

iBike Firmware Release Notes

Releases 1.18, 1.31, 1.74, 1.81, and 1.91

- Implemented a new sensor pairing procedure to simplify the way wireless sensors were paired with the iBike.
- Fixed a bug that didn't properly handle the transition between wireless and wired sensors via the setup menu.
- For firmware versions that support power reception (1.31 & 1.81), the SRM power sensor is now supported in addition to the QuarQ/Cinco device.

Release 1.90

- First iAero firmware release that also permits the use of the GARMIN combined speed/cadence sensor. This firmware also supports power transmission to the GARMIN Edge 705 bike computer. Reception of Power from a DFPM is not supported, so only the "snap-shot" CdA calculation is available when the rider coasts.

Release 1.80

- First iAero firmware release that also permits the use of the GARMIN combined speed/cadence sensor. This firmware supports receiving power from a DFPM and calculating CdA. It does not support power transmission. When used in conjunction with a DFPM, the CdA calculations can be done continuously in real-time providing continuous CdA feedback and a Time-Advantage indicator. When no DFPM is available, a "snap-shot" CdA calculation is possible when the rider coasts.

Release 1.30

- First iAero firmware release. This firmware supports receiving power from a DFPM and calculating CdA. When used in conjunction with a DFPM, the CdA calculations can be done continuously in real-time providing continuous CdA feedback and a Time-Advantage indicator. When no DFPM is available, a "snap-shot" CdA calculation is possible when the rider coasts.

Release 1.73 (note: v1.70 through v1.72 were buggy and had limited release life)

- Added support for GARMIN combined speed/cadence sensor as well as power transmissions to the Garmin Edge 705 bike computer.

Release 1.17

- Added code that attempted to reduce elevation notches caused by voltage fluctuations induced by wireless communications coupled with a "zero-ohm" resistor coupling between the batteries in the iBike and the Wireless mount.

Release 1.16

- Improved Pairing for wireless sensors by adding flashing display feedback and improving the logic used in the process for communicating with the sensors.
- Eliminated Heart Rate and Cadence totals screen. This was added in v1.15 by mistake.

Release 1.15

- Separated the Factory Calibration code/algorithms from the standard runtime code/algorithms in order to make room for additional enhancements. This affects the manufacturing process. It will now be necessary to first program the iBike units with version 1.14 of the firmware to perform the factory calibration procedure. After the calibration is complete, the latest version of the firmware may be programmed into the units.
- Added support for wireless bike speed, cadence, and heart rate sensors through the new wireless handlebar mount. This support includes:

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- Additional setup screens to enable/disable the wireless support
- Additional setup screens to select which wireless sensors the iBike should expect to find and use
- Logic to support wireless sensor pairing.
- Logic to support sensor discovery at power-up, wake-up, and center-button presses.
- Logic to support the standard serial communications (via the USB mount) in the event that the iBike detects it is not currently connected to the wireless handlebar mount.
- Modified the internal structure of the ride file header.
 - Includes the following 4 additional parameters:
 - Structure version number
 - Starting Barometric Pressure
 - Average temperature for ride
 - Mechanical Drive Train Efficiency Factor. (CmCeff value)
 - Trainer Mode Enable/Disable indication
 - Store the following data in the ride file instead of reporting current config settings when the ride file data is retrieve from the iBike:
 - English or Metric units selection
 - Data recording interval (1 sec or 5 sec)
 - Aerodynamic Drag Coefficient
 - Rolling resistance/Friction Coefficient
 - Total Weight
 - Wheel Circumference
- Modified the internal structure of the ride file data records to include:
 - Crank Speed in RPM
 - Heart Rate in Beats per Minute
- Modified the way the pressure sensors were powered in order to reduce the overall current draw. Before this modification, the average current draw of the iBike was between 3.23 to 3.31 mA. After the change, the average current draw was reduced to between 2.43 to 2.52 mA. This translates to approximately a 23% savings in power consumption.
- Developed a new 2-part flash upgrade procedure which was required in order to provide support for the new serial communications to the wireless handlebar mount. This 2-part procedure is required to upgrade versions of iBike firmware 1.14 or earlier to the latest code compatible with the wireless handlebar mount.
- Added the Trainer Mode Unlock functionality to the firmware. When the firmware receives the proper unlock codes, the Trainer Mode power calculation support will be unlocked. Once unlocked, the user will be able to enable/disable the feature through the iBike setup screens.
- Added the Trainer Mode power calculation support. When this new mode is enabled through the setup menu, the power calculation is based on power curve information for particular trainers instead of the standard power calculations performed in the iBike. The PC/Mac software will be used to download trainer power curve configuration information into the iBike. It should be noted that in order for a particular trainer to be supported by the iBike, it's power curve must be able to be modeled using a 3rd order polynomial expression in the following form:
 - $y = A + Bx + Cx^2 + Dx^3$, where y = power in watts, x = speed in mph

Release 1.14

- Special version just to fix the batch of units with improperly calibrated barometric sensors, with serial numbers xx xx xx 04 02 01 xx xx....

Release 1.13

- Added support for downloading user programmed Training Interval sets from a PC. Version 1.04 of the PC software is required to use this feature.

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- If a coast down is bad (negative or zero coefficients) then the old coefficients will be retained rather than being overwritten by the new bad numbers.
- User data storage was made more robust to solve some problems that can occur when the battery gets low and writes to flash memory become marginal.
- Fixed incorrect speed and mileage calculations when wheel size or English/Metric display state changed through PC/Mac user profile screen.
- Errors in factory calibration or user setup data storage areas will show as “LOST CALS” or “LOST SETUP” when a new battery is installed. If the setup is lost then you will need to reenter your user information and redo the leveling, coast down and so on. This should only happen if the battery gets too low before replacement.

Release 1.12

- Fixed cause of “3 Err 406” problem.

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Release 1.11

- The aerodynamic and friction coast down coefficients are now shown on two new Totals screens after the memory usage screen. They show as “Cst Aero” and “Cst Fric”. You can use this to check if they look reasonable right after a coast down, or to do on the road comparisons of riding positions and so on without having to run back to a PC to view the coefficients each time. Note that an underscore is used for a decimal point, so 12.345 shows as “12_345”.
- If a coast down generates negative drag coefficients the screen will flash “Bad Coast” for several seconds after “Calc Coast”.
- Five second recording mode now averages the data over each 5 seconds rather than simply sampling every 5th second’s data.
- Changing the data recording rate (1 or 5 seconds) will automatically do a Trip Reset to close the old ride file since ride files do not support changing data rates within one ride.
- Fixed end of year rollover to match standard calendar with just 12 months, not 13.
- Cumulative climbing is now calculated, sent to the PC/Mac, and displayed on a new 2nd Totals screen. Trip/Sub-trip mileage is also shown on this screen. Note that very heavy filtering of the altitude is used to be able to ignore small ripples in the road and altimeter noise, so the cumulative climbing value has a several second delay.
- Fixed display of odometer numbers higher than 3276.7 miles or kilometers on Totals screen.
- Power is more quickly forced to zero when you stop pedaling (with a cadence sensor).
- Coast down mode keys are now consistent with tilt calibration mode. Press the center button to exit or abort. Once the coast down mode is entered, all other keys except the center are ignored.

Release 1.10

- Fixed issues with holding a button during various transition screens like Trip Reset confirmation, blinking Sub Trip, Auto Hill, etc.
- Confirmation screens (such as “not reset”) now require you to acknowledge the message by pressing the center button. Any other presses are ignored until you confirm the message.

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- Trip and Sub-trip Reset confirmation screens will now flash the Reset word rather than Trip or Sub. If you confirm with another press of the center key, the whole screen flashes.
- General button code improvements to make the key functions more bulletproof.
- The time to hold the buttons down for reset, setup, auto-hill, sub-trips and intervals have all been shortened, by popular request. We like it better too.
- Handling of multiple button presses has been improved. This especially helps with illegal combinations of buttons that are accidentally pressed by big thumbs or gloves when holding down a key (for trip reset or setup, for example). Rather than ignoring the illegal combination, the iBike will act as if you are pressing just the first button it sees, which would typically be what you intended even if you accidentally press another adjacent key with it.
- If the iBike is asleep, pressing and holding the center key will wake the iBike up and show the trip reset screen. Older versions would only wake up, requiring another press and hold to enter trip reset.
- With wired cadence, the power was forced to zero when not pedaling, even on the coast down screen that is used to check coast down results. This has been fixed so that the calculated power will show on the coast down setup screen, even when not pedaling.

Release 1.08

- Several major improvements to watts measurement on rough roads and bumpy downhills.
- Dashes will no longer be shown on the power display. A proper power value will show at all times.
- Wind speed accuracy has been improved. Power measurement accuracy is not affected by this change.
- Added support for wired cadence. Cadence automatically replaces calories display on the power screen as soon as a signal from the crank sensor is detected. Cadence shows as RPM on bottom row of display. Cadence is not yet stored in the ride files (need application updates to support this, coming soon), but the average and maximum cadence for trips and sub-trips are calculated and shown on the iBike screen.
- With wired cadence, power will always drop to zero when the rider stops pedaling. Without wired cadence the power generally drops to zero when not pedaling, but coasting down a steep hill in a tuck position may still show some watts.
- Trip calories added to the first Totals screens to provide a way to read the calories when cadence is shown instead of calories on the power screen.
- Improved wheel timer code. Should eliminate occasional glitches in speed readings reported by some users.

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Release 1.07

- Fixed file memory wrap calculations that would sometimes cause ride file download errors, apparently missing ride files, wild mileage values and other ride file related errors.
- Aborted trip or subtrip resets are more obvious. If you don't confirm the reset by pressing the center button again during the several seconds that "trip reset" flashes, then the screen will show "not reset" to make sure that you know the reset was not performed. Press the center key to confirm that you have seen the "not reset" screen.
- Coastdowns are prevented when the ride memory used is 95% or higher, since there may not be sufficient ride memory to complete the coastdown operations. "Data Full" will show to tell you why.
- iBike will show "Data Erase" when the PC tells it to erase all ride data.
- Improved handling of and recovery from communications errors with PC/Mac.
- Improved reset startup sequence and oscillator setup.

Release 1.06

- Holding the down (Hill-Wind) button for 2 seconds toggles Auto Hill on/off. This replaces the setup screen, and makes it easier to turn this feature on and off while riding. Additionally, the center button canceling of Auto Hill speed/gradient display has been eliminated to allow you to switch between the power and bike computer screens without disabling the Auto Hill mode on a long climb. This is based on using the iBike on Alpe d'Huez and Mt. Ventoux where it never levels out long enough to retrigger the Auto Hill display when you want it. Now just hold the Hill button to turn this feature on or off. A screen will blink briefly to show you the new state as "Hill Auto" or "Hill Off".
- Added a recording interval setup screen to choose between 1 or 5 second recording without having to use the PC to set it. Use 5 second recording to hold more hours of rides in memory, and 1 second for more resolution.
- Added a 3rd Totals screen to show the amount of ride log memory used. It shows Log xx% Full, and the bar graph also indicates how much has been used.
- Fixed memory usage calculation. It could show a large wrong number when the memory was empty.
- Fixed avg or max display when in Auto Hill mode. It now properly alternates between avg speed and avg slope, or max speed and max slope, as appropriate.
- Added automatic warning when memory gets near full (at 80, 90 and 95%) and when full ($\geq 99\%$).
- Added bootup screen telling when data memory is being checked and initialized ("Data Setup").
- Ride detail storage stops when ride memory is full, but data accumulators (ride time, odometer, etc.) continue to operate so no mileage is lost.
- Erase All Ride Data from PC/Mac now does a trip reset as well, clearing any ride data on LCD.

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Release 1.05

- Key presses ignored during firmware updates to prevent interruption.
- Screen shows "FILE LOAD" during firmware updates rather than going blank.
- Mac communications improved to prevent overflows.
- Fixed setting of 1 or 5 second data storage rate from PC/Mac.
- Changed wind zero offset screen to display wind pressure, not speed, since speed exaggerates minute sensor noise at extremely low speeds. The display should show very close to zero after zeroing.

Release 1.04

- Fixed initial average speeds in main trip and Subtrip mode.
- Fixed Subtrips to only accumulate distance when the mode is active.
- Wheel sensor circuit is powered down if magnet keeps switch closed to save battery power in sleep mode. Polls sensor every 2 seconds to see if the magnet/bike has moved.
- Added low battery warning screen.
- Most error screens now allow continuation by pressing the center button.
- Some more helpful error message and warning screens added (more to come).
- Ride data can now be stored every second, or every 5 seconds (for longer total time). The setting is not yet stored in the ride file, so every ride in memory will be assumed to have the same setting, including old files. We will be changing this in the future, but for now you should probably erase old ride files before changing the data storage rate to avoid confusion. The current storage capacity at the 5 second rate is about 50 hours. This will increase to 80-90 hours in the next file system revision.
- Added a wind offset screen to the set up menu. If the wind speed isn't approximately zero when in a garage or other windless place, use this screen to reset the offset value to zero. Press the center button to get speed close to zero. This can be done multiple times if needed.

Release 1.03 (Critical update)

- Fixed file system recovery from a corrupted file.
- Fixed problems with aborting coast downs that would often corrupt ride files.
- Made coast down procedure more robust. Added Calc Coast screen after Done Coast.

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To install your update do the following:

1. Download the firmware update file iBikexxx.zip and place it on your desktop. (The xxx is the version number, such as 105 for 1.05.)
2. Unzip the folder. Place the file iBikexxx.enc on your desktop.
3. Launch your iBike app.
4. Plug in your USB Adapter and connect your connect the iBike application to the appropriate com port.
5. Connect your iBike to the USB Adapter.
6. Press the center button of the iBike to make sure it is turned on!
7. Go to Device/Firmware Update on the iBike PC/Mac application
8. Navigate to the desktop and select the file iBikexxx.enc
9. Click open. The firmware upload will begin. The iBike screen will say "File Load" (if the old version is 1.05 or later).
10. You will see a progress bar on the PC during the upload. It will move quickly from left to right and refill many times.
11. The update process may take several minutes. Be patient. DO NOT run or switch to other programs while you wait. If you do this by accident, and it appears that the application has disappeared or locked up, it may still be running. Wait several more minutes to let the upload complete and you should see the iBike screen change from File Load to reset to normal operation.
12. The application will notify you when the update is complete. The iBike will automatically restart and return to normal operation.
13. If you are upgrading from v1.03 or earlier, you MUST ERASE YOUR RIDE MEMORY to start with a freshly formatted file system, even if you think the ride memory is empty. Simply select the application menu item Device->Erase All Ride Data and confirm your request. The application will confirm the erasure with "Upload successful."
14. You may now remove your iBike from the USB adapter and go ride. Enjoy!

DO NOT DISCONNECT YOUR USB ADAPTER OR IBIKE DURING THE UPDATE, AND DO NOT CANCEL THE UPDATE!

For more detailed instructions, consult the iBike Manual on your CD.