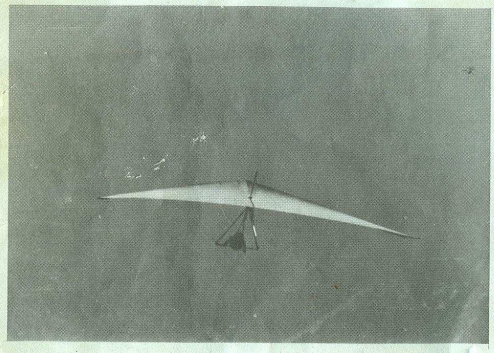
Delta Wings

PHOENIX STREAK 160



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• TELEX NO. 65-1425 •

PHOENIX STREAK 160

OWNER'S MANUAL

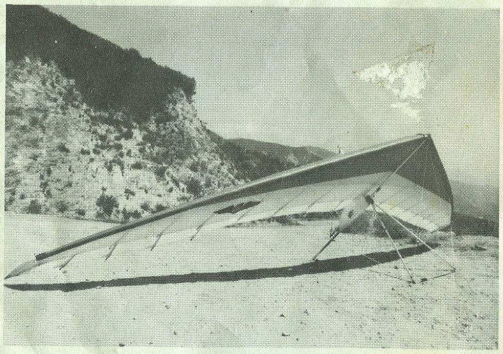

TABLE OF CONTENTS

PHOENIX "STREAK" OWNER'S MANUAL

Dear Pilot,

The Phoenix Streak has been designed for the pilot who desires the highest performance available out of today's flexwing double surface gliders, without the sacrifice of responsive, comfortable handling.

Safety and strength were primary design criteria and this glider meets or exceeds all current HGMA Airworthiness Standards. It is essential that this manual be read carefully before assembly and flight. Stability systems, pre-flight procedures and periodic inspections should be understood and practiced.

The Streak's exceptionally clean leading edge, high aspect ratio and low billow give it excellent sinkrate performance. Double surface, relatively small area, enclosed hardware, minimal twist and efficient stability systems give this glider a high L/D and glide retention to higher speeds than ever before possible. A freely floating crossbar provides light, quick roll response. Light, smoothly increasing pitch pressures and carefully optimized spiral stability make thermal soaring pleasant and efficient.

The Streak requires no special control techniques and experienced pilots adapt to it easily. Performance and handling will feel different, though, so give yourself an extra margin of safety in regard to ground clearance and weather conditions during your first 20-40 hours of air time. Use caution during the transition period to an unfamiliar glider and remember the old saying: "It's better to be on the ground wishing you were in the air, than in the air wishing you were on the ground."

We at Delta Wing wish you the finest of flying and we are ready to provide any assistance necessary to expand your flying experience. Please do not hesitate to write or call.

Best of Lift,

Delta Wing Kites & Gliders, Inc.

DESCRIPTION OF DESIGN

The Phoenix Streak incorporates a number of new design features that, brought together with state-of-the-art hang glider technology, creates one of the most convenient, safest and rewarding gliders in the sky.

The shock-absorbing webbing restraint on the floating crossbar; the freely shifting double surface and moderate keel pocket, all combine to give handling second to none. The insert stiffened leading edges supported by shaped tabular ribs form a well-defined airfoil section. This, along with a super-clean spanwize sail, results in excellent performance.

The hardware is enclosed or faired as much as possible, without sacrifice of set-up and inspection ease. With a little practice all set-up procedures, which can be down "on-the-bar" or "on-the-ground", are fast and simple.

A full cable-supported reflex system gives the Streak excellent pitch response and dive recovery.

All the above systems combine to form the "Streak", a glider designed with the pilot in mind.

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PHOENIX STREAK
OPERATING LIMITATIONS

- Utility Class Glider -

Flight operation should be limited to non-aerobatic maneuvers, i.e. those in which the pitch angle will not exceed either 30 degrees nose up or down of the horizon and in which the bank angle will not exceed 60 degrees. The Streak is capable of spins, though it is characteristically resistant to them.

Additional parameters:

Stall speed @ max. recommended loading:	25 mph
Maximum speed @ min. recommended loading:	44 mph
Recommended pilot weight range:	
Streak 160	130-220 lbs.
U.S.H.G.A. required rating (or equiv.):	Hang 3

Static Aerodynamic Load Tests

+30 deg. @ 65 mph, -30 deg. @ 46 mph, -150 deg. @ 32 mph

This glider should not be flown in excess of VNE = 46 mph

The glider is not certified for towing. The kite must be of hardware that is factory certified for towing. A certified tow bar with upper release or equivalent must be used. Floats are recommended for towing over water.

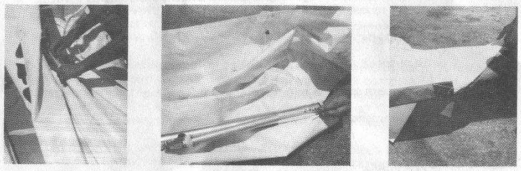
DISCLAIMERS:

WARNING - The owner and operator must understand that due to the inherent risk involved in flying such a unique vehicle, no warranty is made or implied, of any kind, against accidents, bodily injury, or death. Operations such as aerobatic maneuver or erratic pilot technique may ultimately produce equipment failure, and is specifically excluded from the warranty.

PHOENIX "STREAK" ASSEMBLY PROCEDURE

FROM SHIPPING CARTON:

1. Unpack glider on clean floor or grass area and position it 'belly down'. Remove sail ties and unfold tips.
2. Leaving leading edges close together, slide the aft sections into the applied pocket of the sail leading edge.
3. Install leading edge tip sections; they are marked 'left and right', with washout struts facing inwards (aft). Insert clevis pins and safety them. It is a good idea to tape over the safety rings and clevis head.
4. Pull the sail down the leading edge, and insert the sail mounting bolt through the gromett in the sail and into the end hole of the leading edge. Secure it with the wing nut and safety ring.



4.

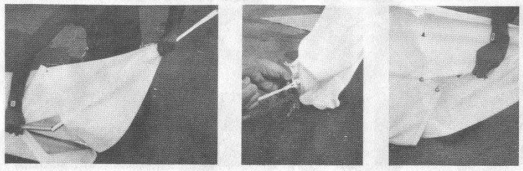
FROM NORMAL BREAK-DOWN: SET UP ON BAR

5. Roll glider over, remove control bar bag and make sure flying wires are not twisted around base or downtubes.
6. Assemble control bar and safety the clevis pin.
7. Attach the forward flying wires to the nose by placing the thimble over the nylon bushed stud. A rolling motion of the thimble will cause it to pop on and off the nylon bushing. It is then secured with a wing nut and safety ring. With a little practice it is quick and easy.

6. 7.

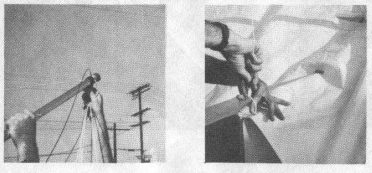
PHOENIX "STREAK" ASSEMBLY PROCEDURE CONT'D

8. Turn the glider over; stand it on the bar.
9. The washout strut is inserted through the tip pocket, and into the receiver mounted to the leading edge. Tension the tip with the double purchase cord and cover it with the tip flap. Attach the undersurface tip to the peg midway down the strut in the same way with the double purchase bungee cord.



9.

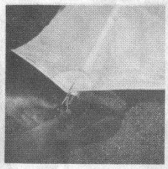
10. Spread both wings until you feel some resistance (about 2/3 extension).
11. Erect kingpost, sliding luffline strap up and over nico on front wire. Then attach overhead cable tensioner at second or third notch. Fore and aft rigging should be tensioned one notch away from full tight. Excessive slop is not necessary, yet over tightening should be avoided.
12. Free luff lines if tangled, and attach center line to keel pocket cord with plastic clip.



11. 12.

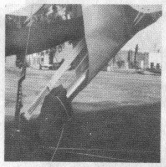
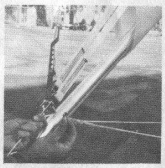
PHOENIX "STREAK" ASSEMBLY PROCEDURE CONT'D

13. Insert the upper surface ribs (they are progressively shorter from root to tip). Secure with the double purchase string. Inserting the ribs before the crossbar is tightened is easier and causes less wear on the batten pockets. While inserting the root ribs it is helpful to list the keel slightly.


13.

14. Deploy the crossbar by pulling back on the nylon cord attached to the end of the crossbar retaining strap. It is easier to pull on the strap itself as soon as it becomes in reach. Simply follow the cord up into the keel pocket and grasp the webbing in front of the key. Pull back the strap, then attach it in the desired setting. Factory position is the full back on the loose end of the strap, and second from the end on the fixed end. Stow the pull back cord on the inside of the keel pocket.


14.

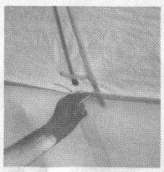
PHOENIX "STREAK" ASSEMBLY PROCEDURE CONT'D

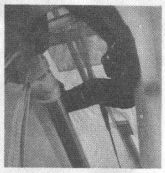
15. Insert the undersurface battens, 6 per side, progressively smaller from root to tip. They are inserted through the webbing tabs along the upper surface, which in turn holds the two surfaces together, but allows them to shift independently.

Insert the batten end, passing it between the webbing, then into its pocket. Slide it up into the pocket past the leading edge pocket seam until it stops. If this step is done before the crossbar is erected, there may be considerable resistance as it meets the leading edge insert, but a firm push will take the batten up to its stop. Secure the battens with bungees over the end of the batten, which should be facing down, leaving the uppersurface smooth.

PRE-FLIGHT:

16. Pre-flight your glider. First open the undersurface and check inside the envelope. Make sure that the crossbar is properly safetyed by pushing up on the crossbar. The safety wire to the nose should become tight just as the crossbar meets the uppersurface. Also check that the webbing restraint is not twisted and that the kingpost separates the two sides. Inspect the haulback strap the same as your hangstrap. After inspecting the inside, do up the undersurface.





15. 16.

Continue with a normal pre-flight inspection, including: -

- Hangstrap position and condition
- All bolts and nuts, clevis pins and rings
- Sail condition for tears, all battens properly secured
- Reflex bridles properly attached, not tangled or caught under rib ends
- Attachment and movement of internal tip strut
- Sight along both wings and check that reflex bridles, tips, leading edge and airfoil shape thru ribs looks the same on both sides
- Check cable tension, side wire slack and 'feel' (by lifting and rolling the wing to check crossbar travel).
- HOOK IN!!

PHOENIX "STREAK" ASSEMBLY PROCEDURE CONT'D

SET-UP ON GROUND:

For set-up on the ground, position the glider nose into the wind and unzip the bag. Then assemble the control bar, lay it back and turn the glider over 'belly down'.

Continue with steps 9 thru 13 of "on-bar" assembly. Insert the undersurface ribs, step 15. Carefully lift the nose of the glider until the control bar swings forward. Make sure you have a good hold on the nose or keel just behind the sail slot. Rest the glider back on its control bar and reach for the forward flying wires. Remove the wingnut and ring from the stud, attach the forward wires, then secure them with the nut and ring. Erect the crossbar, step 14; then continue with as standard preflight.

BREAKDOWN PROCEDURE

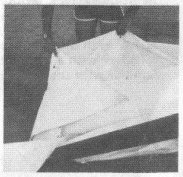
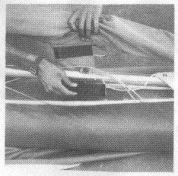
Disassemble your glider, 'on-the-bar' or 'on-the-ground', by reversing the the assembly procedure.

The undersurface battens are used to help furl the sail, while the ribs are bundled, tied, then placed in their custom coverbag.

As you bring together the leading edges make sure they are kept parallel with the keel, otherwise the crossbar may slip between the keel and leading edge toward the nose. This will make it hard to close and may cause severe damage to the structure. Once the leading edges are together pull the sail up from between the leading edge and keel. Place the undersurface ribs in the sail fold and use them to help establish roll. Fit the rolled sail inside the cupped leading edge pocket of the sail. Do the same with the other side, then secure the halves together, just behind the end of the keel, with a sail tie. Use another tie at the tip then one a foot down from the kingpost top. Put on the bag, slipping the tips in first, then roll the package over on its back. Disassemble the control bar and cover it with its custom bag. Use the top to protect the sail from the upper fitting, then lay down the bag inside the cupped sail halves. Place the padded piece attached to the control bar bag around the keel at the rear eye-bolt fitting and secure with the velcro. Lay the wires along the keel and check that the center junction cover is protecting the sail from the hardware. The cupped sail halves can now be brought together over the control bar, forming a smooth overlapped cylinder along the glider. Place the rib bag in the end of the glider bag, with cambered end facing toward the nose. Zip up the bag, being careful not to catch the sail edges.

Always transport your glider, control bar and batten bag up, on a well supported and padded rack, for there are more gliders damaged on the ground than in the air.




STREAK !

PHOENIX "STREAK" FLIGHT TECHNIQUE

On the first few flights with your new Streak, please follow recommended procedures for familiarization with any new and different glider: Fly from a small hill with an easy launch and a large open landing area, then work your way back up to your previous level of flying in gradual steps.

LAUNCH: Due to their excellent balance and solid feel on the ground, the Streaks launch very well. It's likely to feel different than what you are used to so keep a few points in mind. This glider's take-off characteristics are similar to those of a rigid wing. It is neither necessary nor advisable to "pop the nose" and fill the sail. Simply hold the wing at a flying altitude and let it stay there. Accelerate smoothly and run hard until the ship lifts you off the ground. Pitch pressure is light, so make gentle corrections.

FLIGHT: Hands-on experience is the only way to really learn the flight traits of a new glider, but here are a few hints: Relax and let your Streak fly itself most of the time. Use light control forces and explore the response to various combinations of pitch, roll and yaw input. With adequate ground clearance try flying "too slow" and "too fast" for the conditions at hand, to become familiar with the range of performance and handling.

Though the Streak is spin resistant, it can be provoked with exaggerated control into a fully controllable and gentle spin mode. The glider will instantly return to normal flying when pressures are released.

LANDING: Due to the high L/D, you will need extra room for landing the first few times. Flying fast is not an effective method for making steep approaches because this ship retains its glide to very high airspeeds. For a steep approach "mush" the glider down to no less than 50' AGL (higher in rough air), then resume flying speed for a normal final approach. Fly along in ground effect, letting the airspeed bleed off to just above stall, then with hands high on the down tubes do a smooth, firm flare. Flaring too early will cause the glider to climb up before stalling, usually resulting in a rather poor arrival with dropped wing, nose or both. In the "mush" mode will be ineffective with a feeling that "the bottom fell out". When you become familiar with these techniques your landing will be fine.

TUNING

PITCH: First check ribs for proper shape. If they are correct, careful positioning of hang strap will compensate for pitch trim problems.

Always be sure the hang strap is looped around the keel and not allowed to move forward or aft from its set position. The hang loop retaining clamp should be used for this, and normal setting is in the center, loosen it and move the loop forward for faster trim to just in back for slower trim. If a trim correction of more than this is necessary, contact your dealer or the factory. Use a back-up loop and be sure it is free in all harness positions.

ROLL-YAW: Prior to making adjustments, check for any twisted wires, tangs, equally tensioned ribs, and equal sail leading edge tension. Check that the ribs are of proper and equal shape (side by side).

If the turn persists, compensate with leading edge and defined strut tension. For a turn to the left, tighten the left tip and re-tension the left strut respectively. A single hole should do the trick. If more than two holes are necessary, you probably have a slightly bent leading edge, and it should be removed, inspected and if damaged, replaced.

For stability in extreme conditions, the Streak has reflex bridles (or lufflines), running from a loop near the kingpost top to three ribs each side and the keel pocket. In flight the bridles should be slightly slack and do not affect handling or performance. Under no circumstances should these be removed, modified or lengthened beyond design specifications.

PERIODIC INSPECTION

A complete periodic inspection should be done on your glider - whenever you suspect it to be damaged; after each 30 hours of airtime; and at least twice a year regardless. This inspection can best be performed by your local, qualified Delta Wing dealer. The inspection should include the following:

1. Pull the sail and inspect thoroughly. Repair on any tears, holes, and worn seams should be done only by a qualified sailmaker.
2. Inspect all spars for dents and scratches. Check carefully at ends of sleeves and around bolt holes for signs of stress. Replace any questionable components with genuine Delta Wing parts.
3. Inspect all cables for frays and kinks, cable ends for elongated thimbles or tangs. Replace as necessary.
4. Inspect bolts for corrosion or stress. Replace worn or damaged lock nuts.
5. Check ribs for stress, especially the lexan sections.
6. Reassemble with new parts where necessary, mount sail and check for proper sail tensions. Perform a careful check flight.

Some other components that require special attention are as follows:

1. Webbing straps - your hang loops and the crossbar retaining strap should be inspected every time you fly. They should be replaced at the first sign of wear, and once a year regardless. Do not attempt to duplicate the crossbar retaining strap, it is made to strict specifications, and is easily obtainable through Delta Wing.
2. All cables, including reflex bridles, should be replaced once a year or at the first signs of wear.
3. The nose wire attachment tang and stud, downtubes, control bar brackets and keel should receive special attention after a bad landing as they absorb most of the force of a nose in. In case of sustained damage replace parts as necessary and give complete inspection to the rest of the glider.
4. If the leading edge inserts seem to be losing their stiffness or dirt entrapment within the pocket is evident, they may be removed from the dismounted sail. Cupping the edges as if forming a long tube, pull firmly on the insert while the sail is held at the tip. Install the inserts in opposite fashion. Small tears may be mended with mylar or fiberglass strapping tape, and in the case of replacement always replace both sides to keep the glider in trim.
5. Fresh water is usually sufficient for washing your sail. If further cleaning power is necessary, use only approved dacron sailcloth cleaners.

If you have any questions about the maintenance of your glider, contact your local Delta Wing dealer, or if one is not available, contact us at the factory; either will be happy to serve you.

"STREAK" COMPLIANCE VERIFICATION SPECIFICATION SHEET

	ITEM		160
1)	Weight, lbs. (no bag)		72
2)	Tube Dim., in. +1/16		220.25/2.0, 1.875/
	Length/outside dia./		1.0, 125.25, 130.25,
	hole locations.		201.345, 219.75
	Leading edge		
	Crossbar-half		114.875/2.0/
			1.0, 2.875, 112.0, 113.875
	Keel		132/1.625/
			1.25, 3.1, 60.25,
			105.0
	Tip Strut, fwd. sect.		10.0/.875/.75
	rear sect.		42.75/.75/22.75/42.375
	Kingpost		47.9/1.125/
			.50
	Control bar base		57/1.125/
			.75, 56.25
	Control bar down tubes		68.75/1.125/
			1.0, 1.5, 67.5
3)	W/keel @ 0°		
	a. washout tip angle		+7°
	b. control bar angle		+2°
4)	Sail depth, half-way		5"
	down crossbar, L.E.		
	to keel (to L.S.)		
5)	Sail depth, half-way		3"
	between nose and C.G.		
	(to L.S.)		
6)	Bridle Dim., K.P. top to		
	outside webbing at t.e. of sail		
	Keel line		47½"
	Dim. Tol.	#1	64½"
	-½", +0	#2	85½"
		#3	109"
7)	Chord lengths		
	3' from root		74"
	3' from tip		34"
8)	Span - sail		34' 10"
9)	Bow in tubes, max. depth		
	off line set from end to end.	+½"	
	Leading edge		6"
	Crossbar halves		0"
	Keel		0"
10)	The HGMA placard is located on the keel approx. 9" in front of the control bar. The factory test fly sticker is located on the bottom noseplate.		
11)	Recommended pilot		
	flying weight range		
	lbs. -		130 - 220

Recommended pilot proficiency level for all sizes is USHGA hang 3 or equivalent.

*Sail dimensions +1"