

Chip Timing Configuration and Operation (Trident)

Theory of Operation

Last Seen, First Seen, and Best Seen

We need to remember that there are different perspectives for these attributes, depending on which system you are considering.

The Trident chip timing system¹ (UHF8) sends a signal which is used to charge the tag briefly during which time the tag transmits its unique ID string. This happens on the order of 100 times/sec. These are filtered such that only the "Last Seen" (LS) and "Best Seen" (BS) are sent to the scoring software (with configuration `Filtered message types = BS,LS`). The BS timestamp will be before or at the LS timestamp.

- Note with the bib in front, the body blocks the signal so LS should be the read right over the starting line

RaceDay Scoring (RDS) will use the last of these reads (by timestamp) when processing start line reads, and the first of these reads (by timestamp) when processing finish line reads. So at the start RDS will use LS from UHF8's perspective, and at the finish it will use BS from UHF8's perspective.

See [Rationale](#) for quotes from Trident and RaceDay Scoring support which led to this solution.

Start or Finish Determination

The RDS start/finish "location" for chip timing needs to know when to treat the location as "start" and when to treat the location as "finish".

The following settings need to be configured

- Scored Events
 - Actual Start Time is set to the first GUNTIME marker – this is generated when the trigger button is pressed
 - Timing Locations - Default Finish Occurrence (see below)

¹ Unfortunately, [Trident](#) and [Flying Feet Computers](#) call their systems "TimeMachine" and "Time Machine" respectively. We are using UHF8 as the acronym for the chip system, and Time Machine (TM) as the name for the manual system.

- Location > Start/Finish (chip) Settings
 - Start Read Settings - time of day to STOP collecting start times
 - Finish [& Split Point] Read Settings - time of day to BEGIN collecting finish times
 - Occurrences
 - Max Number of Occurrences: 2 means one for start and one for finish
 - Gap Factor (Min Time Between Reads)

Bib Number / Chip ID Association

When a chip is read at the antenna mat, RDS needs to associate the chip ID received from the chip timing system with a bib number in order to ultimately map to the participant. The bib/chip association is made by uploading a csv file at Participants > Actions > Setup Chip Auto-Assignment.

RDS allows up to two chips to be associated with each bib number. The input file should have a row for each bib number, so two rows with the same bib number if we're using separate chip IDs on the redundant chip. The chip IDs from Trident are the printed number on the chip, 0 filled to 12 digits. The file [bib-chip assignments](#) on Google Drive under the fsrc.kiosk@gmail.com account is set up for this purpose.

Handling Missed Reads at the Finish

We use the manual Time Machine (TM) as a backup for missed reads at the finish.

Normally, RDS will use the time found for a bib on the Main Stream (UHF8) rather than the Backup Stream (TM). However, we have to prevent the case where the actual finish chip read was missed, but the participant walks near the finish line later and that read is recorded.

For this reason, we monitor the raw TM reads to see if one was used. When a TM read is seen as "used", after an appropriate delay to account for system lag, click on the participant then set Read Cutoff Time to be a few minutes after the Time Machine read. This prevents the result from being overridden by an errant chip read on the Main Stream.

Operation

Before Start

- laptop: Adjust date and time > Sync now
- on laptop browser, navigate to <http://192.168.0.102> (IP video camera)
 - Settings > System > Time
 - Sync with PC time # this should adjust time zone depending on EST/EDT

At Start

- lead timer should briefly press the gun trigger when the race starts, to record GUNTIME
- display clock should be started simultaneously by a helper
- Time Machine START TIME button should be pressed as normal

After Start

- tmtility > Races
 - adjust race Start Time to match the GUNTIME used above
 - in RDS: Raw Reads, filter on Marker, use time for first GUNTIME
 - this time is added to the Time Machine time (which is 0:00:00 based) to get the correct time of day for recorded finish times

During Race

The lead timer needs to cycle through the following:

- tmtility > Results
 - manage bib scans and Confirm results - confirmation provides TM results to RDS
 - <https://tm-csv-connector.readthedocs.io/en/latest/users-guide.html#tmtility-operation-scanner-connected>
- RDS Dashboard to monitor recent reads and results
- RDS Time Machine raw reads to detect missed chip reads at the finish
 - Data Checks > Time Machine - Used
 - If any reads are "Used", select the Name, then set Read Cutoff Time to be a few minutes after the Time Machine read, or to "current time"

If someone thinks their result is missing, the video can be reviewed. It's probably better to wait until it's not busy before doing this.

- Get the approximate time the participant finished (convert that to time of day), and their bib number
- In Blue Iris (BI), double-click on the timeline at about that time
 - video can be played
 - or use ctrl-shift "-" to go back a frame, or ctrl-shift "=" to go forward a frame
- if the participant can be seen finishing, we can use the time of day to create a raw read (in the "Time Machine (backup)" stream) for their finish
 - NOTE: a replay of Time Machine (backup) stream may remove this raw read – do we want a separate backup Video "stream" just for this purpose?
- Real time monitor can be resumed by clicking the clock "Now" on the right of the timeline

Post Race

If video results are desired, see

<https://help.runsignup.com/support/solutions/articles/17000073009-adding-video-results-to-your-race>

Troubleshooting

Results on RunSignup Don't Seem Right

Go to the Scored Events page and click Save.

From RunSignUp: [depending] on the order of operations, and updates you made so it is hard to say when you may need to Save the Scored Events page.

Configuration

Trident

- if the system clock is off from gps at the startup display, use the config button (right middle) to select Accept, then hold to activate. `GPS autocorrect limit = -1` should prevent this from being needed, though.

`config.ini`

- <https://www.manula.com/manuals/tridentrfid/timemachine/1/en/topic/configuration-options>

This needs to be changed when the clocks change

- `Time zone offset = -04:00 // for EDT spring/summer p02`
- `Time zone offset = -05:00 // for EST autumn/winter p02`

These shouldn't need to change

- `System name = FSRC_UHF8_A // p00`
- `Company name = FSRC // p29`
- `Name log files by date = T`
- `GPS autocorrect limit = -1 // always adjust to GPS time`

- Activate relay on tag = F // default was A which is not in manual
- Beep on tag = A // (default) beep on all tag reads
- Filtered message types = BS,LS // p47
- Best seen method = N // note default in manual is N normal, but was set to V in original file

RaceDay Scoring

- (re)start read connector after reader boots
- (re)start read connector after deleting tags (normally shouldn't delete tags)
- Timing Locations
 - start/finish timing location
 - name: Start/Finish
 - types of times: Start & Finish/Split Times
 - Which Streams
 - Main = Trident UHF8 A
 - Backup = Time Machine
 - Start Read Settings
 - race start + 5 minutes (for every 5K of min event distance)
 - Finish & Split Point Read Settings
 - race start + 15 minutes (for every 5k of min event distance)
 - Max Number of Occurrences = 2
 - Gap Factor (occurrence 1) 0:15:00.000
 - Generate Test Reads [???
- Streams
 - create/use stream for chip timing
 - name: Trident UHF8 A
 - type: Trident Direct Connect
 - assign as **Main Stream**: Start/Finish
 - IP: 192.168.0.101
 - port: 10001
 - [adjust read dates: set to race date -- for testing only]
 - create/use stream for backup timing
 - name: Time Machine
 - type: File (Custom or Chip System Type)
 - path: C:\Users\fsrck\OneDrive\Documents\Time Machine
 - extension: csv
 - format: [IGNORE],[BIBCODE],[TIME]

- delimiter: ,
 - assign as **Backup Stream**: Start/Finish
 - [adjust read dates: set to race date -- for testing only]
- Participants
 - Actions > Setup Chip Auto-Assignment
 - Import Chip Assignments
 - bib, chip column headings
 - can have up to two chip assignments per bib
- Sync Settings
 - save all defaults
- Scored Events
 - Basic Info
 - Min Finish Time Allowed = 0:15:00.000 (for 5K or longer)
 - Sorted by = Chip Time
 - Times
 - Approx Start Time = nominal race start time
 - Actual Start Time = trigger time from raw reads, or first read over start mat
 - Max Chip Start Time Offset = 5 minutes (for 5K or longer)
 - Timing Locations
 - Start Timing Location: Start/Finish
 - Finish Timing Location: Start/Finish
 - Default Finish Occurrence: 2
- Age Group / Team Types
 - set as appropriate

tmtility

- Races view: [race] > Start Time = first GUNTIME from raw reads, or first read over start mat
 - NOTE: must be set before any results are confirmed, best to set as soon as possible after the start
 - NOTE: if using copy/paste, double check as sometimes msec portion is lost

Topodome TD-J10A Bullet Camera

Initial setup

- CamHipro phone app
 - Set admin password
 - Wireless: FSRCnet 2.4 [not used as we hard wire now]

- use Device Information to determine IP Address 192.168.0.102
- on laptop browser, navigate to <http://192.168.0.102>
 - Settings > Network > Network: Fixed IP Address: 192.168.0.102
 - Settings > Media > OSD set
 - Time Stamp: On
 - Time show: Bottom left
 - Camera Name: Off
 - Settings > Media > Video
 - First stream > Maximum frame rate: 15fps
 - Second stream > Maximum frame rate: 15fps
 - Settings > Media > Audio
 - First Stream > Audio Settings: Off
 - Second Stream > Audio Settings: Off
 - Settings > System > Time
 - NTP server: time.windows.com
 - Time zone (GMT-05:00)Eastern Time (U.S. and Canada) # for EST fall/winter
 - Time zone (GMT-04:00)Atlantic Time (Canada) # for EDT spring/summer
 - disable Automatically adjust clock for daylight saving time changes

Laptop

Initial setup

- Use an external hard drive as D:\
- laptop: System > Power & battery > Screen and sleep
 - When plugged in, put my device to sleep after: Never

Blue Iris (IP camera monitor software)

Initial setup

- Blue Iris Settings > Startup: enable Prevent power management from putting the PC to sleep
- Blue Iris Settings > Storage > Folders > New
 - D:\BlueIris\New
 - GB: 1000
 - disable "Limit clip age"
- Blue Iris Settings > Storage > Folders > Stored
 - D:\BlueIris\Stored
 - GB: 0
 - disable "Limit clip age"
- Blue Iris Settings > Cameras
 - Limit live preview rate: 5fps

- Camera Settings > Video
 - disable Display overlays live
- Camera Settings > Record >
 - Video: Continuous
 - Combine or cut video each
 - 1 hrs
 - 3.0 GB
 - File format and compression...
 - Video compression > Direct-to-disk

Rationale

From **Larry Hicks** (Trident rep)

At a start I would suggest Last Seen, the bib is usually on the front and the body blocks the tag read after they leave the start line. For the finish line, Best Seen is preferred as the algorithm compensates for early reads, it takes about ½ a second to get the best seen read as it must collect all the reads before calculating the best seen time. That's usually not a problem but just so you know. It won't cause the course to be "shortened" to any noticeable extent.

Last seen output is delayed by 5 seconds or more. if it hasn't seen the tag for 5 seconds it sends the last read it saw with its time stamp. If it sees it again during the 5 second interval, the 5 second timer is reset

From Matt Avery (RaceDay Scoring support)

We just look at the bib/chip code and time of day. For start locations, we take the last seen read within the timeframe set, and for finish/split locations we take the first seen read within the timeframe set.

Backup streams are an entirely different story. We do not consider reads from a backup stream at all if there's any reads for that participant on a main stream. As soon as a read is seen on a main stream for someone we will immediately ignore any times from any backup streams for them and use that main read (even if it's "worse" based on the time of day).

References

- [Trident TimeMachine Manual](#)
- [Solutions : RaceDay Scoring](#)

- [Optimizing Blue Iris's CPU Usage | IP Cam Talk](#)
- [Blue Iris Clip Length For Continuous Recording | IP Cam Talk](#)