







# ***SAILING MASTER™***

## **Sailing Manual**



Starboard Software

## Sailing Manual

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# Contents

|   |     |
|---|-----|
| Welcome.....  | i   |
| If you hate to read manuals and know how to sail..... | i   |
| Manual Organization.....                              | ii  |
| For More Information on Sailing.....                  | iii |
| Technical Support.....                                | iv  |
| Chapter 1 Display .....                               | 1   |
| Start Up Window .....                                 | 1   |
| Settings Window .....                                 | 1   |
| Weather Report Window .....                           | 6   |
| Race Screen (Macintosh).....                          | 7   |
| Race Screen (Windows).....                            | 8   |
| Instrument Window.....                                | 9   |
| Boat View Window .....                                | 10  |
| Water .....   | 10  |
| Boats .....   | 10  |
| Race Course Components.....                           | 12  |
| Control Window .....                                  | 13  |
| Push Button Interface.....                            | 14  |
| Cockpit Interface (Mac only).....                     | 14  |
| Stern View Window .....                               | 15  |
| Conditional Objects .....                             | 16  |

**Sailing Manual**

- Course Window .....17
  - Course View Components .....17
  - Leg View Components.....18
- Menu Bar.....19
  - About Sailing Master.....19
  - File Menu.....19
  - Options Menu .....19
- Results Window .....20
- Chapter 2 Sailing the Boat.....23
  - Introduction .....23
  - Steering the Boat.....24
    - Holding Course.....24
    - Pointing Up.....25
    - Tacking.....26
    - Falling Off .....26
    - Jibing.....27
  - Visual Cues .....28
    - Heading and Wind Arrow .....28
    - Boatspeed.....28
  - Practice.....29
  - Boat Heel .....29
  - Sail Trim .....31

## Contents

|                                       |    |
|---------------------------------------|----|
| Rapid Sheeting .....                  | 33 |
| Points of Sail and Sail Trim .....    | 33 |
| Using the Telltales.....              | 34 |
| When to Adjust Sail Trim .....        | 35 |
| Practice.....                         | 35 |
| Smart Tiller .....                    | 35 |
| Using the Keyboard (Optional).....    | 36 |
| Chapter 3 Rules of the Road.....      | 39 |
| Introduction .....                    | 39 |
| Race Course Layout .....              | 40 |
| Leeward Mark and Start Line.....      | 41 |
| Windward Mark .....                   | 41 |
| Jibe Mark (Olympic Course only).....  | 41 |
| Legs .....                            | 42 |
| Rounding Marks .....                  | 42 |
| Finish Line.....                      | 42 |
| Racing Rules.....                     | 42 |
| Opposite Tacks (Port-Starboard) ..... | 42 |
| Same Tack (Windward-Leeward) .....    | 43 |
| Changing Tack.....                    | 43 |
| Buoy Room .....                       | 44 |
| Touching a Mark .....                 | 44 |

# Sailing Manual

|  |    |
|--|----|
| Warnings .....                               | 44 |
| Penalties.....                               | 45 |
| Accidents .....                              | 45 |
| Colliding with the Committee Boat .....      | 45 |
| Running Aground .....                        | 46 |
| Hazards.....                                 | 46 |
| Chapter 4 Racing .....                       | 47 |
| Introduction .....                           | 47 |
| Wind Characteristics .....                   | 47 |
| Water Color .....                            | 48 |
| Prevailing Wind.....                         | 48 |
| Puffs and Lulls .....                        | 49 |
| Beating .....                                | 50 |
| Current Wind Direction.....                  | 50 |
| Using Wind Patterns.....                     | 53 |
| Using the Course View .....                  | 53 |
| Using the Leg View.....                      | 54 |
| Upwind Tactics: Bad Air and Slam Dunks ..... | 55 |
| Approaching the Windward Mark.....           | 56 |
| Rounding the Windward Mark .....             | 58 |
| The First Reaching Leg (Olympic Course)..... | 59 |
| Downwind Tactics.....                        | 60 |

## Contents

|   |    |
|---|----|
| Approaching the Jibe Mark .....         | 61 |
| Rounding the Jibe Mark .....            | 61 |
| The Second Reaching Leg (and Runs)..... | 62 |
| Approaching the Leeward Mark .....      | 62 |
| Rounding the Leeward Mark .....         | 62 |
| Finishing the Race .....                | 63 |
| Upwind Finish .....                     | 63 |
| Finishing on a Downwind Leg .....       | 64 |
| Ending the Race .....                   | 64 |
| Appendix A Learning to Sail.....        | 65 |
| Introduction .....                      | 65 |
| Lesson 1: The Sailboat .....            | 66 |
| Lesson 2: Your First Sail .....         | 67 |
| Lesson 3: Maneuvering Upwind.....       | 68 |
| Lesson 4: Understanding Wind .....      | 69 |
| Lesson 5: Introduction to Sails.....    | 70 |
| Lesson 6: Using the Sails.....          | 71 |
| Lesson 7: Maneuvering Downwind .....    | 72 |
| Lesson 8: Right-of-Way .....            | 73 |
| Appendix B The Cockpit Interface.....   | 75 |
| Introduction .....                      | 75 |
| Steering the Boat.....                  | 77 |

**Sailing Manual**

Holding Course.....77

Pointing Up.....78

Tacking.....79

Mastering Tacking with the Mouse.....80

Falling Off.....81

Jibing.....82

Sail Trim .....82

Index .....85



# Welcome

Welcome. If you like, you can hop in the white boat right now and start puttering around. However, to get maximum enjoyment from the program and improve your chances of winning, you need a clear understanding of your boat, the course, the competition, and the applicable rules. Therefore, we recommend that you spend a few minutes reading this manual before setting sail.

This manual describes the operation of Sailing Master on both IBM-compatible computers running Microsoft Windows and on Apple Macintosh systems. The program appears and operates nearly identically on both systems. Therefore, unless otherwise noted, the description in this manual applies to both version of the program.

## **If you hate to read manuals and know how to sail**

Load and launch the program. When the Settings Window appears, set level to 1 and turn Autoheel and Autotrim on with 2 boats. Press OK in the Settings Window and then in the Weather Report Window. When the Race Screen appears, by default you control the white boat. Turn Autopilot on in the Options Menu to let the computer control your boat.

## Sailing Manual

Observe the following changes during the race:

The arrow at the top of the Boat View Window indicates changes in the wind direction.

When the wind shifts, the boats will often change course. Note how the boats use the tiller/rudder to turn.

The boats follow a triangular path around the course. The course is represented by three marks shown as dots in the Course Window in the middle left of the screen. The marks will also appear in the main Boat View Window and in the Stern View Window in the lower left of the screen. The Start and Finish Lines are defined by a mark and the race committee boat.

To see a closer view of where your boat is on the race course hit the space bar or mouse-click in the Course Window.

After you have observed the race for a while, turn off Autopilot and experiment maneuvering your boat using the push buttons:

**Point Up** causes your boat to head higher toward the wind (until you come about). Select **Hold Course** to stop turning.

**Tack** makes your boat turn upwind very rapidly. Select **Hold Course** to stop tacking.

**Fall Off** causes your boat to bear away from the wind (until you jibe). Select **Hold Course** to stop falling off.

**Jibe** causes your boat to fall off rapidly. Select **Hold Course** to stop jibing.

Refer to this manual as needed.

## Manual Organization

This manual is organized as follows:

Chapter 1, "Display", describes what you see on the screen - the windows, controls, and indicators.

Chapter 2, "Maneuvering the Boat", discusses how to control your sailboat using the mouse and the keyboard.

Chapter 3, "Rules of the Road", describes the course and the sailing rules enforced in the program.

Chapter 4, "Racing", guides you through the race.

Appendix A, "Learning to Sail", contains a series of lessons for teaching sailing concepts with an introductory sailing text.

Appendix B, "The Cockpit Interface", describes a method available on Macintosh computers for controlling the boat from a simulated cockpit.

## For More Information on Sailing

Sailors wishing to learn more about sailing and racing in conjunction with this software will find the following books helpful.

To learn about sailing basics:

Fries, D., *Start Sailing Right!*, American Red Cross/U. S. Sailing, Newport, RI, 1988.

To learn about racing:

Brown, A., *Invitation to Sailboat Racing*, Simon and Schuster, New York, NY, 1972.

Fries, D., *Single-Handed Racing: High-Performance Sailing Techniques*, Contemporary Books, Inc., Chicago, IL, 1986.

Fries, D., *Successful Sunfish Racing*, John de Graff, Inc., 1984.

## **Sailing Manual**

### **Technical Support**

We are committed to providing customers with excellent products and technical support. If you have any questions, comments, or suggestions, please call us at 313/662-4393 (FAX: 313/662-0425) or write to us at the following electronic and surface mail addresses:

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# Chapter 1 Display

This chapter introduces the menus, windows, and controls in order of appearance in the program. Subsequent chapters discuss their operation in greater detail. New users should follow the recommendations for initializing the settings.

## Start Up Window

When the program is launched, the Start Up window appears on the screen, displaying the version number and company information. In the Windows version, click on the Start button to proceed.

## Settings Window

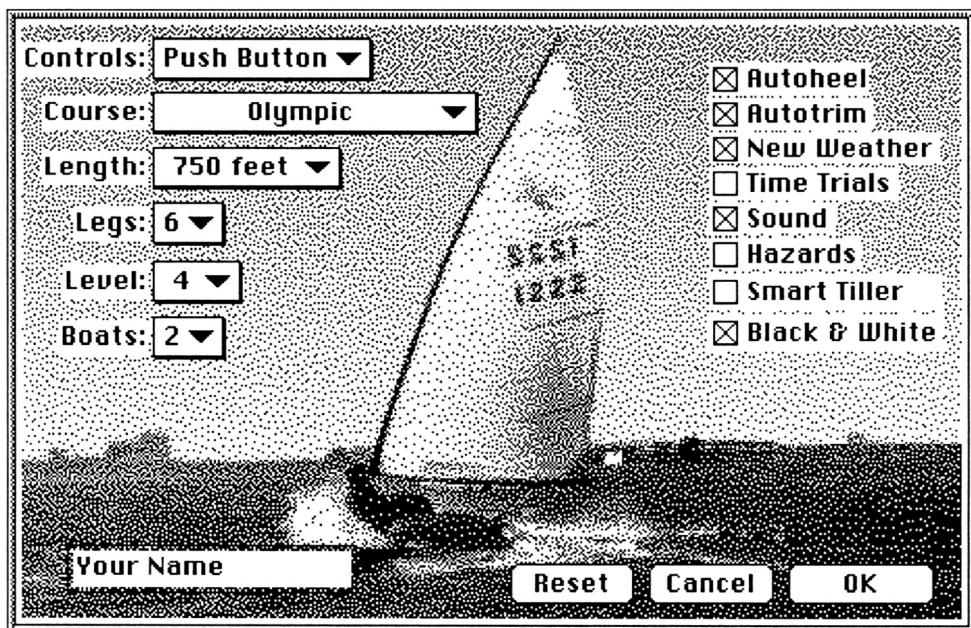


Figure 1. The Settings Window  
(Macintosh)

The Settings dialog window immediately replaces the Start Up window. The Settings Window displays pull down menus, check boxes, and mouse

## **Sailing Manual**

buttons so that you can completely configure a race using the mouse. The program recalls the settings used in your last race and displays them by default in the Settings Window fields.

The pull down menus on the left of the Settings Window perform the following functions:

### **Controls (Macintosh only)**

The Controls menu lets you choose from two methods of manipulating your boat. The Push Button method (described in Chapter 2) lets you control your boat using a labeled set of mouse buttons. The Cockpit choice (described in Appendix B) allows you to steer the boat and trim the sails directly by moving a tiller and mainsheet. New users should select the Push Button field.

### **Course**

The Course menu offers a choice between Olympic and Windward/Leeward style courses as described in Chapter 3.

### **Length**

The Length menu determines the distance in feet between the windward and leeward marks. You can select a course ranging in length from 300 to 2000 feet on the Macintosh version and 300 to 1500 feet on the Windows version.

### **Legs**

You can choose a race ranging from 1 to 6 legs. Note that course length and the number of legs help determine the duration of a race. Under average wind conditions and skill levels, a 1 leg, 300 foot race can take as little as a minute whereas a 6 leg, 2000 foot race may last over half an hour.

### **Level**

This menu determines the competitiveness of the boats raced by the computer. The highest level at which you can consistently win races indicates your proficiency. Select Level 1 when first starting.

### **Boats**

This field determines the total number of boats competing in the race. When you first start practicing the program, you may want to set the number of boats to 1 so that you will not be distracted by other boats while you learn the ropes.

### **Autoheel**

Selecting this check box causes the program to always correctly position your weight in the boat. This action helps maximize your boat speed by optimizing the angle (*heel*) of the boat relative to the water. If you do not select Autoheel, you will have to position your weight using a slider. When getting started, select Autoheel. Later, for a more realistic challenge, leave this box unchecked.

### **Autotrim**

Selecting this check box causes the program to always correctly adjust (*trim*) the sail on your boat. This action, along with Autoheel, helps to maximize your boat speed. If you do not select Autotrim, you will have to trim the sail yourself. When getting started, select Autotrim. When you become more proficient, leave this box unchecked.

### **New Weather**

This check box determines whether the next race will have the same weather conditions as the previous race.

### **Sound (Macintosh only)**

This check box enables the playing of sounds (committee boat horn, luffing sail, etc.) during a race. Note that sound tends to slow down the screen display, especially on older Macs.

### **Time Trials**

This check box enables formal support for time trials. The option allows multiple players to match skills and individuals to simulate different strategies and tactics over identical weather. Before the first time trial, you may change the weather report until it appears to your liking. However, in subsequent races the Change button in the Weather Report Window will be dimmed.

## **Sailing Manual**

You may not change the course parameters (Course, Legs, and Length) between races because this would invalidate the comparison. If you attempt to do so, an Alert will appear allowing you to either cancel the changes or to start a new series of time trials. You can change other settings so that each player can have a competitive race against the computer as well as the time trial participants.

After each time trial, the individual race results will appear at the top of the Results Window, with the time trial rankings directly below. The time trial rankings are sorted first on the basis of finish place in the race and second on the finish time. Therefore, time trial participants should concentrate primarily upon winning the race rather than completing the course as fast as possible - these two objectives do not always coincide. Each participant should enter his or her name in the lower left of the Settings Window.

### **Hazards**

This check box enables "hazards" such as row boats and windsurfers that provide an additional challenge.

### **Smart Tiller**

Checking smart tiller makes it easier to sail close-hauled while maneuvering upwind. We recommend that you first learn to steer your boat without this feature.

### **Black & White (Macintosh only)**

The Black & White check box only appears on Macintoshes that have the 32-bit Color Quickdraw system software installed. Users with black and white monitors should always check this feature. Displaying in black & white also significantly improves screen updating on color Macs.

### **Name Field**

By default, the text entry field in the lower left displays the name of the Sailing Master licensee. This field should be changed before each race in a time trial competition.

### **Cancel**

Clicking Cancel exits the program.



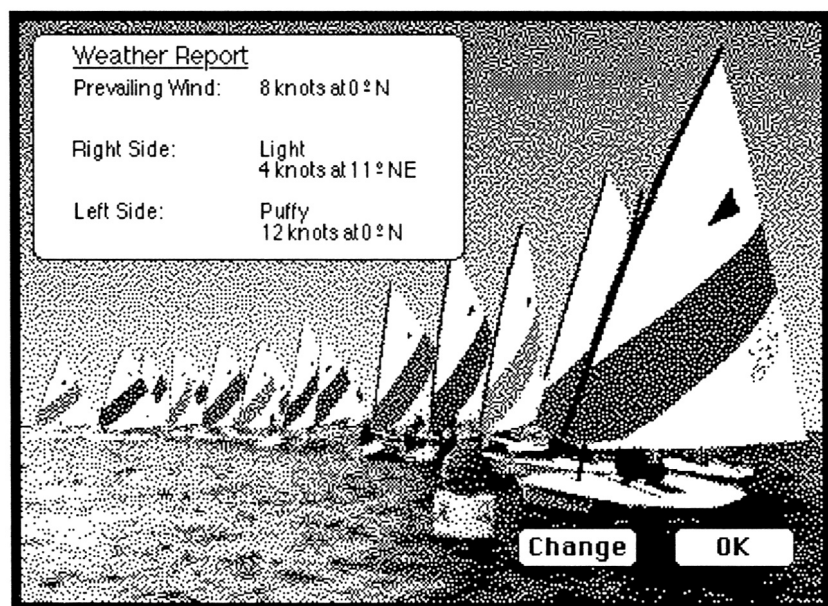
### **Reset**

Reset returns the settings to their default values if the race is the first in a session, otherwise it returns them to their values for the previous race.

### **OK Button**

Clicking the OK Button with the mouse or hitting the return key on your keyboard causes the program to accept the settings.

### Weather Report Window



**Figure 2. The Weather Report Dialog Window**

The Weather Report dialog window appears just before the race is about to start. On slower computers there may be a delay of up to 15 seconds before the OK button appears in the lower right hand corner. This report provides information about the wind characteristics on the course (explained in Chapter 4). After you have read the report, click on the OK button to begin the race. If you don't like the weather conditions, click on Change.

## Race Screen (Macintosh)

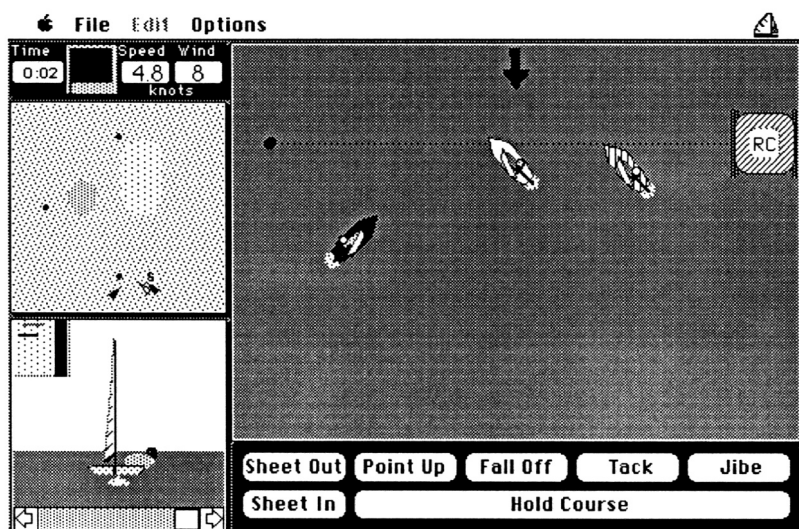


Figure 3. The Race Screen (Macintosh version)

# Sailing Manual

## Race Screen (Windows)

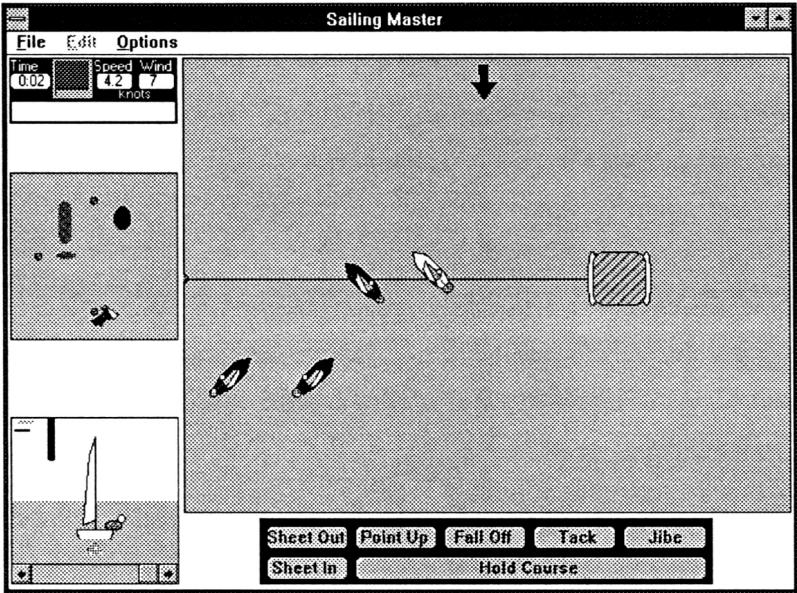


Figure 4. The Race Screen (Windows version)

The primary race screen contains the five windows which display the race action and allow you to interactively sail your boat. Described in clockwise order from the upper left, these windows are:

1. Instrument Window
2. Boat View Window
3. Control Window
4. Stern View Window
5. Course Window

The following sections describe the components of each window in detail.

## Instrument Window



**Figure 5. The Instrument Window**

The Instrument Window contains four instruments or indicators which provide feedback on race conditions. In *Sailing Master for Windows*, messages appear beneath these instruments. From left to right these instruments are:

### The Race Clock

The race clock indicates the elapsed time of the race in minutes and seconds. The time displayed is negative before the race starts (the *prestart*).

### The Race Flag

The race flag shows signals indicating the current status of the race.

### The Boatspeed Indicator

This instrument displays your boatspeed in nautical miles per hour (knots).

### Windspeed Indicator

The windspeed indicator quantifies wind intensity applied to your boat.

# **Sailing Manual**

## **Message Box (Windows only)**

The race committee will occasionally post messages in the Instrument Window to alert you to events occurring during the race. These messages will appear briefly in a white message box in the bottom of the window. For example, when a boat crosses the finish line, the race committee will inform you of this event via the message box.

## **Boat View Window**

The Boat View Window shows an overhead view of your boat and the competition. The wind arrow at the top of the view indicates your sailing angle. The size of the window depends upon the size of your monitor (Macintosh) or the resolution of your graphics driver (Windows). The view shifts so that your boat is always visible in the window.

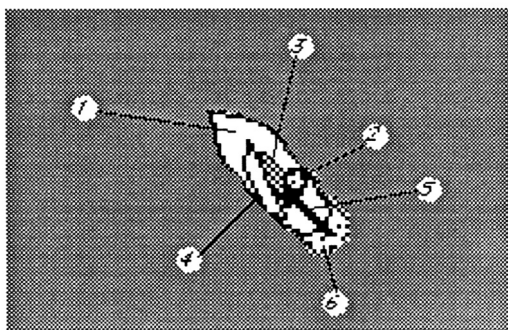
The following items and component parts are visible in the boat view window:

### **Water**

The background of the view consists of the water in the lake. The color or pattern of this water indicates the wind strength near your boat.

### **Boats**

The boats are high performance one-design single handed yachts similar in design and performance to the Force 5 or Laser models. Your boat, the one with the white hull, always appears in the Boat View Window. In addition, competing boats, distinguished by darker patterns and/or different colors will also appear in the window if they are reasonably close to your boat. Each boat consists of the following components:



**Figure 6. Boat Components**

### 1. Hull

The hull is the main body of the boat.

### 2. Sailor

The sailor, represented by a circle, almost always sits on the side of the boat closest to the direction of the wind (the *windward* side) applied to the boat. You literally are the sailor of the white boat.

### 3. Cockpit

The cockpit is the gray area within the hull.

### 4. Sail

The sail is the white area outlined in black which extends from the front of the cockpit to the rear or side of the boat. The sail almost always lies on the side of the boat opposite the sailor. This side, which is farther from the wind, is called the *leeward* (rhymes with steward) side.

### 5. Tiller/Rudder Assembly

The tiller and rudder of the boat are represented by a single thick line drawn from the rear or *stern* of the boat up to the rear half of the cockpit. The rudder is the part of the line which extends over the stern of the boat, while the tiller is the longer part which lies over the hull. The sailor steers the boat by pushing away, pulling in, or centering the tiller. These actions, in turn, cause the rudder to affect the direction of the boat.

## Sailing Manual

### 6. Wake

When the boat moves over the water, the hull and rudder create a wake (an area of disturbed water) behind the stern. In the Boat View, this wake is represented by a circle of a lighter pattern or color than the surrounding water. The faster the boat is moving, the bigger the wake.

## Race Course Components

### 1. Buoys



Figure 7. Boat Rounding a Buoy

The course is defined by a sequence of up to three buoys (also called marks) which float in the water. When your boat nears one of these marks, the buoy appears as a small dark circle in the boat view window.

### 2. Committee Boat and Start/Finish Line



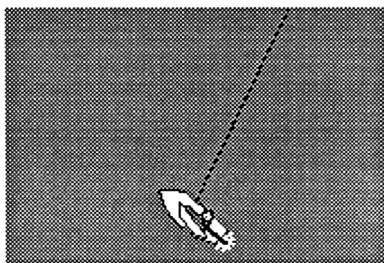
Figure 8. Boats Approaching the Start Line

The start and finish lines of the sail boat race are indicated by a dotted line drawn between a buoy and the *race committee boat*. The race committee boat is so named because its crew sets the course, posts the race flags in the information window, and officiates the race. The race committee boat is a slow moving pontoon boat which only appears at the start and finish of the



race. The Boat View depicts the race committee boat with two pontoons and a striped roof (bearing the letters "RC" in the Macintosh version).

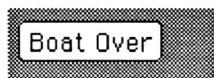
### 3. Guide Line



**Figure 9. The Guide Line**

Quite frequently, you will be very close to a mark which is just outside the field of view shown in the Boat View Window. Since you need to be aware of this mark in these situations, the program draws a line called the Guide Line emanating from your boat in the direction of the mark. The line will disappear when the mark becomes visible or when you move further away from the mark.

### 4. Message Box (Macintosh only)



**Figure 10. The Message Box**

The race committee will occasionally post messages in the Boat View Window to alert you to events occurring during the race. These messages will appear briefly in a white message box in the upper left hand corner of the window. For example, when a boat crosses the finish line, the race committee will inform you of this event via the message box.

## Control Window

The Control Window is directly below the Boat View Window. You will steer your boat and (if Autotrim is not selected) trim the sail in the Control Window. The Control Window will contain either the Push Button Interface or the Cockpit Interface (Mac only).

## Sailing Manual

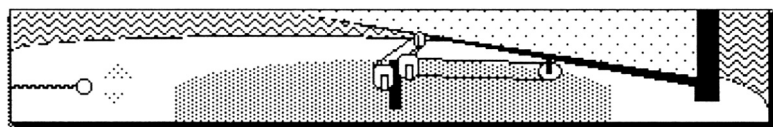
### Push Button Interface



**Figure 11. Push Button Interface with Autotrim enabled**

The Push Button Interface allows the user to control the boat using a set of buttons labeled with standard sailing terminology.

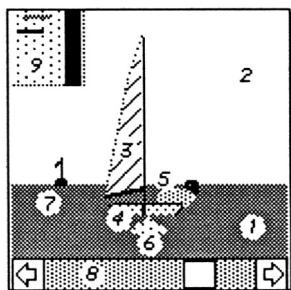
### Cockpit Interface (Mac only)



**Figure 12. The Cockpit Interface with Autotrim enabled and the boat on starboard tack**

The Cockpit Interface allows the user to control the boat by directly manipulating the tiller and mainsheet. Appendix B describes this process in detail.

## Stern View Window



**Figure 13. The Stern View Window as the Boat Approaches the Upwind Mark with Autoheel Disabled**

The Stern View Window shows you a three-dimensional view of your boat from directly astern. This view allows you to control your position in the boat and monitor sail trim, wake, and course buoys. The Stern View Window displays the following objects.

### 1. Water

### 2. Sky

### 3. Sail

As in the Cockpit Interface you can clearly see the sail attached to the boom and mast. The appearance of these objects will change as the sail is trimmed.

### 4. Hull

In this view of the hull, you can see the stern along with a short vertical line representing the rudder.

### 5. Sailor

The head and torso of the sailor (you) sitting aboard the hull are represented by a dark circle attached to a shaded oval.

## **Sailing Manual**

### **6. Wake**

When the boat is moving, its wake appears as a pie shaped slice emanating from the rudder. As in the Boat View, the wake size increases with boat speed.

## **Conditional Objects**

The following objects appear only under certain conditions.

### **7. Buoy (Mac only)**

A three dimensional view of the buoy appears in this view when you are near the mark. This representation consists of the buoy itself floating in the water and a small identifying flag attached to it. The buoy gets bigger as you approach it. When you are very close to the mark, you will see a number identifying the buoy on the flag.

### **8. Heel Slider**

When Autoheel is disabled, the Heel Slider appears in the Stern View Window. You will have to control the heel of the boat manually by moving the slider to the left or right. As you do so, your weight shifts in the boat changing the angle of the stern relative to the water.

### **9. Tell Tales**

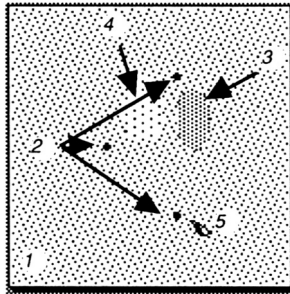
When Autotrim is disabled, wind indicators called tell tales appear in the Stern View. The tell tales are attached to your sail near the mast. The stern view shows an expanded inset view in the corner of the window. On starboard tack the tell tales appear in the upper left, on port tack they appear in the upper right. Chapter 2 describes how to use these indicators.

## Course Window

The Course Window shows two separate views called the Course View and the Leg View. The Course View allows you to monitor conditions over the entire race course. The Leg View shows a more detailed picture of the current leg on which you are sailing. (The current leg is defined by the last mark you have passed and the mark which you are approaching.)

The Course View always appears by default at the start of a race. You toggle between views by mouse-clicking with the cursor in the Course Window or tapping the space bar on the keyboard.

## Course View Components



**Figure 14. Course View Components of the Course Window**

### 1. Water

The water provides the background of the Course View.

### 2. Course Marks

The three dots arranged in an isosceles triangle in the center of the lake represent the marks or buoys which define the race course.

### 3. Puffs

The darker ovals on the surface of the water represent puffs where the windspeed is greater than the prevailing conditions on the course.

## Sailing Manual

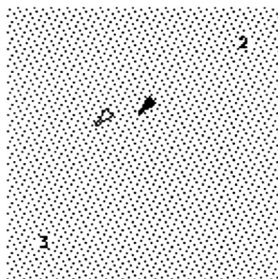
### 4. Lulls

The lighter ovals on the surface represent areas of lighter wind than prevails on the rest of the course.

### 5. Boats

A boat in the course view appears as a small triangular symbol pointed in the direction the boat is heading. Your boat symbol is white, all other symbols are black (shaded on color systems). When the boats are close together in the course view, the boat symbols will overlap due to the compressed scale of the view.

## Leg View Components



**Figure 15. The Leg View of the Course Window**

### Water

The background of the leg view shows the water on the course. Puffs and lulls are not shown in the leg view.

### Marks

In the leg view, one or two marks will be visible unless you have sailed far away from the course. A mark is represented by a small circle. In the Macintosh version, the mark number appears in the circle.

### Boats

As in the Course View, a boat is represented by a small triangular symbol pointed in the boat heading.

## Menu Bar



**Figure 16. The Options Menu of the Menu Bar**

A standard menu bar appears above the Race View Screen. It contains the following menus.

### About Sailing Master

In the Macintosh version, the Apple Menu contains an **About** item. In the Windows version, the **About** item appears under the **File Menu**.

### File Menu

#### Quit

Selecting the Quit item in the File Menu ends the race and brings up the Results Window described below.

### Options Menu

#### Autopilot

Selecting Autopilot lets the computer control your boat. Autopilot is useful for learning how to maneuver the course and when you want to relax. You can turn Autopilot on and off during the race as you learn the program.

#### Pause

Selecting Pause causes the boats to stop moving and freezes the wind conditions on the lake, deselecting Pause resumes the race. When Pause is on, you can still adjust your tiller and other boat controls. Use Pause as you are learning the game and when you want to take a break during a race. Pause is especially useful for teaching sailing concepts as explained in Appendix A.

# Sailing Manual

## Messages

Selecting Messages enables the Message Box. Deselecting Messages disables the Message Box.

## Sound (Macintosh only)

You can turn sound on and off using this menu item

# Results Window

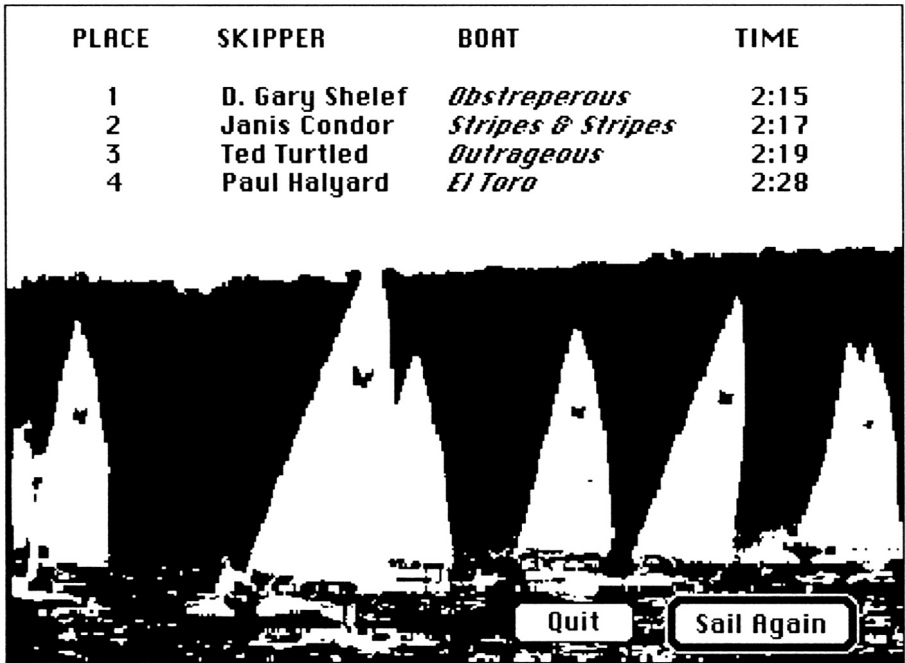


Figure 17. The Results Dialog Window  
(No Time Trials)



| PLACE | SKIPPER      | BOAT                         | TIME |
|-------|--------------|------------------------------|------|
| 1     | K. Weber     | <i>Obstreperous</i>          | 0:59 |
| 2     | Ted Turtled  | <i>Outrageous</i>            | 1:08 |
| 3     | Janis Condor | <i>Stripes &amp; Stripes</i> | 1:10 |
| 4     | Paul Halyard | <i>El Toro</i>               | 1:11 |

**Time Trial Results**

| RANK | SKIPPER     | PLACE | TIME |
|------|-------------|-------|------|
| 1    | D. Wheatlee | 1     | 0:57 |
| 2    | K. Weber    | 1     | 0:59 |

**Figure 18. The Results Dialog Window  
with Time Trials**

The Results Window appears after a race is completed or when you select the Quit option from the File menu. The top part of the window shows the Results Board listing the race participants in order of finish and their finish time or DNF (did not finish). With time trials active, a ranking of the (human) players appears below the race results. After you have read the results, click the Sail Again button for a new race or select the Quit button to exit the program.



## Chapter 2 Sailing the Boat

### Introduction

This chapter describes how to sail your boat. First, you will learn basic maneuvers such as holding course, pointing up, tacking, falling off, and jibing. After you feel comfortable steering, you can read the following sections on boat heel and sail trim. Or you can skip those sections and go on to Chapter 3 and start racing with Autoheel and Autotrim active.

This section assumes that you have launched the program with the Autoheel and Autotrim boxes checked and the Smart Tiller box unchecked in the Settings Window. If you are sailing for the first time on the Macintosh, use the Pushbutton Interface. To minimize distractions, you should also set the Number of Boats to 1. Don't worry about any of the other settings. If you have not already done so, start up the program with these settings and resume reading when the Race Screen appears.

Before maneuvering your boat, select Pause and take a moment to study the Race Screen. Although this screen may appear complex at first, bear in mind that each of the windows simply contains a different view of the same information about your boat as it sails along.

These views are entirely consistent with one another. For example, in each window you can see that your boat is on starboard tack. The sail is on the left side of the boat in the Boat View and the Stern View Windows. An imaginary line drawn in the direction of the wind arrow crosses over the right side of the white triangle representing your boat in the Course Window.

The use of different views is entirely analogous to real sailing. A good sailor constantly shifts focus between different views and tasks, including:

- Adjusting the tiller and mainsheet.
- Checking sail trim.
- Studying wind conditions.
- Sensing boatspeed and heel.
- Observing competitors' boats.

## Sailing Manual

Some of these tasks can be done simultaneously, e.g. moving the tiller and watching the boat change direction. Other tasks require single-minded concentration: In order to read wind conditions on the water, a sailor may stand up in the cockpit for a moment while ignoring sail trim and competing boats.

To an experienced sailor, the tasks and views involved in sailing a boat are second nature. The same holds true in this software. In order to become proficient at the program, you must learn to quickly shift your focus between windows, digest the information presented in each window, and simultaneously adjust the controls in your boat.

As you read the following sections, practice shifting between different windows and observing the changes that occur simultaneously in each view.

## Steering the Boat

### Holding Course

When the Race Screen appears, your boat will be holding its course headed up about 45 degrees to the northwest. The boat maintains its course because the tiller is centered, as you can see by looking at the tiller in the Boat View Window. You should hold course whenever you want to stop a maneuver. If you are new to the program, you may occasionally get confused while turning. In these situations, you should hold course and get oriented before attempting a new maneuver.



**Figure 19. The Hold Course Pushbutton**

To hold course at any time, press the Hold Course push button.

## Pointing Up



Figure 20. Pointing Up

You will often adjust your boat's heading to point up higher relative to the wind. When sailing upwind, you will usually want to sail close-hauled at an angle of  $\sim 45^\circ$  relative to the wind. Figure 20 shows a boat pointing up higher relative to the wind. Note how the sailor pushes the tiller away and then centers it after pointing up.

1.



2.



Figure 21. Pointing Up with the Push Button Interface

To point your boat higher up into the wind, press the Point Up push button once. The button will become darker and your boat will start to slowly point up. When your boat is about to reach the desired heading, click the Hold Course push button to stay on the new course. The Point Up push button will lighten to its original shade to signify that it is no longer activated.

If you click the Point Up button more than once, your boat will start turning faster and the button will become darker to signify this change. When the button background turns black, the boat is turning as fast as possible. This setting is equivalent to pressing the Tack button. If you continue to point up without pressing Hold Course, your boat will eventually *come about* (tack).

The Point Up button always works relative to the wind. Therefore, if you click Point Up a second time after your boat has tacked, it will start to turn in the opposite direction.



## Sailing Manual

### Tacking



**Figure 22. Tacking**

When sailing upwind, you will often need to tack. This basic maneuver is easily accomplished in the program.

1. 
2. 

**Figure 23. Tacking with the Push Button Interface**

To come about, press the Tack push button once. The button will turn black and your boat will start to point up rapidly. After your sail comes about in the Boat View window and your boat is about to reach the desired heading, click the Hold Course push button to stay on the new course. The Tack push button will lighten to signify that it is no longer activated.

### Falling Off



**Figure 24. Falling Off**

You will often adjust your boat's heading to fall off relative to the wind. Figure 24 shows a boat falling off. Note how the sailor pulls the tiller in and then centers it after falling off.

1. 
2. 

**Figure 25. Falling Off with the Push Button Interface**

To fall off away from the wind, press the Fall Off push button once. The button will darken and your boat will start to slowly fall off. When your boat is about to reach the desired heading, click the Hold Course push button to stay on the new course. The Fall Off push button will lighten to signify that it is no longer activated.

If you click the Fall Off button more than once, your boat will start turning faster and the button will become darker to signify this change. When the button background turns black, the boat is turning as fast as possible. This setting is equivalent to pressing the Jibe button. If you continue to fall off without pressing Hold Course, your boat will eventually jibe.

Like the other push buttons, the Fall Off button always works relative to the wind. Therefore, if you click Fall Off a second time after your boat has jibed, it will start turning in the opposite direction.

### Jibing



**Figure 26. Jibing**

When sailing downwind, you will occasionally need to jibe as shown in Figure 26.

## Sailing Manual

1. 
2. 

**Figure 27. Jibing with the Pushbutton Interface**

To jibe, press the Jibe push button once. The button will turn black, the tiller is pulled in the Boat View and your boat will start to fall off rapidly. After the sail comes about in the Boat View and your boat is about to reach the desired heading, click the Hold Course push button to stay on the new course. The Jibe push button will then lighten to signify that it is no longer activated and the tiller will be straightened in the Boat View.

## Visual Cues

As you maneuver your boat, you should continuously monitor information displayed on the Race Screen which will help you to determine the optimal heading for your boat. These visual cues include your boat, competing boats and the wind arrow in the Boat View Window and the boatspeed indicator in the Instrument Window.

### Heading and Wind Arrow

The angle made between the heading of your boat in the Boat View Window and the wind arrow is the most important guide in steering your boat upwind. You will usually want to point up as high as possible so that this angle will be just over  $45^{\circ}$ . If this angle is less than  $45^{\circ}$ , your boat will slow down considerably.

The wind on the course is constantly shifting. The wind arrow will move immediately when a shift occurs. As soon as this happens, you will want to adjust the heading of your boat by either pointing up, falling off, or tacking. Do not become complacent when sailing upwind, instead get in the habit of checking the wind arrow frequently for shifts.

### Boatspeed

In order to know how high to point up, you must also continuously monitor your boatspeed. The program provides you with several visual cues for doing so. The simplest method of gauging your boatspeed is to



watch how fast your boat moves along in the Boat View window. As your boatspeed changes, you will notice that the size of your wake in both the Boat View and Stern View will change as well. The faster your boat moves, the bigger the wake. Simultaneously, the boatspeed indicator gives you an absolute display of your boatspeed in knots.

When sailing against other boats, you should frequently compare your speed, wake size and boat heading to those of your competitors. If your wake is considerably smaller than your competitors, then you are probably not on the optimal heading and you should adjust course. Since wake size provides this relative information and is visible in the primary Boat View Window you should learn to use your wake size rather than the boatspeed indicator as the primary aid in gauging your speed.

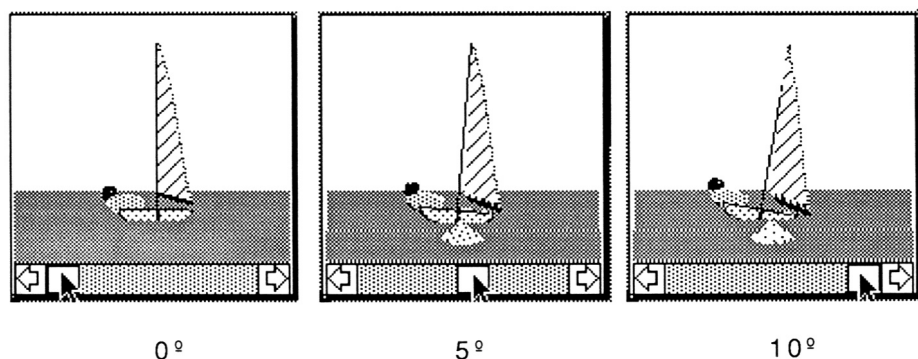
### **Practice**

Before going on to the next section, take a few minutes to practice maneuvering your boat. As with real sailing, there is no substitute for "time on the water". Perfecting the basic maneuvers will make you competitive against your on-line opponents.

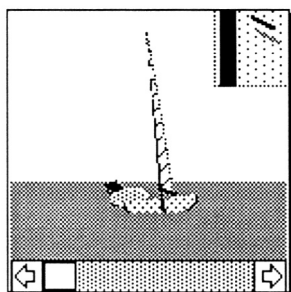
If you are eager to start racing, you can skip the next two sections on boat heel and sail trim and learn how to race in Chapters 3 & 4. The software will do the rest of the work if you continue to select Autoheel and Autotrim in the Settings Window. Return to this chapter when you are ready to add to your boat handling skills.

### **Boat Heel**

For a more realistic racing challenge, start the program with Autotrim selected and Autoheel disabled in the Settings Window. If you are currently sailing, first select Quit (Command-Q) from the File menu and click the Sail Again button in the Results Window.



**Figure 28. Boat Heel Angles: Flat and Heeled to Leeward**



**Figure 29. Boat Heeled to Windward**

There are four angles of boat heel possible in the Stern View Window. Figure 28 shows a boat sailing flat and heeled at angles of 5° and 10° to leeward. In light winds, your boat can also heel to windward as in Figure 29. Your boat moves fastest when it is flat.

In a single-handed sailboat you control boat heel by shifting your weight laterally along the beam of the boat. In this software, you accomplish this with the slider at the bottom of the Stern View Window.

The amount you will have to shift the heel slider depends upon wind conditions and sail trim. In light air, you will want to center yourself in the boat by moving the slider to leeward, while in very heavy air you will have

to "hike out" by moving the tiller all the way to windward. In other than extreme wind conditions, the slider should be somewhere in the middle. The water color in the Boat View window indicates the intensity of the wind applied to your sail.

With Autoheel disabled, your boat heel may change after wind shifts and tacks. Sometimes the heel will be correct, but often your boat will either be overheeled or underheeled. Therefore, you should check your boat heel frequently. Proper heel is especially important in high winds - if you wait too long to flatten your boat, it will capsize.

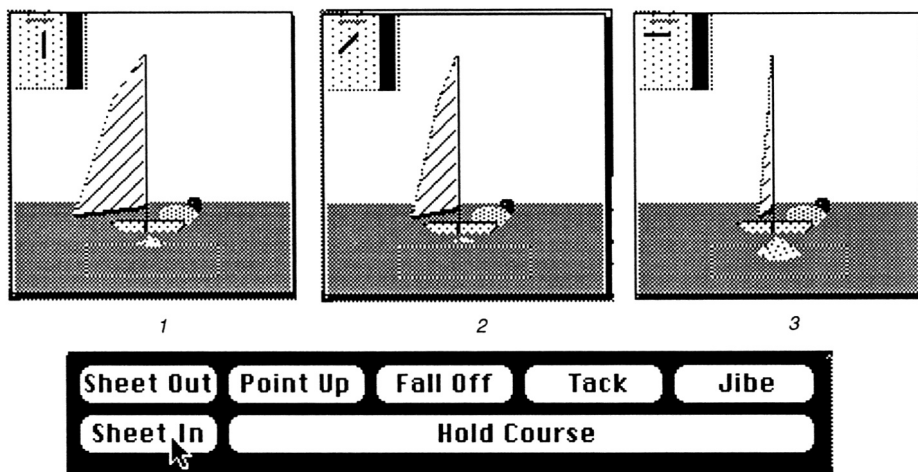
Take some time to practice heeling your boat properly. With your boat on a broad reach, hold course and adjust your boat heel. If you monitor the boatspeed indicator in the Instrument Window, you will see that your boatspeed is greatest when the boat is flat.

Now point up and tack the boat, making sure to get on a proper heading before adjusting boat heel. Boat heel is secondary to a proper heading - you will make more headway with an overheeled boat sailing off the wind than you will with a properly heeled boat in irons.

Repeat these maneuvers until you feel comfortable with boat heel. Then you can either learn how to trim your sail or skip ahead to Chapter 3.

### **Sail Trim**

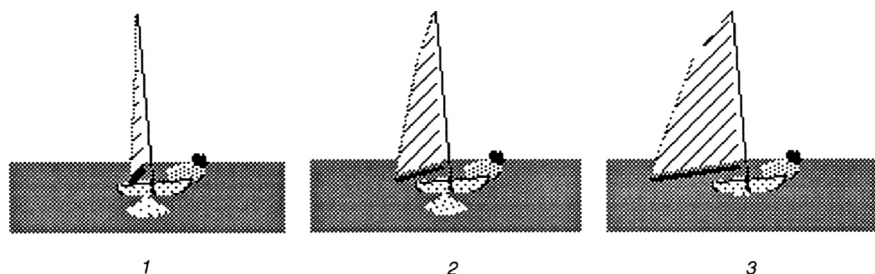
When you deactivate Autotrim in the Settings Window, you gain complete control of sail trim. If you are currently sailing with Autotrim active, select the Quit item from the File menu and click the Sail Again button in the Results Window. At first, you will want to activate Autoheel so that you can concentrate on learning sail trim. Later, you can deactivate both Autoheel and Autotrim for full control of boatspeed.



**Figure 30. Sheeting In with the Pushbutton Interface**

With Autotrim disabled, two additional buttons labeled Sheet In and Sheet Out appear on the left side of the Pushbutton Interface in the Control Window. You will use these buttons to control sail trim. In addition to these buttons, the telltales attached to the luff of your sail appear in an inset view in an upper corner of the Stern View Window. On starboard tack, the telltales appear on the left side of the window. On port tack, they appear on the right side.

When you pull the sail in on starboard tack by clicking on the Sheet In button, the sail, boom, and rigging will move in toward you in the Stern View Window. When your sail is close-hauled, the sail will appear as a thin sliver. In addition, the appearance of the telltales may change (See the "Using the Telltales" section). Sheet Out has the opposite effect.



**Figure 31. Stern View Changing with Sail Trim**

As you adjust sail trim, the Stern View Window changes as well. When the boat is close hauled, you can only see a thin sliver representing the sail. As you let the sail out, you will see more and more of the sail and boom.

### Rapid Sheeting

In certain situations, especially when rounding the windward and leeward marks (Chapter 3), you may want to let your sail in or out all the way rather than incrementally. On the Macintosh, holding down the shift key while clicking on the Sheet In button will trim your sail all the way in. With the Windows version this is done by clicking on the Sheet In button with the right mouse key. Similarly, holding down the shift key with the Sheet Out button (Macintosh) or clicking on that button with the right mouse key (Windows) will extend your sail all the way out.

### Points of Sail and Sail Trim

How you should trim your sail depends largely on your point of sail:

- **On a beat**, the sail should be close-hauled.
- **On a reach**, the sail should be eased out somewhat.
- **On a run**, the sail should be let out all or most of the way.

## Sailing Manual

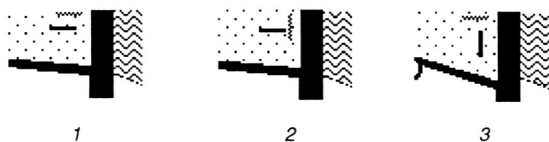
These general guidelines should be used for "coarse" adjustment of sail trim with the telltales used for fine tuning.

### Using the Telltales



**Figure 32. Maximum Telltale Extension:  
Normal (1) and Light Air (2)**

The telltales are the primary indicator of sail trim. Your sail is trimmed properly when sufficient air flows over both sides of the sail. When this occurs, both telltales will be blown back to their maximum extension. In medium to heavy air, the telltales will be horizontal at maximum extension. In light air, they will droop downward slightly.



**Figure 33. Tell Tales: Properly Trimmed  
(1), Overtrimmed (2), Undertrimmed (3)**

If your sail is overtrimmed, the leeward tell tale will droop because it is not getting enough air. Conversely, if you undertrim the sail, the windward tell tale will droop. Remember that the leeward tell tale appears lighter than the windward tell tale due to the opacity of the sail through which you are looking.

In Figure 33, you can tell that the boat is beating because both telltales are horizontal when the boat is close hauled. On this point of sail, the windward tell tale droops if the sail is let out as in parts 2 and 1.

### When to Adjust Sail Trim

To maintain the maximum possible boatspeed, you must adjust your sail trim whenever your sailing angle changes, i.e. whenever you change course or the wind shifts. Usually, your telltales will also change with sailing angle.

In addition to watching your telltales, you should continue to monitor the visual cues such as wake and opposing boats. In heavy air, your telltales can be plastered to your sail at full extension even if your sail is not optimally trimmed and you will have to rely on other feedback to maximize boatspeed.

### Practice

If you like, take a few minutes now to practice sail trim. First, adjust sail trim while holding course and note changes in boatspeed and telltales. Then work on pointing up and falling off, making sure you are on a proper course and, only then, adjusting sail trim. When you feel comfortable with maneuvering and trimming the sail on one tack, try coming about, holding course, and trimming the sail. As you practice, the sequence of steering and sheeting will become routine.

Remember, you do not need to master sail trim or boat heel right away. Instead, you can race with Autoheel and Autotrim active and then practice more advanced boat handling at your leisure.

### Smart Tiller

The Smart Tiller feature allows sailors to concentrate on wind shifts and strategy without having to worry about fine-tuning their steering on upwind legs with the mouse. With Smart Tiller selected in the Settings Window, the program will help you sail as close as possible to the wind on upwind legs. Smart Tiller works with both the Pushbutton and Cockpit mouse control methods. The feature does not affect the operation of the keyboard equivalents.

## Sailing Manual

**Smart Tiller will not work when the boat is near the upwind mark**, allowing you to have complete control of steering. We recommend that you not use the Smart Tiller feature until you have first mastered maneuvering your boat [without Smart Tiller].

### Pointing Up with Smart Tiller

If your boat is sailing at an angle greater than 45° relative to the wind and you point up, your boat will automatically adjust to a 45° sailing angle and hold course. If you decide to point up when your boat is already close-hauled or you are near the upwind mark, then your boat will continue to turn until you hold course.

### Falling Off with Smart Tiller

If your boat is sailing at an angle less than 45° relative to the wind and you fall off, your boat will automatically adjust to a 45° sailing angle and hold course. If you decide to fall off when your sailing angle is greater than 45°, your boat will continue to turn until you hold course.

### Tacking with Smart Tiller

When you initiate a tack with Smart Tiller active by clicking on the Tack button, your boat will come about and hold course exactly when your boat makes a sailing angle of 45° on the new tack. You must use the Tack button (rather than Point Up) to employ the automatic tacking feature.

### Smart Tiller Considerations

Smart Tiller does *not* compensate automatically for wind shifts. You must react to a wind shift by hitting the appropriate control.

## Using the Keyboard (Optional)

You can control the tiller with the keyboard instead of the mouse. The following paragraphs describe the mechanics of moving the tiller with the keyboard. You should follow the instructions in the "Steering the Boat" section to practice maneuvering with either the keyboard or the mouse.

You can steer the boat with either hand. Right handers will probably want to use their left hand to control the tiller with the keyboard and operate the mouse with their right hand for controlling sail trim and boat heel when Autotrim and/or Autoheel are deactivated. The reverse is true for left-handers.



### Using the Left Hand

To operate the tiller with your left hand, place it in the traditional left-hand "home-row" typing position with the pinkie, ring, middle, and index fingers resting on the "A", "S", "D", and "F" keys and your thumb hovering over the space bar. You will use your middle finger to control the tiller by pressing the following keys:

"e" pushes the tiller away from you. Use "e" to point up.

"E" pushes the tiller to the furthest position away from you (*hard alee*). Use "E" to tack or radically alter course.

"c" pulls the tiller toward you incrementally. Use "c" to fall off.

"C" pulls the tiller to the innermost position. Use "C" to jibe.

"D" or "d" centers the tiller. Use "d" to hold course.

**Do not hold down the keys, use clicking motions.**

### Using the Right Hand

To operate the tiller with your right hand, place it in the traditional right-hand "home-row" typing position with your pinkie, ring, middle, and index fingers resting on the ";", "L", "K", and "J" keys and your thumb over the space bar. You will use your middle finger to control the tiller by pressing the following keys:

"i" pushes the tiller away from you. Use "i" to point up.

"I" pushes the tiller to the furthest position away from you (*hard alee*). Use "I" to tack or radically alter course.

"," pulls the tiller toward you incrementally. Use "," to fall off.

"<" pulls the tiller to the innermost position. Use "<" to jibe.

"K" or "k" centers the tiller. Use "k" to hold course.

**Do not hold down the keys, use clicking motions.**

# **Sailing Manual**

## **Toggling the Course/Leg Views**

Clicking the space bar with either thumb toggles the course/leg view in the Course Window. The keyboard saves time over the mouse-based method of clicking in the Course Window since you do not have to move the cursor around the screen.

# **Chapter 3 Rules of the Road**

## **Introduction**

Before starting to race, you must know the course layout and the rules of the road. Both old salts and landlubbers should read this chapter to know which rules and penalties the program enforces. Note that while this chapter introduces the course rules, Chapter 4 provides specific practical tips for negotiating the course.

Race Course Layout

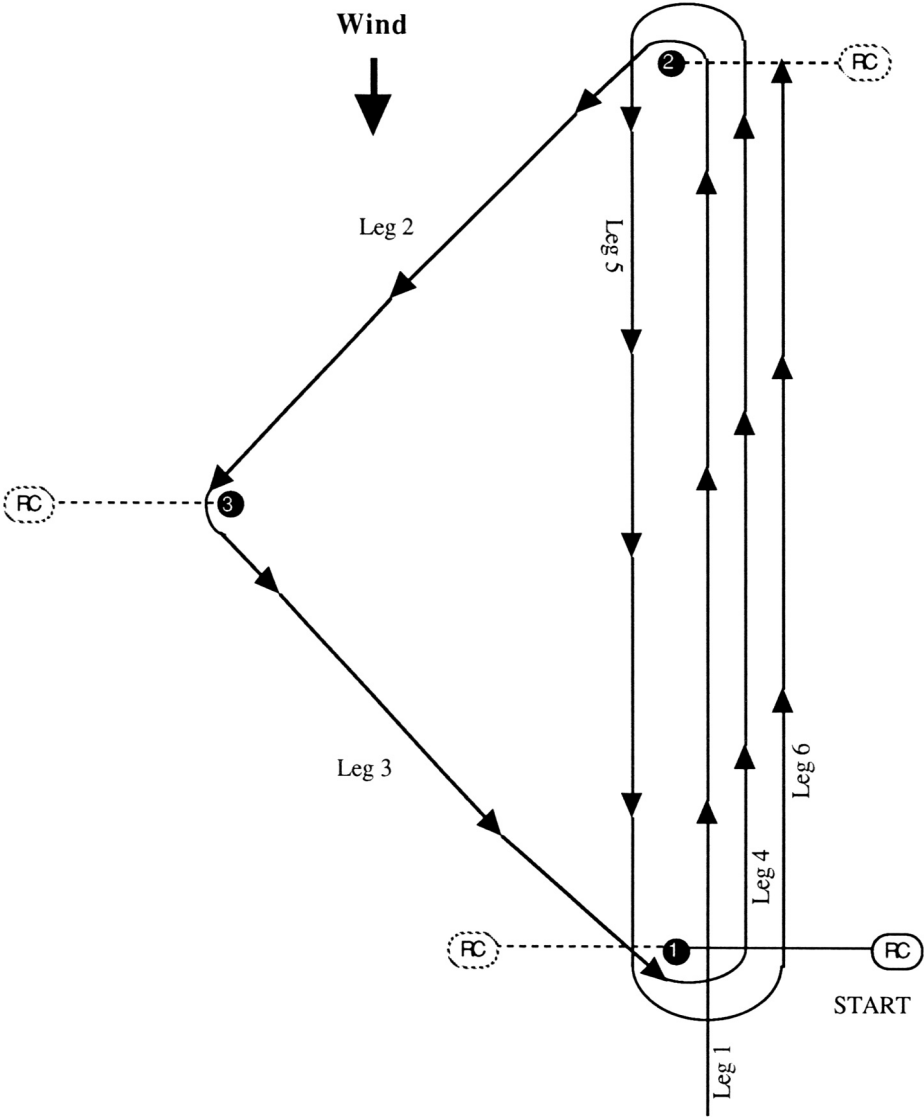
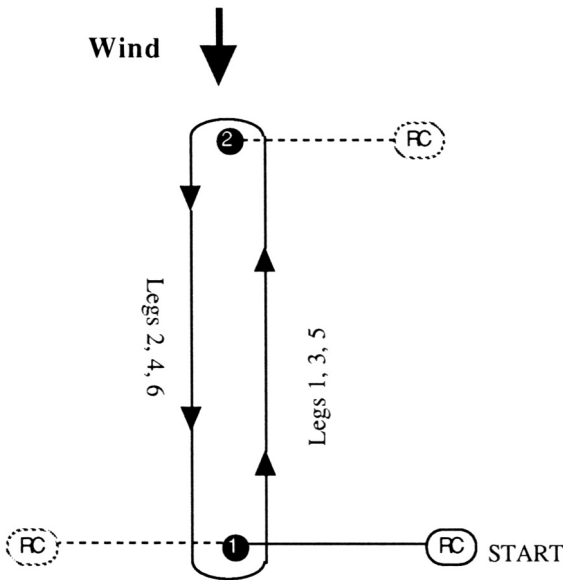


Figure 34. Olympic Course Layout



**Figure 35. Windward/Leeward Course Layout**

The Course menu in the Settings Window determines the layout used in the race. Figure 34 shows the Olympic race course, Figure 35 shows the Windward/Leeward course. The race course is defined by the following components:

### **Leeward Mark and Start Line**

The leeward mark (1) and race committee boat (RC) define the start line.

### **Windward Mark**

The windward mark (2) is set directly upwind from the leeward mark.

### **Jibe Mark (Olympic Course only)**

In the Olympic Course the jibe mark (3) is set to port of and halfway between the windward and leeward marks.

# Sailing Manual

## Legs

Each pair of marks defines a leg of the race course sailed in the direction of the arrow heads. In the Olympic course, the upwind legs (called beats) numbered (Legs 1, 4 & 6) run between the leeward and windward marks. Leg 2 is a starboard tack reach from the upwind to the jibe mark. Leg 3 is a port tack reach from the jibe to the leeward mark. Leg 5 is a run directly downwind from the windward mark to the leeward mark. The Windward/Leeward course omits the reaches - odd-numbered legs are beats, even-numbered legs are runs.

## Rounding Marks

Boats must round all marks to port, i.e. the mark is on the port side of the boat when rounded. An imaginary line drawn from the stern of the boat as it sails the course should completely enclose all of the marks with no loops.

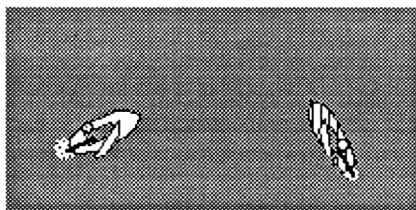
## Finish Line

To define the finish line, the race committee boat anchors to port of the destination mark of the last leg of the race. In Figures 34 and 35, the finish lines are represented by dashes.

## Racing Rules

The program implements a simplified subset of the following official Yacht Racing Rules:

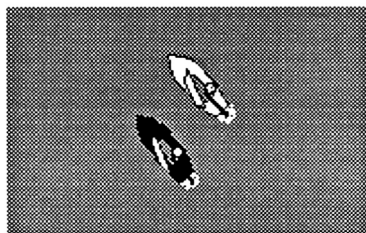
### Opposite Tacks (Port-Starboard)



**Figure 36. Boats on Opposite Tacks:  
Striped boat on starboard tack has right of  
way.**

When two boats are on opposite tacks (booms on different sides), the boat on port tack must keep clear. In Figure 36, the striped boat, on starboard tack, has the right of way.

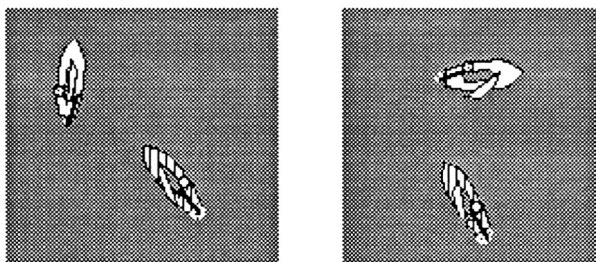
### Same Tack (Windward-Leeward)



**Figure 37. Boats on Same Tack: Black boat to leeward has right of way.**

When boats are on the same tack (booms on same sides), the windward boat must keep clear. In Figure 37, the black boat has the right of way.

### Changing Tack

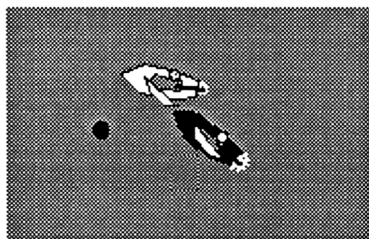


**Figure 38. Changing Tack: The white boat must keep clear while tacking.**

A boat which is tacking or jibing must keep clear of other yachts. In Figure 38, the tacking white boat must keep clear of the striped boat.

# Sailing Manual

## Buoy Room



**Figure 39. Rounding the Buoy: The white boat must give the black boat with the inside overlap room to round the mark.**

When two or more boats are rounding a mark, the boat(s) on the outside, further from the mark, must allow the overlapping boat(s) on the inside room to round the mark. In Figure 39, the white boat must give the black boat buoy room.

## Touching a Mark

No part of a boat can touch a mark.

## Warnings

If you are in danger of violating one of the above rules, the sailor with the right-of-way may hail you by placing a message in the Message Box. Your competitors use the following warnings:



**Starboard!** means that the approaching boat is on starboard tack and that you are in violation of the opposite tack (port-starboard) rule. You should probably come about or fall off.

**Up! Up! Up!** indicates that your competitor has right-of-way under the same tack (windward-leeward) rule. You must point your boat up higher into the wind.

**Buoy Room!** means that your competitor needs room to round the mark.

## Penalties

If a collision occurs and you are in violation of a right-of-way rule or you have touched a mark, the following penalty procedure will be enforced:

1. You will be hailed with the message "Do your circles!".
2. Your boat may be moved back to stay clear of your competitors.
3. You will be forced to turn your boat around in circles for several seconds. The program automatically sets your tiller so that your boat will usually make at least a 270° turn similar to the penalty enforced in the America's Cup.
4. During the penalty period, your boat has no rights-of-way whatsoever.

Similar rules apply to your competitors.

If you have the right-of-way in a collision, your boat will not be penalized by the race committee. However, you should always attempt to avoid collisions: Each collision may damage your boat and reduce its speed for the remainder of the race.

## Accidents

### Colliding with the Committee Boat

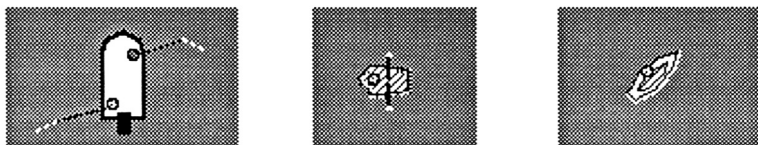
The committee boat is a very sturdy aluminum pontoon boat. If you collide with the committee boat, your boat will be severely damaged and the race will terminate.

## Sailing Manual

### Running Aground

The areas around the course are very shallow. If you sail too far from the course, your boat will run aground and the race will terminate.

### Hazards



**Figure 40. Hazards: Fishing Boat, Row Boat, and Windsurfer**

With hazards active, three types of obstacles can appear in the Boat View Window:

Fishing boats appear in light wind. They remain stationary.

Row boats move laterally across the screen.

Windsurfers sail close-hauled in heavy air.

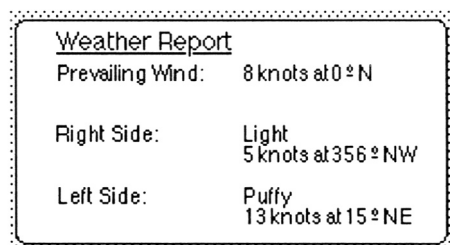
If you collide with a hazard, your boat will capsize and you will lose several seconds righting your boat. Computer-controlled boats are also susceptible to hazards.

# Chapter 4 Racing

## Introduction

Now that you've learned the rules of the road and how to maneuver your boat, you're ready to start racing. After a discussion of wind characteristics, we'll tour the race course.

## Wind Characteristics



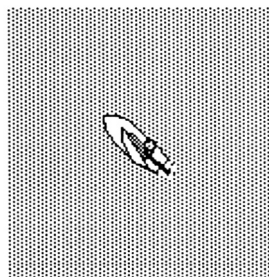
|                       |                            |
|-----------------------|----------------------------|
| <u>Weather Report</u> |                            |
| Prevailing Wind:      | 8 knots at 0°N             |
| Right Side:           | Light<br>5 knots at 356°NW |
| Left Side:            | Puffy<br>13 knots at 15°NE |

**Figure 41. The Weather Report**

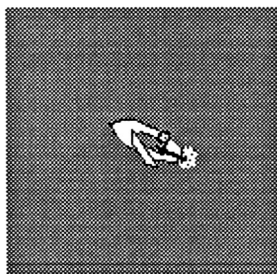
The wind on the course has several predictable characteristics which will influence your tactics throughout the race. The Weather Report Window summarizes these conditions before every race. Always read this summary before clicking the OK button in the Weather Report Window.

## Sailing Manual

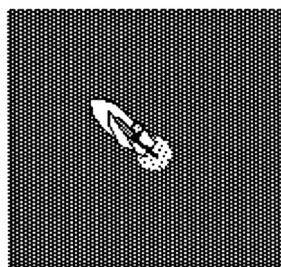
### Water Color



1



2



3

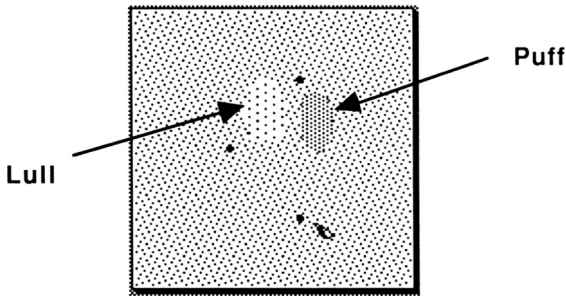
**Figure 42. Water Color in the Boat View:  
Light (1), Medium (2), and Heavy Air (3)**

You can learn a lot about the windspeed by looking at the water around your boat in the Boat View window. When the windspeed is less than six knots, the water color as seen in the Boat View Window is fairly light. As the wind gets stronger, the color intensifies first to a medium shade or pattern (6 - 10 knots) and then (>10 knots) to a darker shade or pattern.

### Prevailing Wind

The majority of the course is subject to a constant wind speed with random shifts of direction at regular time intervals. One exception to the prevailing winds occurs at the start of a race. The wind always blows out of due north before the boats reach the start line. This curious phenomenon explains why the race committee always aligns the course perfectly from north to south.

## Puffs and Lulls



**Figure 43. Puffs and Lulls**

In addition to the prevailing wind, regions of wind called puffs and lulls move over the surface of the water. Puffs have greater windspeed than the prevailing conditions. If the windspeed in a puff is significantly higher than the prevailing windspeed, then the puff will appear darker than the rest of the water surface in the Course View, otherwise it will be invisible. Similarly, lulls have lower windspeed than the prevailing conditions and may appear in a lighter pattern than the rest of the water surface.

Puffs and lulls have several predictable characteristics. The size, windspeed, and wind direction in a puff or lull do not change as it moves across the race course. These regions move at constant speed over the course in a north-south direction. A wind region dies out when it reaches the south end of the course, and is replaced by a new region at the north end of the course.

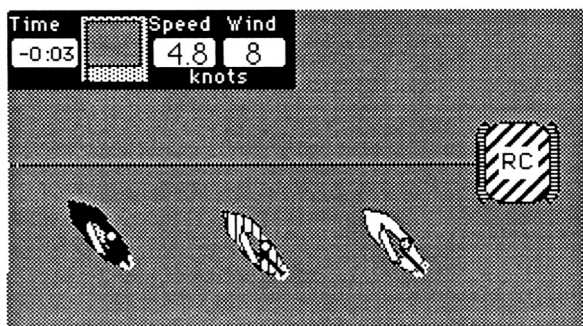
Puffs and lulls have priority over the prevailing wind conditions. This means that when you are in a puff, the wind conditions of the puff apply to your boat. These characteristics allow you to watch puffs and calm areas on the Course View and anticipate changes in windspeed.

When a puff and a lull intersect, the area with higher priority may be visible in the Course View. However, when two wind regions of the same type intersect, it is not possible to anticipate which one will have priority.

The Weather Report includes a description of the wind conditions in the puffs and lulls on the east and west sides of the course. This description may or may not be complete.

## Sailing Manual

### The Start



**Figure 44. Boats Approaching the Start with the Instrument Window Superimposed**

When the Race Screen appears, your boat approaches the line on starboard tack. At least one of your competitors will be on starboard tack, additional competitors will usually be on port tack. In the instrument window, you can see that the gray (blue on color systems) Preparatory race flag is flying and the clock is negative. Since the wind usually blows out of due north as the boats approach the start line, you should simply hold course. Just as the clock reaches the start time (0:00), the black (red) Start Flag will appear in the Instrument Window. The race is on and you are now beating upwind.

### Beating

The primary objective when beating is to sail *close-hauled* on the *favored tack* in an area with the most wind. As you sail upwind, you must constantly monitor conditions on the course both near your boat in the Boat View and around the course in the Course View.

#### Current Wind Direction

First, you should always be aware of the current wind direction applied to your boat. The most direct way to check wind direction is, of course, to look up at the wind arrow. However, you can also detect wind shifts indirectly through changes in boat speed, telltales, and competitor heading.

- If, while holding course, your boat slows down abruptly without a change in water color in the Boat View, the cause must be a *header*.

On the other hand, a *lift* may cause your boat to pick up speed as it sails off the wind. Remember that wake size indicates boat speed.

- If you are handling sail trim (Autotrim is off), your telltales may droop provided that your sail trim had been proper before the shift.
- The competing boats will usually react rapidly to wind shifts. A competitor adjusting course in the Boat View Window is an excellent indirect indicator (of a wind shift).

Regardless of how you detect the wind shift, you must react by either falling off, pointing up, or tacking.

The decision on whether to adjust heading or tack usually depends upon the new wind direction. Unless you are far from the center of the course or approaching the mark, the favored tack will be starboard for wind out of the northeast and port for wind out of the northwest as indicated by the wind arrow in the instrument window. When a large wind shift occurs ( $> 15^\circ$ ), you will probably want to tack as soon as possible. If the wind shift is minor, i.e. the opposite tack does not have a significant advantage, you may want to adjust course since you lose boat speed when tacking.

# Sailing Manual

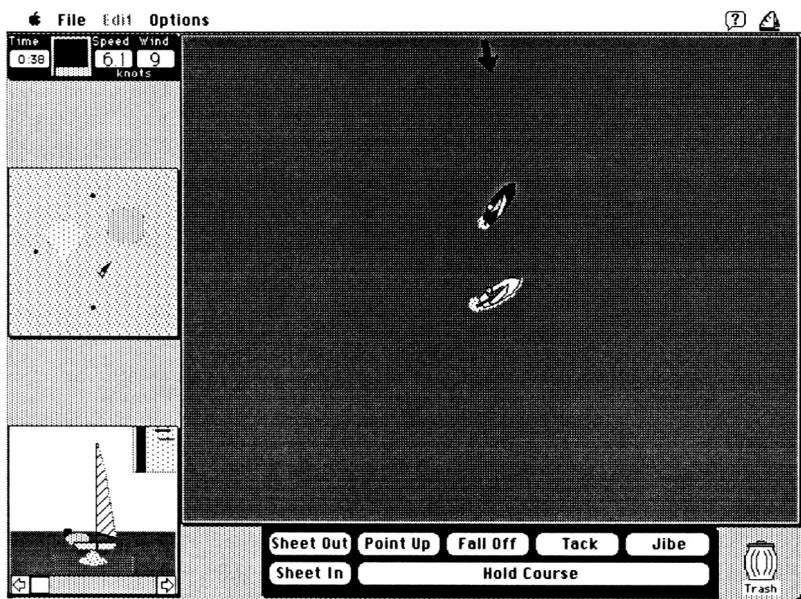


Figure 45. Race Screen as Boats Beat to Windward



In Figure 45, the wind has just shifted by about 5 degrees to the Northwest, the black boat has already reacted to the shift by pointing up higher to the wind. The sailor controlling the white boat should follow suit. Note that the leeward telltale in the cockpit view has drooped because of the shift, indicating less than optimal boat speed. Also note the large puff on the right side of the course view and the lull on the left.

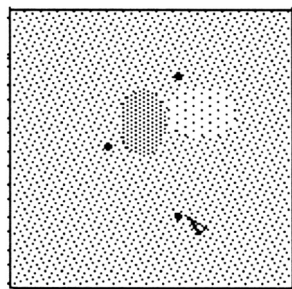
Because the wind tends to shift at frequent regular time intervals, you can pick up seconds by timing your tacks to coincide with the shift intervals. However, some wind shifts occur because you have entered a puff or lull where the windspeed is roughly the same as the prevailing conditions.

### Using Wind Patterns

You can use the wind pattern on the course to your advantage by sailing in the puffs and avoiding lulls. This strategy works best when conditions on the water vary greatly due to large puffs and lulls. Your on-line competitors may have excellent boat speed (depending on the level) and are very adept at sailing close to the wind on the favored tack. However, they tend to ignore wind regions as they attempt to minimize distance traveled "as the crow flies".

### Using the Course View

| <u>Weather Report</u> |                                      |
|-----------------------|--------------------------------------|
| Prevailing Wind:      | 8 knots at $0^{\circ}$ N             |
| Right Side:           | Light<br>5 knots at $356^{\circ}$ NW |
| Left Side:            | Puffy<br>13 knots at $15^{\circ}$ NE |



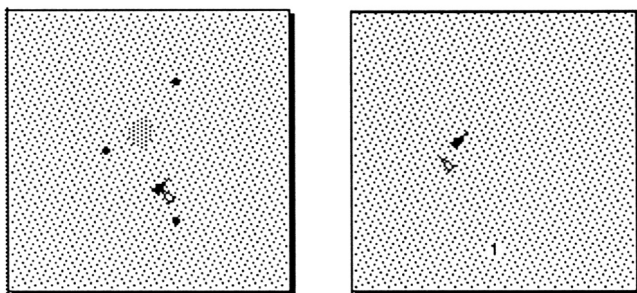
**Figure 46. Weather Report and Corresponding Course View at the Start**

Just as a single-handed sailor may stand up to get a view of the course, you should occasionally look at the Course View to see where the areas of light and heavy wind are on the course and how fast they are moving. In Figure 46, there is a puff on the left side of the course and a lull on the right side.

## Sailing Manual

Since there is a great differential in windspeed between the puff, the prevailing conditions, and the lull, the sailor should stay on the left side of the course as long as possible on the upwind legs.

In the course view, the size of the boat symbols is greatly exaggerated. Therefore, this view does not provide you with sufficient perspective to gauge your position relative to the mark and your competitors. To view these components you should use the Leg View. Remember that mouse-clicking in the Course Window or tapping the spacebar toggles between the Leg and Course Views.



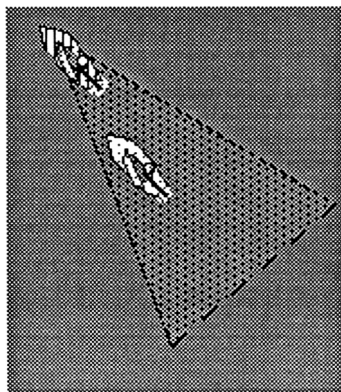
**Figure 47. Corresponding Course and Leg Views on an Upwind Leg**

Figure 47 shows the difference between the Leg and Course Views. The Course View on the left indicates that the boats are about to collide. However, the more accurate view on the right, indicates that the black boat is ahead by several boat lengths.

### Using the Leg View

You should look at the Leg View frequently while beating, especially to avoid collisions when your competitor(s) is nearby but not visible in the Boat View Window. The Leg View also gives you a good idea of your position relative to the marks. Remember that you usually want to stay near the center of the course when sailing upwind. If neither the windward nor leeward marks is visible in the Leg View on a beat, then you have probably strayed too far from the center of the course.

## Upwind Tactics: Bad Air and Slam Dunks



**Figure 48. Bad Air Zone**

As a boat sails upwind, the wind from her sails generates a triangular area of dead air behind her, Figure 48. This bad air considerably hampers competing boats within the triangle.

Bad air is a very effective tactical weapon on upwind legs. Figure 49 below shows a bad air maneuver called the slam dunk in which the striped boat crosses the bow of the trailing white boat (1). Note how the white boat's wake diminishes as it enters the striped boat's dead air (2). The striped boat completes the maneuver by tacking directly in front of the white boat (3), thus maintaining the bad air effect and gaining distance. The white boat must now tack to get clean air.

The slam dunk is especially popular in match races such as the America's Cup. The tactic is equally effective in a two dinghy match race in this program.

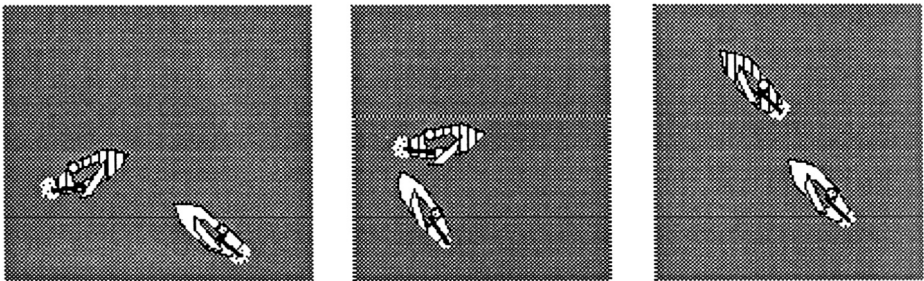


Figure 49. The Slam Dunk

**Approaching the Windward Mark**

The following instructions apply only if the upwind leg is not the last leg of the race. If this is not the case, follow the directions in The Finish section.

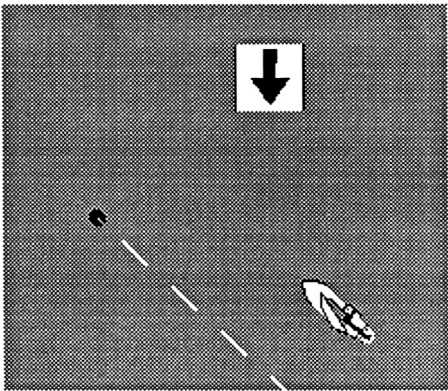
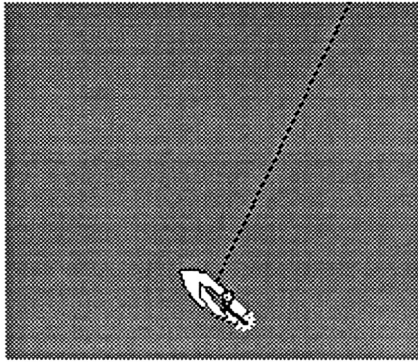


Figure 50. Approaching the Windward Mark with Wind Arrow and Layline Superimposed

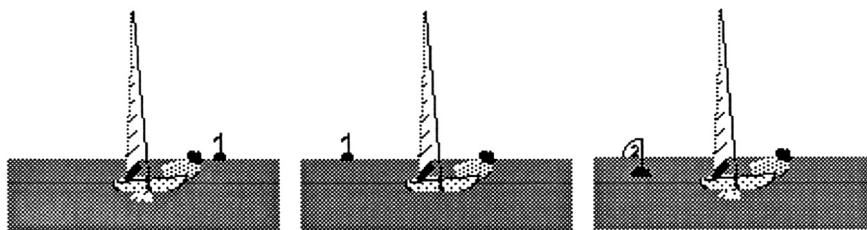
In order to properly round the windward mark, you must first approach it from the right on starboard tack above a  $45^\circ$  layline relative to the wind. Remember that  $45^\circ$  is the closest angle your boat can point without slowing down. Figure 50 shows a boat above the layline (white dashes): With the current wind direction, it will be able to *fetch* the mark. If the boat were below the layline for the current wind, it would have to tack to port and then to starboard to fetch the mark. Either of these situations would change if a wind shift occurs before the boat reaches the mark.

When you should get over to the right side of the course depends largely upon wind shifts and your competitors. However, remember that if you wait until the last moment to get to the right of the mark on port tack while a competitor approaches the mark on starboard tack, the competitor has the right of way.



**Figure 51. Guide line Appearing on an Upwind Leg**

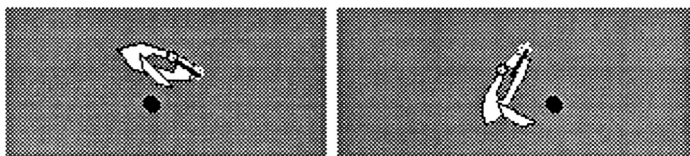
Quite frequently, you will have to approach the windward mark when it is not visible in the Boat View. In these situations, the guide line will be drawn in the Boat View, allowing you to determine your orientation relative to the mark. In Figure 51, the boat is nearing the mark on the left side of the course. The sailor should soon tack to get over to the right side of the mark.



**Figure 52. Stern View Changing as Boat Nears Windward Mark**

In the Macintosh version, the Stern View also indicates your position relative to the windward mark. If you are pointed below the layline as you approach the mark, the buoy and its flag appear to starboard of your boat (1), indicating what an observer directly astern of you would see. If the buoy is to port of your boat, then you are approaching it on proper course (2). As you get closer to the mark, the buoy in the stern view will get bigger and the mark number on the buoy flag will become legible (3).

### Rounding the Windward Mark



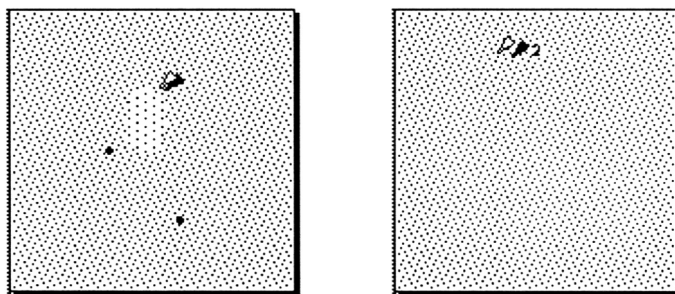
**Figure 53. Rounding Windward Mark**

As you approach the windward mark, prepare to round it efficiently by getting as close to the layline as possible without touching the mark or violating the buoy room rule. When the bow of your boat crosses an imaginary vertical line drawn through the windward mark, you should fall off by pulling in on the tiller (1). Orient your boat toward the next mark (2). If you are not using Autotrim, make sure to sheet out.

## The First Reaching Leg (Olympic Course)

After successfully rounding the windward mark and properly trimming your sail, you will want to plan your strategy for the first reaching leg by checking the wind patterns in the Course View. If you are in or approaching a puff heading over the left side of the course, you may want to point higher and "ride" the puff as long as possible. Conversely, if you are in or heading toward a lull, you may want to point below the layline for the jibe mark to avoid the light air. Paying attention to the course view during the *upwind* leg will help you to anticipate the movement of puffs and lulls on the downwind legs.

As in beating, there is often a tradeoff between sailing a direct course toward the jibe mark and sailing into the areas with the best wind. You should opt for the latter strategy especially when there are large differences in wind velocity.



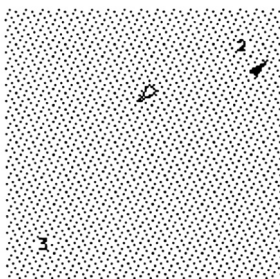
**Figure 54. Rounding Windward Mark:  
Course and Leg View**

Figure 54 shows the course view after the sailor of the white boat has rounded the first mark just upwind of the black boat. Since a lull lies right in the middle of the second leg, the sailor should probably sail west and then south rather than directly southwest. This strategy would be especially effective if the lull has very light air and is slow moving, information that can be obtained by reading the weather report and observing the course while sailing upwind on the first leg.

Once you have decided upon the path you will take to the jibe mark, you should concentrate on steering your boat as precisely as possible along this course. At the same time, make sure to trim and heel your boat for optimal boat speed. If you are controlling sail trim, look at your telltales

## Sailing Manual

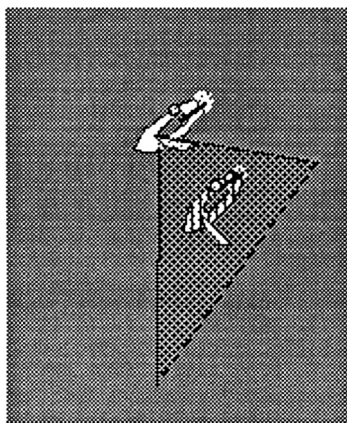
frequently. When a wind shift occurs, they may droop and you will need to adjust the mainsheet.



**Figure 55. First Reaching Leg: Leg View**

Toggle into the Leg View so that you can see both the jibe mark and your competitors. If you are sailing away from or toward wind areas, switch back and forth into the Course View to monitor their progress. In the Leg View shown in Figure 55, the white boat has a comfortable lead but appears to be sailing a little bit above the layline.

## Downwind Tactics: Blanketing



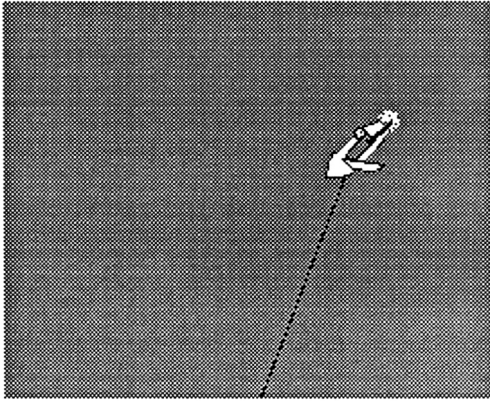
**Figure 56. Blanketing**

On a broad reach or a run, the sail produces an area of dead air called the blanket zone. Similar to bad air on upwind legs, the blanket zone is an effective weapon for slowing down and catching your opponents on the



reaching legs. Figure 56 illustrates correct blanketing technique. Note the difference in wake size as the white boat overtakes the striped boat.

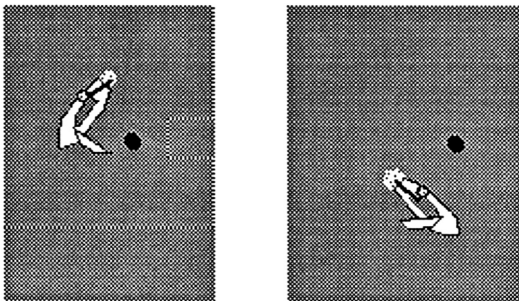
### Approaching the Jibe Mark



**Figure 57. Approaching Jibe Mark, Guide Line Visible**

As with the upwind leg, the guide line will be drawn in the boat view if you are approaching the jibe mark when you can not see it in the boat view. Use this guide line to aim your boat within a couple of feet of the jibe mark.

### Rounding the Jibe Mark

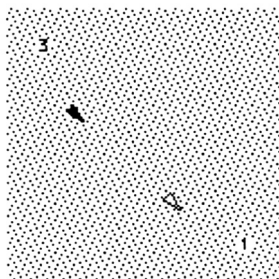


**Figure 58. Rounding Jibe Mark**

## Sailing Manual

Start to jibe as your bow crosses the horizontal plane of the mark. Hold course when your boat is headed directly to the southeast.

### The Second Reaching Leg (and Runs)



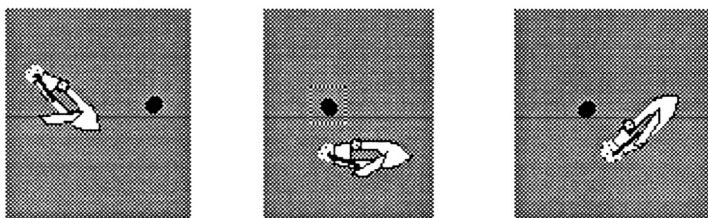
**Figure 59. Second Reaching Leg: Leg View**

The strategy and tactics of the second reaching leg and downwind runs are similar to those of the first reaching leg. The primary difference lies in the approach to the downwind mark described next.

### Approaching the Downwind Mark

As you approach the downwind mark, you should aim for your bow to cross the horizontal plane about a boat length (14 feet) from the mark. This extra clearance will allow you to start your turn sooner and prevent you from straying too far downwind.

### Rounding the Leeward Mark



**Figure 60. Rounding Leeward Mark**

Rounding the leeward mark entails turning your boat about 90° up into the wind. As your bow reaches the horizontal plane of the downwind mark,

start to point up. If you are controlling sail trim, you should sheet in rapidly soon after holding course on your new upwind course. You are now beating upwind as you were on the first leg.

## Finishing the Race

The finish line is defined by the final mark at the port end and the committee boat to starboard. When you near the finish line on the last leg, the visible portion of the line, the upwind mark, and/or the committee boat will be depicted in the boat view as shown in Figure 61 (the committee boat is outside the current view). You successfully complete the race by crossing the finish line with any part of your hull or sail. Touching the upwind mark or crashing into the committee boat will result in disqualification. You may also be disqualified if you cross the horizontal plane of the line but do not cross the line itself between the mark and the committee boat. Whenever you or one of your competitors crosses the finish line, you will be hailed with the message "Boat Over".

### Upwind Finish

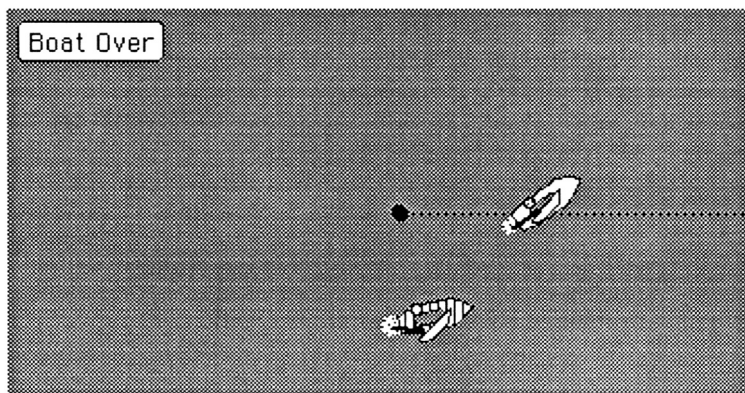


Figure 61. Upwind Finish

On an upwind finish, rounding the mark efficiently is not the major concern since the finish line extends from the upwind mark to the committee boat. Your sole objective is to finish ahead of the opposition. As you near the finish line, you should try to anticipate the wind conditions such that you will be able to cross the line properly without having to pinch up into the wind.

## Sailing Manual

If you are clearly ahead of your opponent on the final upwind leg and your boatspeed is the same or greater, you should consider *covering* your opponent by always sailing on the same tack as her: When she tacks, you tack. Covering minimizes the risk that your opponent will overtake you due to an unfavorable wind shift.

### Finishing on a Downwind Leg

If you are ahead on a final downwind leg, you should concentrate on taking the fastest line to the finish while avoiding any blanketing maneuvers. On the other hand, if you are behind, you will want to do your best to blanket and overtake your opponent.

### Ending the Race

If you finish ahead of one or more of your opponents, the program will wait for them to cross the finish line before displaying the results and allowing you to quit the program or race again. Occasionally, the competition will withdraw from the race or be so far behind (a *horizon job*) that you would rather terminate the race immediately. In this situation, simply select Quit from the File Menu and the Results Screen will appear. If you finish last, the Results Screen will appear automatically.

# Appendix A Learning to Sail

## Introduction

This appendix describes how to use the program to teach sailing concepts in conjunction with an introductory sailing textbook. Each set of concepts is introduced as a lesson accompanied by readings in the text. A lesson plan consists of:

- A summary of the concepts discussed in the lesson.

- The settings to invoke when launching the program for the lesson. For example the Autotrim and Autoheel features of the program allow the novice to first learn about the mechanics of steering without worrying about sail trim or boat heel.

- Suggestions as to how to introduce and demonstrate the sailing concepts in the lesson. The instructor can use the program to demonstrate concepts by identifying them himself or to test the student's knowledge by requiring the student to identify them.

- Notes that the instructor should bear in mind when presenting the lesson.

The instructor should be proficient with the Pushbutton Interface as explained in this manual. These lessons work best with the student using the mouse to control the boat while the instructor invokes the Pause function from the keyboard as needed.

# **Sailing Manual**

## **Lesson 1: The Sailboat**

### **Key Concepts**

- Hull
- Port
- Boat and sail parts
- Rig
- Starboard

### **Lesson Plan**

Assign text dealing with the key concepts.

Launch the program with Autotrim and Autoheel activated and 1 Boat.

When the race screen appears select Pause.

Ask the student to identify boat components in the Boat and Stern Views.

Move the tiller with either the keyboard or the mouse.

Ask the student to identify the port and starboard sides of the boat.

### **Notes**

The boat used in the program is a single-sail boat very similar to a Laser.

## Lesson 2: Your First Sail

### Key Concepts

- Helmsman
- Steering with the tiller

### Lesson Plan

Assign text dealing with the key concepts.

Launch the program with Autotrim and Autoheel activated and 1 Boat or resume from Lesson 1 by deselecting Pause.

Identify the helmsman in the Boat and Stern Views.

Show the student how to steer the boat using the Pushbutton Interface.

Show how the tiller/rudder causes the boat to turn in the Boat View.

Turn the boat up into the wind to slow it down. Point out the wind direction indicated by the arrow.

Allow the student to steer the boat. Ask the student to head down, head up, and slow the boat down in the no-go zone.

### Notes

Since Autoheel and Autotrim are enabled in this lesson, the student does not need to worry about sail trim and can simply concentrate on steering lessons. Subsequent lessons illustrate sail trim.

# Sailing Manual

## Lesson 3: Maneuvering Upwind

### Key Concepts

- Sailing Upwind
- In irons
- Tacking Problems
- Tacking
- Tacking sequence

### Lesson Plan

Assign text dealing with the key concepts.

Launch the program with Autotrim and Autoheel activated, and 1 Boat.

Demonstrate tacking to the student:

Indicate how the boat comes about in the Boat and Stern Views.

Use the Pause feature in the middle of the tack.

Note that if you turn too far your boat will be sailing on a reach. Conversely, if you stop tacking too soon your boat will slow down (in irons).

Allow the student to practice tacking.

After the student gets the knack of tacking, instruct the student to sail to the windward mark. Explain the use of the Course and Leg Views in the Course Window to the student.

### Notes

This lesson can be repeated with Autotrim and/or Autoheel deactivated. With these settings, the student will have to adjust sail trim and boat heel after every tack.



## Lesson 4: Understanding Wind

### Key Concepts

- Wind sensing
- Wind direction
- Puffs and lulls
- Points of a compass

### Lesson Plan

Assign text dealing with the key concepts.

Launch the program with Autotrim and Autoheel activated, and 1 Boat.

The Course and Boat Windows illustrate the effects of wind shifts, puffs and lulls on the water. Puffs appear darker than the prevailing water color while lulls appear lighter.

When the Weather Report appears, ask the student to interpret the weather report by pointing the direction on the screen of the prevailing wind and in the puffs or lulls on the sides of the course.

This lesson works best when there are visible lulls and puffs on the course. If the wind speed is between 7 and 9 knots on both sides of the course, use the Change button in the Weather Report Window.

When the Race Screen appears, ask the student to identify the puffs and/or lulls in the Course Window.

Ask the student where the boat will go fastest.

Sail into a puff or lull and explain how the boat speed and heading change as a result of the wind conditions. Also point out how the color and wake size change in the Boat View.

Allow the student to sail into and out of puffs.

### Notes

The wind directions described in the Weather Report conform to the standard compass headings.

# Sailing Manual

## Lesson 5: Introduction to Sails

### Key Concepts

- Windward
- Leeward
- Sheeting
- Sail telltales

### Lesson Plan

Assign text dealing with the key concepts.

Launch the program with Autotrim deactivated, Autoheel activated, and 1 Boat.

When the race screen appears select Pause.

Point out the direction of the wind arrow and ask the student to identify the windward and leeward sides of the boat in the Boat View Window.

Demonstrate sheeting in and out. Point out the following changes:

The sail shape changes in the Stern View as you trim the sail.

Your boatspeed and wake size change with sail trim.

When you are properly trimmed, both telltales are straight back indicating smooth air flow on both sides of the sail.

When the sail is sheeted too far out, the windward telltale flutters indicating turbulent airflow on the windward side of the sail.

When the sail is sheeted too tight, the leeward telltale flutters indicating turbulent airflow on the leeward side of the sail.

### Notes

The windward telltale always appears darker than the leeward telltale due to the opacity of the sail.

## Lesson 6: Using the Sails

### Key Concepts

- Points of Sail
- Heading

### Lesson Plan

Assign text dealing with the key concepts.

Launch the program with Autotrim and Autoheel activated, and 1 Boat.

Show the student all of the points of sail and interactively test the student's knowledge of each point of sail. Use the Pause function as needed.

Explain the meaning of *heading* - the direction the bow points to.

### Notes

Note how the sail trim changes in the Stern View with the heading. When heading upwind the sail is close-hauled. As the boat heads down the sail eases out. The boatspeed also changes accurately with the points of sail, i.e. the boat is fastest on a beam reach.

# **Sailing Manual**

## **Lesson 7: Maneuvering Downwind**

### **Key Concepts**

- Sailing downwind
- Jibing

### **Lesson Plan**

Assign text dealing with the key concepts.

Launch the program with Autotrim and Autoheel activated, and 1 Boat.

Demonstrate jibing to the student and indicate how the boat jibes in the Boat and Stern Views.

Allow the student to practice jibing.

## Lesson 8: Right-of-Way

### Key Concepts

- Avoiding collisions
- Right-of-way
- Basic Rules

### Lesson Plan

Assign text dealing with the key concepts.

Launch the program with Autotrim and Autoheel activated, 2 Boats, and Level 1.

All of the basic rules can be illustrated with the program Furthermore, the software actually enforces standard penalties when a collision occurs.

Demonstrate Basic Rule 2 - boats on same tack - by falling off toward your competitor as the boats approach the start line. Select Pause and ask the student which boat has the right-of-way. (The leeward computer-controlled boat has right of way.)

Deselect Pause and demonstrate avoiding a collision by pointing up and pushing the tiller towards the leeward boat, causing your boat to head up.

In order to demonstrate Basic Rule 1 - port/starboard, get over to the left of the computer boat and then tack on to port while the computer boat remains on starboard. Select Pause and ask the student which boat has the right-of-way. Then deselect Pause and cross underneath the computer boat.

To demonstrate Rule 4 - boat overtaking another boat, follow the computer boat around the race course. When the computer boat rounds the windward mark and starts the first reaching leg, select Pause with your boat directly astern and ask the student who has right-of-way.

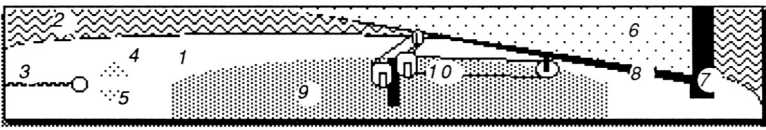
Allow the student to practice sailing in the presence of a second boat. When a collision is imminent, the program will often issue a warning. If a collision occurs, the program will enforce the correct penalty.



# Appendix B The Cockpit Interface

## Introduction

This appendix describes how to sail your boat with the Cockpit Interface on Macintosh computers. This section assumes that you have launched the program with the Cockpit Interface radio button active and the Autoheel and Autotrim boxes checked in the Settings Window.



**Figure 62. The Cockpit Interface with Autotrim enabled and the boat on starboard tack**

When looking at the Cockpit Interface, you must think of yourself as a sailor actually sitting in the cockpit of the boat. The display in the Cockpit Interface will change depending on the tack your boat is on: When your boat is on starboard tack, the wind is blowing over the right side of the hull on which you are sitting and the tiller will be to your left. When the boat is on port tack, the wind is blowing over the left side of your hull and the tiller will be to your right.

Many of the components of the Cockpit Interface are the same components as those shown in the Boat View and Stern View. These parts include:

### 1. Hull

The hull is the white area which predominates in the lower two thirds of the Cockpit Interface.

### 2. Water

Water near the boat is indicated by the wavy pattern bordering the hull on the upper half of the window.

## Sailing Manual

### 3. Tiller

The tiller half of the rudder/tiller assembly appears on the far left of the window.

### 4 & 5. Tiller In and Tiller Out Buttons

The triangular Tiller In and Tiller Out buttons allow you to steer the boat by moving the tiller. Clicking with mouse cursor in the Tiller In button pulls the tiller toward you, while clicking in the Tiller Out button pushes the tiller away from you.

You can use the keyboard instead of the mouse to move the tiller as described in Chapter 2.

On 68000-based Macintoshes, there may be a slight but noticeable delay between the moment when you click on a tiller button and the corresponding movement of the tiller. This delay does not mean that the program did not record your mouse click. ***Do not click repeatedly on the button if a delay occurs***, since doing so can cause the tiller to move more than you intend it to.

### 6. Sail

In the cockpit view, the lower part of the sail at eye level is represented by the dotted triangle in the upper part of the view.

### 7. Mast

The thick black vertical line drawn near the front of the boat (the *bow*) represents its mast. The front of the sail (the *luff*) is attached to the mast.

### 8. Boom

The boom extends diagonally from the mast directly below the sail. The lower part of the sail (the *foot*) is attached to the boom.

### 9. Cockpit

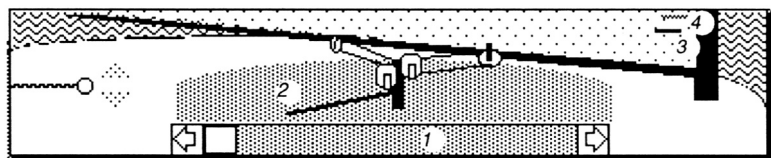
The cockpit is the gray area in the lower center of the view.



### 10. Blocks and Mainsheet

The rope (*mainsheet*) and pulleys (*blocks*) used to trim the sail are attached to the cockpit and the boom. If Autotrim is active, these components will move automatically and optimally as you steer the boat.

If Autotrim is disabled, you will have to trim the sail yourself and four more objects will appear in the Cockpit Interface to help you.



**Figure 63. The Cockpit Interface with Autotrim Disabled**

#### 1 & 2. Mainsheet Slider and Visible End

You trim the sail using the mainsheet slider, a standard Macintosh control. Pulling the slider towards the stern of the boat pulls the mainsheet in and cause the mainsheet/boom/ sail assembly to move in towards you. Moving the slider towards the bow does the opposite. Note that the end of the mainsheet (2) is now visible and its position changes as you adjust the slider. On starboard tack, try to imagine your right hand holding onto the mainsheet.

#### 3 & 4. Lower and Upper Telltales

The telltales move in response to the amount of wind passing over the windward and leeward sides of your sail. The lower telltale is attached to the starboard side of your sail. Therefore, it appears darker when you are on starboard tack, and lighter (due to the opacity of the sail) when you are on port tack. The reverse holds true for the upper telltale.

## Steering the Boat

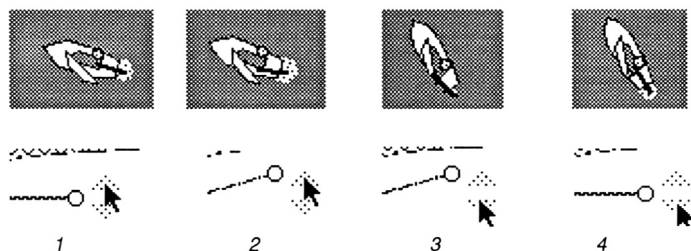
### Holding Course

In the Cockpit Interface the tiller is drawn horizontally when you're boat is holding course, with the handle resting in the notch between the Tiller In and Tiller Out buttons. To hold course, either move the tiller by adjusting

## Sailing Manual

the Tiller buttons until the tiller is centered or press the "D", "d", "K" or "k" keys on the keyboard.

### Pointing Up



**Figure 64. Pointing Up with the Tiller**

In order to point your boat higher up into the wind with the Cockpit Interface, you must push the tiller away from you. To do so, place the tip of the cursor over the Tiller Out button and click once with the mouse (1) or hit "e" or "i" on the keyboard. The tiller will move away from you instantaneously both in the Cockpit Interface (think of yourself as sitting in the cockpit of your boat) and in the Boat View Window (2) and your boat will start to turn up into the wind. Keep an eye on the wind arrow in the Instrument Window as you start to point up.

If you are attempting to point up as high as possible, you will want to center the tiller just before the boat makes an angle of approximately 45 degrees relative to the wind. To center the tiller, click once with the cursor tip over the Tiller In button (3, 4) or hit "D", "d", "k", or "K" on the keyboard. Check the alignment of the tiller in the Cockpit Interface to make sure that it is centered. Remember that pulling the tiller in too far will cause the boat to fall off (see below).

If you wait a little too long before centering the tiller or the wind shifts unfavorably, your boat will be pointed too high up into the wind and your boat will start to slow down. When this common situation arises, simply fall off as described below. A more prolonged delay in centering the tiller will cause your boat to come about.

## Tacking

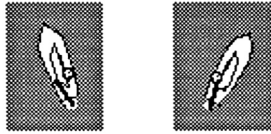


Figure 65. Tacking

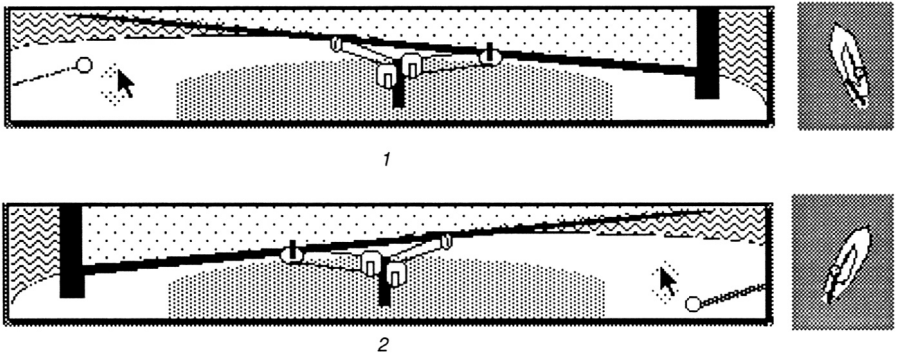


Figure 66. Tacking with the Cockpit Interface

To start coming about in the Cockpit Interface, simply push the tiller hard alee either by clicking once with "E" or "I", or by clicking repeatedly with either the Tiller Out button or the "e" or "i" keys. Watch your boat in the Boat View as it starts to point up into the wind. A split second after the boat points up directly into the wind, the boom will come across the hull. At this moment, the display in the Cockpit Interface will flip into almost a mirror image of what you saw before you came about. If you started on starboard tack, the tiller will have moved from the Tiller Out position away from you on your left to the Tiller In position on your right. Having come about, your boat is now falling off away from the wind in the Boat View Window. Look at the wind arrow, and try to anticipate when your boat will make an angle of at least 45 degrees with the wind on the new tack. If you are using the mouse to steer, simultaneously move your cursor to the new location of the Tiller Out button and click to center the tiller and hold course on the new tack. Alternatively, center the tiller with the "D", "d", "K" or "k" keys.

## Sailing Manual

Most users will find it much easier to tack with the keyboard and simply focus on the Boat View Window without begin distracted by the view flipping in Cockpit Interface. For this reason, the following section is optional.

### Mastering Tacking with the Mouse

Mastering tacking with the mouse in the Cockpit Interface is the hardest part of learning to sail in the program for most users. An understanding of what takes place when you tack will help you to learn this maneuver.

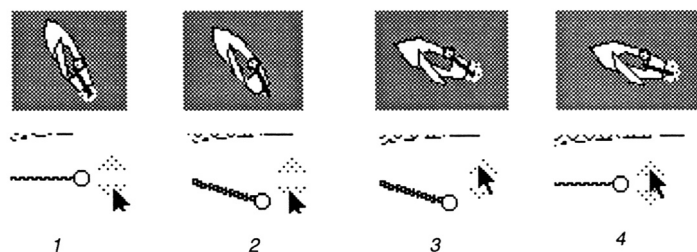
In a real single-handed sailboat, tacking involves 3 steps:

1. The sailor starts her tack by pushing the tiller away, the boat points up, and the boom starts to come about.
2. At this point the sailor ducks underneath the boom while facing forward, switches the tiller from her left hand to her right hand behind her back, and emerges on the opposite side of the boat on the new tack.
3. The sailor pulls in the tiller to fall off and then centers it to hold course.

Steps 1 and 3 are very similar to what takes place in this software, Step 2 is the key to understanding tacking. Since current Macintosh technology can not be programmed to have an aluminum boom jump out of the screen, force you to duck, and rotate your chair 180 degrees, the program automatically flips the view for you as if you had actually done so. Sliding the mouse cursor across the Cockpit Interface to the new location of the tiller buttons is roughly analogous to physically moving across a real sailboat while tacking. The tiller, which was in your left hand pushed away from you, is now pulled in with your right hand as you sit on the opposite side of the boat. (As noted in Chapter 1, the Cockpit Interface simulates what you would see if you were actually sitting in the boat and looking clear across your boat at the sail. When looking at the Cockpit Interface, especially when tacking, try to imagine your hand resting on the tiller and your legs extended in the cockpit.)

Practice tacking back and forth for a while. After starting a tack by pressing the Tiller Out button, try to anticipate your new position in the boat by sliding the cursor across the Cockpit Interface to where the Tiller Out button for the new tack will appear when the view flips.

## Falling Off

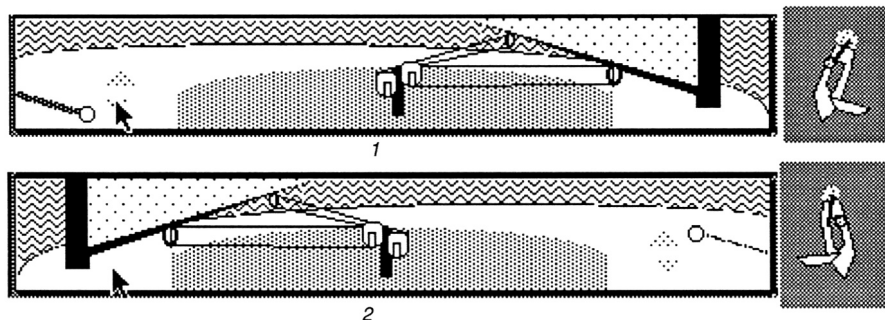


**Figure 67. Falling Off with the Cockpit Interface**

To fall off away from the wind, pull the tiller in by clicking on the Tiller In button in the Cockpit Interface (1) or hitting the "c" or "," keys. Watch your boat as it starts to fall off in the Boat View (2, 3), and center the tiller just before the boat reaches the desired heading (3, 4).

# Sailing Manual

## Jibing

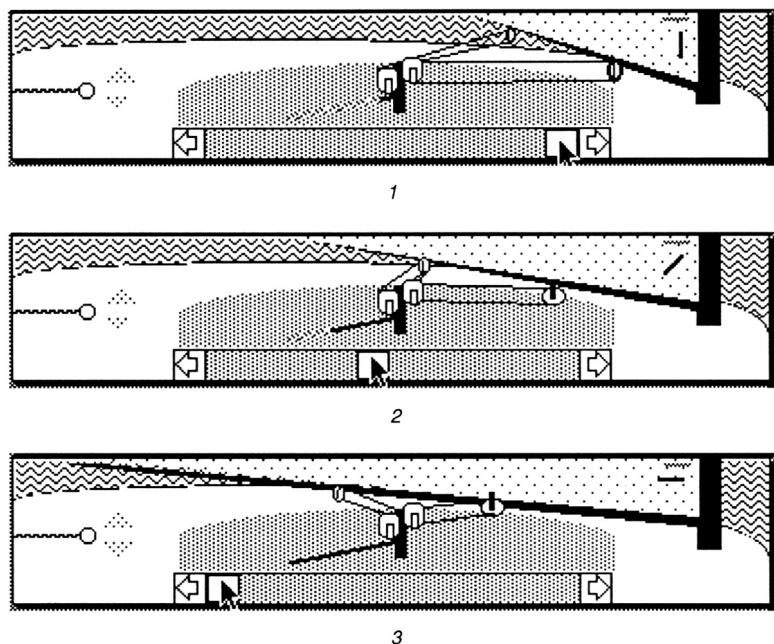


**Figure 68. Jibing with the Cockpit Interface**

If you continue to fall off from the wind, you will jibe your boat and the Cockpit Interface view will flip in a manner similar to what occurs when you tack. Pulling the tiller farther towards you with "c", "C", ",", or "<", will accelerate the jibe. When you jibe, the tiller that was pulled in with one hand on the original tack will now be pushed away in the opposite hand on the new tack. Center the tiller by moving the cursor to the other side of the Cockpit Interface and clicking on the Tiller In button or simply hitting the "D", "d", "K" or "k" keys.

## Sail Trim

When you deactivate Autotrim in the Settings Window, you gain complete control of sail trim. If you are currently sailing with Autotrim active, select the Quit item from the File menu and click the Play Again button in the Results Window. At first, you will want to activate Autoheel so that you can concentrate on learning sail trim. Later, you can deactivate both Autoheel and Autotrim for full control of boatspeed.



**Figure 69. Sheeting In with the Cockpit Interface**

With Autotrim disabled, the mainsheet slider, the end of the mainsheet, and the telltales will appear in the Cockpit Interface. You will use the mainsheet slider to control sail trim.

When you sheet in on starboard tack by moving the slider thumb to the left, the Cockpit Interface changes as follows:

1. The end of the mainsheet, represented by the dark line coming out of the block, moves toward the stern and more line becomes visible. When you pull the slider in, imagine yourself pulling in on the mainsheet with your right hand.
2. The sail, boom, and rigging move in toward you. Notice that more of the boom and sail becomes visible since you are sitting directly opposite the sail.
3. The telltales near the luff of the sail change.

## **Sailing Manual**

Moving the slider to the right on starboard tack lets the sail out. The opposite is true on port tack.



- Accidents
  - committee boat 45
  - running aground 46
- Autoheel
  - described 3
  - disabled 29, 36
  - setting 3
- Autopilot
  - described 19
- Autotrim
  - conditional objects 77
  - described 3
  - disabled 31, 36, 82, 83
  - push button interface 14
  - setting 3
- Bad air
  - described 55
  - figure 55
- Beating 50
- Blanketing
  - described 60
- Boat heel
  - angles 30
  - practice 31
- Boat View Window
  - description 10
- Boat(s)
  - components 11
  - description 10
  - leg view 18
- Boatspeed
  - and boat heel 31
  - and sail trim 35
  - monitoring 28
- Boatspeed indicator
  - Instrument Window 9
- Buoy(s)
  - course view 17
  - leg view 18
  - stern view 16
- Cancel
  - settings 4
- Close-hauled
  - described 33

## Sailing Manual

### Cockpit

- boat view 11

### Cockpit interface

- components 75

- falling off 81

- holding course 77

- jibing 82

- mainsheet slider 83

- pointing up 78

- tacking 79

### Cockpit Window

- view flipping 79

### Committee boat

- boat view 12

- colliding with 45

- finish line 42

- start line 41

### CompuServe iv

### Control Window

- components 13

### Course

- wind characteristics 47

### Course view

- components 17

- described 17

- toggling from keyboard 38

- using 53

- weather report 53

### Course Window

- course view 17

- described 17

### Downwind mark

- approaching 62

### Falling off

- described 27

- figure 26

- wind shifts 51

### File menu

- described 19

- quitting 64

### Finish line

- described 42

### Finishing

- described 63

- downwind 64
- upwind 63
- Guide line
  - boat view 13
  - using 57
- Header 50
- Heading
  - and wind arrow 28
- Heel slider
  - resetting 31
  - shifting weight 30
  - stern view 16
- Holding course
  - described 24
- Hull
  - boat view 11
  - cockpit interface 75
  - Lesson 1 66
  - stern view 15
- Instrument Window
  - described 9
  - figure 9
- Jibe mark
  - approaching 61
  - described 41
  - rounding 62
- Jibing
  - around a mark 62
  - described 27
  - figure 27
  - lesson 7
- Keyboard
  - toggling views 38
  - usage 36
- Layline
  - windward mark 56
- Leeward mark
  - described 41
  - rounding 62
- Leg view
  - components 18
  - toggling from keyboard 38
  - using 54
- Lessons

## Sailing Manual

- drills 74
- introduction to sails 70
- maneuvering downwind 72
- maneuvering upwind 68
- review 74
- right-of-way 73
- sailboat 66
- understanding wind 69
- using sails 71
- your first sail 67
- Lift 50
- Lull(s)
  - characteristics 49
  - described 18
  - lesson 4
  - water color 49
  - wind shifts 53
- Mainsheet slider
  - cockpit interface 77
  - sail trim 83
- Menu bar
  - described 19
  - figure 19
- Message Box
  - boat view 13
  - Instrument Window 10
  - warnings 44
- Messages
  - boat over 63
  - described 20
- Options menu
  - described 19
- Pause
  - described 19
  - lesson 1
- Penalties 45
- Pointing up
  - described 25
  - figure 25
  - wind shifts 51
- Points of sail
  - and sail trim 33
  - lesson 6
- Port tack

- described 75
- Prestart
  - described 9
- Puff(s)
  - characteristics 49
  - course view 17
  - described 17
  - lesson 4
  - "riding" 59
  - water color 49
  - wind shifts 53
- Push Button interface
  - pointing up 25
  - tacking 26
- Pushbutton interface
  - falling off 27
  - holding course 24
  - jibing 28
  - sail trim 32
- Quitting 19, 21, 64
- Race clock
  - Instrument Window 9
  - start 50
- Race course
  - components 12
  - layout 40
- Race flag
  - Instrument Window 9
  - start 50
- Race Screen
  - described 8
  - upwind 52
- Reaching
  - first leg 59
  - second leg 62
- Reset
  - settings 5
- Results board
  - described 21
- Results Window
  - described 21
  - figure 20, 21
- Rudder
  - boat view 11

# Sailing Manual

## Rules

buoy room

described 44

figure 44

changing tack

described 43

figure 43

implementation 42

lesson 8

opposite tacks

described 43

figure 42

penalties for violation 45

same tack

described 43

figure 43

touching a mark 44

warnings 44

Running aground 46

## Sail

boat view 11

stern view 15

## Sail trim

controlling 31, 82

using telltales 34

when to adjust 35

## Sailor

boat view 11

stern view 15

## Settings

autoheel 3

autotrim 3

black & white 4

boats 3

cancel 4

controls 2

course 2

hazards 4

legs 2

length 2

level 2

name field 4

new weather 3

reset 5

- smart tiller 4
- sound 3
- time trials 3
- Settings Window 1
- Sheeting
  - lesson 5
- Sheeting in
  - described 32, 83
- Slam dunk
  - described 55
  - figure 56
- Smart Tiller
  - described 35
- Sound
  - described 20
- Starboard tack
  - described 75
- Start
  - described 50
- Start Up Window
  - described 1
- Steering
  - lesson 2
- Stern
  - boat view 11
- Stern view
  - changing with sail trim 33
  - windward mark 58
- Stern View Window
  - description 15
- Tack
  - favorable 51
  - port 75
  - starboard 23, 75
- Tacking
  - described 26
  - figure 26, 79
  - lesson 3
  - practice 80
  - using the mouse 80
  - wind shifts 51
- Tactics
  - bad air 55
  - blanketing 60

## Sailing Manual

covering 64

downwind 60

slam dunk 55

upwind 55

Technical Support iv

Telltails

cockpit interface 77

lesson 5

stern view 16

using 34

wind shifts 51

Tiller

boat view 11

cockpit interface 76

holding course 24

left handed operation 37

lesson 2

pointing up 78

right handed operation 37

U.S. Sailing iii

Views

relationship 23

Visual cues

described 28

Wake

boat view 12

comparing size 29

size changing with boatspeed 29

stern view 16

Warnings

rule violations 44

Water color

described 48

figure 48

lesson 4

Weather

changing 6

Weather report

course view 53

display 6

prevailing wind 48

Weather Report Window

described 6

figure 6



lesson 4

## Wind

direction 50

predictable characteristics 47

prevailing 48

using patterns 53

## Wind arrow

and heading 28

checking frequently 28

tacking 79

## Wind shifts

detecting 50

reacting 51

## Windspeed indicator

Instrument Window 9

## Windward mark

approaching 56

described 41

rounding 58

stern view 58

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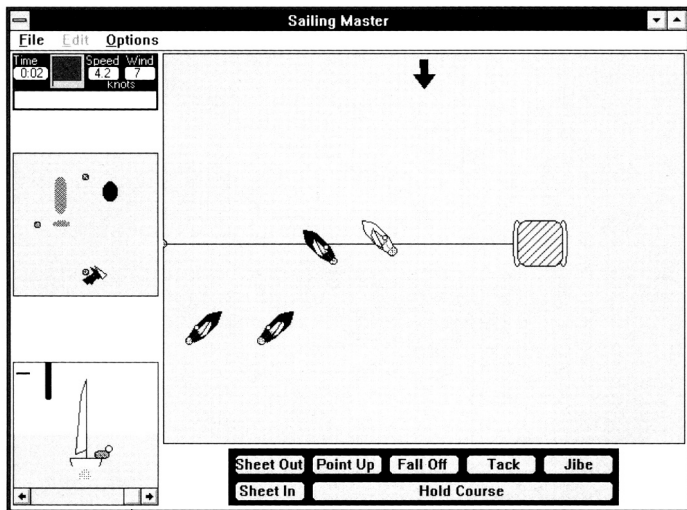
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## Summary

**Sailing Master™** simulates sailboat racing on IBM-compatible personal computers running Microsoft Windows and on the Apple Macintosh. You control steering, sail trim, and boat heel on a single-handed racing yacht using the mouse. Race against up to three competing boats controlled by the computer. Optional hazards, multiple skill levels and the Autopilot, Autoheel, and Autotrim features provide a continuing challenge. Full support of time trials allows multiplayer competition and evaluation of strategies with identical weather. A comprehensive manual containing a series of sailing lessons makes the software an excellent tool for learning or teaching sailing and racing concepts. If you like flight simulators or golf games, you'll enjoy **Sailing Master**.

## Features

- Wind Shifts and Puffs
- Blanketing
- Moving Telltales
- Bad Air Effects
- Basic Rules Enforced
- Detailed Sailing Manual
- Boatspeed and Windspeed Indicators
- Hazards (Row boats & Windsurfers)
- Weather Report and Results Board
- Moving Sail and Tiller
- Sail Trim
- Multiple Skill Levels
- Boat Heel
- Adjustable Course Length
- Windward/leeward or Triangle Courses
- Autopilot, Autoheel, Autotrim
- Time Trials
- **Color**

## System Requirements

On IBM-compatible personal computers, **Sailing Master** requires Microsoft Windows 3.x, 2 MB RAM, and 1 MB of hard disk space. On the Macintosh, you'll need System 6.0.x or 7.x, 1 MB RAM, and 1 MB of hard disk space.

**MAKES A GREAT GIFT!**