## Pitts Monster Pitts Monster



Aerobatic flying just doesn't get any better than this Pitts ARF. The classic lines of a biplane coupled with the radial cowl, add excitement to the maneuvers you love, knife edge, split S, lumcevac, torque rolls, snaps, and ground-hugging inverted flight. What's more, we've engineered this ARF to get you into the air with a minimum of fuss. So take a few minutes to carefully read the introductory material and then get to work. You'll soon be out at the field with a classic aerobatic champion!

#### WARNING

A radio-controlled model is not a toy and is not intended for persons under 16 years old. Keep this kit out of the reach of younger children, as it contains parts that could be dangerous. A radio-controlled model is capable of causing serious bodily injury and property damage. It is the buyer's responsibility to assemble this aircraft correctly and to properly install the motor, radio, and all other equipment. Test and fly the finished model only in the presence and with the assistance of another experienced R/C flyer. The model must always be operated and flown using great care and common sense, as well as in accordance with the Safety Code of the Academy of Model Aeronautics (5151 Memorial Drive, Muncie, IN 47302, 1-800-435-9262). We suggest you join the AMA and become properly insured prior to flying this model. Also, consult with the AMA or your local hobby dealer to find an experienced instructor in your area. Per the Federal Communications Commission, you are required to use only those radio frequencies specified "for Model Aircraft."

#### LIMITED WARRANTY

Carl Goldberg Products, Ltd. has inspected and certified the components of this aircraft. The company urges the buyer to perform his own inspection, prior to assembly, and to immediately request a replacement of any parts he believes to be defective for their intended use. The company warrants replacement of any such components, provided the buyer requests such replacement within a period of 90 days from the date of purchase and provided the defective part is returned, if so requested by the company.

No other warranty, expressed or implied, is made by the company with respect to this kit. The buyer acknowledges and understands that it is his responsibility to carefully assemble the finished flying model airplane and to fly it safely. The buyer hereby assumes full responsibility for the risk and all liability for personal or property damage or injury arising out of the buyer's use of the components of this kit.

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#### PARTS LIST

- 1. Fuselage
- 2. Cowl
- 3. Fin
- 4. Rudder
- 5. I-Strut (2)
- 6. Landing gear legs (2)
- 7. Wheel Pants (2)
- 8. Canopy
- 9. Belly pan
- 10. Stab
- 11. Elevators (left and right)
- **12.** Top wing with ailerons
- **13.** Bottom wing with ailerons.

#### HARDWARE LIST

Cabane Struts (4) pcs. (12) 4-40x1/2" socket head screws (4) #4 flat washers

I Struts (2) pcs.

- (8) 4-40x1/2" socket head screws
- (8) #4 Flat washers
- (8) 4-40 aircraft lock nuts
- (8) 1/4"x20 eye bolts

Landing gear 2pcs

- (6) 6-32x3/4" socket head screws
- (6) #6 Flat washers
- (2) 4mm axles with lock nuts
- (2) 4mm wheel collars with set screws
- (2) 2-3/4" wheels
- (2) 4-40 T-nuts
- (2) 4-40x1/2" socket head screws.

#### Motor Mounts (2) pcs

- (4) 8-32 x 1" Socket head bolts
- (4) 8-32 x 1-1/4" Socket head bolts
- (4) 8-32 T-nuts
- (4) aircraft lock nuts
- (12) #8 flat washers

#### Flying wires

- (13') braided cable (for flying wires and rudder pullpull.
- (8) metal plates
- (8) 2-56 rigging couplers (4 flying wires 4 rudder)
- (12) cable swages (8 flying wires 4 rudder)
- (3) 2-56x1/2" screws
- (3) #2 flat washers
- (3) 2-56 nuts
- (4) 2-56 golden clevis
- (4) metal clevis clips
- (2) #2 x 1/2" sheet metal screws

#### Pushrods

- (1) 8mm x 17" wooden dowel
- (2) pcs shrink tube
- (1) 5/32 x 19" plastic tube
- (4) 2-56x 1-3/4" pushrods threaded both end(ailerons)
  (2) 2-56 x 7-1/2" Pushrods threaded one end(elevator)
- (1) 2-56 x 20" threaded one end (throttle)-
- (1) 2-56 x 6" rod threaded one end (elevator, servo end)
- (16) golden clevis
- (16) metal clevis clips
- (1) pushrod connector(throttle)
- (16) 2-56 nuts

Tail Wheel

- (1) tail wheel bracket
- (1) 1-1/4" tail wheel
- (2) #6x 3/4" sheet metal screws
- (2) #6 flat washers
- (2) springs
- (1) 6-32 x 3" threaded rod
- (2) nylon adjustable horn bracket
- (2) 1/8" wheel collars with set screws

Control Horns

- (6) 6-32 x 2" machine screws(ailerons and elevator)
- (1) 6-32 x 3" threaded rod(rudder)

(8) #6 flat washers

- (8) #6 nuts
- (10) adjustable horn brackets
- Fuel Tank (500cc 16.91oz.) (3) feet fuel line (1)tank stopper (3) brass tube
- (1) tank clunk

Cowl Mount

- (4) 4-40 x 3/4" socket head screws
- (4) 1/4" long silicone fuel tubing.
- (4) #4 flat washers

Wing attachment

- (2) 8mm x 1-1/2" wooden dowels
- (1) ply plate( mounting bolt reinforcement)
- (2) 1/4" x 2" wing mount bolts
- (2) 1/4" flat washers

Miscellaneous (21) CA hinges (1) 1/8" x 24" nylon tubing (1) 4" x 12" clear plastic

#### Notice:

## Before starting be sure all parts have not been damaged during shipping. Once assembly has been started, all warrenty on parts are void.

Before you begin assembling your **Pitts ARF**, take some time to read through this entire instruction book. It is designed to take you step-by-step through the process and to give you added information on engine and radio selection and set-up, balancing your aircraft, and flying your model. The time you spend will speed the assembly process and help you avoid problems.

#### PREPARING FOR ASSEMBLY

You will need a work area of approximately 24 x 70" which has been covered to protect it from adhesive, as well as cuts and other damage. Many people cover their work area with a sheet of dry wall (sheet rock) and/or waxed paper to prevent CA Glue and Epoxy from ruining the work surface.

#### **CONSTRUCTION TIPS**

IMPORTANT: ALWAYS READ A FEW STEPS AHEAD. This will alert you to coming instructions and will help you plan accordingly.

Using the Parts Identification section, familiarize yourself with the various items included in your kit box.

As you work, CHECK OFF EACH STEP in the box provided, so that you are sure you do not forget anything.

Do not hesitate to ask questions. Your local hobby dealer and area flyers will most likely be happy to help, as they want you to have a successful flying experience. You may also receive technical assistance from Carl Goldberg Products, Ltd. by telephone 1-678-450-0085.

#### **ADHESIVES & GLUING TECHNIQUES**

CA adhesives are specially formulated to firmly glue the plywood, hardwood, and balsa used in your model and to withstand the vibration and stresses of high performance flight. However, there are times, such as when you are installing the stabilizer and fin on the fuselage and want more setup time for careful alignment and positioning, then you should use epoxy. Occasionally, you also will want to use thin CA, which "wicks" into the surrounding areas. Aliphatic resin glue or similar water-based glues can also be used, but they will add to the assembly time because they dry so much more slowly than CA glue. Remember, when ever using any CA, you must be careful to read instructions thoroughly, as you will have only seconds for positioning of parts. Be sure to trial fit parts together before gluing. Also, never use watery THIN type CA glue for gluing plywood and hardwood parts. Thin CA's do not adequately bond these areas.

#### CAUTION

Some people may experience an allergic reaction when exposed to fumes from CA glue or epoxy. As with paints, thinners, and solvents, it is always important to use glues only where there is adequate ventilation to carry fumes away. A fan is recommended. Also, special care must be taken when using CA, as it will bond skin as well as other surfaces. Before using any CA, carefully read all label precautions. When using CA, protective eye-wear and care in keeping the glue away from the face is highly recommended. If CA does happen to get into the eye, hold lid open and flush with water only. Seek immediate medical attention.

#### COVERING

The Pitts ARF is covered in a premium polyester film chosen by many of the world's top flyers for its beauty, toughness, and ease of application and repair. It is not uncommon for ARF's to develop a few wrinkles in transit. If this is true of your model, the situation is easily corrected. Before you begin putting the pieces together, run over the surface of each section with an iron (either specially designed for airplane use or the more cumbersome household iron) or use a modeling heat gun. Apply the heat (set at about 350° F), following along with a soft cloth and pressing down on the covering as you go around. This will more firmly set the covering adhesive into the wood and keep your aircraft covering tight and smooth in the future.

One of the great advantages of polyester film is that it can be applied over itself without causing gas bubbles. This allows you to repair your aircraft, as well as to customize it in a number of ways. If, due to a flight mishap, you get a hole or similar covering damage, simply trim away the ragged edges and then apply a patch, following the directions that come with your covering , which is available at your hobby dealer.

## IMPORTANT INFORMATION

Covering coming loose is not COVERED UNDER WARRANTY. Due to temperature changes the plane may develop some wrinkles in the covering that you will need to remove with an iron. Be sure to seal the edges down first so that you do not cause the covering to shrink and leave exposed areas of wood. Please inspect the plane before beginning to assemble to make sure you are happy with it. After assembly has begun you cannot return the kit. If you find a problem before beginning to assemble the plane you must contact us, please do not return it to the dealer.

#### ITEMS NEEDED TO COMPLETE THIS AIRCRAFT

- □ 1 RADIO GUIDANCE SYSTEM (4 CHANNEL MINIMUM REQUIRED WITH 7 SERVOS)
- You will need 7 servos for the plane. we recommend a standard servo on the throttle and 4 standard servos are ok for the ailerons. The elevator and rudder needs a 100oz of more servo. We used the Futuba S9151 which is 132 oz.
- □ 4 6" AILERON SERVO EXTENSION WIRES
- □ 3 Y-HARNESS
- □ 1 ENGINE .61-.108 2-STROKE, .91- 1.20 4-STROKE AND MUFFLER
- □ 1 CA ACCELERATOR
- □ 1 2 OZ. BOTTLE CA MEDIUM GLUE
- □ 1 1/2 OZ. BOTTLE CA THIN GLUE
- □ 1 20 MINUET EPOXY
- □ 1 1/4" FOAM RUBBER

#### OPTIONAL:

- □ 1 1/5 PILOT FIGURE
- $\Box$  1 Prop to fit your engine
- □ 1 Spinner 3 inch
- NOTE: The Pitts ARF covering matches Yellow(#885), Blue(#872) Oracover.

#### TOOLS AND SUPPLIES FOR ASSEMBLY.

- □ MODELING OR UTILITY KNIFE
- □ WORK SURFACE (24" X70")
- □ ELECTRIC DRILL
- □ 1/16", 3/32",1/8", 3/16", 5/32", 1/4", 5/64" 7/32" DRILL BITS
- SMALL STANDARD & PHILLIPS SCREW-DRIVERS
- □ MASKING TAPE
- □ NEEDLE NOSE PLIERS
- □ MOTO TOOL
- □ 24" RULER
- □ FLEXIBLE STRAIGHT-EDGE
- □ 30-60-90° x 6" TRIANGLE
- □ SOFT PENCIL
- □ A FEW STRAIGHT OR "T" PINS
- □ ADJUSTABLE WRENCH
- □ WIRE CUTTER (DYKES)
- OPTIONAL HEAT GUN/COVERING IRON
- □ ACID BRUSH
- □ ELECTRICAL TAPE
- □ PIECE OF MEDIUM SANDPAPER
  - 5 FT. LENGTH OF STRING

## **Caution:**

## Before starting, carefully go over all high stress areas with an epoxy or wood glue to confirm all areas are well glued.

## WING ASSEMBLY

# AILERON INSTALLATION

- **1.**  $\Box$  Collect the following parts:
  - (1) Left wing
  - (1) Right wing
  - (1) Left aileron
  - (1) Right aileron
  - (12) CA hinges



- 2. □ Locate the pre-cut aileron hinge slots in both wing halves. Using a hobby knife (#11 blade), slide the blade into each slot to make sure it is cleanly cut.
  - □ Repeat this process with the ailerons, making sure all hinge slots are clean.



- **3.** □ Place a straight pin into the center of each of the four CA hinges.
  - □ Slide each hinge into the hinge slots on one of the wing halves. The pin will prevent the hinges from going further than halfway into the wing.
- **4.** □ Select the aileron for the wing on which you are working and insert the exposed half of each hinge into the aileron slots.

- **4.** □ Select the aileron for the wing on which you are working and insert the exposed half of each hinge into the aileron slots.
  - □ Slide the aileron toward the wing until no gap remains between the aileron and the wing.
- **5.** □ Carefully check the alignment of the aileron. It should be centered, with about 1/32" on either end.
  - □ When satisfied with the alignment, remove the straight pins, being sure to keep the aileron tight to the wing. You may wish to apply a few pieces of masking tape to keep the pieces in place.



- 6. □ Keeping the aileron and wing in position, deflect the surface to it's full deflection and apply 3 or 4 drops of CA glue to the small exposed area of each hinge.
  - □ Turn the assembly over and again apply 3 or 4 drops of CA glue to the exposed hinge surfaces.
  - □ Allow to dry for 10 minutes before flexing the aileron.
- **7.**  $\Box$  Repeat the above steps for the other three wing ailerons.

#### AILERON SERVO INSTALLATION

Note: The following pictures may not exactly match the hardware you are using. Always check the radio manufacturer's instructions when installing radio equipment.



**1.**  $\Box$  Collect the following items:

(4)Servo mounting screw (supplied with radio)

- (1)Servo with rubber grommet (supplied with radio)
- (4) Servo extensions "6"

**IMPORTANT!** To ensure that any connections located inside the wing will not come loose, either when the wires are pulled, or during flying, always tape them securely together with electrical tape.

- Making sure to use the correct servo for the 4. opening, attach the servo wire to the 6" extension and securely tape the connection.
  - □ Locate the string inside the aileron servo mount, and the other end in the exit hole. The hole in the top wing is just behind the front cabane mount. The bottom wing has the hole in the middle of the center section.
  - □ Tie the string to the aileron extension by looping it through the opening between the wires on the plug and taping with masking tape.
- 5. 
  Grasping the string, SLOWLY pull until the end of the 6" extension comes out of the hole.
  - Tape the extension securely to the wing, so  $\square$ that it will not slide back in while you are working.
  - Secure servo with the screws supplied with the radio.
  - $\square$  Repeat for the other three wing servos.

#### AILERON CONTROL HORN INSTALLATION



- **1.**  $\Box$  Collect the following items
  - (8) 2-56 Golden Clevis
  - **Clevis Clips** (8)
  - (8) 2-56 Hex Nut
  - (4) 2-56 x 1-3/4" threaded both ends wire
    (4) 6-32 x 2" Bolt
    (4) 6-32 Hex nut

  - (4) #6 Washer (4) 6-32 Horn Bracket



- **2.**  $\Box$  With the aileron servo in place, make a mark at a 90° degree angle to the trailing edge and in line with the servo arm.
- 3. 🗆 Use the mark to locate the hard point installed in the aileron( dowel with hole in middle).
- 4.  $\Box$  Using a 9/64" drill bit, open the hole in the aileron through to the top side.

#### HINT: Drill the hole from the bottom half way. Then drill down to the hole from the top of the aileron.

- 5. 🗆 Insert the 6-32 x 2" screw from the top through the aileron.
  - Place the #6 washer and the 6-32 hex nut on the bolt and tighten. Make sure that you use thread lock on the bolt and nut.
  - □ Screw the adjustable horn bracket on the bolt.



- **6.**  $\Box$  Thread on to one end of a 2-56 x 1-3/4" pushrod a nut and Golden Clevis.
  - $\hfill\square$  Mount the pushrod onto the the horn bracket.
  - □ Thread the other 2-56 clevis and nut on the other end.
  - $\hfill\square$  Install the rod in the control arm.
  - □ Slide the clevis clip on to each of the Golden Clevis pins.
  - □ Repeat the above steps for the other three ailerons.





7. □ You will need a Y-connector for the top aileron servos. It will exit the fuselage through a hole just to the inside of the front cabane strut. Use cable ties to hold it to the cabane strut so the plug is at the top on each side. You can then plug the ailerons in and attach the top wing.

#### **Bottom Wing Mounting**

## Before mounting the tail the bottom wing should be installed.

- Collect the following items
- (1) Fuselage
- (1) Bottom wing
- (2) Wing dowels (8mm x 40mm)
- (2) 1/4" x 2" wing bolts
- (1) Trailing edge reinforcement plate. 1/8" ply.



1. □ Epoxy the dowels in the pre-drilled holes in the leading edge



2. □ Lay the 1/8" plywood plate over the holes in the trailing edge of the wing and insert the wing bolts for alignment. Use a pen and mark the outline of the plate on the covering.



**3**. □ Remove the covering by cutting about 1/8" inside the line you just drew. Be careful and do not cut into the wood.



**4.** □ Use epoxy and glue the plate in place. Insert the wing bolts to make sure the holes are aligned and clamp into place till dry.



**5.**  $\Box$  Set the wing in place with the dowels inserted into the bulkhead and install the wing bolts.

#### Tail Construction.

- $\Box$  Collect the following items
- (1) Stab
- (1) Fuselage (with bottom wing installed)
- (1) Fin



**1.**  $\Box$  Install stab in opening at rear of fuselage. Measure to make sure it is centered (dimension B on each side should be the same. Now measure dimension A and move stab till they are the same.



**2.**  $\Box$  Sight the stab from the front and rear of the plane and make sure it is parallel to the wing. If necessary sand the saddle on one side to make stab align with wing. Do not go any farther till the stab is level to the wing.



**3.**  $\Box$  When satisfied with the alignment, mark the outline of the fuselage on the stab top and bottom.



**4**.  $\Box$ .Using a sharp knife or razor blade, remove the covering inside the lines you marked both top and bottom. Cut 1/16" inside the lines so bare wood does not show when glued in place. Be careful and do not cut into the wood as this will weaken the structure.

**5.**  $\Box$  Apply epoxy on the fuselage and the stab and slide back into position using the lines you drew on the stab. Use rubbing alcohol the clean the epoxy that will get on the surface of the stab. Check the alignment and set aside until epoxy cures.



**6.**  $\Box$  Install the fin in the slot and check the alignment. It can be adjusted a small amount by sanding the fin post area where it goes into the fuselage. It should not need any adjustment. Mark the outline of the fuselage on both sides. Also mark the outline of the fin post where it goes into the rear of the fuselage.



7.  $\Box$  Remove the covering inside the lines you marked just as you did on the stab.

8.  $\Box$  Mix epoxy and apply to opening in fuselage on top and the back section where the fin post fits. Reinstall the fin and check alignment. Set aside till cured.

#### Elevator Control Horns

- **1.**  $\Box$  Collect the following items.
  - (1) 6-32 x 3" threaded rod (rudder horn)
    (2) 6-32 x 2" bolts(elevator horns)

  - (4) 6-32 nuts
  - (4) #6 flat washers
  - (6) adjustable horn brackets.



**2**  $\Box$  Install the 6-32 x 3" threaded rod in the predrilled hole in the rudder hard point(dowel with hole). The hole will be under the covering and can be located by holding up to a light. Use a #6 washer on each side and locktite or CA glue the nuts in place. Install two horn brackets on each side, one faces forward for the control horn and the inside one faces rearward to attach to the tail wheel spring.



**3.**  $\Box$  Locate the hole for the elevator horn and install the 6-32 x 2" bolt with a washer and nut on the bottom side. Use locktite or CA to secure the nut. Install a adjustable horn bracket on the end. Repeat for other elevator.

**4.**  $\Box$  Hinge both elevator and rudder to stab and fin using the same method used on the ailerons.

#### Landing Gear Installation



- **1.**  $\Box$  Collect the following items.
  - (2) Landing gear legs
  - (6) 6-32X3/4" Socket head screws
  - (6) #6 flat washers
  - (2) Wheel pants, one left one right
  - (2) 4mm axles with lock nuts
  - (4) 4mm wheel collars
  - (2) 2-3/4" wheels
  - (2) 4-40 x t-nuts
  - (2)  $4-40 \times 1/2$ " socket head bolts.

**2.**  $\Box$  Slide gear leg into slot on side of fuselage and install retaining bolts through access holes on the side and middle of fuselage. Be sure to use thread lock on the bolts. The blind nuts are already installed.





**3.**  $\Box$  Install each axle using the locking nut. Be careful not to over tighten the nut, it looks like a large bolt but it has been drilled out for the axle and can be broken if too much torque is applied.



**4.**  $\Box$  Install one wheel collar on each axle with 3/16" between the collar and the axle nut. This will space the wheel in the center of the wheel pant.



**5.**  $\Box$  The wheel pants have the 1/2" hole predrilled in each pant. The 1/8" hole for the mounting bolt must be drilled.



7.  $\Box$  Remove the wheel pant and drill a 5/32" hole at the location you marked. Insert the blind nut on the inside and pull it tight using the 4-40 mounting bolt. Lock in place with CA glue being careful not to get it in the threads.



**6.**  $\Box$  Block the tail of the plane up so that the fuselage is sitting level. Put the wheel inside the pant and slide both on the axle together.

□ While holding the wheel pant level, mark the location of the mounting bolt by using a 1/8" drill and inserting it through the predrilled hole on the landing gear leg



**8.**  $\Box$  Reinstall the wheel and wheel pant and retain with the other 4mm wheel collar. Align the wheel pant on the gear leg with the hole you drilled for the blind nut. Install the 4-40 x 1/2" socket head screw. Don't forget to use locktite to make sure it does not come loose.

 $\Box$  Repeat for other wheel pant.

#### Tail wheel Mounting

- **1.**  $\Box$  Collect the following parts:
  - (1) tail wheel bracket
  - (1) tail wheel
  - (2) 1/8" wheel collars
  - (2) tail wheel springs
  - (2) #6 x 1/2" sheet metal screws\
  - (2) #6 flat washers
  - (2) nylon horn brackets-
  - (1) #6-32 threaded rod 3" long



2. □ Screw the 6-32x3" threaded rod into the brass fitting on top of the tail wheel bracket. Center it up and then screw the adjustable horn bracket on, one on each end.





**3.**  $\Box$  Install one 1/8" wheel collar, the tail wheel and then the other 1/8" wheel collar.



**4.**  $\Box$  Mount the tail wheel bracket to the fuselage using the two #6x3/4" sheet metal screws and two #6 flat washers. Align the bend in the bracket with the back edge of the fuselage.



- **5.**  $\Box$  Remove from the tailwheel springs approximately 1/2" from the other side of the long wire.
  - On the side of the spring that you just cut off, bend 2 or 3 coils of the spring out so that they can hook through the horn bracket.



6. Twist the end of the spring on to the horn bracket. Insert the long wire end around the second horn bracket. Twist the wire so that it will stay hooked to the bracket.



**7.**  $\square$  Repeat for other side.

#### **Top Wing Mounting**

- **1.**  $\Box$  Locate the following items.
  - (4) cabane struts
  - (2) I-Struts
  - (1) Top Wing
  - (1) Bottom Wing
  - (1) Fuselage
  - (2) 1/4-20 x 2" wing bolts
  - (20)4-40x 5/8" socket head screws
  - (12) #4 flat washers
  - (8) #4 aircraft lock nuts
  - (8) I-Strut mounting lugs.



**2**  $\Box$  The cabane struts consist of two front and two rear. The rear is slightly longer than the front. The long ends with two holes go into the fuselage. Slide the long leg in the hole and retain with two 4-40 x 5/8" socket head screws. Use locktite to make sure they do not vibrate out. Don't completely tighten the screws down until after you mount the top wing. Leaving them loose until the top wing is in place with the top of the cabane struts in the pre cut notches, will give them room to move around a little so they will line up perfectly. Tighten after the top wing is in place.



**3.** □ The I strut mounts consist of 1/4" eyebolts that screw into threaded blocks located in the top of the bottom wing and the bottom of the top wing.



**4.**  $\Box$  Screw the eyebolts into the holes in the wing, they are set at a slight angle since the strut does not go perpendicular to the wings. The bottom set will lean out from the fuselage and the top wing will lean in toward the fuselage.



**5.**  $\Box$  Use the I-Strut to check the height of the eyebolt. Screw it into the wing until the holes line up between the strut and the eyebolt.



**4.**  $\Box$  The top wing has four notches cut into the bottom side with a mounting hole and blind nut installed.



**5.**  $\Box$  Install the top wing using four 4-40 x 1/2" socket head screws and four flat washers. Get all the screws started but don't tighten them all the way down till after the I-Struts are installed.

Reinstall the bottom wing as you did earlier.



- 6 □ Fit the I-Strut between the top and bottom wing with the lugs in the notches. Secure with a 4/40 x 1/2" socket head bolt with washer and an air-craft lock nut. Get all the bolts on both sides started but not tightened all the way down. After both I-Struts are in place go back and tighten all the bolts in both the I-Struts and the cabane struts. You can now tighten the bolts that hold the cabane struts to the fuselage.
- 7. □ When satisfied with the wings alignment, place 2 or 3 drops od thin CA around each of the eyebolts.

#### FLYING WIRES



- 1. Locate the following parts
  - $\hfill\square$  Roll of braided cable
  - □ (8) metal plates
  - $\Box$  (4) 2-56 rigging couplers
  - $\Box$  (4) golden clevis
  - $\Box$  (4) metal clevis retainers
  - $\Box$  (8) cable swages
  - □ (3) 2-56 x 1/2" screws
  - □ (3) 2-56 nuts
  - $\Box$  (3) #2 flat washers
  - $\Box$  (2) #2 x 1/2" sheet metal screws



**3.**  $\Box$  Use the three 2-56 x 1/2" screws with a washer under the head, and mount the brackets to the fin and stab with the aircraft nut on the bottom.



The brackets go on each side of the fin and stab with one bolt holding two on. There is a predrilled hole at each location. Hold up to a light to help locate the hole under the covering.



**4.**  $\Box$  The other two brackets mount to the bottom of the fuselage using the #2x1/2" sheet metal screws. Mount to the tailwheel mounting block just in front of the tailwheel bracket.



- **5.**  $\Box$  Insert the cable through the 1/16 OD x 1/4" brass tubing.
  - □ Next thread the cable though the hole at the end of the 2-56 threaded rods and pass it back through the brass tube.



- 6. □ Loop the end of the cable back though the brass tube.
  - $\hfill\square$  Use pliers and crimp the brass tubing onto the cable to secure it.



- C Screw a golden clevis on the rigging coupler. and attach it to the bracket at the fin.
  - Pull the cable to the bracket on the stab and cut 2" past the hole.



- 8. Pass the cable through the brass tube, through the bracket on the stab and back through the brass tube.
  - □ Pull the cable tight, but be careful not to put pressure on the stab or fin. we want the cable to just be snug at this point and we will adjust the tension after all four are in place.
  - $\hfill\square$  Loop the cable back through the brass tube again and crimp.
  - □ Use pliers and crimp the brass tubing onto the cable to secure it.
- 8. □ Pass the cable through the brass tube, through the bracket on the stab and back through the brass tube. Pull the cable tight, but be careful not to put pressure on the stab or fin. we want the cable to just be snug at this point and we will adjust the tension after all four are in place. Loop the cable back through the brass tube again and crimp.
  - $\Box$  Repeat for the other four cables.
- 6. □ After all four flying wires are in place, adjust the tension by disconnecting the clevis and turning.

The wires should just be snug with no slop, don't distort the flying surfaces with too much tension.



#### Belly pan

**1.**  $\Box$  Mount the bottom wing in place.



**2.**  $\Box$  Place belly pan in place and mark the outline on the bottom of wing.



**5.**  $\Box$  Remove the covering over the wing mount bolts access hole.



**3.**  $\Box$  Remove belly pan and cut the covering away 1/16" inside the line you drew.

#### Do not cut the wood!

**4.**  $\Box$  Glue the belly pan in place using epoxy. Be careful not to get glue on the front or rear, just glue to wing, so the wing will come off.

#### **Engine Mounting**



**1.**  $\Box$  Collect the following items.

(2) motor mounts
(4) 8-32x1" bolts
(4) 8-32x1-1/4" bolts
(4) 8-32 t-nuts
(4) 8-32 aircraft lock nuts
(12) #8 flat washers.



- Also collect the cowl mount bolts
   (4) 4-40 x 1" socket head screws
   (4) #4 flat washers
  - (4) 1/4" long pieces of silicone tubing.



**3.**  $\Box$  Install the flat washer and silicone tubing on the 4-40 bolts.



**4.**  $\Box$  Install the cowl with the 4-40 bolts and the predrilled holes in cowl. The blind nut are already installed in the fuselage.

**5**  $\Box$  Measure from the firewall to the front edge of the cowl.lt should be about 5-3/8" on the left side and 5-5/8" on the right side. The difference is the off set for right thrust built into the firewall.



**6.**  $\Box$  Take your engine and clamp to one of the motor mounts. Set the distance from the back of the motor mount to the front of the thrust washer at 6".



**7.**  $\Box$  Take the other motor mount and clamp to the other side of the engine. Set the motor mounts on a flat surface and make sure both sit flat on the table. Make sure the distance from the table to the thrust washer is at least 6". Mark the location of the engine mounting holes on the motor mounts.

8 Drill four 5/32" holes in the motor mounts at the location you marked.

**9.**  $\Box$  Mount the engine to the mounts using the four 8-32 x 1-1/4" socket head bolts with aircraft lock nuts and washers.



**10.**  $\Box$  The firewall has the thrust line marked on it. The center line is off set to the left to compensate for the right thrust.

**11.**  $\Box$  Center the motor mounts on the thrust line and mark the location of the mounting holes. Drill a 7/32" hole at the four places you marked. The 7/32" hole will accept the shoulder on the t-nut.

**12.**  $\Box$  Using one of the 8-32 bolts and washers, seat the blind nuts in the holes.



**13.**  $\Box$  Bolt the engine in place using the 8-32 bolts and washers. Use locktite on the bolts.

#### Fuel Tank

- 1. □ Collect the following item (1) fuel tank 500cc (16.91 oz.)
  - (1) rubber tank stopper

(1) clunk

- (1) 3mm x 25mm screw
- (1) cap washer large
- (1) cap washer small
- (2) 3mm x 40mm brass tube
- (1) 3mm x 60mm brass tube
- (1) silicone tube 4mm x 80mm
- (3) silicone tube 5mm x 165mm



4. □ Install the 4mm silicone tube to the short brass tube and install the clunk to the other end of the silicone tube. This is the fuel pickup and must be free to "flop" around in the tank so it can pick up fuel in any attitude.



- **2.** □ Insert the 3mm screw through the center hole in the large washer, through the center hole in the rubber washer against the large side, and screw the small washer on the back side.
- **3.** □ Insert the brass tubes through three of the holes. They should be arranged so as the long one will be on the right side of the plane and the short one on the left side.
  - □ The tubes should extend out the front of the cap 5/8". Bend the long tube up at about a 20 degree angle. This should be adjusted so the end of the tube almost touches the top of the tank when installed.



5. □ Install the assembly into the tank so the vent tube is turned up to the top of the tank and is positioned on the right side of the tank. Tighten the screw to expand the rubber cap. Don't over tighten or you could split the tank.



5. □ Attach the three pieces of 5mm tubing to the three tank outlets. They are different colors so you can tell which are the two vents and which is the fuel pickup after the tank is installed. Make a note of which color you attach to which tube. The short brass with the clunk is the fuel pickup and must go to the carburetor. One of the long brass tubes is the vent and should go to the pressure outlet on the muffler. The second vent can be used for filling the fuel tank but will have to be plugged with a screw (Not Included) so that the fuel will not run out.



**6.** □ If you use a Y-S engine that pressurizes the tank, you should wrap the tank with nylon strapping tape to make sure the pressure does not split the tank. You should also put a couple of pieces across the cap to make sure it does not blow out.



**8.** □ Install the tank in the fuselage with the cap aligned in the hole in the firewall. Use foam rubber (not included) around the tank to hold it in place



**7.**  $\Box$  Before installing the tank, drill a 1/4" hole in the firewall for the throttle pushrod to exit. The position of the hole will depend on the engine you use. Align the hole with the throttle arm on your engine.

#### **Cowl Mounting**

- **1.**  $\Box$  Collect the following items.
  - (1) Cowl
  - (4) 4-40 x 1" Socket Head Bolt
  - (4) #4 Washer
  - (4) 1/4" pieces silicone tubing
  - (1) 4" x 12" Clear Plastic



- Place the 4" x 12" plastic strip so that it is sitting on top on the engine just past the cylinder head.
  - □ Tape the plastic to the fuselage at the very end with masking tape.
  - □ Mark a outline around the cylinder head and you exhaust pipe.
  - □ Make a mark where the back of the plastic is sitting on the fuselage.
  - □ Un-tape the plastic sheet from the fuselage and cut out the plastic where you marked for the engine.



- **2.**  $\Box$  Unscrew the engine from the motor mounts.
  - □ Place the cowl on the fuselage and fasten using the 4-40 x 1" bolts and washers.
  - □ Re-tape the clear plastic sheet on the marks that you made on the fuselage.
  - □ Make a mark where the cut out is on the cowl.
  - □ remove the cowl and cut out the openings.

### NOTE: Start with small openings then slowly increase the size till the cowl fits.

**3.** □ Use the same method to locate the holes for the needle valve and any other openings you need.

#### Servo Installation

- **1.**  $\Box$  Collect the following items.
  - (1) 8mm x 17" wooden dowel
  - (2) pieces of 1/2" shrink tubing
  - (1) 5/32" x 19" nylon tubing
  - (2) 2-56 x 7-1/2" pushrods threaded one end
  - (1) 2-56 x 6" pushrod threaded one end
  - (1) 2-56 x 20" pushrod threaded one end.
  - (1) remainder of pull-pull cable from flying wires
  - (4) cable swages(brass tubing)
  - (4) 2-56 rigging couplers
  - (8) 2-56 golden clevis
  - (8) clevis clips
  - (1) pushrod connector

□ You will need 7 servos for the plane. we recommend a standard servo on the throttle and 4 standard servos are ok for the ailerons. The elevator and rudder needs a 100oz of more servo. We used the Futuba S9151 which is 132 oz.



□ Install the servos in the tray with the elevator 1. servo all the way against the right side of the plane. For maximum throw you will need longer arms than come with the radio. Dubro heavy duty horns work fine. The long elevator horn is 1-3/8" long. The double ended horn for the rudder is 2.305" long. Install the elevator horn, then mount the rudder servo with the horn installed so it will clear the elevator arm. This will put it a little left of center. The throttle servo can then be mounted on the left side of the plane. (Note: This set up was for a four stroke engine. If you use a different engine you may have to mount the servos differently). Mount the throttle servo so it is on the same side as the arm on your engine. It does not matter if the elevator servo is on the right or left.



**2.**  $\Box$  Install the throttle EZ connector in one of the arms that came with your servo.



3. □ Install a golden clevis on the end of the 2-56 x 20 pushrod. Insert the pushrod in the hole in firewall that you drilled earlier. Slip the 5/32" nylon tube over pushrod and cut to length. It should extend out the hole in the firewall about 1/4" and stop short of the servo by about 2". Connect the clevis to your engine and insert the pushrod in the connector body.

**4.**  $\Box$  Glue the nylon tube in the hole where it exits the firewall.

□ Adjust the throw on the servos after the radio is installed.



- 1. □ Insert the cable through the 1/16 OD x 1/4" brass tubing.
  - □ Next thread the cable though the hole at the end of the 2-56 threaded rods and loop it back through the brass tube.



- **2.** Loop the end of the cable back though the brass tube.
  - $\Box$  Crimp the brass tube with pliers.



**3.**  $\Box$  Insert the 1/8" tubing into the rear cable exit hole. Push the tubing while guiding it through the fuselage.



- **4.** □ Thread the 2-56 end of the cable into the tubing and pull the tubing out the rear cable exit.
  - □ Finish pulling the rudder cables through the fuselage.
  - □ Make sure that the cables are running between the openings in the formers. □ Stretch the cables past the rudder servo by 3" to 4" then cut off excess cable.



- **5.**  $\Box$  Thread one 2-56 nut then a 2-56 golden clevis onto the each end of the cable.
  - □ Connect the golden clevis to the rudder horn bracket. Remember to insert the clevis clip on each of the clips.



**7.**  $\Box$  Assemble the 2-56 cable end same as shown above.



- 8. Place the cable ends on your servo arm and mount the servo arm on the rudder servo.
  - □ Tape your rudder with masking tape so that it will remain straight.
  - □ Place the brass tube on the cable then pull the cables through the holes in the threaded rod.
  - □ Pulling the cable tight, finish assembling the cable just like you did before.
  - $\hfill\square$  Do the same to the other cable.
  - □ You can tighten or loosen the finished cable by twisting the golden clevis.
  - $\hfill\square$  Lock the cable down after adjusting by

tightening the #2 nut against the clevis.

**6.**  $\square$  Repeat for the other rudder cable.

#### Elevator Pushrod



- **1.**  $\Box$  Collect the following items
  - (1) 8mm x 17" wooden dowel
     (2) 1/2" shrink tubing
     (2) 2-56 x 7-1/2" pushrods threaded one end
     (1) 2-56x 6" pushrod threaded one end
     (3) 2-56 golden clevis
     (3) 2-56 nuts
     (3) clevis keepers

2. □ Take the two 2-56 x 7-1/2" pushrods and make a 90 degree bend on the unthreaded end. Make the bend about 1/2" long so you can get a good grip with the pliers. Then cut the end off at 1/8".



- 3. □ Take the 8mm dowel and drill a .073 (5/64") hole one inch from the end. Cut a slot from the hole to the end of the dowel using a knife or dremel tool. The slot should be the size of the wire. Do this on both sides of the dowel.
  - □ Insert the end of the pushrod wire you bent into the hole, one on each side. Use CA glue to make sure they are firmly held.



**4.** □ Take the shrink tubing and slide over the end of the dowel and wires. Let the tubing extend past the end of the dowel about 1/4". Use a heat gun to shrink tight. If you don't have a heat gun a match or lighter will work just be careful with the open flame.



- 5. □ Lay the pushrod on the bottom of the fuse lage and spread the two pushrods apart the distance of the control horns on the elevators. Don't make sharp bends, let the pushrods bow out to the horns. This will give you a tight pushrod set up with no flex.
- 6. □ Put the pushrod in the fuselage fishing the rods out the slot on each side. Install the clevis and hook up the clevis to the control horn. Use masking tape to hold the elevators in neutral while you mark the other end.



**7.**  $\Box$  Install a clevis on the 6" pushrod and attach to elevator arm on servo. Make a mark on the rod and the dowel where they cross 1" from the end of the dowel.

 $\Box$  Remove the clevis from the arm and make a 90 degree bend at the mark. Cut the bend at 1/4".

□ Remove the clevises from the elevator horns and remove the pushrod from the fuselage. Drill a .073(5/64") hole at the mark you made and cut a slot for the pushrod just as we did on the other end. Attach the pushrod using CA and the shrink tube.



**8.**  $\Box$  You now have a finished pushrod. Reinstall in fuselage using the #2 nuts on the pushrod then the clevis. After all adjustments are made the #2 nut will be tightened against the clevis to prevent it from vibrating loose. Install the clevis keepers.



**1.**  $\Box$  Install the switch in the side of the fuselage on the opposite side from the engine exhaust.

**2.**  $\Box$  The battery will need to be mounted according to where your weight and balance comes out. Ours needed to be under the servos to get the weight to the rear. After you complete the model decide where the best place is depending on the engine you use.

**3**  $\square$  There are tons of room between the servo tray and the tank, so mount the receiver there.

The receiver should be wrapped in at least 1" of foam rubber. You will need two Y-connectors here. Plug one into the receiver, the other y-connector will plug into one terminal for the bottom wing servos and the other terminal will go to the y-connector we installed in the fuselage for the top wing servos. Route the antenna out the side of the fuselage and attach to the top of the fin using a rubber band and a straight pin.

## Balance and Control Throws

## Throws

We have provided two sets of throws. Use the lower throws on the first flights then work your way up to the higher throws. Do not use the higher throws till you are ready.

LOW Elevator 1" UP& Down Ailerons 1/2" Up & Down Rudder 1-1/2" Right & Left HIGH All you can get All you can get All you can get

When you have gotten comfortable flying the Pitts slowly increase the throws while still staying within your flying ability.

The Pitts was designed around a 1.20 four-cycle engine or a .90 two-cycle engine both of these engines will give you excellent performance. Remember, a big-ger engine is not always better. Using a 15-8 to a 16-8 prop works well on these engines.

Most any size spinner will work on the Pitts, but a 3" is the right proportion for the airplane.

## **CG Balancing**

Balancing the Pitts is very important, you might need to use weight depending on the servos and engine that you use. Start out with the balance point at 5". This balance point is a safe place for you to fly the Pitts.. As you get comfortable you can move the CG back further. The 33% point is 6.22" The further back you move the CG the more wild the aerobatics will become, **BUT** the more unstable the Pitts will become

The CG is measured on the top wing At the center of the wing measure back 5" and place a mark. Measure back 6.2" and make another mark. Using two fingers under the bottom side of the top wing, lift the plane. It should hang level or slightly nose down. At the 5" in mark it will be nose heavy but will be really stable on the first flight. The Pitts will probably need weight in the tail to get it back to 6.22".