



Race Master

User Guide



Congratulations on the purchase of your **Race Master**. Tacktick have combined technological innovation with feedback from top sailors around the world to bring you the ultimate sailboat racing compass.

All Tacktick equipment and accessories are designed to the best industry standards for use in the leisure marine environment. Their design and manufacture is in compliance with CE Mark requirements, this includes electromagnetic compatibility.

Please read this User Guide carefully before using your **Race Master** and keep it for future reference.

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1. Registering your Race Master

To register for your international warranty, complete and return the warranty card to Tacktick Limited, PO Box 27, Emsworth P010 8YU, England. Retain your proof of purchase as you will need it in the event of a warranty claim.

We also recommend that you keep a record of your purchase:

Date of purchase:	Place of purchase:	Serial number:

2. Package Contents

Race Master
 Mounting Cradle
 4 M5 nuts, bolts and washers for the mounting cradle
 4 nylon screws
 Instructions
 Warranty card

Accessories (may be purchased separately)

Order No.

Race Master mast bracket (slug type)	T041
Race Master soft pack	T042

3. Features and Benefits

Simple installation, powered for life with Tacktick's unique **solar system**

Portable, yet rugged with the Tacktick snap in cradle

No need to adjust for **southern hemisphere** effects

Twin displays which are easy to read even when hiking

Wind shift display in graphic and numerical formats

Easy to use **countdown** timer

Waterproof, submersible to 10m

Low battery indicator

Race duration timer with **resynchronisation** function

Full calibration

Automatic power down if no motion is detected after 60 minutes

Backlighting with **automatic shut off** in daylight

Tacktick's unique technology has patents pending in the UK

4. Definitions and Terminology

True Wind Direction: The instantaneous magnetic bearing of the true wind.

Mean Wind Direction: The average true wind direction during the race.

Tacking Angle: The angle through which the yacht turns when changing from one tack to the next (typically around 90°).

When **Race Master** displays wind shifts, it assumes that your boat is close-hauled and that your Tacking Angle is constant. **Race Master** calculates your True Wind Direction by adding or subtracting half of your Tacking Angle to your heading. The True Wind Direction is only accurate if you are sailing close-hauled and your Tacking Angle has been set up for the prevailing conditions.

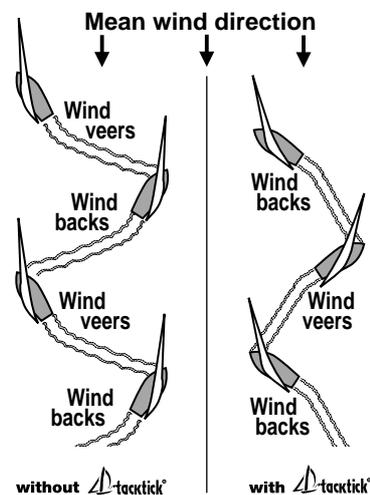
5. Introduction

5.1. Racing and wind shifts

Like most things in sailing, the wind does not remain constant in either strength or direction. The crew tend to react naturally to gusts but find wind shifts more difficult to detect. The wind does, however, tend to shift in regular patterns, oscillating between a back and a veer.

These oscillations give the sailor a chance to gain an advantage by sailing a shorter distance to the upwind mark.

In the diagram, the boat on the right sails a shorter course by tacking when headed and thereby sailing mostly in lifts.



5.2. What can Race Master do for me?

Race Master is the ultimate wind shift indicator, giving you precise, clear numerical and graphical readouts. Before the race, you program into **Race Master** the mean wind direction and the tack angle. During the race, you get an instant visual display of:

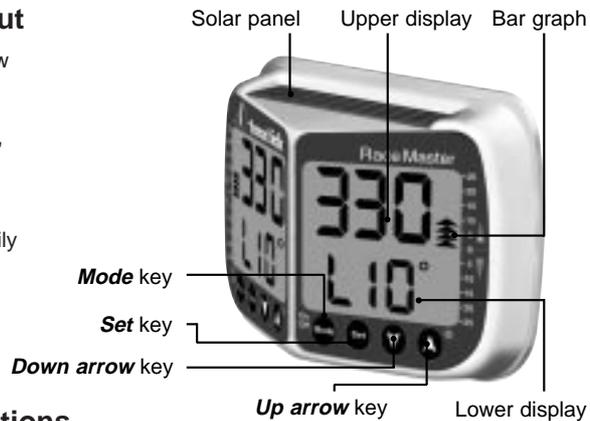
- Your heading as a large stable digital number (the upper display)
- How far you are sailing above or below the mean heading (lifted or headed) as a precise digital number (the lower display)
- How far you are lifted or headed in bar graph format for instant visual impact (the vertical bar graph)

Race Master gives you this critical information when you are sailing both upwind AND downwind. You must continue to sail your boat for maximum speed to windward, using the **Race Master** to help you decide *when* to tack. Timing your tacks is absolutely critical to winning races and **Race Master** shows you wind shifts more clearly than ever before.

Race Master's start timer is simple to operate, yet flexible enough to deal with any starting sequence giving the whole crew an audible sequence and a clear view of the countdown. Once past the start the timer will begin to count elapsed time.

5.3. Race Master layout

Race Master's twin displays show identical information at all times. This gives the instrument an exceptionally wide viewing angle, allowing the whole crew to see critical race information. With its twin (duplicated) keypads, crews can control the Race Master easily even when the boat is heeling.



6. Operating Instructions

6.1. Switching ON / OFF

- To switch ON Press and hold down the mode key until the display appears
- To switch OFF Press and hold down the mode key until the display clears (this will take 5 seconds)

If **Race Master** detects no movement for 60 minutes it will power down (this cannot happen at sea).

6.2. Before the race

Race Master always displays Compass Headings in the upper half of the display.

Before the race, you will need to set up the mean wind direction, the tack angle and the countdown timer. To move between **Main Page** and **Timer Page** in the lower display press the *mode* key.

Setting the Countdown Timer

1. Check you are looking at the Timer page.
2. Adjust the timer by pressing the *up* and *down arrow* keys.
3. Press the *set* key to start the countdown. Audible beeps will count you down to the start.
4. If the initial gun was not timed accurately, press the *set* key at any subsequent gun to automatically **resynchronise** the timer to the nearest full minute.
5. The main page is automatically displayed once the countdown period has elapsed and the race begins.
6. The timer will now count race time elapsed and is displayed in timer mode (press *mode* key)

You should see an "s" or "m" annunciator at the bottom right of the display, if not press the *mode* key.

The up and down arrow keys can be used at any time whilst in timer mode to reset the start time

The countdown timer can be set up to 40 minutes. Between 20 and 40 minutes the display will alternate between seconds and minutes remaining.

For rolling starts, count the number of fleets ahead of your start, and multiply the start time accordingly. This procedure ensures you have an automatic transition to the main page at the start.

Setting up the wind shift display

1. Sail upwind for several minutes to determine your average close-hauled heading on each tack.
2. Steer your average port close-hauled heading.
3. Ensure the **Race Master** is showing the Main Page.
4. Press the *set* key, you will hear a double beep and the bar graph will flash once.
5. Tack through the wind.
6. Steer your average starboard close hauled heading.
7. Press the *set* key, you will hear multiple beeps and the bar graph will flash twice.
8. You can adjust the tack angle, by using the *up* and *down arrow* keys.

If not then press the *mode* key.

Race Master displays '- - t' if it does not register a tack angle of 60° to 120°.

Keep the delay between tacks short to minimise the chance of a wind shift.

Race Master displays the tacking angle e.g. 90t for a 90° tacking angle.

After 7 seconds, Race Master automatically starts to display wind shifts.

Mean Wind Direction and Tacking Angle are now stored in the **Race Master** memory and wind shifts will be displayed on the bar graph.

You may start the procedure on starboard tack, but bear in mind that you will not have right of way when you subsequently tack onto port, so will have to plan ahead accordingly.

6.3. During the race

Sailing upwind, tack to keep the bar graph high (sail in the lifts). Sailing downwind, gybe to keep the bar graph low (sail in the headers).

The heading is always shown in the upper half of the display (the large digits)

Reading wind shifts whilst beating upwind

Graphic Display The bar graph indicates the wind shifts in 2.5° steps within the range $\pm 25^\circ$
Numerical Display Ensure the Race Master shows the main page. Windshifts are indicated by 'L' or 'H' with the degree of lift or header eg. L23°

Reading wind shifts whilst gybing downwind

Graphic Display The bar graph displays wind shifts in 2.5° steps within the range 0 to 50°. At 45°, for example, the bar graph is almost full length and the boat is sailing 45° from the mean downwind direction.
Numerical Display Windshifts are indicated by \lrcorner or \llcorner and show how far the boat is from the mean downwind direction eg. \llcorner 45° indicates 45° to starboard (\lrcorner indicates to port)

Permanent wind shifts

Permanent wind shifts can be recognised by constant headers on one tack and corresponding lifts on the other tack. In this situation the Mean Wind Direction can be manually adjusted:

Ensure the **Race Master** shows the main page, then:

- If on starboard tack, press the *up arrow* key
- If on port tack, press the *down arrow* key

Race Master automatically adjusts BOTH your close-hauled headings (the tack angle is assumed to be unchanged).

Elapsed time

Elapsed time can be accessed during the race by pressing the *mode* key.

6.4. Controlling the Backlighting

To turn the backlighting on:

1. Press and hold the *up arrow* key until the display shows L1.
2. Adjust the light intensity with the up and down arrow keys with a range from L1 - L2

If the battery power is not sufficient to power the backlighting, bAt will appear on the display screen.

To turn the backlighting off:

As above and press the *down arrow* key to adjust the level to LOFF

Daylight Detection: If daylight is sensed for over 4 minutes the backlighting will automatically switch off.

Note: Backlighting will use stored battery power, turn off when not needed and recharge during the day after use.

6.5. The battery status display

The battery status is shown for 5 seconds after the **Race Master** is switched on. The bar graph shows the charge level (a full bar graph indicates a full charge of 199 hours). The charge level is also displayed numerically in hours remaining (assuming the backlighting will not be turned on). If the backlighting is turned on see the table below.

Effect of backlighting on battery level (assuming a full charge initially)

Backlighting off	199 hours remaining
Backlighting level 1	30 hours remaining
Backlighting level 2	15 hours remaining

The backlighting uses battery power heavily. If using backlighting ensure that the **Race Master** is recharged before using again by leaving on a windowsill facing out towards the sun until the battery charge shows 199 hours.

See maintenance section for recharging times.

If the battery level falls below 50 hours then the battery status will appear on the display screen for 2 seconds every 4 minutes and the backlighting will automatically be turned off.

7. Advanced operation

7.1 Working out the line bias at the start

Race Master can help you establish accurately the line bias prior to the start of the race.

Note that the line bias page only works when you have already set up the mean wind direction (see the "before the race" section above).

1. To see the line bias page, press and hold the *mode* key for 2 seconds.
2. Sail directly along the start line, then press the *set* key.

The line bias symbol will appear on the lower display: |—|

Race Master indicates which end of the line is favoured, and by how many degrees e.g. for a starboard bias of 15°, the lower screen would show 15—|.

3. This is normally sufficient for a starting decision. In this case press the *mode* key to return to the main page.
4. Turn the boat towards the eye of the wind, steering to match the compass heading (the upper display) with the line direction (the lower display).

Should there be any doubt about the line bias, or the setting of the mean wind direction, continue with the steps below.

When the two headings match, check to see where the wind is coming from. If the wind is coming from the starboard side, the line is starboard biased, or from the port side, is port biased.

7.2. Setting the wind shifts by going “head to wind”

Assuming you have already set up the tack angle (either by the set up method described in “before the race” above, or by direct entry as described below), you can set the mean wind direction by sailing head to wind:

1. Take the boat head to wind.
2. Ensure the **Race Master** shows the Main Page.
3. Press and hold down the *set* key until the rotating lines are shown.
4. Press *set*.
5. To fine tune your direction, press *set* again.
6. Press the *mode* key, to complete the operation.

If **Race Master** is not showing the main page then press the mode key.

Race Master stores the wind direction.

Race Master stores the wind direction.

The main page is displayed.

7.3. Setting the wind shifts “single handed”

Unlike the standard set up method you press and hold the *set* key just once and **Race Master** then guides you through the sequence without the need to press any more keys. **Race Master** will average each close-hauled heading for 10 seconds.

1. Sail upwind for several minutes to determine your average close-hauled heading on each tack.
2. Ensure the **Race Master** shows the main page
3. Press and hold down the *set* key until the rotating lines are shown.
4. The rotating lines will circle for 30 seconds while you power the boat up on the first close-hauled tack. **Race Master** will register the average heading of the last 10 seconds as your normal close-hauled heading for this tack. This is indicated by the rotating lines freezing.

If **Race Master** is not showing the main page then press the *mode* key.

5. **Race Master** now tells you to tack - indicated by 'tAC' on the display, and beeping.
6. You now have 15 seconds to tack and steady her on the new course. The rotating lines appear again.
7. After 20 seconds, **Race Master** registers the average of the last 10 seconds of headings and beeps again.
8. You can adjust the tacking angle, by using the *up* and *down arrow* keys.

Race Master displays the tacking angle e.g. 90t for a 90° tacking angle.

After 7 seconds, **Race Master** automatically starts to display wind shifts.

Mean Wind Direction and Tacking Angle are now stored in the **Race Master** memory and wind shifts will be displayed on the bar graph.

7.4. Setting the wind shifts before you set sail

You must input the Mean Wind Direction and Tacking Angle.

Wind direction information can be gained from a variety of sources pre-race:

- Weather Forecast
- Race committee boat
- The bearing to the windward mark

The Tacking Angle will be stored in the **Race Master** from your previous race, however, if you feel that it has changed you can enter it directly.

To enter the Mean Wind Direction:

1. Ensure the **Race Master** shows the Main Page
2. Press the *set* key and hold it for 4 seconds (ignore the rotating lines, just keep holding the set key down). The lower display will show the previously stored Mean Wind Direction (180° from factory).
3. To adjust the setting press the *up* or *down arrow* keys
4. When you have finished, press the *mode* key to return to the Main Page

If **Race Master** is not showing the main page then press the *mode* key.

Holding down the *up* and *down arrows* keys will scroll the display when adjusting settings.

To enter the Tacking Angle:

1. Ensure the **Race Master** shows the Main Page
2. Press the *set* key and hold it for 6 seconds (ignore the rotating lines and the true wind direction display, just keep holding the *set* key down). The lower display will show the previously stored Tacking Angle (90t from factory).
3. To adjust the setting press the *up* or *down arrow* keys.
4. When you have finished, press the *mode* key to return to the Main Page

Mean Wind Direction and Tacking Angle are now stored in the **Race Master** memory and wind shifts will be displayed on the bar graph.

8. Adjusting the calibration

Your **Race Master** is designed to operate correctly from the factory and there should be no need to alter the calibration. This section is included only for customers with unusual boat types or other special requirements.

1. To **enter** calibration press and hold the mode and set keys simultaneously for 2 seconds. The upper display will show "CAL".
2. To **move through** each of the following calibration pages, press the *mode* key.
3. To **exit** calibration and save the new inputs press the *mode* key repeatedly until you return to your normal display. Any changes you have made will then be stored, even if you power down.

C1 (Calibration 1) - Adjusts the speed of heading response

Adjust the response speed by pressing the *up* and *down arrow* keys. The default setting is automatic and this is best for most boats and conditions.

Range of adjustment is from automatic (A) through 1 (slowest), 2 and 3 (fastest).

To move to the next calibration page, press the *mode* key.

C2 (Calibration 2) - Adjusts the compass offset

Adjust the heading offset by using the *up* and *down arrow* keys.

From the factory, the compass is designed to display 000° when the compass faces North. If, for example, your bracket is slightly skewed the offset will need to be adjusted.

To move to the next calibration page, press the *mode* key.

C3 (Calibration 3) - Compensates for Compass deviation

This allows the compass deviation to be automatically compensated. Any previously detected magnetic interference is shown eg. d12° means 12° deviation previously detected.

To calibrate:

1. Fix **Race Master** in its normal place and choose open water and a calm day. Do not put up the sails as you need to be able to control the boat in a very slow gentle circle.
2. Press the set key - rotating indicators will appear in the bottom of the display.
3. SLOWLY circle the boat to port or starboard - a quarter of a turn should take **AT LEAST ONE MINUTE**.
4. On completion of a full turn the **Race Master** will beep and the new deviation will be displayed to the bottom right of the display.

Alternatively, you can calibrate ashore on a trailer. Fix **Race Master** in its normal position (ensuring that the metal of the trailer is at least 4 feet from the compass site).

If the rotating indicator speeds up and the **Race Master** beeps rapidly then reduce your rate of turn or start again.

If the deviation exceeds 20° the **Race Master** should be resited.

To exit calibration and save the new inputs press the *mode* key.

9. Installation

Mount the **Race Master** within 20° of the vertical to ensure the compass is able to operate accurately. Mounting at a more extreme angle will cause deviation errors.

There are 2 options for installation.

1. Mast mounting with the T041 mast bracket and the mounting cradle

- i. Drop the slug into the mast groove. Use the centre bolt to secure the slug at the correct height.
- ii. Offer the bracket to the mast, bolting into the slug.
- iii. Fit the two velcro straps for additional rigidity if required.
- iv. Fit the cradle to the bracket using the four nuts/washers/bolts provided
- v. Now clip your **Race Master** to the cradle each time you race



Cradle

Mast Bracket

2. Bulkhead mounting with the mounting cradle

- i. Fit the cradle to the bulkhead using M5 countersunk bolts (supplied) and a sealant to ensure the cradle is sealed to the surface. **WARNING:** take care to avoid damage to existing wiring.
- ii. Now clip your **Race Master** to the cradle each time you race.

10. Maintenance

The **Race Master** is totally sealed against water and is not serviceable. Any attempt to take the **Race Master** apart will invalidate the warranty.

To clean, use only a damp soft cloth. No detergents, solvents or abrasives should be used.

To avoid damaging the **Race Master**, we recommend storing in the Race Master soft pack (T042)

When sailing in bright sunlight it should not be necessary to recharge your **Race Master** after use. If the battery level falls below 100 hours, recharge by leaving on a windowsill facing outside towards the sun until the battery level is recharged to 199 hours.

Approximate recharging times

Bright sun	2 days
Cloudy days	5 days
Dull days	10 days

It is not possible to recharge batteries with electric lighting - sunlight must be used.

Ensure the mounting bracket is secure and check that the security bolts are tight before each race.

11. Problem Solving

Problem	Possible cause	Action required
Race Master turns itself off	Race Master is on land and stationary	Turn Race Master on again and ensure movement every 60 minutes.
	Low battery power	Check battery status screen (battery status section). If battery is close to zero recharge batteries (maintenance section).
Backlighting turns itself off or will not turn on	Daylight detected	No action required. Race Master is designed to turn the backlighting off when light is detected to save battery power.
	Battery power is not sufficient for backlighting	Check battery status (battery status section). If charge level is below 50 hours recharge batteries (maintenance section).
Compass deviates from the expected heading	Race Master is not mounted correctly	Ensure the mounting angle is within 20° of the vertical.
	Magnetic objects are within 70cm (2ft) of the Race Master	Remove magnetic objects or adjust compass correction (calibration 3).
Bar graph does not indicate head / lift properly	Race Master is not set up correctly	Go through one of the set up procedures again.
Race Master 'rattles' when shaken	The sound is the internal liquid damping system	No action required - this is normal.

If you still experience problems contact your local Tacktick dealer.

Note:

If your Race Master appears to malfunction, leave on a window ledge facing the sun for 2 days to fully recharge the batteries. Remove from sunlight when the battery charge reaches 199 hours.

12. Race Master Specification

Character Height	30mm on upper display. 20mm on lower display
Backlighting	Yes
True Wind Direction	Calculated from heading and tack angle
Calibration	Fully adjustable
Waterproofing	Submersible to 10m
Heading Resolution	1°
Heel & pitch angle	±30°
Timer	1 second resolution, 1 to 40 minutes
Countdown alarms	Audible tones indicate time to start
Size	165 x 120 x 55mm
Weight	350g (13oz)
Battery Charging	Solar power
Battery Life	200 hours (20 with backlighting) automatic solar recharging

12. Warranty and After Sales Service

Tactick Limited or its authorised Distributors will repair or replace a Tactick product free of charge where a manufacturing fault becomes apparent within two years of the purchase date provided:

- No unauthorized attempt has been made to repair the product
- The product has not been misused, operated outside of its intended environment or operated in a manner which is incompatible with the written instructions supplied on purchase

Proof of purchase date is required for the warranty to be valid.

Failure *within* the Warranty Period:

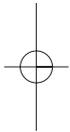
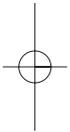
Simply return your **Race Master** to your nearest authorised Tactick Distributor, together with proof of purchase date.

Failure *outside* the Warranty Period:

Simply return your **Race Master** to the nearest authorised Tactick Distributor and an estimation for repair will be provided.

Authorised Tactick Distributor details can be found on:

<http://www.tactick.com>, the back of Tactick brochures, or contact Tactick Limited in England +44 (0)1243 379331 for your nearest dealer.



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