# SUPERNOVA TUNING AND SAILING GUIDE

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Welcome to the Supernova Tuning and Sailing Guide. I have compiled this guide from various sources and from my notes from Class Training days, as well as from my own personal experiences in over 8 years of sailing the Supernova, both Mk1 and Mk2 boats. In this guide, I have started on rigging the boat to get you sailing with basic settings, before going on to some more advanced boat control techniques in the latter section.

When I started with the Mark 1 Supernova, I had no idea how to set up the boat or how to use the controls properly. At first, there seems a lot of string (and this seems to put a lot of people off). However, there are only 6 string controls – 5 if you don't have adjustable lowers (mainsheet, kicker, Cunningham, outhaul, and mast rake). It's not *too* complicated, but it's important to understand what each of the controls do and their effect on the sail shape. Since the early days my sailing has improved a lot – however, there is no substitute for plenty of time on the water to get used to all the different aspects. You can compare this to learning to drive a car – at some point you won't need to think about coordinating throttle, gears, steering, etc. It all just happens and as a result driving becomes an altogether more satisfying experience.

Please ensure you take time using the guide in setting up your boat preferably on a day when it's not windy, wet, or cold. You will need a long tape (8m) to measure rake settings. It's also worth making sure all your control lines work well and have the right amount of adjustment for their job. Once this is achieved it will make the boat much faster and more pleasurable to sail in varying conditions and help you achieve the best performance out of your boat.

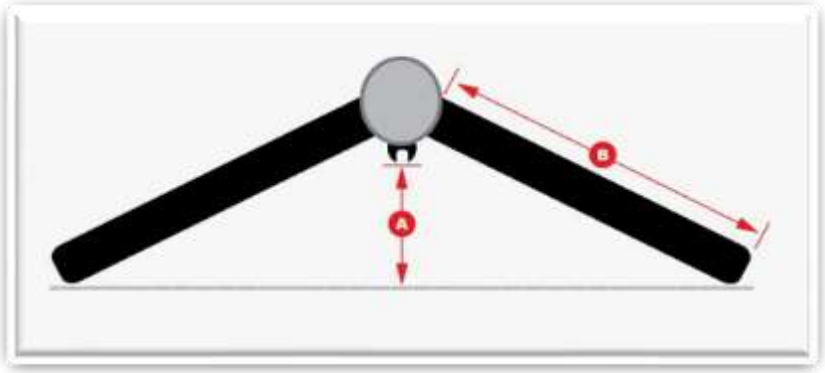
Remember that getting to know what works best for you and your boat takes time, experimenting and practice time on the water. Start with the settings in this Guide, familiarise yourself with them, and don't be afraid to chop and change things to find the settings that work for you.

As the boat (and especially the sail) ages, you'll find that the tuning settings will change. Don't be afraid to check your rig settings from time to time so you can have the confidence that everything is sweet. Then you can concentrate on race strategy and tactics by getting your head out of the boat.

I find it useful to record settings in a notebook for future reference, so you can come back to those that work particularly well.

## SPREADERS

Before you step your mast, it's worth having a look at your spreaders. They have a significant effect on mast bend so correct spreader setting is important for sail shape.




Spreader deflection (distance A) controls how much the mast bends fore and aft. A fuller deflection (with distance A longer) will allow more mast bend, so the sail will be flatter with a more open leech (less power). This may suit lighter sailors who may want a slightly de-tuned rig. A shallower deflection (with spreaders further forward) will give more sail power and is better for heavier sailors.

Spreader length (B) affects the sideways stiffness of the mast. Shorter spreaders make the mast more 'sideways bendy' and more accommodating in gusts, so if you are a lighter sailor you can reduce power at the top of the sail by shortening your spreaders. Higher rig tension means that you can get away with less length and deflection to achieve the same effect.

If you are at the bottom of the weight range, say under 65kg, you can shorten the spreader arms by 10mm or so to reduce sail power, but you may need shorter shrouds to achieve proper tension and adjustment.

For a standard set up, especially if you are in the middle of the weight range (75kg), you can set deflection (A) to 120mm and length (B) to 380mm.

Newer masts have 'swinging spreaders' limited by a bracket to stop them swinging too far forward when sailing downwind. The shrouds stop the boom 'squaring off' so ease the rig tension a little downwind (raked rig) to allow sailing deeper. The leeward shroud is slacker allowing the boom to go further forward. You can also sail 'by the lee' but this is risky in shifty winds as you may inadvertently gybe.

## MAST SET UP

Now that you have set the spreaders you are ready to 'step' the mast. The mast should be stepped so that the distance between the U-bolt at the bow and the front of the mast is 1120mm. You can go one hole forward in the mast step to 1100 which can reduce weather helm on some boats = straight rudder = faster, but older Mk1 boats before SN588 may only be able to achieve 1100mm which will be OK as the mast step position was a bit variable.

Sight along the mast before you step it to check that it's not bent. The aluminium masts are quite soft and can bend out of shape easily. The masts are the Superspars M7 (not the 'M7 Plus' springier masts – these are not class legal).

There is no pre-bend setting on the Superspars mast as we don't use that much rig tension, but it is worth checking mast 'trueness' from time to time by sighting up with the halyard stretched tight against the luff slot.

## MAST RAKE

Now for a critical bit of setting up. Mast rake (using the forestay) is an important control and needs to be calibrated if you want to depower the rig in stronger winds and help you to point higher in lighter winds. Easing the rig allows the shrouds to go slacker so that the mast is more compliant (bendier) with stronger winds. With the following setup, you can point as high as Lasers and Phantoms if you have decent boat speed.

For the rest of this guide I will refer to a 5 point rake setting with 1 being the mast fully upright and 5 fully raked back. Below is an idea of the conditions that suit each setting, taking account of the maximum gust wind speed. F1-F6 refers to the Beaufort wind scale.

Setting 1 – 'Just hiking' medium breeze in flat water only (not waves or chop) – gives a powered sail and tight leech (F2-F3 winds, 6 to 10knts).
Setting 2 – Normal, or **default** setting – light airs to just below hiking – when you are sat on the side and **not hiking** (F1 – F2, 0 to 6knts).
Setting 3 – Full power hiking mode to a bit overpowered (say F3 or F4, 11 to 16knts spilling the main to de-power in gusts).
Setting 4 – Generally overpowered – hiking hard (F4 or F5, 17knts or more).
Setting 5 – Mast fully raked – very strong winds with main spilling wind (F5+, survival sailing when you are seriously over-powered).

**Initial set up (no sail rigged):**

1. The first thing to do is to slacken off your lowers when calibrating.

2. Then set your rig tension (as measured on the shrouds) with the rig fully upright. You can set it around 65lbs (30kg) - about 50mm of play at shoulder height with the boat on its trolley. This is too small to set with a tension gauge (except Loos, setting 5 or 6), but if you use a gauge, the wire diameter on the shrouds is 2.5mm. There is no need for massive rig tension (eg. >250lbs) but you can use more rig tension say up to 180lbs (75kg) but not on older boats, say pre SN583 – this can reduce the rig 'sloppiness' but you do it at your own risk. Remember that dynamic (sailing) loads are much higher than static loads on the shore.

3. Now attach a tape to the halyard and pull to the top of the mast. Measure the mast rake to the top of the transom gudgeon along the centre line of the boat. Pull the forestay tight so that the rig is fully upright - if the shrouds are too tight then loosen off one hole on the adjuster. Incidentally, a lot of boats have the Allen adjusters swapped between shrouds and lowers. As it's more important to get the rig tension right with proper adjustment, you need the adjuster with more adjustment holes on the shrouds to give you smaller incremental adjustment (Allen part number A4272). You are trying to achieve upright setting 1 with rake at 6100mm, with your chosen shroud tension (30kg). The shrouds should be equally tensioned on port and starboard sides. If different, then either you have a bent mast, or the shrouds are of unequal length. The default shroud length is 4000mm (4m) in case you are wondering.

4. Now you need to loosen the forestay to rake the mast back to a fully raked position (5900mm) as this is your setting '5' position. The shrouds will slacken off considerably as you rake. It's worth making your safety line on the forestay be tight at this point so that if your forestay fails you can still sail the boat home.

Now mark the settings 1 – 5 on the foredeck representing 50mm of rake increments against a mark on the rope (a loop of pvc tape will work).

Setting 1: 6100 mm (fully upright)
Setting 2: 6050 mm ('normal' setting)
Setting 3: 6000 mm
Setting 4: 5950 mm
Setting 5: 5900 mm (limit by safety leash is say 5850mm)

You may want to use a calibration sticker, but I find that 3 or 5 marks works fine (or even a single point marked for setting 2). If you don't have any calibration strips, then a permanent black marker or some pvc electrical tape will do fine (you can remove the marks with acetone if you need to later). I use a pair of bobbles with bungee elastic as shown in the picture (here the rake is set to setting 2).

One tip is to have the halyard slightly long so that you can put a permanent pen mark on it at the gudgeon intercept – as a quick and easy pre-race check.

Having the rake calibrated will allow you to repeat rake settings quickly during a race, for example to depower or for pointing higher. The important thing is to have some reference somewhere on your mast rake as this is one of the critical controls – you want to be able to repeat settings without thinking twice about it.

**TOP TIP**: You can make calibration markers with a good labelling machine. These can be purchased for around £60 and use laminated tape which is waterproof, and UV stabilised. I use the 18mm tape with black lettering on white, 36-point font which gives very readable lettering. I have also labelled my control lines near the cleats (Kicker, Cunningham, Rig, Lowers) as sometimes you haven't time to think 'which line do I need to adjust? If there are a few of you it might be better to 'club together' and share the cost of a better machine.

## LOWERS

Now we need to say something about the lowers. They control the bend in the bottom section of the mast by preventing the gooseneck from pushing forward with increasing kicker tension. The later boats have adjustable lowers (as an extra cost option), but earlier boats and Mark 1's have fixed lowers set by a pin, so any lowers adjustment must be done on the shore. You can use 'fastpins' as this allows easier on shore adjustment (but make sure they are tethered in some way, so they can't be lost easily). If you can't afford the cost of adjustable lowers then you'll be fine with the fixed ones. There seems to be a migration away from adjustable lowers on the latest boats.

With fixed lowers, tighten them up for light wind sailing except for very light airs when a flat 'blade' sail will have less drag. You want the kicker to control the leech tension more than putting a bend in the mast. For increasing winds, you want the kicker to put more forward force on the gooseneck, so loosen them off. If you have fixed lowers you will need to judge the setting on shore on what you think the sailing conditions will be – if you think you will be overpowered set them loose before you launch so that when the kicker is on maximum they only go just tight (at your chosen maximum rake setting for the conditions).

Adjustable lowers can be useful in lighter and variable winds (<F3) as it gives you the option to select for more acceleration in puffs (tight lowers) or more top speed (loose lowers and a flatter sail).

In practice, this is how I use my adjustable lowers - in very light wind conditions where I'm not hiking and need most power, the rig will be at default setting 2. I want a flat sail with less camber and a less pronounced luff curve, so the lowers will be eased a bit to allow the mast to bend with normal kicker and mainsheet. It is easier for the wind to stay attached over the sail if it is flatter (particularly in those drifting conditions). You can also tighten up the outhaul a little to help keep any airflow attachment at the foot of the sail and open the lower leech for better airflow off the back of the sail. However, if you use tapered battens you can be a bit more generous with the use of kicker.

If the wind increases (still in rig setting 2), fill the sail foot by easing the outhaul and pull the lowers on taut to hold the mast straight and keep as much power in the sail as possible. You will get more acceleration. If the wind increases even more and you start to hike out, set the rig more upright to setting 1 and then loosen the lowers to flatten the sail more as you apply increasing kicker. You will have less power in the sail but will sail faster as you can keep the boat flatter rather than heeling to leeward which loses energy, is slow and gives too much weather helm. You'll

put too much rudder on to steer straight, increasing the braking effect. If you don't ease off the lowers you will lose a bit of upwind speed because of more drag in the sail through excessive camber. But ALWAYS KEEP THE BOAT FLAT!

In more wind, if I am on rig settings 3, 4 or 5, then I would normally leave the lowers slack and not mess about with them as I want to depower as much as possible - concentrate on keeping the boat flat by the 'Ease mainsheet-then hike-then trim' fast handling method and not by luffing up as you might with unstayed masts (this is very slow on the Supernova).

## KICKER 'SET UP'


The kicker controls the boom and leech tension and is a critical control to understand. Most Supernovas now have a 16:1 cascade kicker but older boats may have 8:1 or 12:1. If you have one of those it is well worth upgrading to 16:1 as it gives you finer control at the expense of doubling the amount of string in the cockpit.

The first thing to check is that you have enough range in your kicker system. Attach the sail with the rig fully upright. There should be enough kicker slack, so the boom can go a little higher to allow you to attach the clew to the boom. The kicker should then be fully tensioned to ensure you don't get 'block to block' at the boom before you have full kicker. The kicker (like mast rake) is a critical control so it needs to be calibrated to replicate fast settings while racing. There are several ways of doing this, but I like to use calibration stickers on the boom using a string arrangement off the kicker cascade back along the boom with a small bobble as a reference. (see picture right). Mine has a 2:1 'doubler' to make the gauging more accurate (see left picture below).

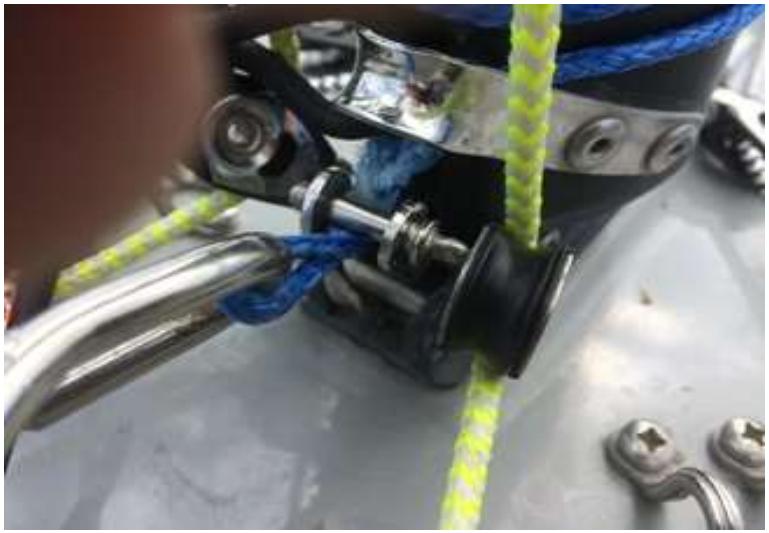
There are some kicker attachment modifications to improve overall reliability such as using a 'soft' kicker boom-strap or loop of dyneema, and a mast step take off instead of the kicker mast tang (which is prone to failure). These are low cost upgrades well within the scope of DIY (see below).

The kicker is a very high stress part of the rig with high loads, so anything you can do to improve its reliability has to be a good thing.


There is a better method of kicker boom attachment which uses a dyneema loop around the mast (figure of 8 fashion) as shown here. This is a length of dyneema with an eye splice in the centre and each end has an eye splice and thimble. The eye at the aft end is secured to the mainsheet block fixing eye by another length of dyneema to prevent the whole thing moving forward. I have used this method with great success as it prevents a high stress load on a single point of attachment (factory method). It is very reliable.

The lower left picture shows the same method with a material 'wrap'. This can be made using appropriate weatherproof material and a good sewing machine.

The improved kicker 'bottom end' uses a twist shackle to the mast step. This also locks the mast into the step and prevents the mast from becoming detached if the boat turns turtle with all the tension off (lower right pic). It also spreads the (high) load between mast step and mast so each has only 50% of the load. Note the kicker tang is now redundant and could be removed.



## BRIDLE (OR STROP)

The bridle is not really an 'on the water adjustable' sailing control but it can be made shore-adjustable using a sliding-splice arrangement with Dyneema. I find that in practice you don't tend to adjust it much, so it's simpler to keep a fixed bridle. The bridle's purpose is a restraint to prevent the boom from applying downward pressure and altering leech tension when you sheet in (this should be what the kicker is for), as well as limiting how much you can bring the boom to the centerline of the boat.

A bridle is made using low stretch 12 strand Dyneema (4mm Marlow D12, English Braids, or Liros). This has a strong breaking strain – a few tons! The Liros rope (available from Force 4 and elsewhere) is particularly easy to splice, nice and soft, not too expensive and seems to last well.

On the Mark 1 boats, the bridle length is nominally 470mm. On Mark 2 boats, it is around 500mm (unless a mini-traveller arrangement is used). It is better to have the bridle too long rather than too short. Getting the correct length makes a significant difference and you can shorten it by 25mm for windy days if you have it adjustable.

The Mark 2 bridle lengths are slightly longer because the deck shape and cleat positions are different.

You can check if the length is correct by laying the bridle flat and the block should reach roughly to the front of the centreboard slot. This will also check that port and starboard lengths are equal.

What you don't want is a bridle that is too short though otherwise it will act like having some kicker on, and the leech will be too tight. In light to medium breezes a bridle that is too long will hurt your pointing because you won't be able to tension the leech correctly and you'll compensate by using a lot of kicker. That will kill your power (because of a flatter sail) and prevent you from centering the boom which you need for pointing high.

The picture (above) shows an 'off boom' sheeting arrangement which I personally like. This puts the ratchet block on the boom rather than on the cockpit floor. It does offer a more precise feel on mainsheet loads and the auto-ratchet works better because of the increased 'wrap' of the mainsheet around the block (180 degrees rather than 120 degrees). The main advantage though is that it removes the ratchet block from the cockpit floor so that there's less risk of entanglement. The bridle can be made neatly from a single length of 3m long Dyneema (4mm) – I intend to write a 'How to' Guide, as the splicing needs a bit of care and is not obvious how it's done.
When you have done the above you are ready to sail, but it's worth having a look at the mainsail – after all, this is the 'engine' of your boat.

## THE SAIL

The full-sized Supernova sail is nominally 8 sq. m in area. There are several sails in use. Early boats used Banks sails, and these are still in use today. It is suggested that these flatten better than the current sails from sailmaker Jeckells, and they are very robust. The Banks sails however don't incorporate a transparent window, so it can be tricky to spot starboard right of way boats if you are on port tack. There are a few (very few) Hyde sails around. The cut of these is very powerful and for most people they are just too powerful. The later Mylar laminate sails are from Jeckells and these are now used on 90% of boats. The 'legal' Jeckells sail has a red diamond in the tack, to distinguish it from early 'bandit' Jeckells sails which had the wrong cut.

There is a newer Jeckells sail available from August 2017 with a new cloth (the old cloth is now unavailable) recognized by looking darker. The cut should be identical so preserving the one design nature of the Class.

It's worth checking both the batten tightness and the sail luff length, as the bolt rope in the luff tube shrinks over time. There should be no creases along the batten pockets. If there are a lot of creases along the luff, then it's likely that the bolt rope has shrunk (maybe by as much as 100mm), and you will need some Cunningham to set the draft properly - the sail draft moves aft with age.

**Tapered Battens (Class Legal)**: You can improve the feel of the rig and therefore your sailing enjoyment by using tapered battens. The standard mainsail as supplied uses contract untapered battens.

Modern sails have their position of maximum camber between 38% and 45%, but the relatively 'soft' untapered battens rely mostly on sail cut to create an efficient aero foil shape. With older sails, the sail may be a bit 'saggy' and the cloth needs a bit more help to retain an efficient shape. Tapered battens will correct inefficiency and aid how well you are able to trim for the constantly shifting wind conditions. It is a challenge to keep our sails in tune with the shifting wind at the best of times.

The main criticism of untapered battens is that they are just sail stiffeners with the maximum camber at 50% and this fights against the designed sail cut. You get too fine an entry on the luff and the draft tends to move aft in stronger winds, creating too much sideways lift and drag. This effect is more pronounced on older sails. Also, the battens are quite soft at the leech so with too much kicker the leech can be too rounded or 'hooked'. The wind can more readily stall off the back of the sail, losing lift and creating turbulence and drag (= slower boat).

Tapered battens won't by themselves give you a noticeable increase in boat speed. They do help the sail maintain the design shape regardless of poor sail trim or wind angle of attack, age of the sail etc. The sail shape can be maintained through a wider set of wind conditions, so the boat will seem easier to sail. Upwind, tapered battens give you a wider 'groove' so you can sail optimally (that is faster) for a greater proportion of the time.

You will find with tapered battens, the sail is more controllable in stronger, gustier conditions. They would particularly suit inland sailors who struggle with gusts. However, sailing the boat is a slightly different and you need to re-learn how you use the kicker upwind. My default rig now is with tapered battens with the top two battens left untapered.

I have written a separate article on '*Performance Tuning Using Tapered Battens*' which is worth a read if you want more detail (download from the Technical section of the Supernova website). Tapered battens cost upwards of £75 for a set of 5 battens. Using tapered battens is Class legal and you could make your own. (Update April 2021 – the Dynaflex battens from the Netherlands are now unavailable as it has become too difficult to sort out paperwork post-Brexit).

There is a newer small sail in the new cloth with full battens – which may suit very light sailors and lady sailors. The sail area is 80% of the full sail (6.8 sq.m. nominally), making it very suitable for the more extreme conditions. It handles very well with the full battens offering more progressive depowering than the older short batten small sail.

## FOILS

The foils (rudder and centerboard) are critical components for fast sailing. Contrary to popular opinion, creating a smooth hull finish by polishing is much less important than having good foils. The condition of the foils has a major effect on boat speed because water is very dense compared to air. If you find that your boat 'hums' when on the plane, then it's likely you have an issue with your foils. In the past, manufactured foils have not been of consistent quality, so it's worth checking your foils 'sit true' and are free from nicks, scratches and cracks.

Leading edges on both centerboard and rudder need to be smooth and free of nicks – fill any deep nicks with epoxy filler and smooth off using

gelcoat repair. Polishing the surfaces also helps, but don't be tempted to use silicone-based polishes otherwise you'll never be able to grip the centerboard when you capsize (Yep, I've tried it). Ideally you want a mirror finish only achievable by a lot of hand polishing or by machine polishing and specialist cutting and polishing compounds. While we are talking about polishing – there's nothing wrong with polishing your boat above the waterline. Personally, I think I sail better with a nicely polished and waxed boat (much like I drive a bit more carefully after I've cleaned the car). You can get marine polishes that contain Carnauba wax from Chandlers. You could go that extra stage and use a random orbital polisher if you have one. I also do car detailing (getting that 'better than showroom' look on a car) so have the equipment anyway. A random orbital polisher with proper polishing pads and the right cutting/polishing compounds can work wonders on your gelcoat (especially on your foils). Try Meguires scratch remover. Have a look on YouTube/Google and there is plenty of information about car detailing – some people are a bit obsessed by it though. If you can't win in the racing, you might as well get the prize for the best-looking boat!

## USING THE CONTROLS FOR DIFFERENT CONDITIONS

Now that your boat is set up correctly you now need to get some extensive sailing practice in to understand how to set the controls for the different wind conditions. It's tempting to keep playing with the tuning setup (otherwise known as 'fettling') but a better method is to set it up once and forget about it. Keep it simple - adjust the two main controls (rig tension and kicker) for the wind conditions while sailing corresponding with the point of sailing (upwind, downwind, reaching) and control the sail and boom with the mainsheet. Forget the other controls unless you need to depower. Focus on tactics, keeping the boat flat, other boats and playing the wind shifts. Most people do this and sail very successfully. The table below shows the basic settings you need for this approach to work.

| **Wind** | **0 – 5knots (underpowered)** | **6 – 15 knots (nicely powered)** | **16knots + (overpowered)** |
|---|---|---|---|
| Rig Tension | Setting 2 | Setting 2 | Setting 3 - 5 |
| Lowers (set and forget) | Tight | Loose | Loose |
| Kicker | None, just on | Some to get top telltale flicking 50% upwind, just on downwind | Plenty to depower. Off to tack. Downwind some on |
| Cunningham | Off | Off | On to maximum upwind, off downwind |
| Outhaul Upwind | Light airs tighter otherwise 50mm – 100mm from boom. A bit more downwind. | 75 – 150mm from boom | Tighten to reduce power in foot of sail |
| Centreboard | Down up wind, up off wind. ½ up when reaching | Raise 100mm upwind, up off wind. ½ up when reaching. | Raise 200mm upwind. A bit more when reaching. |

If you are happy with the above, then that's it. You will be able to sail perfectly well with this approach if you concentrate on staying out of the water, on overall race strategy and tactics, and enjoying yourself. The Supernova is a great boat for that, but for advanced sailing you need a few more percentage points and for that understand a bit more about it.

The next section is about advanced control of the boat as a sort of 'MasterClass'.

Here's a bit more detailed information about sailing the Supernova in different wind conditions. Not everyone sails the Supernova the same way – but this is how I do it.

**Light Wind Sailing**

**For light airs** you sit in the boat or on the side looking for wind puffs and don't need to hike out. Set the rig to setting 2 (which is the default setting) and set the lowers slack in the really drifting conditions for a flatter sail to eke more power out of the wind and to keep the wind attached to the sail. Really sit in (or kneel) in the light stuff. If you have more wind, then set the lowers a bit tighter to put a bit more acceleration in the sail and build some speed. If you have stronger, more sustained gusts, start to ease the mainsheet and hike a bit, but you shouldn't need to touch the rake setting – just leave it on setting 2 and concentrate on other things like mainsheet control to keep the boat flat. However, upwind you do need to set the kicker quite precisely as you want to keep a tight leech, so make sure all the telltales are streaming aft.

**Light winds but gusty**: If you try to use a fully upright rig (1) in gusty conditions, the rig is too stiff and unforgiving when the gusts hit. You'll find the heeling hard to control. On the default rig setting (2) the leeward shroud should be just starting to go slack. This allows the mast to bend a bit both fore and aft and sideways which will help flatten the sail and open the leech in the gusts with the wind spilling out of the top of the sail. This means you can use a bit more kicker to close the leech slightly without it hooking and have a flatter luff entry - the benefit is that you can sail with the boom further out (to develop more power, build speed) and your pointing will be as high as a Laser.

**In the lightest of airs** leave the lowers loose to allow some low mast bend to flatten the leech around the bottom batten. Remember to be careful with the kicker tension – too much will hook the leech and kill your speed and you won't point. This is where pays to look at your kicker calibration marks for the setting that works so that you apply just the right amount. In these light airs (F1 – F2), your body position will be kneeling or centered in the cockpit around the mainsheet bridle if there is not enough wind to sit on the sidedeck (if you are on the side then have your forward leg against the bridle/strop). Pull the outhaul on until the sail foot is closer to the side of the boom, 50mm. Downwind you can heel the boat to windward to reduce the wetted hull area (less drag=more speed) and hold the mainsheet falls for a better feel. For upwind, the centreboard should be 3/4 down, downwind fully up. Cunningham slackened right off.

Upwind your boom should be out by the back corner. Keep adjusting boom position continuously to maintain a good balance between speed and height - ease boom out in lulls to keep speed and squeeze the boom in any puffs to gain height (please don't even think about a mainsheet jammer). For extra pointing you can squeeze the boom further inboard but only in flat water. Watch for those puffs coming as a slight increase in wind will have a large effect on boat speed. Move gently and slowly in light airs, avoid rudder movement and practice those roll tacks. You need very little sail twist in light airs upwind. The leech needs to be straight. The more you tension the leech the flatter the luff entry and you

can open the leech by moving the boom outboard for more power. You need to check your kicker calibration frequently, so you know exactly what leech tension you are using and repeat it on the next upwind leg if it's working well.

On a reach, use some kicker but not too much. In the puffs, bear away to keep in the puff longer.

**More Wind Conditions**

Once there is enough wind to start hiking upwind you can pull the rig fully upright and have the lowers on a tight setting. This is your power mode as the rig tension and tight lowers will anchor the mast and reduce any mast deflection. However, only use setting 1 in just hiking breeze, no waves - AND NOT IN GUSTY CONDITIONS. The rig is very unforgiving and this setting gives a high-camber sail and tightest leech with the least twist, so it only works when there's enough wind to keep the leech open and able to follow round the camber of the sail, but not too much that you need to depower. For me, this is 5 to 8knts wind. In practice on inland waters, there are nearly always gusts so I rarely go fully upright.

Upwind, have the centreboard fully down. Ease the outhaul to give 100mm of depth. Hike with your front leg touching the bridle. If you lean towards the bow you will point better but not if you are in waves or chop as this will make the bow dig in and kill your speed. You want to keep the maximum draft of the sail 45% aft so the Cunningham should be slack, unless you have an old sail where you'll need some Cunningham for proper sail set.

Use a similar kicker tension as in very light airs - pull kicker on a bit to flatten luff entry for the wind. The sail will be fuller than very light airs and have a harder leech with very little twist. Keep the boom out over the back corner to develop power and speed.

However, … this next bit is very important - If you are in 'just hiking' mode on your upright setting 1 **and** start to get overpowered **do not pull the kicker harder**. The rig is just too tight on its fully upright setting, so if you pull on more kicker to flatten the sail the leech will start to hook too much, and this will kill your speed. The boat will feel unresponsive. Try not to increase the kicker and sheet in harder, as this is the opposite of what you should do – the boom needs be out wider to keep speed and to keep footing. Prevent the leech closing too much by flattening the sail. The solution is you **must** ease the forestay back to setting 2, lowers loose, and the mast will have less support and bend more under the same load. In other words, there will be more elasticity in the rig. The sail will look better (flatter) and the boat easier to steer. Pull some kicker on to close the leech a little bit and flatten luff entry and the boom should be able to come inboard a little from your upright setting 1. Another problem with keeping on setting 1 is the inability of the mast to deal with dynamic loads as well on gusts. As mentioned before, if its gusty then don't use setting 1 – just stay on setting 2 to use the elasticity of the rig and the boat will be easier to handle.

Now you are on rake setting 2 (normal setting) you should be using the mainsheet constantly to control the leech tension with the kicker adjusted to hold this tension whenever you ease the boom out, then as the breeze increases the kicker should be tensioned more to keep a tighter leech and aid pointing.

So, let's look at what you should be checking when sailing upwind:

- Look at the telltales – the windward telltale should be just starting to lift. If the top batten leech telltale is just flicking forward, then your kicker tension is perfect. I've added a section below on reading your telltales.
- Check your kicker calibration – are you noting the setting if you are going fast?
- Check the mainsheet/boom position (out over the back corner, try not to pinch unintentionally).
- Check your heading – is it OK for the windward mark? Are there any wind shifts on which you'll need to tack? Stay in phase with the shifts and tack on the headers.

If it's flat water, you shouldn't have to ease much rig tension beyond setting 2 until it's quite windy. You can start to load up the Cunningham to open the upper leech and tighten the outhaul to open the lower leech. You can raise the centerboard about 100 – 200mm.

A bit more about using the kicker and telltales …

Look at the telltales on the leech of the sail, as you can judge how much kicker tension is correct (top telltale just stalling). Ease the kicker off and hold the leech tension with the mainsheet. If your kicker is too much, then the upper leech will 'hook' to windward. If excessive, this detaches the wind at the top of the sail where it is stronger than at boom level, losing you vital power where you need it most.

As the breeze increases, start to pull more kicker tension to control the upper sail leech. Look especially at the top batten leech telltale – this telltale will give a good indication of the amount of twist in the top of the sail. You need some twist as the wind is a bit stronger higher up so the apparent wind is further aft. You want to be able to capture this power to maximum effect, rather than spilling the wind off a too-open leech. If the leech is too open, then you are losing valuable sail power at the top. This means you want to set the kicker to have just enough twist in the top of the sail but not too much – so that the wind can't stay attached all the time. This gives optimal power and helps to point higher. Look for the top batten stalling (flicking back) about 50% of the time. The sail is trimmed as tight as it can be. You would only want to trim this tight in medium winds and flat water – not in very light airs or stronger winds.

As the wind increases more, you will want the kicker now to flatten the sail by pushing the gooseneck forward - use plenty of kicker tension to depower the boat in upwind sailing, as the kicker is very effective in sail flattening (remember you want kicker tension to put more force on the gooseneck rather than control the leech so set the lowers loose) – but ease the kicker if you feel if you are lacking in power. You will get better boat speed with the mainsheet eased (boom out further) when you are using lots of kicker.

**Even Stronger Winds**

You should be able to stay on setting 2 on flat water a long way up the wind range using the mainsheet to control the rig. You will be overpowered in the stronger winds so trim the mainsheet constantly in gusts to keep the heel angle constant and the boat footing fast. Remember – EASE-HIKE-TRIM. If it becomes too difficult to keep the boat stable and footing fast, put on some Cunningham to open the leech and give more sail twist until the boat becomes more controllable – the boat will feel more stable instantly. If you are still overpowered then rake further to settings 3 or 4. Your goal is to keep the boat flat. If you don't correct the heeling, you will use more rudder to correct the weather helm which will act as a very efficient brake, kill your upwind speed and therefore your pointing. It's an excellent idea to buy one of those inclinometer gadgets (about £20) and Velcro it to the mast – you will soon see the reality of your angle of heel and how flat you are sailing the boat!

Pull on some more Cunningham to take the draft of the sail forward and open the upper leech for more twist. The Cunningham on hard will give a much flatter, more controllable sail. The effect is quite noticeable although I tend to use the Cunningham as an 'on/off' control upwind. Loosen off the lowers and leave them loose and use more kicker than normal to create a blade shape in the sail. Pull the outhaul tighter to lose power out of the bottom of the sail, even to the point of having a crease running along the foot if you must.

Remember though, if you are on higher rake settings then don't forget to release the kicker before you tack so that you can get under the boom. Also remember to release the Cunningham for off wind sailing.

In anything above F4, you will have your kicker on hard with lots of rake and mast bend (loose lowers) to flatten the sail. When a gust hits you, ease the mainsheet a bit and point up (pinch) by a few degrees (not more than 10). Hike out a bit harder if you can. If you are at your limit don't bear away as this will power up the sail more and cause you more problems and you will heel more and slip sideways. Try and keep the boat pointing up high, this will provide a big net gain on those upwind legs at the expense of boat speed. Look out for the gust easing and be ready for it. As the gust eases, move inboard as necessary to keep the boat flat, sheet in the mainsheet quickly and bear away slightly to pick up some speed. If you watch the top guys, the 'S-shaped' track of the boat is very subtle, with only small tweaks on the tiller. Don't forget to hike hard again as you sheet in if you need to, maintaining a flat boat. Gust control is one of those essential techniques, especially on inland waters.

**Survival Sailing Mode**

Sometimes you'll be sailing when the wind increases beyond what you can really handle, you may be tired or exhausted from all that effort, so you need to enter 'survival mode' to get you round the course or to get back to shore. Quite often, it's the gusts that really overpower you and cause most of the problems, so control of the boat in gusts is one of the key skills needed for survival mode sailing.

Spotting the gusts early is key to avoid heeling and capsizing and getting even more tired, so look upwind to spot the gusts coming. Other boats to windward are also worth looking at – if they look overpowered then quite soon you may be getting the same gust.
You will want to rake the rig fully (setting 5) and if sailing upwind set the Cunningham very tight to open the leech and move the draft fully forward, lowers loose, mast fully raked, kicker on and tighten up the outhaul to remove power from the bottom of the sail and open the leech at the sail foot. Spill plenty of wind by easing the mainsheet as necessary and foot off rather than sail high to spill a lot of power off the sail. You will sail slowly but at least you will get home. The aim here is to sail the boat conservatively in what are adverse conditions so you don't want to capsize. Once you are cold it's very hard to get back in the boat as your energy will be sapped very quickly.

**Gybing in stronger winds**

Many of us struggle with those gybes in strong, gusty winds – which is why the 'nova is often called 'the SuperOver' by Laser sailors and others. At a gybe mark, the strong wind 'safety gybe' involves either heading up or bearing away onto a run. Grab the mainsheet falls to initiate the boom moving across the boat. As it does so, move the tiller so that the boat bears away. Don't try and gybe around a mark and head straight onto your new bearing if on a broad reach, as you will get overpowered and capsize very close to the mark. Better to play safe and get onto your new bearing well after you've congratulated yourself on getting through the gybe and not getting wet.


*Picture courtesy of Caz Hand*

**Keeping control downwind on the run**

Ease off the Cunningham and kicker. When it's windy you can sail slightly higher to keep control and put your centerboard down a bit (but not too much). If you ease the kicker right off the sail will twist off making the boat harder to control, as will digging the bow in by sitting too far forward. Have some kicker on and move towards the back of the boat. Stay in any gusts longer by bearing away to pick up speed. At the same time move back in the boat to get on the plane (you can give one pump under Rule 42 to assist).

**Sailing in Sea -Waves/Chop**

Inland sailors who do little sea sailing (like me) will need to learn how to deal with tide and waves (or chop). The 'curse' of the inland sailor is to pinch – this doesn't work in the sea, so you will need to learn to sail a lot freer with the boom further out and with more power. It is better to sail with a more upright rig to maintain power through waves, but you need to be fitter for hiking long distances upwind and keeping the boat flat. One approach is to keep the power in the lowest part of the sail but flatten off the upper portion of the sail (more kicker, looser sail foot). Keep the centerboard down upwind but raise it halfway if you get overpowered. Playing the mainsheet upwind works well if you are on the lighter side to keep the boat as flat as possible.

Your seating position should be much further back when sailing in chop so that the bow doesn't dig in to waves. It also pays to catch waves downwind (centerboard down helps) – surfing the waves can be very exhilarating.

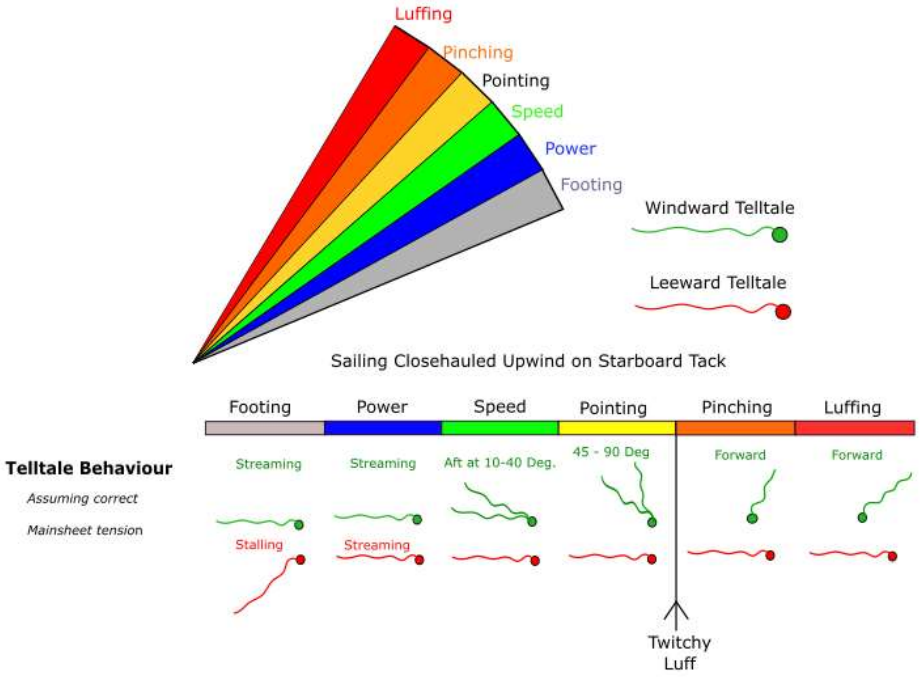
## HOW TO 'READ' YOUR TELLTALES

Telltales tell you about the wind flow over your sail. The luff telltales are most used when beating – upwind closehauled (or CH). You will find that you'll be looking at the telltales quite often in the beat, maybe 30 to 50% of the time when sailing upwind (especially in inland waters where the wind is constantly changing in both velocity and direction, so it does pay to be constantly checking them).

The extreme limits of VMG (Velocity Made Good) upwind sailing (i.e. closehauled, CH) is between 'footing' and 'pinching'. Footing is sailing quite a low angle where pinching is sailing extremely high (and slow) – if you see a bubble on the luff of the sail behind the mast then you are sailing too high and need to bear away a little.

If you refer to the diagram there are 3 optimal zones in the CH range – pointing, middle (speed) and low (power). Sailing CH 'in the groove' is sailing in these 3 zones (yellow, green and blue). The groove is narrow, around 5 to 10 degrees, so you need to be concentrating to stay in it! Luffing, pinching and footing are sailing outside the optimum CH and you need your 'gearing' to keep you in these 3 zones – unless you intentionally want to luff, pinch, or foot off because of tactical reasons.

The diagram assumes you are sailing upwind on starboard tack looking at the telltales from the starboard side. This shows the zones and the behaviour of the telltales in each zone. Footing or pinching do not give best VMG although there can be times when you need to be in these zones – pinching to make a mark rounding or, footing if we know there's a windshift or more wind pressure ahead, and is more of a strategic/tactical decision.



## USING THE 'GEARS' – WHAT UPWIND GEAR ARE YOU IN?

**1st gear (Power)**: Both windward and leeward telltales streaming straight back. Maximum power mode. You want to be in first gear when:


- Straight line sailing in light winds
- Light wind sailing when the wind is lighter than the waves
- You are on the start line and want to accelerate fast with power
- Punching through waves (where you need momentum = power)
- Sailing in bad air
- After tacking to accelerate
- When you want a wide 'groove'

Keep the boom out towards the aft corner of the boat. Ease the mainsheet and outhaul. Top leech telltale streaming back, not flicking. Top batten to leeward (sail twist).

**2nd gear (Maximum Speed)**: Windward telltales stream upwards from horizontal say 10 – 40 degrees. You want to be in second gear when:


- Flat water sailing in light or very light winds
- Sailing through chop – medium breeze
- You want to accelerate a bit more into third gear to point better.
- When you need to be in 'footing' mode
- When you are in first gear and want to point higher
- When you're in third gear and want to change down to go faster.

Boom a bit further in towards the centreline. Mainsheet trimmed so that top batten is parallel to boom. Top leech telltale flicking back 20% of the time. Moderate kicker.

**3rd gear**: Windward telltales stream upwards from horizontal at 45 degrees.


You want to be in third gear when:

- You want to be in high pointing mode
- Moderate breeze, over 10 knots
- In lighter winds but only in very flat water – not in waves – this is very slow

Boom even further in towards the centreline. Mainsheet trimmed so that top batten is slightly to windward. Outhaul tighter, tight leech with even more kicker. Top leech telltale flicking back 50% of the time. As you point higher, the windward telltale will rapidly move upright or occasionally forward – but your speed will drop.

**4th gear**: Windward telltales stream straight up. Very twitchy luff.


You want to be in fourth gear when:

- You have too much power and want to depower (pinch to lose power)
- You cannot hike anymore to keep the boat flat
- Moderate to heavy wind when the wind is stronger than the waves (when you put the bow down to get through the waves)
- Survival sailing.

Boom further off centerline. Mainsheet trimmed tight but eased to keep the boat flat, Top batten to leeward. Outhaul tight to remove power from foot of sail, kicker hard on to keep leech tight when mainsheet eased, Cunningham on hard to move draft forward. Usually, unless you are over-powered, keep out of 4th as it's relatively slow.

**Reverse gear**: I'll let you work out this one! Very useful if you are head to wind and stalled, or if you are over the start line … and yes, it is an option (but not fast). Remember to look behind you for other boats!

As a general rule, if the boat feels fast compared to boats around you then you can trim the mainsheet a bit harder – this will make the boat point higher. Conversely, if you feel you are slower than boats around you, then ease off the mainsheet. This will give more power (lower gear) and build more speed, which is a pre-requisite for higher pointing. Once the boat feels like it's going faster again, trim the mainsheet a touch harder, and back through the cycle – ease off once the speed falls off. By easing and trimming constantly, you'll be keeping the boat on the edge of maximum trim. However, this only works if you concentrate very hard. If the wind is light, shifty, there are waves, or if you are not mentally up to it, then you are better to ease the mainsheet and sail with a little less height.

If you see a mismatch between the upper telltales and those lower down, then you haven't got the right twist in your sail (kicker not set correctly). For example, if the upper telltales are twitchy but the lower ones are streaming nicely, then the upper part of the sail is effectively oversheeted. This indicates in light air there is not enough twist, and in a breeze your leech is hooked, so slacken off your kicker. If you have too much twist, the opposite will be true – the lower telltales will be lifting with the uppers streaming – more kicker is needed. You can use the top **leech** telltale to indicate twist – it should flicker forwards some of the time when sailing CH. *Always keep the leeward telltale streaming - a leeward stall is very slow!*

## PUTTING IT ALL TOGETHER

Developing a fast boat and sailing the Supernova well is a long-term effort governed by how often you sail and how you personally learn. By calibrating the key controls like mast rake and kicker, you will be able to replicate settings from day to day and week to week. What's important is to keep the boat set up in a consistent way, so that you have a constant 'reference platform' on which to base your improvement.

Concentrate on getting the important things right – the small stuff doesn't matter unless you are looking for that last few percent. There's no substitute for spending time on the water and seeing what works for you, and what doesn't. Remember that this Guide is just that – a guide. Each of us has our own way of sailing and you may wish to experiment to see what works for you, and what doesn't. However, having a good starting point such as this can eliminate a lot of experimentation and speed your progress.

Hopefully I have taken some of the mystery out of the rig and sail settings. In a one design Class such as the Supernova, all boats should be equal, and results will come from sailing ability, setting the rig up so it works for you, and mental attitude. Remember that rig setting 2 is the 'base' setting and will keep a straight mast in a 10-knot wind. You can change the rig tension to experiment in different wind or water conditions such as chop, but you need to keep a notebook to record any changes and their effect. You should always revert to the base settings at the end of the day, ready for the next. You could of course use a smartphone app or other device (I use a Garmin Forerunner) for your practice and tuning sessions, but GPS electronics is not Class legal for racing.

As I said, developing a fast boat is a long-term effort where you need some patience. However, there is no substitute for getting on the water and trying things out in a systematic way. The best way is find a buddy and do some boat-on-boat comparisons on the water in the same conditions.

Happy sailing and good luck!

Pete Bingham
Class Secretary

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