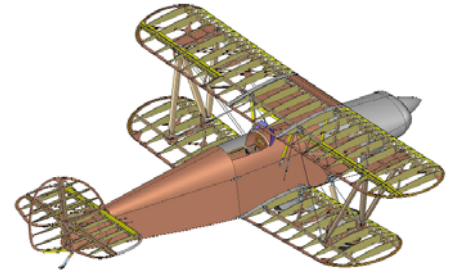


# Scale Built R/C Fury II General Assembly Information



**T**hese general instructions for all of the assemblies is an overview on the format of the instructions and explanations of nomenclature. Also included is the part numbering system that we use. Note that there are several computer generated illustrations located in the instructions. The use of these detailed, almost photo quality, illustrations makes it easy to understand the location of the various parts and sub assemblies used in the construction of the aircraft components.

These instructions are written with the understanding that all of the parts for assembly have been made or were purchased as a short kit. A separate information sheet is provided for tips on cutting out the parts by hand.

All our printed material other than the large full-size assembly drawings are provided on-line at no charge. Because we are not printing the instructions and other written items like this General Assembly Information, we are not concerned about the cost of printing that we would have to pass on to our customers. We will use as many pages as it takes to provide the information required to construct our Fury II aircraft.

Some may think that because there are so many pages in the instructions, the aircraft must be hard to build. That is not the case at all. Most model aircraft kit instructions are limited by the cost of printing those instructions. We are perhaps providing too much information for some experienced builders, but we feel that there is no such thing as too much information for the builder. Even some of the experienced builders may be surprised about a few things that they didn't think about.

## **THREE RING BINDERS.**

**We** recommend that all of our printed material and the smaller 8 1/2 x 11 inch A-Size drawings have holes punched in them and stored in 3-ring binder. Use a 3-hole punch to make the holes. Pages can be easily removed for reference use and easily updated.

Four binders are to be used for the instructions and the smaller drawings; one for the tail group, another for the fuselage, one for the wings, and the fourth one for the landing gear, flying wires, control systems, cabine struts, and the covering and painting of the aircraft.

For easy reference, we suggest that the binders be organized with table of contents dividers. Each assembly will have its own divider. Behind the binder would be the instructions followed by the A size (8 1/2" x 11") drawings that pertain to that assembly.

## **CONSTRUCTION MATERIALS REQUIRED TO BE PURCHASED:**

**All** the construction materials that need to used to build an assembly are listed. This would include such items as glue, particleboard for jigs, wax paper, etc..

## **WOOD PRODUCTS TO BE PURCHASED:**

A listing of all of the wood items is provided. This list does not include the wood for the laser cut parts. If the builder will be cutting out the individual parts himself, the individual drawings will provide the information to what kind of

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material should be used.

#### **OTHER MATERIAL ITEMS TO BE PURCHASED:**

This list would include such items as aluminum sheeting, steel strips and tubing, brass sheet, brass tubing, and other brass shapes, piano wire, cable, etc..

#### **FASTENERS REQUIRED:**

**T**he various fasteners; nuts, bolts, washers, clevises, etc., are listed for the particular assembly being built. Separately there will be a shopping list of items that need to be purchased. This list will included the grand total of the various fasteners required.

#### **TOOLS REQUIRED FOR ASSEMBLY:**

**A** list of recommended tools and items to make the assembly easier to make. Most of the tools listed are commonly found in a home work shop. This would include such items as an X-Acto knife with a #11 blade, razor saw, sand paper and sanding blocks, screw drivers, pliers, files, hammer, etc..

Also included are common power tools such as an electric drill motor, Dremel tool, drill sizes required (a full number and fractional set of drills is recommended) from 1/16" to 1/4", soldering iron.

#### **DRAWINGS REQUIRED FOR ASSEMBLY:**

**T**he various drawings needed to for the assembly are included. This includes a top or side view of the complete assembly and a part list. The part list also includes the following items; item number (a simplified part number) which also is the sequence of assembly number, the actual part number, description of part, quantity required, and the material used.

#### **PART NUMBERING SYSTEM:**

**P**arts have a coding system. This is required for our computer generated drawings. All part references are printed in bold print. Description for part number **#IF28-1A**, the Fury's fin assembly, is as follows.

# symbol indicates a part number.

**IF** indicates the name of the model, laacs Fury

**28** is a reference for the part number of the fin assembly.

- is a dash to further break down the description of the part.

**1** is the part number of the assembled fin.

**A** indicates that this part is an assembly.

There can also be additional parts that are sub-part of the original part. These would be indicated with another dash number.

There also can be a **L** or **R** that would indicate a left or right hand part. Many of the right and left hand parts are identical except for a bent portion of the part. The right hand part may be bent 10 degrees one way, and the other part is bent 10 degrees the other way. Our computer system requires that the right and left hand parts have their own individual number, thus the L and R is added to the part number.

***Note that after the first reference of the formal part number is given in these instructions, the first two let-***

*ters and two numbers will not be used. This is done to simplify the instructions. Part number #IF28-1A will later be referenced as # -1A.*

## ITEM NUMBERS:

**I**n addition to our part numbers, a unique item number system has been designed. All of our parts must have a individual part number assigned so that the computer system can identify every part. Instead of a random number, we have a groups of letters and a series if numbers separated with dashes. The part number can be quite long.

To simplify the part numbering system, we have come up with an Item Number concept. The Item Number assigned is also a sequence number. The part that starts beginning the assembly process is identified as Item Number 1. The next part added to the assembly is Item Number 2, and so on. We suggest that the A-size item drawings be placed in the 3-ring binder in individual groups by assemblies and arranging the drawings in numerical sequence.

## TWO GENERAL GROUPS OF PARTS WITH DRAWINGS:

**T**here are two general groups of parts with drawings that are made by the builder. One group are the parts specifically made for a particular assembly. A wing rib for example. The parts are identified in the drawing title block as an Item Number. *The actual part number is listed in the drawing too.*

The other group that have drawings are parts that are used in multiple places. For example, the alignment jig blocks that are used for building the wing and tail group. The jig blocks are are identified in the drawing tile block as an drawing number. *The actual part number is also listed in the drawing.*

## BUILDING JIG:

**I**n most assemblies a wood building or alignment jig is recommended. These jigs are simple to build and normally are made from particleboard and pine molding strips, both of which are found in home supply stores.

## ADHESIVES AND GLUES:

**S**everal types of adhesives are used in the construction of the Fury II. The three basic types are, white glue, CA glue, and epoxy glue. The newer expanding polyurethane glues, Gorilla and Grizzly, can be used in many applications. There are advantages of using of all of these adhesives. Shown is our choice of what adhesive to use for various steps in the construction. There are many adhesives to glue the parts together. The builder should use personal preferences and or recommendations from others for what type of adhesive to use for any given assembly. We prefer the use of T-88 epoxy for all the hardwood parts and as an alternative, Elmer's white glue.

## ACCURACY AND TOLERANCE OF PARTS:

**M**ake the parts as accurate as you can with your skill and to a major consideration, the type of tools and equipment you have to make the parts. We try and work with a plus or minus 1/64" of an inch. Closer tolerances are sometimes required and are so noted on the individual drawings.

When using thick epoxy glues it is desirable to have a slight gap (.005 to .010 inches) between the joining of two parts. The small gap is where the epoxy glue can be located instead of being squeezed out by a force or clamped fit between the parts to be joined. A means of holding the part in position is required when there is a gap in the joint. Our jigs provide for the holding the parts in position.

## STORING OF PARTS:

**We** recommend that the builder uses ZipLock plastic bags in the quart and gallon sizes to keep track of the individual parts, fasteners, and jig parts. Bin boxes should be used for larger parts like the 2 foot drill jig for the drilling of the hinges in the wing and ailerons.

## BASIC PROCESS OF CONSTRUCTION:

**The** assembly of the various parts is depicted in a series of illustrations. Each illustration provides a visual explanation of the step by step process to assemble the components. If there are questions about a part, the bill of materials for that assembly or part fully describes the item.

In our assembly instructions we show step by step illustrations of how to assemble an assembly. The major assemblies are usually made in a jig of some sort. The first part placed in the jig is item #1. The next part placed in the jig is item #2, and so on. Only the item numbers are mentioned in the assembly illustrations and in the written part of the instructions.

## BUILDING STEP NOMENCLATURE:

**Each** building step starts out with a new step number. There are times that the previous step has only a small amount of information on its last page. The space is left unused in case additional information is to be added into that that building step. From time to time, we will temporarily add something to fill in that space such as a photograph that has something that pertains to the part being assembled.

## ASSEMBLY INSTRUCTIONS ARE INDEPENDENT OF OTHER INSTRUCTIONS:

**All** of the various assembly instructions are of a stand alone design. All of the information to make an assembly is included. In this way the builder doesn't have to go back and forth to previous or future instructions. Also if there are more than one builder involved, each builder can work on a given assembly without having to refer to an assembly that is not available for him. In one sense, our instruction manual for the entire aircraft is much longer than necessary because we duplicate many of the building steps in each of the individual instructions.

## BILL OF MATERIALS:

**The** bill of materials shows all of the items in each assembly. It shows the item number, part number, description, quantity, the type of material used and drawing numbers.

The item number is a quick reference number instead of the more complex computer part numbers. The item numbers are used in all the instructions and illustrations. They are also provide a sequence number that the parts are assembled. Starting with **Item #1**, it is placed in the jig first. Then **Item #2** is placed in the jig, and so on. The assembly illustrations indicate which item goes where. Parts that have the same sequence number are ones that during the assembly process where it doesn't make any difference which part is assembled first.

Item numbers with a bracket around them **do not** have a drawing available. They are purchased items used as nuts, bolts, washes, ball links, clevises; or other purchased items that require no modifications such as wheels, servos, batteries, engines, and gas tanks. We use a bracketed number for these parts that indicates the sequence number.

All parts in the construction of our Fury II have a part number. Even a simple washer has its own drawing and part number. Many drawings like the washer are not needed by the builder. This washer in the bill of materials is only given a item number and a full description of what it is and what material it is made from. Also the quantity of how

many are used in the individual assembly.

A brief description of the part is given.

The quantity shown reflects only the number of the items required for the individual assembly. It is not the total quantity required to build the complete aircraft.

Type of material is given as well as the size or thickness of the material.

The last column is the drawing number. The majority of the parts are item numbers and these parts are identified as a item number, not by the computer part number. Typically, assemblies are identified by a drawing number. Parts are shown full size unless otherwise noted. Bigger drawings are B,C, D, and custom size drawings are called E sizes. **The part numbers in bold print have drawings that do not fit into the A size format.** Next to the part number in bold print is a code with a letter and a number. A typical code would be E1. E1 is the first of a series of large drawings (24" x 48"). The E1 drawing is one showing only tail group parts. There are many item numbers shown in most of the larger drawings. Above the title block of the drawing is a table of contents that indicates which parts are on the drawing and where they are located.

Parts with a triple asterisk after the description **do not** have individual drawings supplied. These parts are cut from strip stock whose length is measured in place and cut to size individually.

Part numbers that end with an A are assemblies. An R or a L indicate a right or left hand part.

Assembly items **do not** have a material description. The description of the various items in the assembly are shown in the assemblies own instructions and in its bill of materials.

## SEQUENCE OF BUILDING ASSEMBLIES AND INSTALLING INDIVIDUAL PARTS.

**The** various assemblies should not be built in a random order. If they are made in such an order, a particular assembly may not properly be attached to the various parts of the assemblies. Our jigs and fixtures are not built and designed by a major tool and die company. We rely on using one finished part that acts like a jig so that it can be placed in the proper position or that a hole on each part is aligned properly so that a bolt can be placed in the hole to join the two parts together.

For example:

**The** assembled vertical fin must be bolted to the rear vertical part of the fuselage. There are two bolts that attach the fin to the fuselage. The holes in the fuselage must be aligned to the previously drilled holes in the fin's spar. To accurately place the two holes in the fuselage part is somewhat difficult to do without special tooling. The simply and extremely accurate way to do this is to hold the fin in position against the fuselage where it will be attached. Then using a drill motor, place the drill into on of the attachment hole location in the fin's spar and drill through the spar in to the fuselage where the fin will be attached. Then bolt the fin onto the fuselage. With the fin firmly in position, drill the second hole into the fuselage. Place the second bolt in place and secure it in place with a nut. I call this matched hole drilling.

**The** matched hole drilling is done in many different situations. Sometimes a simple aluminum sheet drill jig is used to locate the holes in both parts. This is done with the drilling of the holes for the hinges in the flight surfaces.

**Now** back to the original comment about the order of making the various assemblies. We suggest that the assemblies be built in the following sequence or order and why this sequence. **Note that this sequence is presented as a informal VERY ROUGH draft with numerous errors and will be corrected as we progress with the**

## building of the prototype model.

1. **Vertical Fin.** The fin is somewhat an easy part to make. The making of this part will get the user familiar with the method of construction and of the understanding of our instructions.
2. **Rudder.**
3. **Stabilizer.**
4. **Elevators.**
5. **Rear Portion of Fuselage.** (complete but without sheeting)
6. **Installing all Rear Portion of Fuselage Bulkheads.**
6. **Tail Skid.**
7. **Installing Tail Group, Tail Skid, and Stabilizer Braces onto Rear Portion of Fuselage.** (no sheeting)
8. **Installing Elevator and Rudder Servos and all its linkage.**
6. **Front Portion of Fuselage.** (frame only no sheeting, firewall and rear bulkhead only)
7. **Bottom Wing Panels**
8. **Top Wing Center Section.**
8. **Install Rudder and Elevator Servos, Trays, and All Linkage in Rear Fuselage.**
9. **Remove Rudder and Elevator Servos, and Pull-Pull Cables from Rear Fuselage.**
7. **Bottom Wing Panels.**
8. **Installing Front Fuselage Fittings.**
9. **Installing Front Fuselage Bulkheads** (no motor mount box parts)
10. **Cabine Struts.** (no streamline faring strips)
11. **Top Wing Center Section.**
12. **Installing Cabine Struts.**
13. **Installing Cabine Cable Braces.**
14. **Top Wing Panels.**
15. **Installing Flying and Landing Wires.**
16. **Landing Gear.**
17. **Installing Landing Gear.**
18. **Motor Mount Box and Attachment of Engine.**
19. **Remove all Assembly Items that are Attached to Front Fuselage.**
20. **Install all Front Fuselage Cockpit details**
21. **Install Throttle Servo and its linkage, and Ignition System Components in Front Fuselage.**
22. **Remove Throttle Servo and Ignition System Components from Front Fuselage.**
23. **Join Front and Rear Fuselage Fames.**
24. **Install in Front and Rear Fuselage Receiver(s), Batteries, Switches, Wiring, Wiring Retainer Clamps.**
25. **Reassemble all Major Assemblies, Flying Wires, Cables, Radio Equipment, Landing Gear and Tail Skid, and everything else that has been previously attached.** Note that all of the nuts and bolts don't have to be installed, just enough to secure the various fittings and assemblies into position. One might say that this is the second time we have assembled everything together, and that is partially true. However, we want to make sure that everything goes together and that the radio equipment and servos work properly. Perhaps the main reason is that if the fuselage sheeting (1/32" Plywood) had been previously installed, there would be several bracket that cannot be attached since one can not have access to put in the bolts or nuts in place.
26. **Take everything off that is bolted to the front and rear Fuselage Assemblies.**
27. **Attach the 1/32" Plywood sides to the front and rear Fuselage Assemblies.**
28. **With the fabric covering that will be used, cover the 1/32" Plywood Fuselage Sides.** If the fabric covering is installed after the fuselage fittings are already installed, it will be difficult to make the area around the fittings to look good.
29. **Install all of the Front and Rear Fuselage Fittings.**
30. **Install the 1/32" Plywood Sheeting on the Bottom of the Front and Rear Fuselage.**
31. **Install the 1/32" Plywood Sheeting on the Top of the Front and Rear Fuselage.**
32. **Cover the Fuselage with Fabric and apply paint.**
32. **Install the .016" Aluminum Sheeting over and under the Gas Tank area.**
33. **Install the Cockpit Door Assembly.**

34. **Install the Engine.**
35. **Install the Cowl Assembly.**
36. **Install the Cabin Strut and cables.**
37. **Reassemble all Major Assemblies, Flying Wires, Cables, Radio Equipment, Landing Gear and Tail Skid, and everything else that has been previously attached.** Note that all of the nuts and bolts don't have to be installed, just enough to secure the various fittings and assemblies into position. One might say that this is the second time we have assembled everything together, and that is partially true. However, we want to make sure that everything goes together and that the radio equipment and servos work properly. Perhaps the main reason is that if all the fuselage sheeting (1/32" Plywood) had been previously installed, there would be several brackets that cannot be attached since one can not have access to put in the bolts or nuts in place.
38. **Measure and locate where Rudder and Elevator Pull-Pull Cables exit the Fuselage Sides.**
39. **Install Streamline Fairing Strips on Cabine Struts.**
40. **Take everything off that is bolted to the Front and Rear Fuselage Assemblies.**
41. **Attach the 1/32" Plywood sides to the Front and Rear Fuselage Assemblies.**
42. **Cut out holes in Rear Fuselage Sides for Pull-Pull Cables.** *(Use dimensions previously determined.)*
43. **Varnish the Front and Rear Fuselage Frames and the inside of the 1/32" Plywood Sides.**
44. **With the fabric covering that will be used, cover the 1/32" Plywood Fuselage Sides.** If the fabric covering is installed after the fuselage fittings are already installed, it will be difficult to make the area around the fittings to look good.
45. **Install all of the Front and Rear Fuselage Fittings.**
46. **Install the 1/32" Plywood Sheeting on the Bottom of the Front and Rear Fuselage.**
47. **Varnish the Fuselage Bottom Sheeting.**
48. **Install the 1/32" Plywood Sheeting on the Top of the Front and Rear Fuselage. Paint with Varnish First.**
49. **Cover the Fuselage with Fabric and Paint and Pinking Tape.**
50. **Cover the Wings and Tail Group with Fabric, Pinking Tape, Drain Grommets, and Inspection Rings.**
51. **Paint the Wings, Fuselage, and Tail Group.**
52. **Install the Pull-Pull Cable Guides on the Fuselage Sides and top of Stabilizer.**
53. **Install the .016" Aluminum Sheeting over and under the Gas Tank area.**
54. **Install the Cockpit Door Assembly.**
55. **Install the Engine, Ignition System, and Gas Tank.**
56. **Install the Cowl Assembly.**
57. **Install the Cabine Struts and its Cables.**
58. **Reassemble the Aircraft with all the Assemblies and also with the Flying Wires, and Pull-Pull Cables.**
59. **Now is the time to take pictures of the finished model.**

#### **AD's: (Aircraft Directives)**

**AD's** in the full-scale aircraft industry are called Aircraft Directives. The AD's are sent by the FAA to all certified aircraft owners when there is a problem with the safety and operation of their aircraft. They can be minor issues that don't effect the immediate safety of the aircraft, but these changes have to be made by a certain time limit. Some of the AD's can be really important and must be fixed immediately. An example is if the wing spars have to be repaired or replaced. A permit, with restrictions, is issued to be able to fly the aircraft to a repair facility.

We are going to use somewhat a similar AD system. With our AD system we will try our best to keep our Fury II customers notified of any changes and also for us to keep track of any changes and corrections in our Fury II aircraft. The AD's will be issued by email. Our on-line instructions and the 8 1/2 x 11 inch drawings in a PDF format will be updated constantly and available on-line 24-7.

The AD's will start to be made when we have, or a customer has, nearly completed the first prototype aircraft. Our AD's will be issued for many reasons such as **major errors** in the written text, changes in the sequence of assembling the parts, change in the part, change in the illustrations, corrections of dimensions, etc.. The major changes will be recorded as soon as practical and emailed to our Fury II customers.

Changes or revisions that are **minor** in nature such as a change or addition in the text, a new dimension added, and errors or questions that come up that the builder can easily correct or compensate for, will not necessarily have an AD created. These changes will be made in the instructions or drawings when there is time available to do so.

Our AD's will be noted to the right of the check off box ( [ ] ) in the paragraph concerning the part change. For example, consider a *hypothetical* Aircraft Directive #1 (AD1).

The following is a *hypothetical* change of the assembly instructions.

[ ] Next drill a 1/8" hole into bracket **IF#123435**.

Example of how a AD notice is shown in the corrected part of the instructions.

[ ] ***AD1*** 52210. Next drill a 3/16" dia. hole into bracket **#IF12345**. The bracket in now made from .062" 2024T-3 aluminum.

Note that the AD notice is shown in bold type, italics, and underlined. AD1 is the first AD issued for this part. AD2 being a second notice or the rescinding the first notice. The number 52210 is the date of the AD notice (May 22, 2010). The items underlined (3/16" dia.) and the change in the thickness of the material are the changes that were made in the part. The part number **#IF12345** is in bold print. Any time a part is listed in the instructions it will be in bold print.

Part number **#IF12345** will be corrected in all the drawings and illustrations when the AD notice is created. The individual part drawing will have been corrected and a revision note shown in the revision box in the upper right hand part of the drawing. If the revision box gets to full of revision notices (hope this doesn't happen) then we delete some of the earlier AD's. A record will be maintained for the older AD's.

The AD idea is new for us. Most likely there may be changes in showing the AD's and the saving of them and the passing on the information of the changes to others. User comments are welcomed. (nelsonhobby@prodigy.net). We think the idea of the AD's is worth the effort.

#### **COMMENTS:**

**We** will have comments added at the end of the various instructions and other printed items. We know that In time we will receive comments and repetitive questions from Fury II builders and those interested in building one. The information from these people are welcomed and many will be initially placed in the comments sections. *This is a quick way for us to post this information.* In time, many of these ideas will be incorporated into our instruction manual(s).

Probably these comments will be shown in a Q&A (Questions and Answers) section. We are trying our best to create the best instruction manual that has ever been created in the hobby industry. Our goal model is to have a set of instructions equal or even better than what was supplied with the full-scale homebuilt Christen Eagle aerobatic biplane. The full-scale Eagle is known to have the best set of instructions of any homebuilt aircraft kit ever offered.