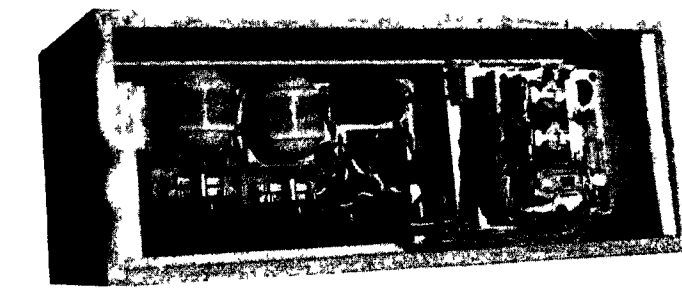


SUITABLE POWERPLANTS —

ENGINE	PROPELLER
MC COY 09 DIESEL 9D 4P	TORNADO
MC COY '9' GLOW	8D 4P
OK CUB 09 GLOW	8D 4P
MILLS 08 DIESEL	9D 4P
OK CUB 075	8D 4P
K & B 09 GLOW	8D 4P
OK CUB 074 GLOW	8D 3P



WIRING PROCEDURE
 WIRE YOUR RADIO ACCORDING TO THE MAKER'S INSTRUCTION, ONLY CHANGE IS THE BATTERY ARRANGEMENT AS SHOWN
 USE ONLY ROSIN CORE SOLDER
 USE #24 STRANDED WIRE
 TEST ALL JOINTS
 TACK GLUE ALL WIRES
 TEST OPERATION THOROUGHLY
 CHECK BATTERIES OFTEN

LIVEWIRE
 R/C INSTALLATION DIAGRAMS
 ON THIS DRAWING THERE ARE SHOWN RADIOS WHICH ARE TYPICAL OF THEIR TYPES AND METHODS OF INSTALLING THEM IN THE LIVEWIRE REMOVABLE UNIT. ALL HAVE BEEN WELL TESTED, BUT OTHERS OF A SIMILAR NATURE MAY BE USED IN THE SAME MANNER, SUCH AS: C-S '27', E. D. BOOMERANG, PORT CONTROLAIRE AERO-TROL, LORENZ, MINI-MAC, SIMPLE SINGLE
 DESIGNED BY *HdeBolt* © 1955 DMCO
 THE dBOLT MODEL ENG. CO. WILLIAMSVILLE, N. Y. USA

"LIVE WIRE REBEL" INSTRUCTIONS

The Live Wire "Rebel" is a realistic appearing full fledged radio controlled miniature aircraft, it is not a toy in any sense of the word. It is especially suitable for use with "single channel" radio equipment and when so equipped it makes an ideal R/C trainer or in the hands of an expert it becomes a fine contest winning model. Developed along the Live Wire design theory it makes the most of "stress engineering" so that you have a light weight rugged aircraft that will carry much more than its own weight in equipment and still provide the ultimate in performance. The Live Wire design incorporates exceptional stability, instantaneous maneuverability, controlled climb and marvelous wind penetration all the result of a well developed compromise factor. The construction is simple and straightforward to give you a long lasting model that is easily assembled. The "Rebel" makes an ideal R/C trainer with its compact size, simplicity and adaptability to such a wide range of radio equipment. Its "forgiving" flight characteristics make it a pleasure to learn to fly with a "Rebel".

POINTS TO BEAR IN MIND

This is a radio controlled model aircraft. Therefore, it is different from all other types and no matter what sorts of models you have used before there are some things which are done differently in R/C which you must do if you are to have success.

First of all the "Rebel" uses a removable R/C unit. This was done so that it would be easy for you to have access to the R/C apparatus, making checks simple and equipment changes a cinch. The removable unit is approved by all radio manufacturers and you should follow their instructions when installing the equipment in the unit. The battery packs are also approved, no changes should be made here as a change could alter the balance of your model or shorten battery life.

Several types of control actuators are shown, any of these will operate the Rebel's controls. Servos are considered to have more power and to require less maintenance, with their excessive power control installation is relatively simple. If it is decided to use escapement type actuators closer attention will have to be paid to the installation. The whole system must be kept completely free from the slightest binding and the control must work down to the very last few winds in the rubber. Don't attempt to fly unless you have met these conditions!

INHERENT FLIGHT CONTROLS OF THE MODEL

Even though you will have control of the model through radio it is also imperative that the model shall possess ability to right itself instantly when all controls are neutralized. With an R/C model you actually only guide the model in its flight, without a pilot in the craft it is impossible to duplicate full scale flying completely as a pilot has a sense of "feel" which it is impossible to have while still on the ground. Without elevators the model must also have a means of controlling the rate of climb or else it soon would get too high. The Live Wire design provides a superior method of obtaining all of these inherent controls.

The main control over your flight is longitudinal stability which regulates your rate of climb, angle of glide and wind penetration. It also adds to the ability of the model to recover from maneuvers into smooth level flight. This stability is set up by the angle of the wing and stabilizer in relation to the thrust line and the center line of the fuselage. With the Live Wire the wing is set at 5 deg. positive and the tail at 3/4 deg positive to both the thrust line and the center line. These settings are important if your model is to fly well under all conditions and should be adhered to very closely.

The other important point to watch is the location of the balance point of your model. The center of gravity controls the gliding angle of the model and helps in wind penetration. In R/C it is desirable to have the model glide flatly with the nose below the horizon, never nose high. This allows you to have a good flow of air past the rudder maintaining constant control and a flat flying model offers the least resistance which speeds up wind penetration. The ideal balance point is shown on the drawings and every effort should be made to keep it there. Above all it should never fall to the rear of the tolerances given, better that it should be forward. Slight differences in workmanship and wood weights can cause a variation in the CG, be sure that you do not build too heavy in the aft part of the model!

Otherwise, if you use the same care in building an R/C model as you would use on any other type you should get along right well. If ever in doubt use control line stunt model experience as a basis for construction.

CHOICE OF RADIO EQUIPMENT

The Rebel can actually use any type of radio equipment as long as the total installed weight of it does not go over 27 oz. maximum. It is an established fact however, that the lighter this equipment is the better will be the performance of the model as a whole. Beginners should choose single channel equipment and actuators for one control only until they gain a bit of experience flying by R/C. In most cases a second control can be added later easily, especially engine control. For them the best type of equipment is that which is of the highest quality and with the least adjustments to make, things are easier to understand and are more dependable that way. The choice of actuators is important, do choose one which is reliable, powerful and built to last. Dmeco offers Multi-Servos which have many advantages in this respect.

CHOICE OF POWERPLANT

Choosing the proper power for the model is important, a properly matched model, engine and propeller can mean the difference between an average model and one which is really outstanding. On the drawings is given a table of

powerplant combinations, among them is one to suit your combination or you may have an equivalent of another make. It is important not to over power the "Rebel", better that it should be underpowered at the beginning. In most cases if your total model weight will be under 37 oz. one of the .09Glow engines is most suitable. Much less than that and a .075 diesel or glow can be used. If the weight will be greater than 37 oz. a .09 diesel type would prove more suitable. The propeller is important, especially the pitch. Never use over 4" pitch as this matches the models flying speed, additional pitch can give serious speed build ups under some conditions. For peak engine performance a fuel tank of the R/C variety should be used, one of the suitable types is shown.

CONSTRUCTION

The first step is the removable R/C unit which is used as a jig in building the fuselage. Take the two radio beams and cement them to the sides. Set the sides up on the drawings and cement the end pieces in place. Install battery compartments, terminal block and mounting pieces to suit your particular radio and actuator. Add the bottom floor after all wiring has been completed.

FUSELAGE

Use the R/C unit as a jig by placing it in its location on the drawings. Cement the vertical stiffeners to bulkheads No 2 & 3. Pin them in place on the R/C unit. Now erect the remaining bulkheads in their respective places. Splice the keel pieces together as indicated, note that the bottom edge is a straight line. With the bottom edge down cement the keel pieces in place on the bulkheads to form the fuselage base. Add the fuselage sides. Install the upper fuselage longerons. Cement the cabin sides in place and add the pine cabin block. Install the maple engine mounts using bulkheads No 1 and 2A, add bulkhead 1A. Now, cement the fuel tank in its proper location. The top cowl sheeting is now installed, dampen the outside to allow it to bend easily. Install the top fore and aft stiffeners in the R/C compartment. Add all sheet fill in at the rear of the fuselage. When dry remove from bench for all underside work. Install all fore and aft stiffeners between bulkheads No 1 and 2. Add bottom cowl sheeting. Cement the nose cowl blocks in place. Install the bottom stiffeners in the R/C compartment. Cement the maple gear block in place well. Install landing gear dowels. Make the cross bulkheads by tapering 3/4" sq material and cement them in place. Add the bottom stringers as shown. Fill in with sheet where required. Add tail skid and block. Make all necessary access openings and stabilizer mount checking it carefully. Using a sharp knife and a sanding block work the whole fuselage down to a smooth surface. All equipment installations should be made at this time, actuators, push rods, switches and engine. Check carefully for operation and remove to prepare for covering.

RUDDER AND FIN

The fin is built up on the drawings as a flat structure from the wood indicated. When it is dry remove it from the drawings and work the airfoil into it with a sanding block. Be sure there are no warps. The rudder is sanded to a wedge shape and fastened to the fin with "Perfect" brand cloth hinges. It may now be cemented to the fuselage checking alignment carefully.

STABILIZER

The stabilizer ribs are first assembled on the main spar. Place the assembly on the drawings and block up the trailing edge evenly so that the ribs can meet it on an even keel. Add the leading edge and cement the structure. When dry remove and add the tapered trailing edge, if elevators are desired use fabric hinges, if not cement in place. Install the tips and braces. Cover the center section with 1/16" sheet and when dry sand the entire structure well to prepare for covering.

WING

The wing panels are built separately, joined later for the dihedral and spliced. Both panels are built over the same drawings by reversing the center rib and the tip rib for the opposite panel. Proceed as follows. Pin the main spar in place. Set all ribs in place on it, note that center ribs need to be blocked up 1/16" to compensate for center section covering. Pin leading and trailing edges in place and cement well. Add the center section splices to this panel. Now install the trailing edge skin and the wing tip. When completely dry remove from drawing and assemble the opposite panel. Be sure that the splices line up exactly with this new panel. While this panel is drying the opposite panel can be spliced to it, block it up evenly to provide perfect alignment. When dry remove from bench and add the center section covering exactly as shown. The wing is completed by working it down to a smooth contour with a sharp knife and sanding block.

COVERING AND PAINTING

It is smart to cement gauze protection strips to any portion of the model where rubber bands will apply pressure, wing and stabilizer trailing edges for instance. The entire model should be covered with silk span or silk if you prefer, not Nylon. First sand the whole model well with fine sand paper, then apply a heavy coat of fuel proof clear dope. When dry sand lightly again and then add another coat and sanding. The fabric is easiest to apply wet and one section at a time, 4 sections to each part of the model. Lay the fabric on the section to be covered with the grain of the fabric running the long way of the section, working from one end carefully draw it up taut working out all wrinkles as you do. Then while the fabric is still wet apply a coat of clear dope onto the fabric wherever it covers wood, do not dope where there is no wood. When dry apply two more coats of clear dope to the whole surface and after thoroughly drying sand the whole structure well with light paper. Add two more coats of clear dope sanding lightly between each coat this time. Now, color may be applied, two coats sprayed if possible. Do not use excessive amounts of colored dope, it is heavy. A well trimmed model is impressive, use an attractive color scheme and be proud of your job!

RADIO INSTALLATION

You will note that all radio equipment including the actuators is installed in the removable R/C unit, thus all installing can be done out of the model. Methods of installing the receiver, actuators and batteries are shown, choose the method which best suits the recommendations for your equipment. Follow the manufacturers instructions carefully, in most cases the battery compartment shown will more than meet the requirements, if not do change it so that it will come up to the minimum required. This model uses pencils as they are very compact, easily obtained and usually fresher stock. In wiring the receiver and actuators follow the circuit given with them, it will be best. Use a good toggle switch and run all wires through the terminal block as shown so that battery replacement will be simple on the flying field. Keep all wires as short as possible and tack glue them to the box wherever possible.

When the radio requires a long antenna run it from the receiver out of the radio compartment underneath the trailing edge of the wing and then to the rudder. Fasten it at the rudder with a hook and rubber band. With rubber band mounted receivers be sure to use a good strong restrainer cord fastened from the receiver to each radio beam, this will keep the receiver from bouncing forward during a rough landing. Take plenty of time and make a nice neat installation, check it thoroughly, use fresh batteries and there will be no troubles at the flying field!

PREFLIGHT CHECK

In preparing for your first flight the best insurance in the world is the careful check against the plans that you can do at home! Live Wire models will fly right off your work bench if everything is exactly as shown on the drawings, so measure carefully and be sure. First, assemble the model as for flight, next choose a flat smooth surface such as a table top. Then build up a pile of books on it so that when the bottom of the fuselage rests on them the wheels will clear. Place a 1/2" sq piece of wood on the books and rest the fuselage on it, move the model until a perfect fore and aft balance is obtained. Mark the spot on the model with pencil and check it against the point shown on the drawings. If they should not agree add ballast until they do, they must agree period. While you are at it the wing should be balanced also, when laid on a flat surface it should hover on the center line, add ballast to the lighter panel until it does.

The third check is to see that the wing and tail angles are correct. This is done by blocking up the tail skid until the bottom edge of the fuselage keel pieces are parallel with the table top. Now you can measure from the table top to the center of the leading and trailing edges of both the wing and stabilizer. Subtract these

dimensions to get the amount of incidence in each, the incidence should agree with the same dimension taken from the plans. If it should not agree shim the part at fault until it does agree, cement the shims in permanently. Check your fin and rudder to see that they align in neutral, does the engine have the correct side thrust as shown? Take the time to be sure that all is exactly as the drawings show, be sure that your radio equipment is operating without a hitch and you are ready for your first flight!

FLYING YOUR "REBEL"

The Rebel may very well be your first model, if it is do not get over anxious and try to follow these instructions. First check run the engine and get a good adjustment for it, while doing this check the radio with the engine running to be sure nothing will bother it. Then you are ready to check out the model. Your model should be test glided before power flight is attempted as a means of assuring yourself that it is in proper trim. To do this choose a clear area of about 300 ft., run into the wind with the model at a brisk clip and launch it with a moderate shove towards a point approximately 50 ft. ahead of you on the ground. Be sure that you hold the nose pointed down at this point and not above the horizon, if the nose is held too high the model will balloon up on you and stall resulting in its falling to the ground. The glide will be excellent if it is straight into the wind and the fuselage remains about level with the ground. You do not want it to land roughly which would be a sign of the tail being too high, nor do you want it to glide with the tail hanging down so that it "floats" along. Tail high conditions are corrected by adding a shim under the leading edge of the stabilizer if necessary, tail low can be corrected by adding the shim under the trailing edge of the stabilizer. In either case a maximum of 1/16" should do it, if not you have trouble in your settings or balance. To correct for any turning tendency simply adjust the rudder from neutral until the turning stops, if you should require over a 1/16" offset here it is a sign of bad alignment somewhere, check for warps in the wing or tail etc. and remove them before flying. Do try several glide tests even after things seem right, gliding can tell you a lot about what to expect from the model in flight so watch it carefully.

FIRST POWER FLIGHT

For your first power flight do choose a day when the wind is not blowing, you will be anxious enough without having wind disturbances to confuse you! If you have followed faithfully to this point your first flight should be uneventful for your model is completely ready to be flown! For the first flight use some means of controlling the engine run such as measured fuel. Use only enough for the engine to run about 1 1/2 minutes which will give you a one minute flight in most cases. With everything handy and in order start the engine and when running smoothly check to see that the controls are operating correctly, if all is well have a helper run with the model into the wind and launch just as you did for the gliding. The model should go out in a straight line for about 100 ft. or so and then start to gain altitude slowly. Just remember that the model does not require control to fly, so do not use any control until the model is well airborne. Even then, just apply very short touches of it at a time, but do note how it reacts to the controls. For this first short flight concentrate on seeing just what happens when the control is applied, it will be time enough to guide it and fly it about on succeeding flights. During this first flight note whether the model has a natural turning tendency and if it does is the turn present both under power and in the glide? If it turns only under power it is compensated for with engine thrust, for a right turning tendency remove some of the side thrust. For a left turn add more side thrust. If the turn is there under power and in the glide make the adjustment with the rudder only. Changing the thrust or rudder 1/32" will make a distinct change in the flight.

Once the model is trimmed out you can enjoy flying it about. In this flying there are a couple of cardinal rules which can help you to keep out of trouble. First of all always fly out into the wind for a distance, do all your flying "up wind" and you will be safer in case of control failure. Secondly, if the model gets out of control because of your actions do leave it go by itself, the model is inherently stable and will recover without your help and probably in a much safer manner! Methods of flying it will vary with the type of equipment used, for the most part they will probably give you either full control or neutral. In this case the rudder action is such that if you use the full amount for any length of time, a few seconds, the model will respond with a violent turn. This is done so that when needed such a violent turn is possible, yet by properly applying the control a smooth shallow turn can be had also. The shallow turn is accomplished by sending a series of signals for the required rudder direction, in effect this would be neutral, rudder, neutral and then rudder again continuing the cycle as long as the turn is desired. Usually the sequence would be quite short. The result of such action is the same as a lesser amount of rudder action. Flying by this method is called "beeping" which is simply sending a series of commands for one control instead of just one steady command. It provides an advantage in that you can have a lot of control or just a little as the situation requires, yet it is not necessary to have a complicated radio rig.

As you progress with your flying you may wish to try a bit of stunting. For most stunts it is necessary to build up excessive flying speed first. With a single control rudder only model. This is done by holding the model into a turn abnormally long, as you hold the control on the model will keep turning sharper until the nose drops into what is known as a spiral dive. Above normal flying speeds are built up quickly this way. Any time that you neutralize the control on a "Rebel" while in a spiral dive the model will automatically seek normal flight again, it may gyrate a bit before it does but it will level out. This action is what is used for stunting, just a turn or so of the spiral will cause the model to perform a stall, more turns with a momentary application of opposite control to bring the model out of the spiral can give a loop. If after several turns full opposite control is applied the model can roll. If a quick recovery to normal flight after a stall is desired the model can be flown in a wide turn to dissipate the speed. Just remember that stunts use up a lot of altitude, so never attempt them low down. There is no substitute for lack of altitude!

Landings are one of the finest things of radio controlled flight. You can quickly learn to get back to your take off spot every time and it requires no special skill to perform spot landings. If you stay upwind with your flying they are much easier. When ready simply head the model downwind so that it will pass off to one side of you as it goes by, allow it to go on down wind until you judge the altitude to be just about right for the model to glide back to you. Then execute a 90 deg turn cross wind, if the altitude seems just right make another 90 deg turn into your landing approach. If you were too high you can delay the second turn until things are right. If you approach the final touch down to low nothing can be done, however should you be slightly high a series of short turns in a "S" fashion will lose altitude quickly for you. There is nothing more satisfying than to complete a radio controlled flight with a touch down right on the take off spot!

We have covered the fundamentals here, specific information that will let you obtain successful R/C flights. What happens after this is up to you, the field of radio controlled flying is sky wide with enormous possibilities depending just how far you care to go. You have started with a marvelous model, the future holds anything that you can possibly dream up, in R/C there seems to be nothing which can not be done!

Good luck, and may you have many, many more fine flights with your "Rebel"!

LIVE WIRE "REBEL" PARTS LIST	
Removable R/C unit	1 maple gear block 1/4 x 1 1/4 x 4
3 side & bottom sheets	1 tail skid mount maple 1/8 x 1 x 1
2 end pieces	1 3/16 x 25 dowel
1 reinforcement strip	1/8 x 3/8 x 16
1 pine control mount	1 leading and trailing edges 3/16 x 3/16 x 10 1/4
2 pine receiver mounts	1 rib material 1/8 x 3/8 x 18
FUSELAGE	
2 front keel pieces	1 leading edge 3/16 x 3/16 x 19 1/2
2 rear keel pieces shaped	1/8 x 3/8 x 20
2 fuselage side pieces	1 trailing edge spar 3/16 x 1/4 x 19 1/4
2 cabin side pieces shaped	1 trailing edge tapered 3/16 x 3/4 x 19 1/4
1 cowl covering material	1 center section covering 1/16 x 2 x 12
1 fore and aft nose reinf	2 stabilizer rib sheet die cut 1/16 x 3 x 9
1 Bulkhead No 2	1/8 x 3/2 x 5/16
1 Bulkhead No 3	1/4 x 1 1/2 x 4 11/16
1 Fill in material	1/8 x 2 x 16
2 cabin stiffeners	1/8 x 3/8 x 18
2 cabin stiffeners	3/16 x 3/16 x 17
6 fuselage longerons	3/16 x 3/16 x 19 1/2
1 cross bulkhead stringers	1/4 x 1/4 x 21 1/2
2 bulkhead sheets die cut	1/8 x 3 x 8
1 bulkhead sheets die cut	1/8 x 3 x 8
1 bulkhead sheets die cut	1/8 x 3 x 8
2 side cowl blocks shaped	1/8 x 1 1/2 x 8
1 bottom cowl block shaped	1 3/16 x 2 1/8 x 3 1/4
1 pine cabin block	1/2 x 1 11/16 x 2 1/8
2 maple engine mounts	1/4 x 7/16 x 4
	3/8 x 3/8 x 6
	2 leading edges 1/4 x 7/16 x 23 1/2
	2 main spars 1/4 x 5/8 x 24 1/2
	2 trailing edges tapered 1/4 x 11/16 x 23
	2 trailing edge skins 1/16 x 3/4 x 23 1/2
	1 center section covering 1/16 x 2 x 21
	4 wing tips die cut 1/16 x 3 x 9
	3 center rib sheets die cut 1/16 x 2 1/2 x 9
	6 main rib sheets die cut 1/16 x 2 1/2 x 9
	Hardware
	1 formed dural gear 2 sheets Silk Span
	1 formed dural rudder horn 6 No 4 and 1/2" wood screws
	1 1/16 x 27 wire 2 4 40 x 1 1/4" bolts
	1 1/32 x 10 wire 4 4 40 nuts