suggestion for Handling the Event Start and Finish

Conduct the start of the rally at a location that has wi-fi service or set up a wi-fi hot spot. This will be needed for contestants to download the scoring app or register for the event.

June 5, 2020

Alternatively, communicate with all entrants the instructions for downloading the event and registering for the event in the app. Monitor their progress with the Rallymaster "Who's not ready?" screen under Manage Entries.

Assign someone at the start of the event to review the competitors devices used for the app. Ensure that location services are enabled on the device and that the correct car number is shown. Ensure they show up as "ready" in the "Who's not ready?" screen of Rallymaster.

At the finish provide a wi-fi hot spot either through the restaurant or set up a mobile hot spot. Our experience has been that most entrants will have a smart phone with a data plan. Wi fi access will be required for those entrants using a tablet with wi-fi only.

If you find you are missing scores for some competitors then examine their phone/device. They may have turned on airplane mode which will prevent the transmission of timing data or they may have a wi-fi only device. Turn off airplane mode or enable the wi-fi connection and the scores will soon be transmitted.

Feedback Welcome

Comments, questions, and suggestions for improvement can be sent to
rbireta@gmail.com

June 5, 2020

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 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.

June 5, 2020

There are eight 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.

Flying Start - Round to Next Minute - Similar to the Flying Start but the out time assigned is rounded to the top of the next whole minute.

Flying Start - Round Down - Similar to Flying Start but the out time is rounded down to the most recent half minute.

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.

On Course - Competitors receive a score of zero points if they pass this checkpoint.

Off Course - Competitors receive a maximum score, specifiable by the Rallymaster, if they pass this control.

Time Check - Not scored. This type of checkpoint is used to allow competitors to compare their in time with the in car clock.

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.

June 5, 2020

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 .

June 5, 2020

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.

6) How much does this cost to use?

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.

June 5, 2020

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 in either seconds or tenths of seconds.

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

Yes with the June 2020 release of the software. You can tell the app when to "open" and "close" 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).

Time Check checkpoint types can also be used during the odometer check to assist competitors in syncing their clocks.

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

June 5, 2020

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 receiver 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.

Alternatively 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.

June 5, 2020

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.

19) I'm not getting scores from a few competitors at the end of the event.

Ensure the competitor's device is not in airplane mode and that it has a data connection. There was a bug in 2019 in the Firestore software that prevented restart of data synchronization after a network problem. This bug has been resolved.

20) Can Competitors use tablets instead of phones?

Yes, with some cautions. Tablets used by Competitors must have internal GPS receivers. Notably some Amazon Fire tablets and Apple iPads without 3G data connections do not have GPS receivers.

Can a Competitor run two devices at the same time with the same car number?

21) Yes, but this is strongly discouraged. Both devices will update the database when they again connect to the network and the last update will be retained. There is no way to determine which device the timeslip came from.

Acknowledgments

The Richta GPS Checkpoint Timing and Scoring system was designed and coded for Android by Rich Bireta. Apple iOS development and user interfaces for both apps were designed by David Bireta. Valuable feedback and field testing were performed by Jim Crittenden.

Software Change Log

1.0 – January 2019. Initial Release
2.0 - September 2019 - Documentation update.
3.0 - June 2020. Documentation update.