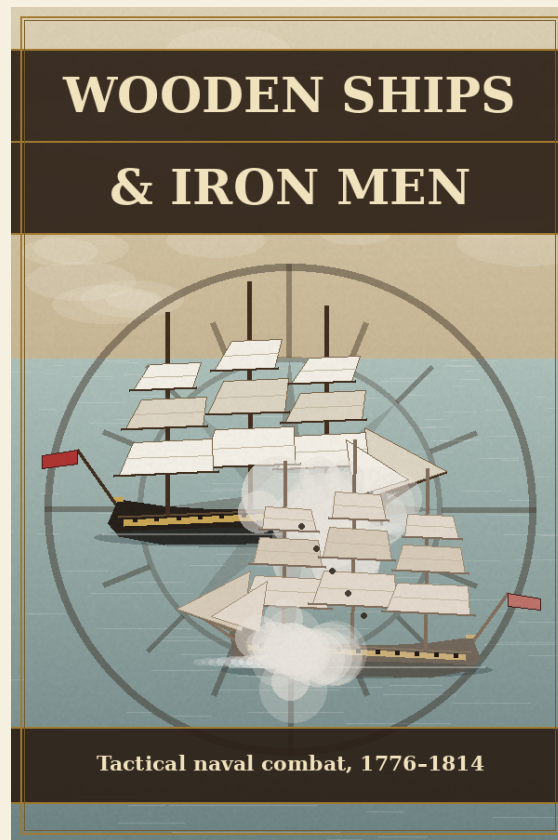




Wooden Ships & Iron Men

Tactical naval combat in the age of fighting sail, 1776–1814

Player and developer manual · version 1.1.1 · Tronsoft Games

1. The action

You command one side of a naval action fought on a chart of 34 by 24 pointy-top hexes. Every ship fills two hexes, bow and stern, and is drawn at her heading, so a glance at the chart tells you which way she is pointed and which beam her guns are on.

A turn runs in seven steps:

Step	What happens
1 Wind	The wind may back or veer a point, or freshen or moderate a force.
2 Movement	Both sides write their orders in secret; every ship then moves together, hex by hex.
3 Grappling	Ships lying alongside may throw grapnels; grappled ships cannot move.
4 Gunnery	Every broadside laid this turn fires at once. Damage is applied afterwards, so a ship that strikes still gets her shot in.
5 Boarding	Grappled ships may send boarders.
6 Reloading	Two broadsides a turn with a full crew, one when short-handed, none if she boarded.
7 Striking	Battered ships test their resolve and may haul down their colours.

Both fleets writing at once is the whole difficulty of the game: you are not reacting to the enemy, you are guessing where he will be in two minutes' time and laying your guns for that water.

2. Sailing

A ship's way depends on her point of sailing. There are four, measured from the eye of the wind:

Point of sailing	Meaning	Effect
In irons	Head into the eye of the wind	No way at all; she may turn, nothing more
Beating	One point off the wind	Her slowest useful point
Broad reach	Two points off	Her fastest point
Running	Dead before the wind	Fast, but she cannot turn as freely into it

2.1 Way by class and sail

Ship	Hull	Guns/side	Carr.	Crew	Rig	Battle B/R/Run	Full B/R/Run	Turns	Armament
First Rate (100)	36	24	2	32	24	1/2/2	2/3/3	1	mixed
Third Rate (80)	31	20	2	27	20	1/3/2	2/3/3	1	mixed
Third Rate (74)	28	18	2	24	20	1/3/2	2/4/3	1	mixed
Third Rate (64)	22	14	2	20	19	1/3/2	2/4/3	1	mixed
Heavy Frigate (44)	22	13	6	19	16	2/3/3	3/4/4	2	mixed
Frigate (38)	15	8	4	14	15	2/3/3	3/5/4	2	mixed
Frigate (32)	12	6	2	12	14	2/4/3	3/5/4	2	mixed
Two-Decker (44)	17	10	0	15	15	1/3/2	2/4/3	1	mixed
Converted Indiaman (42)	17	10	0	19	16	1/2/2	2/3/3	1	mixed
Brig (20, carronades)	10	3	5	10	9	2/4/3	3/5/4	3	carronades
Ship-Sloop (19, long guns)	11	5	1	11	13	2/3/3	3/4/4	2	long guns
Sloop of War (20)	9	4	3	9	9	2/4/3	3/5/5	3	mixed

B/R/Run = beating, broad reach, running. Wind force changes this: 1 light airs; 2 moderate breeze; 3 fresh breeze; 4 strong breeze; 5 gale

In light airs every ship loses a hex of way; in a fresh breeze full sail gains one off the wind; in a strong breeze every ship gains one off the wind and full sail risks her canvas; in a gale full sail is impossible and the lower-deck guns of a two-decker are half served.

Each row of rigging shot away costs a hex of way, and a ship with every row gone is dismasted and drifts. A ship that makes no way for two turns drifts one hex to leeward. A ship that runs off the chart has left the action and takes her guns with her.

3. Writing orders

Orders are written as in the ship's log. **L** is a turn to larboard, **R** a turn to starboard, and a digit is that many hexes run: **L1R2** is turn to larboard, one hex ahead, turn to starboard, two hexes ahead. A turn pivots on the bow — the stern swings — and costs no way, but a ship must make a hex between turns, and no ship may turn more times in a turn than her class allows (see the table above).

Turning your head through the eye of the wind takes her aback: she makes no further way that turn and begins the next in irons. Wearing — turning away through the wind astern — costs nothing but sea room.

Ships that try to occupy the same water run foul of one another and stop; enemies that foul may end up locked together, which is how a great many of these actions were really decided.

4. Gunnery

A broadside bears only on its own beam — the tinted hexes on the chart, **red to larboard** and **green to starboard**. Nothing fires ahead or astern. The expected number of hits is:

guns × range × shot × first broadside × rake × crew × quality × 0.18, then multiplied by a two-dice spread.

4.1 Range

Range (hexes)	1	2	3	4	5	6	7	8	9	10
Multiplier	1.5	1.3	1	1	0.75	0.75	0.5	0.5	0.3	0.3

Carronades count in full at 1–2 hexes, at half from 3–4, and not at all beyond.

4.2 Shot

Shot	Reaches	Multiplier	What it does
Round shot	10	×1	The standard shot: hull or rigging, your choice (aiming high costs a little weight).
Double shot	3	×1.3	Two balls on one charge. Short range only, and it needs hands enough to load.
Chain shot	6	×1.2	Cuts rigging; will not hurt a hull.
Grape	3	×1.4	Sweeps the deck; counts against crew only.

4.3 The dice

Two dice	2	3	4	5	6	7	8	9	10	11	12
Multiplier	0.4	0.55	0.7	0.8	0.9	1	1.1	1.2	1.35	1.5	1.7

4.4 What she carries

Two rates fight the same nominal weight of metal quite differently. A ship built around **long guns** reaches: ×1.2 beyond four hexes. A ship carrying more **carronades** than long guns is a smasher: ×1.15 at one or two hexes, and of little use

further off. Carronades themselves count in full at 1–2 hexes and at half from 3–4.

4.5 Position and crew

Modifier	Value	When
First broadside	×1.25	Her guns were loaded with care before the action; once fired, never again
Rake through the bow	×1.4	Your line of fire runs down the length of the enemy
Rake through the stern	×1.7	The same, from astern, where there is no bulkhead to stop it
Crew	to ×1	Falls when the crew is too thin to serve the guns, and sooner if both broadsides fire
Quality	×0.7 to ×1.25	By the quality of her people: Poor ×0.7, Green ×0.85, Average ×1, Crack ×1.1, Elite ×1.25

A rake does not merely hit harder; the shot travels the length of the gun deck, so far more of it finds guns and crew instead of timber.

5. Damage, fire and criticals

Each hit is rolled against the ship's record. Firing at the hull, most shot goes into the hull itself, some dismounts guns on the engaged side, some kills crew and a little goes high; a rake puts far more into guns and crew; chain and round shot aimed high go into the rigging; grape goes into the crew alone.

Double six — or eleven and up when raking — may do something worse:

Critical	Effect
Fire aboard	One hull a turn until it is got under; it may leap to a grappled ship, and a ship that burns long enough blows up, taking her neighbours' rigging with her
Rudder shot away	She cannot turn until relieving tackles are rigged
Mast carried away	A whole row of rigging gone at once, and a hex of way with it
Officers struck down	Her crew quality drops a grade for the rest of the action
Holed below the waterline	Two more hull at once; a hull reduced to nothing is sinking

6. The watch bill

A crew is not one number. Every ship carries three stations, and damage wears them down separately — shot sweeping a gun deck kills gunners, shot high kills topmen, a melee on deck kills marines first:

Station	Who they are	What they do
gun crews	the greater part of the ship's company	Serve the batteries. The broadside is only as heavy as the hands left at it.
topmen	about a fifth of the company	Work the sails, and go aloft to knot and splice rigging that has been shot away.
marines	a fifth, a third in a ship fitted for boarding	Musketry and the melee: they decide a boarding action, not a gunnery duel.

6.1 Telling parties off

Each turn you may send parties of hands away from the guns. A party is about an eighth of her full complement, so the choice is a real one: every party away is a party not firing.

Duty	Drawn from	Effect
Knotting and splicing	topmen	Each party has a chance every turn of re-reeving a row of rigging, and winning back the hex of way that row was worth. In a strong breeze a topman is sometimes lost overboard.
At the pumps	any hands	Each party holds one leak from gaining, and may fother and plug it outright.
Fire party	any hands	A fire aboard is got under far sooner with a party standing by than without one.

6.2 Leaks

Hull hits taken at one or two hexes — where the shot goes in low and square — may spring a leak below the waterline. Every leak nobody is pumping costs a hull box a turn, so a ship can be perfectly able to fight and still sinking under her own people. The first sign is in the journal, and the count sits on her record.

6.3 Whether it is worth it

Measured over eighty games an action: a side allowed to write a watch bill beats a side that keeps every hand at the guns by about six points on average, and by thirteen in the largest actions, where there is time for water and cut rigging to tell. In a short frigate duel it is worth almost nothing — which is the correct answer, not a fault in the model.

7. Grappling and boarding

Ships that end a turn alongside an enemy may throw grapnels; if both sides want it, it is certain. Grappled ships cannot move, can fire into each other at point-blank, and can be boarded. Boarders go over half-handed or all hands — but a crew sent boarding cannot serve the guns that turn. Marines and crew quality count on both sides. A crew overrun, or outnumbered three to one in the melee, is carried, and her ship becomes a prize under a prize crew. A ship that has already struck and lies alongside an enemy is taken into possession without a fight.

8. Striking, and how the action is judged

A ship whose hull or crew is half gone tests her resolve every turn; the worse the damage, the likelier she strikes, and a better crew holds longer (Poor -2, Green -1, Average +0, Crack +1, Elite +2). Ships dismasted, or with every gun dismounted, or lying under an enemy's guns, strike sooner.

Points go to the enemy for a ship struck, half as much again if she is carried as a prize, and a share for damage short of striking. Each action then carries a **par**: the margin two equal captains are expected to reach with those ships, measured over hundreds of games played by the program against itself. Your result is judged against par, not against zero, so the weaker side can win the action by doing better than history did.

Action	Date	Turns	Forces	Par (first side)	Drawn within
Constitution vs Guerrière	19 August 1812	28	1 v 1	+15	±6
Shannon vs Chesapeake	1 June 1813	22	1 v 1	+11	±6
Flamborough Head	23 September 1779	30	2 v 2	level	±6
The Nile — the Van	1 August 1798	30	5 v 5	+105	±12
The Weather Gage	A squadron action, 1805	30	4 v 4	+35	±12
Lake Erie	10 September 1813	32	3 v 4	level	±8
Breaking the Line	21 October 1805	32	4 v 5	+65	±13
Build a Battle	Ships of your own choosing	30	as you build her	level	±6

Frigate Duel	A chance meeting	26	random duel	level	±6
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9. The actions

Constitution vs Guerrière — 19 August 1812

Off Nova Scotia. Hull's heavy frigate runs down on Dacres, who has hove to and invites action. The American carries more metal and thicker sides; the Briton has the better seamen. Take her or drive her off.

Side	Ships
United States	Constitution (44, elite crew)
Great Britain	Guerrière (38, crack crew)

Shannon vs Chesapeake — 1 June 1813

Off Boston light. Broke has drilled his gunners for seven years; Lawrence has a new crew and a challenge to answer. Evenly matched frigates on paper — fifteen minutes decided it.

Side	Ships
Great Britain	Shannon (38, elite crew)
United States	Chesapeake (38, green crew)

Flamborough Head — 23 September 1779

Moonlight off Yorkshire. John Paul Jones in an old Indiaman with rotten 18-pounders closes Pearson's new two-decker, while Pallas takes on the little Countess of Scarborough. "I have not yet begun to fight."

Side	Ships
Continental Navy	Bonhomme Richard (42, crack crew); Pallas (32, green crew)
Great Britain	Serapis (44, crack crew); Countess of Scarborough (20, average crew)

The Nile — the Van — 1 August 1798

Aboukir Bay at dusk. Brueys lies at anchor, head to wind, confident the shoals guard his inshore side. Nelson's captains stand down the line — some to pass inside it. The French cannot make sail; they can only fight where they lie.

Side	Ships
Great Britain	Goliath (74, crack crew); Zealous (74, crack crew); Orion (74, crack crew); Theseus (74, crack crew); Vanguard (74, elite crew)
France	Guerrier (74, green crew); Conquérant (74, green crew); Spartiate (74, average crew); Aquilon (74, average crew); Franklin (80, average crew)

The Weather Gage — A squadron action, 1805

Two squadrons meet in the Atlantic: three British seventy-fours and a frigate against a Franco-Spanish division with an eighty. The British hold the wind and mean to close; the allies prefer to cripple at long range and slip away.

Side	Ships
Great Britain	Defiance (74, crack crew); Colossus (74, crack crew); Achille (74, average crew); Naiad (38, crack crew)
France & Spain	Indomptable (80, average crew); Argonaute (74, average crew); Monarca (74, green crew); Hermione (38, average crew)

Lake Erie — 10 September 1813

Light airs on fresh water. Barclay's squadron carries long guns and wants the range; Perry's brigs carry carronades and must close to use them. Whoever fights at his own distance wins the lake.

Side	Ships
United States	Lawrence (20b, crack crew); Niagara (20b, average crew); Caledonia (20, average crew)
Great Britain	Detroit (19L, crack crew); Queen Charlotte (20b, average crew); Lady Prevost (20, green crew); Hunter (20, green crew)

Breaking the Line — 21 October 1805

Cape Trafalgar, in a dying breeze and a heavy swell. The allied line stands north; the British come down on it end-on, taking a raking passage to get through it. Once through, the mêlée is what the heavier metal and the better gunners want.

Side	Ships
Great Britain	Victory (100, elite crew); Téméraire (80, elite crew); Royal Sovereign (100, elite crew); Belleisle (74, crack crew)
France & Spain	Bucentaure (80, average crew); Redoutable (74, crack crew); Santísima Trinidad (100, green crew); Fougueux (74, average crew); Monarca (74, green crew)

Build a Battle — Ships of your own choosing

Pick the ships, the crews and the weather, and fight the action you want. Both squadrons form abeam of one another; par is level, so the verdict is simply who did better.

Frigate Duel — A chance meeting

Two frigates sight each other at dawn. Ships, crews and wind are drawn by the seed — every game is a different duel.

10. The screen

The chart is in the middle: drag to pan, wheel or pinch to zoom, click one of your ships to select her, a hex to steer there, an enemy during gunnery to lay a broadside on her. On the left are the wind, the selected ship's record — every box is a hit she can take — her captain's log of orders written, and the journal of the action. On the right are your squadron, the helm, and the gunnery panel with a target, an aim and the next load for each battery.

10.1 Keys

Key	Does
A / W / D	turn to larboard, one hex ahead, turn to starboard
Backspace	take back the last order written
Tab	select the next ship of your squadron
Enter	make sail, or fire
Arrow keys	pan the chart
+ / - / 0	zoom in, zoom out, fit the chart
Esc	close the gunnery return

10.2 The gunnery return

After every exchange each broadside is reported on its own ruled slip: the guns and carronades that bore, the range, the shot, every modifier, the dice as they fell, and where the hits went. Nothing in the model is hidden — if a broadside

disappointed you, the slip says why.

11. Developer notes

11.1 What is in the package

Path	What it is
index.html	The entry. Markup only; it loads the stylesheet and four deferred scripts.
css/game.css	All styling, including the phone layout and the reduced-motion rule.
js/rules.js	The rules engine. No DOM: hexes, wind, plotting, gunnery, boarding, striking, scoring, save and restore. Loads under Node as well as in the browser.
js/ai.js	The computer captains: plot search, target choice, shot choice, boarding.
js/save.js	Every browser-storage call in the package, and the only place keys are named.
js/game.js	The interface: chart rendering, panels, input, animation, flow.
docs/	This manual, the tutorial, the credits and the storefront description.
tests/package-tests.json	The self-tests this package declares, each with its own severity.
validate.js	The in-package validator. Run it with Node from inside the extracted package.

11.2 Storage

Save format **2**. A save written by version 1.0.0 is format 1 and is not readable: a ship now carries three crew stations and a watch bill that release knew nothing about, so an old save is ignored and the title sheet opens in its place (§26).

Namespace **tronsoft_wooden_ships_iron_men**. Keys: **tronsoft_wooden_ships_iron_men_save**, **tronsoft_wooden_ships_iron_men_prefs**. The save holds one battle — the whole game state plus which side you command — and is written after every phase; the preferences key holds the sound setting. Storage is probed on load, and if the browser refuses it the game plays normally and remembers nothing.

11.3 Determinism

Every roll comes from one seeded generator whose state is part of the save, so a battle replays exactly from a restore. Adding **#seed=1812** to the address pins the battle for a test run, and **#seed=1812&scen=nile** starts that action directly.

11.4 Validating

From inside the extracted package: **node validate.js**. It checks the manifest against the 1.6 schema when the specification distribution is present and against a constraint profile derived from that schema when it is not, prints which method it used, evidences every declaration in the manifest against a file that supports it, audits the joints between the interface and the engine, and writes a validation result with a stable code for every diagnostic.

No network requests are made by anything in this package.