



HISTORY

The Sd.Kfz. 234/2, or "Puma," was one of the most heavily-armed advanced armored cars to see service during World War II. It was well-designed and efficient; many of the technical innovations pioneered by this armored car are still used in today's military vehicles.

The Puma was produced from September 1943 to September 1944 to replace an earlier series of large, eight-wheeled armored cars. The design was based on the "monocoque," or unit-body structure, which eliminated the weight of a separate chassis, and allowed for heavier armor.

The Puma was issued to German Army and SS units in the last months of 1943. It was used in France and on the Eastern Front as a reconnaissance vehicle, and for convoy protection and road patrol. Due to the increasing shortage of tanks, many Pumas were pressed into service in the assault role, but they suffered severe losses because of their relatively thin armor.

Only 101 Pumas were built before production terminated so that all factories were available to build tracked, anti-tank vehicles. In addition to the Puma, three other versions of the Sd.Kfz. 234 were produced.

SPECIFICATIONS

Crew	4
Weight	10.67 tons (11.74 metric tons)
Length	22.31' (6.8 meters)
Width	7.87' (2.4 meters)
Height	7.48' (2.28 meters)
Engine	Tatra 103 A/C, V-12 air cooled diesel, 220 bhp
Transmission	Manual, 6 speeds forward, 6 reverse
Speed	50 mph (80 kph)
Range	560 miles (900 km)
Armament	One 50mm KwK 39/1, L/60 gun One 7.92mm MG42 machine gun
Traverse	360 degrees
Elevation	- 10 degrees to + 20 degrees
Ammunition	Main gun: 55 rounds Machine gun: 1,050 rounds

Armor thickness	Maximum: 1.18" (30mm) Minimum: .196" (5mm) Mantlet: 1.57 - 3.93" (40 - 100mm)
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Reference Sources

- Encyclopedia of German Tanks of World War II, Chamberlain & Ellis (Arco)
- Tanks and Other Armoured Fighting Vehicles, 1942-1945, B.T. White (MacMillan)
- "AFV G-2," Vol. 5, No. 12
- Strassenpanzer, Spielberger & Feist (Aero)
- D-Day to Berlin, Terrence Wise (Squadron/Signal)
- Profile No. 33, "German Armoured Cars," Gen. N.W. Duncan

BEFORE STARTING

1. Study the illustrations and sequence of assembly before beginning.
2. Decide how much detail you wish to add to your model and whether or not you intend to modify or "convert" the basic model in any way. Study carefully all available reference material before beginning to ensure an authentic model.
3. Due to the amount of parts in this kit, do not detach the parts from the runners (sprue) until you need them. This helps avoid confusion and lost parts.
4. When cementing the parts together, check the way in which one part fits together with another. This ensures a neat job.
5. Always remember, when working with plastic model cement and paint, make sure your work is well-ventilated. The fumes from plastic modeling products can be harmful if inhaled.

PREPARATION OF PARTS

1. Never tear parts off the runners (sprue). Use a Testor Hobby Knife, nail clippers, or small wire cutters.
2. It is possible some parts may require a little attention with a file or sandpaper to ensure a proper fit and neat appearance. Hobby files and Testor Hobby Sandpaper appropriate for model-building are available in most good hobby shops.

3. If you desire, you may fill any seams (where parts go together) or imperfections with Testor Contour Putty for Plastic Models which is also available at good hobby shops.

PAINTING

You can obtain an excellent finish on your model using Testor enamels. Parts of the model are painted individually, and then the entire model is oversprayed when you have finished construction.

First of all, be sure your brushes are soft, clean and flexible. (Keep them that way by cleaning them thoroughly with Testor Paint thinner.) Never use inexpensive brushes! A selection of Testor Shed-Proof Brushes will serve you well.

Wash plastic parts before detaching them from the sprue. Warm water and liquid detergent remove the oils left from the manufacturing process. Let the parts dry and avoid excessive handling. Immediately before painting, wipe the parts with a "tac rag" (available at automotive centers) to remove dust and lint.

Most parts are best painted while still attached to the sprue or they may be detached and held with tweezers or "magic" type transparent tape. Paint in one direction only. If your paint is the correct consistency, brush strokes will disappear as the color dries. If the paint seems too thick, thin it with Testor Paint Thinner. Wheels may be detached from the sprue and fit onto toothpicks or matchsticks for painting. Then just hold the paintbrush against the edge of the wheel and rotate the wheel to obtain a neat clean finish.

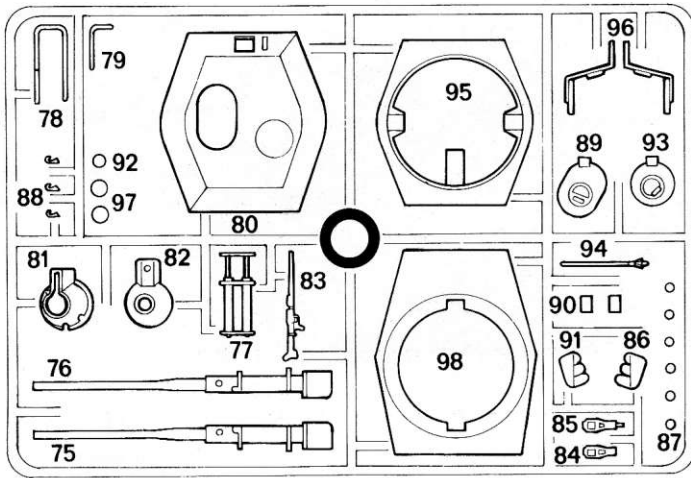
Let the paint dry completely before handling. When the parts are dry, assemble the model, following the directions closely. Remember cement will not stick to painted surfaces. Using your Testor Hobby Knife, carefully remove paint from all surfaces to be cemented. After you have assembled your model you may touch up areas where cement has marred the finish.

When your model is completed, apply a coat of Testor Dullcote #1260 to the entire model. This will give it an authentic, dull finish and protect the surface of the model.

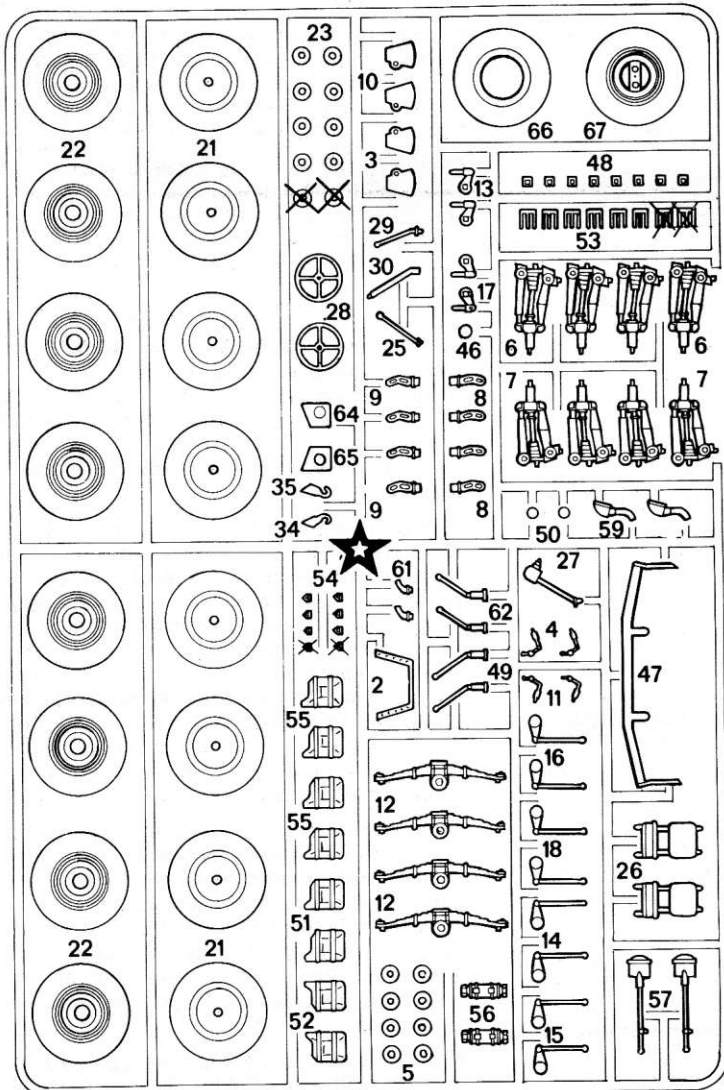
Remove this page from the instruction sheet by cutting along indicated line. Use the drawings of the complete sprue as a part-locating reference when building the model.

Tweezers will be useful in assembling the many small parts in this kit. The type used by postage stamp collectors is recommended.

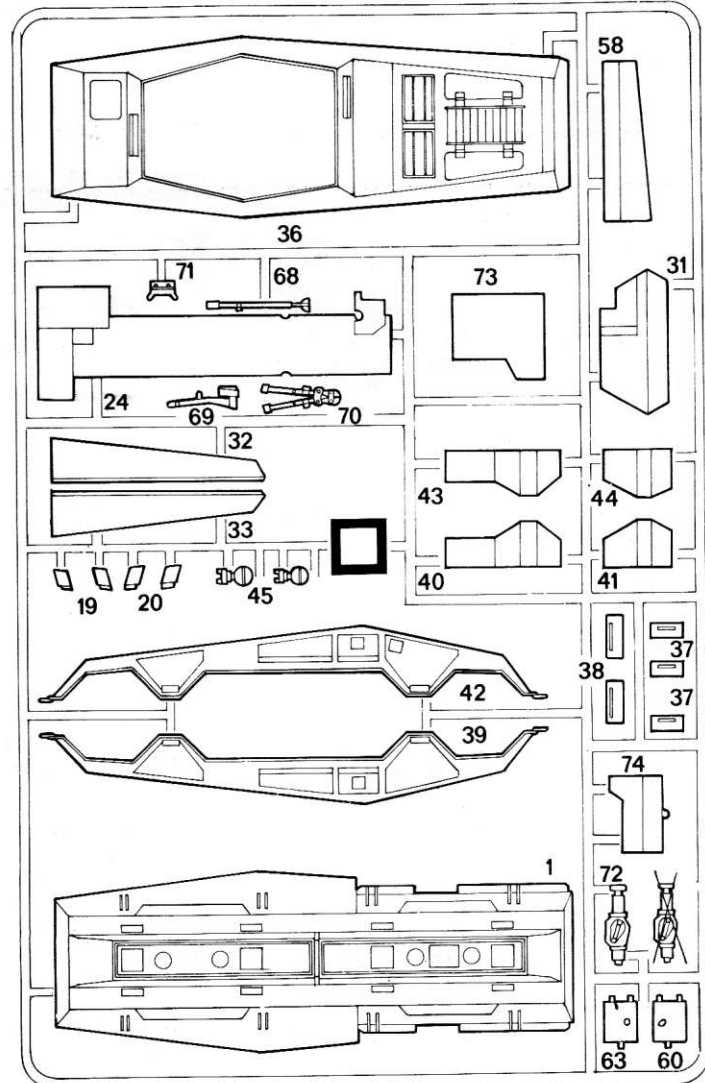
Liquid cement, Testor #3502, is recommended for construction since it can produce the neatest, quickest, and strongest glue joints. Apply small amounts of cement, using the tip of a 00 brush, to the surfaces to be joined while holding the parts in place. Do **not** use large amounts of cement.



Parts from this section are identified with this symbol: ○



Parts from this section are identified with this symbol: ☆



Parts from this section are identified with this symbol: □

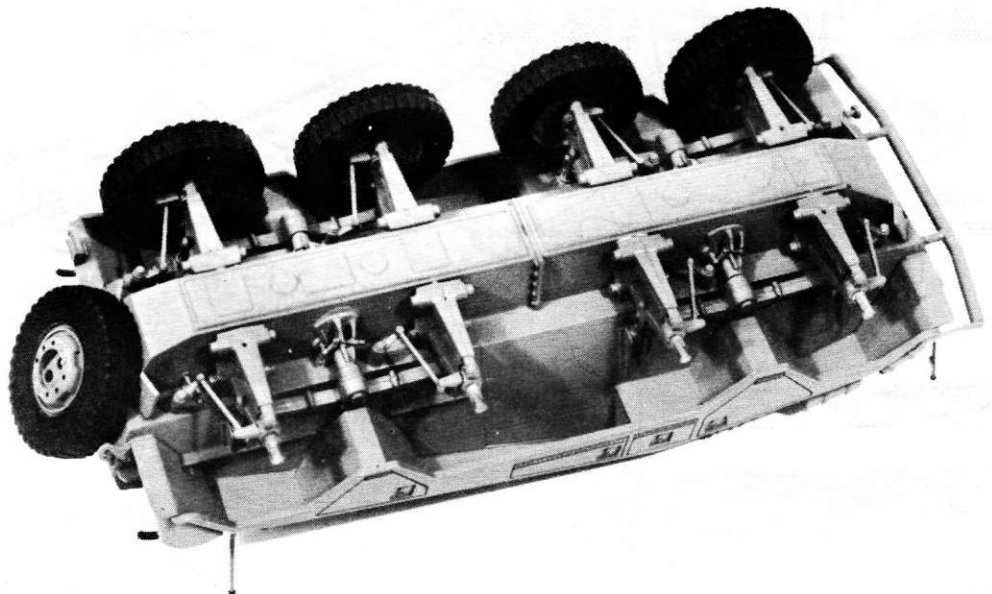
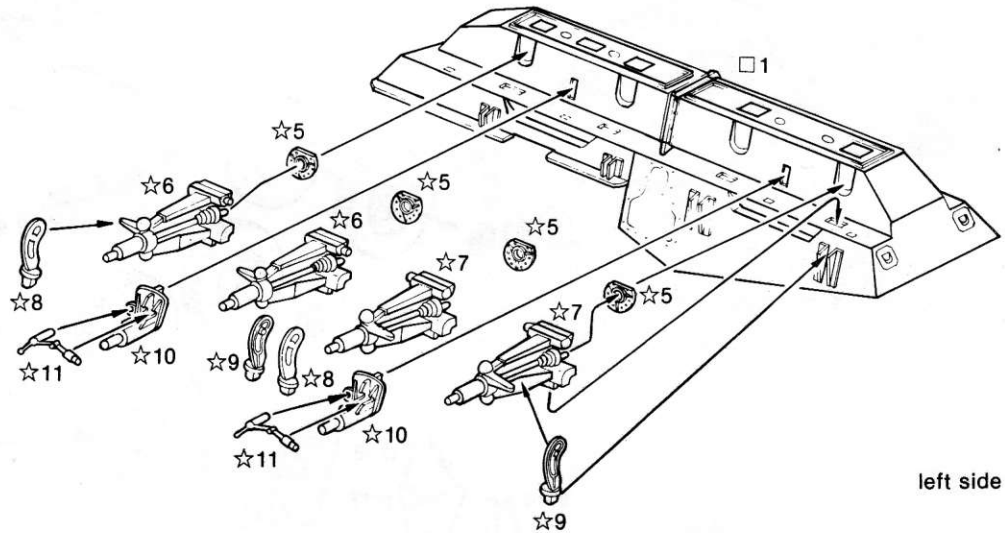
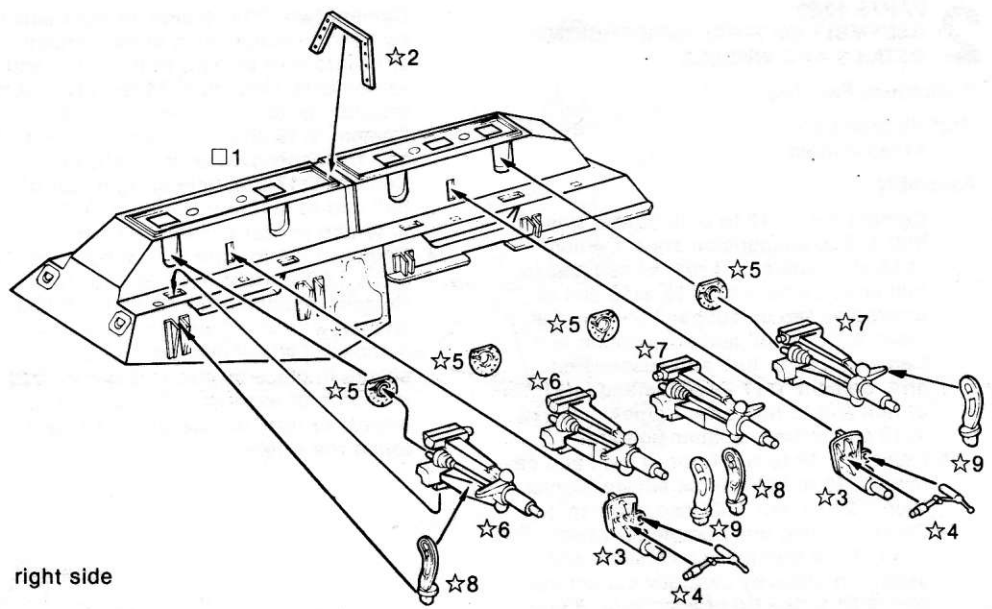
NOTE: All parts not singled out in **Preliminary Painting** should be painted "**Primer Yellow**," the primary body color, before removing them from the parts tree. Instructions for mixing this color are given on page 10.

Before beginning assembly, discard all parts which are crossed out. These parts are not used in the construction of this model.

1 PARTS 1-11 ASSEMBLY OF SUSPENSION

Assembly

- 1. Turn □1 upside-down and cement ☆2 to □1. Cement two ☆3 to right side of □1 as shown. Cement one ☆4 to each of the two ☆3 and to side of hull.
- 2. Cement one ☆5 to each of two ☆6 and two ☆7 as shown, and then cement all four suspension arms to the hull side and allow to dry thoroughly. Cement one ☆8 to the *first* and *third* arms, and then cement one ☆9 to the *second* and *fourth* arms.
- 3. Cement two ☆10 to left side of □1. Cement one ☆11 to each of the two ☆10 and to side of hull. Cement one ☆5 to each of two ☆6 and two ☆7 as shown, and then cement all four suspension arms to the hull side and allow to dry thoroughly. Cement one ☆8 to the *second* and *fourth* arms, and then cement one ☆9 to the *first* and *third* arms. Make certain that all the suspension pieces are correctly located and cemented solidly in place. Allow all parts to dry thoroughly before handling.



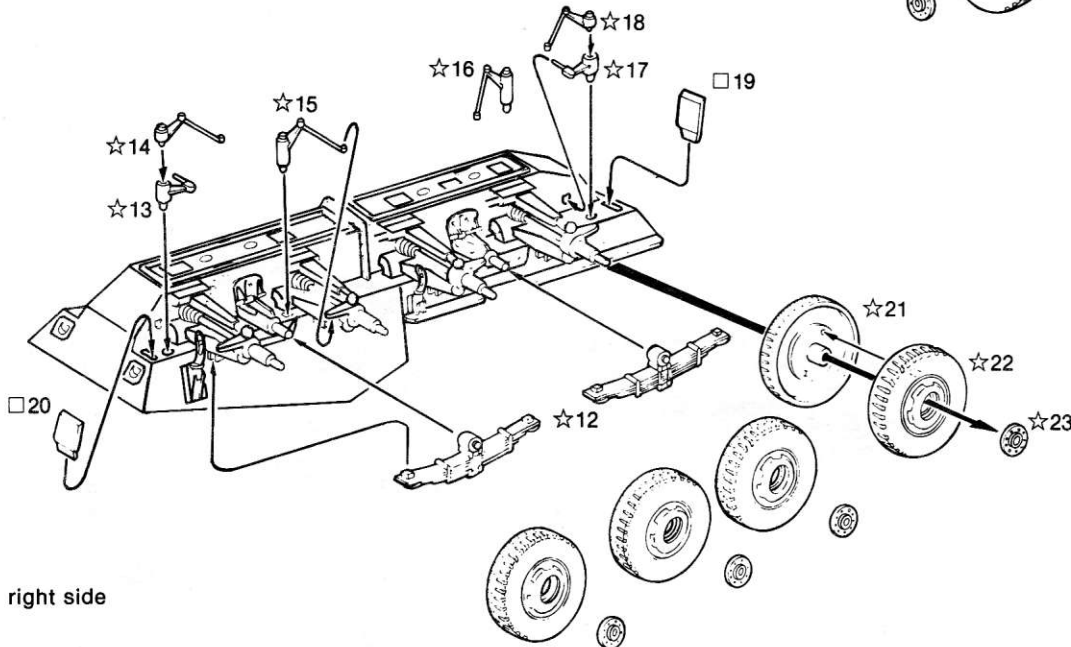
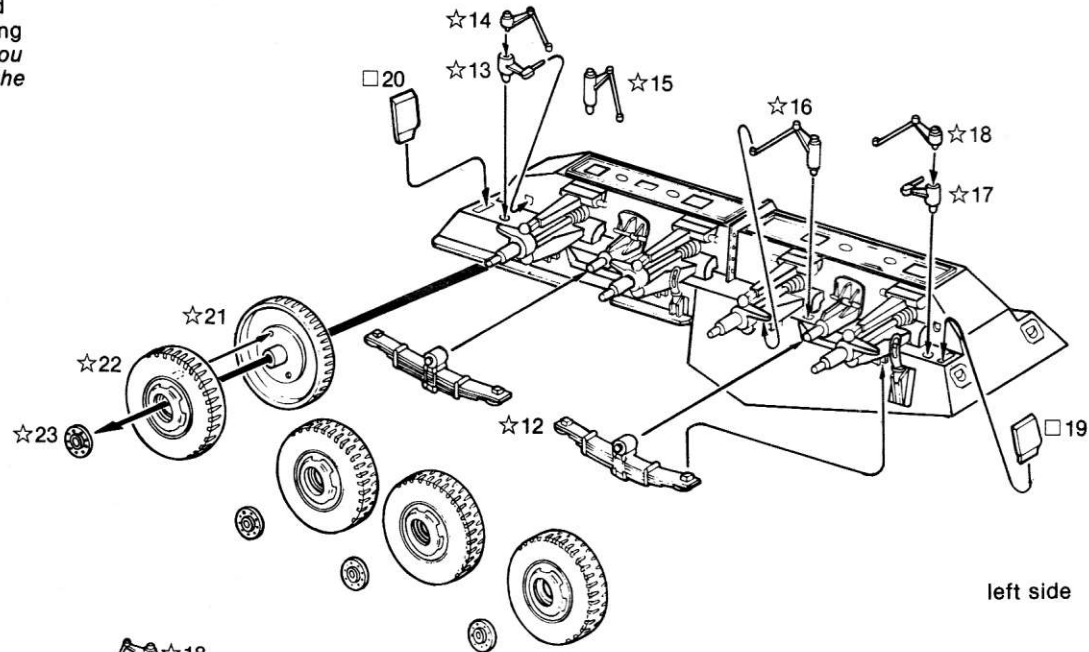
2 PARTS 12-23 ASSEMBLY OF FINAL SUSPENSION DETAILS AND WHEELS

Preliminary Painting

☆21-22 tires only:
#1183 Rubber

Assembly

- 1. Cement two ☆12 to pins on left side of hull and to suspension arms. Cement ☆13 into hole at left rear of hull and to hull side. Cement ☆14 to ☆13 and to protruding tab on suspension arm. Cement ☆15 to hull and suspension arm. Cement ☆16 to hull and suspension arm. Cement ☆17 into hole and left front of hull and to hull side. Cement ☆18 to ☆17 and to front suspension arm.
- 2. Cement □19 to left front of hull, and cement □20 to left rear as shown. Cement four ☆21 to four ☆22 and allow to dry. Carefully push one completed wheel over each of the four axles as shown, and secure in place by carefully cementing one ☆23 to the tip of each axle. *If you want the wheels to turn, do not let the cement touch the wheel.*
- 3. Cement two ☆12 to pins on right side of hull and to suspension arms. Cement ☆13 into hole at right front of hull and to hull side. Cement ☆14 to ☆13 and to protruding tab on suspension arm. Cement ☆15 and ☆16 into holes in hull and to suspension arms as shown. Cement ☆17 into hole in right rear of hull and to hull side. Cement ☆18 to ☆17 and to rear suspension arm.
- 4. Cement □19 to right rear of hull, and cement □20 to right front as shown. Cement remaining four ☆21 to four ☆22 and allow to dry. Carefully push one completed wheel over each axle and secure in place by cementing one ☆23 to the tip of each axle. *If you want the wheels to turn, do not let the cement touch the wheel.*



3 PARTS 24-31 ASSEMBLY OF INTERIOR

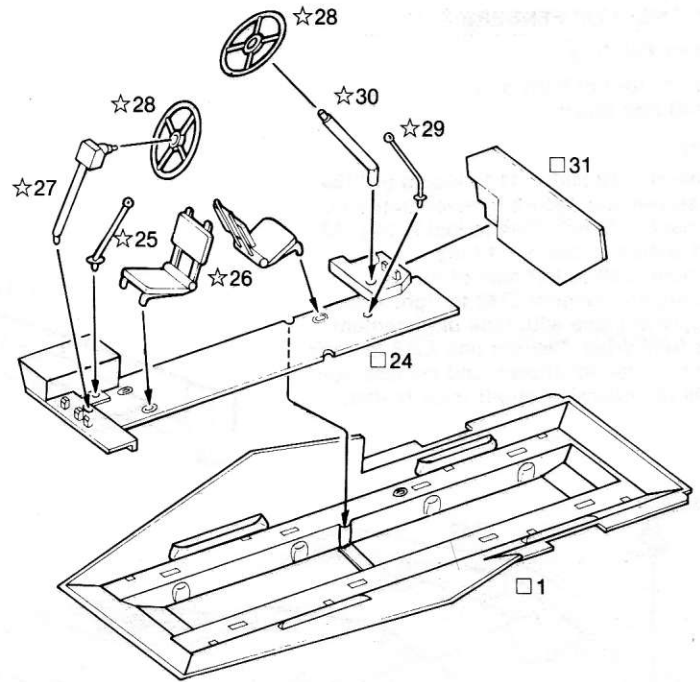
Preliminary Painting

- 1 inside only, □24 top only, ☆25, ☆29 shafts only, ☆26 all except cushions, ☆27, ☆30, □31: #1168 Flat White
- ☆25, ☆29 knobs only, ☆28: #1147 Gloss Black
- ☆26 cushions only: #1164 Flat Olive Drab Green

Assembly

- 1. Cement □24 into hull as shown. Cement two ☆26 into brackets on floor. Cement ☆25 and ☆29 to floor. Cement ☆27 and ☆30 to floor and allow to dry thoroughly before continuing.
- 2. Cement one ☆28 to ☆27 and the other ☆28 to ☆30. Cement □31 to rear of □24 and to hull sides. Allow all parts to dry.

NOTE: If you plan to "weather" the interior of your model, it is suggested that you do so at this stage. See WEATHERING HINTS elsewhere on this sheet.



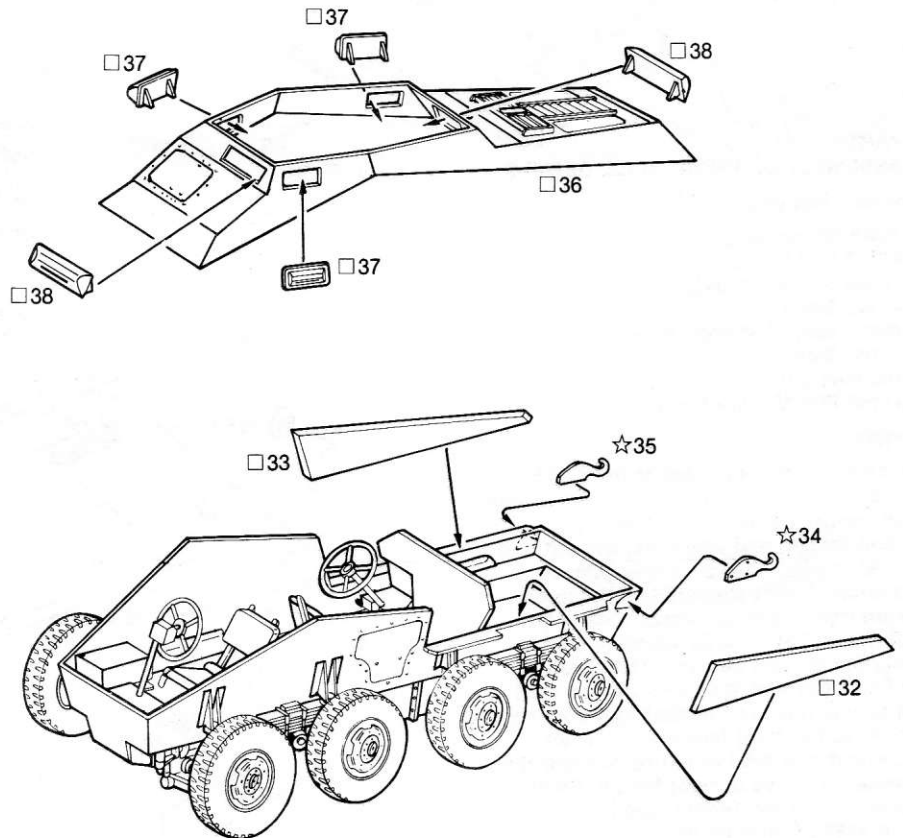
4 PARTS 32-38 ASSEMBLY OF HULL TOP AND DETAILS

Preliminary Painting

- 36, □37, □38 inside only: #1168 Flat White

Assembly

- 1. Cement □32 to left side of hull. Cement □33 to right side of hull. Cement ☆34 to left rear of hull, and cement ☆35 to right rear. Allow all parts to dry thoroughly.
- 2. Cement □36 to hull, securing it in place using rubber bands or tape until the cement has dried. Cement one □37 into each of the three side viewing parts (two on the right, one on the left). Cement one □38 into the front viewing port, and the remaining □38 into rear viewing port.



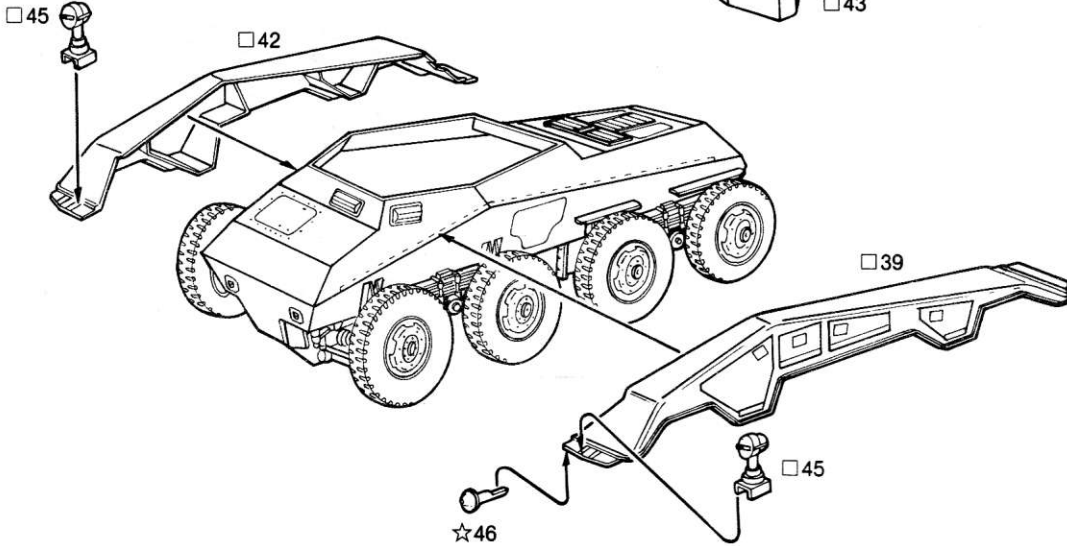
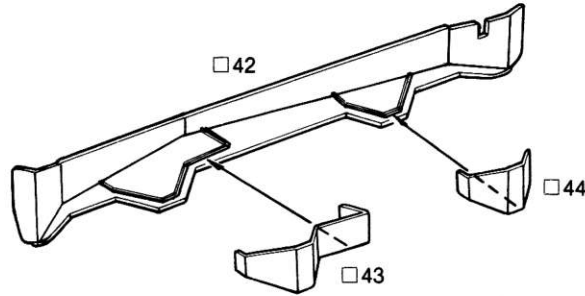
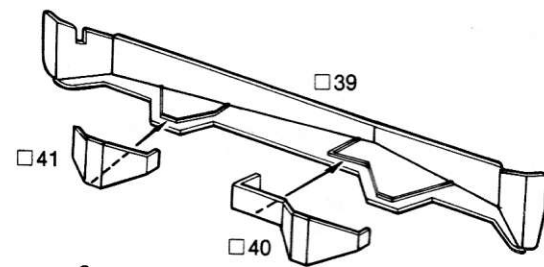
5 PARTS 39-46 ASSEMBLY OF FENDERS

Preliminary Painting

- 45 slot in front of light only:
#1149 Flat Black

Assembly

- 1. Cement □40 and □41 to inside of □39 as shown and secure in place until dry. Cement □43 and □44 to inside of □42 and secure in place until dry.
- 2. Cement □39 to left side of hull as shown, and cement □42 to right side. Secure in place with tape until cement has fully dried. Cement one □45 to each front fender, as shown, and cement horn ☆46 to underside of left front fender.



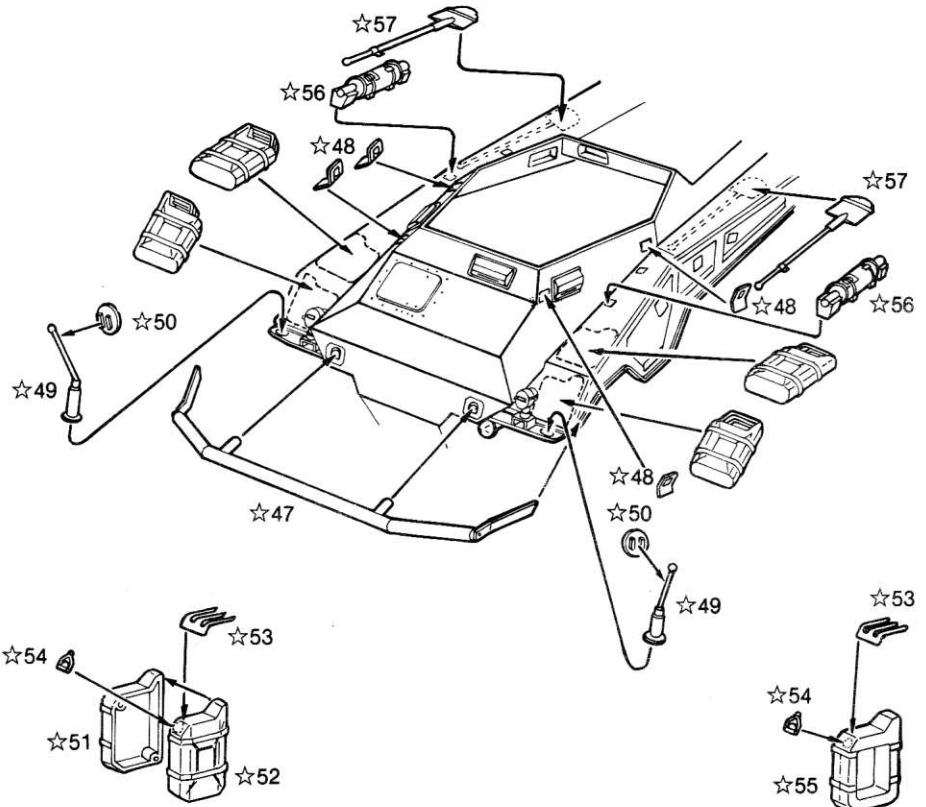
6 PARTS 47-57 ASSEMBLY OF FRONT HULL DETAILS

Preliminary Painting

- ☆49 balls on tips only:
#1168 Flat White
- ☆50 faces of mirrors only:
#1146 Silver
- ☆57 metal part of shovels only:
#1180 Steel
- ☆57 handles only:
#1166 Flat Military Brown

Assembly

- 1. Cement ☆47 into holes at front of hull and to fenders. Cement four ☆48 to hull as shown. Cement one ☆49 to each front fender, and when dry, cement one ☆50 to each ☆49 as shown. Check photos of the completed model to ensure proper positioning of these parts.
- 2. Cement ☆51 to ☆52. Cement ☆53 to top of can, and cement ☆54 to left top of can. Cement ☆53 and ☆54 to ☆55 in a similar manner. Cement four completed cans to the front fenders as shown. Cement one ☆56 to left fender and the remaining ☆56 to right fender. Cement one ☆57 to left fender, and the remaining ☆57 to right fender.



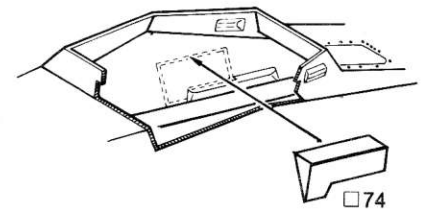
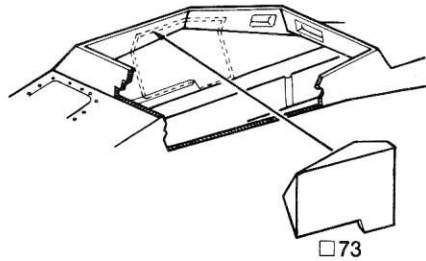
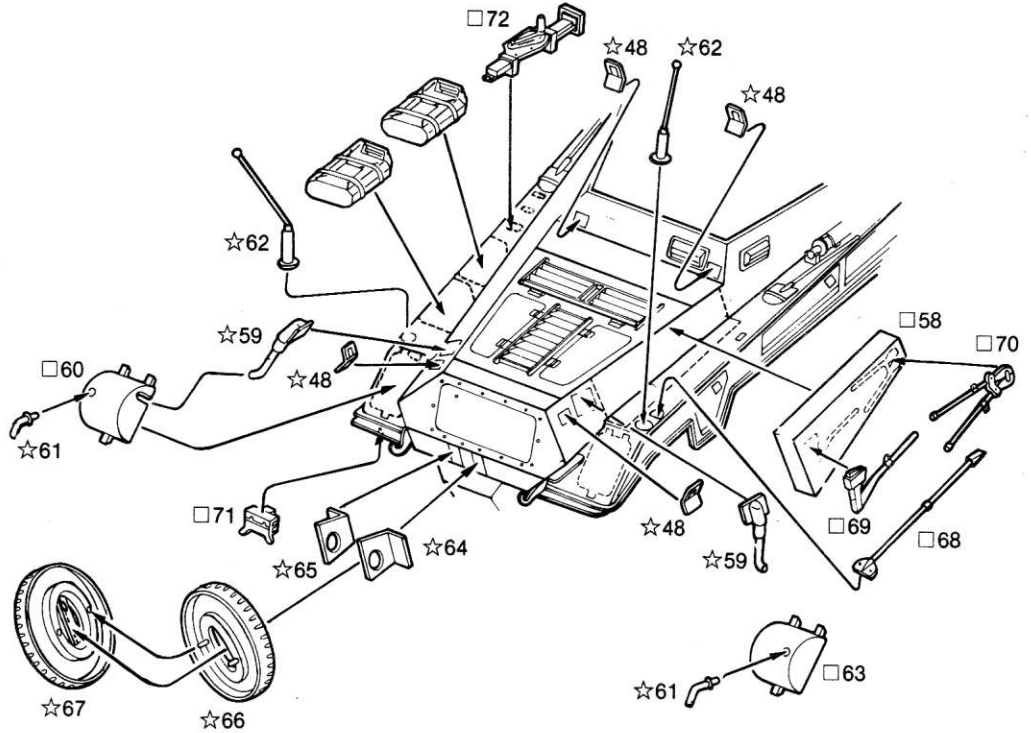
7 PARTS 48, 58-74 ASSEMBLY OF REAR HULL DETAILS

Preliminary Painting

- ☆59 pipes only, ☆61:
#1185 Rust
- ☆62 balls on tips only, □73, □74:
#1168 Flat White
- ☆66-67 tire only:
#1183 Rubber
- 69 blade only, □70 all except straps:
#1180 Steel
- 69 handle only:
#1166 Flat Military Brown

Assembly

- 1. Cement □58 to right side of engine compartment. Cement one ☆59 to left rear of hull, and cement the remaining ☆59 to right rear. Cement □60 to left rear fender and to tip of ☆59. Cement ☆61 into hole in □60. Cement □63 to right rear fender and to tip of ☆59. Cement ☆61 into hole in □63. Cement ☆62 to left rear fender, and cement remaining ☆62 to right rear fender.
- 2. Cement ☆64 and ☆65 to hull rear as shown, and allow to dry. Cement ☆66 to ☆67, and then cement ☆66-67 to ☆64-65 as shown. Check photos of the completed model to ensure proper location of these parts. Cement □68 to right fender, and cement □69 and □70 to □58 as shown.
- 3. Cement ☆48 to left rear and right rear of hull. Cement two ☆48 to rear of driving compartment. Cement □71 to underside of left rear fender. Cement □72 to left fender. Cement two gas cans to left fender. Finally, cement □73 to right side of fighting compartment, and □74 to left side as shown.



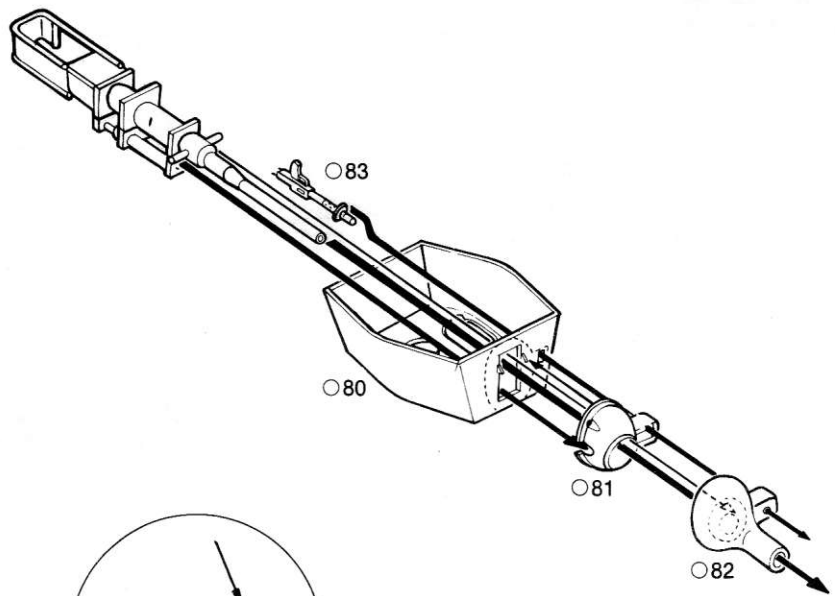
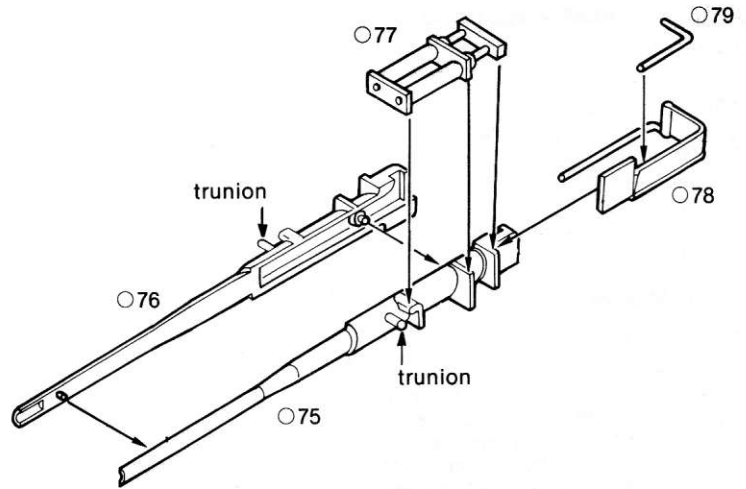
8 PARTS 75-83 PRELIMINARY ASSEMBLY OF TURRET AND MAIN GUN

Preliminary Painting

- 75-76 breach end only, ○77, ○78, ○79,
○80 inside only:
#1168 Flat White
- 83 all except handgrip:
"Gunmetal" (Mix 1 part #1149 Flat Black
with 1 part #1180 Steel)
- 83 handgrip only:
#1166 Flat Military Brown

Assembly

- 1. Cement ○75 to ○76 and clamp together until dry. Cement ○77 to top of ○75-76 as shown. Cement ○79 to ○78 and then cement ○78 to breach assembly.
- 2. Turn turret ○80 upside-down. Insert barrel through opening in front of turret from the inside (note that ○77 faces towards turret roof) until the gun trunions (see drawing) are outside the front face of turret. Secure the trunions in place by catching them in the notches on ○81, and carefully cement ○81 to the turret front. *Make certain that the cement does not touch the trunions or the gun will not elevate.*
- 3. Cut the stock off the machine gun ○83 (see drawing). Carefully push the machine gun through the small hole next to the main gun barrel with the handgrip facing towards the turret bottom. Push the machine gun through as far as it will go and cement in place. Push ○82 over the main gun barrel and machine gun barrel and cement it to the main barrel.



cut along indicated line

9 PARTS 84-94 ASSEMBLY OF FURTHER TURRET DETAILS

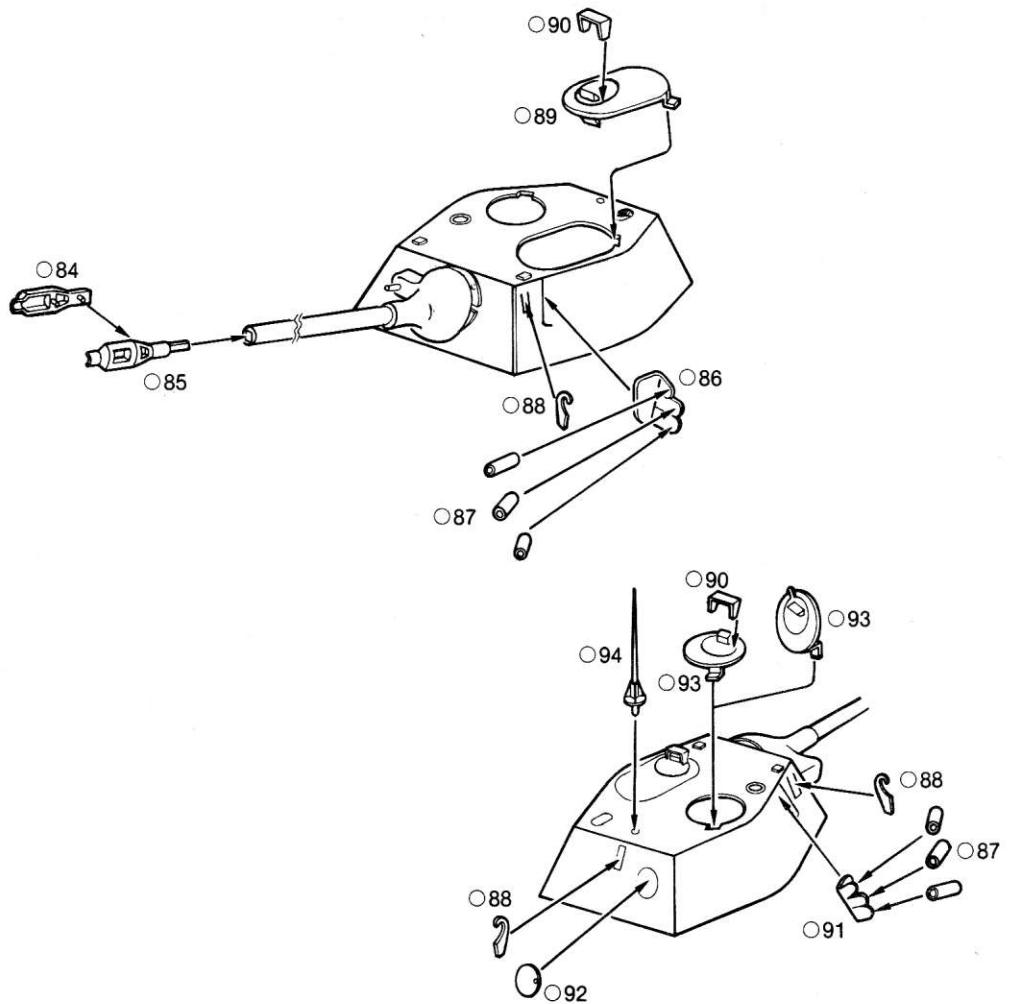
Preliminary Painting

- 84-85 inside only, ○87 inside only:
#1149 Flat Black
- 89, ○93 periscope faces only (see photos):
#1147 Gloss Black

NOTE: The insides of the hatches (○89, ○93) are painted the primary body color.

Assembly

1. Cement ○84 to ○85. Cement ○84-85 to tip of gun barrel. Cement ○86 to left front of turret as shown. Cement three ○87 to ○86 with the hollow ends facing up. Cement ○88 to left front of turret. Cement ○90 to ○89, and then cement ○89 to turret roof in either open or closed position.
2. Cement one ○88 to rear of turret and the other ○88 to the right front of the turret. Cement ○91 to right front of turret and then cement three ○87 to ○91 with their hollow ends facing up. Cement ○92 to turret rear. Cement ○90 to ○93, and then cement ○93 to turret roof in either open or closed position. Cement ○94 to turret roof.



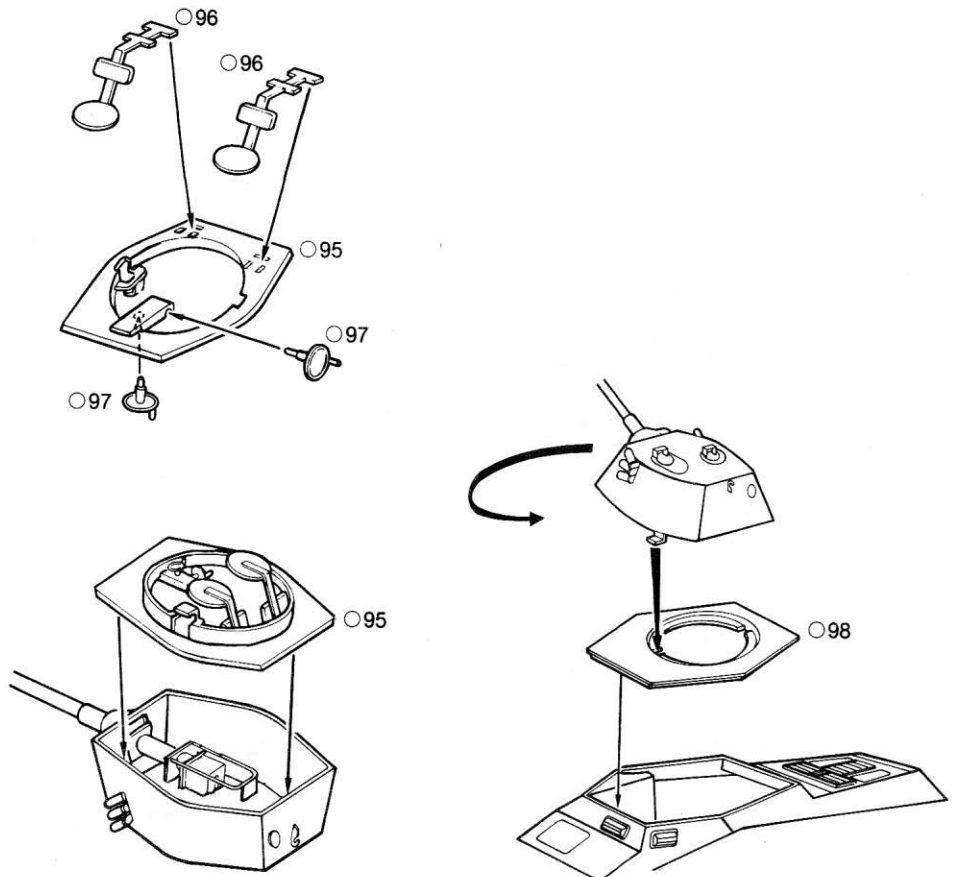
10 PARTS 95-98 FINAL ASSEMBLY

Preliminary Painting

- 95 inside only, ○96 all except cushions,
○97:
#1168 Flat White
- 96 cushions only:
#1164 Flat Olive Drab Green

Assembly

1. Turn ○95 upside-down. Cement two ○96 to ○95 as shown, and clamp in place until dry. Cement two ○97 to ○95 as shown. Cement ○95 to bottom of turret and allow to dry completely before further handling.
2. Carefully cement ○98 to top of hull as shown and allow to dry. Turret may then be assembled to the hull by fitting the two lugs in the bottom of the turret into the two cut-outs in the turret ring; turret may then be swiveled to any position.



CAMOUFLAGE AND MARKINGS



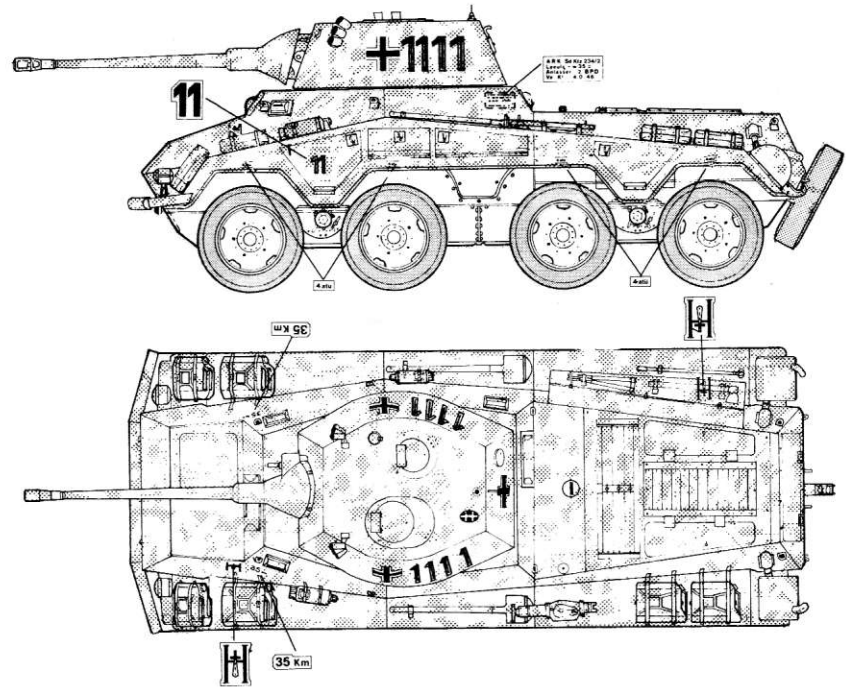
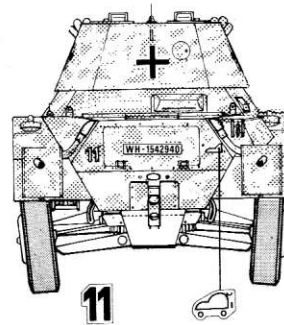
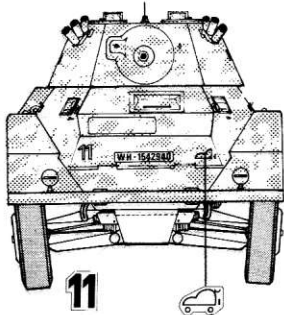
"Primer Yellow" (Mix 10 parts #1167 Flat Desert Tan, 10 parts #1169 Flat Yellow, and 7 parts #1168 Flat White)



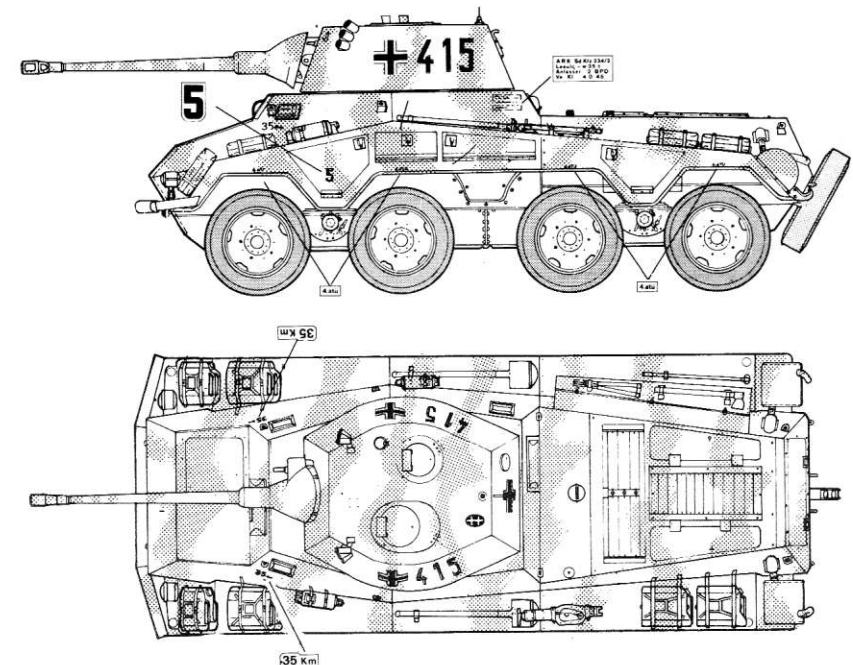
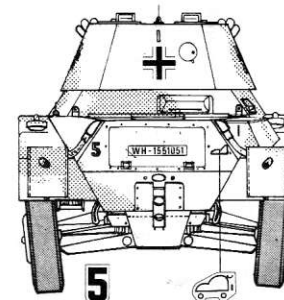
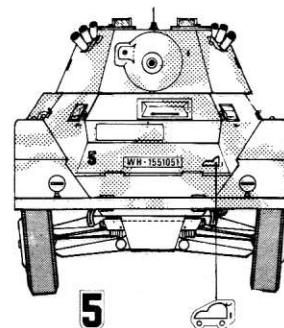
"Dark Green" (Mix 4 parts #1164 Flat Olive Drab Green and 1 part #1149 Flat Black)

APPLYING DECALS

1. Spray entire model with Testor Glosscote #1261. Decals adhere best to a smooth surface and the shinier the finish, the smoother it is. Allow the Glosscote to dry thoroughly before going further.
2. Select the decals you plan to use, and cut each of them out from the decal sheet with small scissors or Testor Hobby Knife.
3. Working with only one decal at a time, dip the decal in clean water for no more than five seconds, then remove it from the water and place on a dry paper towel for about one minute.
4. When the decal slides easily on the backing paper, slide it to the edge of the paper and onto the surface of the model with a soft paintbrush or tweezers. Remember: the
5. Once the decal is in the desired position, apply a small amount of Testor Decal Set #8804. This will help the decal to conform to any irregularities in the surface of the model (rivets, curves, etc.). Allow the decal to dry undisturbed. Should you find the decal has moved or should you desire to purposely move it, apply a little Decal Set to a soft brush and push the decal slowly into the desired position.
6. When the decals are completely dry (usually overnight), apply a coat of Testor Dullcote #1260 to the entire model. This will give it an authentic, dull finish and protect the surface of the model.



1st Vehicle, 1st Troop, 11th Company, Reconnaissance Section, IX SS Panzer Division "Hohenstaufen." France, 1944.



5th Vehicle, 1st Platoon, 4th Company, (Unit unavailable). France, 1944.

WEATHERING HINTS

Nearly all military vehicles show some signs of wear and tear. The process by which the modeler imparts this look to a model is referred to as *weathering*. Many times, the weathering, that is, the representing on the model of rust, mud, oil stains, dust, chipped paint, etc., can really make a model stand out and give it amazing authenticity.

Always try to be logical in applying weathering techniques. For instance, you wouldn't want to show rust on top of mud or dust on your vehicle, nor would you normally want to cover a vehicle supposedly operating in the desert with mud. Vehicles move *through* the land they operate on more than *over* that land, and you must weather your vehicle in such a way that it makes sense.

After you have painted your model in its basic colors, begin by sealing the paint with one or two coats of Testor Dullcote. When this dries, you can add shading to the model using washes. A wash is simply thinner which has been tinted by adding paint to it. Use a broad brush and apply an even wash of #1149 Flat Black (use #1183 Rubber if your model is painted "sand" or tan) over the entire model. Apply this quickly, and before it dries, carefully wipe it off with a soft lint-free cloth. This should leave subtle shadows around all the projections and details. If you like, you can darken these shadows in certain places by adding additional washes with a fine brush.

Always work slowly and carefully, trying not to overdo the weathering. A good rule of thumb is that too little weathering is always preferable to too much. Knowing when you have applied enough is sometimes difficult to determine, so pause often and inspect your model for the desired effect.

The next step is highlighting your model. For this, use a technique called drybrushing. Wide, flat, chisel brushes in various sizes are used. On a scrap of cardboard, mix a small amount of #1168 Flat White with your basic model color and then wipe your brush off on a clean cloth until there is barely a trace of paint left. Drag this drybrush across the surface of your model. Paint will begin to collect on all the edges and high points of the model. Use a scrubbing action at first and literally tint your model with this color. Add a little more Flat White to this color and drybrush again, this time applying the paint a little more subtly.

Repeat this process one or two more times, lightening the color and applying more lightly each time. Don't get carried away, though, the effect should be restrained at this point. After the paint has dried, apply the decals and let them dry.

If you want your model to appear new, it can be left as is. If you want a dirty or dusty model, you can now begin to dirty it up. But if your vehicle is to represent a non-combat or peace-time vehicle, be especially light-handed. Use Testor #1166 Flat Brown or #1167 Flat Tan, and apply using the drybrush method. For a dusty appearance, drybrush lightly; for a grubby or filthy look, scrub the paint on in blotchy or streaked patches. Again add further highlights adding #1168 Flat White and #1169 Flat Yellow, lightening your dirt color and pressure on the brush with each succeeding layer. If your dirt color gets too washed out or yellowish, add a touch of #1185 Rust and #1165 Olive to it. When drybrushing always remember, a lighter color goes over a darker, and brush pressure gets lighter with each succeeding layer.

A little rust on mufflers and exhaust pipes is realistic, as is a hint of it on the metal parts of a vehicle's tracks. But as a rule, be sparing with it if you wish your vehicle to look authentic. Rust is one of the most overdone forms of weathering seen on models. Unless your model is supposed to be a wrecked or an abandoned vehicle, go very easy with the rust. To rust out a muffler, first apply a couple of heavy washes of #1183 Rubber. After this dries, mix some #1185 Rust with the Rubber and drybrush liberally. Follow this color with pure Rust, and if you wish you can add a touch of #1169 Yellow to this, drybrushing very lightly.

Dust is difficult to portray on a model unless you have the use of an airbrush. If you do, try shooting a light sand-colored paint at your model, with your airbrush held about two feet away from your model. If you do not have an

airbrush dust may be simulated by the use of powdered artist's pastels carefully brushed onto your model a little at a time until the desired effect has been achieved. A similar effect can be had by using barbecue ashes just as they come out of your barbecue.

Occasionally there are areas on a vehicle where paint becomes scraped or scuffed off. Such areas include metal flooring, around hatches, grab handles, gun breeches, etc. Paint only rubs off under extreme wear, so keep this to a minimum. There are two ways to represent this. The first is by drybrushing *very lightly* with #1180 Steel or #1181 Aluminum. The second method is by applying graphite. You can do this by drawing directly on the area with a pencil, or by grinding the lead into a powder and applying with your fingers or a paint brush. This aspect of weathering is the easiest to overdo—so use it sparingly.

If you are building a tank, leave the tracks off until last and paint them separately. Use a touch of #1183 Rubber mixed with some #1166 Flat Brown. After this dries add a wash of #1149 Flat Black between the shoes, then, drybrush the shoes very lightly with #1181 Aluminum. Some tracks have rubber shoes—these areas should be painted Rubber.

Experienced modelers do several things to aid them in their hobby. One of the most helpful is attending meetings of their local International Plastic Modeling Society chapter. Here they see and discuss modeling techniques. Your local hobby shop will help you locate your local I.P.M.S. group. Serious modelers also collect books and photographs to use as reference when they finish their models. Again, your local hobby shop can help. Last, but certainly not least, your own observation will prove helpful. Visit museums. Look at buildings and vehicles around you. Notice how rust streaks a metal roof. See the oil and dirt on a piece of road grading equipment (almost identical conditions in which a tank runs). Study railroad boxcars and locomotives to see what the weather has done to them. Your own observation can be the best aid of all.

Remember: try not to overdo weathering—and *keep practicing*. Be patient, it takes time to discover and master all the tricks of this fascinating hobby.

Brush 'em & Spray 'em

Available in over 60 colors, Testor enamel paints come open-stock and carded, with color fidelity matched batch-to-batch, bottle-to-bottle and bottle-to-spray can... Testor paints go on other surfaces too, like styrofoam, glass, paper and even some waxes.

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To complement our line of finishing materials, Testor offers a complete line of hobby accessories especially designed to help you work more precisely and build professional looking models. The Testor Hobby Drop Cloth not only protects all work surfaces from accidental spills, but is an invaluable storehouse of modeling information. Other accessories available, both carded and in attractive kits include: Hobby Sandpaper, Hobby Knife and Precision Gluing Tips.

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