Time to get Serious with Tuning

By Ray Seta – Victoria 2424K

If someone were to ask any Skipper who attended this years White Rock Regatta in Dallas, "How was it?" I think the most common answer would be, "Great, we had a little bit of everything for the two days! You really had to be up on your tuning to do well." This is an understatement given the heavy winds of 15 - 25mph on Saturday, and the 0 - 10mph on Sunday. What I'm about to explain about tuning a Victoria, is for most conditions, an advance method. My arch nemesis and best buddy (John "JK" Kuc...aka...Chong) and I have been racing against each other for almost 24 years and have come to respect each others ability to quickly tune and change with the varying conditions. We have been seriously racing Victorias for over 3 yrs and share all ideas with each other quickly after almost every race, tuning as well as tactics. This is the premise for two boat tuning and testing and the only real way of doing it. You can't go out by yourself and work on boat speed, only boat handling. When you get up to the top of your local fleet or a Nationals competition, the variances in speeds are miniscule amongst the top sailors. But knowing how to adapt quickly for changing or current conditions can be the difference between 1st and 10th. Take the following information for what it's worth and adapt it to your sailing skill level. Just us telling you this info won't make you fast, but you might understand why we sometimes are. JK and I both use what is commonly referred to as the "Mackey Rigs". Built and named for Mr. Craig Mackey, '01 – '02 Victoria National Champion. The lesson here is copy the fast guys and learn from testing. These rigs are paneled sails with the luff curve to match the bend of the tapered Carbon Fiber mast, using extremely tight rig tension. I truly feel that 5 years ago, the experts and Class Champions may have been saying that flat sails were the way to go with the Victoria because of its design and tendency to feel over powered. Well times have changed and I truly feel that we have taken this boat to another level with tuning and learning how to get more power from our rigs and de-power when needed when the winds pick up. This boat can be raced safely in 15 – 25 mph. and under control, given the right tuning and skill level. We proved that at White Rock this year. We believe that the new trend for Victoria's is to have an over powered rig with serious luff curve and draft built in the sails and learn to de-power as the winds increase.

For the following measurements, what I have found very easy to use is the small "Stanley"- 8' Carpenters tape-measure with a belt clip. This allows you to always have it handy with you down by the water for quick changes, not to mention measuring the fast guy's boat.

BUILDING FOR SPEED: One thing to really keep in mind when building your mast and rig, keep it light. Keep all weight down low. This means get all unnecessary hardware off the mast up high. Any weight aloft is weight that the keel must fight to keep the boat from healing over. Taking 1 gram of weight off the mast is like the America's Cup teams striving to find 10 pounds of shroud weight off their 40,000 lb boats. Basically think about it this way, if you observe two boats sailing to windward, equal in boat speed but one is healing more than the other. I will assure you that the boat with less heel will win every time, given all things equal. Let me also mention that I won our Regional Championships with the heaviest boat at the regatta, and that weight was not in the rig itself. Also important to keep in mind is to make every part accessible and easy to adjust on the fly. Sometimes during a starting sequence, a quick adjustment is needed. Like I say copy the fast guys at the lake and learn from them, don't re-invent the wheel here.

MAST RAKE: Basically the rule of thumb is for **Light Winds - Rake Back** and **Heavy Air - Rake Forward**. Let me further define **Rake**. Raking back is the top mast tip towards the rear of the boat and forward rake is towards the bow. Assuming that you mast base is set in the stock kit location. Measure up the Mast 40 1/8th inches from the deck and put a small Sharpie mark/dot at the forward luff of your sail (both sides) as close to the rear of the mast as possible. This will be the mark that all your "raking" measurements will be taking to (See Photo #1). Now clip the tape onto the most rear Transom of the hull on the centerline and pull the tape upwards toward your mark on your sail (See Photo #2). This measurement will be your setting. I have found that in extremely light winds of 1 mph use the measurement of 43 ¾" and in extremely heavy winds of 15+ mph I will use a measurement of 45 ½". Obviously these numbers represent a big window of sailing wind speeds. So it is safe to say that winds that are around 7-10 mph, your mast rake measurements might be around 44 5/8". These measurements are taken with just enough backstay tension to keep the mast in that position with no mast bend. The main adjustment on all the mast raking is done with an adjustable Forestay and jib halyard. The main reason for mast rake adjusting is to keep control of the boat with the minimum of weather helm and movement on the rudder going to windward. If your boat tends to round up in the puffs and you loose control to easily then try raking forward a bit more. The trick here is to carry as much mast rake as possible to stay in control and help your pointing ability to windward, but not have to fight the boat with rudder movement to sail in the groove. The boat should track straight in a steady wind. Maybe a 5 -10% lifting action into the wind in the puffs. We call this weather helm , and this desired feel may vary from skipper to skipper.

BACKSTAY TENSION: Do not mistake Backstay Tension with pulling the mast back for more rake. Backstay Tension is used to only bend the mast to de-power if needed by allowing the top of the sail to bleed off to leeward a bit. When applying more tension here you will notice that the top of the mast above the Forestay connection will bend back as the lower portion below the Forestay connection will bend forward thus flattening the middle section of the mainsail. Basically here the Backstay setting is light to nothing on tension for light winds, and maximum tension to bend the mast back in heavy winds to help flatten to sails in the middle sections and twist off the top of the mainsail to help depower it in the heavier winds. Depending on your mast bend characteristic and your luff curve built into your mainsail, this could change from boat to boat. I see to many people tighten the backstay too tight to induce mast bend, because it looks cool and they see it done on big boats. If you want max power in your mainsails, ease off the backstay and keep the mast straight till you need to depower. Too much backstay will also pull the draft (the deepest part) of your sail back to far in the main. Always keep that draft in the forward half of your sail around 30-45%.

SAIL SHAPE: Sail shape is confusing sometimes when dealing with things like heavy winds and big choppy waves or heavy winds and flat water. When dealing with sail shape the rule of thumb now is go for the power to drive you through the chop and yet not have to much draft to be over powering and laying the boat over on it's side. So a full shape in the sails is wanted with maximum draft forward. A loose outhaul will achieve this. The maximum fullness at the main boom is no more than 1 ½", measured at the center of the boom pushing a tape measure into the sail lightly (See Photo #3), on the Jib sail, a maximum of about 1", measuring the same way. The fullness of the sails will look close to each other. As the winds pick up, flatten the sails with your outhauls on the booms and keep increasing the downhaul tension in the main and jib to keep your

drafts forwards. In heavy winds and choppy waters, keep full a bit longer to help you power through the chop. Draft forward increases acceleration and low end speed, and a flatter sail with the draft back will hinder low end speed but give you better straight line and upper end speed. This is always a toss up and can change with increase or decreasing winds speeds. In most low wind days I will sail with zero downhaul tension, because with the straight mast and no mast bend, the luff curve built into the sail will keep the draft forward.

DOWNHAUL TENSION: The best downhaul system going today is the self adjusting type that automatically releases tension as the boom goes out as you round the weather mark, and automatically increases tension back down as the boom comes into windward sailing position (See Photo #4). This is very hard to explain how to set up, but ask any IOM Class top skipper and he can show you.

BOOM VANG: Light tension in light air and increase the tension as the wind builds to keep the power in the leech (rear edge of sail), by not having the boom raise and spill the leech off to leeward. As I had mentioned before, we always want to power up as the winds increase with tension until the winds start to get over powering. Never have so much Boom Vang tension that the leech of your main will hook to windward pass the backstay line or centerline of boat.

MAIN BOOM POSITION: Once again we have found that the old way of strapping the main boom to the center of the boat when going to windward is not fast anymore. The boats that are letting there booms out a bit from the early days are going faster and making better time to the windward mark instead of healing over and constantly trying to not round up with heavy rudder use. Try using in light to moderate winds, the rear corner of the transom that measures 1 5/8" off centerline as your maximum in position going to windward. As the boat starts to heal over too much and the winds increase to heavy, try using the corner of the hull at the point where the level part of the deck meets the sloping part of the deck at 2 3/8" off centerline of hull (See Photo # 5). This will help the boat from healing over so much and increase the efficiency of the keel fin. This is called keeping the boat on its feet. Sail it vertical, not heeled over.

JIB BOOM POSITION: In light winds start off with the Jib Boom at ¾ of the way to your side shrouds and as the winds increase, go out to the side shrouds to help open the slot between the sails a bit. Once again the idea here is to let the boat sail fast upright and on its feet for better keel efficiency. As the winds start to really increase above 12 mph I will start to bring the Jib Boom in to maybe ½ the distance between my mast and shroud. What this does is help keep the bow down in the chop/waves and helps the boat from rounding up into the wind. I will increase the Jib Boom Topping lift tension in order to help keep the slot open and spill the leech off a bit at the top of the jib.

JIB BOOM TOPPING LIFT: In lighter winds you may only have enough tension to open the slot between the sails slightly. Try to have your Jib Leech curve match the Mainsail's draft vertical curve, viewing from the rear and leeward of the boat. As the winds increase and the boat seems to be overpowered by heeling over a lot, increase tension by 1/16" increments to lift boom. This will twist off the top of the Jib to de-power it up high. This is the same effect as the Backstay on the Mainsail.

JIB BOOM COUNTERWEIGHTS: Having these weight out on the forward end of the Jib Boom is an essential way to have maximum use of your jib in light winds. But when building and designing your rig, make these weights easily removable also. Having the boom perfectly balanced, meaning that when you lay the boat on its side by holding the keel the jib boom will lay horizontally, will assure that the Jib Boom will travel all the way out easily going downwind. But having all that weight out on the forward end of the boat is not good as the wind picks up. At the first sign of your bow starting to bury below the waterline when going downwind is the sign that it's time to remove your counterweights. In moderate to heavy winds having counterweights on the jib boom will only help promote your bow to bury. This is obviously not fast. The reason for counterweights is only to help promote wing-on-wing sailing dead downwind in light winds only. In moderate to heavy winds the boom should travel well on its own just fine without them.

RUDDER / SAIL CONTROL: If your boat is properly tuned, it should sail itself to windward with a minimum of rudder movement. This is called the "groove" of max speed and pointing for the condition. The Victoria rudder, like all radio control sailboats rudders is extremely oversized to real boat scale. This is typical for all R/C boats, but it is needed that way for control. But, it is also the point of most drag on hull speed induced by the skipper. Learn to sail your boat with minimum rudder movement. Learn to ease/feather your sails out just before the wind puffs hit, so your boat won't round up into the wind, and sheet back in after as the puff passes by. Going to windward in a breeze, using this method of easing the sails in and out is the equivalent to not cleating on a real boat and playing the main in and out to keep the boat more upright and on its feet for better keel efficiency. This is really a timing and boat handling issue, but it will make a huge difference in your straight-line speed. Also, learn to steer your boat by using your sails. Set up your sail servo joystick with the windward sail setting with your slide trim tab at the half way position. When tacking, slide your trim all the way in and let the sails help turn the boat. Apply only enough rudder to tack through a 90 to a 95 degree turn to windward and as you pass through the eye of the wind, immediately side the trim to full out position to open the sails. As the boat accelerates out of the tack, slide tab back to the half way position. This is commonly known as shifting gears to get up to maximum speed after the tack. This is a very good thing to learn to maximize your tacking and accelerating out of a tack You can easily gain a half a boat length on each tack against your competitor if done well. Also if you're a leeward boat and need to sail in "pinch mode" to bring a competitor up, bring the sail in with the trim tab and do it for a second or two. This can get a boat off your windward hip real quick if done correctly by the racing rules.

SHROUD TENSION: As I mentioned before, we run with extremely high tension loads on the shrouds. We use a pair on each side, what's commonly known as uppers and lowers. Uppers mounting at approx 7/8th up the mast and lowers mounting about 5/8th up the mast. If you have upper & lower shrouds, try this for tuning. In extremely high winds loosen your uppers and tighten the lower. This will allow the tip and the top section of your mast bend off to leeward to help de-power the rig. In light winds, do the opposite by tightening the uppers and loosening the lowers. This will power up the rig by allowing the top tip of the mast bend to windward in the small puffs.

HULL/KEEL/RUDDER: Let me just touch on these with saying that painted or unpainted, make sure that they are free of scratches, nicks, or dirt. Never wax your hull, this only repels water away and causes laminar turbulence on the surface which is drag. The trick here is to make the water appear to stick to the hull with a microscopic layer of water. This layer of water is the water that stays on the hull when wet before sheeting off. To achieve this lightly sand the hull/keel/rudder with #600 to #1000 grit wet/dry sandpaper prior to race time. Only sand in the direction of the laminar water flow, which is bow to stern and visa-versa. If your at home doing this, try warm soapy(dish washing soap) water to lightly sand with. This will help by not dulling your finish of the painted surface as much. This is a trick that all serious racers will do in the big boat world!

TWO BOAT TESTING: I truly believe that the cliché of "Your only going to be as tough as your toughest competition" applies here. JK and I have a reputation of being ruthless competitors with each other on the race course. This also applies in tuning and training. When we tune against each other we strive for equal boat speed. Once one of us is clearly faster than the other we change one boat without change something on the slower boat till we get that boat faster, then we repeat the process(after a beer!). Never sail in one another's wind shadows and always stay within two (2) boat length of each other. Remember your not racing when your 2-boat tuning. Do this repeatedly on all tacks (then have another beer!). This is just our method and it works.

MARKING AND NOTING: Just when you think you've got the perfect setting and you just won your local fleet regatta, or better yet Nationals. Mark all your setting and keep them for the next race. **Not that simple!** You'll show up at the next event and the conditions will be all different. This is a long term learning process that will take time and practice. Only after getting all nine adjustable items listed in this article in perfect trim will you be faster than the next guy. Every item listed works in conjunction with the others. Making one adjustment will have a direct effect on one of the others. In sailboat tuning another cliché comes to mind, "For every action there is a reaction." After each day or regatta, strive to learn something and make a note of this, either mentally or keep a log. The measurements I have given you for example for Mast Rake is not a secret here in Texas. A couple of years ago Craig Mackey came down and won White Rock Regatta and I started taking note of his tuning methods. In order to talk the same language with him, most of the top skippers in Texas use the same measurements and marks now. Everyone has the mark or dot on their sails to measure to, and it is not uncommon to see tape measures being passed around at lunch to measure the top/fastest boats. The moral: Copy the fast guys!

IN CLOSING: The Victoria is a very realistic boat to race and compete like any type of One-Design full size boat. It wants to sail faster vertically and more efficiently with water always moving across its appendages. This boat like to foot a bit instead of pinching going to windward. Learn to find that groove we speak of when the boat will sail itself. If you find yourself fighting the controls, then something is not right.

In One-Design racing like we have in the Victoria, remember that having the fastest boat on the water will not win you the race. Like the experts will tell you, "There is nothing worst than going fast in the wrong direction!" Meaning, that there is no replacement for good ole tiller time and learning good boat handling, racing tactics, and the rules of racing. But, having good BS (boat speed) can give you that edge of confidence that it sometimes takes to win. Trying to get all these adjustments in line and in synch for the perfect day/condition or race is almost impossible at times. But the guy who makes the least mistakes and gets the closest in his attempt will triumph. Just

remember that when any adjustment is made, be sure to recheck your others. For example doing a quick Mast Rake change of just ¼" will change your boom setting.

CHEECH & CHONGS DISCLAIMER: By helping with these tips we don't claim that you will be the fastest in your fleet, but it should help. By helping others go fast it only makes us have to go faster to still win! JK and I are serious when it comes to our Victoria racing, however, when you see us at a regatta there is nobody else out there having as much fun as we do (See Photo #6, note tape measure clipped on pants for quick access and checking of competitors boats!). So remember, think fast, go fast, and above all have fun fast.

Good Winds & Happy Tuning
Ray Seta – Victoria 2424K (USA), AMYA #8640
Woodlawn Sailing Club – AMYA #112 – Site of the 2003 Victoria US Nationals

VICTORIA

QUICK REFERANCE TUNING CHART

WIND CONDITIONS	*LIGHT*	*MEDUIM*	*HEAVY*	*NUCLEAR*
	0 - 5 mph	**5 - 10 mph**	**10 - 15 mph**	**15+ mph**
MAST RAKE	43 3/4"	44 5/8"	45"	45 1/2"
BACKSTAY TENSION	Minimal	Snug	Tight	Tightest
DOWNHAUL TENSION	None	Snug	Tight	Tightest
SAIL SHAPE	Full	Less Full	Less Full - Flat	Flatest
OUTHAUL TENSION	Loose	Moderate	Moderate - Tight	Tightest
BOOM VANG	Slack	Snug	Tight	Tightest
BOOM SETTING-MAIN	1 - 1 1/2" off center	1 1/2 - 2 1/2"off center	2 1/2 - 3" off center	3 - 4" off center
- JIB	2 - 2 1/2 off center	2 1/2 - 3" off center	3 - 3 1/2 off center	1 1/2 - 2" off cneter
SHROUDS - UPPER	Tight	Meduim	Loose	Looser
- LOWER	Loose	Meduim	Tight	Tight