WheelDash Manual

Version 0.1

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Contents

1 Introduction

This document will cover the features, settings, and technical information of WheelDash, which is available as both a Garmin application and a datafield that can be added to an existing activity. While the application and datafield versions share a fair amount of code, the datafield version is more restricted due to Garmin's restrictions on memory usage and UI refresh rate.
However, the datafield version is currently the only way to use Garmin's native navigation and record and display your wheel metrics at the same time.

Two versions of each WheelDash "flavor" are available on the Garmin Store: a stable version and a dev version (labeled "(dev)"). The dev version includes the latest features but is also considered less stable, mainly because I sometimes push untested code (code related to a specific brand of wheel I don't own, features I can't test on my watch, etc.).

Figure 1: Main screen of *WheelDash*.

2 WheelDash

This section describes *WheelDash* (the Garmin app version) features and settings.

2.1 User Interface

WheelDash main screen displays real time values and metrics (Figure 4). It is composed of five distinct parts : a top bar (or arc), two lateral bars, a numeric indicator and a text area located at the bottom of the user interface (UI).

The top bar and the numeric indicator can display PWM or speed depending on users settings (top bar will always represent a percentage relative to maximum speed or PWM set in *WheelDash* settings). The text area is used to display metrics like average speed, trip distance, voltage, etc... Please refer to the app settings section for a complete list of available metrics. Metrics to display can be selected by the user in the app settings. When multiple metrics are selected, they will be displayed one at a time, each for 2 seconds. The two lateral bars respectively displays current battery percentage and current temperature (usually motherboard temperature but it depends on your wheel brand/model).
A recording status indicator is also displayed on the main screen when an activity is currently being recorded.

From the main screen, you can access the activity recording screen (Figure 2) by swiping up (if your watch screen is not tactile you will have to specifically assign a button to this view if you want to access it).

You can bring the wheel settings menu by pressing the menu button (some

Figure 2: The activity recording view displays current status of activity recording and GPS fix quality.

Figure 3: The wheel settings menu let you modify your wheel settings (available settings depends on your wheel brand).

watch have a menu button, others requires a long press on the back button). This menu allows you to directly change your wheels settings. Please note that available settings depends on your wheel and its brand. If your wheel is able to communicate currently set value for available settings the current setting will be displayed under the menu title (Figure 3).

2.2 Connect IQ Settings

WheelDash settings are accessible using Garmin Connect or Garmin Connect IQ Store. To access settings using the Connect IQ Store app, follow these steps :

1. Open the Connect IQ Store app.

2. Select My Device. If you have more than one Garmin device you can switch the device by selecting Three blue vertical dots then Select a

Device.

3. Depending on which *WheelDash* "flavor" (app or datafield) settings you would like to adjust, tap either My Device Apps or My Data Fields.

4. Select the app you would like to adjust.

5. Select Settings.

6. Select Save to send the changes to your Garmin device.

2.2.1 Global Settings

The global settings apply to all profiles in *WheelDash*.

UI refresh rate: This setting controls how often the *WheelDash* screen refreshes. A lower value will result in a faster refresh rate, but may also use more battery power.

Automatic activity recording: This setting enables or disables automatic activity recording. When enabled, *WheelDash* will automatically start recording an activity as soon as your EUC connects to your watch and will save the activity when you exit the app.

Activity save on exit: This setting enables or disables activity saving when you exit *WheelDash*. When enabled, *WheelDash* will automatically save the current activity if it has been recording when you exit the app. This setting is not needed if you use automatic activity recording.

Default profile: This setting allows you to specify a default profile to use. Default profile will be loaded automatically after a 10 second delay on the profile selection menu displayed on startup or if profile selection menu is disabled.

Profile selection on startup: This setting brings the profile selection menu on startup, allowing you to choose the profile to be loaded. If this setting is disabled the default profile will be loaded.

Debug Mode: This setting enables the debug mode that displays wheel reported values.

Metrics related settings:

- **Display average moving speed:** This setting enables or disables the display of the average moving speed in the bottom part of the screen.

- **Display top speed:** This setting enables or disables the display of the top speed in the bottom part of the screen.

- **Display watch battery consumption:** This setting enables or disables the display of the watch battery consumption in the bottom part of the screen.

- **Display watch battery:** This setting enables or disables the display of the watch battery level in the bottom part of the screen.

- **Display current trip distance:** This setting enables or disables the display of the current trip distance in the bottom part of the screen.

- **Display voltage:** This setting enables or disables the display of the EUC battery voltage in the bottom part of the screen.

- **Display profile name:** This setting enables or disables the display of the current profile name in the bottom part of the screen.

2.2.2 Profile Settings

WheelDash allows you to create and configure up to three profiles. Each profile can have its own unique settings.

Wheel name: This is the name of the profile. It will be displayed in the profile selection menu and in activity summaries.

Wheel brand: This setting tells *WheelDash* what kind of decryption protocol to use to read data from the EUC. Be sure to select the correct brand, otherwise *WheelDash* will not work properly.

Button mapping: There is currently three available actions you can map to buttons: Activity recording view, Cycle through lights mode and Make the wheel beep.

BLE command queuing delay: This setting controls how long *WheelDash* waits between sending commands to the EUC. A lower value will result in faster response times, but may also increase the risk of errors.

Voltage correction factor: This setting is only used for Gotway/Begode EUCs, which always report their battery voltage as 67.2V. To correct this, set the

voltage correction factor to the desired voltage, such as 1.25 for 84V.

Custom firmware: This setting is only used for Gotway/Begode EUCs with custom firmware from Freestyler. If you are using custom firmware, enable this setting to allow *WheelDash* to use hardware PWM instead of software PWM.

Current correction type: This setting controls how *WheelDash* interprets the current readings from the EUC. You can set it to negative, absolute, or relative.

Speed correction factor: This setting allows you to correct the reported speed from the EUC. This will also correct the distance, but will not have any effect on software PWM computation.

Speed on main numeric indicator: This setting controls what value is displayed on the main numeric indicator on the *WheelDash* screen. You can choose between speed or PWM.

Value to display on top bar: This setting controls what value is displayed on the top bar of the *WheelDash* screen. You can choose between speed, PWM, or battery voltage.

Displayed speed limit: This is the maximum speed that will be displayed by the top bar if you set the "value to display on top bar" setting to "Speed". It's only used to scale the top bar and won't have any effect on the main numerical indicator or on your wheel max speed.

Maximum operating temperature: This setting is only used to scale the temperature bar.

Percentage threshold to color top bar with orange: Top bar will be filled with orange when reaching this threshold. As an example, set this setting to 80 if you want the top bar to turn to orange when your PWM (or speed, depending on top bar settings) is higher than 80% of PWM (or displayed speed limit),

Percentage threshold to color top bar with red: Top bar will be filled with red when reaching this threshold.

Calculated PWM related settings (only for Gotway/Begode EUCs)

- **Cut-out speed when performing free spin test:** The speed at which

your EUC cuts out when performing a free spin test.

- **Voltage when performing free spin test:** The voltage of your EUC when performing a free spin test.

- **Power factor correction:** An adjustment factor for PWM estimation, do not change it unless you understand how it works.

Alarms related settings: When an alarm is triggered the watch will vibrate and a message will be displayed on the bottom part of the screen. When multiple alarms are triggered simultaneously, the alarms are prioritized as follows: PWM » Temperature » Speed.

- **Percentage of PWM that trigger an alarm:** An alarm will be triggered if PWM value is higher than set value. Set to 0 to disable.

- **Speed that trigger an alarm:** An alarm will be triggered if Speed is higher than set value. Set to 0 to disable.

- **Temperature that trigger an alarm:** An alarm will be triggered if Temperature is higher than set value. Set to 0 to disable.

3   First Connection

How to connect your wheel to *WheelDash* for the first time :

1. Ensure you correctly set the wheel brand setting for the profile you intend to use.

2. Make sure that only your wheel is powered on around you.

3. Open *WheelDash*, select the profile you want to use, it will bring up the first connection screen.

4. Once you see a confirmation screen saying that your wheel is connected the app will take a footprint of your wheel to recognize it in the future, wait until the main screen of *WheelDash* is displayed. Exit *WheelDash* and power-off your wheel.

5. Power on your wheel again and restart *WheelDash*.

6. You can now start using *WheelDash* with your wheel!

Important note: if you want to delete or reinitialize a wheel footprint, just rename the profile and start the app again.

Figure 4: Main screen of WheelDash.

4 WheelDash : datafield

This section describes *WheelDash* (the datafield version) features and settings.

4.1 User Interface

WheelDash: datafield main screen displays real time values and metrics (Figure 4). It is composed of six customizable fields.

4.2 Connect IQ Settings

WheelDash: datafield settings are accessible using Garmin Connect or Garmin Connect IQ Store. To access settings using the Connect IQ Store app, follow these steps :

1. Open the Connect IQ Store app.

2. Select My Device. If you have more than one Garmin device you can switch the device by selecting Three blue vertical dots then Select a Device.

3. Depending on which *WheelDash* "flavor" (app or datafield) settings you would like to adjust, tap either My Device Apps or My Data Fields.

4. Select the app you would like to adjust.

5. Select Settings.

6. Select Save to send the changes to your Garmin device.

4.2.1 Global Settings

The global settings apply to all profiles in *WheelDash: datafield*.

Debug Mode: This setting enables the debug mode that displays wheel reported values.

Field 1-6: This setting controls what value or metric you want a field to display. Available options are :

- Speed
- Voltage
- Trip distance
- Current
- Temperature
- Total Distance
- PWM
- Battery %
- Min Temperature
- Max Temperature
- Max Speed
- Average Speed
- Min Voltage
- Max Voltage
- Max Current
- Average Current
- Min Battery %
- Max Battery %
- Average Power
- Max Power

Profile to use: Profile to load on startup (restriction relative to Garmin Datafield implementation prevent to conveniently use a profile selection menu on the watch).

4.2.2 Profile Settings

WheelDash: datafield allows you to create and configure up to three profiles. Each profile can have its own unique settings.

Wheel name: This is the name of the profile. It will be displayed in the profile selection menu and in activity summaries.

Wheel brand: This setting tells *WheelDash: datafield* what kind of decryption protocol to use to read data from the EUC. Be sure to select the correct brand, otherwise *WheelDash: datafield* will not work properly.

Button mapping: There is currently three available actions you can map to buttons: Activity recording view, Cycle through lights mode and Make the wheel beep.

Voltage correction factor: This setting is only used for Gotway/Begode EUCs, which always report their battery voltage as 67.2V. To correct this, set the voltage correction factor to the desired voltage, such as 1.25 for 84V.

Custom firmware: This setting is only used for Gotway/Begode EUCs with custom firmware from Freestyler. If you are using custom firmware, enable this setting to allow *WheelDash: datafield* to use hardware PWM instead of software PWM.

Current correction type: This setting controls how *WheelDash: datafield* interprets the current readings from the EUC. You can set it to negative, absolute, or relative.

Speed correction factor: This setting allows you to correct the reported speed from the EUC. This will also correct the distance, but will not have any effect on software PWM computation.

Calculated PWM related settings (only for Gotway/Begode EUCs)

- **Cut-out speed when performing free spin test:** The speed at which

your EUC cuts out when performing a free spin test.

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Alarms related settings: When an alarm is triggered the watch will vibrate and a message will be displayed on the bottom part of the screen. When multiple alarms are triggered simultaneously, the alarms are prioritized as follows: PWM » Temperature » Speed.

- **Percentage of PWM that trigger an alarm:** An alarm will be triggered if PWM value is higher than set value. Set to 0 to disable.

- **Speed that trigger an alarm:** An alarm will be triggered if Speed is higher than set value. Set to 0 to disable.

- **Temperature that trigger an alarm:** An alarm will be triggered if Temperature is higher than set value. Set to 0 to disable.

5   First Connection

How to connect your wheel to *WheelDash: datafield* for the first time :

1. Ensure you correctly set the wheel brand setting for the profile you intend to use.

2. Make sure that only your wheel is powered on around you.

3. Start an activity you want to add *WheelDash: datafield* to. Go to the activity settings, select Datascreen, then select the screen you want to add the datafield to (or add a new one), use start button to edit the screen, select layout and ensure you're using a layout with only 1 field and validate, then select Datafield and select WheelDash

4. Ensure you're on *WheelDash: datafield* screen. The first connection screen will show up.

5. Once you see a confirmation screen saying that your wheel is connected the app will take a footprint of your wheel to recognize it in the future, wait until the main screen of *WheelDash: datafield* is displayed. Exit *WheelDash: datafield* and power-off your wheel.

6. Power on your wheel again and restart *WheelDash: datafield*.

7. You can now start using *WheelDash: datafield* with your wheel!

Important note: if you want to delete or reinitialize a wheel footprint, just rename the profile and start the app again.