



Making Your Boat Go Faster

Some hints and tips on
setting up, maintaining and sailing your RC Laser

Created by Hugh Buckle
with help from
Bob White, Gerry Brooks, Graham Brown, Paul Derwent, Noel McPherson and Cliff Bromiley

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These notes were extracted from a file of cuttings generously shared by Bob White, plus advice from seasoned sailors, particularly Cliff Bromiley, Graham Brown, Noel McPherson and Paul Derwent. For more information, see the Radio Control Sailing Australia web site at <http://www.rudiosail.com.au/> . The comments ideas and tricks are aimed mainly at the RC Laser but some, for instance *Rigging the Boat*, is written for a boat with main and jib. Nevertheless, the principles hold for single sailed yachts.

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Hints Tips and Tricks

1. Avoid water in the cockpit - leads to electrical problems
2. Enclose electrics in a plastic container
3. Remove on/off switch from deck and put it on the plastic container or leave it out altogether as one set of rechargeable batteries will last a day of racing.
4. Insert a tissue or small sponge in the cockpit to soak up any moisture.
5. Use 4 Alkaline AAs in boat or 5 rechargeable AAs.
6. Transmitter on first, then Receiver. Receiver off before Transmitter. Not essential but you may find the servos decide to run if you turn the transmitter off first.
7. Make sure cockpit lid is securely on before launching. Sealing the lid with electrical tape is recommended.
8. Hold tiller down while installing rudder so as not to strain the tiller post.
9. Secure rudder with a pin or ring.
10. Take spare batteries for transmitter and receiver/servos
11. Don't drop-launch from a height. Bend down or use a boathook on the keel ring.
12. Don't ever lift the boat by the mast.
13. Leave sails on mast and boom when transporting and storing to avoid creases.
14. Use silicon or lithium grease on servo shafts to prevent water ingress into servos and cockpit. Periodically remove the mainsheet winch drum and rudder servo arm and repack with grease. It is a good idea to put a thin piece of felt, soaked with grease under the rudder servo arm.
15. If you remove the tiller, don't screw the screw in too hard as it can bind. A little grease on the post can help.
16. Put a little grease on the rudder pintle for smooth operation.
17. After sailing in salt water, wash boat, keel, rudder, masts, booms and sails with fresh water.
18. Spray steel pin on top of keel with WD40/CRC or light machine oil after sailing, particularly if sailing in salt water.
19. To empty water from boat, stand vertically, transom down, and squeeze so water runs out of the hole in the transom.
20. Place boat well forward on the stand so it doesn't blow off backward and strip gears from rudder servo.
21. When packing for a long trip, put the tiller hard over and pack it there to minimise movement.
22. Get CAST Vinyl from a sign writer to adorn your sails and/or boat deck with an individualised identification.

Rigging the boat

In the Phoenix metro area it is not an uncommon sight to see tall sail rigs on model sailboats. This is because of the light winds which are prevalent in this area and many times you would see these high rigged yacht sail away leaving the rest of the short rigged boats adrift. It is safe to say there is more wind aloft and tall sails capture it, so it is within reason to say wind blows 60 percent at the top of sails.

This varying wind speed affects a sail angle, or twist from top to bottom. This twist can be shown in the apparent-wind diagram in the figure below. To explain this simply, the wind twists the sail's leech from top to bottom. At any one time there can be 3 to 5 degrees of twist in the apparent wind from the bottom of the main to the top. The result is the bottom of the main can be beating while the top is close reaching.

The skipper has several ways to control the twist of his main sail, the gooseneck and the backstay. When adjusting the main sail, not enough twist and the top will be stalled relative to the foot, too much and the top will luff before the foot.

To adjust the main sail's twist, trim the main to where the bottom batten is parallel to the main boom. Next, take the yacht out to an open area and set the boat on a stand at an angle as if it was it was heeled over beating to windward. Use the backstay line as a straight line of sight so you can measure twist. Next, sight the top of the main sail, it should lie out 1 3/4 inches from the backstay line. You can now adjust the jib so that it too follows the main sail's twist while keeping the slot between the two sails the same all the way along the length.

Another guide to check the main sail's twist is to attach a telltale on the back of the top batten. The telltale should flow aft at least half the time. If not, ease the main sail by using the gooseneck.

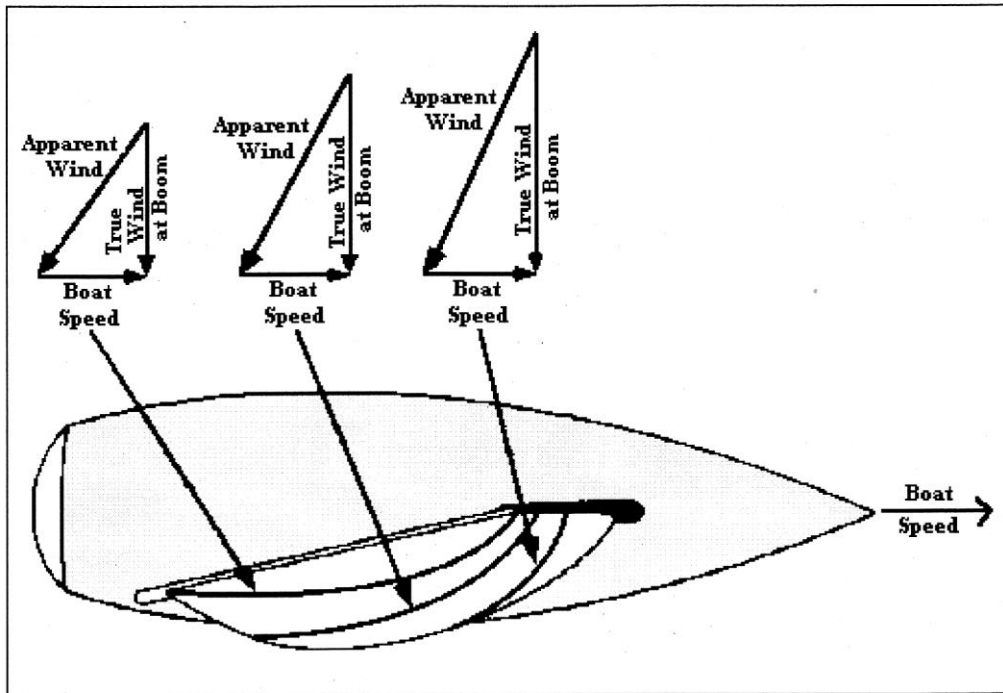
In speed terms, by having more twist, or more leeward sag to the leech (remember sighting by using the backstay line), gives the sail less power. Less twist, or less leeward sag gives the sail more power. One note to remember, under heavy

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winds, more twist to the main can be a boost. By applying twist will allow a main to "dump" wind, which causes less heel, hence more speed. This works well until the wind calms down and now the main is not catching enough wind, and the boat goes slower.

To understand this more, take you boat out and experiment. Only by doing will sail twist become understood.



Twist

Set the outer boom slider 4.5 cm from the end of the boom. Pulling the inner slider towards the mast will bend the mast, thereby flattening the sail.

- When sailing in light airs, set a lot of curve in the foot of the sail.
- In heavy weather, flatten the sail by tightening the leach thereby reducing twist, but not too much as weather helm will increase.

Looking at the telltale level with the Laser symbol...

- If telltale disappears **behind the sail**, you have **too little twist**. So **tighten the outhaul**.
- If telltale flutters **in front of the sail**, you have **too much twist**, so **slacken off the outhaul**.

A good indicator of correct twist is that the Laser should be able to sail itself going to windward, without weather helm.

- **To reduce weather helm**, let off the outhaul a little. The mast will straighten and C of E moves forward. And/Or flatten the foot curve
- **To reduce lee helm**, tighten the outhaul a little. The mast will bend more and the C of E will move aft. And/Or increase the foot curve

If the water is choppy, increase twist so you don't stall the sail.

Weather helm

- **To reduce**, **slacken off** the outhaul to increase twist.
- **To increase**, **tighten** the outhaul.

Mainsheet

- With mainsheet stick fully in and trim set in middle, the boom should be in line with the end of the transom when the sail is pulling.
- Check knot on control line doesn't snag in bow pulley and on winch from fully in to fully out.

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- Mainsheet slider should be directly over the brass eye in the deck. See also note on Boom Sliders in Initial Setup below.

Choose the right rig

- The A rig will develop marked weather helm when overpowered to windward and boat tends to submarine down wind. Max wind speed of the A rig is around 8 knots.
- The D rig appears to work best when set with its foot just above the gooseneck.

Sailing tips

- Boat speed, boat speed, boat speed!!! The faster you go, the higher you can point.
- Slacken sail slightly after a tack to get boat back up to speed, then haul in and point up to wind.
- In strong wind, slacken off the main shortly before tacking to gain boat speed. Don't try and tack in the middle of a gust with the boat heeled right over; wait for the boat to right itself a bit in a lull. If you see a squall coming and you will need to tack, do it before the squall hits.
- If boat tends to submarine downwind, move the rudder rapidly back and forth to get the bow up. Keep the speed up.
- When running down wind, the Laser will sometimes go faster if the boom is let out to 80 degrees so that the wind flows across the sail from Leach to luff.
- In heavy weather, the Laser is sometimes more stable if you let the boom out by more than 90 degrees and sail by the lee.

Getting out of Irons

- Rudder over hard one way, doesn't matter which, but preferably so it will end up pointing in the direction it needs to go.
- Slacken main sheet right off
- Hold until boat is 60° - 90° to wind
- SLOWLY pull in mainsheet, reverse rudder SLIGHTLY, not full opposite, and get boat back up to speed before sheeting in and getting back on course.

Sailing rules

Noel McPherson has been doing a bit of poking around and have found the enclosed YouTube short videos on different aspects of the racing. We believe it will be in everyone's interests to look at them and absorb to clean up some of the situations we get ourselves into.

There are two things in reference to the videos - we only do one 360 deg turn for penalties; and the "Zone" at the marks is 4 boat lengths (say 4 metres); not three.

We need to talk about different components, so if you have any comments please air them.

Video 1 - Room at the Mark

<http://www.youtube.com/watch?v=JrGIDxQaCWQ>

Video 2 - Port and Starboard at the windward mark

<http://www.youtube.com/watch?v=HK7gEwcARFQ&feature=relmfu>

Video 3 - Port and Starboard

<http://www.youtube.com/watch?v=84c1TTiFxE0>

Video 4 - Tacking on the Port layline near the mark

<http://www.youtube.com/watch?v=PwzZ4XerpH8>

Video 5 - Starting on a Port Tack

<http://www.youtube.com/watch?v=LSD1PicwezI>

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Video 6 - Turning a Jibe Mark

<http://www.youtube.com/watch?v=WvTQwwmyE-g>

Video 7 - Jibe Mark in a crowd

<http://www.youtube.com/watch?v=3KHCM9BWZyw>

Video 8 - Tacking in the Zone

<http://www.youtube.com/watch?v=OAPHGISjUbQ>

Video 9 - Animated handy guide to the racing rules of sailing.

<http://www.youtube.com/watch?v=OjnpS4XKdhM&feature=fvwr>

Maintenance

Continual maintenance is important.

- Be sure to wash down the boat, rudder, centreboard, masts, booms and sails with fresh water after sailing, especially if sailing in salt water.
- Empty any water out of the hull and cockpit.
- Be especially careful to dry out the cockpit and leave the cockpit cover off when not in use.
- Preferably store sails on mast and boom. This has the added advantage of preserving your sail settings. If not on the boom, either hang them up or lay them flat. You are recommended not to keep them in the bag.
- Leave everything out of the bag to air, uncover the bung hole in the transom and disconnect batteries when not in use. It is important that the boat isn't left in the bag week after week.
- Put a little light oil or WD40 or CRC on the centreboard locking pin and spring.
- Periodically repack both servo axels with Vaseline or lithium grease to ensure that they are water tight.

Problem solving

Servos

- Depending upon how much moisture your servos suffer, they should last at least 2 years. When it comes to replacing them, HiTec is the recommended brand.
 - Rudder: HiTec HS-311 available from Duane Planes p/l, Maitland
\$11.95 each + Shipping \$8.50 for 4 servos (Apr 2013)
 - Sail winch: HiTec HS-785HB available from Radio Sailing Shop <http://radiosailingshop.com.au>
\$49.40 each + shipping
Also HobbyLand Micromodels, 147 Pacific Hwy, Hornsby 2077
- **Sail Servo:** After removing screws, be careful to pinch together the two control lines as they enter the drum before lifting the drum off the shaft. Use some tape to hold the lines in place while replacing the servo. Apply grease to the shaft. Better use too much than too little. Clean up any excess after re-installing the drum.
- **Rudder Servo:** Same comments re grease. You can also cut a thin piece of felt to fit around the servo entry coming and soak it in grease before screwing the plastic 'tiller' fitting back on the servo shaft.
- **Servo sealing:** It is a good idea to seal the servos against water ingress. They are reasonably water resistant but this can make them even better. Note that it will also void the warranty (but that will happen anyway as soon as you use it in a boat).
 - You will need:
A small philips head screwdriver
Lithium grease or petroleum jelly
Star brite Liquid Electrical Tape (Jaycar)
 - Remove the 4 screws from the base of the servo, making sure you don't loose the rubber washers.
 - Remove the gearbox casing.
 - Add some extra grease around the splined drive shaft and a little on the gears.

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- Re-assemble, making sure that the 'O' rings are in place between the case sections and the rubber washers are on each screw shaft. Don't over-tighten the screws.
- Liberally coat the joints between the casing sections, the screw heads and the control cable entry with Star brite Liquid Electrical Tape and allow to harden until tacky. Repeat with another coat and leave hanging until dry.

Servo Twitch

- May be caused by dirt on the transmitter or servo potentiometer.
- Sometimes caused by feedback. Test with Tx & Rx 15 feet apart. If still twitching then problem with a pot.
- Swap servo connections on Rx to determine if Tx or Servo problem. If problem switches to other servo, then Tx is at fault.

Winch Servo Repair

Note: I tried this once but it was very fiddly, not very successful and in future I will buy a new one, but if you want to have a go, good luck!!

It is almost inevitable that, unknown to you, water will get into the winch servo at some time and if it is sea water, corrosion will occur and probably seize the two ball bearings. If this happens, gears may also be stripped as the servo motor tries in vain to turn the winch drum. You can, of course, just replace the servo with a new Hitec HS-785HB, but you can also repair it. Parts needed:

| Hitec Part No | Description | Approx AUD |
|---------------|------------------------|----------------------|
| 58471 | Universal Ball Bearing | \$8.00 2 needed |
| 55013 | HS-785HB Gear Set | \$10.00 |

If you need to replace the two bearings and the gear set, once you add postage it will probably be better just to buy a new servo (around \$55).

To remove the servo from the boat:

- Unplug it from the receiver
- Remove the winch drum. It is a good idea to tape or clamp the traveller cables so that they don't unwind off the drum.
- Pull the rubber block out from under the servo. You may find that it has been glued in place... persevere!
- Under the deck, you will find two white toggles which lock the servo onto the locating posts. Reach round to the front corner of the servo and rotate each toggle aft.
- You should now be able to remove the servo. It is a tight fit and you may need to separate deck and bottom to ease it out... again, persevere.

To open the servo, remove the 4 long screws, pull the gear casing off and the bottom plate. If you find water droplets inside either the gear case or the bottom plate or the circuit board and you have been sailing in sea water, it may be advisable to dunk the whole servo in fresh water, rinse it out and dry thoroughly to eliminate any salt.

Test the two ball races for damage. Try spinning the upper race which is next to the output spline. For the lower one, try turning the gear set using the 3rd or 4th gear. If the upper race spins freely, don't take it off the shaft in step 2 below. Likewise, if the lower race spins freely, leave it where it is when you remove the output shaft in step 4 (either in the well under the gear or on the servo body post).

To replace the two ball bearings and/or gears:

1. Remove the rubber 'o' ring which is on top of the upper ball race just under the output shaft splines.
2. Ease the top ball race from the output shaft, taking care not to damage the gear or the splines. A pair of bent-nose pliers can act as a gear puller.
3. Remove the second gear which is next to the output shaft
4. Ease the output shaft and gear out. The second ball race should come out of the well under the output shaft gear and remain on the post which is part of the servo body.
5. Remove all the other gears and replace any that are damaged.
6. Ease the output shaft lower ball race off the post which protrudes from the body of the servo.

Hopefully the lower ball race has remained on the post which is part of the body of the servo. If not, than you will need to carefully ease it out of the well. A metal rod with a bent end, such as the one shown here can get under the bearing and ease it out.

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If the upper ball race won't come off the output shaft easily, you will have to pull the output shaft and second gear off together, as the second gear won't slide past the upper ball race. You can then work on removing the ball race away from the rest of the servo.

Monofilament Line has Come off the Drum

The monofilament line is the nylon-looking line that runs from the sail servo drum up and around the bow roller. It looks simple. One track (groove) of the servo drum takes in the line while the other track lets it out. The line runs up and around the bow roller. The moving knot where your mainsheet attaches runs the full length from drum to pulley. There will also be a spring or elastic in the line to keep the line taught.

You are highly unlikely to encounter the problem of the line jumping off the drum; there are three ways that can happen – one is that you had the line jump off the drum while in service because it was too loose, or misadjusted; the next is that the spring or elastic broke; the other is you had the drum off greasing the servo post, and it got away from you. It is a bit of a process to get the line back where it should be but if you follow the following steps it should be reasonably straightforward;

Step 1 : Remove the drum from the servo post. Take the screw out of the centre of the drum, and then pull up on the drum and it will slide off the top of the splined servo post. On some boats, you do not need to remove the bridge over the drum to do this, but it will be easier if you do.

Step 2 : Now, untangle the lines – but do not untie the end knots that are in the centre of the drum. When you have the lines straighten out, and all loops on the drum removed, orient the drum so that you are holding the line taut and the drum is right side up. If the spring/elastic has broken, replace it now. You can identify the bottom of the drum by the splined seat for the servo post. You should now be holding the drum right side up with one line leading forward on each side all the way to the bow roller and no wraps on the drum.

Step 3 : Wind two wraps of the port line clockwise around the bottom track of the drum. Then wrap two turns of the starboard line anti-clockwise around the top track of the drum. Hold the drum so the line stays tight as you are doing this. The spring/elastic should be stretched, holding the line taught, and the drum should be centred on the servo shaft.

Step 4 : Being careful to hold the drum with one finger on each side to keep the line on the drum, hold the drum over the servo post like you were going to install it. If both sides of the line are taut, you are ready to reinstall the drum. If not, take another wrap on one line, or the other, until the drum lines up with the servo post.

Step 5 : Now you need to get the knot in the monofilament line (that you attach the mainsheet to) in the right place. Turn on the transmitter and then your boat. Put the left control lever on your transmitter in the full trim position (mainsheet pulled right in) – usually down. Slide the trim tab for that control all the way in the same direction you have just moved the stick (usually down). The winch will turn until it stops at that trim point (full sail trim). Carefully turn the drum in your hand (being careful not to let the monofilament get loose again) until the monofilament knot is just about touching the bow roller housing (12mm at the most).

Step 6 : If you run out of monofilament on the top drum track before the knot gets to the bow roller housing, simply add a wrap of monofilament anti-clockwise on the top track, and unwind one wrap from the bottom track.

Step 7 : Put a good amount of Vaseline or lithium grease in the deck hole around the servo post where it comes through the deck, and a little in the flat space on the deck where the drum will sit before installing drum. Install the drum on the servo post. The line should be taut when the drum is in place.

Step 8 : Test the travel of the monofilament knot. Using the radio controls, the knot should go from just about touching the bow roller to just about touching the drum itself. If not, lift drum carefully and turn one way or the other slightly and reinstall until you get the knot travel correct. It is very important that the knot has no way to reach either the bow roller housing or the drum.

Step 9 : When you put the drum on, the lines should be very tight at first. After you run the servo end to end a couple of times, the line adjusts itself better on the drum. The line should end up being quite taught, like a base guitar string. Better tight than loose. If it is loose, you may be able to shorten it with a knot or tighten the elastic or spring. As a last resort, you may need to adjust the length of the control line. See *Replacing the Monofilament Line* below.

Step 10 : Replace the screw in the drum and you are ready to go.

If you are installing a brand new line, then see *Replacing the Monofilament Line* below for information on installing the new line, tying the end knots, and adjusting the length of the line. Then return here to wind it and adjust it.

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Replacing the Monofilament Line

This is one method of replacing the mainsheet control line. There is an alternative method on the Go Faster web page under Problems & Trouble-Shooting at <http://radiosail.com.au/go-faster/>. Take your pick

- The method below suggests fitting the winch drum in the middle of a length of control line and tensioning the line where the mainsheet is attached. (I personally like this one better.)
- The Radio Sail web site suggests tying one end of the control line to the winch drum, feeding the loose end through the bow roller and back to the drum.

The problem with the second method comes when you try to tie the loose end back on the drum. My fingers aren't small enough and I found it almost impossible to get the control line tension right. It is much easier to tension the line where the mainsheet is attached as in the method below.

Method

1. Undo the screw holding the sail winch drum and lift the drum off the servo spindle. You may find it easier if you remove the bridge, but it shouldn't be necessary. Remove the old line and discard. Don't lose the screw!
2. Cut a 2500mm length of Rigging Dacron 80lb (available from a fishing shop) and tie a substantial overhand knot 1600mm from one end then feed the two ends through the two holes in the drum. The knot prevents the sheet line from slipping. (Usually the long end goes at the bottom, but it doesn't matter.)
3. Using the long end, wind 5 turns clockwise round the winch drum and place it back on the servo shaft.
4. Thread the remainder of the long end round the bow pulley, port to starboard, and tie a non-slip loop approximately 100mm from the bow pulley. The exact position doesn't matter too much as it can be adjusted later. Leave the tail for the moment.
5. Using the short line, wind 2 turns anti-clockwise on the winch drum, bring the end forward and tie a loop in the end to give approximately 50mm gap between the 2 looped ends. Join the two loops with a couple of turns of elastic, providing sufficient tension to keep the lines taught but not over tight.
6. Using one of the tails, loosely attach one loop to the other. This is in case of elastic failure. Trim the ends and seal them with a match. You can also put a drop of glue on each knot to be sure, to be sure.
7. Now adjust the exact positioning as necessary. Lift the drum off the servo shaft and, with transmitter and receiver on, set the sail trim to the centre and mainsheet lever to fully in. Now place the winch drum back on the servo shaft so that the forward loop is close to the bow roller and check the travel range. The tensioning section should stop just short of the bow roller and a position level with the mainsheet eye in the deck. Final adjustment can be made using the trim adjuster.
8. Attach the mainsheet to the FORWARD loop, feed it through the deck eye onto the boom slider and check that when the sheet is pulled in the clew end of the boom lines up with the outboard end of the transom.

Water in Cockpit

If water is getting into the cockpit, it will most likely be past one of the servo axles, but check the other possible places such as screw holes and hull damage, particularly in the keel near the bow.

- Repack the winch and rudder servo axles with plenty of grease (Vaseline or Lithium).
- Move the deck switch to the receiver/battery container (or discard it) and cover the holes in the deck with tape.
- Make sure the aerial post mount is fully sealed
- Scrunch up a tissue or two and place in the cockpit to soak up any water
- Seal the cockpit hatch cover with tape before sailing.

Water and electronics are not happy bedfellows, so it is a good idea to seal the receiver and batteries in plastic container(s) or bags.

Sail Repair

- Cover leading edge of leach reinforcing panel with Scotch Magic tape. This will prevent the wind getting under the edge and lifting it. Current sails come with this already done so there is no need to do anything unless the panel starts to lift.

Initial setup

Boom sliders

- Since the mainsheet slider is normally located immediately level with the eye in the deck and doesn't need to move, you can cut off the slider's tails and cover the slider with a short length of 12mm dia. heat-shrink tube. This will prevent the mainsheet from snagging on the slider in blustery winds. Use the edge of a small file to cut off the slider's tails, cut a small nick in the centre of the heat-shrink tube for the loop to poke through, manoeuvre the slider into the tube, slide it into position on the boom then heat the heat-shrink tube - a hair dryer should do the job.



Mainsheet slider with tails removed



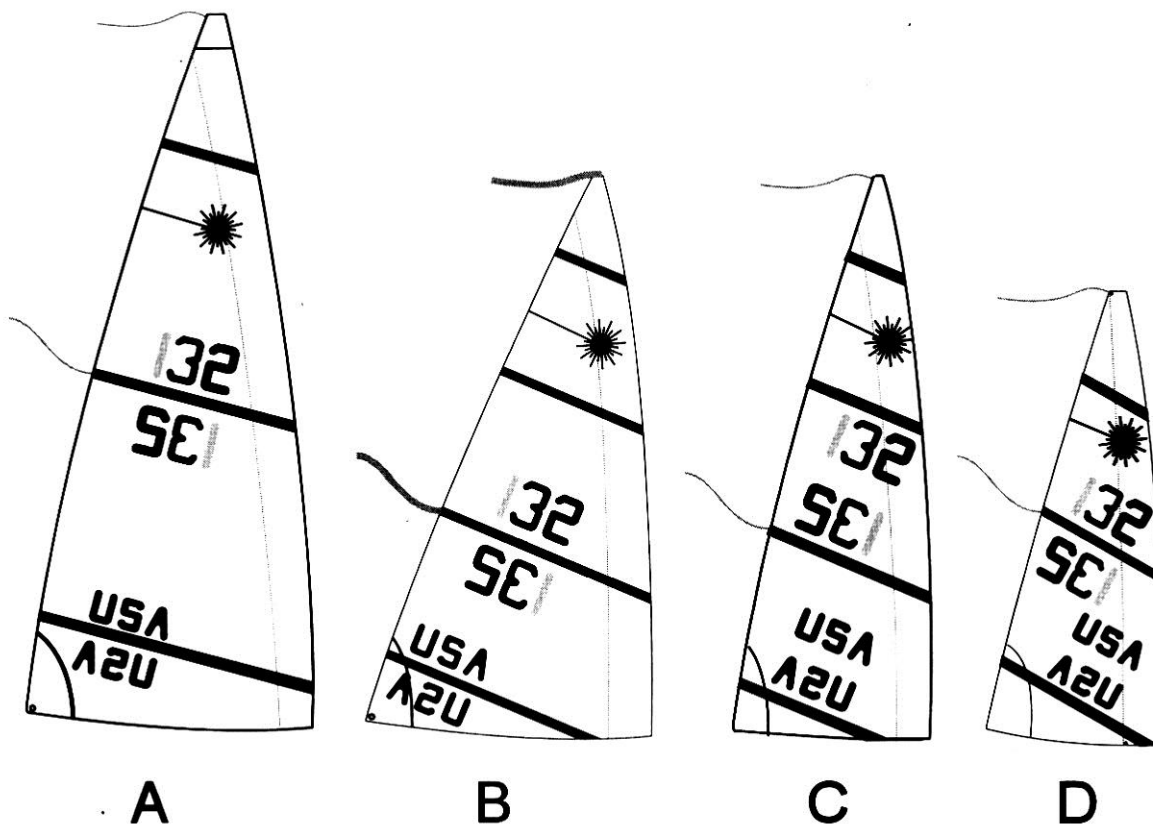
Boom slider with caps

- Glue spherical Caps from a fishing gear shop on tails of other sliders to make them easier to adjust in cold weather. Alternatively use 2 or more layers of 2.5mm heat-shrink tube on the slider tails.

Sail Numbers

The manual that comes with the laser says, in part "... Only official font and size numbers can be used. ... Numbers are installed on the sail just as shown in the diagram. The last two digits are used, as shown in black, below. Leave space for a number 1."

Sail numbers can be obtained from Radio Control Sailing Australia when you register your boat.



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Planet T5 2.4 GHz Radio Setup

Step 1 : Remove mainsheet centring spring

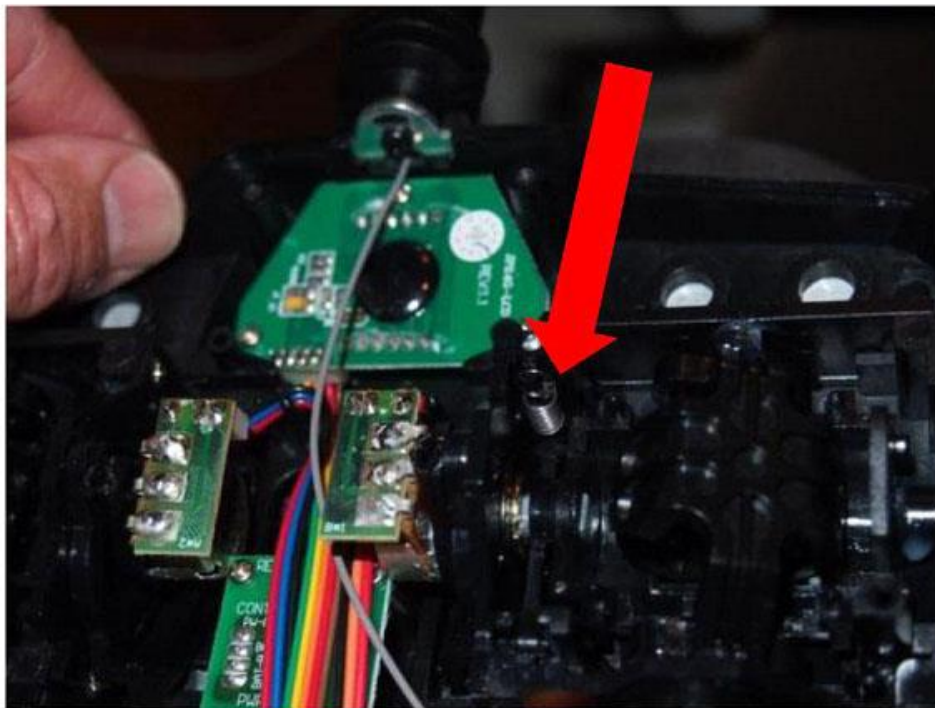
Unscrew the back of the transmitter (you'll need a small-medium Philips head screwdriver).

Remove this spring.

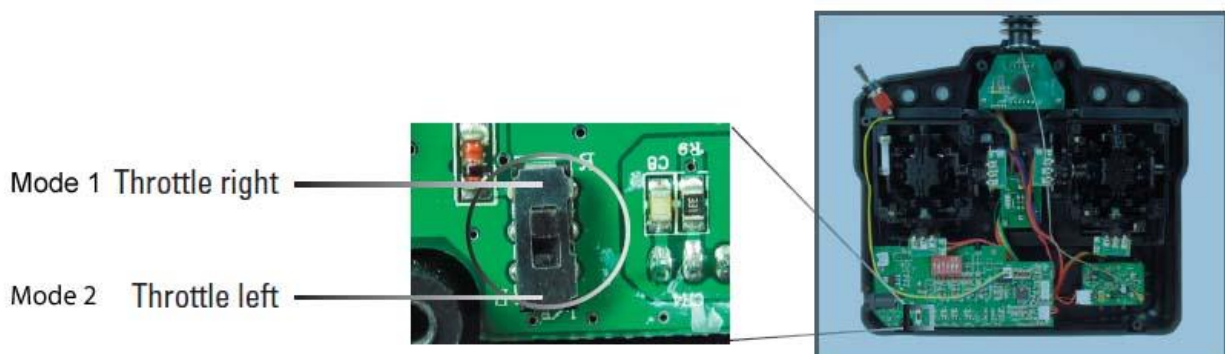
It is the 'up-down' spring for the mainsheet. When you have the back off the transmitter with the aerial away from you, it is on the right hand side. It is easily flicked off with a small screwdriver. It will likely fall into the innards but can easily be shaken out. At the same time, remove the cam follower that the moving end of the spring was attached to as this will also fall off with use.

Remove the ratchet spring from the left hand 'up-down' control stick and install it on the right hand one. This will stop the mainsheet control from moving accidentally.

Optionally, install the cam follower and spring on the left hand 'up-down' control stick. This will stop the left hand stick from moving up and down, distracting you and ensure that these small parts are not lost.



While you have the back off the transmitter you are recommended to switch the transmitter to Mode 2. You will find the switch in the bottom left hand corner of the main circuit board and it needs to be switched towards the bottom of the transmitter. You will find instructions in the T5 Instruction Manual on page 8 under Mode Chang Switch.



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Step 2 : Set up battery holder in plastic container



The boat is normally supplied with one strip of stick-back Velcro in place on the base of the radio compartment. You are recommended to put another strip on either side of the one that is there.

You should also put sticky-back Velcro on the underside of the plastic box and on its lid.



You are recommended to place the battery holder in a small plastic box. This provides another layer of waterproofing.

NOTE: Some people elect to remove the on-off switch from its position on the deck and place it in the plastic container. The cut-out in the deck plate can then simply be covered with a small piece of white tape.

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Step 3 : Set up receiver in plastic container



You are recommended to place the Planet receiver in a plastic box. The one shown is a tic-tac container with sticky-back Velcro on its underside and a small hole drilled in the end for the aerial to protrude through.

- The aerial needs to be straight for best performance.
- The receiver performs best if it is close to the underside of the hatch cover. Some Velcro it to the plastic hatch cover.

Step 4 : Receiver connections

For each of the connectors, the Black wire goes to the bottom.

Mainsheet goes in position '3'



Rudder Servo goes in position '2'

Power lead goes in position 'B'

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CAUTION!

The transmitter and receiver must be 'bound'. This is very straightforward and is described on Page 6 of the Planet T5 manual. Make sure you carefully read and follow the instructions exactly.

It is important to read all of the instructions in the Planet booklet before commencing to set up your boat.

If you have inherited a Planet T5 Tx/Rx without the manual, here are some of the main points:

Transmitter Info

Battery Status Display: Replace the batteries when the voltage falls to 4.4 volts.

Reversing switches: Used to reverse the direction the servos run.

Batteries: Rechargeable AA batteries can be substituted for alkalines. There is a charge socket on the side of the transmitter for a 4.8V charger. Note the polarity diagram on the back of the transmitter case near the socket.

Stick Tension Adjustment: The transmitter features adjustable spring tension. Remove the 6 Tx case screws and open the back. Use a small Philips head screwdriver to adjust the tensioners.

Stick Height Adjustment: Use an allen key in the centre of the stick to slacken it, adjust the height to suit and retighten.

Aerial: In use, keep the aerial pointing up but not directly at the model.

Receiver Info

7710350 PLANET R6M 6CH 6 GRAM 2.4GHz RECEIVERS RP £15.99

The receiver should be protected from moisture, vibration and dust.

Aerial: Should be deployed perpendicular to the rear face of the receiver

Connections: The lower gold pin is negative, centre positive and upper signal.

Power details: Normal operation 4.8V – 6.0V. Idle current 40mA

Warnings: Do not operate below 4.4V. Incorrect connect may cause permanent damage. Exposure to vibration damp or wet conditions may cause it to stop working.

Binding Planet Transmitter and Receiver

Recognising an un-bound receiver: Upon connecting the receiver battery, the receiver status LED will flash on and off slowly regardless of whether the transmitter is switched on or not.

Binding Transmitter and Receiver:

1. Switch off the transmitter
2. Connect power to the receiver. Press the binding switch on the side of the receiver briefly once.
3. The receiver Binding LED will flash in groups of three.
4. Switch on the transmitter. As the signals are acquired, the Binding LED will flash briefly then glow solidly a few seconds later indicating a successful bind.
5. Done. The Binding LED will glow solidly whenever the transmitter is powered on.



Hobby King HK-T6A V2 Radio Setup

These instructions are for the 6-channel model but, with the exception of the software configuration, are expected to be valid for the 4 channel HK-T4A V2 model as well.

Converting Transmitter's Mode

Mode refers to the action of the two sticks.

- Mode 1 transmitters have the Throttle (Main Sheet) on the right.
- Mode 2 have Throttle on the left.

Right-handed sailors will usually want the self-centre Rudder stick on the right and notched Main Sheet stick on the left. Mode 2 transmitters are set up this way. Mode 1 are the other way round and probably more desirable for left-handed sailors.

If you have a Mode 1 transmitter, this is how to convert it to Mode 2. You will need a set of small Philips head screw drivers and a small pair of long-nose pliers or, ideally, a pair of locking surgical forceps.

1. Remove the 4 Philips head screws from the back of the transmitter and carefully remove the back.
2. With the aerial pointing away from you, the Rudder stick mechanism is on the left and the Main Sheet on the right. You have to move the flat notch spring from the Rudder mechanism to the Main Sheet and disconnect the Main Sheet's self-centring cam follower.
3. Remove the flat notch spring from the Rudder mechanism and transfer it to the Main Sheet mechanism. Photos1 and 2 show the notch spring in its new position.
4. Remove the coil spring from the Main Sheet self-centring cam follower. Just lift the top of the spring off the cam follower and unhook the spring sideways from the bottom anchor.
5. Lift up and remove the Main Sheet cam follower.
6. This next step is a bit tricky and is entirely optional. It will make the Rudder stick self-centre in both directions. Install the cam follower on the vacant peg. Hold the coil spring by the side of the top loop; hook it under the bottom anchor and onto the cam follower. Have patience... it isn't easy. Photo 3 shows this completed.
7. Check that both sticks work as required, then screw the transmitter back on, making sure not to trap any wires.

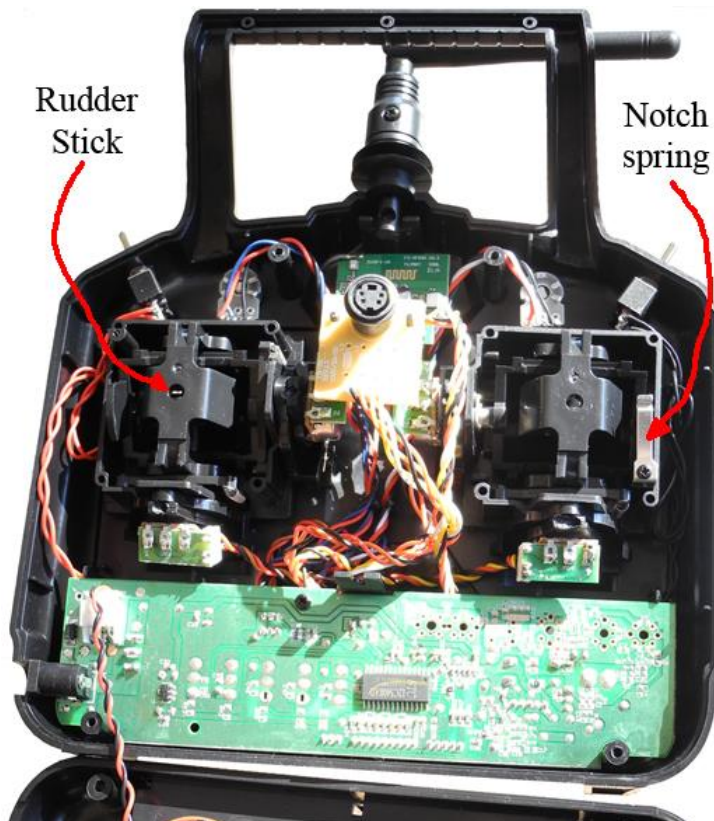


Photo 1

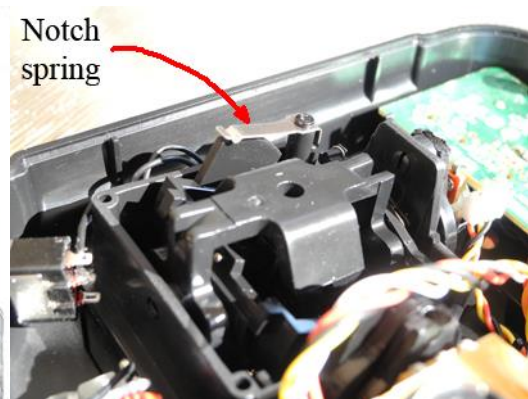


Photo 2

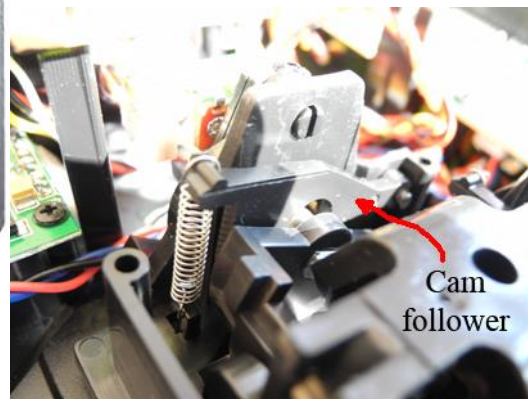


Photo 3

4 Channel System Review

For a review of the 4-channel HK-T4A V2 Tx/Rx go to <http://www.rcmodelreviews.com/hobbykingrc.shtml> .

Note that this is the 4-channel unit, not the 6-channel I use.

Bind Tx & Rx

This will bind your Tx to the Rx.

1. Turn off both transmitter and receiver
2. Unplug servos from Rx
3. Plug power into one of the servo positions (black led to outside)
4. Put Bind Plug in battery position on Rx
5. Turn on Rx. Rx LED should blink. (Note Rx must be on before Tx for Binding)
6. On Tx, press and hold Bind Range Test switch while you turn on Tx. Don't release the button.
7. When Rx LED stops blinking, release the Bind Range Test button
8. Turn off Rx
9. Turn off Tx
10. Remove and save the bind plug
11. Transfer the power plug to the Bat terminal on the Rx

Connect Servos and power to Receiver

1. Plug power into Bat on Rx (black lead to outside)
2. Plug Rudder servo into Ch1 (black lead to outside)
3. Plug Main Sheet servo into Ch2 (black lead to outside)

Powering up

Tx first, then Rx - always this order, except when binding.

Transmitter software configuration

This applies only to the 6 channel HK-T6A V2 transmitter, not the 4 channel model which is not software configurable.

Required:

| | |
|----------|--------------------------------------|
| Cable | CP2102 USB to UART Bridge cable |
| Driver | CP210x USB to UART Bridge Controller |
| Software | T6Config.exe |

Downloads

Driver: http://www.4shared.com/file/5zFJCDPo/CP210x_VCP_Win_XP_S2K3_Vista_7.html

UserId hnmph@optusnet.com.au

Password atom1ant

Software: <http://blogs.hari.us/archive/2009/11/01/working-with-hobby-king-2.4ghz-6ch-tx-rx.aspx>

Restart system after installation of driver and software

Start T6config

Setting: Com3

System Settings

End point Note: Manual says range 0%-100% in each direction

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| | | | |
|-----|------|------|--|
| CH1 | 100% | 100% | Change to 120% 120% - gives 47° rudder swing |
| CH2 | 115% | 115% | |
| CH3 | 115% | 115% | |
| CH4 | 100% | 100% | |
| CH5 | 100% | 100% | |
| CH6 | 100% | 100% | |

Reverse

| | | |
|-----|-------|--------------------|
| CH1 | x NOR | Change to unticked |
| CH2 | NOR | |
| CH3 | NOR | |
| CH4 | NOR | |
| CH5 | NOR | |
| CH6 | NOR | |

Subtrim

| | |
|-----|---|
| CH1 | 0 |
| CH2 | 0 |
| CH3 | 0 |
| CH4 | 0 |
| CH5 | 0 |
| CH6 | 0 |

DR

| | | |
|-----|-------|--------|
| | DR On | DR Off |
| CH1 | 100 | 50 |
| CH2 | 100 | 50 |
| CH4 | 100 | 50 |

Stick Select

Model 1 selected

Type

ACRO

Mix

| | |
|-----------|-------|
| Mix Num | Mix 1 |
| Source | VR A |
| Des | CH5 |
| Up Rate | 100% |
| Down Rate | 100% |
| Switch | ON |

Switch Program

| | | | |
|----------|-------|---------|----------------|
| Switch A | SW On | DR | Change to NULL |
| Switch B | SW On | ThroCut | Change to NULL |
| VR(A) | NULL | | |
| VR(B) | NULL | | |