RaceData2 User Guide

Instrument data on your mobile device

For iOS v1.8.2, Android v1.10.1

1. Overview

RaceData2 is a comprehensive mobile application for phones, tablets, and smartwatches that displays and graphs real-time sailing data from Expedition Navigation Software or NMEA 0183 instruments, while enabling remote control of critical race functions.

Key Features

- Clear, easy-to-read data in customizable layouts (2×2, 2×3, 2×4, 3×3, custom)
- Graph data with moving average (MA) and exponential moving average (EMA) indicators, and minimum, mean, and maximum values
- Ping the start line and marks, set and control the race timer, ping new marks, advance or revert the active mark in a route
- Set up Windward/Leeward race courses
- Set a man overboard (MOB) trigger for Expedition
- Apple Watch companion app with standalone WiFi direct (Expedition only, Windows RaveData3 Bridge required)

Platform Support

- Android phones and tablets
- iOS (iPhone and iPad)
- Apple Watch (standalone or paired with iPhone)
- WearOS devices (Android Watches)

Data Protocol Support

- Expedition Protocol (UDP) - Primary mode
- NMEA 0183 Protocol (UDP) - Requires WiFi bridge hardware
- RaceData3 Bridge - For Apple Watch standalone mode

2. Quick Start Guide

Step 1: Install the App

1. Install RaceData2 from the Google Play Store (Android) or Apple App Store (iOS)
2. For Apple Watch: Install the iOS app which includes the watch companion app
3. Ensure your device is connected to the same WiFi network as your Expedition PC or NMEA 0183 bridge

Step 2: Configure Your Data Source

Choose your data source and follow the relevant setup section:

- Expedition Navigation Software → See Section 4
- NMEA 0183 instruments → See Section 5

Step 3: Configure RaceData2

1. Open RaceData2 and tap the Settings gear icon
2. Select your protocol (Expedition or NMEA 0183)
3. Enter the IP address of your data source
4. Set the UDP port (default: 6011)
5. Enable 'Data Listening' to start receiving data
6. Customize your data pages with the channels you want to display

3. Installation

Apple Watch Installation

The Apple Watch app is automatically included with the iOS app.

1. After installing RaceData2 on your iPhone, open the Watch app on your iPhone
2. Scroll down and find RaceData2 in the 'Available Apps' section
3. Tap 'Install' to add it to your Apple Watch
4. The watch app can operate in two modes: paired with iPhone or standalone via REST API (see Section 7)

4. Expedition Setup

Configure Expedition Navigation Software to transmit data to RaceData2 via UDP.

Step 1: Add a Network Port

1. In Expedition, go to Menu > Instruments
2. Select an available Network port
3. **Note:** If you do not have a spare Network port, add one at Menu > Instruments > # Number of Network Connections

Step 2: Configure Network Port Settings

Configure your Network port with the following settings:

- **Instruments:** Expedition
- **Connection:** UDP
- **Address:** This is the IP address Expedition will transmit data to. Setting the last field to *.255 (e.g., 192.168.20.255) will broadcast data for any device on the network to listen to.

- **Port:** RaceData2 default port is 6011. Change the port here to 6011, or change the RaceData2 port to match.

Step 3: Configure Expedition Settings

1. Click 'Expedition Settings' in the Network port configuration
2. **Exp Rx Filter:** Clear All, but select 'Receive Marks' for pinging marks
3. **Exp Tx Filter:** Select the Expedition channels you wish to send to RaceData2
4. Apply these changes

Step 4: Verify Data Transmission

1. Click Raw Data
2. Verify that data is being transmitted (you should see data streaming in the Raw Data window)

5. NMEA 0183 Setup

RaceData2 can receive NMEA 0183 data directly from your instruments via a WiFi bridge.

Hardware Requirements

To use NMEA 0183 protocol, you need a NMEA0183 to WiFi bridge device from manufacturers such as:

- Antisense
- Digital Yacht
- Yacht Devices
- ShipModul
- Quark-Elec

Tip: Consult your local Marine Electronics installer about available options and installation.

Supported NMEA Sentences

RaceData2 automatically decodes and displays data from the following NMEA 0183 sentences:

APB, BWC, DBT, DPT, GGA, GLL, GSA, GSV, HDG, HDM, HDT, MTW, MWD, MWV, RMB, RMC, ROT, RSA, RTE, VDR, VHW, VTG, VWR, VWT, WPL, XTE, ZCD, ZDA, ZTG

These sentences are automatically mapped to standard channel names based on Expedition channel naming conventions.

6. RaceData2 Configuration

Initial Setup

1. Ensure your phone or tablet is connected to the same WiFi network as your data source (Expedition PC or NMEA bridge)
2. Start RaceData2 and tap the Settings gear icon at the bottom of the screen

Settings

- **Screen Always On:** Prevents your phone screen from turning off during a race
- **Dim in Pocket:** Uses the proximity sensor to turn the screen off when your phone is stowed in a pocket or face down.
- **Pin RaceData2 on Top (Android only):** Prevents other apps from drawing over RaceData2.
    - If using an iPhone, use Guided Access on your phone to keep RD2 in the foreground. See Apple documentation

CRITICAL: If RaceData2 is not the 'on top' app, data reception will be paused. This is a limitation of Android and iOS operating systems.

Power Management Warning: Using the above display settings to suit your requirements will use more battery. Using the 'Dim in Pocket' feature will reduce power consumption.

Network Settings

- **Your Device IP:** Displays your phone/tablet's current IP address
- **Expedition/Bridge IP:** Enter the IP address of your data source (Expedition computer or NMEA bridge)
- **UDP Rx Port:** The port RaceData2 listens on (default: 6011 for Expedition)
- **UDP Tx Port:** The port RaceData2 uses to send commands (default: 6011 for Expedition)
- **Ping Test:** Verifies that the configured IP address can be reached.
- **Rae Data:** Displays data packets being received

Important: Check that your phone's IP address is in the same subnet as your data source. The first three octets (numbers) of the IP address must match. For example, if Expedition is at 192.168.20.10, your phone should be 192.168.20.xxx

- **Data Listening:** Toggle to enable/disable the reception of data
- **Auto Start:** Automatically starts listening to data when RaceData2 is launched
- **Demo Data:** Generates simulated data for testing and setting up your display pages without connecting to a data source

Important: If you change your IP/port settings you may need to toggle off then on **Data Listening**

Protocol Settings

Select which data protocol RaceData2 should use:

- **Expedition Protocol:** For receiving data from Expedition Navigation Software (includes full command support)
- **NMEA 0183 Protocol:** For receiving NMEA0183 via a WiFi bridge

Note: When using NMEA 0183 protocol, the Commands page (start timers, ping marks) will not be available as these features require Expedition.

- **Convert depth to feet:** Expedition default depth units is metres
- **Boat Length (m):** Expedition default distances are in nm. RD2 converts to metres, however if you want to display Distance below line or Distance to line in BL, enter your boat lengths in metres here. Leave at 0.0 for distance in metres.

Data Pages

Data pages display real-time sailing data in customizable layouts.

Creating and Configuring Data Pages

1. Tap the Pages icon to reveal your data pages
2. Tap any data field to:
    - select/change channel for that data field
    - change that channel settings (precision, colours)
    - toggle night mode.
3. Select a channel to assign it to that field
4. Swipe left or right to navigate between pages

Data Freshness Indicators

RaceData2 provides visual feedback on data quality:

- **Green Dot:** Actively receiving fresh data
- **Orange Dot:** Data is stale (no change in value for 10 seconds)
- **Red Dot:** No data received for this channel in 20 seconds

 Page Settings Options

- **Select Layout:** Change the current page layout
- **Lock Cells:** Prevents accidental touches from changing the data fields
- **Lock Page:** Makes the current page full screen and prevents accidental touches. A small padlock icon appears - press and hold to unlock
- **Delete Page:** Removes the current page (only if more than one page exists)
- **Add Data Page:** Creates a new data field page
- **Add Graph Page:** Adds a new graph page

Graph Pages

Graph pages provide visual trends of your sailing data over time with advanced analysis tools.

Configuring Graphs

Tap the Graph Config icon on the navigation bar to configure:

- **Channels:** Select which channels to graph (one or two)
- **Time Span:** Choose the duration of data to display
- **Trendline:** Select None, MA (Moving Average), or EMA (Exponential Moving Average)
- **Shade:** Shades the area between the live data line and the MA/EMA line

 Command Page (Expedition Only)

Remotely control Expedition. All commands display a confirmation window before being sent.

All pings will set the mark(s) to the position as set in Expedition Settings (Bow or GPS).

If no acknowledgement is received from Expedition after 1s from a command being sent you will see an alert. With Events only, you have the option to retry for 30s.

For critical commands, verify they have actioned in Expedition, and check History at the bottom of the page.

Start

- **Ping P:** Ping the port end of the start line
- **Ping S:** Ping the starboard end of the start line
- **Timer:** Sets the start countdown timer in Expedition
- **Sync:** Sync Expedition start timer to the nearest minute
- **Kill:** Kills the start timer

Marks

- **Set W/L Course:** Enter Windward/Leeward course geometry (bearing and distances etc) and send to Expedition. This will make the W/L course the Active Course.
- **Ping New:** Pings a new mark (not active) at the GPS/bow
- **Ping Active:** Moves the current active mark to the GPS/bow
- **Previous:** Moves the active mark to the previous mark in the route
- **Next:** Moves the active mark to the next mark in the route
- **Active Mark Display:** Name of the current active mark in Expedition

Events

Sends an “Other” Event type to the Expedition Events database, with any additional comments added.

Man Overboard (MOB)

- Pressing the MOB button sends an MOB command to Expedition
- Requires secondary confirmation to prevent accidental activation
- Typically sets an alarm in Expedition and creates an active MOB mark at your current position
- If integrated with NMEA2000 interfaces, the MOB alert can be broadcast to other systems onboard

7. Apple Watch

Installation

The Apple Watch app is bundled with the iOS app

1. Install RaceData2 from the App Store on your iPhone
2. Open the Watch app on your iPhone
3. Scroll to 'Available Apps' and find RaceData2
4. Tap 'Install' to add RaceData2 to your watch

Operating Modes

Mode 1: iPhone Relay (Default)

The watch receives data relayed from the iPhone app.

- **Requirements:** iPhone must be running RaceData2 and connected to Expedition/NMEA bridge
- **Subscription:** Watch inherits subscription status from iPhone app

Mode 2: Standalone

The watch connects directly to the RaceData3 Bridge, allowing it to work independently of the iPhone.

- **Requirements:** Expedition v11+ with RD3 Bridge running, watch connected to same WiFi network
- See the RD3 Bridge setup instructions in the RaceData3 Bridge app help file.
- **Configuration:** Set in watch app settings: PC with RaceData3 Bridge IP address, port (default: 5001)

Watch Display Layout

Pages are laid out horizontally. Swiping left/right on the watch face will scroll between pages.

IMPORTANT: The Settings page is always the right most page.

Control adding/removing pages and setting page layouts on the Settings page.

Race Mode

The Apple Watch app uses Apple Health workout sessions to remain active in the foreground while sailing.

1. The first time you use the watch app, grant HealthKit permissions when prompted
2. Tap 'Start Session' in the watch app Settings to start a session and keep the app active throughout your race
3. Tap 'End Session' when you finish racing to resume normal service for your watch

Note: Without an active workout session, the Apple Watch will dim and eventually sleep, and may not return to the RaceData3 app.

Water Lock

When a Sailing Session is active, you can lock the watch screen to prevent accidental touches from changing the screen.

1. Start a Sailing Session
2. Double Tap the watch face – you will feel haptic feedback from the watch and see a small blue water drop next to the time in the top right of the watch face.
3. The touch screen and crown dial are now inactive
4. To exit Water Lock, press and hold the crown button until unlocked.

8. Troubleshooting

No Data Received

If you are not receiving data, verify the following:

1. **WiFi Connection:** Ensure your device is connected to WiFi
2. **Same Network:** Your device must be on the same WiFi network as your data source
3. **IP Address Match:** Check that the first three octets of your device IP match the data source (e.g., both should be 192.168.20.xxx)
4. **UDP Port:** Verify the UDP port settings match between RaceData2 and your data source (default: 6011)
5. **Expedition Streaming:** In Expedition, check Menu > Instruments > Raw Data to confirm data is being transmitted
6. **Ping Test:** Use the ping function in RaceData2 Settings to check if the data source IP address responds
7. **Data Listening Enabled:** Ensure 'Data Listening' is toggled ON in RaceData2 settings

Commands Not Working

- Ensure you are using Expedition protocol (commands do not work with NMEA 0183 etc)
- Verify the Expedition IP address is correctly entered in RaceData2 Settings
- Verify you can Ping the Expedition PC
- Check that 'Receive Marks' is enabled in Expedition's Exp Rx Filter
- Confirm commands are being received in Expedition's Raw Data window
- Check you are using Expedition minimum version v12.6

Apple Watch Not Receiving Data

- **Paired iPhone Mode:** Ensure the iPhone app is running and receiving data
- **RaceData3 Bridge Mode:** Verify watch is connected to WiFi and RaceData3 Bridge app settings are correct

10. Advanced Tips

Network Topology and Setup

For complex network setups with multiple devices, routers, and switches, refer to the RaceData2 Network Topology diagram:

Download: https://pub-4981bcabf59e448cb7f0ba321b814d37.r2.dev/RD2-topography.pdf

This document provides examples of typical yacht network configurations including:

- Expedition PC connected via router
- NMEA WiFi bridge configurations
- Multiple mobile devices receiving data simultaneously
- Proper IP addressing and subnet configuration

Broadcast vs. Unicast

Broadcast (Recommended): Set the last octet of the Expedition transmit address to .255 (e.g., 192.168.20.255). This allows all devices on the network to receive data without specific configuration.

Unicast: Send data directly to a specific device IP address. Useful for limiting network traffic but requires configuring each device individually.

Optimizing Battery Life

For long races, consider these battery-saving strategies:

- Use 'Dim in Pocket' to reduce screen brightness when not actively viewing
- Lower screen brightness manually in device settings
- Close other apps running in the background
- For Apple Watch: Use Workout Session (Start Session) for screen off control.

Multiple Devices

RaceData2 supports multiple devices receiving data simultaneously:

- Configure Expedition to broadcast data (see Broadcast vs. Unicast above)
    - This is easier than setting dedicated device IP addresses. Device IP's may change depending on your router DHCP settings.

If you want to restrict RD2 from sending commands to Expedition, use Tx +1 in Expedition Network settings. For example:

- Expedition port = 6010, and Tx +1
    - RD2 will receive data on 6011. Any commands sent to 6011 will not reach Expedition
    - Set RD2 Tx Port to 6010 for commands to reach Expedition.

Support & Resources

Getting Help

If you need assistance with RaceData2:

- **Email Support:** Contact us through the Field Yachting website
- **FAQ:** Visit fieldyachting.com/faq for additional troubleshooting tips