

BP HOBBIES PIPER J3 CUB EP ARF

By Bob Aberle



BP Hobbies is the new name for the company we have called Balsa Products for many years. It is still the father and son team of Bob and Dave Peru, along with son-in-law, Jim Minadeo. Their new website is: www.bphobbies.com. The location is still Piscataway, NJ.



Photo 1



Photo 2

The subject of this review is the new BP Hobbies Piper J3 Cub, an electric-powered stand-off-scale ARF model. It is presently selling for \$79.95. Photo 1 is of me holding the little Cub and it will give you idea as to the size. Final assembly of this aircraft involves only a few hours of work, mainly to install the motor and RC systems.



Photo 3

The model itself definitely looks like it was hand crafted and with care. The structure is totally built up of balsa, with considerable use of plywood in critical strength areas. Then the entire airplane is covered with an iron-on material, naturally in Cub yellow!



Photo 5

With a wingspan of 37 inches it is possible to ship the Cub with the wing panel already joined. This saves an assembly step that many newer builders do not like to perform. All the structural components are already factory covered. Even the wing struts are assembled and painted.

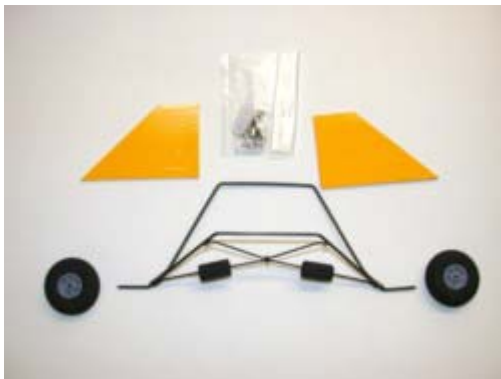


Photo 6



Photo 7

The scale-like main landing gear is preformed and painted. Both wheels and fairings are included (photo 6). Just about every hardware item you will need is provided, including control rods, horns, easy attachment connectors and all the various screws (photo 7). A propeller spinner is supplied, but this isn't scale for a Piper Cub so I left it off.



Photo 8



Photo 9

The clear plastic side windows and windshield are pre-molded and, when installed in the fuselage, provide a flush fit (photo 8). Scale-like decals are provided (photo 9). I omitted the military roundels because that isn't scale on the yellow painted civilian Cubs. Military Cubs were usually painted Olive Drab. I actually applied the civilian decals early on, before I started the final assembly tasks.



Photo 10

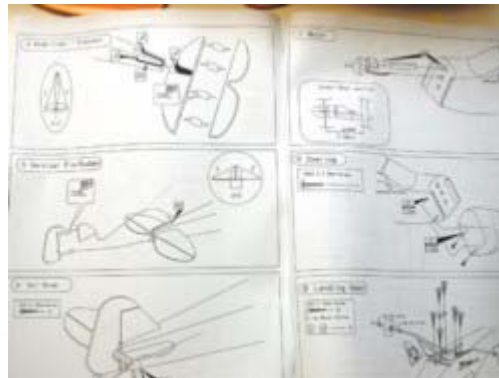


Photo 11

The instruction manual was thorough, but contained no words, only hand drawn sketches (photo 10). This type of "International" instruction booklet has become very common in the realm of plastic models. The self-explanatory illustrations cross all language barriers and allow the manufacturer to use just one set of instructions in all countries. But this is the first time I have seen illustration-only directions in an RC model which is more complicated than a plastic model meant to sit on a shelf.

Even though the directions are adequate, I've taken extra photos during the preparation of this review just in case Sport Aviator readers need a little more assembly help than the booklet provides. Hopefully the Sport Aviator review will be referenced on later Cub Instruction Manuals and on BP's website.

The Rest of the Equipment



Photo 12



Photo 13

The electric power system and the RC system components are not supplied with the ARF kit. They must be purchased separately and BP Hobbies, of course, offers all of these items on their website. The recommended motor is the BP-12 outrunner brushless motor that sells for only \$18.95 (photo 12). To operate this motor you will need a BP 15A brushless Electronic Speed Control (ESC) equipped with a Battery Eliminator Circuit (BEC) (\$29.95). You will also need a three cell Li-Poly battery pack. The one recommended is the E-Tec1250 mAh, with the extra connector that allows access to each of the three individual cells (\$39.95). These items are all shown in photo 13.



Photo 14



Photo 15

Photo 12 is a close up photo of the BP 12 outrunner brushless motor. The BP 15A ESC shown in photo 13 will require APP type battery connectors as well as a set of BP's Feigao 3.5 mm gold plated spring connectors to connect the ESC with the motor. The connectors go onto the bare wires of the ESC. The E-Tec three cell 1250 mAh Li-Poly battery (photo 15) will also need APP connectors installed to mate up with the ESC.

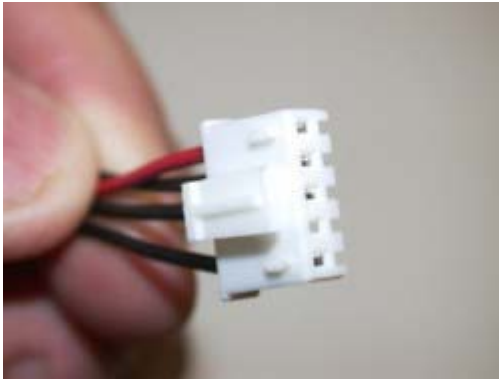


Photo 16



Photo 17

Photo 16 shows the special connector that comes with the E-Tec battery pack which allows access to each of the individual cells. Since these battery cells are wired individually, my recommendation is to use the new FMA CellPro 4S charger (photo 17), which virtually eliminates any chance of the cells becoming unbalanced. The adapter, also available from FMA Direct, allows the E-Tec battery to plug into the CellPro charger.



Photo 18

The RC system used on this Cub involved a Blue Bird single conversion FM receiver (4.6 grams), two Blue Bird ultra micro servos, type BMS-303 (3.4 grams each) for the elevator and rudder and a single Blue Bird BMS-306BB (6.6 grams) for the aileron control function. These are all very lightweight equipment, but worked well and I recommend them. All of the motor and radio equipment can be purchased from BP Hobbies.

Assembling the Airplane



Photo 19



Photo 20

The first thing that will be obvious when you unpack your new BP Cub is that a lot of the covering material has become loose during transit from the manufacturing facility in the Far East. As a result, the first thing you must do is carefully re-iron out the wrinkles using both a modeler's iron and heat gun. Better use less heat at first than more. Too much heat can burn through the covering making it necessary to apply patches, which you don't want on a new aircraft.



Photo 21

Once you have the covering tight again, take note that the aileron, elevator and rudder control surfaces have been hinged with the typical plastic sheet hinges (lite-hinge). But these hinges *have not* been glued in place. The instructions recommend epoxy cement to affix the hinges. I don't agree with that (*Ed Note: Neither do I as these hinges were design exclusively for use with thin CAA adhesive. Read Sport Aviator's "[Installing Mylar Hinges](#)" article in the Flight-Tech Section.*) Use thin CAA cement instead.

What you do is apply the cement and accelerator to one side. Then attach the control surface and apply some more CAA cement at the hinge line. The cement will wick inside making for a really strong bond. After doing this make sure you pull on each control surface to see that the hinges are anchored properly in place.

(Ed. Note: This system will work for very small electric aircraft, like the Cub, since there is not a lot of strain being applied to the control surfaces during flight. But larger electrics and glow engine airplanes require a stronger bond. Use the hinging system in the article linked above instead on those aircraft.)



Photo 23

For the aileron torque rods I did use 5-minute epoxy cement to reinforce the balsa inside the aileron's torque rod holes. Place some epoxy on the wire torque rod and also inside the aileron hole, then insert the aileron on to the rod, and at the same time get each of the three hinges in place. Note how I used some wax paper, held in place by masking tape, to prevent cementing the aileron permanently in place (photo 23).



Photo 24



Photo 25

The elevator and rudder are hinged in the same manner. At this point you are ready for the final assembly. It does not take a long time to reach this point as most of the work was done by the factory. A one-piece wing is a good thing in a model airplane.



Photo 26



Photo 27

Next, you must install the aileron servo into the bottom center section of the wing. Two hard wood blocks are first epoxied in place (photo 26). Next, screw the aileron servo to these blocks and attach the short control rods between the servo output arm and the horns on the aileron torque rod end. I used DuBro EZ connectors on the servo output arm made z-bends at the end of the rods going to the horns (photo 27)



Photo 28



Photo 29

Before installing the stabilizer and vertical fin, you must cut out the covering material where the slots are located. When doing this you will find a wood spacer in the stabilizer slot that must be removed and discarded (photo 28). Then just slide the stabilizer and vertical fin in place and spot glue in place with thin CAA to hold the position. Check that the stabilizer is parallel with the wing and that the vertical fin is 90 degrees to the stabilizer. Then apply 5-minute epoxy to finally secure the tail pieces (photo 29).



Photo 30

A preformed tail skid is placed at the bottom rear of the fuselage and held in place with a plastic strap and two sheet metal screws.



Photo 31



Photo 32

Now we are ready to mount the brushless outrunner motor to the nose of the Cub. The plywood firewall is already in place. Notice the square hole at the upper portion of this firewall (photo 31). The gray plastic motor mount comes with the BP motor. You first must attach the motor mounting ring to the gray plastic mount using three sheet metal screws (photo 32).



Photo 33



Photo 34

A square piece of hard balsa must be inserted into the square hole in the top of the firewall (photo 33). Use your finger to reach inside and get some epoxy cement on the end of the stick and on the former behind the firewall. Also epoxy the stick at the firewall (photo 34). The square stick should be cut off so that only a 1-inch length exits between the firewall and the end of the stick.



Photo 35

Photo 36

Next, slide the gray plastic motor mount on to the end of the stick and press it until the stick is completely inserted into the mount (photo 35). Ultimately, the distance between the firewall and the front of the large nut on the motor shaft should be 2 ½ inches. A single, No. 2 sheet metal screw up on top holds the motor mount to the square stick. The final step is to install the molded fiberglass cowl to the forward fuselage (photo 36). This cowl will overlap the fuselage side by exactly 9/16 inch. Two small sheet metal screws on each side hold the cowl in place.

When finished, your motor shaft should be protruding out the center of the top cowl hole and when you mount the prop with two 3 mm nuts and washers it should clear the front of the cowl by about 1/4 inch. The prop, by the way, is a GWS (orange) 8 X 4.



Photo 37



Photo 38

When I tried to install two wheel collars, one on either side of the wheel, I found that the wire landing gear wasn't long enough (photo 37). The fix was simple, eliminate the inside wheel collar and just use one on the outside (for each wheel) as shown in photo 38.



Photo 39



Photo 40

The pre-assembled landing gear assembly fits into two slots on the bottom of the fuselage. These slots are covered over so you must first remove that material to expose the slots. The landing gear is held in place with three plastic straps and a total of 6 sheet metal screws (photo 40).



Photo 41



Photo 42

The landing gear's scale like side skirts looked to me like they were designed for a different aircraft. I was forced to cut off the piece shown on the left side of photo 41. Then I held the skirts by hand and applied some thick CA cement and accelerator to hold them in place (photo 42).

Radio Installation and Finishing Touches.



Photo 43



Photo 44

You can now install your radio equipment. The Cub's radio compartment is assembled at the factory and fit the small servos perfectly. The tiny Blue Bird receiver is double sided tape mounted to one of the side windows. The two Blue Bird elevator and rudder servos are screwed into place on the provided plywood support tray (two screws per servo) as shown in photo 44.



Photo 45

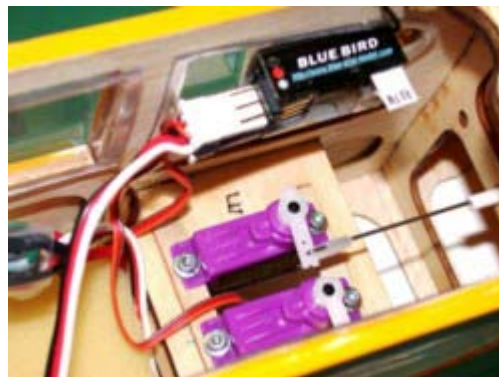


Photo 46

The ESC was double sided taped to the right windshield support post, right next to the battery pack (photo 45). The Control rod sleeves have already been installed at the factory. So it is only a matter of inserting the preformed wire control rods into the two sleeves (one for the elevator and one for the rudder).



Photo 47

At the rear of the aircraft, control horns were attached to the elevator and rudder control surfaces (three screws each). At the ends of each horn I installed DuBro EZ connectors, which I favor. But be advised that BP does supply comparable connectors with the Cub.



Photo 48



Photo 49

This is a good time to mount the wing to the fuselage. The forward attachment points are two wood dowels that fit into two holes in the top, forward fuselage former. The rear of the wing is held in place by a single metal screw and washer. A "T" nut is already in place on the inside of the fuselage. But it is up to you to drill the clearance hole for the screw in the wing's trailing edge. To make this an easy job, I simply inserted the screw from the reverse side, so that it stuck out a little (photo 48). Then I placed the wing in position (dowels engaged at the front), made sure it was centered and not canted to either side, and pressed the wing down on top of the protruding screw. That left a location mark. I drilled out a hole to clear the screw and the job was done and was accurate! To be sure, I mounted the wing with the screw provided (photo 49) and rechecked to make sure the wing was on straight.

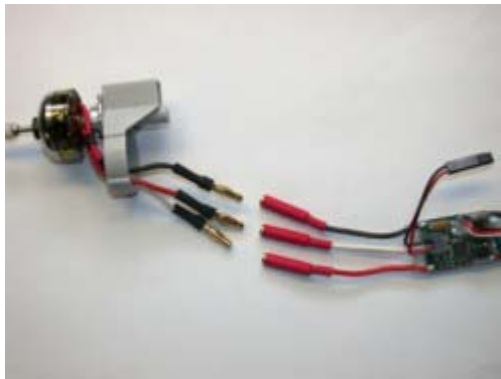


Photo 50

Actually, I did some of the motor connecting steps before mounting the motor to the Cub. So this sequence is a little out of order. I actually soldered the gold plated connector sets to both the motor and the ESC before installing the motor and mount to the protruding square stick (photo 50). I pre-ran up the motor on the bench to make sure that the direction of rotation was correct.



Photo 51

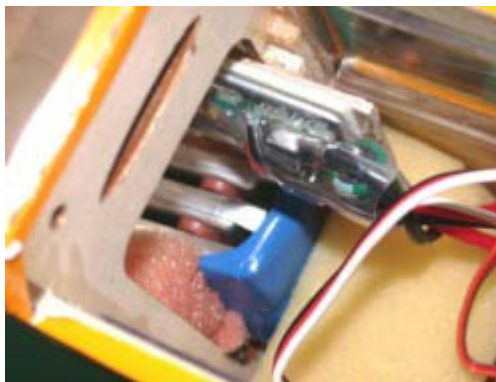


Photo 52

On my BP 12 brushless outrunner, the wire color coding was as follows: black motor to black ESC, red motor to white ESC and white motor to red ESC (photo 51). That should allow the motor to rotate in the normal counterclockwise direction. Photo 52 is a closer, more detailed picture showing the ESC and battery location. The former you see is at the wing's leading edge position. Although we tell everyone to remove the battery pack for charging purposes, having to remove two wing struts and the wing is a major project on this scale aircraft.



Photo 53

Since I'm using the FMA CellPro 4S balanced charger, I don't expect any problems. But I do want to make it clear that during any charging you must be there to watch what's going on and to observe the LCD screen on the CellPro charger. It will tell you the exact voltage of each cell. When each cell gets to near 4.20 volts, the pack is fully charged. To gain access to the battery pack for charging purposes, I cut away the covering at the bottom of the fuselage, in the area between the two landing gear wires (photo 53).

(Ed Note: The CellPro charger is what is known as a "Balanced" charger. This means that the charger monitors the voltage of each of the three battery cells during the charging process. If one cell reaches peak voltage before the other two cells, the CellPro, and other balanced chargers, begins to drain power from the high-voltage cell while continuing to charge the other two cells. This prevents overcharging the one cell. In the end, all three cells have the same voltage; they are balanced. Without a balancing charger, it is possible to over charge one cell and that may cause the cell to explode, destroying the aircraft and anything else in the immediate area. If you are not using a balanced charger, always remove the Li-Poly battery from the airplane for charging and place in a safe, non-flammable environment such as a metal "ammo can" or clay pot with cover. Even when using a balanced charger, it is always safer to remove the battery for charging.)

Passing through this fuselage opening are the two sets of APP connectors, one pair from the battery and the other from the ESC. There is also the extra cable with the multi-pin white plastic node connector, which gets plugged into the FMA adapter on the CellPro charger. True, these wires will tend to hang out the bottom of the fuselage a little, but that should not prove a problem.



Photo 54



Photo 55

For information, the two sets of wing struts fit at the bottom into slots cut in the fuselage and are held in place with a single sheet metal screw on each side. On the wing end, two screws are used, one for each strut. These screws go into hardwood inserts built into the wing.

The final balance point was practically right on. If anything, the airplane was just slightly nose heavy and that is better for this aircraft. The temptation might be to cut off part of the gray plastic motor mount so that the motor mounts closer to the firewall. Moving the motor back would only shift the CG to the rear and you don't want that.

Final control throw ended up with the ailerons moving $\frac{1}{4}$ inch either side of the neutral position. The elevator moves $\frac{3}{8}$ inch either side and the rudder moves a full 1 inch either side of the neutral position.

The final weight of this Cub was 20.5 ounces. The brochure and advertising claimed a 16-17 ounce weight. Since I used very light weight RC equipment and an equally lightweight electric motor I was surprised at the final weight. I would have to assume that a lot of hard balsa and plywood in the structure contributes to that extra weight. Still, at 198 square inches of wing area the resulting wing loading is 14.9 oz/sq. ft. That's slightly high for this size model, but not that high!

FLYING



Photo 56

All of my flights have been hand launched. Photo 56 shows NEAT Fair Director and AMA Hall of Fame member, Tom Hunt, launching the BP Hobbies J3 Cub on its first flight. I'm sure that on a smooth surface this Cub could easily takeoff from the ground. But my flying field is too rough for the small models, so we always hand launch our airplanes. With the higher weight and resulting wing loading this Cub does have a tendency to stall when the flying speed is reduced. But I did not get a snap stall, especially when slowing down for the landing, so that is OK.



Photo 57

It was also obvious during the first flight that coordinating in some rudder control, along with aileron application, made for better (smoother) turns. Prior to the second flight, we programmed in some coupled rudder with ailerons. About 25% mixing was set in the transmitter. When you move the aileron stick, the rudder also moves a small amount. As soon as we did that the flying got to be a lot easier. So, if your transmitter has that kind of capability, use it! If not, try using your left hand a little to add rudder as you apply aileron.



Photo 58



Photo 59

Also helpful was some exponential rate control on both aileron and rudder. The rudder expo I'm sure would make ground taxiing much easier. Generally speaking, the BP J3 electric Cub was still an excellent sport flyer and really fun to watch in the air. One SEFLI club member got on my case because the cowl did not have the typical protruding or exposed engine cylinder heads, as in the full scale Cub. I promised I would make up two sets and apply them to either side of the cowl for some added realism. Since rudder is needed for a smooth turn and the airplane is rudder sensitive on the ground, it already behaves like the full-size Cub so it might as well have the exterior engine cylinders too.



Photo 60



Photo 61

With the recommended 1250 mAh capacity battery pack and a motor current of 8.7 amps, the theoretical motor run time is 8.6 minutes. But at 4.7 watts/oz (76 watts/lbs) you can easily fly this Cub at half throttle. At that kind of reduced power you can expect flight times of 10 to 14 minutes.



Photo 62

You will like the way the Cub lands as it is predictable and does not need a lot of airspeed during the approach. Even with the higher than expected wing loading, landings are relatively easy to do.



Photo 63

One last thought, if you don't like attaching the prop to the motor shaft with two 3 mm hex nuts and washers, there is an alternative. E-Cubed RC (www.ecubedrc.com) sells a neat aluminum collet type prop adapter (photo 63). This adapter makes for a more positive prop mount and is also makes changing propellers easier. So that is something to consider.

For more information on this inexpensive, easy to assemble and fun to fly small electric, please go to: <http://www.bphobbies.com/view.asp?id=A1832386&pid=W976843>