

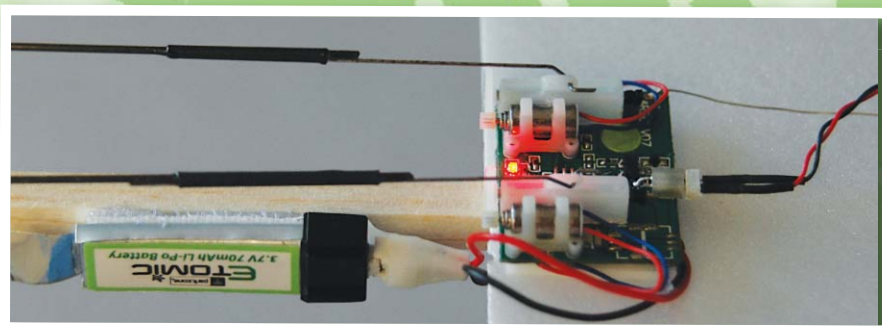
by Joe Hass

A rubber-powered kite enters the RC ultramicro age



Peck-Polymers is owed credit for the inspiration for this sport foamie project.

Stringless Wonder Revisited

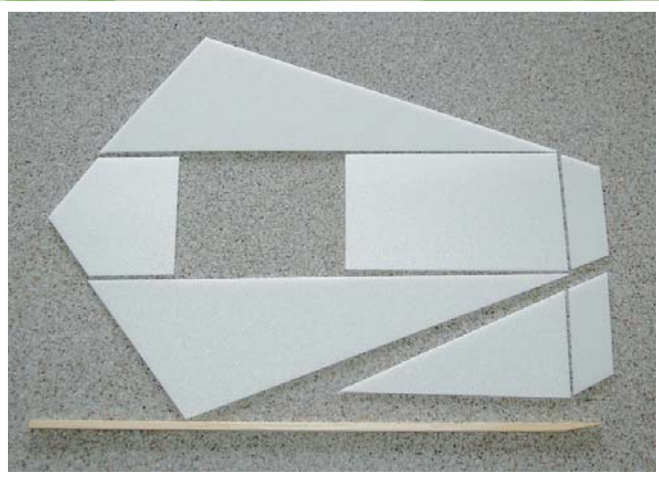


The ParkZone "brick" receiver is used to control the 100%-size version. Notice the bend in the pushrod, to assure linear servo gear clearance.

THE ORIGINAL rubber-powered Stringless Wonder is an intriguing, kitelike aircraft that Bill Hannan designed and Peck-Polymers kitted in 1973. Bill Pardoe won the Northrup Flying Wing Contest with it, with a five-minute flight.

This model is still available as a stick-and-tissue kit. It's a quick build that can provide hours of free flight fun.

The Skymasters Radio Control Club of Michigan, in conjunction with the Romeo Skyhawks, Greater Detroit Soaring and Hiking Society, and Radio Control Club of Detroit, host weekly winter indoor flying at

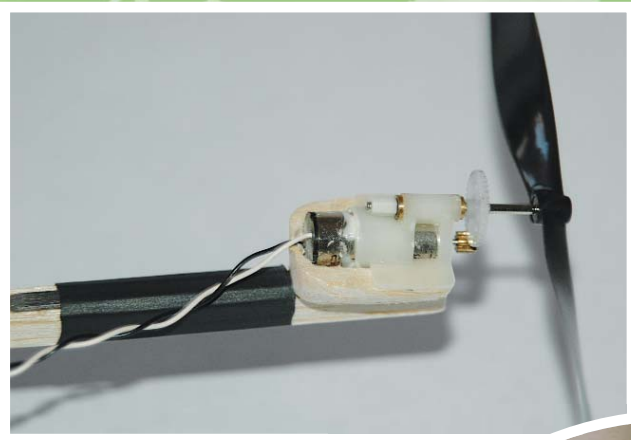


The 100% version uses 2mm Depron, while the 150% size is built using 3mm Cellfoam88 or equivalent. Both use a 1/4-inch motorstick.



A ParkZone Ember motor system powers the 100% version. The downthrust shown might not be everyone's taste, so feel free to take some out.

Photos by the author

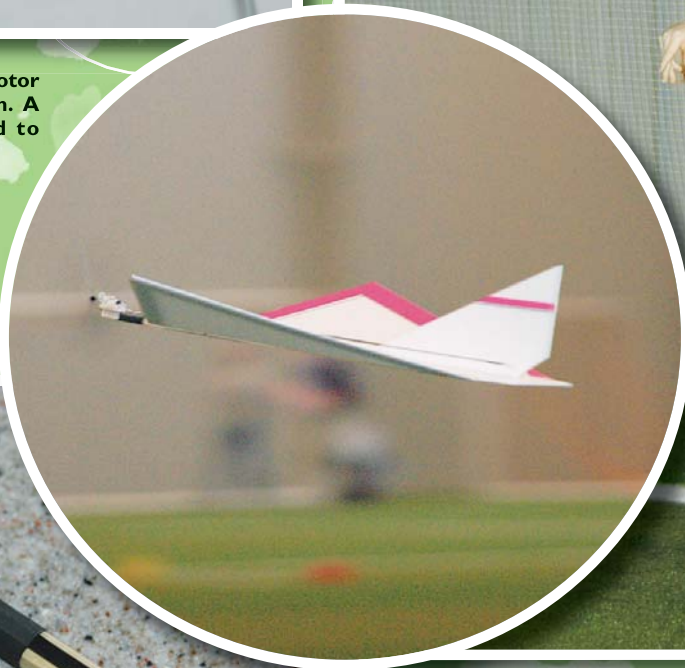


Above: A Mustang ParkZone motor system powers the 150% version. A scrap block of balsa is carved to accept the mount.

Right: The larger Stringless Wonder is higher in performance and can be flown slower. These aircraft turn big and climb quickly, as did the original FF version.



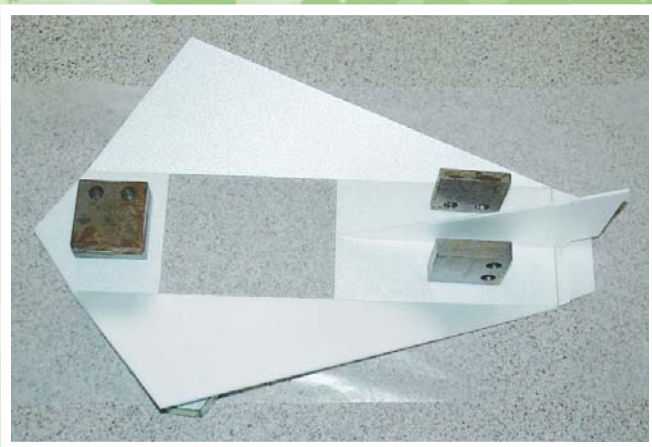
Above right: Ten-year-old Tim Young launches the 100% Stringless Wonder Revisited. A high-angle toss is required. Flying the model is fun for all ages.



Left: The 3mm carbon-fiber motor mount under heat-shrink tubing on the motorstick allows the motor to be positioned for optimal CG placement.



ParkZone hardware is perfect for the Stringless Wonder. Tubing that links the pushrod ends is glued once the control surface is centered.



A CA glue fillet is sufficient to support the wing dihedral joint. Hinge the surfaces before assembly. Isn't using waxed paper a good idea?



The 150% Stringless Wonder is a great backyard flyer and can manage light breezes. Loops and stall turns are possible.

Stringless Wonder Revisited

Type: RC indoor sport

Skill level: Beginner

Wingspan at 100%: 10 inches

Wingspan at 150%: 15 inches

Wing area at 100%: 63.9 square inches

Wing area at 150%: 95.85 square inches

Weight at 100%: 17 grams

Weight at 150%: 39 grams

Power for 100%: ParkZone Ember motor/70 mAh Li-Poly

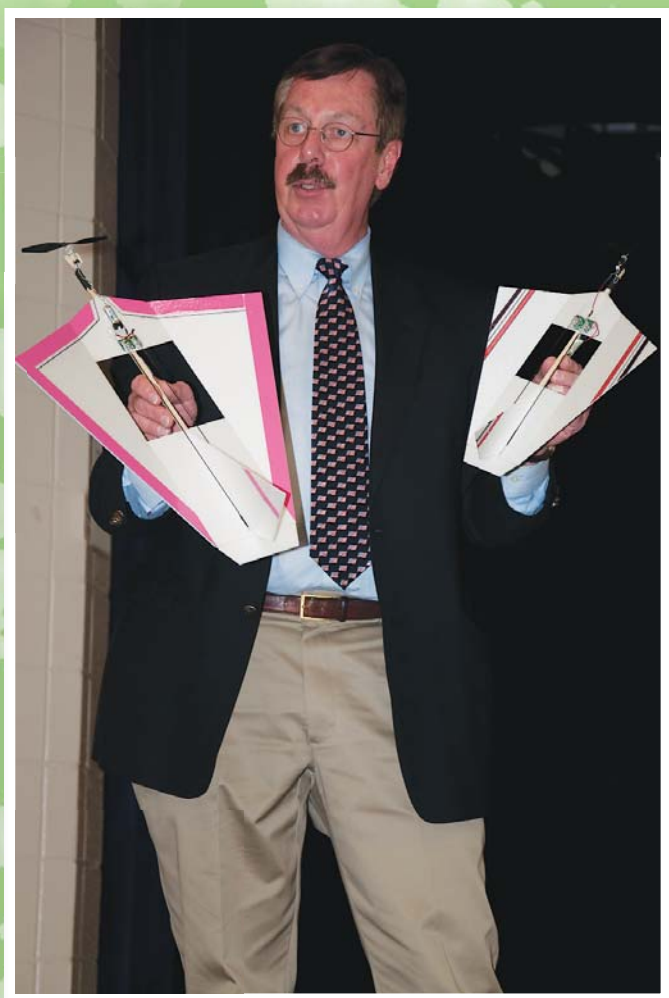
Power for 150%: ParkZone Mustang motor/150 mAh Li-Poly

Construction for 100%: 2mm Depron

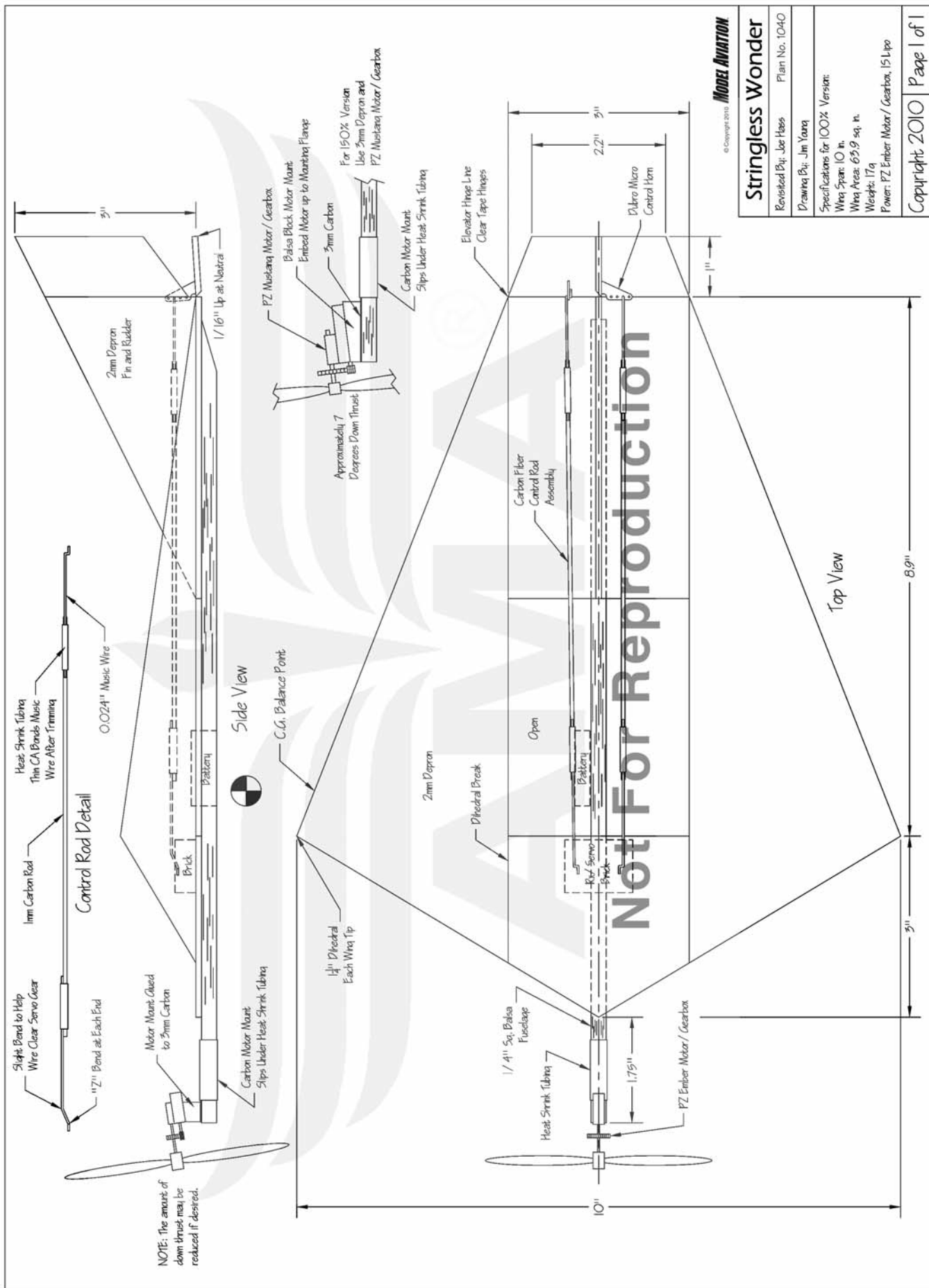
Construction for 150%: 3mm Depron

Radio: ParkZone receiver ESC/servo, DSM2 module

Finish: Builder's choice of stickers, markers, and/or paint



The author unveiled his Stringless Wonder revisit at the 2010 new year's Skymasters club meeting.



MODEL AVIATION
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Stringless Wonder

Revised By: Joe Haas Plan No. 1040

Drawing By: Jim Yang

Specifications for 100% Version:

Wing Span: 10 in.

Wing Area: 65.9 sq. in.

Weight: 17g

Power: PZ Ember Motor / Gearbox, 15 Lipo

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Ultimate Soccer Arenas in Pontiac, Michigan. This phenomenal facility allows us to keep our flying skills up and our creative juices flowing.

I started this project when I remembered that I had a Stringless Wonder kit on the shelf. Opening the plans got my mind in gear. I thought that some 2mm Depron, the ParkZone “brick” receiver/ESC/servo module (item PKZ3351), and the Vapor motor system should be what I needed to make an RC version.

I cut a kit of foam pieces using the original plans as a template. Rudder and elevator dimensions were carefully calculated (as in with the width of a nearby ruler). The “motorstick” fuselage was cut from a piece of hard $\frac{1}{4}$ square balsa.

There are few tricks to ease assembly. I’ll get to those in a moment.

The first flights were disappointing, because the power from the Vapor system barely provided a gradual descent. I knew that a similar but stronger power system was available, for the ParkZone Ember (item PKZ3228 motor/gearbox and PKZ3002 propeller). That change made all the difference.

Then I created a 150%-scale version of the Stringless Wonder. Employing 3mm Depron and the ParkZone Micro Mustang power system (item PKZ3624 motor/gearbox and item PKZ3601 propeller), flight performance is excellent.

I have a few assembly suggestions that apply to either size Stringless Wonder. Cut out your kit. Actual dimensions can vary significantly, so don’t be too concerned.

Bevel the LE of the elevator and rudder to allow for movement of the control surfaces. Hinge both the rudder and elevator with hinge tape before assembling the wing. It is much easier to decorate your aircraft before construction, so get your felt-tip markers and pens out now.

Attach the Du-Bro Micro Control Horns (item 848) to the elevator and rudder with gap-filling, foam-safe CA. The rudder control horn is attached to the left side of the rudder. The elevator control horn is attached on the right side of the elevator.

Protect your building surface with waxed paper. Attach the vertical stabilizer to the rear wing center-section. Position the front wing center-section on your building surface. Small weights help hold things steady.

Attach each outer wing to the center-section pieces. Approximately $1\frac{1}{4}$ inches of dihedral on each wingtip is necessary. I confess that I didn’t bevel the foam on the wing outer panels.

A few drops of gap-filling, foam-safe CA will tack the outer wing panels to the center-section. After the CA has kicked off, flip the wing over and fill the gap with a bead of gap-filling CA. The $\frac{1}{4}$ square “fuselage” is attached to the bottom of the wing with gap-filling, foam-safe CA.

The receiver/ESC/servo module is attached with double-stick foam tape. Pushrods are created with 1mm carbon-fiber rod and .024-inch-diameter music wire. Make the Z-bends with small needle-nose pliers.

Notice that the music wire that attaches to

the servo is angled down, to clear the gears. Position the wire on the carbon fiber and slide heat-shrink tubing over the wire. Shrink the tubing, but do not apply thin CA yet.

Remove the music wire from the servo side of the pushrod. Slide the other Z-bend into the flight-surface control horn. Using the forward hole on the servo (it has a larger opening), slide the Z-bend into the servo. Slide the wire into the preshrunk heat-shrink tubing on the pushrod. The fit is tight enough to allow adjustment, including during the test flights.

After successful test flights, a drop of thin CA will hold the wire and carbon-fiber pushrod in place. There should be roughly $\frac{1}{16}$ inch of up-elevator at neutral.

The motor gearbox is adhered with CA to a piece of 3mm-wide, flat carbon fiber. Not being sure exactly where the motor gearbox should be, shrink a piece of heat-shrink tubing around the front of the $\frac{1}{4}$ square motorstick.

Slide the 3mm carbon-fiber flat stock underneath the heat-shrink tubing. This allows for easy repositioning or experimentation. It also provides for a bit of shock absorption in case there is an “incident.”

On the original 100% version of the Stringless Wonder, the ParkZone single-cell, 70 mAh Li-Poly battery (item PKZ3001) is attached to the side of the fuselage with hook-and-loop fasteners in the wing opening. The CG is close to $\frac{3}{4}$ inch behind the wingtip.

The original version flew well with the downthrust indicated. However, flight performance improved as the excessive downthrust was removed.

Sand the bottom of the gearbox to change the angle, and glue the gearbox to the 3mm flat stock. The original weighs 17 grams ($\frac{1}{2}$ ounce).

It is easier to have someone else launch the aircraft on the first flights. A light toss with the nose pointing up approximately 20° will reduce the altitude loss on the launch.

Adjust the battery, motor, and elevator position to get the flight characteristics you desire. This model will need right rudder trim unless you set the motor with roughly 1° of offset.

The RC Stringless Wonder is easy to fly. It climbs easily and has a nose-up attitude, even in a cruise.

Plan ahead for turns during flight, because there isn’t much elevator authority to pull the model around in a tight turn. To make a turn as compact as possible, initiate it and add full up-elevator while extra power is applied, to keep the nose up.

The Stringless Wonder will not stall. There’s enough power to fly and climb for up to eight minutes, but looping is a challenge. The 150% version is much better at aerobatics.

The 150% version uses all the same build techniques. I fashioned a motor mount from a small balsa block with approximately 7° of downthrust.

The motor/gearbox is attached to the wood block with CA. A ParkZone 150 mAh Li-Poly battery (item EFLB1501S) can be used for longer flights. On the 150% version, the Li-Poly is attached to the wing center-section in front of the receiver module. This iteration of the model weighs 39 grams (slightly more than 1 ounce).

When ordering Stringless Wonder plans (set 1040), ask the AMA Plans Service to provide an extra copy at 150% of the original. You should get that copy for half price at least for a limited time. Save the effort of having to run to the copy center later.

The basic design allows for a great deal of experimentation with power systems and electronic components. Experiment with the CG. After a dive to build speed, I have performed loops, Immelmans, and Chandelles with the 150% Stringless Wonder.

Have fun! **MA**

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Sources:

Skymasters Radio Control Club
www.skymasters.org

Peck-Polymers/A2Z Corp
(877) 754-7465
www.a2zcorp.us/store

ParkZone
(800) 338-4639
www.parkzone.com

Spektrum RC
(800) 338-4639
www.spektrumrc.com