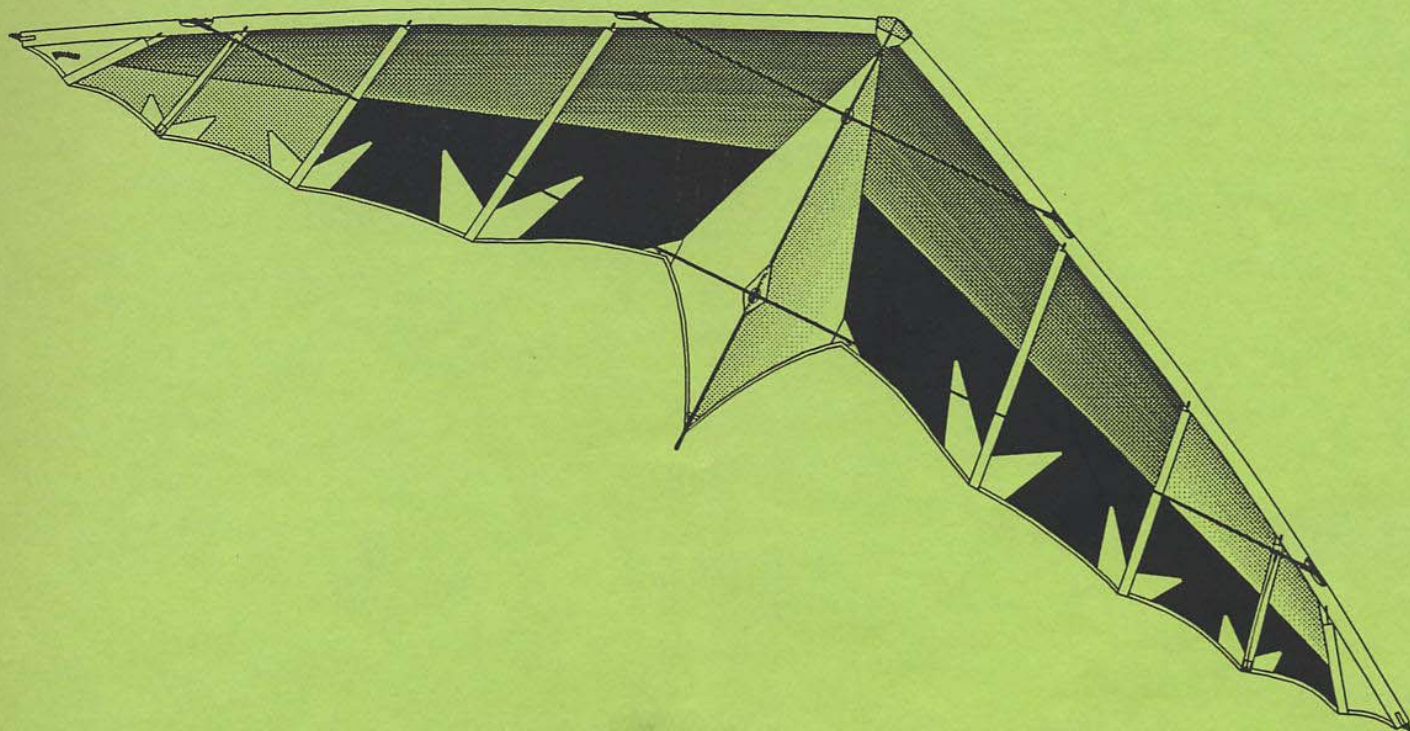




ATTENTION

As with most action sports equipment, kites can be dangerous if misused. It is the flier's responsibility to understand the use and operation of his or her kite and how to fly it safely. Both the kite itself and the flying lines present potential hazards to spectators. Moving at high speeds, the kite and the lines can hit or cut with surprising force. Never underestimate the force of a kite and never fly your kite over spectators, near a roadway or near power lines! Play smart and play safe! It's more fun for everyone!

SAFETY FIRST

prism **RADIAN**

Instruction Manual and Flying Guide

Second Edition

Prism Designs Inc., Seattle, WA
(206) 547-1100

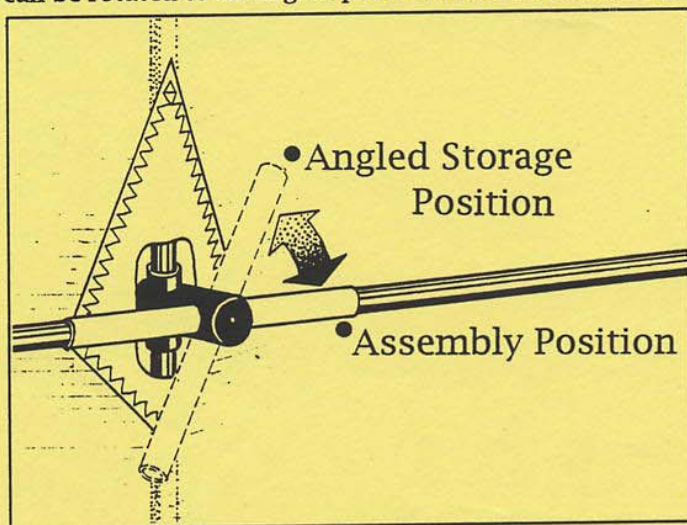
Notice of New Fittings!

As part of Prism's dedication to progressive design, your new *Radian* has been equipped with our brand new line of custom fittings. Though a new edition of our instruction Manual and Flying Guide with updated illustrations is in production, we have decided not to wait for the new publication so that our customers can benefit from these innovations as soon as possible.

These new fittings will not change the basic operation or adjustment of the *Radian*. Any changes in the instructions should be covered by the following notes and illustrations. If you have any uncertainties or if there is anything that we can be helpful with, please don't hesitate to call or fax us. Our fax line is (206) 547-1200

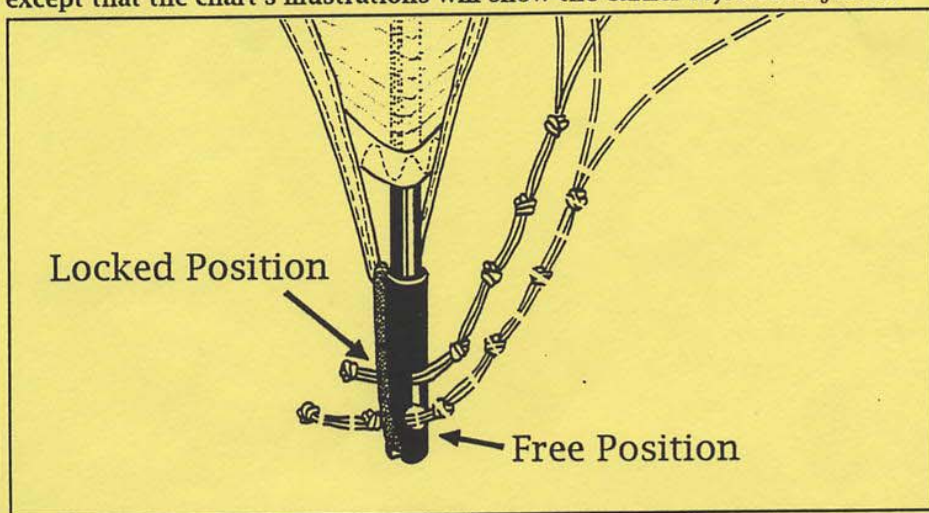
New Center "T"

The new center "T" now remains attached to the spine when the kite is disassembled for storage and can be rotated to an angled position to facilitate rolling up the sail.



New Bridle Adjustor

The new Bridle Adjustor is now an integral part of the custom shock cord nock at the base of the spine. Note that the new fitting will not affect the settings recommended by the Tuning Chart, except that the chart's illustrations will show the earlier style of Adjustor.



New Attitude Adjustor and Top "T"

The Attitude Adjustor is now an integral part of the top "T" fitting. Changing the Attitude Adjustor setting will use the same procedure outlined for the new bridle Adjustor above.

***R A D I A N* Features**

Design

- **Radically high aspect wing** with fully cambered airfoil for unmatched high-lift, low-drag performance.
- **Transparent center panel** and vivid color palette stand out in a crowd.
- **Completely silent flight** and superior wing efficiency achieved with 8 battens and a stiffened and scalloped trailing edge. In moderate to strong winds the *Radian* is light pulling and blindingly fast.
- **Eight removable battens** allow you to fine-tune the *Radian* for optimal performance in winds from 3 to 25 mph.
- **Attitude Adjustor™*** lets you choose how your *Radian* will fly. Keep it graceful and forgiving, or snap in a setting which will take you to the edge..or anything in between!
- **Bridle Adjustor™*** eliminates picking at knots. With one snap-out/snap-in motion both bridles can be adjusted simultaneously in less than five seconds.
- ***Radian* flies better with use.** Sail is cut to stretch into its designed shape, not out of it.
- **Dynamic sail twist** increases responsiveness and acceleration.
- **Frame resists distortion** in high winds with upper spreader "T". Allows for a truly remarkable upper wind range.

Construction

- **Longer sail life.** Reinforcement fingers at batten-pocket ends distribute load into the bias of the sail fabric and control the sail shape, giving the sail a longer life. Triple-stitched zig-zag seams provide maximum strength.
- **Built to withstand punishment** with double-reinforced wing tips, spreader cut-outs, and quadruple-reinforced center diamond.
- **Kevlar™ nose reinforcement**, made from the same fiber used in bulletproof vests, is amazingly light but highly resistant to spar punch-through. Internal Kevlar™ at inner standoffs reinforces the sail at its points of highest stress.
- **Bomb-proof attachment straps** for shockcord will not rip or tear out like grommets.
- **Stronger than knots**, our sewn bridle loops are built to last.
- **Impeccably crafted** at our workshop in Seattle, Washington.

*Patent pending.

Table of Contents

Introduction	3
How to Use This Manual	4
A Word on Safety	5
The <i>Radian</i> , complete labeled illustration	6
Assembly	7
Preflight Check	10
Disassembly	10
Launching	11
Tuning	12
Bridle Adjustor	12
Tuning Chart (also on back cover)	13
The Attitude Adjustor	14
Wind and Weather	15
Wind Direction	15
Wind Speed	16
Turbulence	17
Basic Flying	18
Advanced Flying	21
Light Winds	21
Tuning for Fanatics	22
Care and Repair	24
Troubleshooting	25
Specifications	27
Glossary	28

First Edition ©March, 1992

Second Edition ©June, 1992 by Prism Designs, Inc. All rights reserved. No reproduction whatsoever without permission. Copyright includes cover page, feature page and illustrations. **Attitude Adjustor**, **Bridle Adjustor**, and *Radian* are trademarks of Prism Designs, Inc.

Introduction

Thank you for your purchase. We take great pride in the quality of our products and in the thought which goes into their design. As a young company we're excited about our opportunity to build a reputation for quality, service, and innovation in the kiting world. If you have comments or ideas that you'd like to share with us, please don't hesitate to call or write. With your permission, we'll put you on our mailing list so that we can keep you informed about our new products and innovations*.

You should understand that as a point of pride we stand 100-percent behind our products. If for any reason you are dissatisfied with your purchase, let us or your Prism dealer know, and we'll do our best to make things right.

Good Flying!

Prism Designs, Inc.
425 North 36th Street
Seattle, WA 98103
(206) 547-1100
(206) 547-1200 fax.

* Fill out the card enclosed with your Radian to get on our mailing list. If you don't have the card, just call or drop a line with your name, address, and phone number. Your address will be used for our mailings only.

How to Use This Manual

In an ideal world, we would be at your side when you first put your *Radian* together and learn to adjust and fly it. We've done our best to provide you with a manual that contains everything we would tell you if we were there, in the hopes that it will be a valuable reference throughout the life of your kite. If you're like some of us and hate to read instruction manuals, or if you just can't wait to get flying, then don't even bother to finish this section. Just read the next few pages on safety, assembly, and launching, and keep the manual around for when you want to learn more about getting the most out of your kite. We strongly recommend that you try your first flight in winds of about 6-11 m.p.h. If you are flying in different conditions, the instructions will show you how to set up the kite accordingly. In the rest of the manual, you'll find:

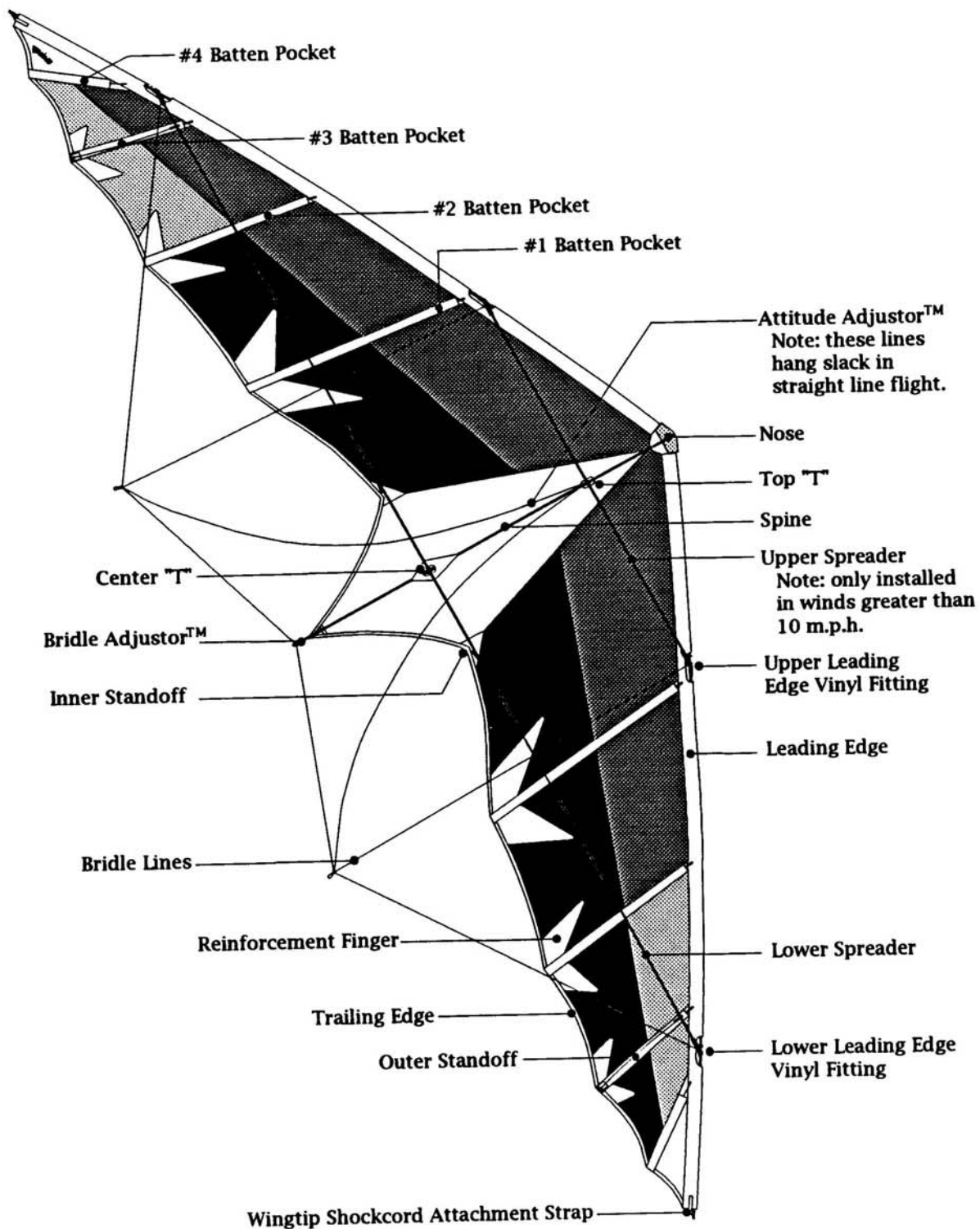
- a tuning chart, handy for choosing the best adjustments for different wind conditions, page 13,
- an explanation of the use of the **Bridle Adjustor** and **Attitude Adjustor**, pages 12 and 14,
- a section on caring for your kite, page 24,
- sections on reading wind speed and direction and on picking good places to fly, page 15,
- a section on basic flying to help you keep your kite in the air and learn to fly it, page 18,
- tips on advanced flying and maneuvers, page 21,
- a section on advanced tuning for fanatics, page 22,
- ... and a troubleshooting guide, page 25.

Some Words on Safety

You are responsible for the safe operation of your kite. Understand that it is potentially a very dangerous device with which you can seriously hurt both yourself and other people. If you cannot accept full responsibility for flying your kite safely, please return it immediately to any one of our dealers for a full refund. It saddens us to see a park closed to kite fliers because one person took a risk with their kite and hurt or threatened someone. Nobody wants to have a few such people create a reputation for sport kite fliers as being dangerous and inconsiderate. Please do your part to keep kite flying safe.

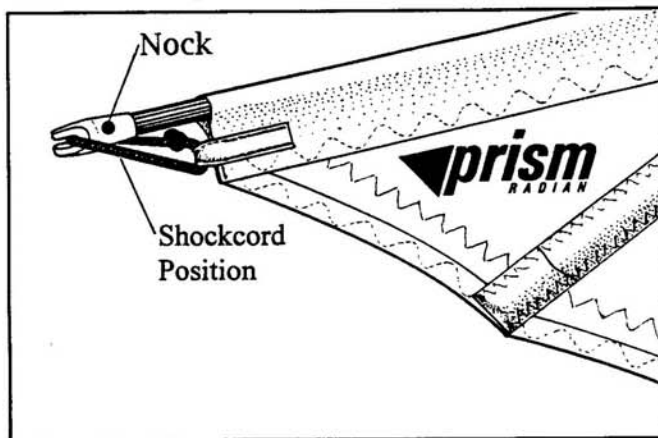
- **Never fly near power lines.** Don't even consider it. Both the kite spars and the flying lines conduct electricity. You could electrocute yourself or cause damage to the power lines for which you would be entirely liable.
- **Never fly in thunderstorms** or in stormy, unpredictable weather.
- **Never fly over people** for any reason. One slip or a broken line and you could cause a very serious injury.
- **Never fly over roads** or anywhere that your kite could interfere with automobiles.
- **Never fly near airports** or low-altitude aircraft.
- **Warn people** in the area about your kite and its lines.
- **In crowded areas, be considerate** and fly with shorter lines to take up less space. We often fly with only 75 feet, and find the kite to be quicker, more responsive, and even more fun to fly.
- **Be sure your kite is properly assembled,** adjusted, and untangled before you launch.

The R A D I A N



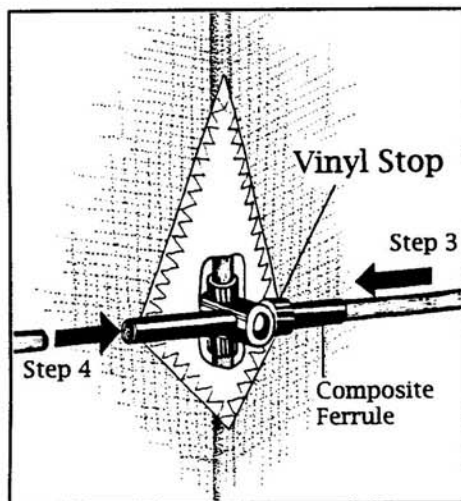
Assembly

1. **Unfold your *Radian*** and lay it on the ground with the nose pointing away from you and the side with the batten pockets facing up. **Note: As you assemble the kite, check to make sure that none of the bridle lines get tangled around or behind the spreaders.**
2. **Both lower spreaders should already be inserted all of the way into their vinyl fittings at the leading edge. If they are not, do so now. Check also to be sure that the wing tip shockcords are properly hooked into their nocks.**



Shockcord Detail

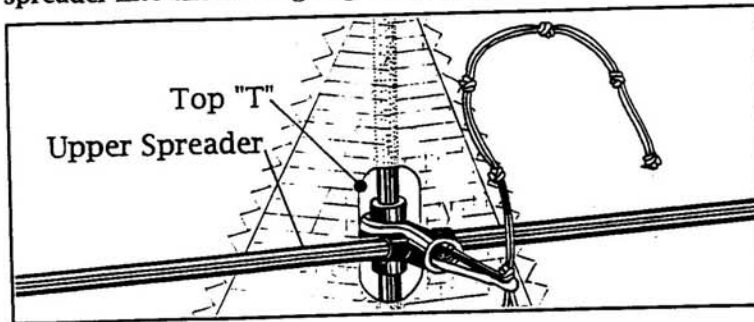
3. **Insert the composite ferrule on the right-hand lower spreader into the hole in the center "T" vinyl fitting. Be sure the ferrule is centered in the fitting and pushed up against its vinyl stop collar.**



Center "T" Assembly

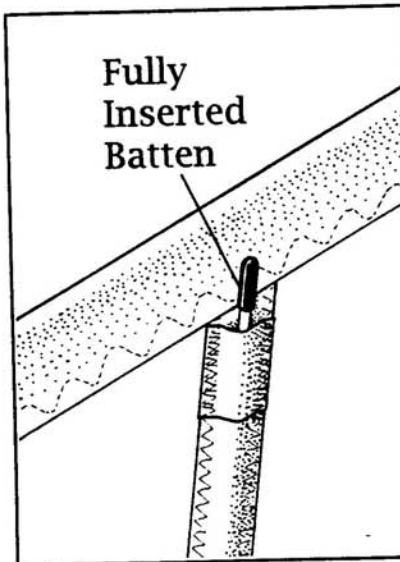
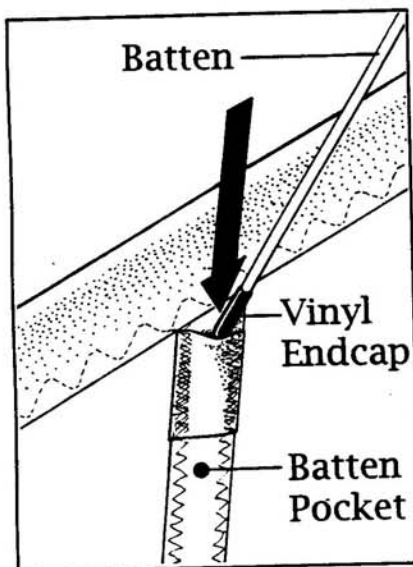
Caution! During assembly and disassembly any kite is at its most vulnerable. Take special care not to push a spar or standoff through a wing. When inserting a spar into its vinyl fitting, hold the spar near its tip in one hand and the fitting in the other. Then guide the tip directly into the fitting. The same applies when inserting standoffs into their vinyl retainers.

4. **Insert** the free end of the left-hand lower spreader into the composite ferrule. Again check to make sure that the other end is snugly in place in its vinyl fitting at the leading edge.
5. **Important! Do not install the upper spreader in winds less than 10 mph.** In stronger winds, slide the upper spreader through the top "T" fitting and insert one end all the way into one of the vinyl fittings on the leading edge. Now insert the free ends of the spreader into the leading edge vinyl fittings.



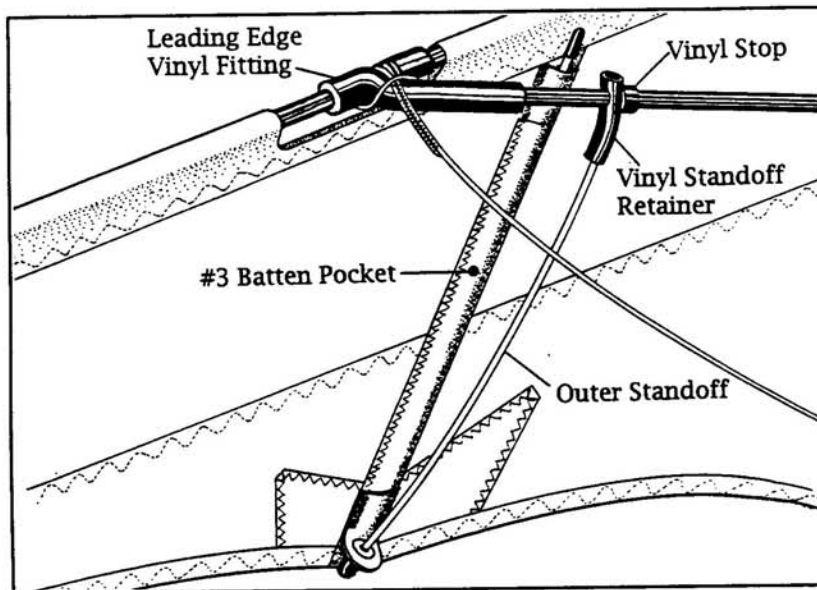
Top "T" Assembly

6. **Insert the two longest battens** from just behind the leading edge and all the way into the two #1 batten pockets. The black endcaps on the battens should project slightly from the pocket and just overlap the stitching on the leading edge. **Insert the next longest pair of battens** into the #2 pockets. The battens won't fall out; the friction in the pockets holds them sufficiently.

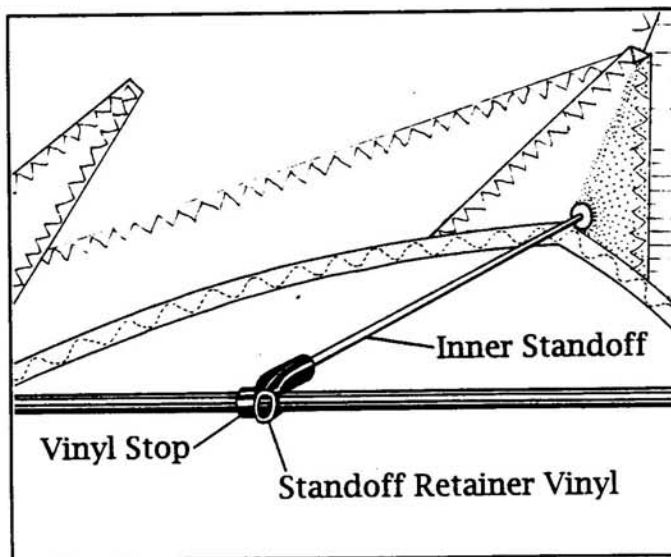


Batten Insertion

7. Your *Radian* is now battened for flight in winds of about 6 to 11 m.p.h. If you know that the wind is significantly above 11 m.p.h., or if in flight the kite makes any buzzing noise, you should go ahead and insert the #3 and #4 batten pairs as well. In very light winds (less than 6 m.p.h.), the battens are no longer necessary to keep the kite silent and efficient, and removing all of them will reduce weight for ultralight performance. Consult the tuning chart on the back cover of this manual for specific batten configurations.
8. Gently insert the tips of the four sail standoffs into the small vinyl retainer tubes on the lower spreaders. Again be sure that the bridle lines are completely free and clear.



**Outer
Standoff
Assembly**



Inner Standoff Assembly

9. **Clip on your flying lines.** We recommend 100 feet of 80 lb. braided Spectra to start. If you use significantly longer or heavier line (over 150 lb. test) you may find the kite to be sluggish and unresponsive. It's a good idea to mark one of the sleeved loops at the ends of your lines with a permanent marker so that you know which line goes to which handle.

Preflight Check

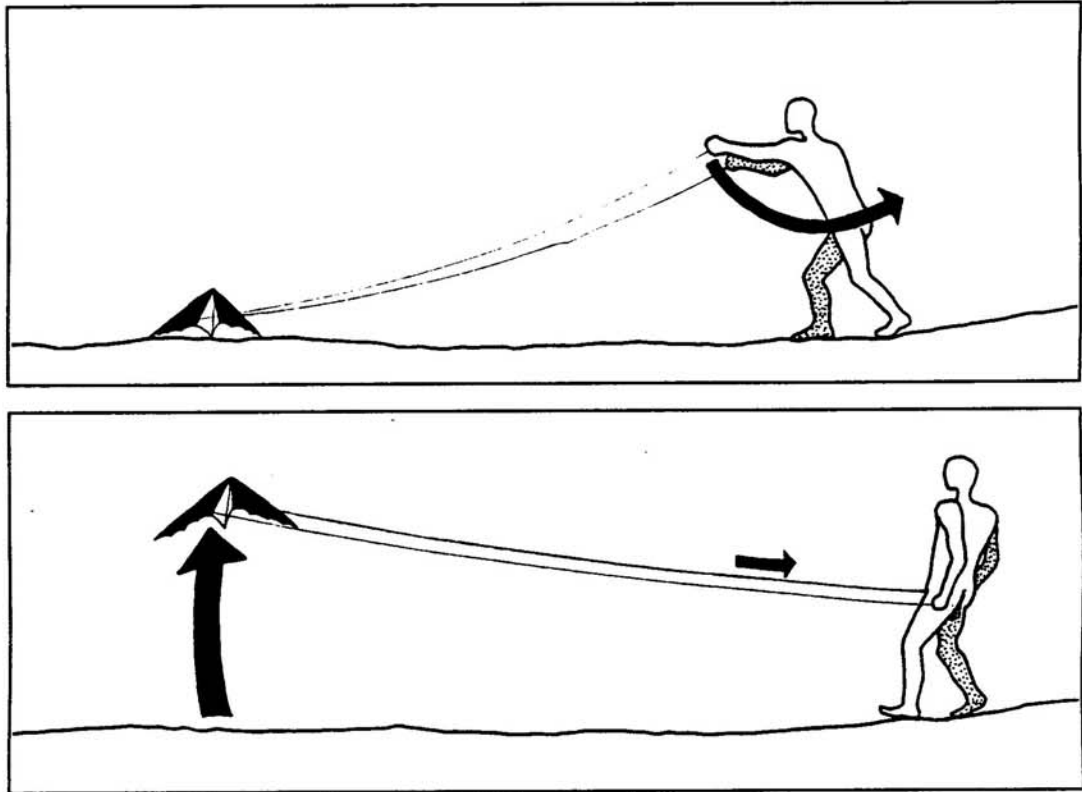
- All spreaders are fully inserted into vinyl fittings.
- Bottom spreader ferrule is centered in center "T" against stop.
- All bridle lines are completely clear and untangled.
- Standoff retainer vinyls are in the same position on both lower spreaders.
- **Attitude Adjustor** clip is at the marked factory setting for the first flight. See *Attitude Adjustor*, page 14.
- **Bridle Adjustor** clip is set for current wind conditions. See *Tuning Chart*, page 13.
- If all is well, your *Radian* is ready for launch.

Disassembly

- **Begin by removing all battens** and storing them in the inner batten sleeve in your Prism kite bag.
- De-tension the sail: **remove the standoffs** from their vinyl retainers.
- If upper spreader is in use, **Carefully remove each end of the upper spreader** from the leading edge vinyl fittings and slide it out of the upper "T".
- **Pull the end of the left-hand lower spreader** from the composite ferrule at the center "T".
- **Pull the composite ferrule** with the right-hand lower spreader from the center "T" fitting.
- Bring the lower spreaders up to the leading edges and **fold the kite, wings together**. Bring the spine up to the leading edges, then include the upper spreader when you carefully roll the sail around the spars.
- **Make sure the standoffs won't puncture the sail when you roll up your kite.** The *Radian* should now easily slide into its bag and can be easily and quickly re-assembled when you next fly.
- If you need to break your *Radian* down into a smaller package, remove the lower spreaders from their leading edge vinyl fittings. Then grasp the knot on the wingtip shockcord and slide it towards the ends of its nock. The knot will provide a grip with which to pull the shockcord out of the nock. It is normal for the wingtip shockcords to be quite tight. Next, pull on the wingtip nock until the lower leading edge spar slides out of its ferrule. Now you can fold the wing in half towards the nose before rolling up the *Radian* as outlined above.

Launching

1. Find an open field or park without trees or power lines. Trees, buildings or hills upwind or directly downwind of your site can cause turbulence and make flying more difficult.
2. With the kite on its back and pointing away from the wind, unroll your lines as you walk directly upwind of it. Take a moment to make sure that both your lines are of exactly the same length.
3. Gently pull the lines, raising it to an upright and slightly nose-back position. Check to make sure that your kite and lines are not snagged on any rocks, twigs, or other snaggables. Keeping the kite in position, fully extend your arms in front of you at about shoulder height. In one rapid motion, take a step backwards while sweeping your arms sharply downwards and back alongside your hips. The *Radian* responds to a sharp pull with surprising acceleration, so be ready to see your kite leap from the ground.



4. Now that you are flying, keep the *Radian* pointed upwards until you have some altitude. Keep in mind that the *Radian* is an extraordinarily responsive machine. Take it easy on the controls until you have a chance to get used to the precise control motions that the *Radian* requires. If you need basic flying instructions, refer to page 18 of this manual.

Tuning

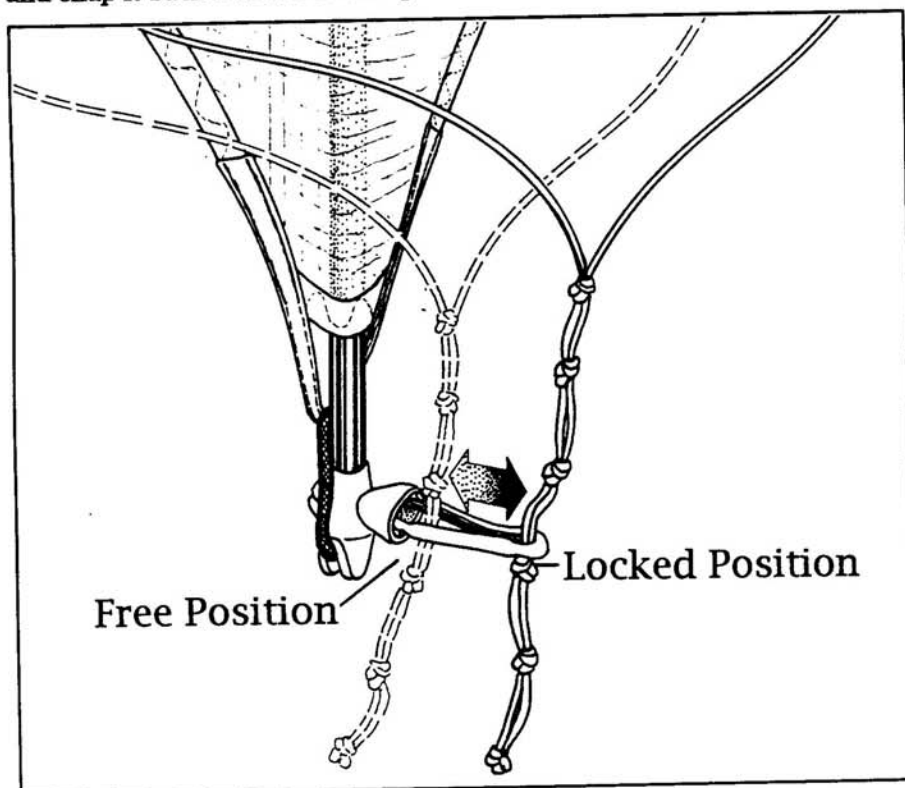
The Radian can be fine-tuned for a broad range of conditions and flier skills. As you spend more time with the kite, you'll find that making these simple quick adjustments becomes second nature.

The chart on the following page (also on the back cover) is a good one to keep handy. It shows you suggested settings for different wind conditions and is a helpful reference when you first get to the flying field. Keep in mind, however, that these settings are only guidelines. With time and some experimentation, you may find settings that work even better for your flying style. For an in-depth discussion of tuning, See *Tuning for Fanatics*, page 22.

Bridle Adjustor™

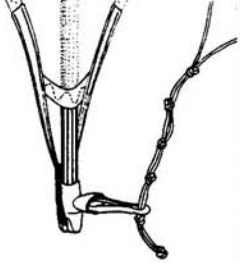
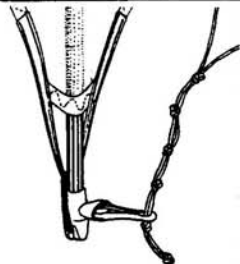
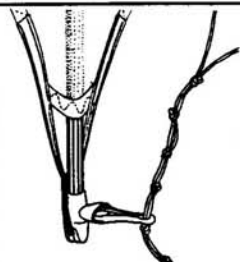
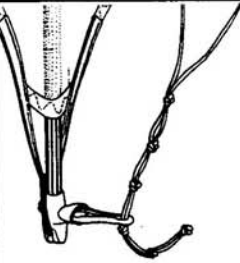
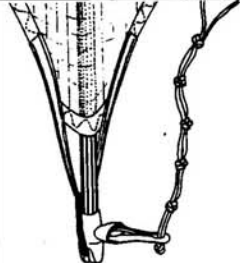
The **Bridle Adjustor** sets the kite's angle of attack by simultaneously adjusting the length of the bridle lines that lead to the clip at the base of the spine. For moderate wind conditions adjustment of the bridle is unnecessary except for super fine tuning or experimentation with flying styles. In lightest and heaviest wind conditions however, you may want to bring the nose forward somewhat by lengthening the bridle lines to the tail. Use the table on the following page to tune your kite.

To set the **Bridle Adjustor**, slide the knotted adjustment line into its free position as shown below. Then move the knotted line through the open end of the clip to the desired setting and snap it back into the locked position.



**Bridle
Adjustor**

Tuning Chart

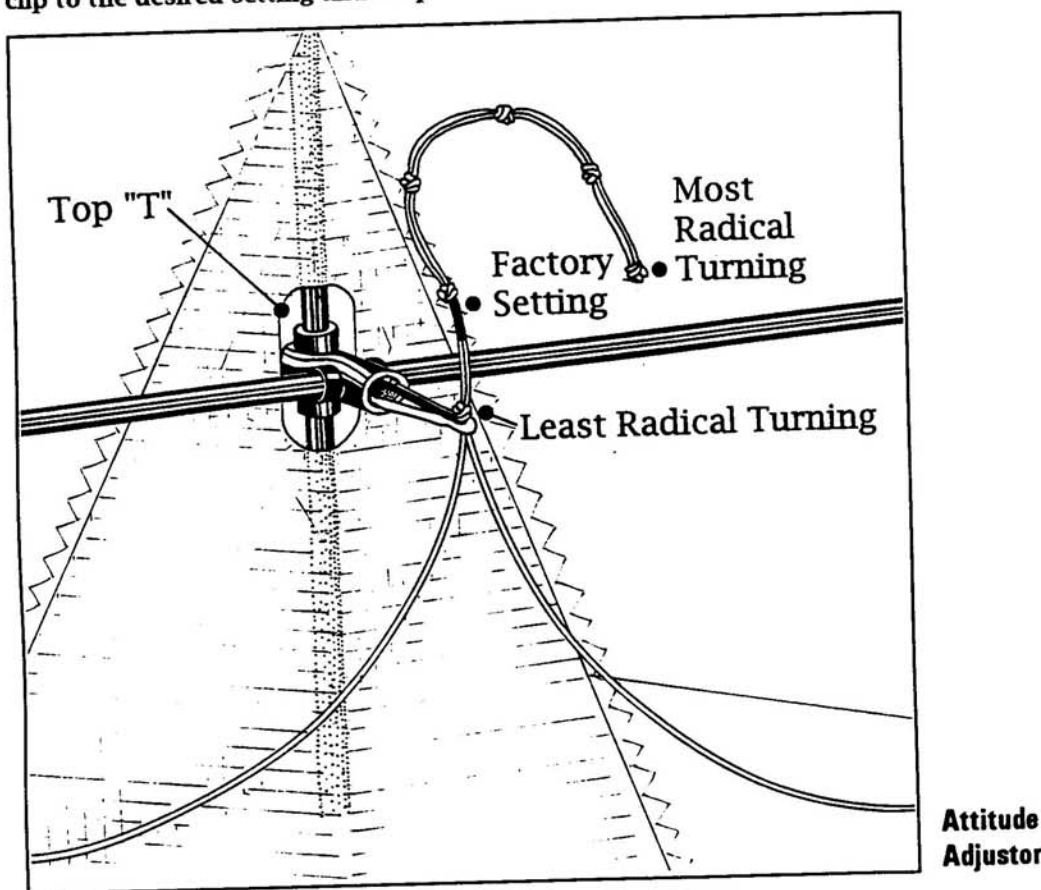
Wind Speed	Wind Indicators	Batten Pairs	Bridle Adjustor™	Notes
0-3 m.p.h.	Glassy water. No apparent wind on face. Smoke rises straight up.	None		Flying possible only with experience. See <i>Advanced Flying</i> , page 21, for low wind flying techniques.
3-6 m.p.h.	Glassy or slightly textured water. Leaves rustle. Slight wind felt on face.	#2 (if sail is not silent.)		Ultralight conditions. Reduce weight and create a fuller sail shape by removing any unnecessary battens. Remove upper spreader for a fuller sail shape.
7-11 m.p.h.	Twigs and small branches move. Significant texture on water, but no whitecaps present. Kite buzzes if all battens are removed.	#1 & #2 only		Gentle breeze. Keep the kite fast and quiet by inserting the #1 and #2 battens. Remove upper spreader, especially if kite feels sluggish or wind is inconsistent.
12-16 m.p.h.	Small branches in motion. Whitecaps visible on water. Flags flap.	All		Moderate breeze. Kite spins very fast. Insert all battens.
17-25 m.p.h.	Small trees sway. Traffic lights sway. Flags fully extended and flap vigorously.	All		Fresh breeze. Kite flies and turns extremely fast. Exercise caution. Spill wind from sail by adjusting bridle at tail of kite to second to last knot.
25+ m.p.h.	Larger trees sway.		Flying is not recommended.	Strong breeze. Kite may be overpowered and shudder in flight.

The Attitude Adjustor™

With the Attitude Adjustor, you can easily control how forgiving the *Radian* is to fly. With a snap of the Adjustor, you can make the kite stable, easy to fly, and perfect for graceful, swooping turns. Snap it again, and you're on your way towards flying a challenging, high performance machine which can turn faster and spin tighter than anything we've ever seen. You can instantly choose from a scale of six different settings to match your mood and flying style. Your *Radian* comes from our factory with the Attitude Adjustor at a forgiving setting for an introductory flight. When you're ready to start exploring more radical flight, simply refer to the figure below and snap in a new setting.

Note: It is normal for the Attitude Adjustor lines to hang slack during straight line flight.

To change the Attitude Adjustor setting, slide the knotted adjustment line at the top "T" into its unlocked adjustment position. Slide the knotted line through the open end of the clip to the desired setting and snap back into the locked position.



Caution: The *Radian* is an extraordinarily responsive kite even when fully restrained. In high wind conditions, radical settings allow extremely tight turns and spins that you must be prepared to handle. For safety and the health of your kite, err on the side of caution when adjusting the *Radian* in the upper end of its wind range.

Wind and Weather

An ability to “read the wind” will go a long way towards making your kite flying a safe and satisfying experience. You don’t need to have a weather station on your hat in order to make surprisingly accurate judgments about the wind’s speed and direction. With a little practice judging wind and turbulence, you can choose areas to fly which will have the smoothest, most consistent wind, and set up your *Radian* to perform at its best in all conditions.

Wind Direction

Wind direction is particularly easy to judge because you can almost always find several good indicators. Just the feel of the wind on your face will always give you at least a rough idea of the wind’s direction. Here are some other things to look for:

- **Flags** are good indicators, but can't tell you much in less than 5 m.p.h. of wind.
- **A few bits of grass or dry leaves** released overhead will provide a good local indicator of direction.
- **Smoke** drifts downwind even in the lightest winds.
- **Other kites**, particularly single line kites, will always hover pointed into the wind.
- **Boats at anchor** usually lie with their bows pointed into the wind.
- **Birds** usually land and take off facing the wind. You can also watch them circling overhead. In the part of their circle that faces the wind, they will appear to slow down and be lifted upwards.
- **Passing clouds** will give you a good idea of the prevailing wind direction. Be aware, however, that sometimes the wind near the ground will be quite different.
- **Trees**, particularly tall narrow ones, bend over away from the wind.
- **Weather reports**, particularly forecasts for boaters, will usually give an expected wind direction and strength. Needless to say, they are not always accurate.
- **Smell**. As you become more tuned to the wind, you will find that you can often tell its direction simply by the smell of the air. If you live near water, you may find that the air has a slightly wet, fishy smell if the wind has been blowing over the water before reaching you. If the air has passed over a pine forest, a city, or a factory before reaching you, it may also have a characteristic scent.
- **Wet a finger**. This is the oldest one in the book. Lick a finger and stick it up in the air over your head. The side of your finger which feels coldest is the direction from which the wind is coming.

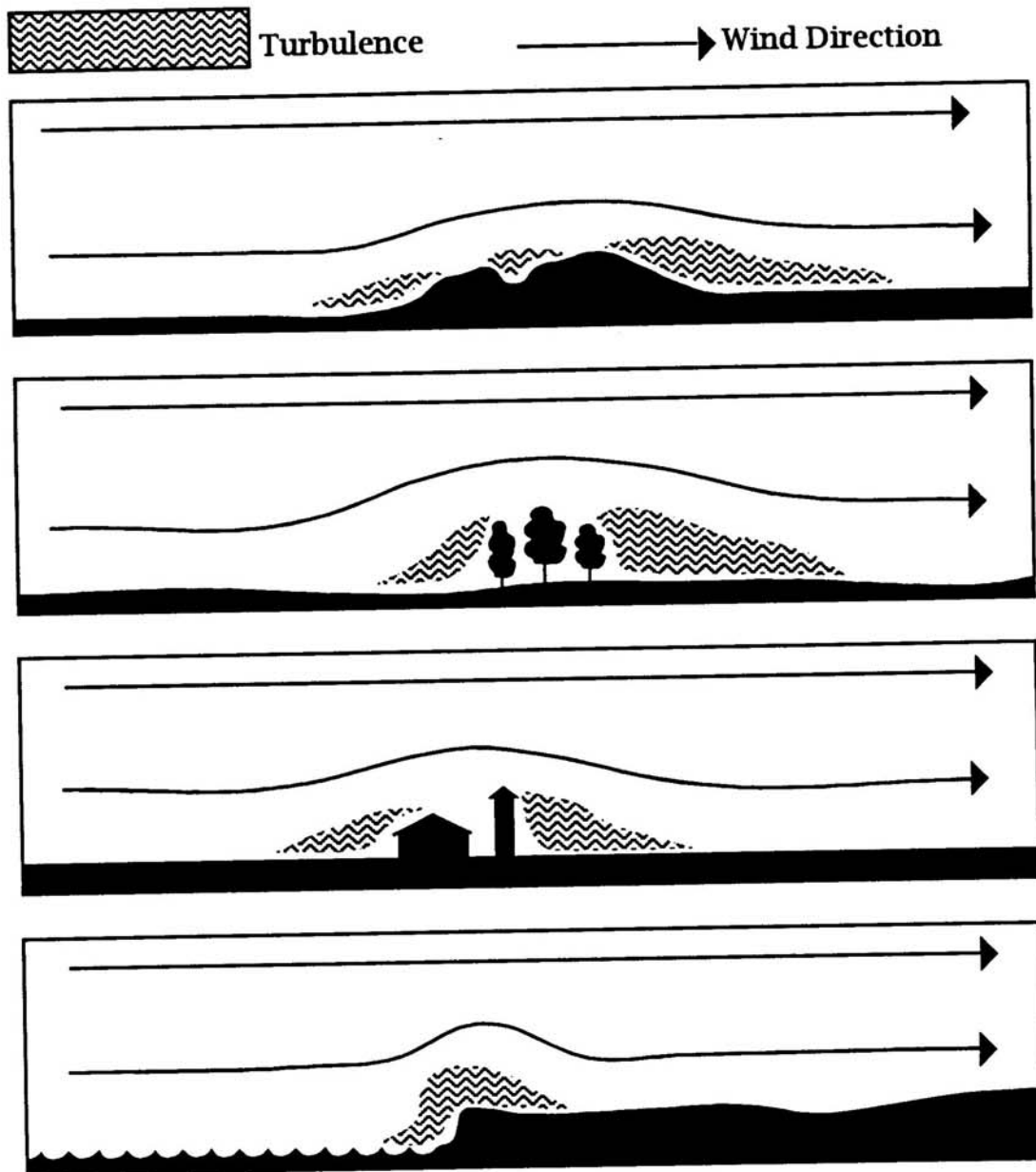
Wind Speed

Wind speed can be a little tougher to gauge, but with practice you'll be able to judge the wind speed to within a couple of miles per hour. Hand held wind meters can be useful and run from affordable to expensive. However, if you're like us, you'll forget it as often as you remember it. Here are a few indicators to look for which will give you a relative sense of how hard the wind is blowing.

- **Texture on the surface of water.** If you fly near water, this is the most useful of all clues about wind speed. The ripples and waves on the surface are noticeably different for every 3 m.p.h. change in wind speed. Take a look at the water when you go flying, and you'll quickly get a feel for what texture corresponds to what wind speed. Keep in mind that the first whitecaps usually form on the surface when the wind is blowing at 12 m.p.h.
- **Flags on buildings or on poles** can hang straight down, flop around weakly, or stream out fully extended, depending on the wind speed. You can tell a lot by watching how vigorously flags are flapping in the wind. A flag up high in unobstructed air is a more reliable gauge than a flag surrounded by buildings or sheltered by a hill. Flags will seldom extend in less than 7 m.p.h.
- **Moving trees** also indicate wind speed. In 4-7 m.p.h. you'll see rustling leaves. In 8-12 m.p.h. you'll see smaller twigs in motion as well. As the wind increases past 12 m.p.h. you'll see small branches, then large branches, and then entire trees starting to sway.
- **Tall grass** will move when the wind is almost too light to feel on your face, 1-3 m.p.h.
- **Swaying stoplights** at intersections often indicate 15 m.p.h. or more.
- **Telephone wires** start to whistle in 25-30 m.p.h. We don't recommend flying your *Radian* in winds more than 25 m.p.h. **Do not fly your kite anywhere near overhead wires!**
- **Weather reports** will sometimes give you expected wind strengths. Weather forecasts for mariners tend to be a bit more precise.
- **Weather maps** can be useful to look at, especially if they show the isobars (pressure contour lines). When the isobars are closely spaced over your area, expect stronger winds. If there is a large high pressure system parked overhead, you may be in for some days of light wind flying.
- **With local knowledge**, you may find that in your area there is a time of year when the wind blows consistently at one speed from one direction every day. Some areas have predictable winds which come up each day as the result of the sun heating up the ground surface.

Turbulence

Because your *Radian* is so adaptable, you'll seldom find yourself in situations where there is too much or too little wind to fly. At any field, in any conditions, however, you'll want to pick an area to fly which will give you the smoothest, most consistent wind. The key is to avoid turbulence, or air that is bumpy and uneven. You'll be able to feel turbulent air as an irregular tugging on your flight lines as your kite flies through it. You will also notice that the kite has difficulty "hanging" in one place directly overhead or at the edges of the wind window. Turbulent air is formed when the wind flow is disturbed as it passes obstructions. Look for it in the following places:



Basic Flying

Your Stance

Begin by standing in a relaxed position facing your kite. Your hands should be out in front of your chest, but not fully extended. You won't gain appreciable control over your kite by spreading your hands apart or holding them high above your head.

Flight Controls

Your kite flies in a straight line as long as your control handles are held the same distance from your chest. It turns as soon as you move your control handles so they are no longer the same distance from you (one hand is further away from your chest in the direction of the kite than the other).

There are many subtle ways of controlling your kite and even advanced flyers disagree about what constitutes the best technique. But you should probably start off controlling your kite with simple pulling motions. To make a right (clockwise) turn, gently pull the control line in your right hand towards your chest. Remember that as long as you hold your right hand close to you the kite will continue to turn clockwise, and will even complete a loop if held long enough. Any time you return the controls to an even position, the kite will fly straight in the direction it is heading at that time. To turn left (counter-clockwise) make the gentle pull with the left hand instead of the right.

A First Flight

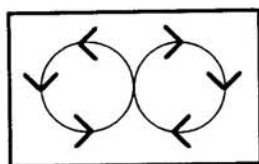
You will avoid a lot of frustration by flying in moderate, steady winds from 6-11 mph. Pick a location where you have plenty of space in every direction. Beaches and parks are great but avoid a location that forces you to fly the kite over water or people. Begin by assembling your kite and preparing to launch (see pages 6 and 11 for help). After launching, assume your flying stance and make minor corrections to fly the kite straight upward and gain altitude. Once you have a comfortable amount of altitude but before the kite is flying directly overhead, begin to experiment with turns. Keep your control motions small at first and keep the kite generally out in front of you, not too far left or right. After some practice you should be able to fly the kite back and forth in a sweeping motion. As a rule of thumb keep your range of controls (the distance between the controls) small, perhaps two feet at the most.

As you gain control and confidence, you may want to try some refinements. Practice making each sweep straight and horizontal. Plan the timing and size of each turn and try to stick to it. Expand your sweeps to the left and right to explore the edges of your flying space.

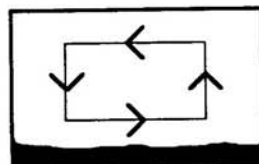
If you haven't already accidentally landed your kite and you are ready to end your first flight, try this basic landing procedure. Fly the kite far off to your left or right, slowly losing altitude by steering it down. With less wind on the sails, the kite should slow down and eventually you can guide it gently onto the ground.

Maneuvers

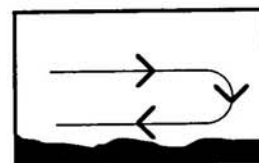
Soon you will want to move on to some more difficult and exciting flight maneuvers with your *Radian*. There are several more advanced flight patterns that are beautiful and will exercise your new-found flying skills. Many of these maneuvers involve doing complete loops, so let's begin there. Before flying a loop, give your kite some altitude and think about what controls are necessary: you will have to enter a turn, hold the turn until the kite has made a complete loop, and then exit the turn at a time when the kite is pointing in a desirable direction (NOT AT THE GROUND!). You will notice that a complete loop puts one twist in your control lines. Don't panic! The lines on your kite are designed to slide against each other, allowing a pilot to twist up to fifteen times and still have control of the kite. Furthermore, twisting your lines does not change or reverse your flight controls. In your early flights you may want to practice returning to untwisted lines by alternating the direction of your loops. Hone your loop flying skills by planning and executing different sized loops. Then try some of these more advanced maneuvers.



Fly large and small figure eight patterns that consist of two loops.



Combine crisp turns with straight flight to make geometric patterns.



Practice long, straight ground passes. At the end of a horizontal sweep make a downward turn into another horizontal sweep in the opposite direction. Use the horizon as a reference and practice dragging your wing tip along the horizon before you practice dragging it on the ground!

Get comfortable flying in a dive. Remember that recovering from a dive requires picking a turn direction and sticking with it until the kite is no longer pointed at the ground.

Begin to invent your own maneuvers and patterns that are challenging and fun for you. Now you are on your way to more advanced flight. Enjoy!

Unplanned Landings (and other common beginner's problems)

Early on you may experience overturning or abrupt turns when you apply the controls. Keep your turns gentle and brief. Make your motions evenly and avoid abrupt changes. You will also improve your control of turns if you plan the turns before you enter them. Think about when you want to turn, the direction you will turn the kite, and when you want to stop turning. **Keep in mind that with a kite as responsive as the *Radian*, coming out of a turn is just as important as going into it.** This will help with overturning and give you an action plan for those split seconds when the kite is turning.

You can avoid crashes by flying simple maneuvers at higher altitudes, but beginners and experts alike crash their kites. If you have tried our suggested maneuvers and haven't

crashed yet you should go directly to the pro circuit! Crashing often occurs when the kite is pointed downward and the pilot is indecisive about how to recover. If you find yourself flying straight down, commit to a turn that will avoid the ground and prevent the crash. **If you get in a situation where you cannot avoid a crash, crash soft!** Don't pull on the lines. Instead, step quickly towards your kite before it crashes. This slows the kite and changes a potentially disastrous crash into an unplanned landing! **Note:** While your *Radian* is a rugged performance machine and will withstand many crashes, serious and damaging accidents are always possible. Your *Prism* dealer should carry spare parts for the *Radian* if you happen to break a spar or standoff. If not, feel free to order them from us using the form included with this manual.

Advanced Flying

Light Winds

Flying in light wind is particularly challenging and quickly improves your flight skills. With practice, you may find that light winds allow you to perform an even wider variety of maneuvers with your *Radian*. Consider these points for light wind conditions:

- Be sure that your *Radian* is properly tuned for light winds. See *Tuning Chart*, page 13, and perhaps *Tuning for Fanatics*, page 22.
- More responsive **Attitude Adjustor** settings allow more maneuverability in light winds. See **Attitude Adjustor**, page 14.
- There may be moments when your kite has too little wind to fly. By using a sharp pumping motion similar to that used in launching you can give the kite extra power and gain altitude. Apply this technique in turns as well, giving the kite extra power to accomplish the turn.
- To keep flying, you may have to walk backward, giving the kite more wind artificially. When you do feel a gust of wind, use it to your advantage by walking forward in an effort not to lose ground. Keep in mind that making any kite look good in extremely light winds requires moving around almost constantly, walking towards the kite when you have altitude or a puff of wind, and pulling backwards when you need forward speed. With practice, it is possible to use forward and backward movements to regulate the kite's speed like a throttle and allow particularly graceful maneuvers.
- An impressive maneuver for times when the wind is really light is to fly your kite in a full circle around yourself (a "360"). Do this by jogging in a broad circle, guiding your kite with you, and keeping tension on the lines to give the kite power. At one point in your circle you are actually flying the kite upwind of you! Here you have to be particularly careful to keep tension on the strings by jogging.

Landings

Here is a more sophisticated landing that takes practice but looks great and is particularly useful for easy relaunch. Fly the kite to the edge of the wind window and low to the ground. The kite will slow down and hover. Then combine two actions: Turn upwards so the kite is pointing directly up and simultaneously walk quickly towards the kite. The kite should settle onto the ground in takeoff position. In the lightest winds this landing can be made directly downwind. In moderate or stronger conditions you will have to make it closer to the edge of the wind window. For an even greater challenge, loop the kite tightly and close to the ground and settle it down just as you come out of the loop pointing upwards.

Tuning for Fanatics

Tuning for Fanatics

This section has been included in the manual to provide a more detailed explanation of some of the *Radian's* basic tuning procedures, and to suggest some additional possibilities for the tuning enthusiast. If the basics of tuning are familiar to you, and you want to delve into more subtle territory, this section has your name written all over it.

• Upper Spreader

The *Radian's* wing is specifically designed to be flown without its upper spreader in winds up to about 10 m.p.h. Removing the upper spreader reduces weight and allows the inner sections of the wing to take on a fuller shape, increasing lift in light winds. Removal of the spreader also allows the leading edge to flex slightly, giving the kite a "snappier" feel in certain kinds of maneuvers. Flying without the spreader is a particularly good setup for gusty or inconsistent winds, as the added flex helps to absorb some of the "bumpy" feeling of flying in turbulence. In winds of more than 10 m.p.h., however, you may find that flying without the upper spreader causes the leading edge to flex inwards to a concave shape and makes the kite slow and sluggish.

• Bridle Adjustments

Adjusting the bridle at the tail of the *Radian* changes what is called the "angle of attack" of the wing. This angle is essentially the angle that the wing presents to the air flowing over it. Any sail or wing is particularly sensitive to the angle at which it is held to the wind. In a sailboat, this angle is adjusted for maximum efficiency by trimming the sails in or letting them out until they are providing as much forward push as possible. With the *Radian*, the angle of attack is determined by the Bridle Adjustor. Each knotted increment of the adjustor changes the angle of attack by slightly less than one degree. The *Radian* will fly throughout its wind range on the factory setting, but it is possible to change some of its flight characteristics by experimenting with other settings:

Settings near the first knot (where the left and right bridle lines meet):

- Increase pull.
- Facilitate stalls, hovering, skating sideways, and groundwork, especially in moderate to strong winds.
- Decrease speed, especially in light and moderate winds.
- Increase overspin, which can be used to great advantage in some radical maneuvers.
- Allow the kite to turn a bit more tightly. (Keep in mind that the Attitude Adjustor at the upper "T" is the best way to change the kite's turning radius.)

Settings near the last knot:

- Decrease pull.
- Encourage acceleration upwards, especially in light winds.
- Increase speed in moderate winds.
- Depower the kite by spilling air in strong winds.
- Reduce overspin.

- **Batten configurations**

The *Radian's* removable battens stiffen the sail, making the sail shape flatter, and reduce drag by preventing the trailing edge from flapping in flight. They also add weight to the kite. In light winds, it is all-important to keep the kite as light as possible by using as few battens as possible. You can always add another pair if the trailing edge starts to flap. Try the following order of batten insertion to really fine-tune the *Radian* for light to moderate winds:

0-4 m.p.h.	no battens
5-7 m.p.h.	#2 battens only
7-9 m.p.h.	#1 and #2 battens only
10-13 m.p.h.	#1, #2, and #4 battens
14+ m.p.h.	#1, #2, #3, and #4 battens

- **Carbon Battens**

Significantly lighter than fiberglass, carbon fiber battens (available from your Prism dealer) can be used as replacements for or in conjunction with the white fiberglass battens which come standard with the *Radian*. They are not quite as stiff as the stock battens and have a different modulus of elasticity, or "spring" to them which allows the *Radian* to feel "snappier" in maneuvers. They are particularly useful in light wind situations when you want the kite as light as possible but need to insert one or two battens into each wing in order to keep the kite silent. In strong winds, you may find that the stiffer fiberglass battens allow the *Radian* to fly at higher speeds. As a general high wind tip, we have found that the stiffer the battens in the sail, the faster the kite will fly and the less it will tend to be overpowered.

- **Standoffs**

The *Radian's* four standoffs control what sail makers call "twist" in the wing. Twist is the change in angle of attack along the wing which allows the kite to fly and be controllable. In the *Radian*, you can see it in the way that the sail near the wingtip is flared backwards by the outer standoffs.

The amount of twist in a kite's wing affects both its speed and stability. A wing with little twist (a small amount of flare at the wingtips) can be quite fast but may not track well or "hang" comfortably at the edges of the wind. A wing with lots of twist will be slow and stable but may sacrifice an ability to fly in very light winds because it creates additional drag.

Your *Radian* is set up at the factory with an amount of twist that we have found to be the best compromise between these extremes. It is possible, however, to fine-tune the twist by sliding the inner standoff vinyls towards the center "T" by one or two inches. This will slightly reduce the twist at the wingtips and is well suited for flying in the very lightest winds. In stronger winds, sliding the standoffs inwards will speed the kite up but may make it slightly less stable and more prone to overspin.

Care and Repair

Your *Radian* has been carefully designed to take the punishment that it will inevitably see during its lifetime. Bear in mind, however, that a kite's element is the sky. When out of its element the *Radian* is most vulnerable to damage. Be careful when assembling and handling the kite on the ground, especially in strong winds. Once your *Radian* is fully assembled, it is often helpful to carry it by holding it at the nose reinforcement and letting the rest of the kite trail off downwind.

Try to avoid getting the *Radian* wet. Water causes the nylon sail material to stretch slightly and distort the shape of the wing. If your kite does get wet, unfold it and let it dry at room temperature **with the standoffs removed from their retainers**. If you crash the kite in salt water, treat it to a fresh water rinse before you let it dry.

Beaches can be wonderful places to fly, but sand is very abrasive and can wear through any kite in short order. Brush off the kite frequently and thoroughly, and try to keep sand from accumulating inside the leading edge and causing wear from the inside out.

Small tears in the sail can be easily repaired with an appropriate color of adhesive-backed ripstop repair tape, available from most kite dealers. It helps to round the corners of the patch slightly to keep them from peeling up. For a really secure repair, apply one patch on either side of the sail.

If you break a spar, don't despair. Replacing spars is relatively quick and easy. Your dealer will have the appropriate size and length replacement, as well as a sheet from us clearly describing the replacement procedure. If not, use the order form included in this manual. Standoffs are also easily replaced by removing the black vinyl retaining cap from the aluminum fitting which protrudes through the reinforcement tab and pulling the rod out through the hole. When you insert the new standoff, simply push the retaining cap back on as far as it will go. Work carefully when making repairs to your kite. There is nothing more frustrating than causing additional damage while trying to complete a repair.

Troubleshooting

Kite Has Difficulty Launching: Kite won't fly easily into the air.

- Be sure to read section on *Launching*, page 11.
- Be sure you are launching in more than 3 m.p.h. See the *Wind and Weather* section, page 15.
- Be sure the kite has no tangled bridle lines.
- Check that your flying handles are not reversed.
- Be sure that the kite is properly adjusted for the wind conditions. See steps 6 and 7 of the *Assembly* section on page 8 and the *Tuning* section on page 12.

Kite Capsizes/Falls Out of the Sky: Kite flips over on its back when you turn tightly and falls to the ground. Most common in light winds.

- You are probably using control motions which are too large. The *Radian* is an incredibly responsive kite and is best controlled with small, precise hand movements. If you are used to flying conventional delta wings, you may find that it takes a moment to adjust to the *Radian's* responsiveness.
- Try snapping the Attitude Adjustor in at the factory setting. See *Attitude Adjustor*, page 14.

Kite Exhibits Asymmetrical Flight Characteristics: Kite is uncontrollable or turns differently in one direction than in the other. Kite turns to one side even when you try to fly straight.

- Check to be sure your bridle lines are not tangled on any part of the kite.
- Check that your flying lines are both exactly the same length.
- Check that the shock cord in each wing tip is properly engaged in itsnock. See illustration on page 7.
- Check that the spreader ferrule at the center "T" is centered in the vinyl and up against its stop and that the spreaders are fully inserted into the vinyls at the leading edge.
- Check that all standoffs are in place and that the standoff retainer vinyls are in the same places on both lower spreaders.
- Check that you have the same number of battens in both wings.
- Check that the leading edge vinyl fittings for the lower spreaders are up against their stops.

Kite Does Not Fly Silently: Kite makes a buzzing or flapping sound as it flies, usually when the sail is set up without all of its battens.

Note: Avoid flying the *Radian* when it is making a buzzing or flapping noise, as this will cause premature wear.

- Insert the appropriate battens. If you have no battens in the sail, try inserting battens into the #1 and #2 (longest and next-to-longest) batten pockets. If you already have the battens in these pockets but not in the #3 and #4 pockets, insert the remaining battens. See the *Tuning Chart* on the back cover of this manual.
- Be sure that the wing tip shock cords are properly engaged into the nocks. See the illustration on page 7.

Turns and Spins Are Too Tight To Control: Kite spins too tightly for successful recovery.

- Be sure you are not over-controlling the kite with hand motions that are too large or jerky.
- Try flying with the **Attitude Adjustor** set closer to the factory setting (See *Attitude Adjustor*, page 14). This will limit the tightness of your spins.

Kite Bucks or Shudders in Flight: Kite seems to be shuddering in strong winds, especially in fast, tight spins.

- Kite is overpowered. Be sure that you are flying within the recommended wind range (up to 25 m.p.h.)
- Be sure that the upper spreader is properly inserted through the top "T" fitting. See *Assembly*, page 8.
- Set **Bridle Adjustor** at tail of kite to the last knot (See *Tuning Chart*, page 13). This will tilt the nose towards you slightly and de-power the kite.
- Be sure that all battens are inserted and that the standoffs are properly located. See *Assembly*, page 8.
- If you feel bumpiness in lighter winds, be sure you are flying in an area as free from turbulent air as possible. See the section on *Turbulence*, page 17.

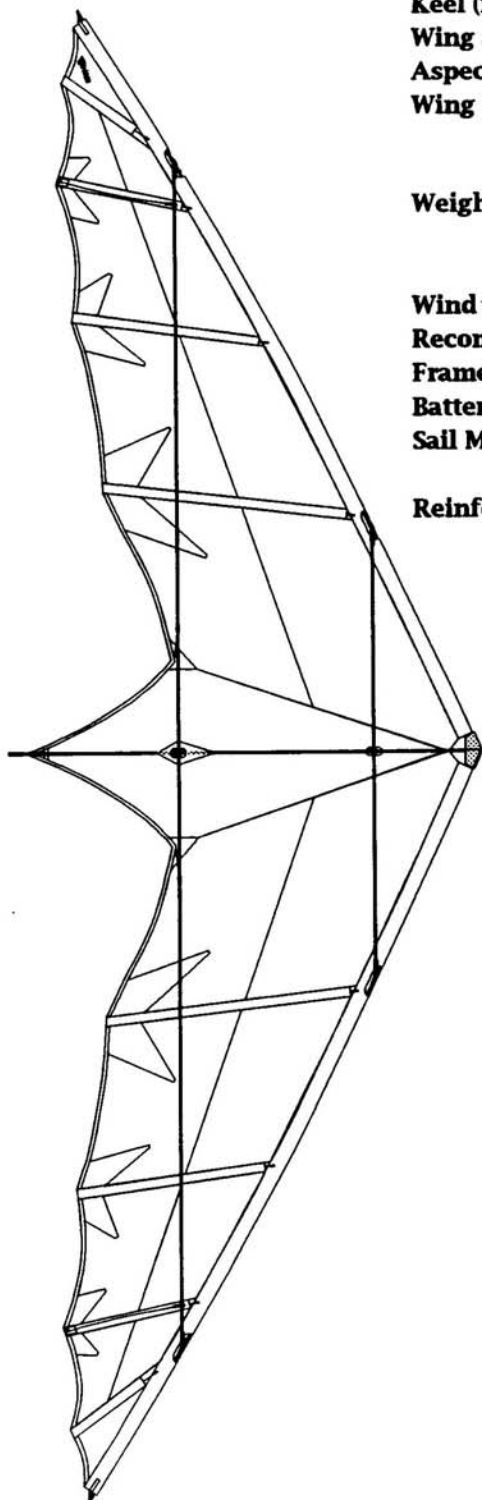
Kite Overspins: Kite rotates far beyond the point at which you want to come out of a tight turn or spin. Kite is unstable at the edges of the wind and is not content to "hang" there. Most common in light winds.

- Be sure you are not over-controlling the kite with overly large hand motions.
- Be sure that both wing tip standoffs are properly in place. See step 8 of *Assembly*, page 9
- Be sure that you are not using any more battens than you need to stop the sail from buzzing. See *Tuning*, page 12, and steps 6 and 7 of *Assembly*, page 8.
- Be sure that the **Bridle Adjustor** is at an appropriate setting. A bridle setting which tips the nose too far back for the wind strength can cause overspin. For an in-depth discussion of bridle adjustment, see *Tuning for Fanatics*, page 22.
- Adjust the **Attitude Adjustor** to limit the tightness of spins. See *Attitude Adjustor*, page 14.

Kite Flies Sluggishly or Won't Climb: Kite seems to want to fall backwards and is reluctant to accelerate. Kite won't fly very high and is reluctant to "hang" at the edges of the wind window. Most common in light winds.

- The *Radian* should be flown with 80 lb. test line in normal wind conditions. Heavier line may significantly affect flight performance.
- Check that in winds less than 10 m.p.h. you have not installed the upper spreader. See *Tuning Chart*, back cover, and *Tuning for Fanatics*, page 22.
- Be sure that you have enough wind to fly. If the wind is less than 3 m.p.h. you will have to walk or jog around to keep the kite in the air.
- Be sure that you are not using any more battens than you need to stop the sail from buzzing. See *Tuning*, page 12, and steps 6 and 7 of *Assembly*, page 8.
- Be sure that the bridle is set properly. See *Tuning Chart*, back cover, or *Tuning for Fanatics*, page 22.

Specifications



Wingspan (ft.).....	8.5
Keel (in.).....	28
Wing area (ft. ²).....	8.7
Aspect Ratio (span ² /area).....	8.3
Wing loading (oz./ft ²)	
no battens, no upper spreader.....	1.02
all battens, upper spreader incl.....	1.27
Weight (oz.)	
no battens, no upper spreader.....	8.9
all battens, upper spreader incl.....	11.1
Wind Range (mph).....	3-25
Recommended line.....	100 ft. of 80 lb. Spectra™
Frame.....	2200 & 2300 AFC Carbon
Battens.....	1/8" & 3/32" Fiberglass (Carbon optional)
Sail Material.....	0.75 oz. ripstop nylon sailcloth, mylar laminate
Reinforcement Material.....	1.5 oz. ripstop nylon sailcloth, mylar, kevlar laminates

Glossary

aspect ratio	A number describing the shape of the kite wing. Computed as the ratio of the square of the wingspan to the surface area of the wing. A high aspect ratio contributes to wing efficiency yielding lower drag and greater lift. It is a common misconception that aspect ratio is computed from the angle between the leading edges. See <i>Specifications</i> , page 27.
Attitude Adjustor	<i>Prism's</i> trademarked innovative bridle that allows the flier to choose from a full range of flight characteristics. See <i>Attitude Adjustor</i> , page 14, and <i>The Radian</i> , page 6.
batten	A thin rod made of fiberglass or carbon fiber that reinforces the surface of the wing, contributing to silent flight and wing efficiency. See <i>The Radian</i> , page 6, and <i>Assembly</i> , page 8, step 6.
bias	Fabric bias refers to a direction along the surface of the fabric diagonal to the square grid of the woven threads. Fabric is more prone to stretch along the bias. The reinforcement fingers along the Radian's trailing edge help prevent this stretching.
bridle	The harness system used to connect the kite's frame to the control lines. See <i>The Radian</i> , page 6, and <i>Tuning</i> , page 12.
Bridle Adjustor	<i>Prism's</i> trademarked innovation allowing for quick and easy bridle adjustments to tune the kite for any conditions. See <i>Bridle Adjustor</i> , page 12, and <i>The Radian</i> , page 6.
cambered airfoil	An airfoil whose shape is determined by sewing subtly curved panels together to create a curved wing surface. Properly designed, a cambered wing is much more efficient than one sewn only with straight edged panels.
capsizing	Most common in light winds when the kite loses support. The kite flips onto its back and begins to fall out of the sky. See <i>Troubleshooting</i> , page 25.
carbon fiber	Long chains of carbon molecules used in composition to create stiff, light spar material. A complete carbon fiber frame is standard issue with the <i>Radian</i> .
center "T"	The vinyl fitting that connects the spine to the lower spreaders. See <i>The Radian</i> , page 6, and <i>Assembly</i> , page 7, step 3.
composite ferrule	The stiff tubular fitting joining the lower spreaders through the center "T" vinyl fitting. The <i>Radian</i> uses a ferrule composed of a tubular aluminum core bonded to an outer shell of filament-wound fiberglass. See <i>Assembly</i> , page 7, step 3.
"crash soft"	This phrase helps the flier remember the technique of slowing down a kite when a crash becomes inevitable. Throw your arms forward and walk towards the kite when a crash is imminent to avoid serious damage. See <i>Basic Flying</i> , page 20.
dynamic twist	The convex planform of the <i>Radian's</i> trailing edge allows the sail to twist appropriately in response to gusts or strong pulls on the controls.
fiberglass	Long strands of glass fiber used in composition with epoxy to create relatively light and flexible rods and tubing.

keel	The V-shaped wing section defined by the <i>Radian's</i> transparent center panel. The keel restricts lateral airflow along the sail and contributes to stability and straight line tracking.
leading edge	The front edge of the wing that contains the spar. See <i>The Radian</i> , page 6.
lift	The driving force generated by wind flowing around a wing. A difference in pressure is created between the upper and lower surfaces of the wing and it is this difference which is resolved into the forward motion of a kite as it flies through the air.
lower spreaders	The carbon fiber rods connecting the outer leading edges with the composite ferrule at the center "T". See <i>The Radian</i> , page 6.
mil	One one-thousandth of an inch.
mylar laminate	A high performance transparent fabric use in the <i>Radian's</i> center panel composed of a grid of nylon fibers laminated between two films of thin mylar for stretch resistance.
nock	A special plastic fitting at the end of a spar which holds the shockcord at the spine or wing tips.
Prism Designs Inc.	An innovative designer and manufacturer of performance kites. Located in Seattle, WA at (206)547-1100.
ripstop nylon	A light tightly-woven nylon fabric with a grid of larger diameter nylon threads designed to limit ripping.
sail	In kiting, this refers to the actual material of the wings and keel of the kite.
shockcord	A fabric covered elastic cord used in the <i>Radian</i> to tension the sail along the spine and the leading edges. See <i>Assembly</i> , page 7, step 2.
spar	A straight carbon fiber rod that comprises part of the frame of the kite.
Spectra™	A fiber used in several brands of low-friction low-stretch kite line available in various lengths and strengths at your local kite shop or from a catalog. Spectra™ lines are available in braided and wound forms. The braided lines are more durable but also a bit more expensive.
spine	The spar that runs from the bottom point of the center panel to the nose of the kite. See <i>The Radian</i> , page 6.
standoff	A small fiberglass rod that maintains sail shape and tension by pushing the sail away from the lower spreader. See <i>The Radian</i> , page 6, and <i>Assembly</i> , page 9, step 8.
top "T"	The point at which the vinyl fitting connects the spine to the upper spreader. See <i>The Radian</i> , page 6, and <i>Assembly</i> , page 7, steps 2,3, and 4.
trailing edge	The back (scalloped) edge of the wing. See <i>The Radian</i> , page 6.
upper spreader	The upper carbon fiber rod separating the leading edges and passing through the top "T". See <i>The Radian</i> , page 6.
vinyl fitting	A fitting made of vinyl tubing that joins two or more spars together.

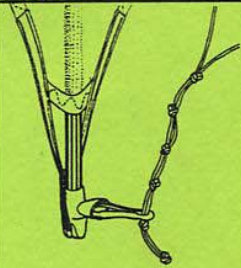
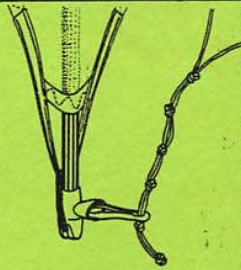
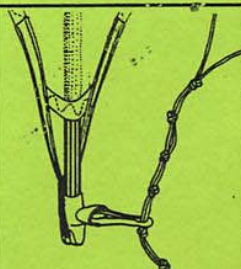
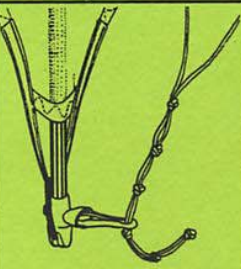
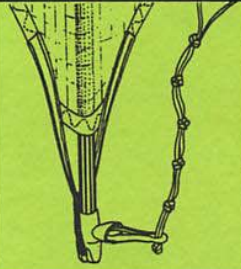
wing efficiency

A general term referring to a wing's performance. It is commonly thought that weight and sail area are the only important contributors to a kite's performance. In fact, wing efficiency is equally if not more important. A kite such as the *Radian* with a relatively small sail area but a very efficient wing can fly well in light winds while allowing great speed and very light pull in strong winds.

wing loading

A measurement of the weight in ounces that a square foot of wing area supports in flight.

Tuning Chart

Wind Speed	Wind Indicators	Batten Pairs	Bridle Adjustor™	Notes
0-3 m.p.h.	Glassy water. No apparent wind on face. Smoke rises straight up.	None		Flying possible only with experience. See <i>Advanced Flying</i> , page 21, for low wind flying techniques.
3-6 m.p.h.	Glassy or slightly textured water. Leaves rustle. Slight wind felt on face.	#2 (if sail is not silent.)		Ultralight conditions. Reduce weight and create a fuller sail shape by removing any unnecessary battens. Remove upper spreader for a fuller sail shape.
7-11 m.p.h.	Twigs and small branches move. Significant texture on water, but no whitecaps present. Kite buzzes if all battens are removed.	#1 & #2 only		Gentle breeze. Keep the kite fast and quiet by inserting the #1 and #2 battens. Remove upper spreader, especially if kite feels sluggish or wind is inconsistent.
12-16 m.p.h.	Small branches in motion. Whitecaps visible on water. Flags flap.	All		Moderate breeze. Kite spins very fast. Insert all battens.
17-25 m.p.h.	Small trees sway. Traffic lights sway. Flags fully extended and flap vigorously.	All		Fresh breeze. Kite flies and turns extremely fast. Exercise caution. Spill wind from sail by adjusting bridle at tail of kite to second to last knot.
25+ m.p.h.	Larger trees sway.		Flying is not recommended.	Strong breeze. Kite may be overpowered and shudder in flight.