



ErgRace software by Concept2

What does ErgRace software do?

ErgRace software connects Concept2 Ergometers (ie the Concept2 RowErg, SkiErg and/or BikeErg) together for accurate timing and reporting of races. For smaller events, the ErgRace software may be all you need. Some larger events may need additional resources provided by [external services](#).

[Click here for a “Quick-Start Guide”.](#)

ErgRace can be downloaded from www.concept2.com/ergrace

Concept2 asks you to save paper and not print this document. It is updated frequently with new features and more clear explanations. Also, the various links to other documents won't work from a printed copy.

For online racing, check out ErgRace Online (www.concept2.com/ergraceonline) and also many other apps including ErgWorld, Zwift, Selfloops, IC Row, Time-Team, and others

ErgRace is currently only in English. If you wish to assist with translations, please click [here](#) for a document with how you can help.

ErgRace is supported only on Windows.

A project and alpha-test version of [ErgRace for Mac may be available.](#)

**** Release notes: 1/21/2025 ****

[** RELEASE NOTES from 2/2/2023 **](#)

Some notes about this guide:

ErgRace software is the successor to Concept2's "Venue Race Application" or "VRA". As such there are necessarily references to legacy files and services. References to legacy VRA is in purple text and can be ignored unless using older support tools such as ErGo, etc. Support for legacy files is limited and only initial testing of legacy files will be performed by Concept2. Bugs in legacy file formats may or may not be fixed. As of August 1 of 2020 these reference and legacy features may be removed.

Some features of ErgRace are not complete. These features are frequently printed in red or are labeled (Future)

There are also some considerations for PM3 and PM4 users. If you are using only PM5s, the green text can be ignored.

Some terminology may not be familiar to everyone. There is a [glossary](#) provided at the end of this manual. Concept2 encourages questions, feedback on this document, and bug reports for the ErgRace software to be sent to info@concept2.com.

The ErgRace software is intended to be used with the latest Concept2 performance monitor firmware. It is suggested to update all PM3,4,5 monitors with the latest firmware available. ErgRace may offer you to update but please take note of the instructions and warnings. It is very important to have ALL the PM5's numbered properly before starting an update! If it is not set up properly it may require manual updates of each monitor individually using a laptop and the Concept2 Utility. This may be time consuming.

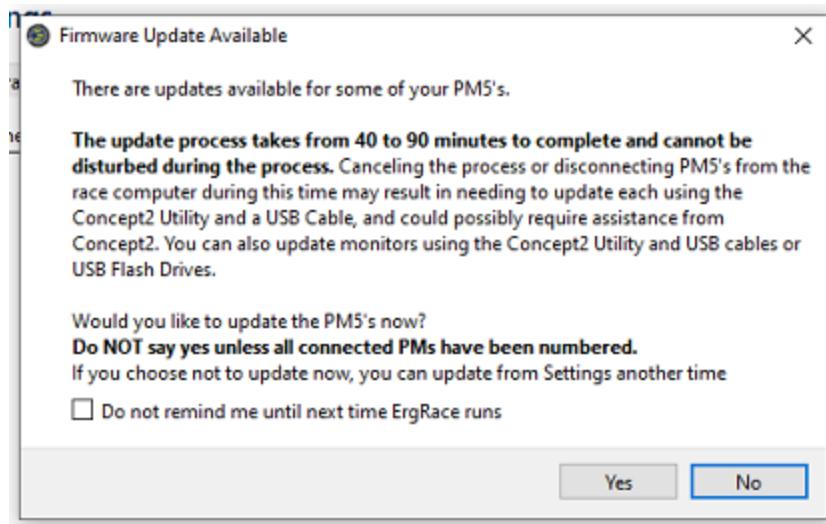


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[Erg:](#)

Erg Number:

Lane:

Boat:

Network:

Primary monitor:

Individual Race

Team Race

Relay Race

Triathlon Race (future - not implemented yet)

False start:

Race "Viewer"

Race file

RS485

USB

Tie

Place

Resources:

USB Cables

Ethernet Cables

How to set up a network for additional view computers

Cable & Connection Troubleshooting

Firmware

Cable Test Mode

Power Bricks

Terminators

Trouble Numbering Ergs.... Or trouble finding all the Ergs after setup.

Long USB Cables

USB Hubs:

Still having problems?

How to deal with a broken Ergometer:

How to deal with a broken Monitor:

How to quickly change batteries

How to get help if this users manual does not answer your questions....

ErgRace Crashes when creating a race:

Setup or Event Day urgent help

A note about browsers for Viewers:

How to set Chrome or Firefox to the default browser:

Setting default browser in Windows 7 , 8, and Windows Vista:

Setting default browser in Windows 10

Updating firmware

Wiring diagrams

The ErgRace software has built in guidance for how to wire the Ergs together and to your computer depending on the mix of PM3, PM4, PM5 and other requirements.

For a simple set up such as:

• All PM5 monitors mounted to Concept2 Indoor Rowing machines

Allowing a greater distance to the race Ergs:

Multiple Primary monitors:

Viewer Operation

Most common display (Hybrid View)

[Using a mixture of SkiErg, BikeErg, and Indoor Rower:](#)

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[Installation issues?](#)

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[Known issue: Multiple copies of ErgRace appear in the "Add/Remove Programs"](#)

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Checklist before running a public race

Concept2 recommends printing out this page and use as a checklist of things to do to ensure the best experience.

- Check all cables: Ensure all USB, Ethernet, and “Tach” (generator) wires are all fully pushed in.
- Load a ‘test race’ even if it’s a short 100m or 2:00 race and start the race. Pull on every handle a few times (or pedal if using the BikeErg) to make sure meters count and boats move. After success, test each format of race you intend to use during your race day.
- If the Ergs are not new, update firmware on monitors. For instructions, refer to www.concept2.com/firmware. Some newer features (Group mode, Elimination Race, etc) may require a firmware update to a ‘beta’ edition.
- For BikeErgs, ensure a full calibration is performed on each BikeErg before connecting them with ErgRace.
- Decide how ties will be handled by officials in giving medals. Also decide what the rules are for False starts, for example you might choose to say that 2 false starts for the same person results in disqualifying them from a medal.
- Train the ‘officials’ (starters, referees, announcers...) on the start sequence by demonstrating. Don’t forget about how to handle false starts and ties, machine failure, etc. And if computer gets disconnected or crashes, “KEEP ROWING” will appear on PM.
- Follow the Windows computer setup instructions: Turn off screensaver, windows updates, ‘sleep’, and the like. Check it out [here](#).
- If a computer running the ErgRace display is supplying sound to a PA system, turn off Windows “Sounds” so ‘bings’ and other things do not occur unexpectedly.
- Move all “power bricks” (power adapters) for the computers and other equipment away from the Concept2 USB and Ethernet cables.
- Have on hand the Concept2 Tech Support number: 800-245-5676. After hours, contact Scott: [+1 802 279 6753](tel:+18022796753)
- If you have problems, press the “Feedback” button and enter what you were doing when the problem arised, or how you think the issue occurred, along with the approximate time (or “just now this bad thing happened”) so that we can improve the ErgRace software. If the problem is in the ‘display’, having the version of the display code in use is helpful. You can find this on the page just after clicking “Launch Race Display” and before choosing a view.

ErgRace User Manual

Installing

1. Obtain the latest version from www.concept2.com/ergrace
2. Run the ErgRaceSetup.exe file
3. Follow the directions and answer the prompts.
4. If Windows or Mac asks about a “Firewall” permission, say “Allow”. **This is important for running the race display later.**
5. Concept2 recommends following a few additional steps to tune Windows for running an ErgRace. See here: [Windows General Setup Instructions](#)
6. If there are problems installing, please contact info@concept2.com

For administrators of Windows fleets (schools, etc.), deployment services such as PDQ should work, try:

```
ErgRaceSetup.exe install -c --al --da
```

or to suppress output try

```
ErgRaceSetup.exe in -c --al --da >nul 2>nul
```

First run of the software

Windows may ask for firewall permissions the first time, say YES. Remote displays require this to be unblocked.

Physically Connecting Performance Monitors

For the easiest connections Concept2 recommends the Concept2 Performance Monitor 5 (PM5) with up to date firmware. Concept2 PM3 and PM4 may also be used with some limitations and changes to procedures and connections.

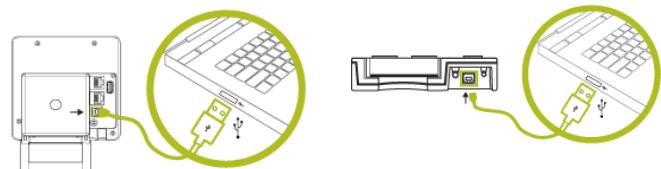
Connecting PM3 monitors:

Connect each PM3 to a USB port on the computer or to a USB hub attached to a computer. Though capable of more, Concept2 recommends no more than 14 PM3's be connected. All USB cables must be 15' (5m) or less. USB extension cables are highly discouraged -- please contact Concept2 for additional guidance if you think you need longer cables. USB Hubs must be USB 2.0 or USB 3.0. To avoid “USB Overload” problems, each USB hub should be attached to a power supply (AC Mains). Concept2 ErgRace software is designed to work with PM3's

however Concept2 does not regularly test PM3 or PM4 for reliability. Concept2 suggests using PM5's with up to date firmware for best results.

Connecting PM4 and PM5 Monitors:

In the most simple setup, connect one PM4 or PM5 to the computer with a [USB A to B cable](#). Or, if your computer only has USB C connections, then use a USB C to B cable or a USB C multi-port adapter (see [here](#)).

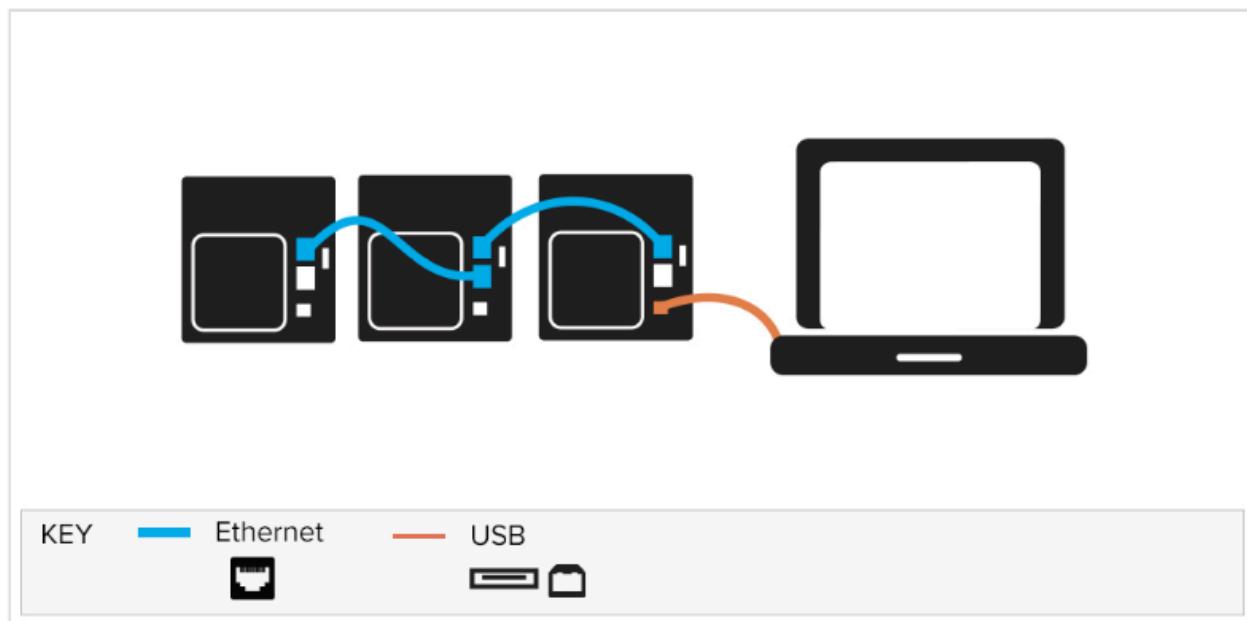
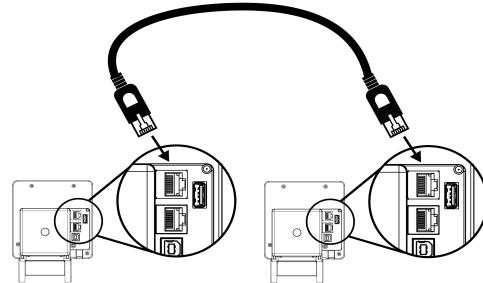


This PM4 or PM5 can be mounted to a BikeErg, SkiErg, or RowErg or can be a spare monitor [See [below](#) for why].

Next, use “[Ethernet Patch Cables](#)” from this PM4/5 to another one, and continue using Ethernet cables to each additional PM4/5.

Note: While we use Ethernet type cables, this is NOT an Ethernet network.

Hubs/Switches/Routers are not needed, and connecting to a computer’s Ethernet port will NOT work.



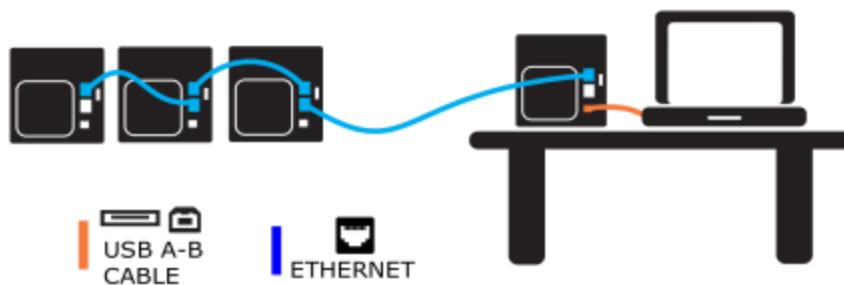
Numbering the PM5's:

1. Once all the monitors are connected, run the ErgRace software.
Note: If you are using PM4 or PM5's and the ErgRace software says it is only connected to one PM5, don't panic, just continue with the next steps!
2. Click "**Number All Ergs**".
3. Check to see that ALL the PM3/4/5's have a "?" on them. If not...
 - a. If some of the monitors are 'off' (sleeping), press a button on them, click **DONE** and then "**Number All Ergs**" again.
 - b. If the monitors are ON but do not have a ? on them, click **Done Numbering**, [troubleshoot the problem](#), and then click **Number All Ergs** again.
4. Now that they all have a ? mark on them, go to the PM5 that you want to be Erg #1 and press "**Request**". If prompted to "**Confirm**", press "**Confirm**" button.
5. Continue and number ALL the performance monitors.
6. If there are any that are not mounted to a Erg, number these monitors last.
7. When they are all numbered to your liking, press "**Done Numbering**".
8. The ErgRace software will perform some final checks and let you know of any problems.

Troubleshooting: If you have the ? on the screen, press "Request Lane number" and it does not offer a lane number within 10 seconds, refer to the [troubleshooting section](#).

Why use a PM4/5 that is not attached to an Erg? [Cable & Connection Troubleshooting](#)

The connection between the computer and the final performance monitor must be by a USB cable. USB cables have a limit of 15 feet so, if the computer running ErgRace is more than 15 feet from the race machines, the solution is to have an additional monitor next to the race computer. This is called the "Primary" monitor, and all the rest are "Secondary" monitors. When numbering the PM's, number all the monitors attached to Ergs first, then you must number any of the PM's that are not attached to Ergs - ie the "primary" monitor on the table. Primary monitors that are not attached to an Erg do not need to be included as a participant in the race – they just form a connection to the PM's on Ergs.



Limitations on number of Ergs attached:

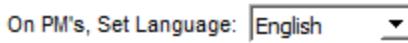
PM4 and PM5's attached with Ethernet cables have a limit of 80 Ergs, plus up to 4 additional performance monitors as non-racing 'primary' monitors. If you are using a large number of Ergs in your race, please write to us for additional tips.

It is possible to use Erg numbers higher than 80 by adjusting the 'Start Lane Numbering At []' value from 1 to a higher number. This allows you to set up one race system with lane numbers 1-50, and an additional computer/race system with lane numbers 51-100 (or whatever is desired) as this keeps the total number attached to each computer below 80. To access this feature, click on the "Advanced Numbering" button.

Current and up to date PM5 firmware will allow for up to 100 monitors plus up to 4 'primary' monitors, however you must update ALL the monitors to these firmware versions for this to work properly. To use more than 80 monitors, you may not use PM3's or PM4's. If you need more than 100 monitors in a race system, please contact Concept2 for more information.

With PM3/4/5 attached only with USB cables and hubs, Concept2 recommends up to 20 machines, Any more than 10 starts to become challenging due to cable lengths and Windows properly recognizing the monitors.

A few additional notes:

1. It is not necessary to set the time/date/language. ErgRace can do this for you.
2. If language of the PM's is an issue, look in Settings for this dialog box:
 . If you set it to "No change" it will not change the language on the PM5's. If you set it to "Default" it will reset the PM's so they will prompt the user to set language.
3. If you get PM's that give some error messages (161, etc.) during setup and wiring, don't panic. Try ErgRace and see if it works. It should clear these issues.

Create a new race

New races can be created manually from within ErgRace software. As an alternative to manually creating races, "Race Files" can be obtained from other race management software (see [other resources](#) section). New races can be created 'on the fly' and immediately used, or can be prepared in advance and saved as a "Race File".

From the main menu, select **Create Races**. Choose an appropriate race type from the list..

Summary of different types of races that are supported:

Individual is a traditional ‘singles’ race: one athlete on one Concept2 erg racing for a score of Time, Meters, or Calories.

Relay races are similar to Individual but a group of athletes get on and off a single machine to share the work.

Team (Average) is when several athletes are on several machines where the score is averaged; much as being in a multi-person boat. If there are teams of 4 (Quad), then 4 machines’ scores drive one ‘boat’ across the screen.

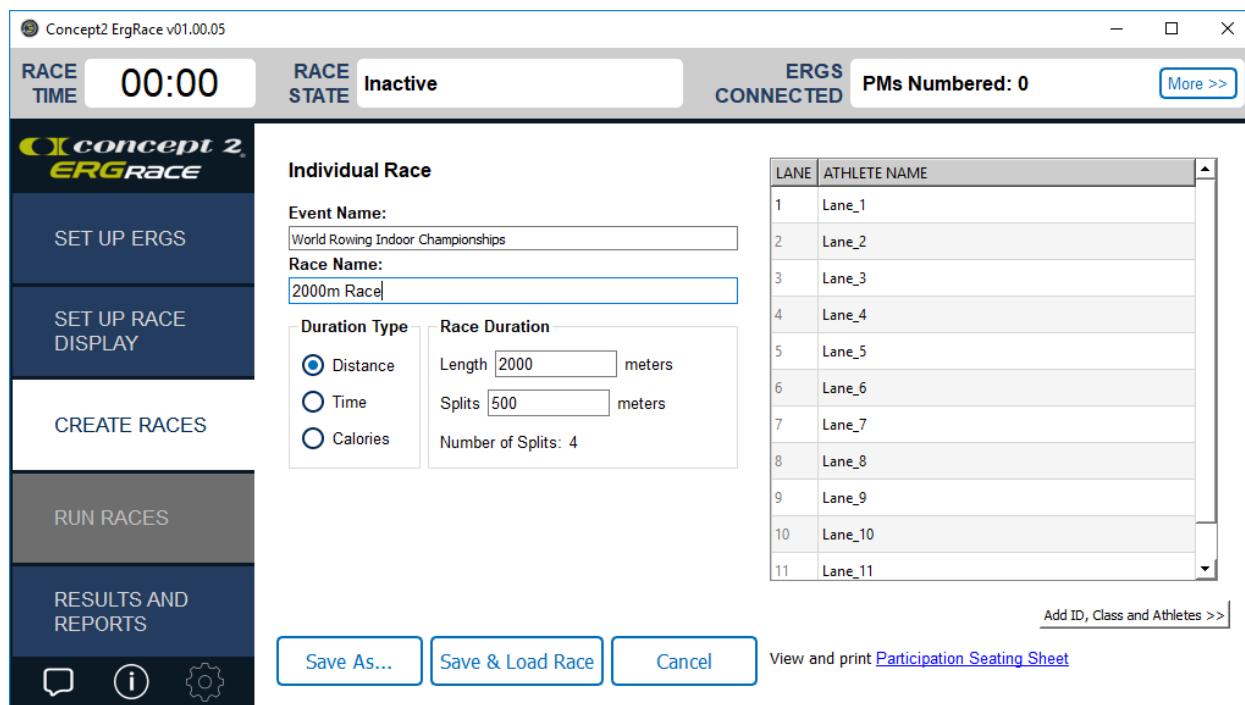
Team (SUM) is available for the case of one athlete moves between Bike, Ski, Row and accumulates meters on each. This will be replaced with “Mixed Erg Race” in the future. Unless you update to the latest firmware, please do NOT set up a Team race greater than 60,000m.

Mixed Erg race is a race where one athlete moves between several Ergs of different types.

Biathlon is a race where the athlete will do some work on an Erg, then do something else (like target shooting) for a period of time, and then return to do some more Erg work. This cycle may repeat several times. The final score is the total amount of time spent on the event.

[Click here for a document describing how to set and number ergs for a Bike/Ski/Row event.](#)

You should now see a screen similar to the below (options may vary depending on the type of race selected).



Fill in the choices and names as desired.

- The “**Event Name**” appears at the top of the audience display and results printouts. This is intended to be the same for the duration of your day of events, for example “World Indoor Rowing Championship”.
- The “**Race Name**” will show up on the audience display, results printouts, and on the PM3/4/5 screen during warmup. It will also help create the name for the saved .RAC2 and results files.
- Choose the desired duration type (goal) of distance, time, or calories.
- Optionally enter the athlete (or team) names in the table.
 - If you are entering them manually by typing them in, you can use the TAB button to add lanes as necessary.
 - You may also cut/paste from an Excel spreadsheet. *** NOTE: ErgRace may crash if the last row of the cells you are copying from are blank. Ensure all cells in the last row are filled with something.*
 - Try to keep athlete names short, only the first portion will show on the PM3/4/5 monitors and on the audience display.
 - PM's/Lanes that are “Primary” monitors that are not attached to an Erg need not have any name or other information assigned, however adding a name of “EMPTY” will not cause any problems other than a possible “Tach Wire Warning” to appear which can be ignored..

When satisfied, click the **Save and Load** button. This will prompt you to save the .RAC2 file for later use and also setup (load) the Erg monitors with the race configuration you have selected.

If you just click **SAVE**, then it will save the .RAC2 file to the computer but not set up the Ergs.

Note: You may create and save a race file while another is running and active, but you cannot “Load” it into the Ergs until after the race is over.

Load a race file

If needed, select the **Run Races** tab, then “**Open a Saved Race**”. Browse and find the file you want to load. Select it and click Load. You will then be given the opportunity to make last minute edits to the file before configuring and running the race.

For developer information on how to create .RAC2 files, please see our [File Formats](#) section.

Note: Concept2 recommends placing race files in Documents/Concept2/ErgRace/Races.

Legacy VenueRace files

You may load simple time/distance race files that were made by older race management software, such as the old Concept2 Venue Race Application, or ErGo, etc.. Simple time and

distance races created for legacy “Venue Race Application” can be loaded into ErgRace software. However, for any new ‘race management’ software being written, Concept2 recommends using the new .rac2 file format.

Limitations:

- 1) Concept2 does not support TEAM race types at this time. But you can create new Team races.
- 2) Once imported the race file may only be able to be saved in new .RAC2 file format. There is no provision for saving to .RAC file format.
- 3) The old Venue Race software did not understand UTF-8 encoding for foreign characters, so some legacy programs may save the file in ANSI format. If your older .RAC file has accents or other diacritic marks, please check the import.

Different types of races

Below are a listing of the basic race types and their limits. However, there are a variety of creative ways to use these race types for interesting events. An [separate document has been created here](#) that describes some interesting cases.

Singles (Individual) Race

A “single” race is a very basic individual race between multiple athletes each sitting on their own Erg (SkiErg, RowErg, or BikeErg) for the duration of the race. The length of the race can be:

- Distance (such as 2000m) - the ‘score’ will be time
- Time (such as 4 minutes) - The score is meters. (ErgRace 1.04.10 and above under certain conditions will allow a time race with score of Calories -- must have PM5’s updated to latest -- see release notes at top of document or contact Scott at Concept2).
- Calories (such as 50 calories) - the score will be time

Limits: Individual races can be...

- Distance race between 100m and 50,000m with splits, longer distance races will not use splits (just a total).
- Time race with more than 60 seconds, however if time of the race is more than 4 hours, it will not use splits (just a total).
- Calories: more than 10 calories

There can be a maximum of 30 splits for any race system with PM3 or PM4 monitors; and it is possible to have a maximum of 50 splits if only PM5’s with up to date firmware are in use. Long races will not use splits.

 Note: ErgRace version 1.01.12 and above allow for longer races, however splits will not be available over 50,000m. Warning: ErgRace version below 1.01.12 should not be used for long races with any PM3 or PM4 monitors.

 Note: Many of the PM3/4/5 firmwares will not display the proper number of meters when greater than 65535 meters. If it seems strangely small, this is probably why. If this is of big concern, use PM5's and get the latest Beta firmware (ie RowErg firmware 168 or above)

Handling Empty Lanes:

Tip: Entry of the word “EMPTY” in the “Name” field is an indication to the ErgRace software that no one will be in this lane. The effect of entering EMPTY will be that the lane will not be shown on the race display. This is useful for setups that have a large number of Ergs but only a few people participating and all the empty lanes will ‘clutter’ the race display. However, if you DO want the lane to be shown, enter something other than EMPTY, for example ‘Lane 12’ or ‘-’ or ‘empty’.

Single Individual Race Advanced features:

Clicking on the **Add ID and Class >>** button provides the opportunity to use some advanced features in ErgRace:

The “**ID**” field will allow you to enter up to 4 character country code or other affiliation code. This information is passed to the results files and is primarily used to display the country or affiliation on the race display. You do not need to use the ID field, it can be left blank. The ID field is NOT used for anything other than the display, it is not presented in results nor used for any scoring purposes.

Using the “**Class**” field allows you to run more than one group of athletes at the same time. For example, you may have 20 Ergs attached and have 12 women and 8 men. To give out first, second, and third place awards to the top women and men, type in “Men” and “Women” into the appropriate rows. Then the Men and Women will be grouped together on the displays and each get a first, second, third place.

Using Classes can be complex and confusing when viewing the race. Concept2 recommends the use of as few classes per race as possible. There is a maximum of 10 classes supported in any race.

Class names should be kept short to ensure that it can be displayed on the Race Display screen. For example “M50-59 LW” is preferable compared to “Men’s 50-59 Lightweight”

The race organizer is urged to consider reading [this article about Seeding and Seating athletes in ErgRace events](#).

Relay Races

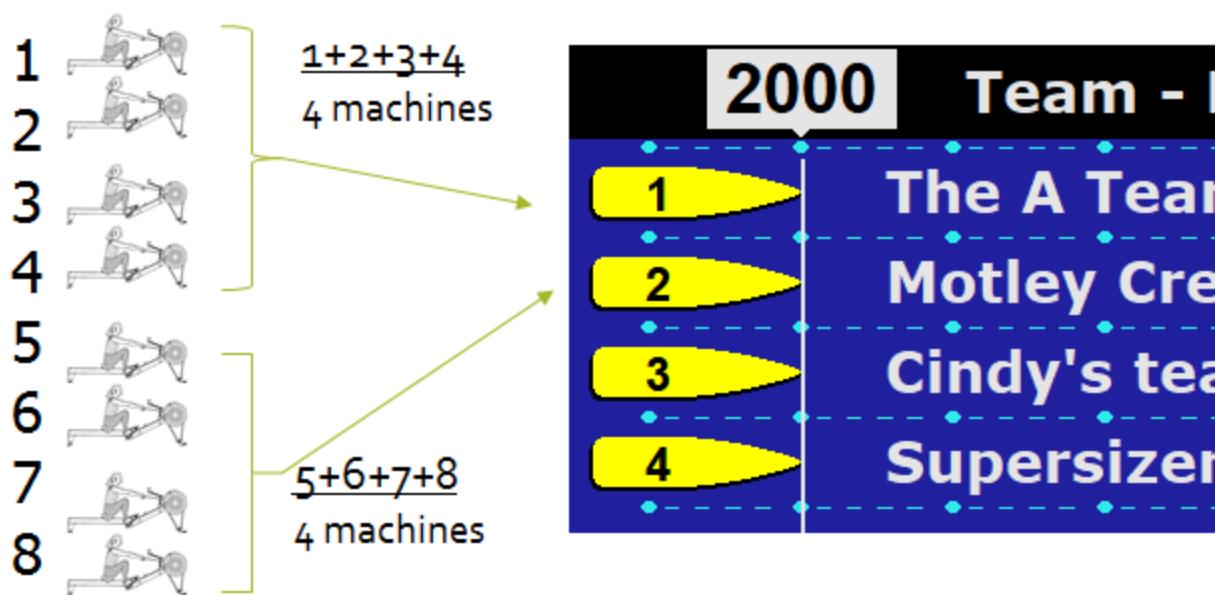
In Concept2's terminology, a Relay Race is where multiple athletes alternately use one Ergometer during the course of a race. Participants get on and off at prescribed times or meters or calories.

Although there is a placeholder for Relay Races in the ErgRace main menu, this has not been specifically implemented as a different type of race. As a workaround, please use Individual Race and the rules (and prompts from officials) will suffice to have team members change at the right times.

Team Race

In a team race, each athlete will be on their own Erg, but the ‘team’ score is the sum (or average) of the efforts of the entire team.

Example1: There are 32 RowErg’s connected numbered 1-32. There are four teams, each team consists of 8 athletes. The first team sits on RowErg #1, #2, etc. to #8. The second team sits on #9..16, the third team on 17-24, and the last team sits on RowErg #25 to 32. The option for “Average” is selected as if this were an 8 on the water. A distance race is set up for 2000m. The ErgRace software computes the average of the meters accumulated by Erg #1, 2, 3, and 4 and moves the “boat” along based on the average meters. The meters to go displayed on the PM will also reflect the average meters. To be clear, the meters on the PM will NOT reflect the individual user’s meters but the team meters. All of the rest of the display on the PM (such as stroke rate, average pace, etc.) will be the individuals personal performance.



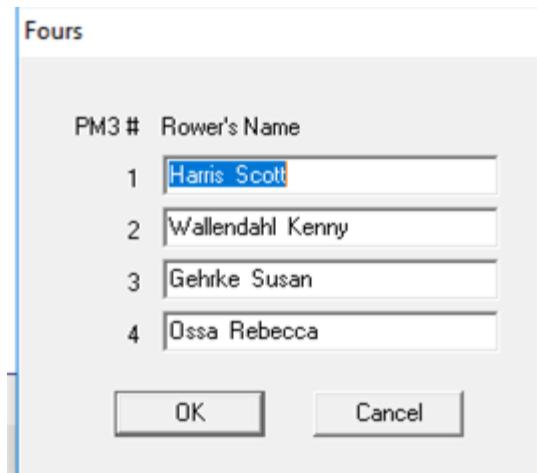
Example2: There are 5 SkiErgs, 5 BikeErgs, and 5 RowErgs connected to ErgRace software. They are numbered in rotation, ie Ski, Bike, Row, Ski, Bike, Row, etc. A “Team race” is set up for 4000m; 3 ergs/team, the setting is set to “SUM”, and 5 team names are entered. There are 5 participants in this race. Each of the 5 participants will start on the BikeErg and go for 2000m before moving to the RowErg. When the meters gets to 1000m they will move to the SkiErg to finish the race.

Tracking individuals in a team race

For the most part, ErgRace places importance on the “Team Results” and not on individual results. Only the Team Name is shown on the Viewers shown to the audience, and only the team name is shown on the PM5’s when athletes sit down on the Ergs. However, if tracking individual athlete’s performance during a team race is important to an event, ErgRace software

does track each participants progress. In the race creator, you may click the advanced >>

button and click on the button labeled “Athletes” and enter the names



Similarly, imported Race Files can contain individual athlete information. Results files will contain the athletes individual results.

A few notes are in order about team racing in general:

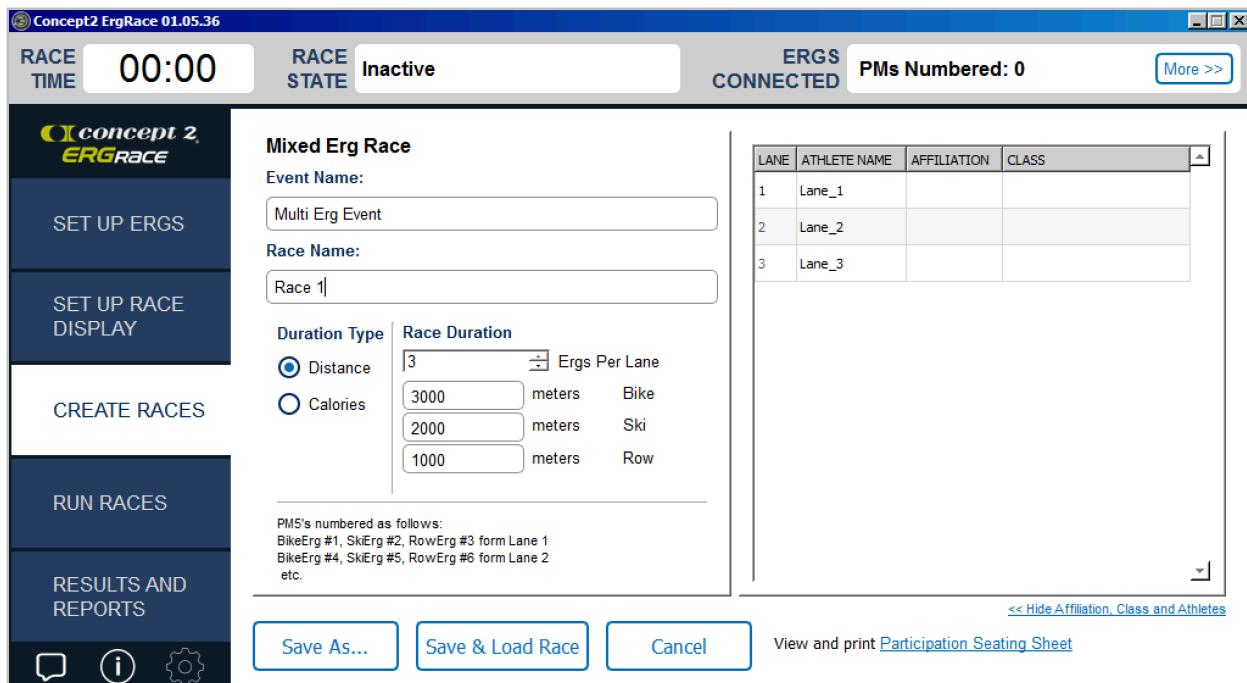
1. It is up to the race organizer to get the right athletes on the right machines.
2. In a team race of “Distance” or “Calories” -- some athletes will go further than others. For example in a team of 2 with a goal of 2000m, one athlete may go 1990m and the other 2010 for an average score of 2000. Similarly, all participants may go a bit longer (in time) than expected when reviewing the “Detailed Data” stored in the PM3/4/5 as the computer is figuring out when the ‘team’ has passed the finish line. There is a small delay (typically 0.5 to 2.5 seconds) to notify all the monitors that they are ‘Done’ -- so they will go ‘over’ in time/meters/calories just a bit.
3. With many Ergs attached, there is a slightly larger inaccuracy in the team race final score due to the time it takes to poll all the monitors. Concept2’s ErgRace software does what it can to minimize these discrepancies but it is not perfect. To improve accuracy, use multiple “Primary” monitors when using large numbers of machines.
4. Unlike simple time and distance races the computer (not the PM3/4/5) determines when the race is over. The individual results provided by ErgRace will NOT exactly match the results stored in memory of each individual Erg. Further, if the computer is no longer

connected due to a computer problem or connection issue, the race cannot complete properly.

Mixed-Erg Individual Race

A Mixed-Erg Individual race (and the similar pre-set [Ergathlon](#) race) allows for an individual athlete to use multiple machines in sequence.

A typical example of this is illustrated in the following example:



BikeErg #1, SkiErg #2, RowErg #3 would be used by Joe, and BikeErg #4, SkiErg #5, and RowErg #6 would be used by Scott, and Ted uses the remaining erg #7,8,9.

Each of the 3 participants will start with the Bike and will cycle for 3000m. The BikeErg monitor will count from 3000m down to 0m. Then each athlete will move on to their SkiErg and count down from 2000m to 0m. Last, each athlete will get on their Rower and the meters will count down from 1000 to 0m.

The Audience Display in this case will show three lanes with 6000m (the total distance) and show meter markers going down to 0m. Time will count up and reflect the total time to do all sequences.

(As of version 1.1.0) results are only the complete time to perform the race. Future editions will report time to complete each machine segment and a total of the ‘transition time’ between machines.

Mixed-Erg races are currently only Distance or Calories. Time based Mixed-erg races are problematic due to the time transitioning between machines -- it is unclear the best and fair way to handle this situation. Feedback on this point? Please write to info@concept2.com with the subject of “ErgRace Mixed-Erg Time based race comments”.

Ergathlon:

Same as above “Multi Erg Individual Race”, but select from preset distances to match the PM5 “Ergathlon” distances for convenience of setup. (Not done yet, but you can still setup an Ergathlon using the correct distances).

Biathlon

Biathlon is a race where the athlete will do some work on an Erg (called the “leg”), then do something else such as target shooting for a period of time (called “Range time”), and then return to do some more Erg work. This cycle may repeat several times. The final score is the total amount of time spent on the event -- the sum of all the leg and range times.

Concept2’s current implementation of the Biathlon only allows for Legs to be Meters or Calories. At this time Concept2 is not able to understand a good path for having Biathlons with TIME (score of meters or calories) to be used for a multi-segment piece like this. The implementation is restricted to 2 to 5 segments of ‘range time’.

NOTE: If if you have feedback, more segments are needed, or have ideas on how a “time biathlon could be work and be fair, please write to info@concept2.com).

 Requires PM5’s with updated firmware. Plan to update your PM5’s to firmware version >168.

 Biathlon is new feature first introduced in available in v1.2.0 and available upon speical request to Concept2.

 As of 4/18/2019, the Biathlon feature has not been used or tested extensively, please try it in your situation before committing to a large or important event. Not for use with older PM5, PM4, or PM3 monitors. The “range time” may not be more than 10 minutes or there will be trouble (known issue).

Pursuit Race

A pursuit race (formerly called “PaceRace”) has a ‘paceboat’ that pursues the athletes. Any athletes passed are then ‘done’ and out of the race. See [here](#) for a more complete description and how-to.

Group Mode

Group mode allows for a simple ‘group workout’ to occur and the ability to reset all the ergs to some standard workout formats:

- Just Row
- Pre-Selected Fixed Time pieces
- Pre- Selected Fixed Distance pieces

The use case for this is for certain ‘events’ (such as Hyrox) where the scores of everyone are desired to go to a central non-Concept2 scoring system, and the ability to reset/control the ergs, but not have a ‘race start’.

As of this writing (3/17/2025) there is telemetry of the results available in the JSON/Socket connection however no display/leaderboard/etc has been considered yet. Contact Concept2 for more information.

Start Sequence (all race types)

Before the race starts

Before the race starts, the athlete will be shown a screen similar to below:

For convenience, the athlete is shown:

- The helpful message “OK to warm up”
- The lane (erg) number
- A portion of their name (long names will be truncated)
- A portion of the race name (long names will be truncated)
- The drag factor (no button pressing is necessary, just take a few strokes)

The units shown will be set appropriately for the type of race. NOTE: Concept2 has chosen to set the units for each race type per our best recommendation, however if a different unit is desired check in the “Settings” of ErgRace.

None of the buttons on the screen will work except the UNITS button. The ErgRace and PM5 will allow the user to press the UNITS button to choose different units during Warm Up, during the race itself, and also after the race is over. The UNITS button is disabled during the start sequence.

Race Start Methods

When starting a race, there are a variety of ‘Race Start’ methods that can be used. They are listed from most common to least used. For official Concept2 regattas, Random start should be used.

In general, the flywheels have to be ‘stopped’ (or spinning at a very low RPM) for the ErgRace software to allow a start to occur. This prevents an unfair advantage by having some momentum in the flywheel before the start of the race. The “Start” button will be disabled until this occurs. See also '[false start](#)' information below.

Random Start

The Random start is the most commonly used and recommended start sequence.

In a random start, a button on the control panel is used to move from “OK to Warm Up” to “Prepare to start”. Once all flywheels have slowed or stopped, the button will allow a “Start Race”. At this time, the monitors will, in sync with each other, move to Sit Ready, then Attention, to “Row” (RowErg) or “Go” (BikeErg or SkiErg). At the moment Go or Row is shown, the time

clock for the event has then started. Human reaction time is measured, if the athlete delays in starting the clock has already started and this will cause a worse ‘score’. If the athlete starts before the ROW or GO is shown, this will cause a “[False Start](#)”.

The Random start utilizes a random amount of time between each of the stages “Sit Ready” “Attention” and “ROW” or “GO” so as to reduce the chance of athletes predicting the start which tends to cause more false starts.

The next page is a printable flyer that can be used to educate athletes new to ErgRacing.

Race Start Audio

At the moment of “Sit Ready”, “Attention” “go” and “False start” - there are sounds produced by the viewer. If these are not desired, turn off the audio on the display devices (TV, etc.). See also [Audio Troubleshooting](#) section if it is not working. Concept2 suggests only connecting PA system to ONE viewer as multiple viewers may not be exactly in sync.

PM3/PM4/PM5 VIEW DURING THE START SEQUENCE

When all rowers are at the sit ready position, the starter will begin the START SEQUENCE

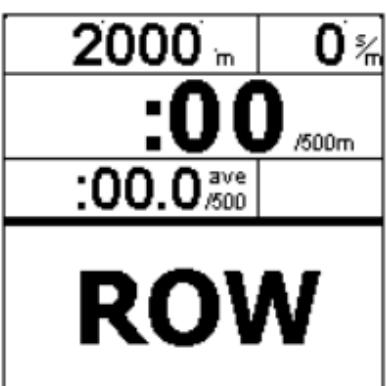


This is the first screen that will show on your PM3/PM4/PM5 display.



Followed pretty quickly by this one.

There is a random time delay of one to two seconds between **Attention** and **ROW**.



Begin rowing when **ROW** is visible on your display. If you start early the computer will false start you.

Time races will look a little different...



Modified Random

Same as the “Random” above, however an additional button press is required to proceed past the “Sit Ready” state. This is sometimes used in large races with a large number of machines to step participants through the start sequence and ensure handles are at the ready.

False Starts

A false start occurs when a user pulls on the handle too early and the flywheel is accelerated above a certain threshold. A good way to reduce false starts is to use the Random or Modified Random start type and give athletes good instructions.

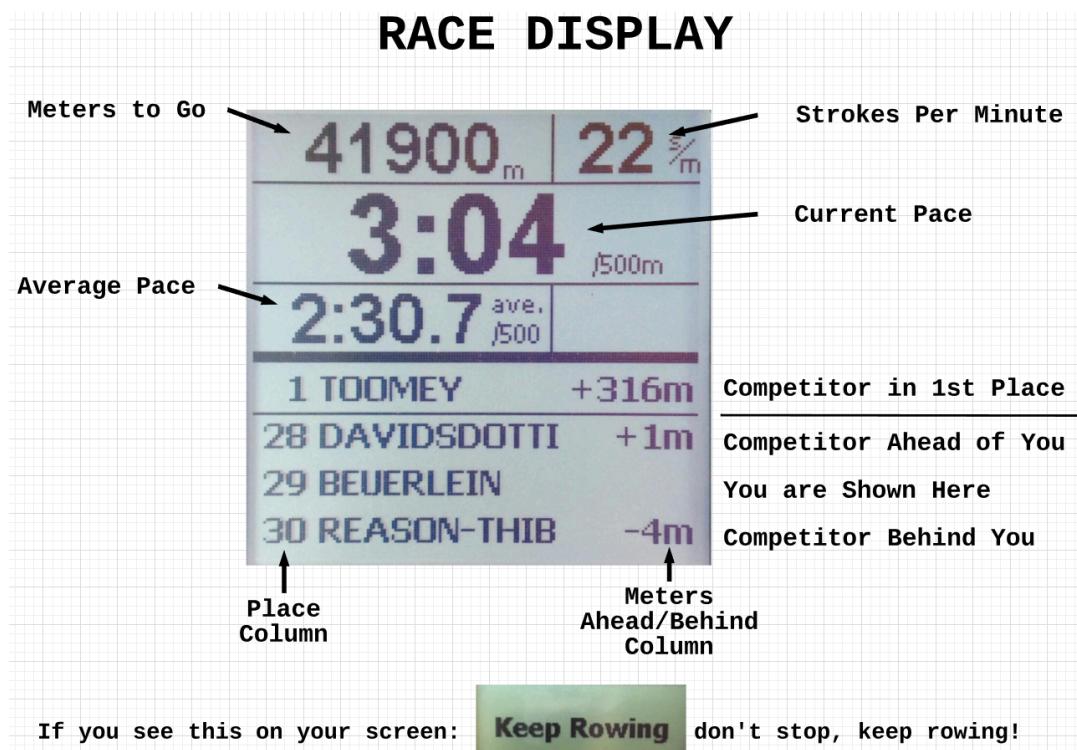
Each event organizer may decide on their own local rules, however it is typical to remove a person from the race event if they have personally caused 2 false starts.

When false starts occur, the false starting lane number is available for display to the audience, and is also shown on the PM3/4/5 so that it is public knowledge who the offending athlete(s) are. Wait for flywheels to slow and stop before starting the race again. The ErgRace software will guide you through the process.

During the race

During the race, the ErgRace software will show the status

What the athlete sees during the race:



Units seen

During the race, the top half of the screen will show the common performance monitor information. The athlete may change the UNITS from ave/500m -> watts -> calories -> meters & time during the race.

Units seen on the performance monitor are set automatically by ErgRace software to be appropriate for the type of race. To change or disable this feature, look in [SETTINGS](#).

Final Result:

At the end of the race, the final result will be shown. Depending on units, it may be shown on the top half, but it should always be shown in the lower half. Please note: Extremely long races may have most-significant digits removed.

Example of end of a time race:

:00	43	%
1:33		/500m
1:43.5	ave.	/500
1 Scott Davids	1443m	
3 Teddy Hamil	1178m	
4 Paul George	1159m	
5 Nathan Carl	803m	

Example of end of a distance race:

(Add screenshot here!)

Other Competitors

If the race has more than one [class](#) in it, the athletes shown on the monitor, and their position, will only be the other athletes in the same class. Please note that the audience display will show all participants color coded with their class.

Automatic collection of results

ErgRace software will attempt to automatically collect all results. If cables or other connections are broken or a monitor is damaged this may not be possible. Assuming all systems are normal:

Time Race: After a time based race is over, all results will be collected automatically and available within a few seconds.

Distance and Calorie: For Distance and Calorie based races results will be collected automatically when all Ergs have completed their distance. Ergs that have not been used at all (i.e. have not accumulated ANY meters) will not be counted. If there is at least one Erg that has counted some meters or calories and has stopped, the race will not automatically close. You may receive a message "Remaining Ergs appear to have stopped" as a prompt you may wish to STOP the race.

Note: Before stopping a race, you should check to see if there are a few stragglers that are just taking a quick break and plan to continue.

Team Race: Please note that Team races must remain connected to ErgRace in order for the race to finish properly. The ErgRace software determines the end of the race, not the performance monitors.

Stop Race

The “Stop Race” button may be pressed to cancel the race, and results or partial results (if any) will be collected. You will be prompted to confirm stopping the race.

Ties

Ties will be declared between two individuals or teams if the time is the same to 0.1s; 1m; or 1 calorie.

Places

In the event that two athletes tie for a place they will be awarded the same rank, and the next athlete to finish behind them will occupy the same rank plus two places, with the subsequent athletes ranked in order of finishing. Please note this is consistent with legacy VRA app and the method is consistent with some other sportss uch as [rules for Triathlon](#) section 2.11b)

Results on the PM5

When the race is over, the final result will be on the PM5. The DISPLAY button may then be pressed to show the splits, and UNITS to change units. Please note that meters in each of the splits may not add exactly to the final number of meters as there is some rounding/truncation.

Manually collecting results:

While Concept2 does everything possible to ensure that results are collected, there are times when a cable gets broken or Windows crashes or some other unexpected event occurs. Race organizers should be prepared with contingency plans should something in the computer or connections go wrong and ErgRace does not collect results. Some tips for NON-TEAM races:

1. Depending on when the fault happened, consider to use your phone to take a picture of the Race Display screen to capture some or most of the results. Do this before loading the next race or taking any other corrective actions.
2. Consider having printed ‘Participation Seating Sheets’ printed out. There is a convenient blank spot for manually collecting results. Or, some race organizers have individual cards for each participant.
3. Know where to find the final result on the monitor:
 - a. Typically on the bottom half of the display the 2nd line from the bottom will have the athlete’s name and a final result.
 - b. You may be able to press DISPLAY button to see splits and final result.

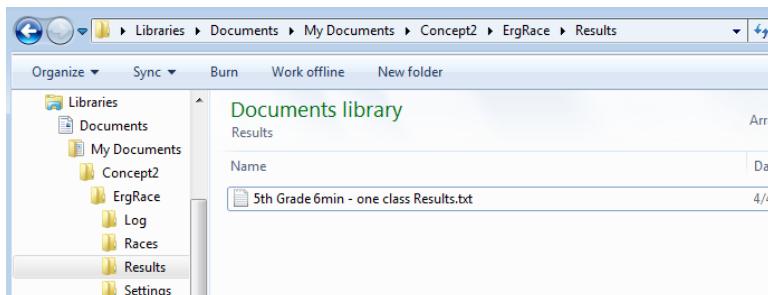
- c. Their final score should also be on the top ½ of the display, but you may need to press UNITS a few times to get to the correct units for your race. Make sure you do NOT write down “Ave /500” or “/500” (current stroke pace) times!
- 4. Collect all the results possible before taking any corrective actions with the ErgRace software such as restarting the app, or rebooting the computer.
- 5. Clicking the [More >>](#) button may show you some results on the race control computer; or more to the point the results up to the point of failure. Consider taking a picture of it.

Race Results Files

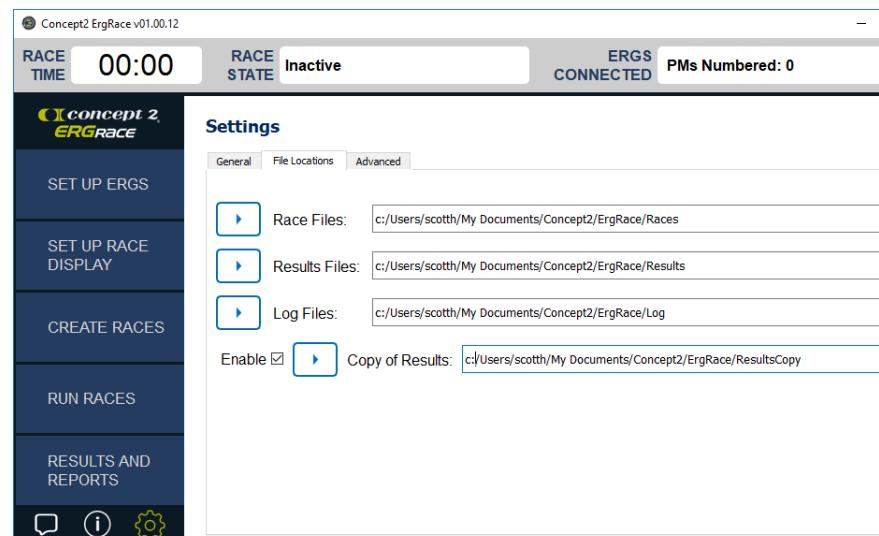
Several files are created:

- ErgRace results in JSON format. See information here: [file format](#).
- Legacy Venue Race (VRA) compatible files only for Time, Distance, and Team races
 - Results file
 - Splits file
 - STROKE data is NOT created.

By default, results files may be found in your Documents folder under /Documents/Concept2/ErgRace/Results for example:



In Settings, you can change the location of the results files however Concept2 strongly recommends leaving the file locations where the installer decided to put them - an example is shown below. Concept2 does NOT recommend saving results to any type of network drive or removable storage. If you need your results to get put on a network drive or portable drive, use the “Copy of results” feature and select where you want them to go. This way you will



always have the results stored in the normal place if the network or portable drive fails. .

Displaying and printing results

From the ErgRace screen, click on “Results and Reports”. You should see a report of the last race run. If not or if you wish to review a previous race, click on “Open Previous Results” and choose the result file you are interested in.

You can change from a “Summary” report or a “Detailed” report that also shows splits and other details.

To print the report, click the “Printer”  icon

 Note:  Export to Spreadsheet (XLSX) if shown does not work. To import into Excel, look in the results folder for results with .txt extension. Rename the file to CSV and Excel should import them.

Merge Results

If you have multiple heats of one class of race, you may use the “Merge” button. After clicking “Merge” you can either:

1. Click on ONE additional file to merge into the currently loaded results file, or
2. Click on Two or More files and those (and only those) files will be merged together.

When the merge is complete, you may save the merged results file. The source files will not be changed.

Please note that the CLASS NAMES must match perfectly for them to be merged properly. If you have a class called ‘mens’ and another called “Mens” they will not be merged.

Please also note that the Merge feature does NOT check to ensure you are comparing the same length race. For example, it will allow you to merge a 1K and 2K race together and sort based on final time. This is of course pretty much useless...

Detailed results discrepancies:

It should be noted that the sum of all the split distances and/or time may not exactly add up to the final result. This is normal and is a result of rounding/truncating of the splits as they are recorded. The “Final Result” is the correct value to be used for scoring in an Erg Race.

Biathlon reporting accuracy and differences from PM log

With regard to detailed reporting on biathlon, there will inevitably be questions on why data doesn't match between the PM log and ErgRace report, and also why the finish times on the report don't always equal the sum of the pieces in the detail section.

Explanation:

1. Why the PM “Total Time” number doesn't match the finish time in ErgRace

During a biathlon event, the PM is providing to ErgRace real time split and rest information that is accurate to .1 sec. However the PM stores rest information in its internal log only to 1 second resolution. So when the PM displays the Total Time it can be off by a second or more.

2. Why the ErgRace finish time on the report doesn't always equal the sum of the splits (row and shooting times).

ErgRace has split information that is accurate to .1 but truncates values that it displays in order to match the numbers on the PM log display. This can result in the finish time being higher than the sum of the pieces by as much as .2 per biathlon segment, or worst case 1 second for a 5-segment biathlon.

Custom Reports

It is possible to modify the reports to customize titles, localize for your language, or add a sponsor or event logo. At this time this is a manual process of using NCReport format editor. The report editor is not currently included with ErgRace installation but it can be obtained by contacting Scott at Concept2. No support is provided by Concept2 for custom reports-- we suggest making a backup of the report formats before changing the report format.

ErgRace Settings:

Ergrace settings can change certain behaviors of ErgRace. Most of the time, it is best to leave the defaults set. To get to settings, click the “Gear” icon.

Settings - General - Race Start Type:

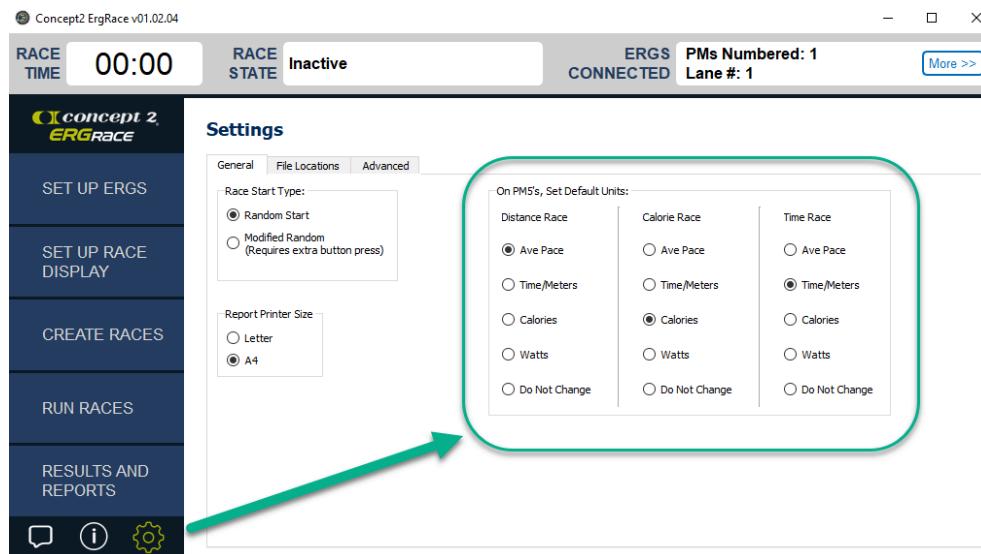
Race Start Type can be changed as desired. Larger races may desire to have an extra button press to get the race started for more control.

Settings - General - Report page size:

Report size is dependent on your location and avoid printers complaining of the wrong paper size.

Settings - General - Performance Monitor Units:

Concept2 has chosen what we believe are appropriate units for the athlete for each type of race. These units will be set each time you load a race. The Athlete can change after the race is over if desired. In Settings, you can change the default units, or choose to disable the 'reset' of units.



Settings - File Locations:

Concept2 does not recommend changing the location of the file locations. If you plan to change these, Concept2 strongly recommends NOT setting these locations to a network location that could become disconnected. Concept2 is not responsible for lost results. If you need results sent to a network location, please check the "Enable" box for a copy of the results, and choose the destination for the files. ErgRace will save the results in the /Results folder first, then make a copy in the "Copy" location.

Settings - Advanced - Diagnostic log files

Concept2 collects diagnostic files to assist with diagnosing problems and product improvement. If you do not wish files to be sent due to privacy or internet connection limitations, please uncheck the Upload Diagnostic Logs to Concept2 Server. There is a button for sending the files manually at your convenience.

Settings - Advanced - Start delays

Concept2 does not recommend changing these values. These are the minimum and maximum random times between Ready and Attention, and between Attention and Start. If you do not want a random time, set the minimum and maximum to the same values. Concept2 does not recommend setting these values to zero (this is untested), but small numbers can be used for an 'almost instant start' (please test in your situation!). The values are in MS (Milliseconds), so 2000 Milliseconds = 2 seconds.

Closing the ErgRace App

When you are done for the day, you should close the ErgRace app. When you close the app, you may be presented with this dialog box:



CANCEL will leave you still in the ErgRace app.

Answering YES is suggested, this will put the monitors back on the Main Menu and allow them to power down after a few minutes.

Answering NO will leave them on the Race screen. This is useful if you just need to switch computers, install a new version of software, or if something else is wrong. The monitors will stay on for 30+ more minutes.

If you close ErgRace and say NO but still want to get the monitors back to the main menu, OR if someone has started removing cables, you can also remove/replace one of the batteries, or "reset" the monitor using a thin object in the reset hole in the back of the PM5.

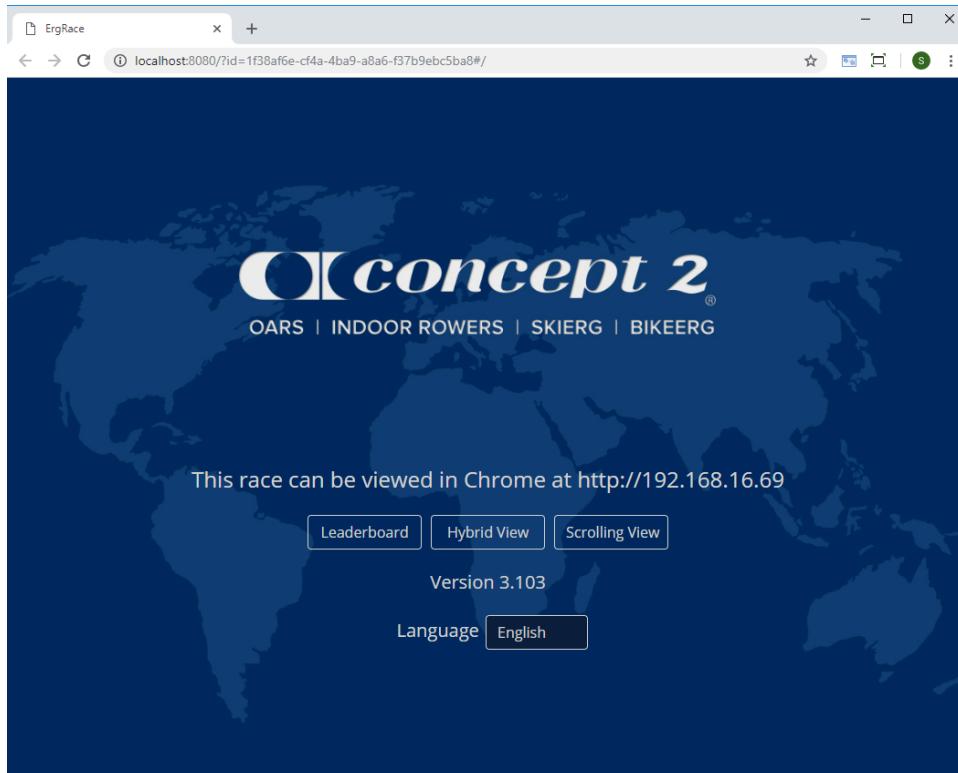
Race Display

The race in progress can be viewed in the following configurations:

- On the race computer screen
- On the race computer “extended desktop”
- On a jumbo screen or projector connected through the race computer
- On an additional computer that is networked with the race computer
- On a mobile phone or tablet

The simplest approach to be able to see a view of the race is to launch a ‘race viewer’ on the race computer:

- 1) Ensure Firefox or Chrome is installed.
- 2) Confirm that Firefox or Chrome is the default browser ([click here for instructions](#) on how to do this and why)
- 3) Click the “Launch Race Display” button in the ErgRace app. You should see something similar to this:



If you are planning to view the race on additional computers make note of the URL that is presented on the page (as shown above **http://192.168.16.69:8080**).

- 4) Select “**Hybrid View**”
- 5) To put the graphic on an external monitor or projector:
 - a) Physically connect the monitor or Jumbo screen to the computer using VGA or HDMI cables

- b) Hold down the WIN  button and then tap P; then choose “Extended desktop”
- c) Drag the browser window to the 2nd desktop.
- d) Press F11 to make the ‘view’ full screen

Advanced display options:

Concept2 engineers have carefully chosen most options that are recommended, however every race and display is different. If you have need to make any changes, please contact Concept2 (info@concept2.com or +1 802 888-7971) for assistance.

Viewing the race on additional computers - Local Network

Viewing the race on Additional computers may be desirable, and will even allow having different views of the race shown. For example, the announcer/commentator may want to see the leaderboard while the boat race graphic is shown on a jumbo screen.

1. The additional computer must be on the same network as the race computer and must have firefox or Chrome browser.
2. Type in the URL for the race viewing web page. (Remember this was presented on the race viewing web page.)

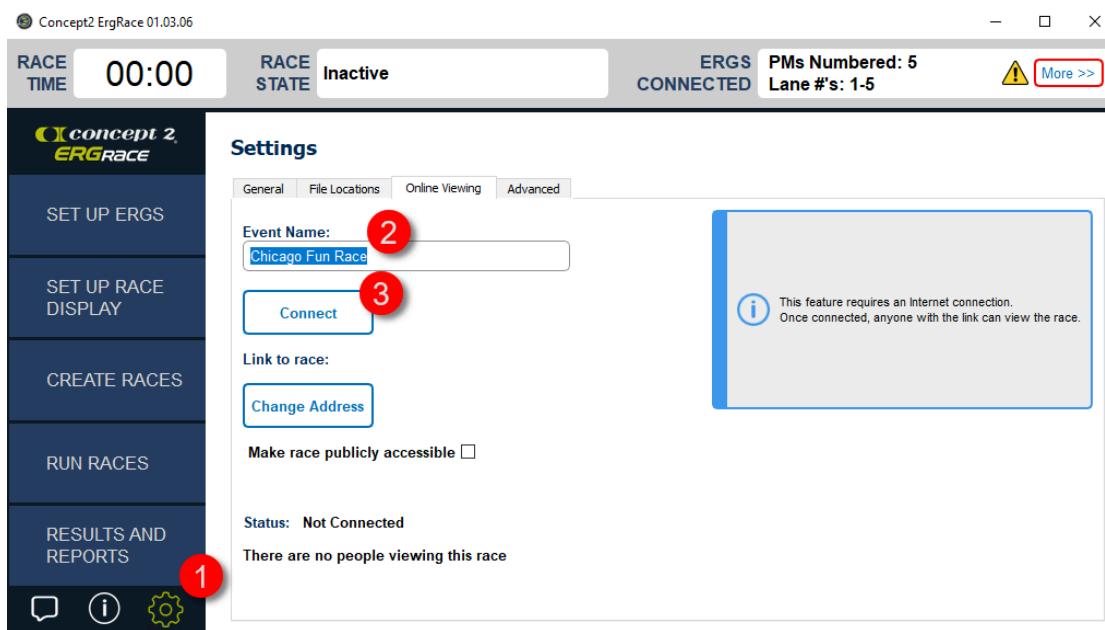
This race can be viewed in Chrome at <http://192.168.16.57:8080>

3. Choose the view that you wish to see. Move it as needed to the projector / large TV, etc. and press F11 to make it full screen.
4. Concept2 recommends no more than 10 additional computers be added to the race viewing system.

Viewing the race on additional computers - Worldwide via Internet

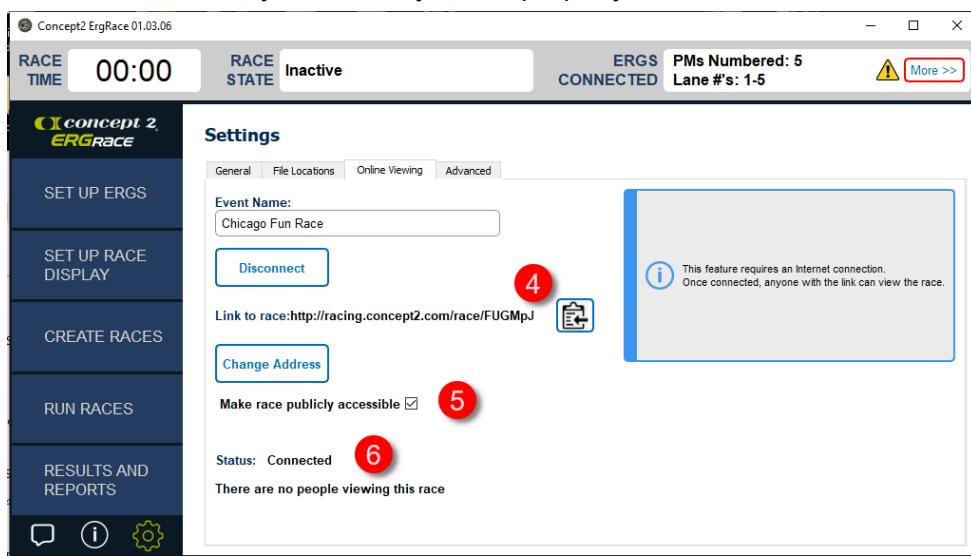
If you have an internet connection (and ErgRace version 1.03.06 or above), you can use Concept2's server to view the race live through the internet. This feature is 'new' and is not yet optimized for tablets or public use but available for use and Concept2 appreciates any feedback.

1. Click on the SETTINGS button
2. Type in the name of your event, such as "Chicago Fun Race" or "World Championships". This title helps viewers know what race they are watching.
3. Click the "Connect" button.



4. Note that a URL (web link) is shown. This can be given to people who wish to view the race. To send the link to someone else, click the icon nearby and it will be in your 'paste buffer' so you can go to email or twitter or facebook and post the link.
5. If desired, check the box "Make race publicly available".
 - a. If not checked, only the URL can be used to find the race.
 - b. If checked, it will show up in a list of races at racing.concept2.com.

6. The “Status” will let you know if you are properly connected to the internet.



Display “viewer” Options:

Leaderboard:

Shows a basic table of results

Hybrid view:

Concept2's recommended display. The display will attempt to show as many participants as possible based on the display available. When there are more than 18 participants, some will be shown in a 'table' format at the bottom. The fastest participants will be sorted to the top of the display.

INDIVIDUAL					concept 2 ERGRace	1st: 1469m	0:04
PL	NAME	LANE	GAP	CUR. PACE	1500m	1450m	1400m
	LANE_1	1	-	2:47	1		
	LANE_2	2	-	1:42	2		
	LANE_3	3	-	1:11	3		
	LANE_4	4	-	1:11	4		

Scrolling view:

Will show basic information and boats for the first 18 participants. More can be seen by scrolling up and down using a mouse scroll-wheel or trying the up/down arrows.

Other ways of looking at the real time data:

Because the data is available through a web socket, it is possible to create custom displays. Web developers can evaluate the data provided using [this documentation](#).

Viewer AUDIO troubleshooting:

The viewer should have sounds “Sit ready” “Attention” & horn sounds available. If you do not want them, turn the sound down on the TV/Laptop. If you want them and are not working, please see if there is a “Speaker” icon somewhere on the Chrome browser. If there is, click on it. If this does not work, please contact Scott or Mike at Concept2 for support.

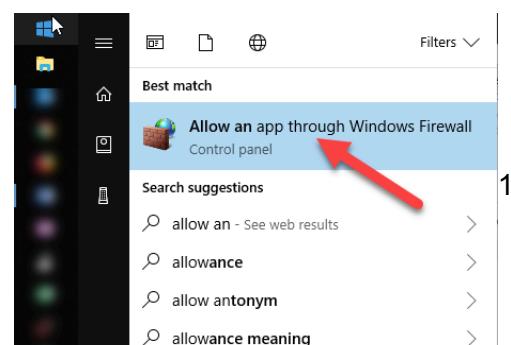
Viewer troubleshooting on a local computer:

If you get a 404 error, please update to latest version which should correct the issue. If this does not work, the Chrome browser cannot find the files it is expecting from HTDOCS folder. Search for /htdocs folder under C:\Program Files (x86)\Concept2\ErgRace or C:\Program Files\Concept2\ErgRace, and copy the folder to %appdata%\Concept2\ErgRace. Contact Scott at Concept2 for further assistance in performing these steps if needed.

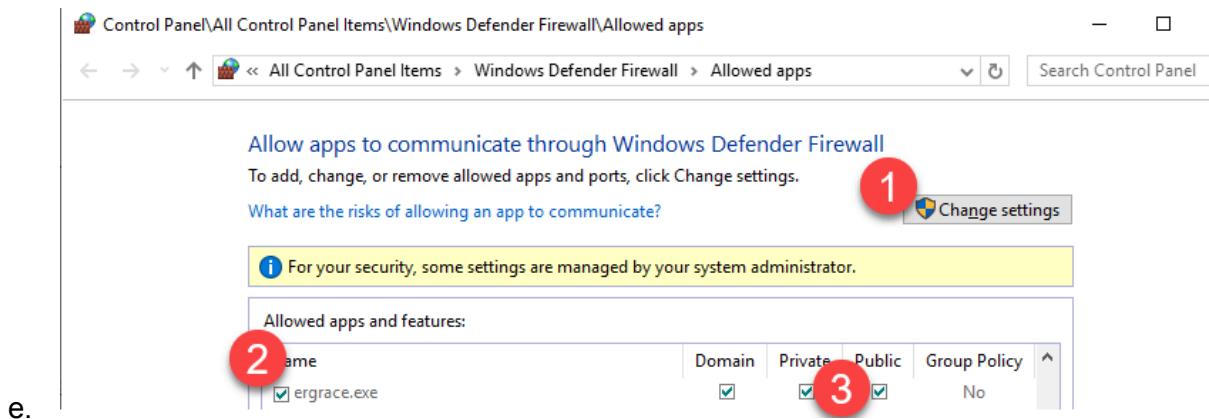
Viewer connection troubleshooting:

If your remote (networked) view computer cannot connect to the ErgRace computer... follow these steps:

1. Click on View, then check the box for remote displays, then click on the ‘restart web server’ link. If you are presented with a few choices, pick the interface that you want to use (ie WiFi or Ethernet).
2. On the remote computer, try pressing CTRL-F5 to force a full refresh of the display.
3. Windows 10:



- a. Click START, then type “Allow an” and select the allow an app through Windows Firewall
- b. Then click “Change Settings”,
- c. “Allow Another App” and find ErgRace. If it is not in the list, you can find it under either /ProgramFiles/Concept2/ErgRace/Ergrace.exe or /ProgramFiles (x86)/Concept2/ErgRace/Ergrace.exe.
- d. Tick all the possible boxes to allow ErgRace to communicate.



Another reason the viewer may not work could be another application on your computer that uses port 443. If you get just the “Race will begin soon” and no boats when you load a race, your best option is to remove any software that is acting as a web server. A workaround is to edit the ‘environment.json’ file to use an alternative port to 443. Try 445 for example.

ErgRace Software System Requirements:

Minimal requirements

- At least 2 Concept2 Performance Monitors: PM3, PM4, or PM5. Concept2 recommends PM5 monitors. Firmware should be up to date
- Update the firmware on all Performance Monitors
- A windows computer with Windows 7, 8.1, or 10. Concept2 recommends Windows 10 or 11 Home or Pro. Computers with Windows in “S” mode will not be able to use ErgRace.
- Dual core i3 minimum with no local viewer. Animated viewers like showing Boats require recent i5 sixth generation or better processor or faster for proper animations.
 - Install ErgRace Software (If it won’t install, please install [this MS component](#)
 - Install Chrome or FireFox
 - Windows RT, XP, 2000, and Vista are NOT supported.

- For important high-profile events, Concept2 recommends certain changes to Windows for the highest reliability. See [Windows computer setup section](#).
- [USB A-B cable](#), the same kind of cable connects a computer to most printers. See
- For PM3's, added USB A-B cables and [USB 2.0 powered hubs](#)
- For PM4 and PM5's, one ethernet cable per PM4 and PM5. Concept2 recommends [5m \(14-15'\) ethernet cables](#).
- For 'race view only' computers, recent generation i5 or equivalent or faster processor is recommended for proper animations.

Optional equipment

- Large TV or projector compatible with the ErgRace Computer
- For added displays:
 - Extra laptop(s) for added display, this could be a Windows, Mac, or Linux computer with Chrome or Firefox. Also some devices can be used such as a Raspberry Pi; ChromeBook; Chrome Stick; Android "TV Box".
 - A projector or TV compatible with the Above
 - A network that can connect to the ErgRace computer. Concept2 recommends wired Ethernet networks, however Wireless (WiFi) can work in most cases. More on how to set up a network [here](#).

Optional services

- Registration services
 - RegattaCentral
- Race management services
 - Time-Team.nl
 - Regatta Master
 - HereNow
 - ErGo

Windows general setup

There are many things that could go wrong in your Windows computer during a race that can be prevented. Please take as many of the steps that follow to ensure the best experience for you and your athletes:

1. Concept2 recommends the Chrome browser though others may also work. Concept2 does not recommend Internet Explorer. To get Chrome, browse to www.chrome.com
2. You will need to ensure that Chrome is your default browser. Click [Here](#) to see how to do this.

3. If using sound (connected to a PA system) to assist with starting, turn off windows sounds -- all the bings and boops that Windows makes when you click somewhere you shouldn't.
4. Turn off all screensavers: Start > Settings > Lock Screen > "Screen saver settings"
5. There is nothing more frustrating than having the computer go to "sleep" in the middle of a race....) so turn off all "Power Save" and "battery management" features in your laptop. Here's an article that may be helpful:
<https://www.itechtics.com/tools-prevent-windows-10-sleeping/>
6. Turn off Windows Update... see the following articles:
 - a. <https://www.makeuseof.com/tag/5-ways-temporarily-turn-off-windows-update-windows-10/>
 - b. <https://www.easeus.com/todo-backup-resource/how-to-stop-windows-10-from-automatically-update.html>
7. The day before a race, do a complete windows update (Check for updates) and apply them. In case the "turn off windows update" step does not work....
8. Disable non-Microsoft Anti-Virus/Malware scans during your race. Re-enable them later.
9. Turn off as many Windows 10 TaskBar popup messages as possible. For basic instructions:
 - a. Click on Start > Settings > System > Notifications & Actions
 - b. Turn off as many as you are comfortable turning off
 - c. Alternatively, see the following articles:
 - i. <https://www.howtogeek.com/269331/how-to-disable-all-of-windows-10s-built-in-advertising/>
 - ii. <https://www.howtogeek.com/279632/how-to-stop-microsoft-edges-pop-up-notifications/>
10. Concept2 suggests setting the "DPI" (Make text larger or smaller) to 100% or 125%.
11. Google Chrome is very demanding on a computer's resources. Use a good PC if possible. Significant demands may be made by Chrome software reporter tool. Consider disabling it:
https://www.ghacks.net/2018/01/20/how-to-block-the-chrome-software-reporter-tool-software_reporter_tool-exe/

Glossary

ErgRace software:

The software that assists with running the race.

ID (Affiliation):

Three alpha-numeric characters that may be used for identifying a participants country or club affiliation. Not required entry. Please note in .RAC2 and Results files, this will be referred to as "Affiliation" however when creating a race or on the race display it is labeled "ID".

ErgRacing:

The activity of racing Concept2 Indoor Rower, SkiErg, and/or BikeErg

Venue Racing software:

The predecessor to this software (www.concept2.com/venuerace)

RowErg:

the [Concept2 Indoor Rower](#)

SkiErg

The [Concept2 SkiErg](#).

BikeErg

The [Concept2 BikeErg](#)

ErgRace computer:

A Windows computer with minimum 2GB ram and dual-core processor. Concept2 recommends a laptop for several reasons.

ErgRace Display Computer:

A separate computer used to display the race. This computer is connected to the ErgRace computer by Ethernet or WiFi to collect the data and display it. This can be a Windows, Mac

OSX, tablet, Chromebox, or other device so long as the browser is up to the task of displaying the race code in HTML5.

Event:

The name of the event, such as “Crash-B 2017” or “Long Beach WIRC” or “British Indoor Rowing Championship”

Flight:

A group of Ergs connected to one ErgRace computer. Some larger events may have more than one Flight.

Class:

Some races may have more than one ‘Class’ or athletes racing at the same time, but scores/places should be separated. For example lane 1-10 may have heavyweight and 11-20 lightweight. There will be a first place winner for heavyweight and a first place winner for lightweight. When other competitors are shown on the PM5 screen, it will only be those competitors in the same class. When shown on an audience display (viewer), they will be grouped together. There can be a maximum of 10 classes in a race.

Race:

A group of Ergs in a Flight connected to an ErgRace computer that start at the same time.

Heat:

Some races may have qualifying Heats in which some athletes advance to the Final of the Race. Or, in a finals only Race, the athletes may be broken up in to several heats as there are more participants than Ergs in the available flights. Races having heats may have one or more time slot for which the event occurs.

Examples:

The Event is...Long Beach WRIC 2019

Race #1 includes men 30 to 39 class and women 30 to 39 class

Race #2 includes heat 1 open men class

Race#3 includes heat 2 open men class

Erg:

Any physical BikeErg, SkiErg, RowErg, etc.

Erg Number:

This is the number given to the erg in your venue when “Number Ergs”. Erg numbers must be sequential and all Ergs need to be numbered. In a singles race and Relay Races the Erg Number is the same as the Lane Number. But for Team, Multi-Erg, and some other formats there may be multiple Ergs that form a “Lane”. It is possible to start at a different number than 1 for the special case of having more than one “system” in the same room, however in most cases you start with erg #1. Remember to number any monitors not mounted to a machine last.

Lane:

For Singles and Relay races, the Lane and Erg Number are the same thing. However, multiple Ergs and multiple people on those Ergs are ‘in a lane’ (or “in a boat”) for some types of races such as “Team” and “Multi-Erg” races. Please see the respective sections of the manual for how this is used. See also “Boat” below.

Boat:

On some displays there is a single “Boat” that moves across the screen to represent the progress of an individual or a team in a particular lane. Roughly equivalent to a “Lane”. The term “Boat” is used regardless of use of BikeErg or SkiErg.

Network:

Multiple computers connected via Ethernet (preferred) or WiFi. Click [here](#) to learn how to set up a network.

Primary monitor:

A “Primary” monitor is attached directly to a computer with a USB cable, all the rest that are connected with Ethernet cables are called “Secondary” monitors. A Primary monitor may be a part of the race (ie installed on a BikeErg, SkiErg or RowErg), or it may be just a spare PM4 or PM5 sitting on a table near the race computer. This is done to allow more distance between the Race computer and the Ergs on the field of play. Primary monitors must be numbered, even if last and will not be a part of the race.

[Note: in legacy Venue Race software this was called “Master” and “Slave” monitors, however this terminology has been deprecated due to concerns over the US historical connotations of this terminology]

Individual Race

Each athlete uses one Ergometer (Indoor Rower/RowErg; SkiErg; or BikeErg) and is competing against other individuals.

Team Race

Multiple athletes efforts are combined together (either traditional Average or as a “Sum”) to produce a score. There may be 2 to 16 athletes in each ‘team’.

Relay Race

Multiple athletes alternately use one Ergometer during the course of a race. Participants get on and off at prescribed times or meters or calories. This is treated similarly to a “Singles” race but with acknowledgement that athletes will be getting on/off, and there are some special features to indicate when it is time to ‘change’ that can be optionally enabled (PM5 recent firmware only).

Triathlon Race (future - not implemented yet)

Use of BikeErg, SkiErg, and RowErg combined into one event. In a time event, typically 3 splits (one split per machine) so competing for total meters or calories. IN a distance event, score is the total of all time spent both on each of the machines and transitioning between them.

Typically 3K on bike, 2k on rower, and 1k on skierg (FACT CHECK!)

False start:

Flywheel movement due to athlete activity during the start sequence and before the “GO” (Row) signal will be declared a ‘false start’ and the race will not continue. Athletes will be instructed on their PM5’s and on viewers to “Stop Rowing” and the flight needs to be restarted.

JSON Live Stream data interface

To facilitate multiple “Audience Displays” and other needs for real-time data during a race, Concept2 ErgRace software provides a way for any local or networked device to collect data through a “Socket” connection. Details can be found here:

https://docs.google.com/document/d/15xtQKiUglUd_b9cAMtC97gdeUUh6HjrqrgEEvzkcLU/edit#heading-h.ce9x3egi4b6b

Race “Viewer”

Using Chrome and a ‘web page’ that has the graphics and connections needed to display (view) the race.

Race file

.RAC file - a file containing athlete information, configuration of the race, etc. created and used by legacy Concept2 Venue Racing App. Limited support is available, but not recommended for use except when older race management software is used.

.RAC2 file - a file containing race configuration and athlete information for a particular event. See file format section of this manual.

RS485

RS485 is a ‘serial’ data connection method used between PM4 and PM5 monitors for racing. There is no ‘standard’ connector for RS485, so Concept2 chose to use RJ45/Ethernet patch cables as they are easily obtained from many sources.

USB

Universal Serial Bus. USB connections are typically made between printers and other devices.

Tie

ErgRace considers a tie to be two athletes getting the same score to within 1m, 1Cal, or 0.1 second.

Place

During and at the end of the race the competitor (or team)’s “Place” may be shown. In the case of a tie, placement numbering will skip some numbers. For example, if there is a 3 way tie for 2nd place, the placement may look like:

- 1 - Joe
- 2 - John
- 2 - Scott
- 2 - Kevin
- 5 - Paul

In the event that two athletes tie for a place they will be awarded the same rank, and the next athlete to finish behind them will occupy the same rank plus two places, with the subsequent athletes ranked in order of finishing. (adapted from [rules for Triathlon](#) section 2.11b)

Gap - The distance (in meters or calories) between this competitor (or team) and the competitor (team) that is just ahead. Gap is not displayed for the leader, during the first moments and last moments of a race.

Resources:

USB Cables

Most laptops will have USB Type A jacks on them. This is the typical USB connector that has been in use for years, the type a typical wired mouse or USB flash drive uses.

Concept2 recommends to use USB 2.0 cables with “A” connector on one end and “B” on other end as shown below.



A possible source of these cables is here: https://www.monoprice.com/product?p_id=5438

Warning: Never use USB cables longer than 15' or 5m total.

Why? USB's electrical design doesn't allow it. When USB was designed, a decision was made to handle the propagation of electromagnetic fields on USB data lines in a way that limited the maximum length of a USB cable to something in the range of 4m. This method has a number of advantages and, since USB is intended for a desktop environment, the range limitations were deemed acceptable. If you're familiar with transmission line theory and want more detail on this topic, take a look at the USB signals section of the [developers FAQ](#).

Warning: Never try to use a USB A to A cable like this one:



Some newer computers and tablets do not have USB type “A” connectors, but the USB Type “C” sockets. If this is the case, you can either use an adapter or a USB C to USB B cable.



Laptop with USB C connections



USB C to A adapter



USB C to USB B cable

Ethernet Cables

Ethernet cables should be Cat 3, 4, 5, 5e, or 6 “Straight through” (not “Crossover”) cables. A possible source for cables is here: https://www.monoprice.com/product?p_id=11382

In most cases, use 14-15' (5m) between Ergs, and 30-35' between rows of Ergs.



Do not connect an ethernet cable between a PM5 and your Ethernet network of the RJ45 connector on a laptop.

How to set up a network for additional view computers

There are many ways to set up a network, and many good references on how to do this.

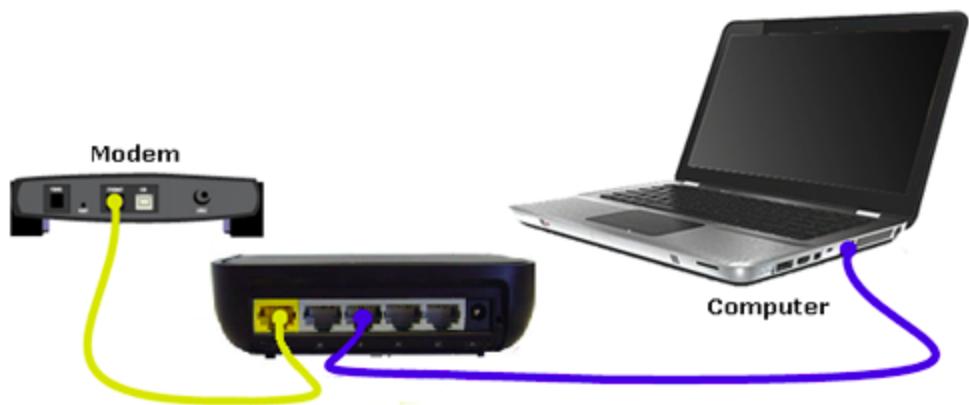
Here are a few links:

<https://stevessmarthomeguide.com/build-home-network/>

<https://www.lifewire.com/setting-up-a-home-network-router-817728>

A few simple ways are described below:

Concept2 recommends having a wired internet connection and wired connection between computers. Concept2 suggests getting a “Router” and connecting all computers to the “LAN” ports, and connecting the “WAN” port to the internet connection. This will keep your network “Private”.



Cable & Connection Troubleshooting

Firmware

Older firmware may not be able to be used with ErgRace. If in doubt, use the concept2.com/utility to update to the latest and try again. One monitor with older firmware (especially if connected directly with a USB cable) may create a situation in which nothing works.

Cable Test Mode

If you are having trouble with connecting all your Ergs (for example using Ethernet cables only some of them get the ? mark, or have trouble getting assigned lanes), here is a procedure you can follow to determine the bad part:

1. Close the ErgRace software, and answer “YES” to put the ergs in Normal mode (ie back to Main Menu).
2. On any PM4 or PM5, choose **More -> Racing -> Help -> Cable Test -> Start**.
(on some older firmware it may be **Games -> Racing -> Help -> Cable Test -> Start**)
3. Observe the rapidly blinking green LED on the back of all the monitors. If some are not blinking, there is a problem. Fully push in cables, replace cables, or replace monitors as needed until they are all blinking.
4. If some are blinking yellow, go back to the first monitor and **STOP** the test, then **START** it again. Verify all are blinking green.
5. For a reliability check, now go wiggle cables - tugging on them and moving them side to side. If the LED's on any change to red or yellow, you may have found a point where there is a cable or connection that is not working so well. Try replacing the cable or PM5 at that connection and try again (previous step) until the system is robust.
6. When finished and satisfied, STOP the test.
7. Wait at least 20 seconds before re-launching the ErgRace software. The monitors should all “Reboot” during this 20 second pause. This reboot in itself may help to solve some issues, this is equivalent to pressing and releasing the reset button in the back of the monitor.

Power Bricks

Sometimes the “Power bricks” (power adapters) for Laptops and other equipment emit wireless “noise”. To prevent problems, keep these power bricks away from the USB and Ethernet cables. A few feet away is sufficient. The worst thing to do is have a coil of excess USB or Ethernet cables and plunk the power brick on top.



Terminators

For many smaller races, terminators are generally not needed. But when the overall ethernet cable length gets long (for example 14' cable times 20 Ergometers is 266' of cable!), then it is recommended to use “Terminators” in any empty PM4/PM5 jacks. Terminators just make the data signal reflect off the end of the wire and back causing data errors. Terminators may be [made](#) or [purchased \(part # 1482\)](#) from Concept2. Some other information is available at the bottom of our legacy [Venue Racing Software](#) page.

Though it is rare, incorrectly manufactured terminators can cause more harm than good: If your system is not working well it is worth testing without one or both terminators to see if this improves anything. But... see [below](#).

Occasionally a terminator is ‘blamed’ for causing problems and it would appear that removing the terminator ‘fixes’ things. But it may also be the case that one of the PM5’s is damaged or not operating properly. See below.

Trouble Numbering Ergs.... Or trouble finding all the Ergs after setup.

If you have trouble numbering the ergs and nothing seems to help, do a “Pinhole Reset” to ALL the monitors. To do this -- gently insert sharp pointy thing (paperclip, etc.) into the back of the PM5’s reset. When you remove the pointy thing, the monitor should reboot to the Main Menu. Close and re-run ErgRace and try again. An alternative is to use the “[Cable Test Mode](#)”. After exiting Cable Test mode about 10 seconds later the PM5’s should reset.

If ErgRace cannot ‘see’ any of the PM5’s (or does so sometimes, and not others) we recommend:

- Reboot the computer
- If you have ASUS computer, see if “Armory Crate” is installed. If so, uninstall. It is known to interfere. ASUS provides special instructions [here](#).
- There are other apps that can interfere with connecting to the PM5. Try another computer, if that works, then some software may be the problem. Contact Scott at Concept2 for assistance.
- Make sure that the Ethernet cables don’t make a loop.
- Make sure that 2 ‘primary’ monitors are not cabled together with ethernet cables.

If you have changed “primary” monitors and numbering is giving you problems, try this:

- Close ErgRace
- Use file explorer to go to Documents, then to the Concept2 folder, then ErgRace folder. Delete the ‘Maps’ folder.
- Run ErgRace again and start over numbering.

Long USB Cables

As mentioned elsewhere in this manual, USB Cables over 15' long generally don't work very well and should be avoided. If you have any cable (or 'passive' extension cables) that make a USB cable over 15' long and are experiencing problems then this is a likely cause. "Active USB Extensions" are ok to use, but again do not purchase or use extensions longer than 16' (5m) long.



Active USB 2.0 Extension



Passive USB Extension

USB Hubs:

Ensure USB hubs are USB 2.0 or USB 3.0/3.1. If more than 3 things are plugged into the hub, it will also require a power adapter plugged into the wall. Don't use too many hubs! Remember, a Active USB extension (above) is also a Hub.

Still having problems?

- Have you followed all the recommendations and still having lots of problems numbering ergs?
- Seemingly Random problems?
- Is "More Status" showing more than 0.1% error rate?
- Getting desperate?

Try one of these two things:

- 1) Exit from ErgRace software.
- 2) Let the monitors all go to 'sleep' (about 4 minutes of 'inactivity') --OR-- use a pointy object to 'reset' each of the monitors.

Still having problems? Simplify the system or "divide and conquer": Cut the system in half and try half. Still have problems? Just try one or two monitors.

How to deal with a broken Ergometer:

If the PM5 monitor is working OK, but something on the Erg breaks, it may be best to remove the monitor from the machine, swap out the machine, then put the monitor on the new machine. By doing this there is no need to renumber Ergs, and the race can continue quickly.

How to deal with a broken Monitor:

Between races, if a broken monitor needs to be replaced, just remove it and install a new monitor. Hook up the cables. Go to the “Advanced Erg Numbering” screens and first click “Discover” followed by “Number Missing Ergs”. The replaced monitor should get a ? and be numbered in the ‘hole’ that was created by the monitor you removed.

👉 If this does not work and you now have problems renumbering, do the following:

- 1) Click “Feedback” and put in your name/email/and ‘problems renumbering when replacing monitor’. This will help Concept2 developers improve the software.
- 2) Go to “Advanced Numbering” and then “Clear Erg Map”.
- 3) Close ErgRace.
- 4) Reset all the monitors one by one with a paperclip.
- 5) Run ErgRace again
- 6) “Number All”

How to quickly change batteries

If you need to change batteries during the day, the best and fastest way is to load a race so the monitors are on the “OK to Warm Up” screen and then just go change the batteries. The monitor will automatically get reattached and all set up without any further intervention.

How to get help if this users manual does not answer your questions....

During business hours, please call [Concept2](#) USA at +1 802 888 7971 and ask for Scott, Mike, or Trevor. If we are not available, our customer service or tech support folks may be able to help or reach us.

ErgRace Crashes when creating a race:

There is a known issue with the “QT” framework which ErgRace is built upon. If copying/pasting data from Excel, the last ROW may not have any blanks in it or ErgRace may crash.

Setup or Event Day urgent help

As an alternative please try Scott Hamilton at +1 802 279 6753. If this is an event day and you need emergency help, please call anytime. If a non-emergency but you are setting up for an event, please limit to 7:00am to 10:00pm East Coast (NYC) time.

You can reach us via email at info@concept2.com and expect a response during business hours, or scotth@concept2.com for after hours urgent support.

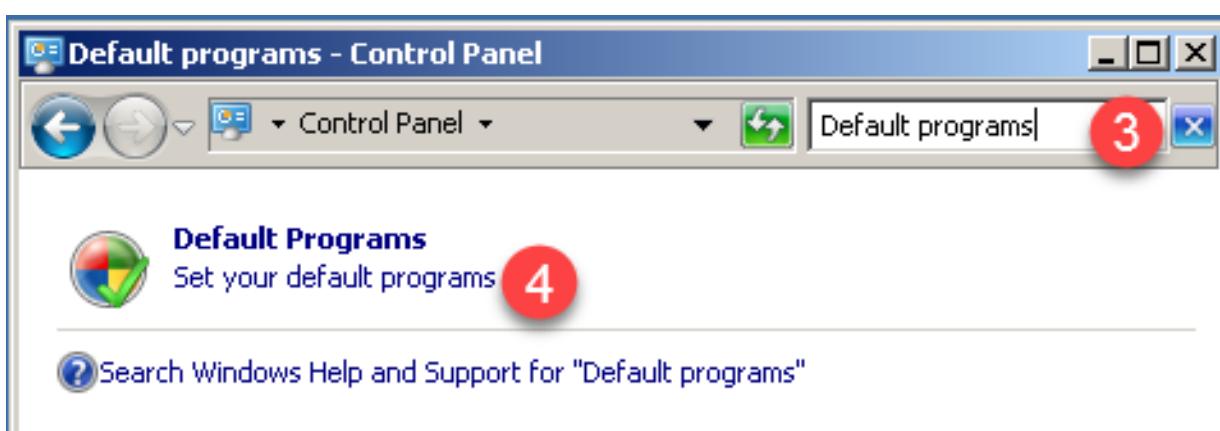
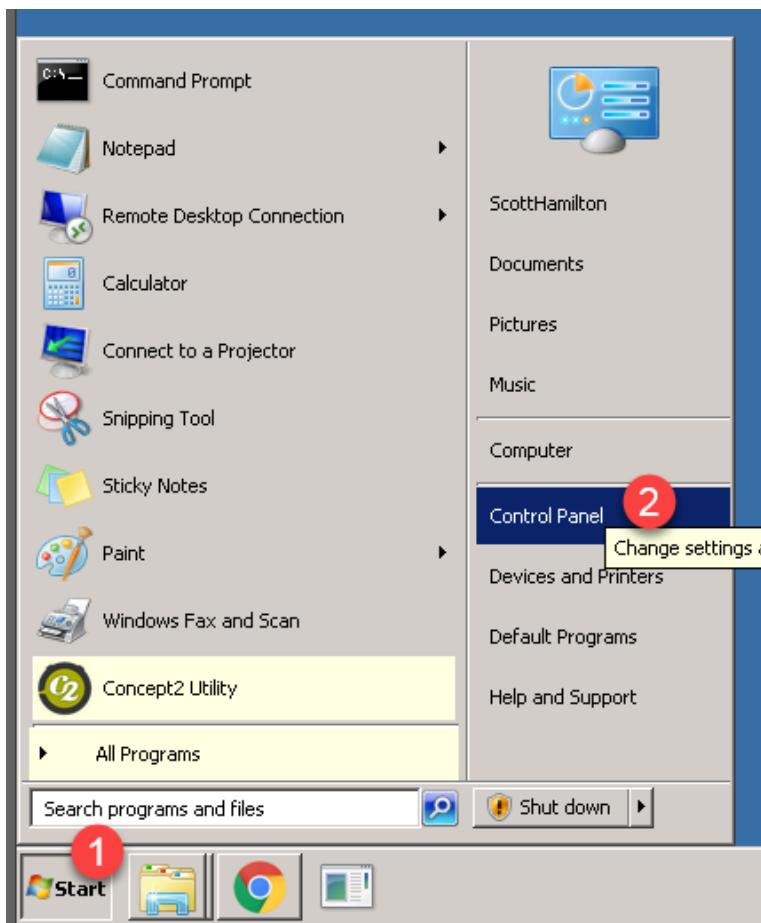
A note about browsers for Viewers:

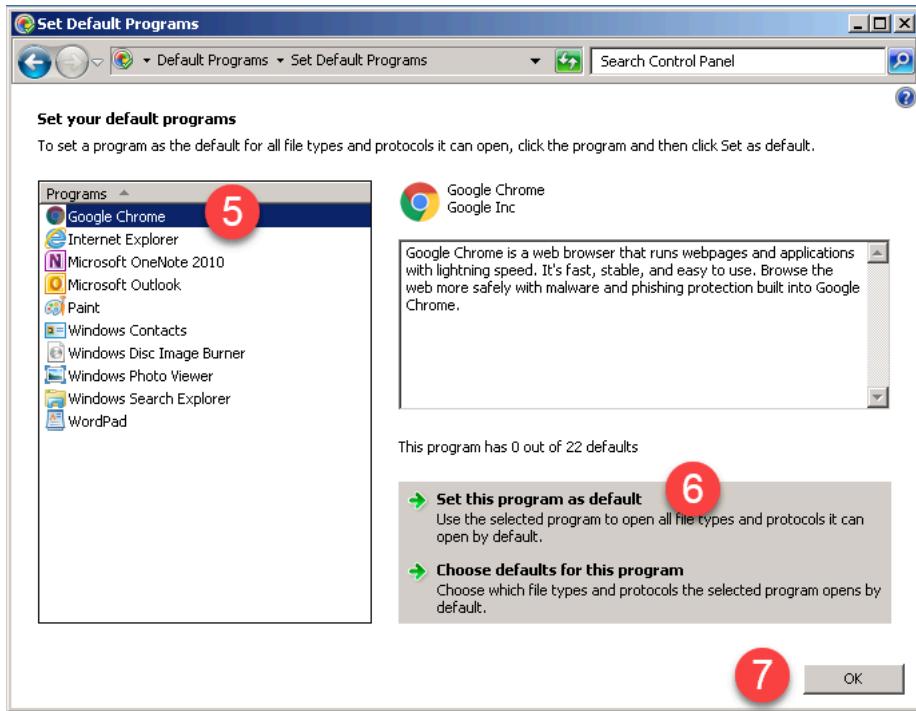
Concept2 designed ErgRace around Chrome. However, Firefox, Edge, Opera, and Safari have all shown that they can work. Concept2 does not always test all browsers with each update. If you have a specific problem, please report in “Feedback” part of the app which browser is not providing good results and how to replicate the problem, then follow up with an email with screen captures (Windows - use the SNIPPING tool, Mac use Command-Control-Shift-4) showing the problem.

How to set Chrome or Firefox to the default browser:

Setting default browser in Windows 7 , 8, and Windows Vista:

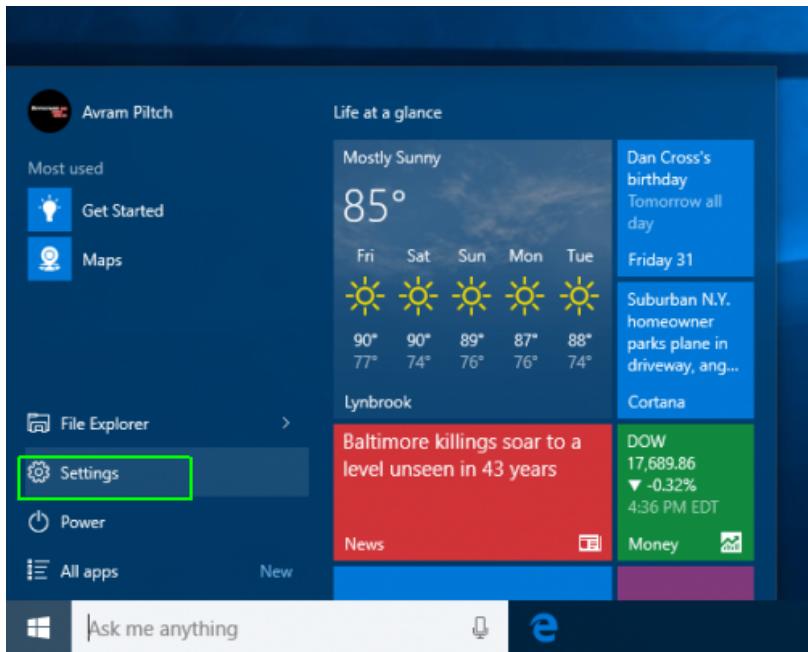
1. Start
2. Control Panel.
3. You will see a magnifying glass in the upper right. Type “Default Programs”.
4. Select “set your default programs” in the window below.
5. Click on Chrome or Firefox
6. Click on “Set this program as default”
7. Click OK
8. Close any the Control panel windows



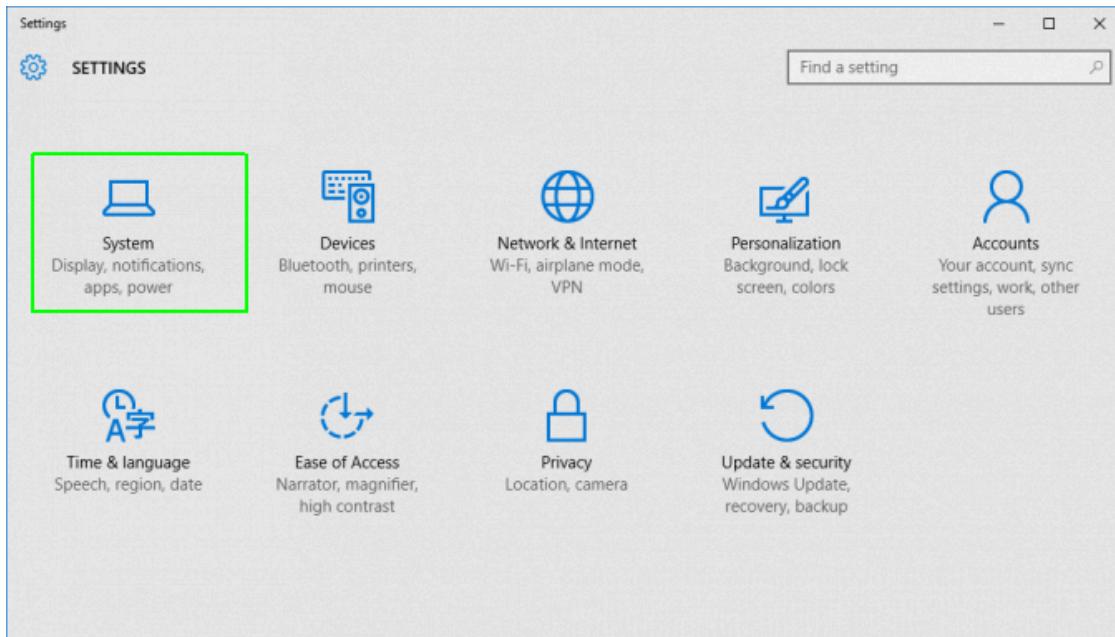


Setting default browser in Windows 10

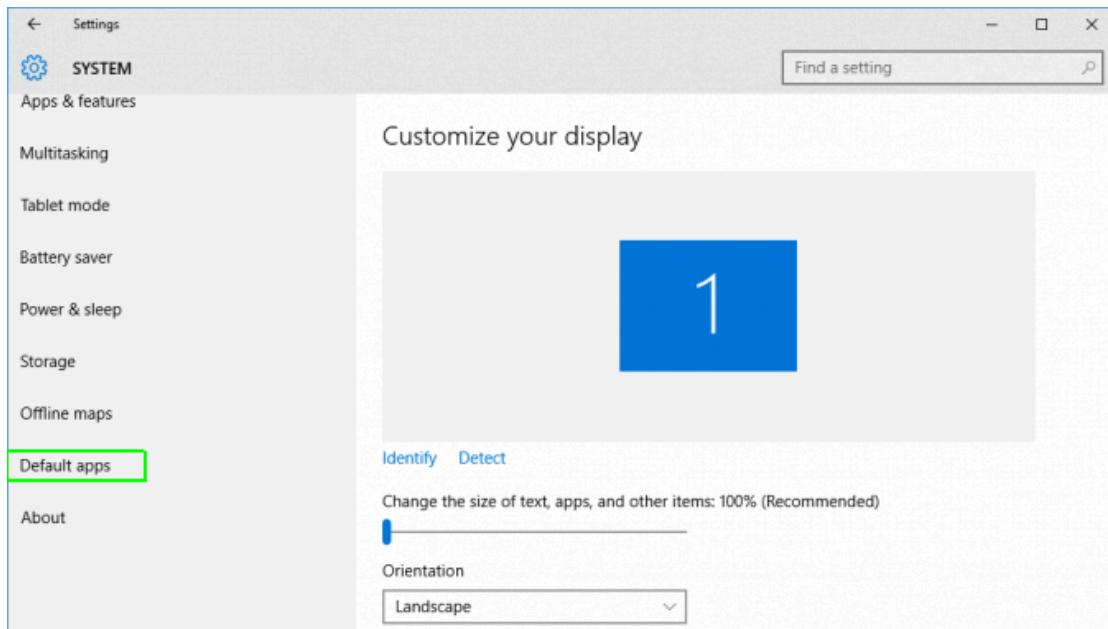
1. **Navigate to Settings.** You can get there from the Start menu.



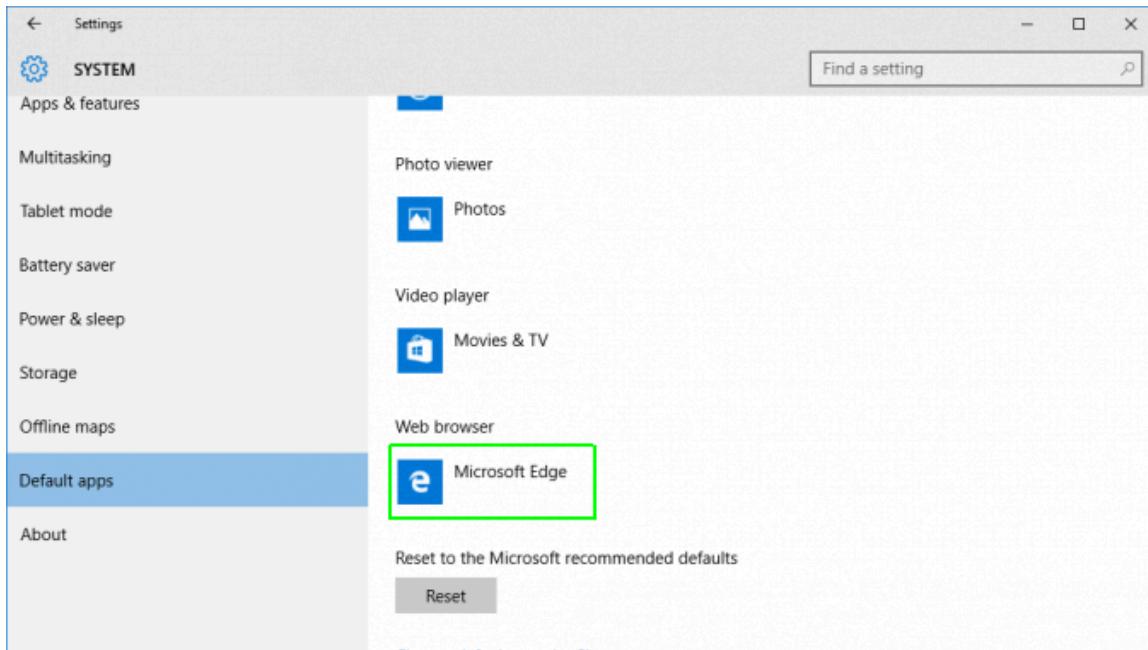
2. **Select System.**



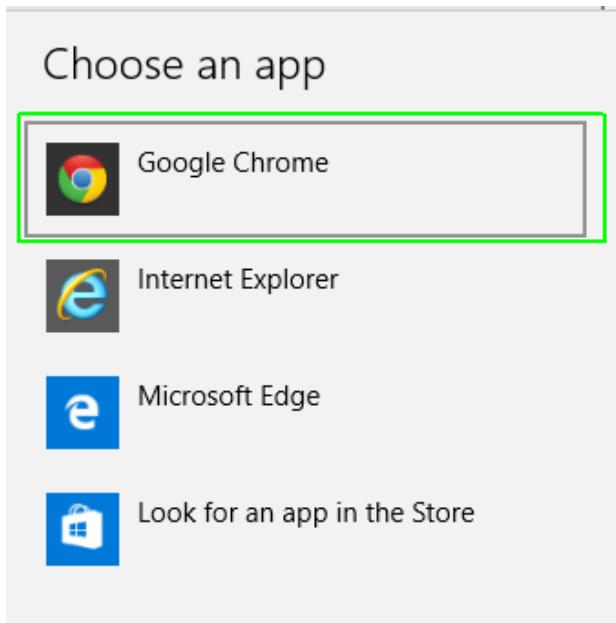
3. Click Default apps in the left pane.



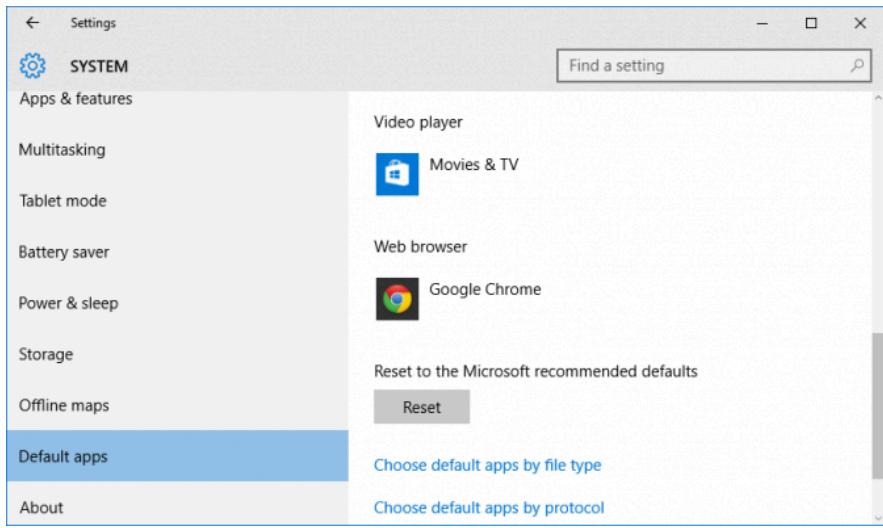
4. Click Microsoft Edge under the "Web browser" heading. If there's a different default browser, you'll see that program's icon under "Web browser" instead.



5. Select the new browser (ex: Chrome) in the menu that pops up.



You'll see that your new selection is now listed under "Web browser."



Updating firmware

Firmware in the PM3, PM4, or PM5 should be relatively recent. If you bought new Ergs from Concept2 then the firmware should be up to date to run most common races. However, if they are older, a firmware update is recommended.

To update firmware, instructions can be found on Concept2's web site here:
www.concept2.com/firmware

(outline of things to be written...)

Race start sequence

- Ok to warm up
 - Setting drag
- Sit ready
- Attention
- Row

Time starts

What to do if it says

- Keep rowing
- Stop or next activity (TBD)

Buttons you can use

- During warmup and during race: units
- At end of race: display to show your final scores and splits

Can I use:

- LogCard - While this may work, it is not recommended. If you wish to try it in advance of your race please feel free. Concept2 does not support this configuration.
- USB Stick - Concept2 does not recommend users put the USB stick in. It probably won't work anyway.
- Heart Rate - The ErgRace software is 'in control' of the PM5's. Only certain buttons work, therefore no way to get to the 'connect' screen to connect your belt.
- NFC - ErgData and other apps should not connect to the PM5 in race mode.

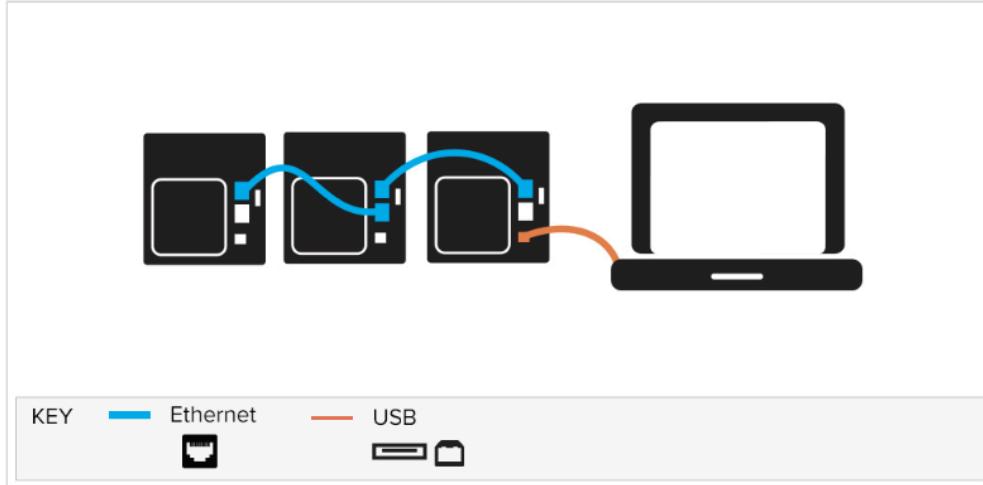
Wiring diagrams

The ErgRace software has built in guidance for how to wire the Ergs together and to your computer depending on the mix of PM3, PM4, PM5 and other requirements.

For a simple set up such as:

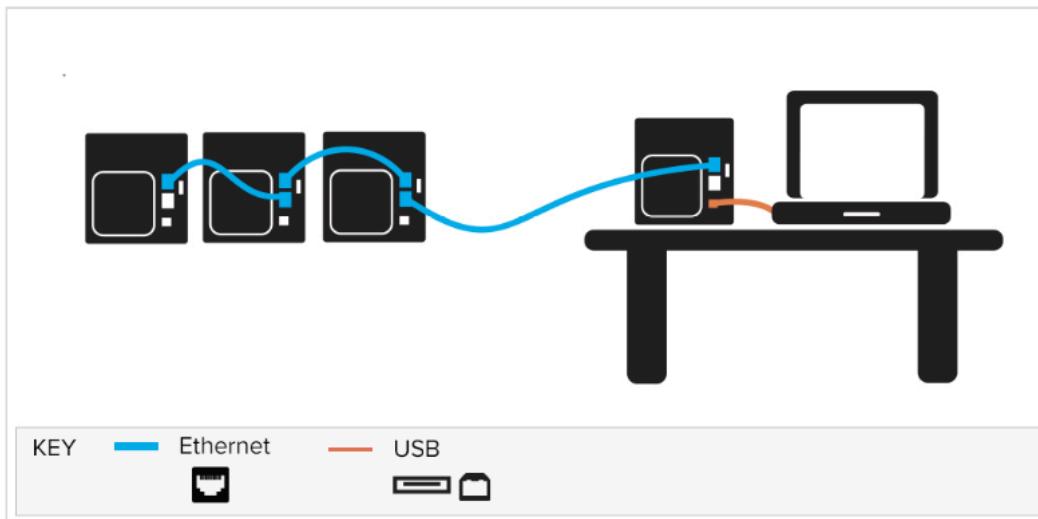
- All PM5 monitors mounted to Concept2 Indoor Rowing machines
- Computer can be close to the Rowing machines

This setup can be used:



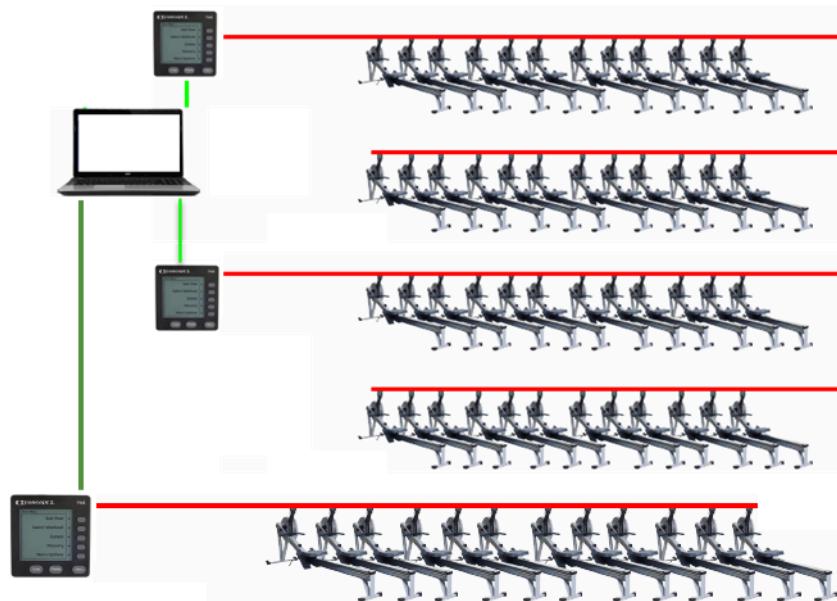
Allowing a greater distance to the race Ergs:

To allow more than 15' from computer to the 'race line', use a spare PM4 or PM5 near the computer and number it last. This spare is called a "Primary" monitor.

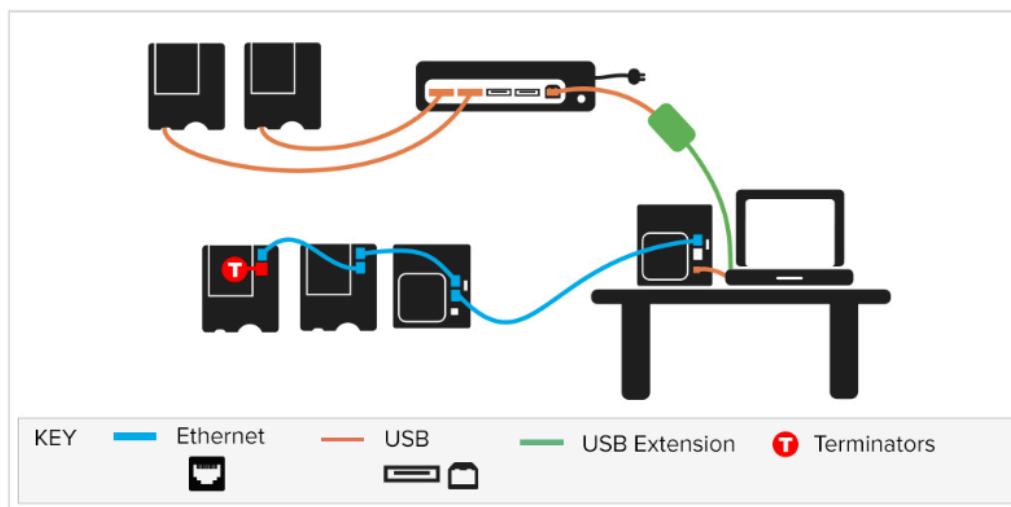


Multiple Primary monitors:

For better performance (collecting data more frequently), use multiple “Primary” monitors as shown. This is important for ‘team’ racing with large number of machines. Except in certain circumstances, there is a limit of 82 monitors attached (80 on Ergs, and 2 masters). There are other good reasons for using multiple masters: Shorter overall ethernet cable lengths (less need for terminators); easier to troubleshoot broken wires (easier to isolate to a certain section); and if you need to reconfigure (break up or combine) the race lines for different types of events.



Here is a sample diagram using a mix of PM3, PM4, and PM5:



Viewer Operation

Most common display (Hybrid View)

Ensure that your computer has Chrome as the default browser. Concept2 does not recommend using Edge or Internet Explorer.

On the ErgRace PC, click ‘launch race viewer’

Choose “Hybrid view”.

For 1-18 lanes in use, the display will show boats on the right along with vital statistics on the left. For 19 or more lanes in use, there will be 2 or 3 columns of vital statistics at the bottom of the screen which will show the slowest of the participants starting approximately 100m or 10c into the race.

Controls that are available within the viewer:

Auto-scaling is now available in ErgRace 1.5.0 and above. Auto-Scale will allow up to 20% of the active “Boats” to fall off the left side of the screen; then after about 10 seconds will re-scale (zoom out) to the next standard scale. If all the boats are close together, the display may ‘zoom in’ to highlight the difference between boats.

The **+** and **-** keys will allow you to manually change the lane scale of the meter markers. The range can only be up to 1000m.

Auto-scaling can be turned on again using **SHIFT-A**.

Using a mixture of SkiErg, BikeErg, and Indoor Rower:

If using a mixture of Ergs in a team race, the active machine in use will determine which icon will be shown. If multiple machines are in use, a generic ‘icon’ will be shown. This poses an interesting dilemma about which icon (Ski, Row, Bike, Generic) to use before the race starts -- ErgRace will use the type of machine in the lowest numbered erg in each team for the starting icon. If the actual participant starts on a different machine, it will change immediately to the correct icon, but best practice would be to number the ergs with this in mind.

Scrolling View:

Choosing “Scrolling View” will show up to 18 lanes with a boat/ski/bike icons to show progress. To see other lanes, use the UP and DOWN arrows or use the scroll-wheel on your mouse.

Table View:

A basic spreadsheet like table view of all the Erg’s data.

Troubleshooting Error Messages:

Installation issues?

Windows 7 is no longer supported. If it works, feel free to use, but we cannot provide support for problems anymore.

Use Windows 10 or 11 Home, Pro, Enterprise.

Windows "S" and "N" editions are not supported.

Ensure your Windows 10 or Windows 11 is fully up to date. Start->Updates->Check for updates. If that does not work, then try installing this:

https://aka.ms/vs/17/release/vc_redist.x86.exe

(If the link is broken, google for Microsoft Visual C redistributable, and pick the x86 version not the x64 version; as of 3/22 the home page is here.:)

<https://docs.microsoft.com/en-us/cpp/windows/latest-supported-vc-redist?view=msvc-170>

If the above does not allow ErgRace to run properly, please write to info@concept2.com.

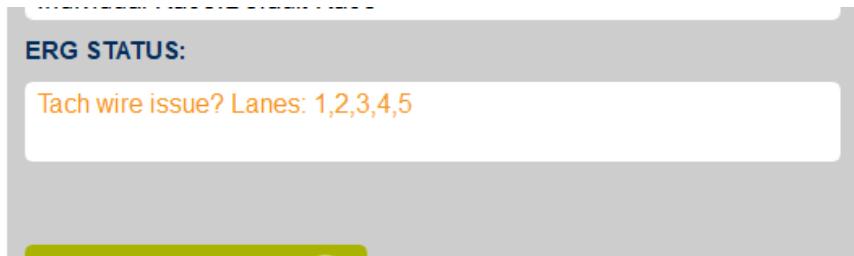
Uninstall Issues?

Known issue: Multiple copies of ErgRace appear in the “Add/Remove Programs”

Concept2 has noted a bug in the installation process – each time it is installed it is creating a new entry in “Add/remove programs” and is not cleaning up after itself. If you wish to get rid of these entries, follow the procedure below:

1. Uninstall ErgRace
2. Run RegEdit
3. Go to HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Uninstall
4. Check each line for "ErgRace" as shown above
5. For each, delete the entire key from the left hand pane.
6. Repeat until they are all gone.
7. Reinstall ErgRace

Tach wire issue?



Or



This message does NOT relate to the wires between the PM5's. This message on the ErgRace screen may indicate that a tach wire from the sensor on the Erg and the PM5 has become disconnected. So, please check it. If the Erg and PM5 seem to be working and counting meters then you can probably ignore this, but understand the tach wire (generator wire) may be damaged and may cause further problems. If you have a spare machine or replacement generator then it would be good to swap equipment.

Error retrieving results from Erg #____.

One possible cause is the wire got disconnected or there was other trouble retrieving the data from the PM5. Please check the PM5 and write down the results. More than likely, the final score is correct, but all the split data may not have been retrieved.

Another possible cause is the memory inside the PM5 may be corrupt. Replacing the PM5 is one option. Another option is to [“factory reset” the PM5 monitor](#). Hold down the UNITS and the TOP and BOTTOM unlabeled button. While holding these down, press and release the ‘reset’ button in the back of the monitor.

In either case, it would be best to run a short (60 second or 100m) test race before proceeding with important test races.

Appendix:

Technical information

File formats

ErgRace uses JSON files, where the legacy Venue Race app used CSV files.

ErgRace uses a JSON file in with .RAC2 extension to specify the race, and as output there is a results .JSON file.

In addition, there are LOG files that are created for debugging/forensic use; they are generally useless unless a problem encountered, if so they are useful to help improve the product. If the /Log file is taking up too much space and you have not had problems it's OK to delete the files in the LOG folder.

For technical information, there is some online documentation [here](#). File formats for .RAC2 and the live stream are on your computer in **c:\Program Files(x86)\Concept2\ErgRace\Docs**

Legacy files...

ErgRace will import Venue Race App .RAC files and convert them to .RAC2 format. This is a one-way conversion, ErgRace will not save .RAC files for use in Venue Racing App. In general, typical Time, Distance, and team races can be imported without problem, however Concept2 does not regularly test importation of these files or the legacy results files. Further, some participants names with diacritics (accents, etc.) may not import properly into ErgRace as ErgRace uses [UTF-8 encoding](#) and Venue Race uses [ANSI encoding](#).

- Legacy .rac file format - import of basic time/distance races generally works well. Team race should import properly but should be checked carefully.
- Legacy results - best attempt to match.

- Legacy splits - best attempt, not guaranteed to match exactly, not tested with Team races.
- Legacy stroke data - not supported
- Legacy logs - not supported

Glossary

Glossary

ErgRace software:

ErgRacing:

RowErg:

ErgRace computer:

Event:

Flight:

Class:

Heat:

The Event is...Long Beach WRIC 2019

Race #1 includes men 30 to 39 class and women 30 to 39 class

Race #2 includes heat 1 open men class

Race#3 includes heat 2 open men class

Network:

Primary monitor:

Individual Race

Team Race

Relay Race

Triathlon Race (future - not implemented yet)

False start:

Race "Viewer"

Race file

RS485

USB

Tie

Place