

# MISSING

# LINKS

## *tweaks list*



### VEHICLE

M1, M1A1, M1A2  
Abrams Main Battle Tank

### MANUFACTURERS

Tamiya kit numbers 35124 and 35158  
Shanghai Dragon kit numbers 3516  
and 3531  
Trumpeter kit number 00337

### SCALE

1/35

### AUTHORS

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### VERSION

1.0 March 14, 2002

Each MISSING LINKS Tweaks List is designed to assist the modeller enhance and refine the kit detail. We welcome comments that would help make each Tweaks List a more accurate reference tool.

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## Tamiya M1 Abrams Main Battle Tank (#35124)

### HULL

- Front driving lights drilled out and replaced with M.V. Products lenses
- Windshield wipers added to Driver's hatch periscope from plastic strip
- Crowbar brackets on front side skirts made from K&S square brass tubing cut in a miter box
- Front fender spring rods made from copper wire
- Front fender spring rod mounts made from lead foil and two bolt heads from a Waldron Sub Miniature Punch & Die Set
- Weather stripping added to tops of side skirts from plastic strip
- Bolt head detail added to side skirt weather strips from Waldron Sub Miniature Punch & Die Set
- All side skirt hinge pin detail added from a Waldron Sub Miniature Punch & Die Set
- Triangle shaped side skirt mounts made from plastic strip
- Crew mounting cables on front side skirts replaced with picture hanging wire
- Rear Side skirt locking pins made from sprue
- Rear Side skirt locking pin mounts made from lead foil
- Locking pin retaining chains made from Campbell Scale Chain
- Weld seams added to all hull lifting rings from Green Stuff putty
- Weld seams added behind drive sprockets where rear hull plate and hull sides meet from Green Stuff putty
- External fire extinguisher opening cutout
- External fire extinguisher handle made from plastic strip
- Crew heater drain drilled out
- Lightening holes drilled into drive sprockets (4 each)
- All hull stowage bin handles removed, and replaced with plastic strip
- Non Skid Texture needs added
- Add vertical weld seems to the upper hull where the air intakes top angle meet the engine deck, area looks like this from the side almost

### Engine Deck

- Kit exhaust sawed off
- Engine exhaust outlets rebuilt from plastic sheet (Templates made before removing kit part)
- Engine exhaust door louvers scratch built with plastic strip cut in a Northwest Shortlines Chopper

- Kit engine exhaust grates cut from kit part, sanded, drilled open, & remounted to the exhaust doors with plastic strip
- Hinge pin detail added to engine exhaust door hinges from Waldron Sub Miniature Punch & Die Set
- Upper engine deck lift rings made from plastic strip punched with a Waldron Sub Miniature Punch & Die Set
- Rear tail light guards made from aluminum tubing cut in a K&S tube cutter, Notches cut into guards with a razor saw
- Rear tail lights replaced with red M.V. Products Lenses cut in half
- Rear tail light electrical cables made from sprue
- Locking pin detail added to tow hook from Waldron Sub Miniature Punch & Die Set

### TURRET

- Non Skid texture needs added
- Muzzle reference sensor mount made from plastic strip
- Muzzle reference sensor made from sprue
- Muzzle reference sensor protective cover made from lead foil
- Muzzle reference sensor glass made from 5 minute epoxy
- Coax machine gun flash suppressor made from aluminum tubing & sprue
- Searchlight mounting bracket holes drilled out with a pin vise
- Turret mantlet upper debris door made from plastic strip, hinges made from sprue
- Gunner's primary sight made from plastic strip & aluminum tubing, Sight Glass made from clear epoxy
- Gunner's thermal sight made from plastic strip & aluminum tubing, Sight Glass made from clear epoxy
- Laser range finder made from plastic strip & filled with clear epoxy
- Thermal Sight Glass made from 35mm Purple negative film
- Gunner's sight box lifting brackets drilled out with pin vise
- Bolt detail added to top of Gunner's sight box from Waldron Sub Miniature Punch & Die Set
- Smoke grenade discharger mounts scratch built from plastic strips
- Bolt detail added to tops of smoke grenade dischargers & discharger mounts from Waldron Sub Miniature Punch & Die Set
- All turret stowage bin handles removed, and replaced with plastic strip
- All stowage bin rails replaced with brass wire bent to shape around a home made jig (.030 evergreen rod also works well)

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- Eyebolts added to back of turret from Grandt Line O Scale Metal Eyebolts
- Rear turret webbing needs made
- Wind sensor needs new top
- Tow cables replaced with picture hanging wire annealed with a candle
- Tow cable brackets made from lead foil
- Tow cable debris deflectors made from plastic strips filed and sanded to shape
- .50 ammo box bins made from plastic strip (what are you referring to here, the ammo box holder on the left side?\*)
- Antennae mounts detailed with bolt heads from a Waldron Sub Miniature Punch & Die Set
- Antennae springs made from copper wire wound around a straight pin
- Antennas made from sprue

## Commander's Cupola

- All periscopes made from 1/8" tinted Plexiglas
- Commander's .50 primary sight drilled out & filled with clear gloss
- Eyebolts made from copper wire wrapped around steel wire
- Bolt detail added to base of machine gun cradle support arm from a Waldron Sub Miniature Punch & Die Set
- Hinge detail added to hatch from a Waldron Sub Miniature Punch & Die Set
- MG cradle made from plastic strip, locking pins made from Waldron Sub Miniature Punch & Die Set & Campbell Scale Chains
- Bolt detail added to machine gun mount elevation motor from Waldron Sub Miniature Punch & Die Set
- Ammo box cradle made from plastic strip

- 12.7mm Ammo belt-Tamiya
- MG Feed cover added from plastic strip
- MG Barrel lock added from plastic strip
- MG Barrel drilled out with a pin vise
- MG Charging cable made from sprue
- MG manual triggers made from plastic strip
- MG electrical trigger detailed with small copper wire & plastic strip

## Loader's Hatch

- Hatch lifting handle made from copper wire
- Periscope replaced with tinted Plexiglas (Optional)
- MG cradle made from plastic strip, locking pins added from a Waldron Sub Miniature Punch & Die Set & Campbell Scale Chains
- Ammo box cradle made from plastic strip
- 7.62mm Ammo belt-Tamiya
- Barrel drilled out with pin vise
- Charging cable made from sprue
- Triggers made from plastic strip
- Elevation locking handle made from sprue
- Traverse locking handle made from plastic strip

## TRACKS

- Replace with Armor Track T-156 individual link tracks (AFV club does not make T-156 tracks, only armor track)

## REFERENCES

*M1A1 Operator's Manual* US Army

*The M1 & M1A1* Museum Ordnance Special, Darlington Productions

*Warmachines #5-M1,IPM1, M1A1* Verlinden Productions

*M1 Abrams In Action* Squadron/Signal

*M1 Abrams* Motorbuch International

by Matthew Malagorski

## Tamiya M1A1 Abrams Main Battle Tank with Mine Rake (#35158)

### HULL

- Front driving lights drilled out and replaced with M.V. Products lenses
- Windshield wipers added to Driver's hatch periscope from plastic strip
- Crowbar brackets on front side skirts made from K&S square brass tubing cut in a miter box
- Front fender spring rods made from copper wire
- Front fender spring rod mounts made from lead foil and two bolt heads from a Waldron Sub Miniature Punch & Die Set
- Weather stripping added to tops of side skirts from plastic strip
- Bolt head detail added to side skirt weather strips from Waldron Sub Miniature Punch & Die Set
- All side skirt hinge pin detail added from a Waldron Sub Miniature Punch & Die Set
- Triangle shaped side skirt mounts made from plastic strip
- Crew mounting cables on front side skirts replaced with picture hanging wire
- Rear Side skirt locking pins made from sprue
- Rear Side skirt locking pin mounts made from lead foil
- Locking pin retaining chains made from Campbell Scale Chain
- Weld seams added to all hull lifting rings from Green Stuff putty
- Weld seams added behind drive sprockets where rear hull plate and hull sides meet from Green Stuff putty
- External fire extinguisher opening cutout (Behind NBC Unit)
- External fire extinguisher handle made from plastic strip (Behind NBC Unit)
- Crew heater drain drilled out (In front of NBC Unit)
- Lightening holes drilled into drive sprockets (4 each)
- Right hull stowage bin handles removed, and replaced with plastic strip
- Non Skid Texture needs added

### Mine Rake

- Retaining clips need added to all mounting bolts from wire or sprue

### Engine Deck

- Kit exhaust sawed off
- Engine exhaust outlets rebuilt from plastic sheet (Templates made before removing kit part)

- Engine exhaust door louvers scratch built with plastic strip cut in a Northwest Shortlines Chopper
- Kit engine exhaust grates cut from kit part, sanded, drilled open, & remounted to the exhaust doors with plastic strip
- Hinge pin detail added to engine exhaust door hinges from Waldron Sub Miniature Punch & Die Set
- Upper engine deck lift rings made from plastic strip punched with a Waldron Sub Miniature Punch & Die Set
- Rear tail light guards made from aluminum tubing cut in a K&S tube cutter, Notches cut into guards with a razor saw
- Rear tail lights replaced with red M.V. Products Lenses cut in half (Tamiya clear red acrylic paint works just as good and is a lot easier to do)
- Rear tail light electrical cables made from sprue
- Locking pin detail added to tow hook from Waldron Sub Miniature Punch & Die Set

### TURRET

- Non Skid texture needs added
- Muzzle reference sensor mount made from plastic strip
- Muzzle reference sensor made from sprue
- Muzzle reference sensor protective cover made from lead foil
- Muzzle reference sensor glass made from 5 minute epoxy
- Coax machine gun flash suppressor made from aluminum tubing & sprue
- Searchlight mounting bracket holes drilled out with a pin vise
- Turret mantlet upper debris door made from plastic strip, hinges made from sprue
- Gunner's primary sight made from plastic strip & aluminum tubing, Sight Glass made from clear epoxy
- Gunner's thermal sight made from plastic strip & aluminum tubing, Sight Glass made from clear epoxy
- Laser range finder made from plastic strip & filled with clear epoxy
- Thermal Sight Glass made from 35mm Purple negative film
- Metal lip added to front of the Gunner's sight box from plastic strip
- Gunner's sight box lifting brackets drilled out with pin vise
- Bolt detail added to top of Gunner's sight box from Waldron Sub Miniature Punch & Die Set
- Smoke grenade discharger mounts scratch built from plastic strips
- Bolt detail added to tops of smoke grenade dischargers & discharger mounts from Waldron Sub Miniature Punch & Die Set

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- All turret stowage bin handles removed, and replaced with plastic strip
- All stowage bin rails replaced with brass wire or .030 plastic rod bent to shape around a home made jig
- On The Mark steel mesh added to rear stowage basket
- 20mm ammo can holders on back of stowage basket made from sheet plastic (Field modification)
- Tie down cleats added to back of turret from Waldron Sub Miniature Punch & Die Set and sprue
- Wind sensor made from aluminum tubing, plastic strip & sprue, hole cut out with Dremel Motor tool
- Grandt Line eyebolts added to bottom of stowage basket
- Tow cables replaced with picture hanging wire annealed with a candle
- Tow cable brackets made from lead foil
- Tow cable debris deflectors made from plastic strips filed and sanded to shape
- .50 ammo box shelves made from plastic strip
- Antennae mounts detailed with bolt heads from a Waldron Sub Miniature Punch & Die Set
- Antennae springs made from copper wire wound around a straight pin
- Antennas made from sprue, tied down with stiffened string, lead foil used for end clamps

## Commander's Cupola

- All periscopes made from 1/8" tinted Plexiglas
- Commander's .50 primary sight drilled out & filled with clear gloss
- Eyebolts made from copper wire wrapped around steel wire
- Bolt detail added to base of machine gun cradle support arm from a Waldron Sub Miniature Punch & Die Set
- Hinge detail added to hatch from a Waldron Sub Miniature Punch & Die Set
- MG cradle made from plastic strip, locking pins made from Waldron Sub Miniature Punch & Die Set & Campbell Scale Chains
- Bolt detail added to machine gun mount elevation motor from Waldron Sub Miniature Punch & Die Set

- Ammo box cradle made from plastic strip
- 12.7mm Ammo belt-Tamiya
- MG Feed cover added from plastic strip
- MG Barrel lock added from plastic strip
- MG Barrel drilled out with a pin vise
- MG Charging cable made from sprue
- MG manual triggers made from plastic strip
- MG electrical trigger detailed with small copper wire & plastic strip

## Loader's Hatch

- Hatch lifting handle made from copper wire
- Periscope replaced with tinted Plexiglas
- MG cradle made from plastic strip, locking pins added from a Waldron Sub Miniature Punch & Die Set & Campbell Scale Chains
- Ammo box cradle made from plastic strip
- 7.62mm Ammo belt-Tamiya
- Barrel drilled out with pin vise
- Charging cable made from sprue
- Triggers made from plastic strip
- Elevation locking handle made from sprue
- Traverse locking handle made from plastic strip

## TRACKS

- Replace with Armour Track Models T-156 individual link tracks or AFV Club T-158 "Big Foot" or Armor Track T-158 single link workable tracks

## REFERENCES

*M1A1 Operator's Manual* US Army

*The M1 & M1A1* Museum Ordnance Special, Darlington Productions

*Warmachines #5-M1,IPM1, M1A1* Verlinden Productions

*M1 Abrams In Action* Squadron/Signal

*M1 Abrams* Motorbuch International

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## Shanghai Dragon M1A1 Heavy Armor with Mine Plow (#3516) and Shanghai Dragon USMC M1A1 Heavy Armor (#3531)

### HULL

#### Suspension

- Support Rollers Mounts: At the locating holes for the support/return rollers add a plate of .010 styrene 7 mm x 7mm with bolts heads in each corner and drill new hole to mount the rollers.
- Drill out three lightning holes in the four support rollers Parts C11 & 12. Insert kit support roller into new mounting plates
- Sprockets: drill four lightning/mud relief holes in the outer hub approximately at the 2, 4, 8 and 10 o'clock positions. The holes are slightly oval shaped. Consult references for exact shape. The Legends M1 Accessory kit has a resin outer hub for the DML/SD M1A1 sprocket that has the correct mud relief holes incorporated and is meant to be added to Parts C-5.

#### Track

- Clean and fill the ejection marks in the kit strip and link track. If the model uses all the skirts, a shortcut is to delete the upper run of track.
- An option is to replace the kit track with AFV Club T-158 Bigfoot working individual link track. Tedious, fiddly work but worth the effort after the raised ejection marks are removed.

#### Skirts

- Add plastic strip to the bottom and sides of parts A23 & 29 (#1 Left and Right Skirt) and Part A19 (#2 Right Skirt) These skirts have additional armor and are thicker than the rest of the skirt panels. Replace the plastic the mounting stirrups on the bottom of the # 1 skirts with fine twisted wire. Replace the square "blobs" on the top of Parts 23 & 29 with square brass tubing.
- Thin the edges of the rest of the skirt panels. In actuality, the skirts are about 1/8 inch thick.
- Open skirt hinge points with a drill & sharp knife. Deepen the skirt joints with the back of a #11 blade.
- Add upper skirt supports with plastic strip or epoxy putty. The supports are angled from the skirt to the raised tabs on the upper hull plate. Consult references for correct shapes. Add retaining pin details with slices of .035 and .047 rod. Add PE retaining chains.
- Add the rubber weatherstrips and their metal hold down strips from styrene strips and scratched bolt details or use the Eduard PE Skirt fittings to the tops of the skirts

- On most tanks, the #7 skirt is removed. Cut the skirt off, leaving the piano hinge intact. Drill five holes in a .010 X .030 strip of plastic. Then glue the strip to the hinge. Add two 2mm long pieces of .020 diameter rod to the rear mud flaps.
- **Detail Note:** If the #7 skirt is deleted, add styrene part under the sprocket, above the sprocket, as DML produced the model with open sprocket bottoms.
- If desired, add skirt supports between the hull and skirts. There are two per side, located between the number 2 and 3 road wheel stations and number 4 and 5 road wheel stations. Add a small triangle about 3-4 mm wide and 2-3 mm deep with a 3mm diameter and insert a 24-25mm (or however long to make contact with the side skirt insides) length of brass or styrene rod.

#### Missing Hull Details

- Add the hull fire extinguisher handle by cutting a rounded square hole approximately 4mm long by 2mm in the side of the hull. The location for the hole is 1 mm above the lower edge of the hull and 60mm forward of the end of the upper hull. Add a 2mm long T-shaped handle made from plastic strip or sprue.
- Drill a hole in the hull for the heater exhaust pipe in the round opening in Part A6. Insert an appropriately drilled out piece of .047 rod for the pipe itself.
- Replace part A8 with a slightly bent piece of .047 rod. Bevel the edges so it forms a vertical wedge. Point the wedge to the outside of the tank, in the locating hole and glue.
- Add missing details to fuel filler caps (four.) Each cap should have a retaining pin block between the tabs opposite of the hinges. Drill a hole through both tabs and the retaining block for an angled retaining pin (stretched sprue, plastic rod or copper wire), with a retaining chain (PE.)
- The hull back deck (Part A30) requires careful dry fitting, possible sanding and /or shimming to achieve a tight fit. The hinges for the screened access panels on the back deck will have to be either cut off with a sharp blade and relocated or add strips to bridge the gap between the doors and the ends of the hinges.
- Replace part A11 with copper wire or .020 rod bent to form a grab handle
- When the lower hull and upper hull are joined add a weld seam across the glacis plate, right where the seam from joining the hulls is about the correct place

#### Rear Hull Plate

- Discard kit taillight guards (Parts C10) and replace with new ones fabricated from 1/8 inch aluminum (K&S) or

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plastic tubing (Evergreen, bore the tubing out to achieve a scale appearance), cutting a 3mm deep X 3mm long square out of the tube, on the inside right for the left side of the tank and the inside left for the right side of the tank.

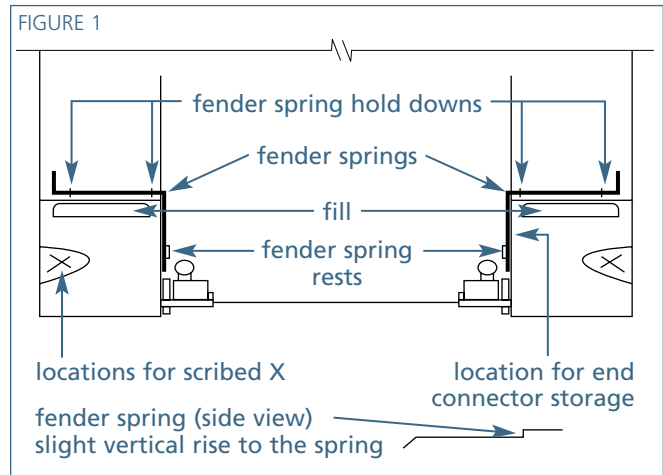
- Add the Auxiliary Power Unit mounting points on the left rear hull made from .060 strip or scavenged from Part C-25.
- Replace the tow pintle with suitably detailed one from another modern US vehicle kit (Tamiya)
- Drill out the two lifting eyes on the upper part of the hull rear plate as well as the two tow points on the lower part of the rear plate.
- Thin or replace the rear mud flaps on both sides. Add a plastic square of .005 or .010 for the delineator plate, Decal #4. This marking is to identify that tank is an oversized vehicle to civilian traffic. It is a reflective sticker mounted on a removable plastic plate and found on tanks in Germany and Korea
- **Detail Point:** The whole rear plate can be scratchbuilt relatively easily for added detail. Use the DML/SD original plate for measurements. When reproducing the grill doors, the two outside sections (oil and transmission exhaust grills) have seven louvers. These are made by stacking sections of plastic, with spacers of strip styrene to maintain a uniform distance between each plate of the louver. The center engine exhaust grill has three louver panels that can also be fabricated by using strips to achieve the uniform spacing. Cover the grills with grates scavenged from the original kit part and sanded to reduce the thickness. If desired, omit one or two of the grates to shoe off your work as tanks occasionally lose the gratings while maneuvering.

## Drivers Hatch

- Add a raised ring of .010 x.060 starting about 1mm in front of the raised portion of the hatch on one side to the opposite side of the hatch. Sand and file the strips to match the contours of the hatch edges, leaving a 1mm overlap on the edge of the hatch.
- Cut a notch in the styrene with a razor saw to match up with the notch in the front slope in front of the hatch
- Add square reinforcing plate behind center vision block mount. Add the hatch lock on the back of the drivers hatch, using .030 square strip. Add a small hook on the lock using copper wire (consult reference photos)
- Add vision blocks made from strip styrene. Using stretched sprue, add wiper blades to the center vision block.

## Front Fenders

- Add hinges to the inside and outside of the fenders. The inside arm consists of a 5mm X 1mm of .010 strip



with a slice of .035 rod to represent the hinge pin. The outside hinge is a 2mm X 1mm of .010 strip also with the slice of .035 rod.

- Fill the depression that runs across the width at the top of the fender.
- Make “L” shaped fender spring rests and mount on the inside of the fender, 12mm forward from the rear of the fender
- Fabricate fender retaining springs from thin wire or .020 rod. The shape is shown below:
- Locate the spring in the slight break in the non-skid surface.
- Secure to the hull with “j” hooks made from the same material, with the hook in the “J” being of the same diameter as the fender spring rod. Drill the holes for the spring retainers 4mm from the outside edge of the hull and 2mm from the inside edge. Use CA to secure the hooks.
- Ensure that the inside arms of the spring rods are laying on the fender spring rests (figure 1).
- **Detail Point:** tank crews will store their extra track end connectors by inserting them on the inside arms of the spring rods. This keeps them handy as well as provides a device to keep the fender (when rotated 180 degrees, under the raised fender) when conducting track maintenance.
- If desired, an “X” shaped depression can be scored into the fender to replicate the reinforcing detail seen on some M1 series fenders

## Headlights

- Remove the two angled cylinders vicinity of the headlight mounts and replace with a 2mm long piece of .080 rod. Glue to the rod to the hull and add triangular reinforcements at the 12, 3 and 9 o’clock positions. Drill out headlights and replace them with MV lenses (LS 29). Add strip to the rear of the headlight assemblies to allow it to make contact with the cylinder.



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## Headlight Brush guards

- Delete parts C6 on both sides. Replace the vertical part with a .030 X .050 strip, angled forward. Use a piece of .030 X .050 strip to run from the vertical post to the step on the forward part of Part C9. Add bolt detail on the top of the guard on the vertical post and add a half circle with a bolt under the guard on the inside of Part C9.
- Replace lower tow points (with the oversized holes to mount the Mine Plow) with ones fabricated from .060 strip or scavenged from the unused hull Auxiliary Power Unit Part A25

## TURRET

### Smoke Grenade Launchers

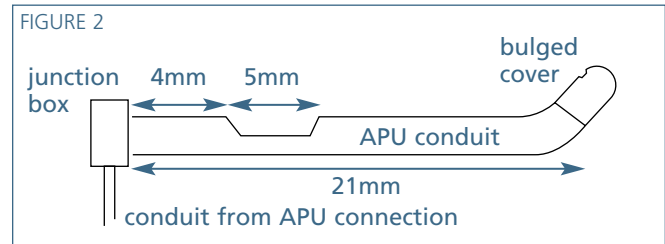
- Replace the kit's M-250 Smoke grenade launchers with the set found in a Tamiya modern US Armor Kit (M1, M1A1, M60A3 or M60A1.) The kit units can be used with filling and sanding to blend the launcher tubes into the base.
- Attach the launchers to the mounts found in the Eduard M1A1 PE set. Ensure that the assembly is pointing away from the tank at an angle.
- Add the electrical connection using thin copper wire, attaching one end to the rear of the launcher and the other to the Smoke Grenade Launcher conduits extensions.

### Smoke Grenade Launcher conduits

- Make a triangular extension to the conduits, extending over the side of the turret by 2mm.
- Add bolt down detail with .020 rod, .010x.020 strip and Grandt Line bolt details.

### APU Connector & Conduits

- If modeling a vehicle with a bustle mounted Auxiliary Power Unit, then add additional conduits, consisting of angle iron on the real vehicle to the turret.
- First, remove the molded angle from the bulged cover, behind the TC's & Loader's hatches to the corner where the conduit angles towards the front of the turret.
- Add a 2mm x 4mm junction box at the end that angles forward.
- Make a new flat conduit that is 2mm wide and 21mm long, with a bend to allow it to attach the bulged cover behind the TC's hatch.
- Make an angled cutout 5mm long, 4mm from the junction box end of the conduit (figure 2).
- Add a 25mm angled conduit, parallel to the left side blow out panel, attaching to the junction box and to the APU connector on the rear of the turret.



- Make the connector from styrene strip, consulting references, or "liberate" the connector box it from Trumpeter M1 series kit.

### Sponson Boxes

- Ensure the boxes mount square and flush on the turret. Add .50 caliber ammunition can mount and strap as well as the turret box mounting point, both are found in the Eduard PE set.
- Add a wire loop for the upper attachment point for the ammunition can strap
- The sponson box lid handles can be replaced with the parts found in the Eduard PE set, the only drawback is that they are flat. The kit handles can be carefully cut off and repositioned as the real ones have a habit of coming unlatched if they are not locked with a padlock.
- Add padlocks if desired

### Turret Rails

- Make all 6 turret rails from brass or styrene rod (.030-.035 diameter). Make a rounded 90 degree angle in them and insert them into pre-drilled holes in the turret and in the cutout notches in the turret boxes. Some dry fitting might be needed here as well as filling of some notches and making new notches with a file.
- Cap the ends with Part F38/F39 or a similar scratch built end support made from .020 styrene.

### Tow Cable Attachments.

- Remove the ill shaped bulges on the front of the turret. Replace with an angled /triangular shaped slice of styrene tubing.
- Use .040 styrene rod to make "T" shaped forward attachment point.
- Make five cup shaped mounting clips per side from aluminum or plastic, 1mm wide, mounting the first one 15mm from the front attachment, below the turret box, and then 10mm apart there after. Another option is to use the clips that come with the Eduard PE set
- The rear cable retainer is a "C" shaped sleeve, 3mm long, to allow the tow cable end to slide into it to secure the cable on the turret.

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## Smoke Grenade Boxes

- Add mounting points behind the mounting tabs that raise the box .5 to 1mm above the side of turret.
- Add the missing hinge detail to the top of the box with strip, 2mm from the ends of the box.

## Loader's Hatch

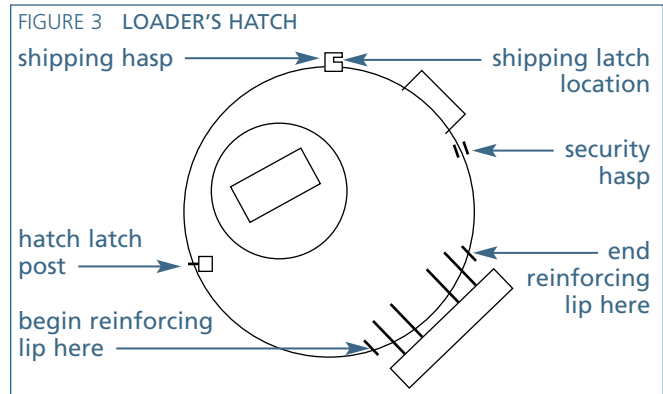
- Add a 1.5mm circular strip of .010 styrene to the edge of the Loader's hatch to make the reinforced lip, found on M1A1s & M1A2s in the late 1990's. Leave a slight overlap of the strip on the outside of the hatch.
- Add the handle, made from copper wire, to the hatch at the 2 o'clock position.
- Make the hatch latch post from a 1mm x 1mm piece of styrene with a wire or styrene rod post. Mount it at the 8:30 position on the new rim on the hatch.
- Add the two hasps to the hatch. The first is the security hasp made from styrene strip located next to the hatch handle. The second is a shipping latch, consisting of an angled metal tab on the front of the hatch at the 12:00 position and a swiveling rod/latch, similar to an eye bolt (pivot) with a wing nut on the end to secure the hatch (figure 3). Consult references.

## Loader's M240 & Mount.

- Add a locking lever to the base of the MG Mount, Part F2. Add a second handle, consisting of a rod with a circular grip added to the MG (Part F58) at the post on the bottom of MG base (consult references).
- Add a charging cable made from thin wire to the right side of the MG.
- Add a latch on the back of the spent brass catcher below the MG. Drill out the flash suppressor on the end of the barrel.

## Commander's Weapon Station

- Hatch: Assemble per instructions. Add a strap handle to top of the inner hatch plate. Use .035 rod or a similar sized disk for the attachment points and a strip of foil for the nylon strap. Add securing bolt detail.
- Drain Holes: Drill through the drain holes found at the 3 & 9 o'clock positions on the CWS
- Lifting Eyes: Drill out the raised areas at the 4 & 8 o'clock positions and insert Grandt Line eyebolts. The eyebolts can be omitted if desired.
- Vision Blocks: Improvements can be added by carving out the molded vision block and replacing them with Plexiglas or clear styrene about .060-.080 in thickness. An easier fix is to replicate the glass using exposed 35mm film or paint, especially if the TC's hatch is closed. The front vision block needs to get the Plexiglas



treatment regardless as it has a clear portion to allow the TC to see forward and use the manual .50 caliber sight when his hatch is in the open protected position.

- .50 Caliber MG: DML/SD did a good job on the .50 but it could use some details. Add a "J" shaped charging handle to the strip on the L/H side of the MG. If desired, drill a 7mm long slot, 2mm wide along the bottom of the MG Mount.
- Add pin detail and retaining chains (PE) to the CWS MG Mount
- Replace the ammunition can mount and ammunition tray with Eduard PE. Replace the .50 Caliber ammunition can with a resin or detailed plastic version

## Gunner's Primary Sight & Armored Cover

- Add a 1mm long section of .025 rod to the rear of the armored sight cover, 7mm from each side. Add another 1mm rod on each side of the armored sight cover, 5mm from the rear to replicate the lifting eye mounts.
- The sight itself is normally painted NATO green, even if the tank is sand colored.
- **Detail Note:** The top rear of the armored sight cover is normally chipped and slightly rusted from spent brass from the .50 caliber machine gun.

## Main Gun

- Assemble gun per instructions, make sure the seam line is filled or replace with an aftermarket aluminum barrel.
- Detail can be added by adding bolt heads and drill out the bottom of the front clamps and deepening the slots on the bore evacuator retaining ring.
- The bore evacuator, which is made from Kevlar, can have a smooth or rough finish to it.
- Wrap a strip of .010 x 7mm strip around the rear of the barrel to make a tighter fit in the mantlet thus improving the appearance.
- Cut off the tab on the top of the muzzle and add a strip of aluminum foil inside of the muzzle to replicate the chrome barrel lining.

by Major John Charvat

- The kit Muzzle Reference Sensor (MRS), Part F-40, is acceptable with minimal work. File the rear to a 45 degree angle and drill out the tube (if desired.) Make sure the tube is aligned with the Gunners Sight.

## Gun Mantlet

- Assemble per instructions.
- Replace the molded bolt detail on the sides with new ones from Grandt Line, punched from styrene with a hex punch & die set, or salami sliced from hex rod.
- Add the mantlet side guards from either .005 styrene or aluminum from a soda can. Add three bolts on the top per side from the techniques described above.
- Drill holes in the two tabs above the gun receptacle as well as in Part B-11. These tabs allow the mounting of gunnery training devices above the main gun.
- Make the channel for the gunner's auxiliary sight from half a section of styrene tube, sliced lengthwise. Use drills and a round needle file to ensure the channel maintains the rounded interior shape.
- Drill out the co-axial machine gun blast tube, Part B-4 and mount. Add Part B-5 after the mantlet is glued to the turret.

## Turret Rear/Wind Sensor

- The kit wind sensor accurately represents one of the several styles of wind sensors found on the M1 series tanks.
- Replace the stowed wind sensor mount with the one found on the Eduard PE set.
- Replace the four fittings on the rear of the turret with the ones found in the Eduard set.

## Radio Antennas & Mounts

- Add coils springs made from thin wire to the kit antenna bases, Part C16.
- Antennas come in two varieties. Both have a tear-drop shaped antenna safety ball on the end. Antenna tie downs consist of a metal clip and a rope, normally tied to the turret rails on the front of the turret
  - the fiberglass antenna is about 7 foot long and can be easily replicated with .030 styrene rod, sanded to a taper.
  - the metal version is about four feet long and quite flexible.
  - both antennas types are normally tied down forward during maneuvers.

## Bustle Rack

- Perhaps the worst part on the tank, this can be completely rebuilt or just replace the rails with brass or plastic rod to a marked improvement. For the gluttons for punishment, refer to the following...

- Measure the distance between the turret rails discussed above. Take Part F53, cut it along the horizontal base and add a styrene strip to allow the holes in the vertical supports for the basket rail to meet the measurements made above. The extended back brace for the basket can be used as modified or for a template to make a new one from sheet styrene.
- Make four basket rails from brass or plastic rod (.030-.035), each having a rounded 90 degree corner (make a jig to ensure four uniform rails with the proper rounded corners.)
- Add the two reinforcing rods and the jerry can holders to the bottom rail. Add expanded or PE diamond mesh on the base rail.
- Use the kit's vertical supports, after filling and sanding to remove the ejection marks. Fit them to the new or modified base, adjusting spacing once all five of the supports are fitted and the mounting points are the correct distance to mount the basket on the turret (Lots of dry fitting here...)
- Insert the rails, starting with the bottom then the top rail. Use slow curing CA or plastic cement to allow time to square up the supports and rails. Add the middle two rails and glue.
- Add a strip of .010 styrene or aluminum between the bottom and second rail to complete the bustle rack.

## Auxiliary Power Unit

- Replace all of the bolt detail on the outside of the APU with Grandt Line bolts.
- Fabricate new top and flush access doors for the APU from .010 styrene. Add piano hinges made from .010 strip and .020 rod. The two smaller doors are raised above the surface and also made from .010 styrene
- Make new "D" shaped handles from styrene rod and stretched sprue for the access doors on the top of the APU.
- Add cabling to attach to APU connector box on the turret
- Place unit in the bustle rack
- See the pictures on the Full Metal Jacket website (<http://www.kithobbyist.com/AFVInteriors/fullmetal/fullmet.html>) for more details

## DETAILS

### ID Panels

- Tactical Signs. Signs used to identify/differentiate friendly tanks. They are normally geometrically shaped: square, rectangular or octagons. The markings contain numbers that identify the battalion and company (sometimes the vehicle bumper number) of the vehicle. Colors depend on units, consult references.

by Major John Charvat

- Thermal ID Panels. Two of these corrugated panels come with the SD USMC M1A1 HA kit, however, three are usually found on a tank to prevent fratricide through the use of thermal tape on the angled surfaces. These are easily fabricated using Evergreen .100 Clapboard Siding cut into panels 21mm wide x 15mm high (6 “strips” high). Frame the sides and bottom with .010 strip. Paint NATO green with khaki strips on the angled surfaces to replicate the thermal tape.
- 20mm Storage Cans
- Two or four 20mm Ammunition Cans are normally fixed to the bustle rack for additional storage, with one outside of the first vertical support and the second between the first and second vertical support, repeat on the other side.

## Spare Road Wheels

- Storage locations vary by units. The most common is to mount the wheel either on the top of the turret on the CITV mount or forward of the CITV, using the bolts found there.
- Another option is to mount it on the turret or bustle rack rails using a M-88 track center guide.

## available kits in 1/35 scale

### ACADEMY

#1345 M1A1

### SHANGHAI DRAGON

#3516 M1A1-HA with mine plow

#3524 M1A2

#3531 USMC M1A1-HA

### ESCI

#5021 M1A1 Abrams Staballoy Armor, actually an M1E1

### TAMIYA

#35124 M1 Abrams

#4054 M1 Abrams (wired remote, 3 engines, one turns turret, same basic kit as original M1)

#35156 M1A1 Abrams 120mm

#35158 M1A1 Abrams w/Mine Plow

### TRUMPETER

#00336 M1A1HA w/Mine Roller Set

#00334 M1A1HA Abrams

#00337 M1A2 Abrams

by Stephen Tyliszczak

## Trumpeter M1A2 Abrams Main Battle Tank (#00337)

### HULL

#### Lower Hull

- At the locating holes for the return rollers (parts C40 and C45) add a plate of .010 styrene 7 mm X 7mm with bolts heads in each corner and add 4mm diameter styrene or brass tube and insert kit return roller
- Drill out the holes in the return rollers
- In between the number 2 and 3 road wheel stations add a small triangle about 3-4 mm wide and 2-3 mm deep with a 3mm diameter and insert a 24-25mm (or however long to make contact with the side skirt insides) length of brass or styrene rod do the same above the number 4 and 6 road wheel stations
- Replace all roadwheels with Tamiya or DML items. The Trumpeter wheels have the poly caps molded as the center of the roadwheels and have a gap when constructed that is a major pain to fill to fill. Tamiya wheels can be ordered by the sprue number for around 10 dollars or less from Hobbylink Japan, while half the price of the kit it adds immense detail to your model.
- When the lower hull and upper hull are joined add a weld seem across the glacis plate, right where the seem from joining the hulls is about the correct place
- Add a Mud scraper. It's a simple rectangle bolted to the hull directly in front of the drive sprocket and fits above the inside teeth

#### Rear Hull Plate

- Discard kit taillights and replace with separate taillights, (these lights cannot be cut out of the kit piece unfortunately, but they are available as separate pieces in Academy Humvee kits as well as DML Abrams kits and most softskins, these lights are standard issue through the US Military and are used on almost every vehicle in inventory)
- Add an .040 styrene spacer behind the taillight then add a 7mm diameter styrene or brass tube as the taillight guard
- Cut 3mm deep X 3mm long square out of the tube, on the inside right for the left side of the tank and the inside left for the right side of the tank
- DO NOT add APU (pieces D9, 10,11,12,13,14 and C38) to the hull
- DO NOT add pieces C26 and C30 and fill locator holes
- Remove the round rod on the right side next to the taillight and replace it with a hollow styrene or brass tube or just a drilled rod
- Add a conduit from the end of the rod mentioned above

- to the taillight through the cut out in the taillight guard
- Add a .010 strip of styrene the length of the engine grilles ( about 59mm) that has a angle starting at 3mm at the ends on each side moving to 26mm inwards and then being straight at about 4-5mm for 8mm before angling back to 3mm at the opposite end
- Glue the above piece into place at a slight downward angle
- Under the center engine grille add a piece that runs the length of the center grille inwards to the edge of the piece you just added and add spacers on the ends to make it the proper height to meet up with the other piece
- Replace the tow pintle with suitably detailed one from another modern US vehicle kit (Tamiya)
- Drill two holes and replace the molded lumps with thin strip to make lifting rings

#### Drivers Hatch

- Add a raised ring of .010 x.060 starting about 1mm in front of the raised portion of the hatch on one side to the opposite side of the hatch. Sand and file the strips to match the contours of the hatch edges, leaving a 1mm overlap on the edge of the hatch.
- Cut a notch in the styrene with a razor saw to match up with the notch in the front slope in front of the hatch
- Add square reinforcing plate behind center vision block mount. Add the hatch lock on the back of the drivers hatch, using .030 square strip. Add a small hook on the lock using copper wire (consult reference photos)
- Add vision blocks made from strip styrene. Using stretched sprue, add wiper blades to the center vision block.

#### Upper Hull

- Replace kit pieces C2 with .020 rod or brass
- Add weld seams to the front plate, right where the upper hull and lower hull are joined, It is a thick but fairly neat weld seem.
- Add vertical weld seams along the rear length of the hull where the air intake angle stops and the flat engine deck begins
- Box in fire extinguisher with .030 styrene to replace kit part
- Manipulate the torsion bars so they have a forward lean, \*common with M1A1 HA and M1A2 tank as a result of heavier armor in the front hull and turret\*
- Replace the kit wheels with Tamiya offerings, the way the Trumpeter wheels are designed is terrible, the poly cap center while with acceptable detail leaves large gaps and poor fit. \*Note, the Tamiya Wheels will only fit without the poly caps inside of them\*

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- Crew heater drain drilled out \*round opening directly in front of NBC system\*
- Use styrene strip or sheet to box in the sponson stowage box, it is very simple and easy and adds a lot to the model

### Front Fenders

- Sand off the molded on fender torsion bar springs
- Add hinges to the inside and outside of the fenders. The inside arm consists of a 5mm X 1mm of .010 strip with a slice of .035 rod to represent the hinge pin. The outside hinge is a 2mm X 1mm of .010 strip also with the slice of .035 rod.
- Make “L” shaped fender spring rests and mount on the inside of the fender, 12mm forward from the rear of the fender
- Fabricate fender retaining springs from thin wire or .020 rod
- Secure to the hull with “J” hooks made from the same material, with the hook in the “J” being of the same diameter as the fender spring rod. Drill the holes for the spring retainers 4mm from the outside edge of the hull and 2mm from the inside edge. Use CA to secure the hooks.
- **Detail Point:** tank crews will store their extra track end connectors by inserting them on the inside arms of the spring rods. This keeps them handy as well as provides a device to keep the fender (when rotated 180 degrees, under the raised fender) when conducting track maintenance.
- If desired, the “X” shaped depression can be filled to add a bit of variety to your model, one fender with the “X” and one without

### Headlights

- Drill out headlights and replace them with MV lenses (LS 29). Add strip to the rear of the headlight assemblies to allow it to make contact with the cylinder.

### Headlight Brush Guards

- The kit brush guards are terribly lacking detail and are of the older type, make new ones with .030x.060 strip in a simple “L” shape with a bolt on top of the “L”

### Tracks

- Replace the kit tracks with either AFC Club “Bigfoot” tracks of ArmorTrack T-158 track. DO NOT use T-156 track also from ArmorTrack, that is the older version and is not appropriate for an M1A2

### Side Skirts

- Assemble per instructions but add .005 strip along length

of each panel with appropriate number of bolts for weather stripping or you can use Eduard’s armor fitting sets.

- Cable foot loops on front side skirt replaced with wire
- Cut off and replaced crow bar brackets with square tubing or PE
- Add plastic strip to the bottom and sides of parts the #1 Left and Right Skirt and #2 Right Skirt. These skirts have additional armor and are thicker than the rest of the skirt panels. Replace the plastic the mounting stirrups on the bottom of the # 1 skirts with fine twisted wire. Replace the square “blobs” on the top of the first side skirt with square brass tubing.
- Thin the edges of the rest of the skirt panels. In actuality, the skirts are about 1/8 inch thick.
- Open skirt hinge points with a drill & sharp knife. Deepen the skirt joints with the back of a #11 blade.
- Add upper skirt supports with plastic strip or epoxy putty. The supports are angled from the skirt to the raised tabs on the upper hull plate. Consult references for correct shapes. Add retaining pin details with slices of .035 and .047 rod. Add PE retaining chains.
- On most tanks, the #7 skirt is removed. Cut the skirt off, leaving the piano hinge intact. Drill five holes in a .010 X .030 strip of plastic. Then glue the strip to the hinge. Add two 2mm long pieces of .020 diameter rod to the rear mud flaps.

### TURRET

#### Turret Face

- The turret face on the left side is the worst part of this kit; there is a 4mm deficiency with the turret face. The turret face is short 4mm’s and needs to be fixed; it is inherently hard to explain this so refer to the drawing for the easiest explanation (figure 4)
- The left outside side of the turret face is the incorrect one, the inside (mantlet side) is correct
- The easiest way to fix this is take the turret face and pay it face down on a sheet of .030 sheet, Mark the existing bottom edge of the turret face, then measure 4mm down along the angle of the turret side (align your ruler to the turret edge) and mark 4mm down. After you mark that and the inside edge of the turret (the mantle side) then connect the dots and you will be left with an isosceles triangle and cut it out and you have the new piece to correct the front plate.
- The left side of the turret now needs to be fixed so it matches up with the new 4mm turret face. The way to do this is identical to the way you made the triangle for the front plate.
- On the side of the turret there is a slight curve upwards about 3mm before the face of the turret, it is very slight but noticeable, the Tamiya and DML kits have this

by Stephen Tyliszczak

shown so you can refer to them if you have them or refer to the drawings in the list

- After you have fixed the front and the sides you have to make a piece to fit the bottom so that the underside is not hollow, this requires a lot of guesswork and sanding so cut a piece to the basic size and shape and then fill and sand until you get it to fit, remember that it is on the bottom of the turret and will rarely if ever be seen so it does not need to be perfect but should be done well on the front and side bottom edges.

### EPLARS Mast

- On the right hand rear of the turret directly behind the turret storage box on the SIDE of the turret there is a new mast on the M1A2. To replicate it take a piece of ? tube and the easiest solution is to take a piece from an Academy M113 kit (piece B22) and fill the hole in the center with .020 rod

### Turret Boxes

- Ensure the boxes mount square and flush on the turret. Add .50-caliber ammunition can mount and straps as well as the turret box mounting point, both are found in the Eduard PE set.
- Add a wire loop for the upper attachment point for the ammunition can strap
- The sponson box lid handles can be replaced with the parts found in the Eduard PE set, the only drawback is that they are flat. The kit handles can be carefully cut off and repositioned as the real ones have a habit of coming unlatched if they are not locked with a padlock.
- Add padlocks if desired

### Turret Rails

- Make all 6 turret rails from brass or styrene rod (.030-.035 diameter). Make a rounded 90 degree angle in them and insert them into pre-drilled holes in the turret and in the cutout notches in the turret boxes. Some dry

fitting might be needed here as well as filling of some notches and making new notches with a file.

- Cap the ends with .010x.080 strip with the edged sanded to be rounded

### Tow Cable Attachments

- Remove the ill shaped bulges on the front of the turret. Replace with an angled /triangular shaped slice of styrene tubing.
- Use .040 styrene rod to make "T" shaped forward attachment point.
- Make five cup shaped mounting clips per side from aluminum or plastic, 1mm wide, mounting the first one 15mm from the front attachment, below the turret box, and then 10mm apart there after. Another option is to use the clips that come with the Eduard PE set
- The rear cable retainer is a "C" shaped sleeve, 3mm long, to allow the tow cable end to slide into it to secure the cable on the turret.

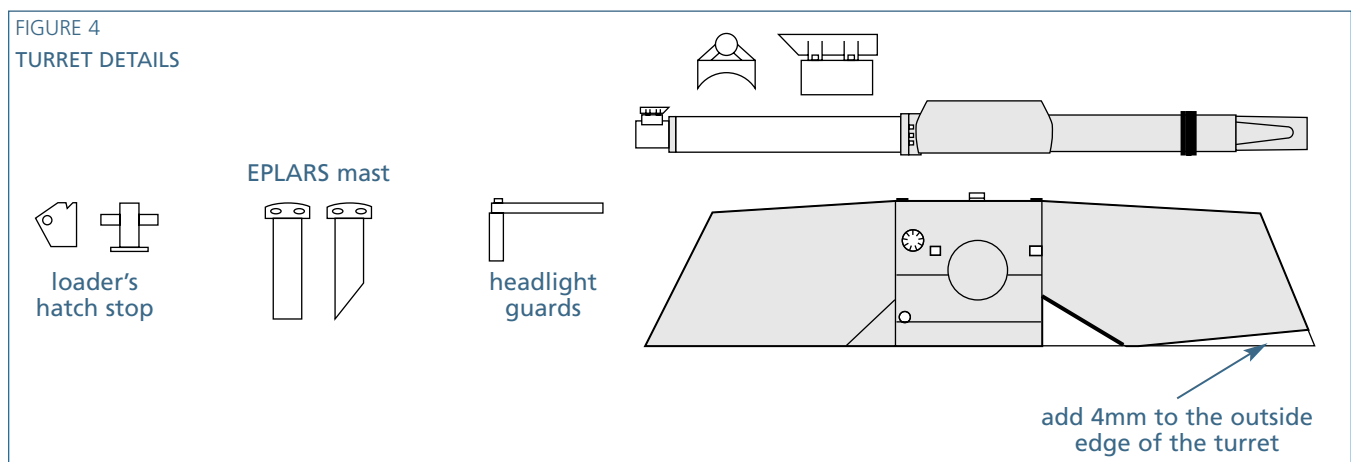
### Smoke Grenade Boxes

- Add mounting points behind the mounting tabs that raise the box .5 to 1mm above the side of turret.
- Add the missing hinge detail to the top of the box with strip, 2mm from the ends of the box.

### Loader's Hatch

- Add a 1.5mm circular strip of .010 styrene to the edge of the Loader's hatch to make the reinforced lip, found on M1A1s & M1A2s in the late 1990's. Leave a slight overlap of the strip on the outside of the hatch.
- Add the handle, made from copper wire, to the hatch at the 2 o'clock position.
- Make the hatch latch post from a 1mm x 1mm piece of styrene with a wire or styrene rod post. Mount it at the 8:30 position on the new rim on the hatch.

FIGURE 4  
TURRET DETAILS



by Stephen Tyliszczak

- Add the two hasps to the hatch. The first is the security hasp made from styrene strip located next to the hatch handle. The second is a shipping latch, consisting of an angled metal tab on the front of the hatch at the 12:00 position and a swiveling rod/latch, similar to an eye bolt (pivot) with a wing nut on the end to secure the hatch (consult references).

## Loader's M240 & Mount

- Add a locking lever to the base of the MG Mount,. Add a second handle, consisting of a rod with a circular grip added to the MG at the post on the bottom of MG base (consult references).
- Add a charging cable made from thin wire to the right side of the MG.
- Add a latch on the back of the spent brass catcher below the MG. Drill out the flash suppressor on the end of the barrel.

## Improved Commander's Weapon Station

- Hatch: Assemble per instructions. Add a strap handle to top of the inner hatch plate. Use .035 rod or a similar sized disk for the attachment points and a strip of foil for the nylon strap. Add securing bolt detail.
- Replace part F14 with a new vision block made to match the rest of the ICWS vision blocks
- Fill all indentations in the tops of the vision blocks, they are way oversize and can be replaced if desired with a very small drill
- Vision Blocks: Improvements can be added by carving out the molded vision block and replacing them with Plexiglas or clear styrene about .060-.080 in thickness. An easier fix is to replicate the glass using exposed 35mm film or paint, especially if the TC's hatch is closed.
- Replace the ammunition can mount and ammunition tray with Eduard PE.
- Replace the .50 Caliber ammunition can with a resin or detailed plastic version

## Gunner's Primary Sight & Armored Cover

- Add a 1mm long section of .025 rod to the rear of the armored sight cover, 7mm from each side. Add another 1mm rod on each side of the armored sight cover, 5mm from the rear to replicate the lifting eye mounts.
- The sight itself is normally painted NATO green, even if the tank is sand colored.
- **Detail Note:** The top rear of the armored sight cover is normally chipped and slightly rusted from spent brass from the .50 caliber machine gun.

## Main Gun

- Assemble gun per instructions, make sure the seam line is filled or replace with an aftermarket aluminum barrel or replace forward part of the barrel with rod, if you choose the latter follow these instructions:
- Detail can be added by adding bolt heads and drill out the bottom of the front clamps and deepening the slots on the bore evacuator retaining ring.
- The bore evacuator, which is made from Kevlar, can have a smooth or rough finish to it.
- Replace the muzzle piece C62 with appropriately sized styrene or brass/aluminum rod
- Laminate two pieces of .030 or a piece of .060 sheet and cut a rectangle and using a round file, file a round channel into one side so it will fit the new muzzle, this is the mount for the Muzzle Reference sensor
- Add a strip of aluminum foil inside of the muzzle to replicate the chrome barrel lining.
- The kit Muzzle Reference Sensor (MRS), Part C60, is acceptable with minimal work. File the rear to a 45 degree angle and drill out the tube (if desired.) Make sure the tube is aligned with the Gunners Sight or using the drawings made in this list scratchbuild a new one

## Gun Mantlet

- Assemble per instructions.
- Replace the molded bolt detail on the sides with new ones from Grandt Line, punched from styrene with a hex punch & die set, or salami sliced from hex rod.
- Add the mantlet side guards from either .005 styrene or aluminum from a soda can. Add three bolts on the top per side from the techniques described above.
- Replace part D1 with a piece of .020x.060
- Drill two holes into the above mentioned part and single holes into parts C25. These tabs allow the mounting of gunnery training devices above the main gun.
- Make the channel for the gunner's auxiliary sight from half a section of styrene tube, sliced lengthwise. Use drills and a round needle file to ensure the channel maintains the rounded interior shape.
- Drill out the co-axial machine gun blast tube, Part C21 and mount.
- Cut off the debris cover from part C19 and replace with a piece of .005 styrene or brass, it is possible to salvage the existing hinged by careful slicing with a razor blade

## Turret Rear/Wind Sensor

- The kit wind sensor accurately represents one of the several styles of wind sensors found on the M1 series tanks.



by Stephen Tyliszczak

- Replace the stowed wind sensor mount with the one found on the Eduard PE set.

## Radio Antennas & Mounts

- Add coils springs made from thin wire to the kit antenna bases, Part C24.
- Antennas come in two varieties. Both have a tear-drop shaped antenna safety ball on the end. Antenna tie downs consist of a metal clip and a rope, normally tied to the turret rails on the front of the turret
  - the fiberglass antenna is about 7 foot long and can be easily replicated with .030 styrene rod, sanded to a taper.
  - the metal version is about four feet long and quite flexible.
  - both antennas types are normally tied down forward during maneuvers.

## Bustle Rack

- Make four basket rails from brass or plastic rod (.030-.035), each having a rounded 90 degree corner (make a jig to ensure four uniform rails with the proper rounded corners.)
- Add expanded or PE diamond mesh on the base rail.
- Make sure that there is no visible gap between parts D30 and D21/33
- Use strip to fill in the gap made when you glue the top two rails to part D17/35

## Blowout panels

- The blowout panels on the M1A2, Piece C43, have three disks on them in a V Pattern, the tops of these disks have protrusions on them which need to be sanded off and the disks sanded smooth
- Add weld seems around the disks, this is best done by letting solvent cement such as Tenax flow around them and then add the welds with a knife blade, pointed file end, etc..
- On the left blowout panel take a piece of .060 strip about 4mm tall and file/sand an angle to one end leaving 4mm along the top
- Drill a hole into the piece and insert a piece of .030 rod about 5-6mm long with the sides even on both sides
- Attach the piece to a small square about 3-4mm and attach directly to the right of the disk closest to the loaders hatch

## Auxiliary Power Unit

- Auxiliary Power Unit: the Trumpeter APU (called Toolbox A) is under scale and has crude detail

- Replace the Trumpeter APU (pieces F20 through F26) with either a DML APU or a resin Legends replacement. The following lists will improve any of them
- Replace all of the bolt detail on the outside of the APU with Grandt Line bolts.
- Fabricate new top and flush access doors for the APU from .010 styrene. Add piano hinges made from .010 strip and .020 rod. The two smaller doors are raised above the surface and also made from .010 styrene
- Make new “D” shaped handles from styrene rod and stretched sprue for the access doors on the top of the APU.
- Add cabling to attach to APU connector box on the turret
- Place unit in the bustle rack
- See the pictures on the Full Metal Jacket website (<http://www.kithobbyist.com/AFVInteriors/fullmetal/fullmet.html>) for more details

## DETAILS

### ID Panels

- Tactical Signs. Signs used to identify/differentiate friendly tanks. They are normally geometrically shaped: square, rectangular or octagons. The markings contain numbers that identify the battalion and company (sometimes the vehicle bumper number) of the vehicle. Colors depend on units, consult references.
- Thermal ID Panels. Two of these corrugated panels come with the SD USMC M1A1 HA kit, however, three are usually found on a tank to prevent fratricide through the use of thermal tape on the angled surfaces. These are easily fabricated using Evergreen .100 Clapboard Siding cut into panels 21mm wide x 15mm high (6 “strips” high). Frame the sides and bottom with .010 strip. Paint NATO green with khaki strips on the angled surfaces to replicate the thermal tape.

### 20mm Storage Cans

- Two or four 20mm Ammunition Cans are normally fixed to the bustle rack for additional storage, with one outside of the first vertical support and the second between the first and second vertical support, repeat on the other side.

### Spare Road Wheels

- Storage locations vary by units. The most common is to mount the wheel either forward of the CITV, using the bolts found there or on the turret rails using a guide horn
- Another option is to mount it on the turret or bustle rack rails using a M-88 track center guide.
- A red jerry can or two is usually carried to the left of the APU, these have diesel fuel and are strictly for the APU.

by Stephen Tyliszczak

## further reading

### BOOKS

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*M1 Abrams in Action*, Armor #26, Squadron Signal Publications, Jim Mesko, 1989

*M1 Abrams Main Battle Tank*, 1982-92, Osprey New Vanguard, Steve Zaloga/Peter Sarson, 1997

*Tank War-Central Front NATO vs Warsaw Pact*, Osprey Elite Series, Steve Zaloga, 1989

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*Warmachines No 8: A Gulf War Eyewitness Report*, Verlinden Productions 1991

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*Mini Color Series M1A1/A2 Abrams*, Concord Publications Company, Walter Bohm, 1999

*3rd Brave Rifles In The Storm*, Concord Publications Company, Chris Mrosko, 1992

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*100 Days, 100 Hours "Phantom Brigade In the Gulf War"*, Concord Publications Company, Edgar A. Stitt, 1991

*Operation Desert Shield prelude to "Desert Storm"*, Concord Publications Company, Yves Debay and Michael Green, 1991

*USAEUR, The United States Army In Europe*, Concord Publications Company, Michael Jerchel, 1992

*Armor of The West, NATO's AFNORTH & NORTHAG*, Concord Publications Company, Yves Debay, 1992

*National Training Center, Ultimate In Land Warfare Training*, Concord Publications Company, Greg Stewart, 1992

*Peace By Force, Elite Forces of the IFOR*, Concord Publications Company, Yves Debay & James Hill, 1997

*Special Ops, Journal of the Elite Forces, Volume 7, Kosovo Special*, Concord Publications Company, Yves Debay & Carl Schulze, 1999

*M1 Abrams Main Battle Tank, The Combat and Development History of the General Dynamics M1 and M1A1 Tanks*, Motorbooks International, Mil Tech Series, Michael Green, 1992

*Museum Ordnance special #9, Abrams Main Battle Tank M1A1 and M1A2*, Darlington Productions, Inc., Glen Broman, 1996

*Hunnicut M1* Book, Vol. 1 & 2.

*Ground War Desert Storm, #6122*, Squadron Productions, Jim Mesko, 1991

*USAREUR, Landpower #3003*, Presidio Press, Skinner, 1989

*US Marine Corps*, Presidio Press, Hans Halberstadt, 1993

*The Armored Fist* Time Life Books

## selected detail sets

### AFV CLUB

#AF3512 M1A1 & A2 Track Workable

### ARMOR TRACK MODELS

#TK- 02 T-156 Rubber Chevron Track, Workable with resin Idler wheels and Drive Sprockets and Retainer Ring (these are for K1/K1A1)

#TK-03 T-158 Rubber Block Track, workable with resin Idlers and Drive Sprockets and Retainer Ring for M1

### DRAGON

#3804 Track Width Mine Plow

### EDUARD

#35259 M1A2 Abrams Detail Set

#35346 M1A1 Abrams Armor Fittings

#35057 M1A1 Abrams Detail Set

#35333 M1A1 Abrams (TA)

### LEGEND PRODUCTIONS

#LF1029 M1 Accessory Set

### MODEL POINT

#MP3559-1 120mm M256 Turned Aluminum Barrel

### MODEL VALLEY/LEGEND PRODUCTIONS

MV #001 M1 Tank Engine Set

LP #LF1028

### ON THE MARK MODELS

#AR-3555 Modern US Handles

### ROYAL MODELS

#022 US M1A1 Abrams Micro Detail Set

### VERLINDEN PRODUCTIONS

#621 M1 Abrams Update & Interior Set

Sheet #508 M-1 Abrams Tank Markings

### Review for Eduard's M1-A1 Abrams Detail Set (#35057) for the Academy M1 Kit (#1345) by Pete Beccera

The PE set includes 46 pieces, not including duplicated parts like the sprocket retainers or various handles. Hull details include driver's vision block wipers, fuel cap handles, access plate handles, and other various hull handles and back deck bolt-down details. Also included are NBC over pressurization system details, taillight guards and the fire suppression T-pull handle.

Turret details for the loader's hatch include the latch,

skate ring, M240 mount, ammo mount, periscope detail and the handle. Cupola detail includes the latch, periscope guards, lifting rings, ammo mount, .50 cal sleeve and hot barrel handle. Gunner's primary sight details include the doghouse doors and hinges. Additional turret details are tow cable mounts, sponson box handles, smoke grenade launcher mount, and spare .50 cal ammo racks.

### Review for Verlinden Productions' M1 Abrams Update & Interior Set (#621) by Matthew Malagorski

This is a very comprehensive, well detailed and cast set that can be used to detail the poor Minicraft/Academy M1A1 kit, as well as, either the original Tamiya M1, or M1A1 kits.

The set can be used to convert Tamiya's original M1 kit to make an IPM1, or to detail the kit's listed above. Highly recommended if you can find one.

#### Kit Components

40 cast resin, 52 photo etch, 1 length copper wire, 2 pieces plastic tubing, 3 page instruction sheet with assembly diagrams and painting instructions

#### Recommended Kit

Academy, also possibly Tamiya M1 or M1A1

#### Status

Currently out of production.

#### Resin Parts breakdown

- 10 Resin parts for the turret interior that includes all equipment visible through the open hatches

- 9 Resin parts for the Driver's compartment
- 9 Resin parts for the Batteries and Replacement Battery Covers
- 9 Resin parts for highly detailed complete replacement M2HB and M240 machine guns
- 3 Resin parts to make up a CLAMS Unit and External APU

#### Photo Etch Parts breakdown

- 2 Photo etch parts for the turret interior
- 10 Photo etch parts for the machine gun mounts
- 22 Photo etch parts for the turret basket
- 2 Photo Etch parts for the smoke grenade launcher mounts
- 2 Photo Etch parts for the Commander's hatch
- 2 Photo Etch parts for the Loader's machine gun ring
- 6 Photo Etch parts for the CLAMS mounting brackets
- 6 Photo Etch parts for the upper oil cooler doors

### Review for Eduard's M1-A1 Abrams Detail Set (#35333) for the Tamiya kit by Stephen Tyliczszak

The PE set includes 144 pieces, including duplicated parts like the sprocket retainers and various handles. Hull details include driver's vision block wipers, fuel cap handles, access plate handles, and other various hull handles and back deck bolt-down details. Also included are Turret basket mesh that will fit the Tamiya kit exclusively, as well as air intake mesh, which is duplicated to give the proper spaced appearance. There are interior pieces for the drivers compartment which include two pieces of PE which has various dials and gauges and a piece of film to go behind one of the PE pieces in Eduard's usual style. These pieces are fairly accurate but are only good for a façade of an interior if you add a Driver figure. Pieces to detail the external APU are also included and will add a lot to the kit piece, these can be used on any make of APU as all current M1 kits include them despite the fact they were rarely used. Chains for the retainer pins for all side skirt pins are included as well as crow bar brackets for the front side skirt. For the rear hull plate they include two bits of PE to

replicate the field expedient holders for concertina wire.

Turret details for the loader's hatch include the latch, skate ring, M240 ammo box holder, 7.62mm ammo belt, handle for the 7.62 ammo box, interior periscope detail and the handle. Cupola detail includes the latch, lifting rings, ammo box holder and an ammo belt for the 50 and handle for the ammo box and a piece for the M2 HMG sight. Gunner's primary sight details include the doghouse doors and hinges. Additional turret details are tow cable mounts, turret box handles, smoke grenade launcher mount, and spare .50 cal ammo racks, IFF panels, parts to detail the 20mm ammo cans included with the Tamiya kit, an reel for wire which is seen often on USMC M1A1 HC tanks. They also include an octagonal plate for unit markings. PE bits for the smoke discharger reload boxes are also included. A coax shroud is also included, as is a debris door for the mantlet. The set is very comprehensive but lacks some of the simple but necessary items which are included in earlier sets such as the fire extinguisher hull handle.

### Review for Eduard's M1-A1 Abrams Detail Set (#35259) for the Shanghai Dragon M1A2Abrams kit by Stephen Tyliczszak

The PE set includes 148 pieces, including duplicated parts like the sprocket retainers and various handles. Hull details include, fuel cap handles, access plate handles, and other various hull handles and back deck bolt-down details. Also included are Turret basket mesh that will fit the DML kit exclusively, as well as air intake mesh. There are interior pieces for the drivers compartment which include two pieces of PE which has various dials and gauges and a piece of film to go behind one of the PE pieces in Eduard's usual style. These pieces are fairly accurate but are only good for a façade of an interior if you add a Driver figure. Pieces to detail the external APU are also included and will add a lot to the kit piece, these can be used on any make of APU as all current M1 kits include them despite the fact they were rarely used. Crow bar brackets for the front side skirt are also included. For the rear hull plate they include PE replacements for the engine grilles, which should not be used as they are flat while the real grilles are just like on the kit. The engine

deck is thoroughly worked over with replacements for all engine grilles and air intakes, which are not necessary but look good. Interestingly enough they also include parts to make the mud flaps on the rear hull behind the sprocket though it should be noted these are used ONLY on Saudi Arabian M1A2 Abrams tanks, not on U.S. Army tanks.

Turret details for the loader's hatch include the latch, skate ring, M240 ammo box holder, 7.62mm ammo belt, handle for the 7.62 ammo box, and the handle. Cupola detail is limited to the Machine gun and includes, ammo box holder and an ammo belt for the 50 and handle for the ammo box and a rear flip up sight for the 50. Cal and front sight and barrel jacket. Additional turret details are tow cable mounts, turret box handles, and spare .50 cal ammo racks. A coax shroud is also included for the mantlet. The set still lacks some of the simple but necessary items, which are included in earlier sets such as the fire extinguisher hull handle. And many of the needed fixes for an M1A2 tank especially around the cupola.