

North Sails Seattle Thunderbird Tuning Guide

Introduction

The following tuning guide is meant as a good starting point in setting up your boat. Since not all Thunderbirds are exactly alike and depending on various factors such as sailing style and local conditions, you may have to alter your rig tune slightly.

Our main goal is to help you achieve a rig setup that is fast in all conditions; upwind, reaching and running, and is easy to adjust while sailing. Your new North Sails are designed around this all-purpose philosophy.

It is important to mark your sheets, halyards, tracks, outhaul, backstay, etc. Keep records of your tuning set ups, the conditions you sail in, and your performance. It is essential to be able to duplicate settings from race to race, and also to be able to reproduce fast boat set up.

Tuning the mast

To properly tune your mast you have to keep several factors in mind, jumper tension, mast rake, upper and lower tension, in-line lower tension (if your boat is so equipped) forestay tension, back stay tension, partners and mast butt. A Loos tension gage is required to measure the tension of your shrouds. Most Thunderbirds use 5/32" wire for the forestay, upper shrouds and lower shrouds and 1/8" wire for the jumpers. To measure wire tension use the small model A Loos gauge. If you have 3/16" wire then the larger gauge will be required. Since the larger gauge gives a different number whenever a Loos gauge number is listed we will list the larger gauge number in parenthesis.

Set your initial jumper tension

To promote mast bend while you apply backstay your jumpers should be set quite loose. Use a small Loose tension gauge to measure the tension. The jumpers should be evenly tightened until the Loos gauge gives you a reading of 5. (This is just a preliminary setting and will have to be adjusted once the final tune begins)

Set rake

To set rake be sure that you mast is centered athwartships in the boat and block the mast at the partners at maximum J (8'). Block your mast fore or aft until you have reached this position.

The mast rake should be set at 6' using the Thunderbird triangular method listed below. When checking rake or any rig tension measurements tighten your backstay until your forestay reads 30 (5).

Step 1: Hold the end of a tape measure at the top edge of the mast band at the gooseneck, then measure back to the transom 16' 10" and place a mark on the deck at that point (This mark should be within 4" of the transom)

Step 2: Hoist tape measure on main halyard until it two-blocks (stops) at the top of the mast, and measure to the top of the mast band at the gooseneck. Note the number on the tape. This is the "A" measurement.

Step 3: With the tape measure still two-blocked at the top of the mast, measure to the mark you placed on the deck just forward of the transom. Record this number as "B" measurement.

The difference between "A" & "B" is the rake number. Your rake should be 6' (+/- .5 "). The larger the number you have the less rake your boat has. The smaller the number the more rake you have. If your mast needs more rake, lengthen your headstay. If it needs less rake, then shorten the headstay. It is important to keep in mind that as you lengthen or shorten you headstay your lower shrouds and backstay may have to be adjusted. It is best to keep your aft lowers and backstay loose while changing headstay length. Your mast butt position will also have an effect on how your mast will

behave while setting rake. You may find that you have to move mast butt position to keep your mast straight while adjusting headstay length.

With your rake set at 6' (+/- .5 "), now you are ready to fine-tune the mast. All rig tension numbers are using the Loos tension gauge. Remember to set your forestay to 30 (5) before taking rig tension measurements. When your backstay is completely off your forestay should read 20(0). With your forestay set at 30(5) you rig tensions should be:

Forestay = 30(5)

Jumpers = 5

Uppers = 37(13)

Aft lowers = 32(9)

In line lowers = 25(3) (if you have in line lowers)

Mast prebend at the dock should be $\frac{1}{2}$ " , with max bend at the center of the mast. To add more prebend, move your mast butt aft. Note that if you move your butt back, this will have the effect of tightening your aft lowers, which will need to be loosened. To remove pre-bend, move the butt forward and then tighten the lowers accordingly.

Adjusting your rig for extreme conditions

Now that you have your rig set up for all around conditions you can fine-tune your mast for extreme conditions. Only make these adjustments if you know that the conditions are going to definitely be heavy or light. When in doubt just use the all around setting listed above for best performance in a wide range of conditions. If you know that the conditions are going to vary light or very heavy, adjust the rig as follows:

0-5 knots wind 18+

Jumpers Keep the same Loosen $\frac{1}{2}$ turn from normal settings

Uppers Keep the same Loosen 1 turn from normal settings

Aft lowers Loosen 1 turn from normal tighten 1 turn from normal settings

In Line lowers Keep the same tighten 1 turn from normal settings

You are now ready to go sailing!

Sail Trim

Because crew weights vary greatly from boat to boat instead of trim for specific wind speeds, we have broken trim down into two categories:

Powered up: meaning you can keep the boat at less than 15 degrees of heel without depowering the sails

Depowering: meaning you can no longer keep the boat at less than 15 degrees of heel without making sail adjustments.

Mainsail:

Powered up conditions

Be sure to not over tension the main halyard. When hoisting the main pull on enough tension to remove all scallops between slugs, then ease the halyard until visible scallops appear and cleat. Even in light air the main needs some backstay applied to achieve the proper shape. Going up wind with the backstay off apply mainsheet tension so that the top batten cups slightly to weather. Now pull on backstay until the top of the mast bends enough to twist the top batten to leeward so that it is parallel with the boom. Adjust traveler until the boom is on centerline. Set outhaul tension so that the foot shelf on the main is completely full. Put a mark on your backstay to easily duplicate this setting in future

Depowering conditions

As soon as you can no longer keep the boat at 15 degrees of heel or less then it is time to depower. Your primary tool to depower is the backstay. As the wind increases apply backstay. This will bend the mast and flatten the main. It will also cause the top batten to twist off to leeward so make sure that after you apply backstay to adjust your mainsheet to bring your top batten to parallel. As the wind increases also start to lower the traveler to help keep the boat flats and reduces helm. As you apply more backstay you will see diagonal overbend wrinkles coming out of the lower luff of the main and the scallops between the slugs will increase. Apply cunningham to remove the wrinkles.

Once you have pulled on the maximum amount of backstay available to you and you can not lower the traveler any further without getting excessive backwinding, it is time to start twisting the mainsail. Do this by easing the mainsheet in small increments until the top batten is twisted about 5 degrees to leeward. You may have to pull the traveler up a bit to prevent the mainsail from flogging.

In puffy changing conditions you should follow these steps:

Puff hits

1st feather into the wind and drop the traveler to keep the boat as flat as possible

2nd pull on backstay to flatten main

3rd pull on mainsheet to pull top batten back to parallel

4th adjust traveler to balance helm and heel

Puff leaves

1st pull up traveler to maintain power

2nd ease backstay

3rd ease mainsheet to achieve proper twist

4th fine tune traveler to bring boom to center line

Genoa trim:

If you are using a push pin at the tack you should add a 1 1/2" shackle with a 1/2 twist to the tack of the genoa to allow the sail to set a bit higher off the deck. You can also use a snap shackle at the tack, which will achieve the same effect.

Powered up conditions

Set halyard so that you have small scallops between hanks. Trim the sail in until you are about 1" off the spreader. Adjust genoa car lead to set twist in the sail. The car should be set so that the foot and leech are the same distance off shroud base and spreader. If the leech is further away from the spreader tip than foot is from the shroud base then pull the lead forward to reduce twist. Do the reverse if the foot is further from the shroud base than the leech is from the spreader. When going upwind at full speed the foot and leech should be about 1" off the shroud base and spreader tip. This is a good all-purpose setting. As the wind increases the jib car lead and sheet will need to be adjusted to maintain this position.

Depowering conditions

If you have followed the directions for mainsail trim by depowering the main with backstay then you are already depowering the headsail as the backstay comes on by making the forestay tighter. As the windspeed increases make sure to check genoa trim. The genoa leech will open as the wind increases, requiring more jib sheet tension. As you reach the condition where the backstay is all the way on and you still need to depower it will become necessary to twist the genoa much like you do the main to depower. Do this by bringing the car lead back. The lead may move as much as 4" back. A common mistake is to bring the car back then sheet the genoa in too tight. When you need to depower by twisting the genoa, you should progressively allow the sail to twist allow the leech to get further away from the spreader tip, opening the slot. At the upper end of the Genoa conditions, the leech should be about 4" away from the spreader, with the foot snug against the shroud base.

Class Jib in 20+ knots

We recommend that you trim the jib to the deck and not the cabin house. In line lowers prohibit trimming to the deck so a track should be placed as far outboard as possible on the cabin house. The halyard should be tight enough to remove any scallops between hanks. Set the jib car lead so that the telltales fly with the top inboard telltale breaking just before the lower two. The foot should be almost flat with 2-3" of camber (2-3" of shape off a straight line) between the clew and tack. Trim the sheet in until the leech is even with the shrouds as seen from to leeward. After identifying correct trim make a mark somewhere on your sheet so you do not have to go to leeward to check your jib trim.

In class jib conditions your slot is more open allowing a lower traveler on the mainsail. At this point you can remove twist (by adding more mainsheet tension) and lower the traveler to keep the boat heeling no more than 15 degrees. As the wind increases keep depowering by again twisting the main and bringing the lead back on the jib to twist the top of that sail. See notes on rig tune for these conditions.

Downwind and class spinnaker

Setting the spinnaker from the cockpit using a spinnaker-launching bag is a very effective way to set. This will help keep the crew in the optimal positions for as long as possible by minimizing packing time, and retrieval of the spinnaker from below before setting.

The .75 oz class spinnaker is designed to sail windward leeward courses, yet has enough of an all-purpose shape to be quite effective while reaching. A common mistake is to fly the sail with the pole too high. Set the pole so that the windward leech of the spinnaker rises vertically from the pole. Another indicator of proper pole height is if the center seam is straight up and down. If the Leech or center seam angle off to leeward then lower the pole. If leech or center seam rotate to windward then raise the pole. The leech should break at the upper 1/3rd of the sail. If conditions get light or bouncy, do not hesitate to lower the pole to stabilize the spinnaker making it easier to trim. The sheet blocks should be approximately 4' from the transom of the boat. Since they are so far aft we recommend the use of tweaker lines. If you do not use tweaker or twing lines the pole will have a tendency to fly away from the spinnaker clew making the sail less stable. To be effective the tweakers should be positioned so they pull down up near the shroud chain plates.

Trim the Mainsail to keep it perpendicular to the wind. Use the vang to keep the top batten parallel with the boom. Make sure and release the backstay all the way off to let the mast go forward as far as possible. Given the mainsail is proportionally so large on a Thunderbird, it is important to keep sharp on main trim, adjusting in and out as the boat heads up and down.

Crew weight.

While going up wind, crew weight should be centered to keep the weight out of the ends. The foredeck person should sit on the rail next to the cabin house. Middle person sits just aft of the aft cabin bulkhead, with the trimmer just aft of the middle person and the helmsperson as close as possible to the trimmer. The Thunderbird is very sensitive to heel and likes to sail on the leeward chine. Every effort should be made to keep the boat heeling in a range from 10 degrees to 15 degrees. In very light upwind conditions where all the crew is sitting to leeward it is best to put at least one person down below and to leeward to help lower the boat's center of gravity and reduce pitching. As the wind increases progressively bring crew to windward to maintain optimum heeling. Do not start to depower the sails until all crew are fully to windward and hiking, then depower per instructions listed earlier.

Downwind you also want to keep crew weight centered fore and aft. In true winds speeds of 15 knots and under the foredeck should sit next to the mast either on the windward or leeward side. Place foredeck to windward if you have weather helm. Place him/her to leeward if the boat is heeling too much to windward and you have lee helm. The center person should stand in the companion way hatch moving from side to side as needed to keep a neutral helm. The trimmer stands just aft of the cockpit hatch bulkhead. Helmsperson should stand just aft of the traveler or as far forward as is comfortable. If the wind increases over 15 true start bringing the foredeck aft as needed to keep the bow up. In windy conditions (25 knots plus) the foredeck should sit back nearer the center person.

General Notes on Speed Sailing

When tacking in light to moderate airs make sure to not come out of the tack too high. It is better to come out low and fast, then bring the boat up after reaching top speed. If you come out too high the boat will not be able to accelerate and it will take you much longer to reach top speed.

Crew weight from side to side is very important to maintain top speed. You should constantly adjust crew weight to achieve optimal heel angle (about 12 degrees). Definitely mount some sort of gauge to tell you how much you are heeling and check it often to maintain proper heel.

Pole height is important and changes in increments of 1" have a big effect on the tri-radial spinnaker. Remember to lower the pole any time conditions get challenging (i.e. bad air, boat wake)

Constant adjustment of the rig, crew position, and course and fleet position is the key to success in any class. The technique of "changing gears" is only accomplished by maintaining constant crew communication. Each member of the crew should be responsible for certain areas of the boat and observations of the course. The only way to make this technique work is through hours of practice with your teammates.

If you have any questions, comments, or suggestions, we will be glad to discuss them with you at (206) 632-5753 or Fax (206) 632-5715.

Thank You - North Sails Seattle