

HOBBY LOBBY INTERNATIONAL's

“WING DRAGON”

(An RTF Electric Trainer/Sport Aircraft)

By Bob Aberle



The Hobby Lobby International “Wing Dragon” is an electric powered, ready to fly (RTF) basic RC trainer or sport flyer. It can be flown in small size fields, such as parking lots and schoolyards when conditions and local rules permit. The Wing Dragon comes with all the necessary support equipment including the electric motor, battery, charger and complete RC system. The only things you must purchase separately are eight (8) AA size alkaline non-rechargeable batteries which power the RC transmitter.



Photo 1



Photo 2

The Ready-to-fly (RTF) concept means that this model is supplied essentially factory assembled with both the motor and RC system components already mounted in place. Only the tail surfaces (stab/elevator, vertical fin/rudder) must be assembled to the rear of the fuselage and the wing halves plugged together.



Photo 3



Photo 4

The process is so simple that not even cement is required. The control surfaces come pre-hinged with the control horns installed. The control rods are already attached to the forward mounted servos and are run towards the control surfaces located at the rear or tail of the model. The landing gear comes preformed with the wheels already attached. There is also a tail wheel and bracket to make taking off the ground easier.



Photo 5



Photo 6

Specification wise, the Wing Dragon is constructed in such a way so that it is very resilient to the rough handling that might be expected as a beginner learns to fly RC. The wing is made from solid, molded foam. The tail pieces are also solid molded foam, resembling almost sheet foam in appearance, yet very strong and durable.

A very strong, molded plastic is used for the fuselage's forward pod. It looks like the thick plastic material used in laundry detergent bottles. The fuselage's rear-mounted boom, or tube, is also a very substantial plastic material that does not bend as was the case on several similar designs over the past couple of years. But no matter how strong the aircraft is, no doubt parts will be broken during those initial instructional flights. Be advised that the Wing Dragon can often be repaired and when parts can't be fixed, new replacement parts are available.

The Wing Dragon has a wing span of 42 inches, an overall length of 34 inches and a wing area of 367 square inches. My evaluation model weighed exactly 23.6 ounces yielding a wing loading of 9.2 oz/sq. ft., which is a light loading and well suited for the beginner RC pilot. Considering you get everything necessary for RC flying and have only a small amount of assembly work, the Wing Dragon is a wonderful bargain, presently (August, 2005) selling for only \$99.90 complete.



Photo 7



Photo 7A

A 115 volt, AC-powered charger is included along with a 7-cell, 1000 mAh capacity Nickel Metal-Hydride (NiMH) battery pack with the connectors already installed (photo 7). The radio system is a three-channel type, providing proportional (or gradual) control of the rudder and elevator using the right hand control stick of the transmitter along with a fully adjustable throttle control for the motor using a lever located on the left side of the transmitter (photo 7A)



Photo 8



Photo 9

To help you along with the assembly, adjusting and flying of the Wing Dragon, a CD (photo 8) is supplied which can be viewed on your PC or on a regular DVD player. The CD runs about 20 minutes. Unfortunately, the voice narrative is in a foreign language, so the primary value is the video portion. But it is still an excellent educational tool and in my opinion the assembly and adjustment sequences are better than the written instruction manual that is also included.

The action shots of the Dragon in flight will really excite you into getting to the flying field as soon as possible. To further help in the learning process Hobby Lobby supplies you with a special cable (photo 9) that allows you to use the RC transmitter as a control box along with an RC model flight simulator. Special instructions are provided so that you can download free software from the FMS Flight Simulator Company. Then by moving the transmitter's control stick you can visually see the DRAGON fly on your PC monitor screen providing flight training even before you get to the flying field.



Photo 10 Photo 11

The electric motor supplied with the DRAGON is the popular Speed-400 ferrite type, brushed variety, which is powerful, yet very inexpensive. These motors are sealed and can't be disassembled. But if you wear or burn one out it is easily replaced at a nominal cost. A 7-inch diameter prop comes pre-installed on the motor shaft. Note that this prop is reversed since the motor is rear facing (photo 10). The forward RC compartment is covered with a small piece of white plastic, held in place by a single screw. You can lift this cover up slightly and rotate it to gain access to the radio components and to the battery connector (photo 11). On the underside of the forward fuselage is a pre-cut slot (photo 12) which accepts the formed wire landing gear. You just press it into place, no screws or cement are necessary.



Photo 12 Photo 13

You will notice in photo 13 that I opened up the air intake holes on either side of the motor to provide for more cooling. The original side air scoops were small and as a result the motor tended to get hot. This extra opening can be handled easily with a standard hobby knife. Note also that I placed a tag saying "RUDDER" to make sure you know that the control rod on the left side of the fuselages goes back to the rudder (photo 13). The right side of the fuselage has the label "ELEVATOR" again to indicate that this control rod runs back to the elevator (photo 14)



Photo 14



Photo 15

This is important because I accidentally placed the stab/elevator in position *upside down*. I had not initially looked at the CD and the written instructions weren't that clear. Since all the decals were in place, I chose to add a new control horn on top of the elevator (on the right side of the vertical fin; photo 15). Install the stabilizer correctly and you will not have to do this extra work. The control horn side goes *upwards*.



Photo 16



Photo 17

In this next photo, 16, you can see where I cut off the original (black) elevator horn. Note the neat tail wheel and bracket that is mounted, along with the stab and fin, with two special screws (no cement – remember!). The white wire trailing is the end of the receiver antenna that runs out through the inside of the hollow fuselage boom. To obtain a little more rudder control throw, I placed the rudder control rod clevis in the middle hole of the control horn as pictured in photo 17.

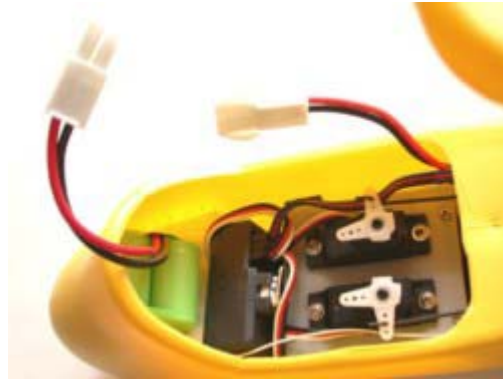


Photo 18 Photo 19

For a little touch of class, a plastic pilot bust is provided, not usually found in most model aircraft in this class; it is pasted to the top of the plastic RC compartment cover. The screwdriver end in photo 17 (enlarge the photo by clicking on it) is pointing to the motor arming switch. It is a push button variety. To get the motor to run, you must press this button once, after powering up with the battery. This is an added safety feature.

A more than adequate RC system operating on the 27 MHz band is provided with the DRAGON. Pictured here are the small size rudder and elevator servos. The three-channel receiver is just to the front of these servos. The motor speed controller with a BEC (Battery Eliminator Circuit) that allows for the sharing of the single battery between the motor and RC system, is behind the servos and back inside the fuselage pod. The 7-cell battery pack is all the way forward to help balance the plane properly (photo 19)



Photo 20

The center of gravity (CG) wasn't discussed in the instructions because, with everything pre-assembled, the balance point was already done for you when the equipment was being installed at the factory. But I did want you to note that the CG on my Dragon came out right at the wing brace (2 7/8 inches back from the wing leading edge) as noted in photo 20. If you select some other type or size battery pack later, on you must check to see that this balance point (CG) does not change.



Photo 21

Before attempting to operate your Wing Dragon RC system, you must install a set of eight (8) AA size batteries in the transmitter. The easiest way to do this is simply use AA size alkaline non-rechargeable cells (photo 21). You should be able to obtain at least 10 hours or more of operating time from the transmitter. In the photo you will note that I used a set of 1300 mAh Ni-MH rechargeable batteries. But going this route you are forced to remove these loose cells and place them in an external charger for charging purposes. In all honesty, the alkaline batteries are the easier way to go. When you turn the transmitter power switch ON an LED will light *green*. When that color changes to *red*, it is time to replace or recharge the batteries.



Photo 22 Photo 23

The Wing Dragon RC transmitter control functions are noted in photo 22 with the rudder, elevator and throttle functions labeled. Both the rudder and elevator controls have trim levers that provide a small degree of trim control to get the plane to fly in a level path. My particular transmitter had only one frequency identification marker which indicated "06" for channel 06 (photo 23). I've already pointed out to the folks at Hobby Lobby that a two digit channel number, like this "06", is already being used on the nine 50 MHz RC channels on the six meter Amateur Radio Service band. The channel designation for the 27 MHz band should be a single digit as in "6".



Photo 24

On the Dragon shipping box was the label shown in photo 24. It states CH 06 and a frequency of 27.095 MHz. Channel 6 on page 18 of the AMA Membership Manual (<http://www.modelaircraft.org/PDF-files/memannual05.pdf>) indicates that the 27 MHz channel "6" is 27.255 MHz, while CH-3 is 27.095 MHz. I'll leave this for the various manufacturers to straighten out.

I see a lot more activity in the near future on the 27 MHz RC band since it provides a convenient separation between larger scale models being flown on the 72 MHz RC frequencies. When you have several modelers all flying at the same time on the six 27 MHz RC channels, you will have to treat frequency control a lot more seriously. This is especially true if you fly Wing Dragons in sport type pylon racing, combat ribbon cutting or balloon bursting fun type contests.

Before getting into the flying portion of this review I wanted to discuss some things about the single flight battery pack supplied with the WING DRAGON. The battery is a 7-cell (8.4 volt nominal) pack consisting of 1000 mAh NiMH cells, weighing a total of 5.3 ounces. The charger supplied works only from 115 VAC power (household power). I measured the charge current at 440 mA.



Photo 25

The instructions say to charge for 3 to 4 hours, but no more than 4 hours. There is no LED on the charger to indicate that the charge is actually in progress. There is also no timer that cuts the charger off after a 4 hour period. The real problem with this type charging is that it depends on the state of charge of the battery. If you fly for half the normal time and use half the battery capacity, then your charging should only take 2 hours, not 4! Charging for a full 4 hours in that case will easily overcharge the battery. The instructions tell you to stop charging when the battery gets hot, because that's when it goes into overcharging.

But I can't see sitting around holding or constantly checking on the batteries temperature for a 2 to 4 hour period. If you fly out a full flight each time, until there is seemingly no power left in the battery, then charging for 3-4 hours is OK. Certainly you can follow this practice at the start and while you are learning to fly.

But for the future, you would be wise to consider what we call a peak detect charger. There are many of these chargers on the market and they operate by sensing the peak voltage of the battery while being charged. When that peak is reached the battery is fully charged and the charge automatically cuts off. So in this regard the amount of charge remaining is unimportant and overcharging will not result.



Photo 26

Since the connectors supplied with the WING DRAGON are not that common, I decided to cut into the battery cable very carefully and inserted a mating pair of Dean's three-pin connectors. With these connectors plugged together I can then plug into the DRAGON and fly. After flying I can separate the Deans connector (photo 25) and plug the battery into a peak detect charger (photo 26). This type battery can accept a 2C charge rate which would be 2.0 amps. At that rate, a fully discharged battery could be recharged at the field in 30 minutes (less if the battery were not fully depleted). Keep in mind the process with a peak detect charger is automatic.

If you don't want to go to this trouble, then you might consider buying several extra battery packs from Hobby Lobby at \$15.50 each. You charge them all at home and fly one battery at a time at the field. I used that same pair of Dean's connectors to allow me to insert a digital meter and measure all the motor electrical parameters.

For information, this motor, prop and battery operates at 11.5 amps, 7.6 volts (under load), 86 watts power input and a prop rpm of 12,000. At 25.3 ounces total weight, that works out to 3.64 watts/ounce which can provide a very fast flight if desired. At the 11.5 amps, if you flew an entire flight at full throttle you would get about 6 minutes in the air. But consider that at only $\frac{1}{4}$ throttle, the power input would be 51 watts, which is still 2.16 watts/oz and certainly enough to keep you in the air. At that lower throttle setting, this battery could provide up to *15 minutes* flying time on a charge. With four battery packs, that's a lot of flying for sure.

I suspect that some of our more experienced sport flyers might want to consider using Li-Poly battery packs. You probably could get away with a two cell Li-Poly pack and could get one rated at 2000 mAh weighing approx. 4.2 ounces. The good news is you would have double the capacity and double the flying time. On the bad news side, the Li-Poly battery at 4.2 ounces would be 1.1 ounce lighter in weight than the 7 cell 1000 mAh NiMH battery. That would make the Dragon tail-heavy making it necessary to add nose weight. There also is the consideration that the physical size of the Li-Poly battery might not fit as easily into the Dragon's nose. So even though there is a possibility, I believe that when you consider cost and the ease of

charging, I would stick with the NiMH batteries.



Photo 27

One very last thing before heading out to the flying field is to check the direction the control surfaces move and to measure the amount of control throw, or travel, for both the rudder and elevator (photo 27). The direction of control has already been worked out for you. Pull the transmitter stick towards you and the elevator should move upwards. Pushing the stick away from you should make the elevator move downwards. Stand *behind* the airplane and move the stick to the right. The rudder should move right. The same applies for left rudder with left stick movement.

Also make sure that with the RC system turned on, and with the transmitter trim levers in their mid range positions, that both the rudder and elevator control surfaces are in their neutral positions. By neutral I mean that the control surface is flush (flat) with the fixed portion of the flying surface (vertical fin and stab). If these control surfaces are not in neutral, remove the black plastic adjustable clevises and rotate them in either direction until both the fixed surface and control surface are perfectly flat. You must start this way before your first flight.

My final rudder control travel was $\frac{5}{8}$ inch either side of the neutral position and $\frac{3}{8}$ inch on either side of neutral for the elevator control surface movement. If, after flying, you feel you need more control, move the clevis attach point on the control horn closer to the surface. If you want to reduce control throw, to make it less sensitive, move the clevis to the outside hole.

FLYING



Photo 28

This is what the RC model aircraft hobby is all about – flying! With the Wing Dragon you can be out to the flying field in the length of time it takes to charge the battery for the first time. Pick an open area for your first flights and if at all possible, try to get an experienced RC modeler to coach or instruct you during your first few times out. Make sure that you are not attempting to fly too close to an existing model flying site. Your experienced modeler friend (instructor) can make sure that is no problem. Also listen to your instructor when he tells you about local frequency control.



Photo 29

Flying the Wing Dragon was a wonderful experience. Just make sure the wind is less than ten mph. It will take off a grass field (or any smooth surface) easily without requiring much turn corrections. Hand launching is also easy, but on your first few flights it is better to have a friend do the launching. This way, your hands are on the controls and ready for any corrective action. Also note that the rear facing motor is excellent from a safety standpoint because you are less likely to get your hand in the prop. That prop location tends to keep it protected in a crash or hard landing. So you will likely not break many props. But it is still a good idea to have a spare with you.



Photo 30

At full throttle the Dragon is quite fast. As a beginner, you do not want to be flying at full throttle. I noted that at half throttle I could easily stay in the air and the slower speeds made it much easier to fly. Also consider that, when at lower throttle settings, you are consuming less electrical power which means you will obtain longer flight times. I was easily able to obtain flights of 15 minutes on a single charge of that 1000 mAh battery pack.



Photo 31

As you get more into flying you will be able to do some basic maneuvers such as loops. Just make sure the first few times you try them you have enough altitude to recover, should you make any errors in judgment. Landings are also easy to accomplish because you can slow the Dragon down considerably. During your initial flight training sessions, just try to concentrate on getting the plane back on the ground and somewhere on your flying field. Don't be initially concerned about steering the model. Just reduce the throttle and let the plane sort of "settle in". Your only concern should be to keep the wings level, but in that regard the Wing Dragon is so stable, it will stay pretty much level all by itself. As you get better you can concentrate more on where you land on your field. During that phase you can work on your steering commands (rudder control). You should be able to solo this aircraft after several flying sessions. That will vary with a person's individual skills, but it won't take long.



Photo 32

You might want to consider joining a local RC flying club. Having experienced people around to help can greatly accelerate the learning process. Your local hobby shop should be able to point you to the clubs in the area. If they can't I suggest you try the AMA at www.modelaircraft.org.

If you are really happy and enjoy your first flying experiences with the Hobby Lobby Wing Dragon you should begin to set your sights on your next aircraft. The Hobby Lobby International website at www.hobby-lobby.com has many RTF and ARF (Almost Ready to Fly) aircraft that can take you from rank beginner to the ultimate – expert! Be patient and most importantly – enjoy – remember it's a hobby and a sport!

For more information on the Wing Dragon, please go to: <http://www.hobby-lobby.com/wingdragon.htm>

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