3406

YAHAGI

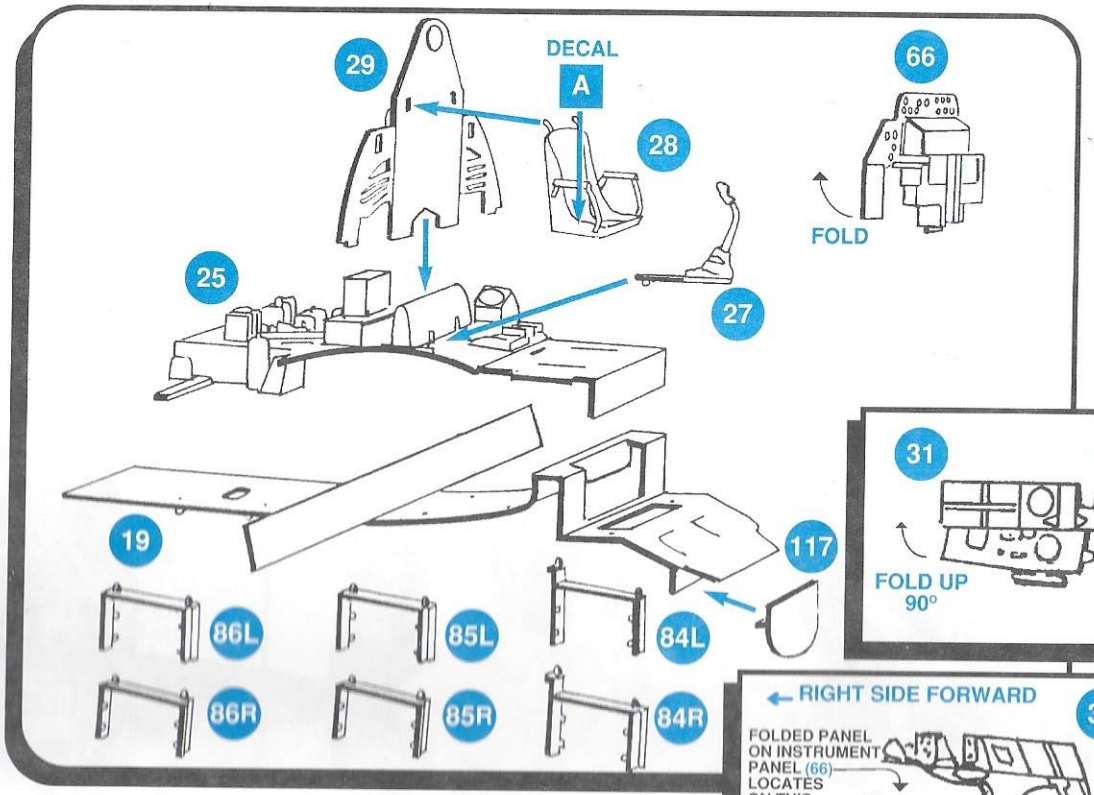
TBM-3 AVENGER

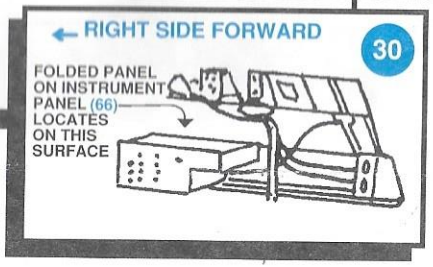
Your Avenger kit is an exact replica of a very complex airplane. **Accurate Miniatures** has turned this complexity into an easily assembled model. But, before you start the assembly process, familiarize yourself with the various components by studying the parts and the instruction sheet. Due to the amount of detail that has been molded into the internal components of this kit, it is highly recommended that you first test fit the pieces before gluing. Gently tacking the part in place before final gluing will insure a proper fit on the locating surface. Take your time and you will be rewarded with a precise fit. This kit is best assembled by painting and assembling various components as you build since many pieces will be very difficult to paint after assembly. Refer to painting instructions for each step before you begin assembling parts.

This kit represents a TBM-3 Avenger. These aircraft were designed in response to a US Navy request for an aircraft to replace the obsolete TBD Devastor torpedo bomber. Bearing a marked resemblance to the F4F-4 Wildcat, the TBF was capable of meeting the Navy requirements for a bomber that had a 300 mph top speed, internal bomb load of 2,000 lbs., a three-man crew and defensive dorsal turret. With its rearward-folding wing design and prototype proven performance, the TBF was ordered for production in December of 1940. The first aircraft were delivered to the Navy on January 30, 1942, and had by this time been christened with its official name "Avenger" in response to the attack on Pearl Harbor. Grumman Aircraft was producing sixty aircraft a month by mid-1942. The Navy requirement for aircraft was more than Grumman Aircraft could produce. Production was increased by adding the Eastern Aircraft Division of General Motors to the roster. These aircraft were identical to the Grumman Aircraft and were designated "TBM." By the end of 1943 the Eastern Aircraft Division was the sole producer of Avengers and by VJ Day had produced over 7,500 aircraft.

AIRCRAFT SPECIFICATIONS:

	Length: 40 feet
	Span: 54 feet, 2 inches
Powerplant:	One Wright R-2600-20
	1900hp air-cooled radial
Armament:	Two wing mounted .50 cal machine guns
	One .30 cal machine gun in ventral position
	One .50 cal machine gun in power turret





Step 1: CO

Begin by painting color details. Glue front side of the co seat (28) to the co wheel to a vertical console (30) to the rest on top of the b panel to the cockp

NOTE: If you plan glue the front bom bomb bay roof. Th bomb bay bulkhea cockpit assembly

PAINTING INSTRUCTIONS

The various lines and components located in the fuselage interior were generally painted in the same color as the fuselage. The exceptions are items such as oxygen hoses, electrical boxes, etc. The interior of your kit may also be worn and chipped in the same manner as the exterior.

Step 1: COCKPIT & FUSELAGE CENTER

Left fuselage half (1) and right fuselage half (2)
— interior - interior green
from firewall forward - light grey interior surfaces
Right fuselage console (30) and left fuselage console (31)
— flat black with aluminum and white details
Control stick (27)— interior green with black handle and tan boot
Pilot seat (28)— interior green with leather armrests
Cockpit tower front (29)— interior green with leather headrest
Cockpit floor (25)— interior green with flat black autopilot boxes
Bomb bay roof (19), crew seat (33), turret base (58), interior bulkhead (64), bomb racks (84L, 84R, 85L, 86L & 86R), front bomb bay bulkhead (117)— interior green
Instrument panel (66)— flat black with clear dials and white knobs
Radio equipment (32)— flat black radio gear on interior green background
Bomb bay bulkhead (26)— interior green with flat black radios

Step 2: REAR FUSELAGE

Flare chutes (34)— aluminum
Ammunition box bulkhead (36), tailwheel bulkhead (37), and cockpit tower back (88)— interior green
Ventral gun window (78)— framing to match aircraft underside
Ventral machine gun (35)— gun metal with brass cartridges
Arresting hook (22)— black with white stripes 1/8" wide
Tailwheel door (39), tailwheel brace (38R), tailwheel & strut (38L)
— same as aircraft underside with flat black tire

Step 3: ENGINE ASSEMBLY

Rear cylinder row (7), front cylinder row (8)— gun metal with black pushrods plug wires
Propeller (11)— flat black blades with insignia yellow tips 5/32" wide - hub-aluminum
Left cowling (3), right cowling (4) and cowl ring (6)— interiors - crankcase front cover (9)— light grey
Exhausts (5)— burnt metal

Step 4: TAIL SURFACES

To be painted when exterior is painted

Step 5: WINGS & UNDERCARRIAGE

Left wing top (12), left wing bottom (13), right wing top (14), and right wing bottom (15),— to be painted when the exterior is painted
Landing gear torque links (40), landing gear legs (41L & 41R), landing gear drag braces (42L & 42R), right landing gear door (44), left landing gear door (45), inner wheels (46), outer wheels (47) and landing gear retractors (87L & 87R)
— same as aircraft underside
Untreaded tires (48) or treaded tires (49)— flat black or dark grey

Step 6: BOMB BAY DOORS

Left bomb bay door (23L) and right bomb bay door (23R)— interior only - bomb bay hinges (24F & 24R) - interior green

Step 7: TURRET

Gun/mount (55)— interior green with gun metal machine gun
Turret ammo box (54)— interior green with brass cartridges
Cabin shelf (20), turret armor (56), turret gunner's seat (57), gun side trunnion (52) and seat side trunnion (53)— interior green
Left turret half (62) and right turret half (63)
— framing to match aircraft upper surface

Step 8: CLEAR PARTS

Gun sight (81)— flat black with clear reflector panel
Windshield (67), sliding canopies (68) and main canopy (69)
— framing to match aircraft upper surface
Radio Antenna (51)— same as aircraft upper surface
Left forward window (72), left rear window (73), right rear window (74), right forward window (75), left ventral window (76), right ventral window (77), and bulged forward side window (83L & 83R),— framing to match exterior
Turret armor glass (61)— lower gun mechanism - flat black

Step 9: FINAL DETAILS

Crew door (21)— interior only - interior green
Pitot tube (18)— same as aircraft upper surface with aluminum tip
Yagi antenna (111) and Yagi radar mount (112)— gun metal
Wing tip navigation lights (79L)— red; (79R)— green

Step 10: ORDNANCE

Torpedo top (90), torpedo bottom (91), round torpedo ring (94) and torpedo vertical fins (95)— gun metal
Front propeller (92), and rear propeller (93)— bronze
Plywood fin box (89)— wood
Rear sway brace (99), front sway brace (100) and rear sway brace stabilizer (103)— aluminum
ASD radome (110)— radome tan
Optional— ASD top fairing (108) and ASD bottom fairing (109)
— exterior color
All crew handholds and push-in steps were painted gloss black.

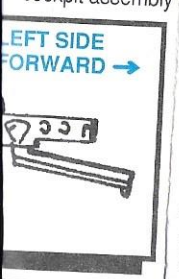
Step 1: COCKPIT AND FUSELAGE CENTER

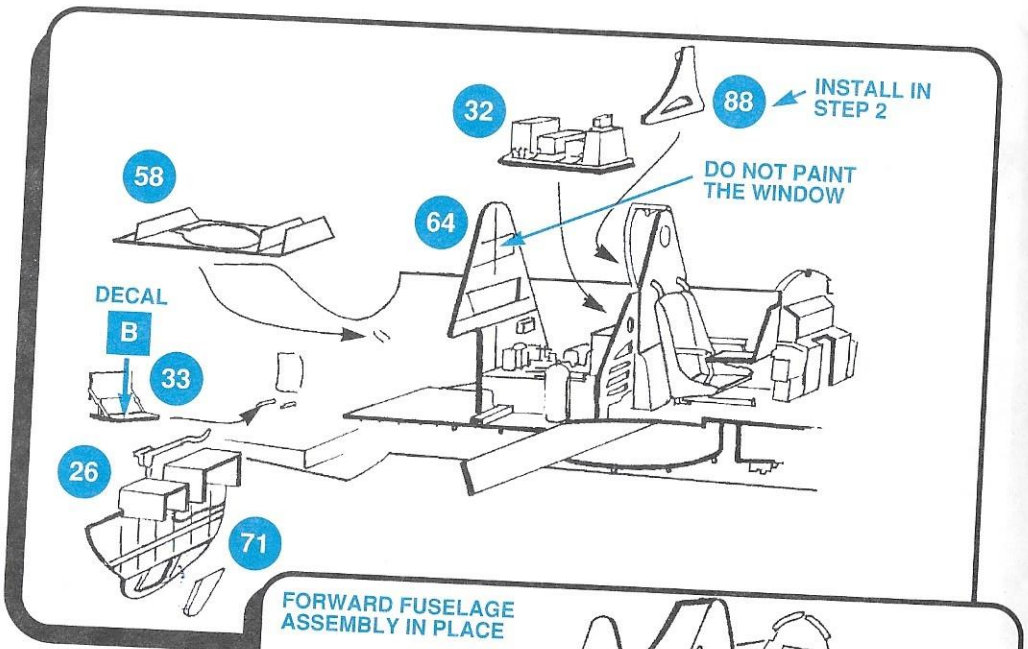
Begin by painting the insides of the left fuselage half **(1)** and the right fuselage half **(2)**. Follow the painting instructions for color details. Glue the control stick **(27)** to the cockpit floor **(25)**. Glue the cockpit tower front **(29)** to the cockpit floor and the front side of the cockpit tower left fuselage half **(1)**. Apply the pilot's seat belt **(Decal A)** to the pilot's seat. Glue the pilot's seat **(28)** to the cockpit floor and the cockpit tower front. Carefully bend the left fuselage console **(31)** up 90° to bring the trim wheel to a vertical position. After painting, glue the console to the left fuselage half. Paint and install the right fuselage console **(30)** to the right fuselage half. Carefully fold the electrical panel up 90° on the instrument panel **(66)**. This panel will rest on top of the box on the right fuselage console when the fuselage halves are joined. Paint and install the instrument panel to the cockpit floor. Glue the cockpit floor assembly to the top of the bomb bay roof **(19)**.

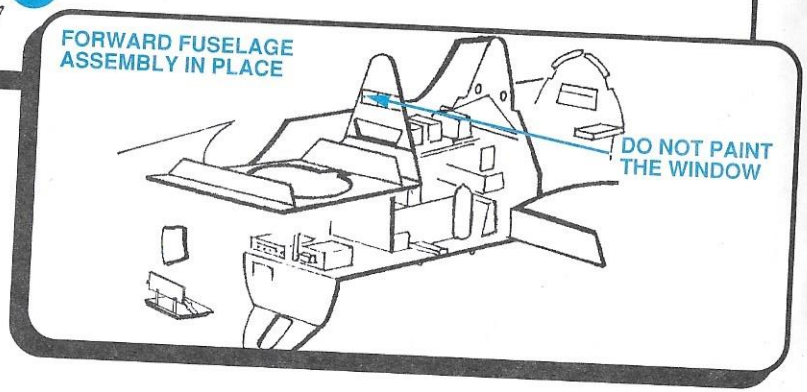
NOTE: If you plan to build your kit with the bomb bay doors closed, do not install any of the bomb racks. Starting at the front, glue the front bomb racks **(84L & 84R)**, the center bomb racks **(85L & 85R)** and the rear bomb racks **(86L & 86R)** to the bomb bay roof. The bomb racks should have their flat surfaces pointing toward the outside of the plane. Now glue the front bomb bay bulkhead **(117)** to the lower front of the bomb bay roof with the ribs pointing to the rear. Now locate and glue the cockpit assembly to the left fuselage half, sliding the wing spar through the opening in the fuselage. Check alignment and make sure everything is straight.

Paint the interior bulkhead **(64)** leaving the small clear window unpainted as indicated in the drawing. Glue the interior bulkhead to the rear edge of the cockpit floor and the left fuselage half. Next, carefully glue the bomb bay window **(71)** into the bomb bay bulkhead **(26)**

NOTE: The clear parts, with the exception of the turret halves, may be installed by using either white glue, clear gloss acrylic or a clear gloss top coat paint to avoid smearing. Glue this assembly to the rear of the bomb bay roof and the left fuselage half. Apply the crew seat belt **(Decal B)** to the crew seat. Glue the crew seat **(33)** to the locators on the left fuselage half facing forward. Glue the turret base **(58)** onto the locators in the left fuselage half. Finally, glue the radio equipment **(32)** to the front of the interior bulkhead and the left fuselage half.







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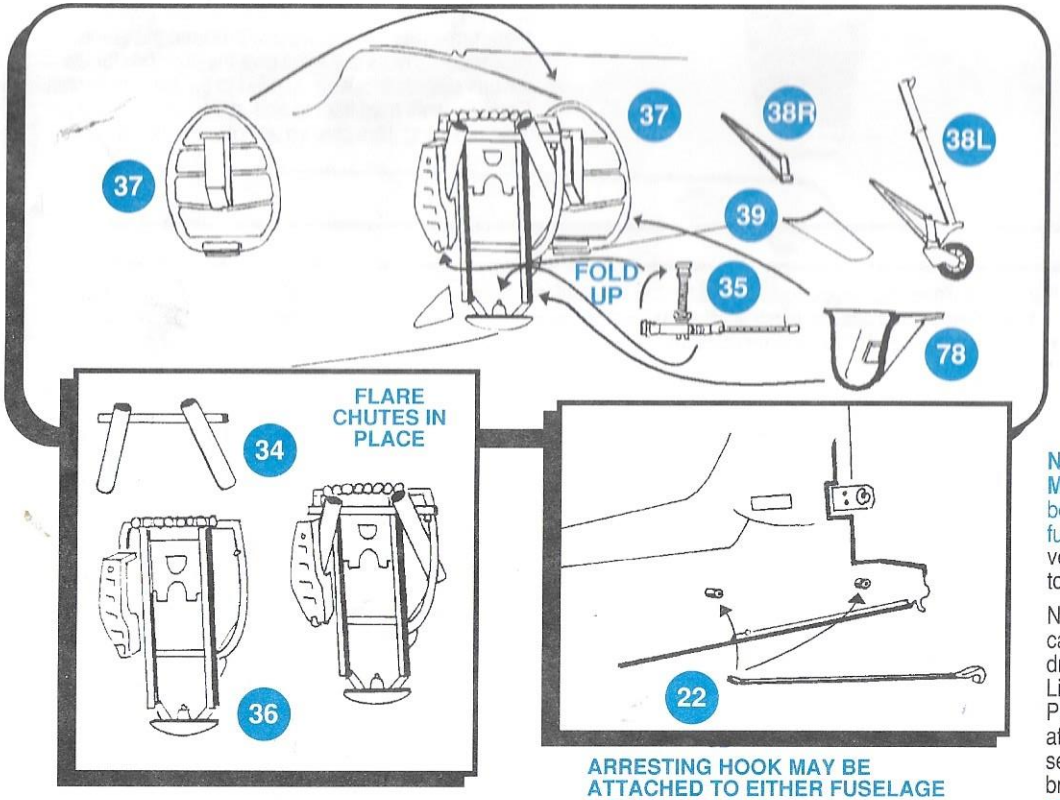


ARRESTING HOOK MAY BE ATTACHED TO EITHER FUSELAGE MOUNTING POINT

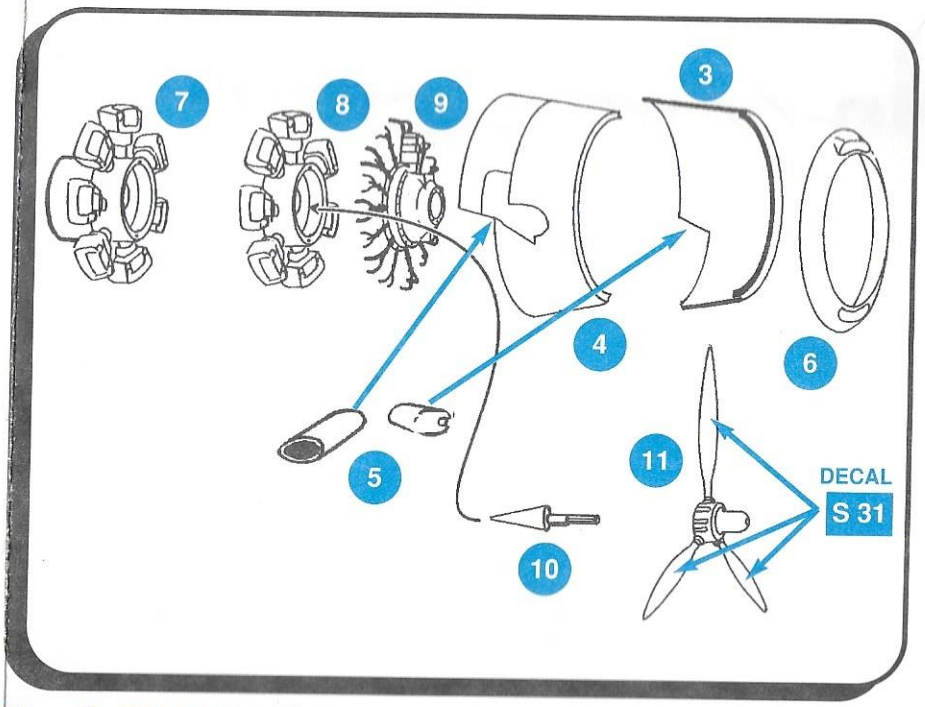
Step 2: REAR FUSELAGE

Carefully align and glue the flare chutes (34) to the forward side of the ammunition box bulkhead (36). The tubes should protrude through the bulkhead and point down slightly toward the rear of the fuselage against the front of the locating rib. Now glue this assembly into the right fuselage against the front of the locating rib. Glue the tailwheel bulkhead (37) onto the right fuselage against the rear surface of the locator rib and the ammunition box bulkhead. Glue the arresting hook (22) to one of the two locating holes in the right fuselage half. The hook may be extended out the rear of the aircraft by placing the hook on the optional rear locator. If you elect to place the hook in the lowered (rear) position, clip 1/16th of an inch off the mounting pin on the arrestor hook and glue to the rear most locator. In either case, make sure the hook end extends through the opening in the tail. Now is a good time to check the alignment of the various components that have been installed in the fuselage halves. Correct if necessary.

Now install the ventral machine gun (35). This piece is delicate, so go slowly. Carefully bend the ammunition belt up 90° so that it will connect to the ammo bulkhead. The gun is now glued to the locator on the ammunition box bulkhead and the ammo box. Exercise caution so as not to accidentally break off the ventral gun barrel.

NOTE: Since you will be handling the fuselage after the two halves are glued together, **Accurate Miniatures** recommends that you cut out the protective template provided for you on the side of your box insert. After gluing the fuselage halves together fold and tape the template to the sides of the fuselage so as to protect the gun during upcoming stages of assembly. As a final note concerning the ventral gun, the large section on the end of the barrel is not a flash hider, it is a counter weight designed to help balance the gun when the aircraft was in flight.

Now test fit the right fuselage half to the left fuselage half. Correct any misalignment problems and carefully glue the fuselage halves together. Glue the cockpit tower back (88), shown in the **Step 1** drawing, to the rear of the cockpit tower. The round device on this part was a Formation Bombing Signal Light. This lamp was visible to other aircraft to the side and rear, and was operated by the bombardier. Paint the center white. Paint and install the ventral gun window (78) to the bottom/rear of the fuselage, after carefully locating the ventral machine gun through the opening. After cleaning up the fuselage seam, the tailwheel assembly may be added. The tailwheel and strut (38L) is glued to the tailwheel brace (38R). This assembly is now glued to the locators on the tailwheel bulkhead. The tailwheel door (39) may now be glued to the tailwheel assembly or installed after final painting. **NOTE:** The tailwheel has a squared off "flat" appearance. On the real aircraft, these tires were made of solid rubber to minimize bouncing on the carrier deck upon landing.



Step 3: ENGINE ASSEMBLY

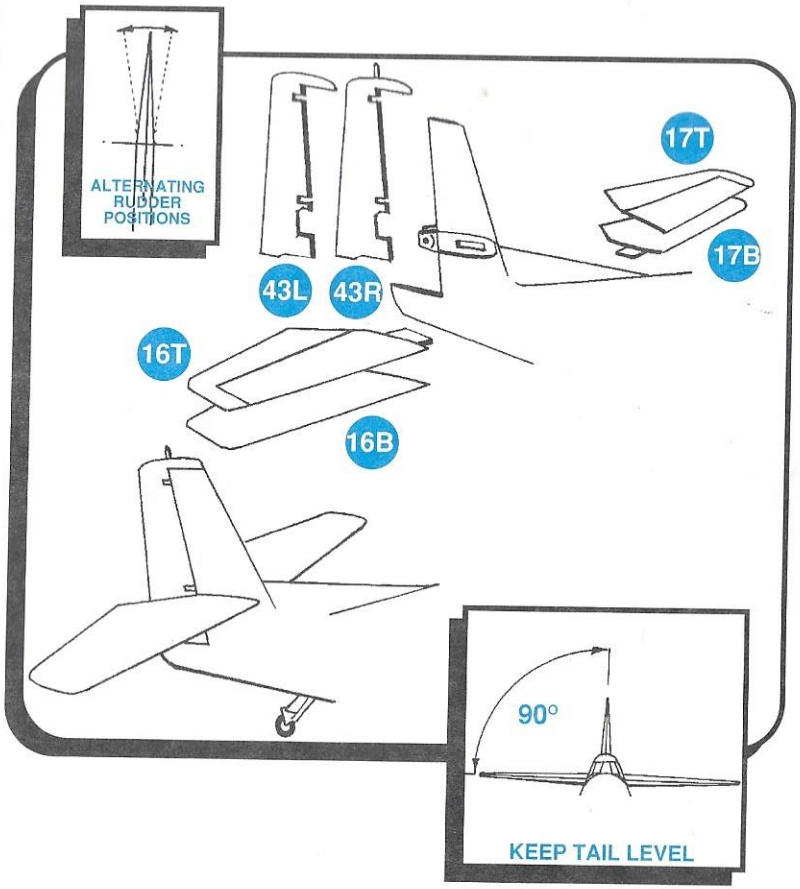
Moving to the front of the plane, proceed with the engine assembly. Begin by gluing the rear cylinder row (7) to the front cylinder row (8). The front row of the engine should have a cylinder pointing down at the six o'clock position. Next, place the propeller shaft (10) into engine assembly and glue the crankcase cover (9) onto the engine assembly trapping the propeller shaft between the crankcase and the front cylinder row. The crankcase front cover should have the larger object (propeller governor) pointed to the twelve o'clock position. The small square on the front of the crankcase points downward. Do not let glue come in contact with the propeller shaft or the propeller will not turn. The propeller (11) may be added now or later in **Step 9** by pushing the propeller hub onto the propeller shaft. **Decal S31** can be added to the propeller as shown.

Glue the engine assembly to the front of the tubular engine mount. Now glue the left cowling (3) to the right cowling (4). Glue the cowl ring (6) to the cowl assembly. Let these parts dry thoroughly, then clean up any glue seams. Now add the cowl assembly to the fuselage. The exhausts (5) can be added now, or glued on after final painting. They should point slightly downward.

Step 4: TAIL SURFACES

Glue the left rudder half (43L) and the right rudder half (43R) together. We recommend you install the rudder to the fuselage in **Step 9** to protect the delicate radio antenna from breakage in upcoming steps. The rudder may be placed off center to give your model a bit more "animation."

Glue the left stabilizer top (16T) to the left stabilizer bottom (16B). Do not glue to the fuselage yet. Now glue the right stabilizer top (17T) to the right stabilizer bottom (17B). After allowing these pieces time to dry, clean up the glue seams. Glue the stabilizers to the fuselage. **NOTE:** If you become confused as to which side is "up," the top sides have one round inspection panel on the horizontal stabilizer. Glue both stabilizers on at the same time, to insure that both pieces can be kept at 90° to the vertical stabilizer. Make adjustments while the glue sets.



Step 5: WINGS AND UNDERCARRIAGE

Begin by opening the holes on the wing bottoms to accept the Yagi radar supports. Model builders with the necessary skill or confidence may wish to cut and position the flaps in a lowered position. This may be accomplished by cutting the flaps free from the lower wing and adding a piece of sheet styrene, see the simple template on the side of the box lift, to cover the opening in the wing. After the covers have dried and been trimmed, the flaps may be glued onto the lower wing at the desired angle.

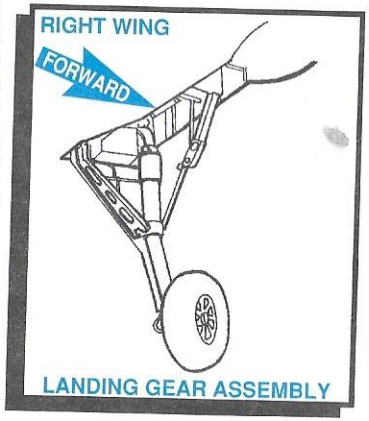
Now glue the left wing top (12) to the left wing bottom (13) and the right wing top (14) to the right wing bottom (15). After allowing sufficient drying time, clean up the glue seams and glue the wings to the fuselage using wing spars on the bomb bay roof to set the proper dihedral (wing angle).

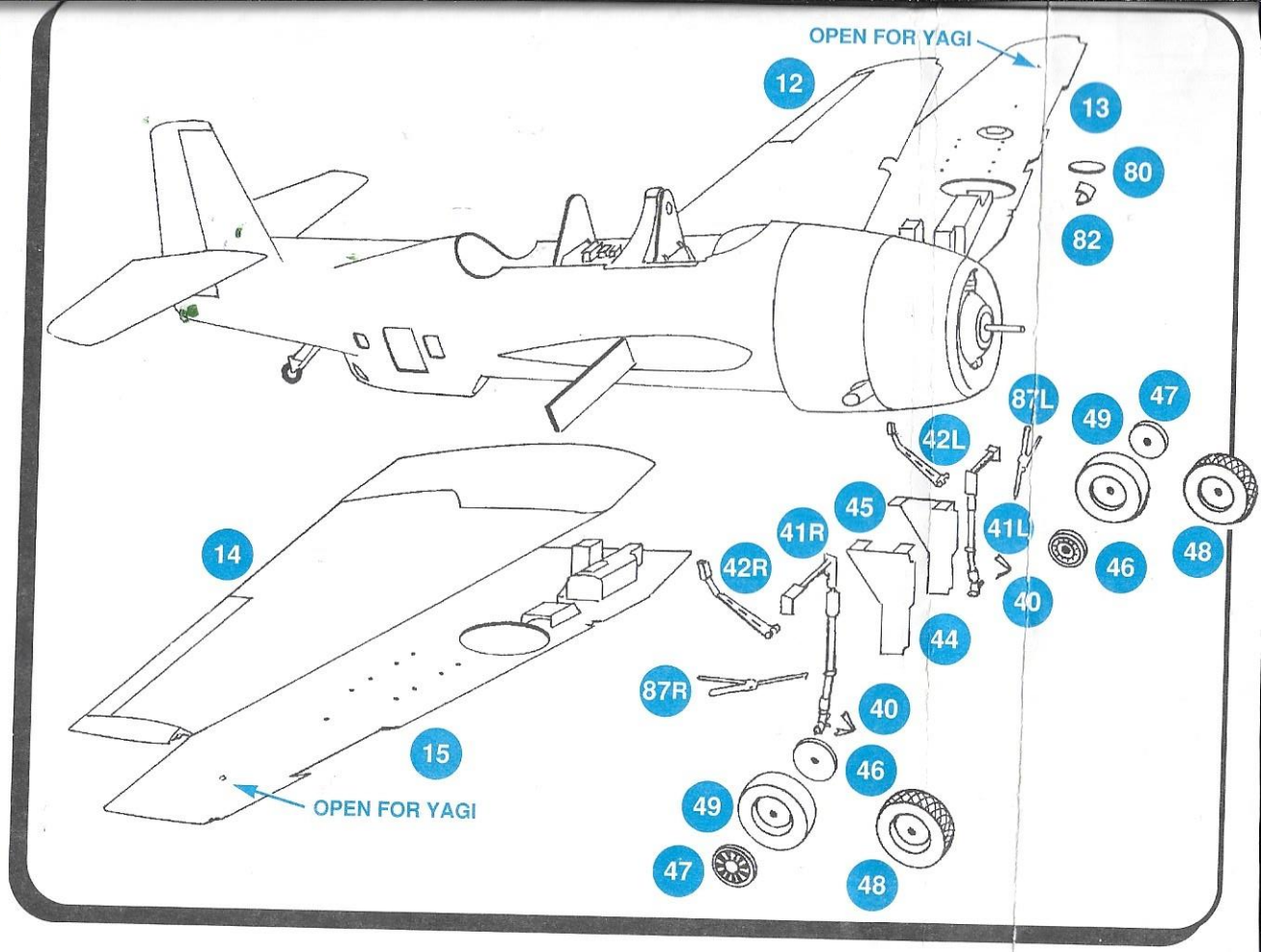
The landing gear may now be assembled by gluing the landing gear torque links (40) to the landing gear legs (41L & 41R). Carefully glue these assemblies into the wheel wells with the axles pointing toward the wing tips. While these parts are drying, glue the landing gear drag braces (42L & 42R) to the back of the landing gear legs and the wheel well. Now glue the landing gear retractors (87L & 87R) to the sides of the gear legs and the wheel well. Check for alignment and allow to thoroughly dry.

This kit provides both treaded and untreaded tires. Carrier based aircraft normally were equipped with high pressure untreaded tires. The Avenger could weigh up to 18,000 pounds when loaded and at this weight, even a high pressure tire sits on a "flat spot." You may wish to sand a small flat spot on the tires. Treaded tires were normally used on land based aircraft. However, there is ample photo evidence of aircraft using treaded tires serving on carriers and vice versa.

Now glue the inner wheels (46) and the outer wheels (47) to either untreaded tires (48) or treaded (49) tires. These parts have been molded separately to make painting easier. **NOTE:** The outer wheel halves are thicker than the inner wheels, be sure to put the outer wheels into the deepest side of the tires. Glue the wheel assemblies onto the gear leg axles. Glue the right landing gear door (44) to the landing gear leg and wing bottom. Repeat with the left landing gear door (45). The brake lines, on the landing gear doors, may be carefully pushed into position against the inner wheel and glued in place.

Carefully glue the wing leading edge light (82) to the left wing, and the landing light (80) to the bottom of the left wing.





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AIRCRAFT SPECIFICATIO

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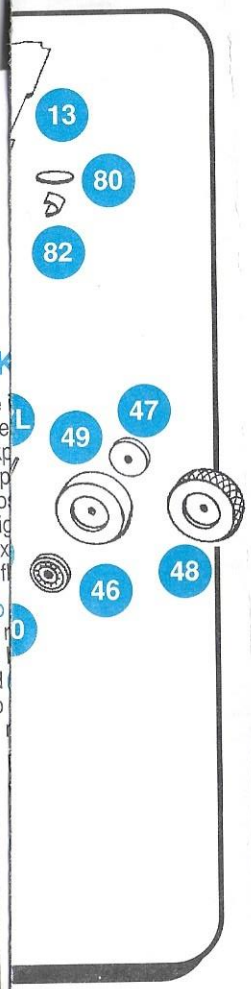
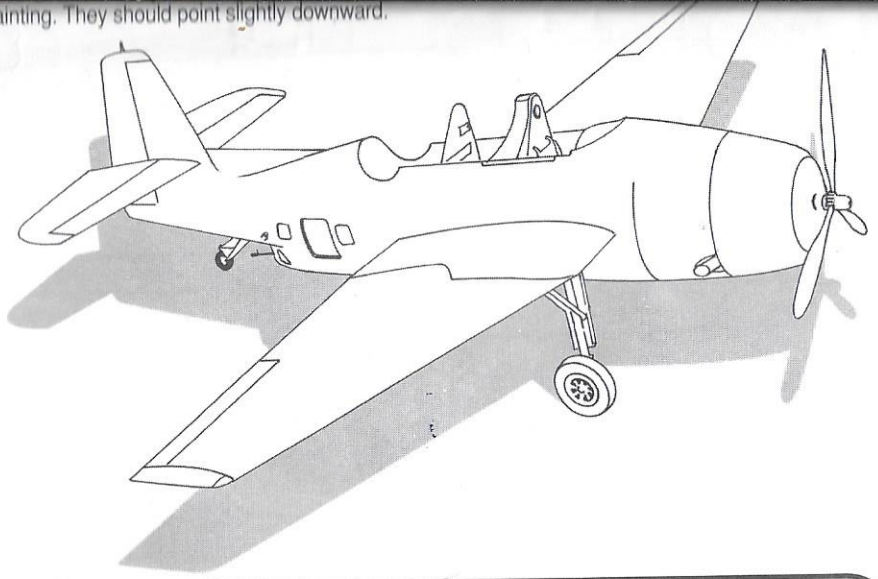
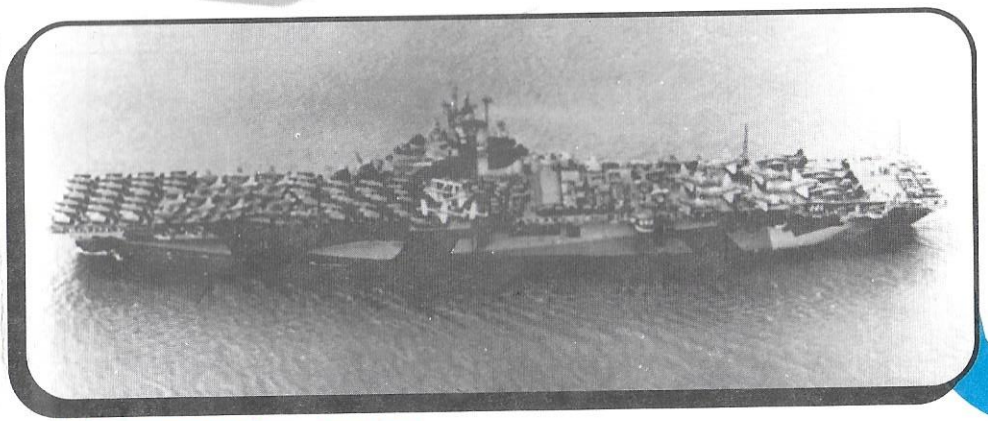


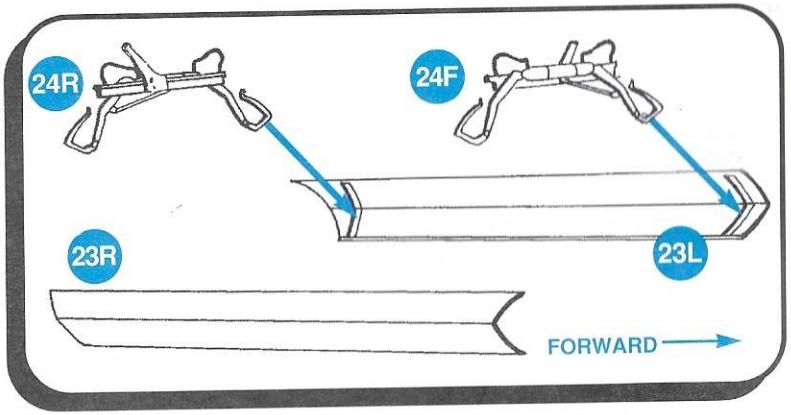




USS INTREPID CV-11

Step 6: BOMB BAY DOORS

If you want to assemble the bomb bay doors closed simply glue the left bomb bay door (23L) to the left fuselage half and right bomb bay door (23R) to the right fuselage half. If you have chosen to build your Avenger with the bomb bay open, carefully remove the bomb bay hinges (24F & 24R) from the parts tree. If you become confused as to which is the front and rear hinge, the rear hinge has the long vertical operating arm. Now cut apart and fold the bomb bay doors (23L & 23R) inward along the groove in the center of the doors. Glue the bomb bay hinges to the front and rear of the doors. The round hydraulic reserviors on the bomb bay hinges should point away from the bomb bay interior. The proper angle for the doors will be set by the hinges. Allow these parts to dry thoroughly, then glue the hinges up into the bomb bay, until they rest on the bomb bay roof and the front and rear bomb bay bulkheads. The doors should also rest on the sides of the fuselage. You may also choose to install the hinges into the bomb bay first, and then add the doors. Either way will work.



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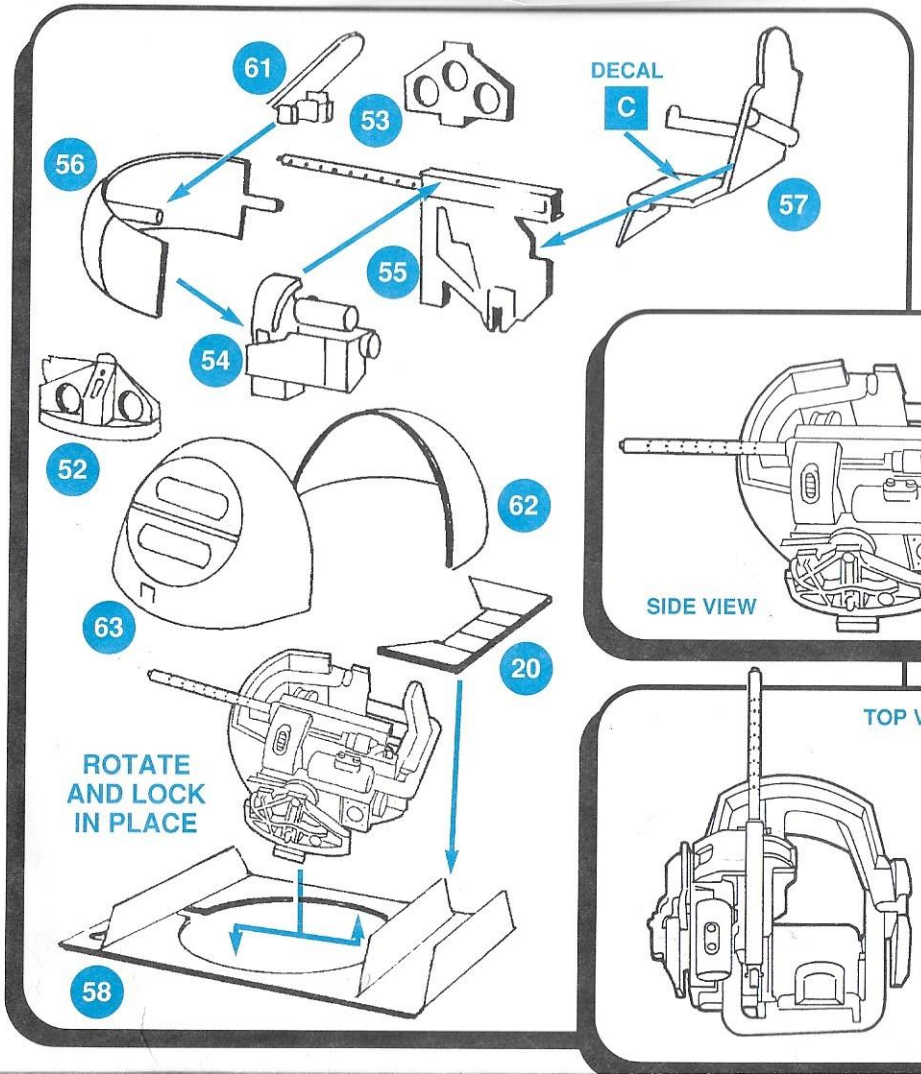
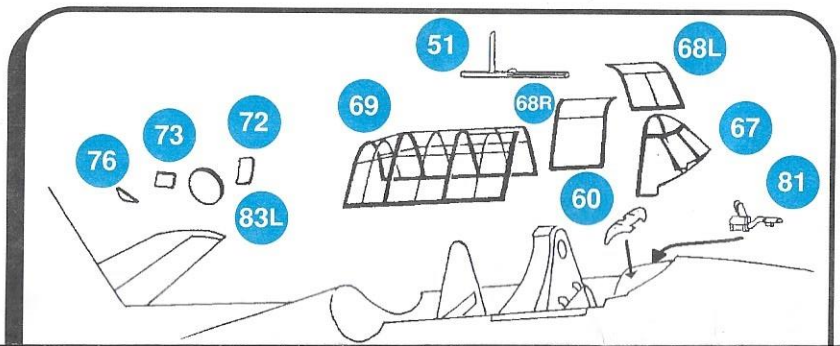


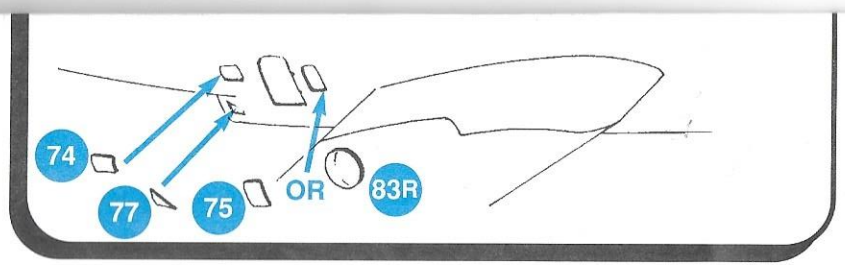
Step 7: TURRET

The parts that make up the turret are delicate and are designed to accurately represent the turret in the simplest manner. Take your time and you will be rewarded with an in-scale functioning turret assembly. Be patient, test fit, allow ample drying time, and do not force the pieces. Become familiar with the fit of the gun/turret assembly, and its location in the clear turret before gluing. Glue the gun/mount (55) to the turret ammo box (54). Next, glue the turret armor glass (61) to the mount on the turret armor (56). Apply the gunner's seat belt (Decal C) to the gunner's seat. Now glue the turret gunner's seat (57) to the ammo box/gun assembly. Next, glue the turret armor assembly to the front of the ammo box/gun assembly and the gunner's seat. Check the alignment of all the turret parts and allow to dry.

Now, using regular modeling cement, carefully glue the left turret half (62) and the right turret half (63). Let these parts dry thoroughly. Carefully place, (DO NOT GLUE), the gun side trunnion (52) onto the turret ammo box assembly. Now place, (DO NOT GLUE), the seat side trunnion (53) onto the turret armor. These pieces will allow the gun assembly to elevate. Now, carefully place the gun barrel through the opening in the turret, and gently slide the left and right side trunnions up into the locating holes on the turret. Be patient. Now very carefully place a small amount of your glue of choice on these pieces where the trunnions fit into the turret.

After allowing the turret assembly to dry, the turret may now be placed into the fuselage on top of the turret base (58) and turned 90° to lock in place. Gluing the cabin shelf (20) to the rear of the cockpit opening will hold the turret in place. The turret will now rotate and the gun will elevate.



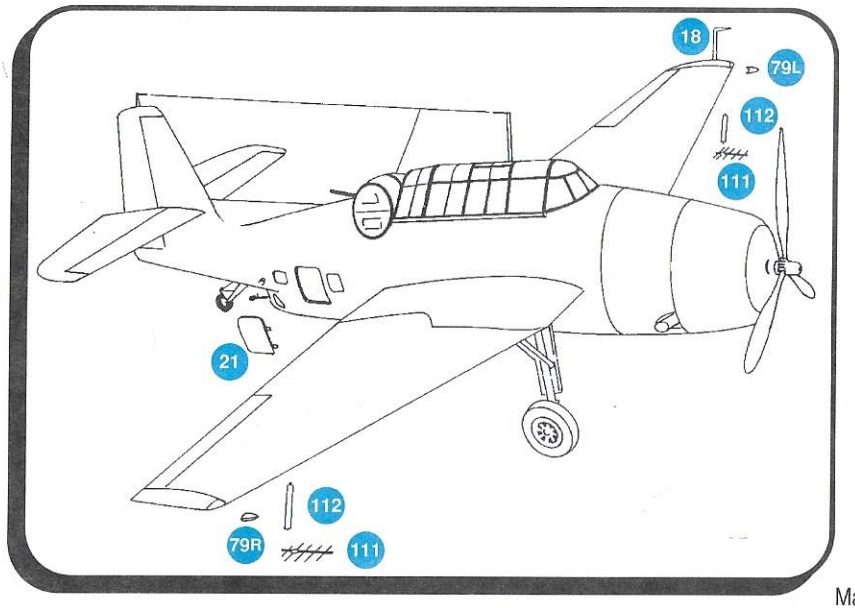


Step 8: CLEAR PARTS

Glue the instrument cowl (60),grey part, to the top of the cowl. Keep this part as far back as possible. Now glue the gunsight (81)to the cowl glare shield. Using the adhesive of your choice, glue the windshield (67)and the main canopy (69)onto the fuselage. Carefully cement the radio antenna (51),grey part, to the top of the main canopy. The sliding canopies (68L & 68R)may be placed in the open or closed position. Each side opens independently, and may be positioned accordingly. The left sliding panel has an additional panel and can be identified by the vertical framing.

Glue the left ventral window (76)and the right ventral window (77)to the left and right fuselage halves. Glue the left forward window (72)and the left rear window (73)to the left fuselage half. Glue the right forward window (75)and the right rear window (74)to the right fuselage half.

Accurate Miniatures has included bulged forward side windows (83L & 83R),to allow builders to construct one of the British Fleet Air Arm "Tarpons." Consult some of the many reference books on the Avenger to build one of these colorful aircraft.



Step 9: FINAL DETAILS

Now add the final pieces. We have left these until last to avoid breakage. You may glue the crew door (21)in either the opened or closed position at this time. Glue the Yagi radar mount (112)to the Yagi antenna (111). Make two sets and glue to the bottom of both wings. These antennas rotated outward slightly and may be positioned accordingly. The right wing Yagi antenna should be added after decal placement. Now add the pitot tube (18)to the left wing tip. Glue the wing tip navigation lights (79L & 79R)onto the wings. Remember red, left light; green, right light. Check alignment of these parts against the box insert drawings. You may now press the propeller onto the propeller shaft. The rudder, assembly from Step 4, should also be added at this time.

AIRCRAFT DECAL AND STENCIL PLACEMENT

EXTERIOR PAINTING AND FINISHING

The last foray of the mighty IJN Yamato on April 7, 1945, led to one of the most dramatic battles in Naval history. Attacks by carrier-based aircraft from Task Force 58.4 sank numerous Japanese warships including the formidable Yamato, virtually without direct involvement of the US Navy surface vessels. Avengers from VT-10 flying from the USS Intrepid (CV-11) engaged the Yamato escort fleet which consisted of a screen of cruisers and destroyers. Our kit depicts a TBM-3 which carried out the attack on and subsequent sinking of the IJN Light Cruiser Yahagi. The MK 13-1A torpedo struck Yahagi midship causing irreparable damage. Six more torpedo hits sealed her fate. This aircraft was maintained in topnotch condition and, therefore, had very little weathering in evidence. History lives again in the form of this very significant aircraft.

This aircraft was painted in the late war color of dark gloss sea blue (FS 15042) overall. You may notice that the upper surface markings on this aircraft are not pure white. A directive in June 1943 changed the upper wing national insignia to a mixture of one-part insignia white and one-part light grey. The decals reflect this subtle difference.

Optional markings (indicated in blue) are included for a TBM-3D night bomber flying from the USS Enterprise in 1945. These markings allow the builder to construct any one of three aircraft from VT(N)-90. The actual planes carried the standard three tone finish (non specular sea blue, FS 35042, over intermediate blue, FS 35164, over white, FS 37875) with the following modifications. The white portions of the airframes were painted black (FS 37038 closest). The white portions of the numbers and national markings were crudely dusted with medium grey in an attempt to create a lower visability marking. This can be duplicated through the use of grey pastels or a water base paint wash. Not all aircraft had their markings altered in this manner but it appears that all planes had oversprayed black undersurfaces. Both the dorsal gun and the turret gun were removed since these aircraft were protected by a covering flight of escort fighters. More information concerning this overlooked history may be found in the Phalanx publication "Batmen- Night Air Group 90 in World War Two."

AIRCRAFT STENCIL GUIDE: For those modelers who wish to apply stencil decals to their kit, **Accurate Miniatures** has researched and provided this stencil information. These drawings give the positions for the various stencils that were applied to the full-size aircraft. Carefully work from front to rear and from top to bottom when applying. Use care so as not to move them as they dry.

MODEL PAINT REFERENCE CHART*

	Federal Standard	Model Master	Humbrol	Floquil Classic Military	Gunze Sangyo Aqueous	Tamiya	Polly S	Aero Master Enamel
Flat Black	37038	1749	33	303010	12	XF1	10	9001
Flat White	37875	1768	34	303011	11	XF2	11	9002
Aluminum	17178	1781	11	303121	8	XF16	1995	—
Interior Green	34151	1715	151	303187	58	—	821	—
Gloss Sea Blue	15042	1717	181	—	54	—	—	9045 A/N623
Light Grey	36440	1730	129	303331	325	—	825	9056
Insignia Yellow	33538	1708	154	303228	329	XF3	40	9003
Gloss Red	11136	2718	19	—	3	X7	—	—
Gloss Green	14187	—	2	—	26	X5	—	—
Gun Metal	—	1795	53	303109	18	X10	1999	—
Burnt Metal	—	1415	—	—	76	—	1997	—

* This chart is provided only as an aid to the modeler and is the closest match possible from each paint manufacturer at time of printing.

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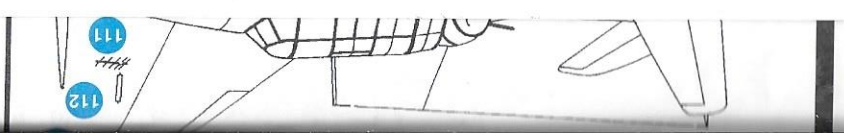

canopies (68L & 68R)may be placed in the open or closed position. Each side opens independently, and may be positioned accordingly. The left sliding panel has an additional panel and can be identified by the vertical framing.

Glue the left ventral window (76)and the right ventral window (77)to the left and right