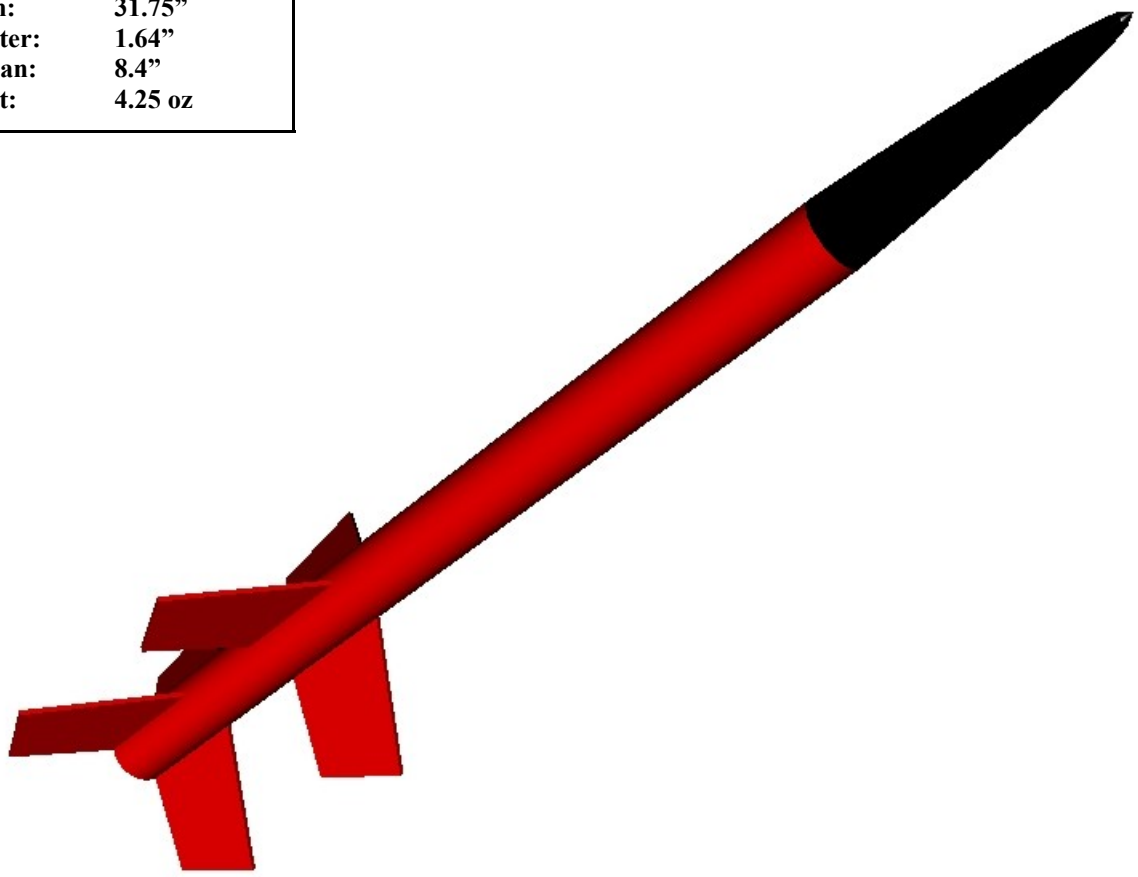
Der Dopple Max

Designed By C. P. McGraw

Skill Level 2

Revision Date: Dec 6, 2005

Length:	**31.75”**
Diameter:	**1.64”**
Fin Span:	**8.4”**
Weight:	**4.25 oz**



Rocket image drawn using RockSim 8

Main Parts List

Nose Cone	PNC-60AH	Shock Chord	SC-24
Sustainer Body Tube	BT-60	Shock Chord Mount	SCK-24
Sustainer Motor Tube	BT-50H	Snap Links	(2) #10
Booster Body Tube	BT-60R	Decal Sheet	Excelsior Rocketry
Booster Motor Tube	BT-50S		
Engine Blocks	(2) CR-2050		
Engine Hooks	(2) EH-375	1″ Spacer Tubes	(2) JT-50C
Tube Coupler	JT-60C		
Centering Rings	(4) CR-5055	Adapter Parts	
Fin Stock	1/8″ Balsa Sheet	18mm Adapter Tube	BT-20J
Launch Lugs	(2) 3/32″ x 1″	18mm Engine Block	CR-520
Parachute	18″ Diameter	18mm Adapter Rings	(3) CR-2050

Brief history of this model

In 1971 **Estes Industries** released their ***Citation*** line of kits as an early experiment in mass-marketing to increase their sales through upscale department stores, such as Sears. One of the kits in that line was a short, humorous 60-Series design called *Der Red Max*. In 1978, this short-body design was joined in the catalog, but not in the ***Citation*** line, by a taller sibling which was named appropriately, *Der Big Red Max*. Using the same fins and similar decals as the short version, this model was really an adaptation of another 60-Series design from the ***Citation*** collection, called the *Patriot*. The new model retained the same nose cone, main body tube, and internal motor mount components as the *Patriot*. *Der Red Max*, *Patriot*, and *Der Big Red Max* were all powered by 18mm motors. *Der Big Red Max* was only offered in the catalog as part of a starter package, which included the *Big Foot* launch pad, ***Astron*** launch controller, and three motors. Although given a 1900-Series catalog number later, the model never appeared as a stand-alone item, and the starter package disappeared from the catalog after only a five-year run. *Patriot* disappeared from the catalog after a 14-year run by 1985. Curiously, the short *Der Red Max* continued to enjoy catalog status through 1987, but eventually ran its course and was not featured in the 1988 catalog.

One year before the ***Citation*** line introduction, in 1970, Estes released a two-stage 60-Series design called the *Omega* as a companion booster for their *Cineroc* video camera. This rocket was powered by two 24mm "D" motors to achieve reasonable performance with the heavy camera payload, and used the same nose cone as the later *Der Red Max*, *Patriot* and *Der Big Red Max*. *Omega* enjoyed an 11-year lifetime in the catalog, remaining featured until 1981 when it was finally dropped.

Der Red Max

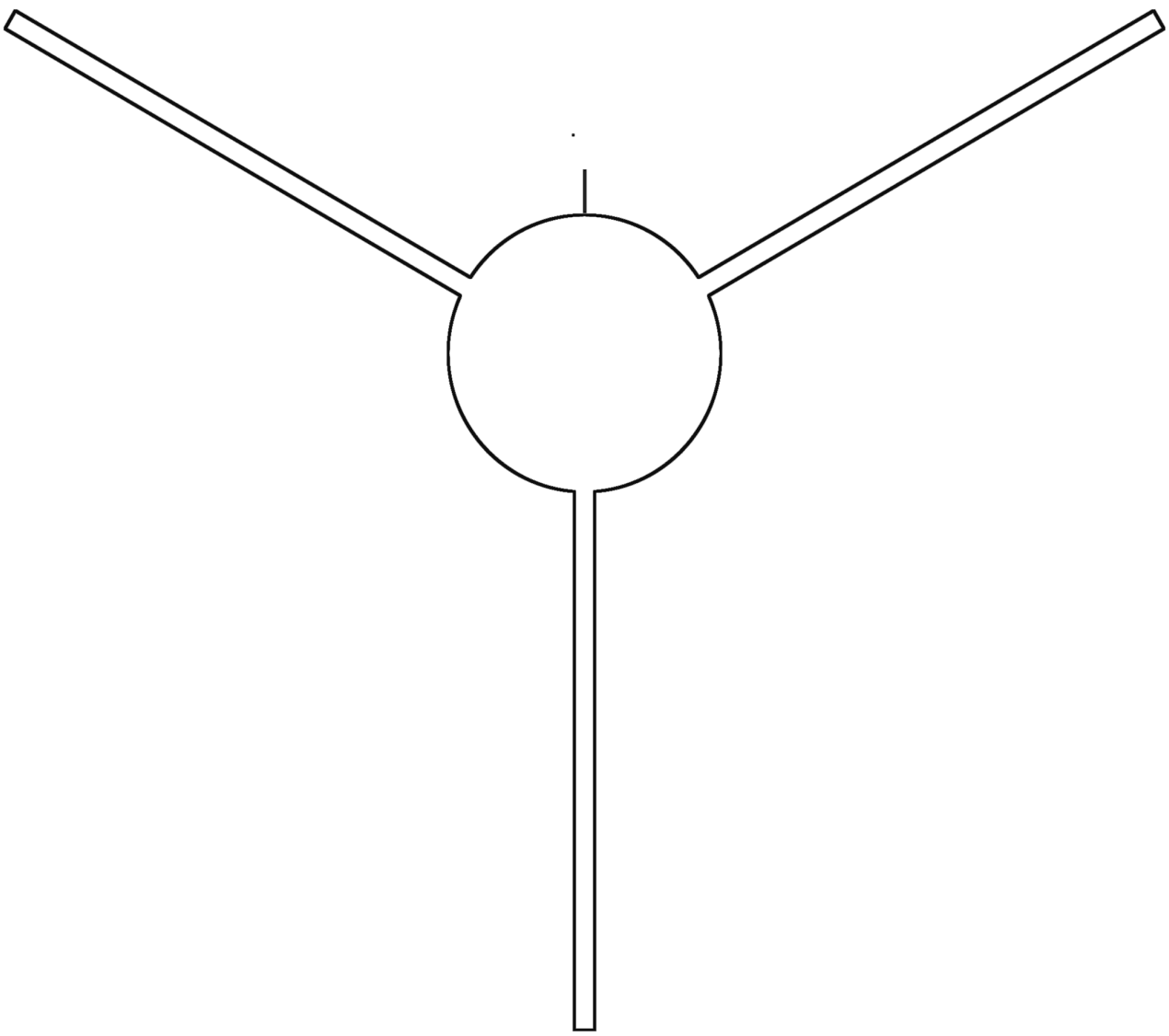
Der Big Red Max

Patriot

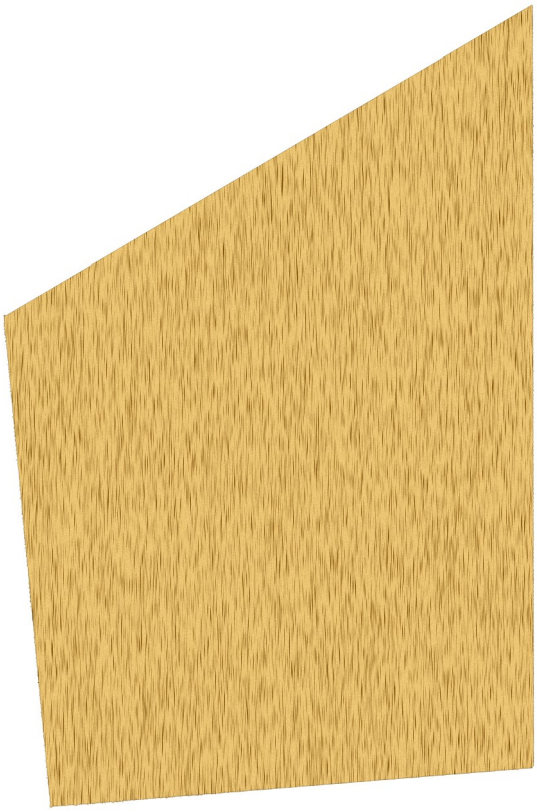
Omega

The **BARCLONE** *Der Dopple Max* is a sport modroc that combines the best features of the long-body *Der Big Red Max* with the two-stage power of the *Omega*. *Der Dopple Max* has long 24mm mounts in both stages, allowing for a full-house "E-E" combination with altitudes in the 2600' range , but allowing for lower-altitude, smaller field, mixed-mode operation using a variety of 24mm spacers and 18mm adapters. **BARCLONE** suggests as a starting point the Estes *Screamin' Mimi*, which has many of the components needed.

Fin Alignment Guide



Fin Cutting Template



Make 8 From
1/8" Balsa Sheet

Left Fin Decal

(Larger than actual size – scale down to fit)

Right Fin Decal

(Larger than actual size – scale down to fit)

Assembly Sequence

Engine Adapter Preparation

- **Step 1** Mark the BT-20J motor tube 1/2" up from one end, and slide one of the three CR-2050 rings up until it is just past this line.

- **Step 2** Slide one CR-2050 ring over each end of the tube, keeping them flush with the tube edges. Apply glue to the joints of all three rings with the tube and allow to dry.

- **Step 3** Apply a bead of glue 2 1/4" up inside the tube from the bottom end (the end with two rings). Using an expended engine casing as a push tool, insert the CR-520 ring into the bottom end of the tube and push with the casing until about 1/4" of the casing remains outside the tube. Remove the casing immediately, then set this adapter aside to dry.

Engine Mount Preparation

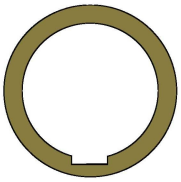


Figure 1

- **Step 4** Modify two of the CR-5055 centering rings with a flat notch on the inside diameter, as shown in Fig. 1 above. Mark these as "A" rings.

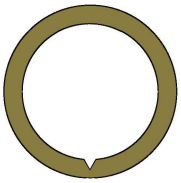


Figure 2

- **Step 5** Modify one CR-5055 ring with a "V" notch in the inside diameter, as shown in Fig. 2 above. Mark this as a "B" ring.

- **Step 6** Mark one end of each motor tube as the bottom edge. Draw lines around both tubes 1", 3", and 3 1/2" from the bottom edge. Draw a line around both tubes 1/4" from the top edge.

- **Step 7** Draw a line lengthwise along both motor tubes. Use this line as a center point reference. Using a fresh #11 blade, cut a slit in both tubes at the intersection of this line and the lines drawn at 3 1/2" from the bottom edge. The slit should be just wide enough to allow the tip of the engine hook to fit through. Do not open this slit any wider than the blade thickness.

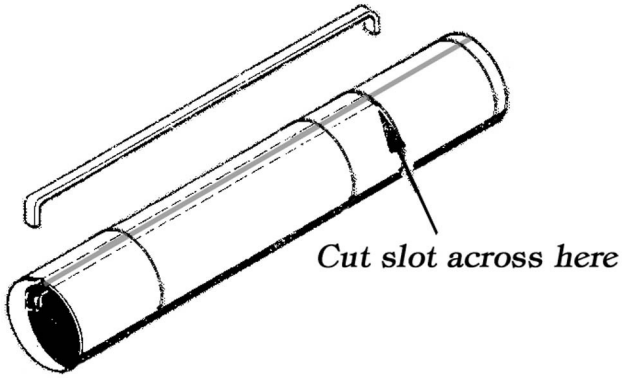


Figure 3

- **Step 8** As shown in Fig. 3 above, insert the engine hooks into both tubes so that 1/4" of the hook extends past the bottom edge of the tube. Apply glue to each mount along the line drawn 1" from the bottom edge of the tube. Slide one of the "A" rings up from the bottom, with the flat notch over the hook, until it is *just forward* of the 1" line. Make sure the hook is aligned directly over the center reference line.

- **Step 9** Cut two strips of 20# printer paper 5" long and 1/2" wide. Apply glue to one side of one strip, and begin wrapping it around one of the mounts to the ***lower edge*** of the line drawn at 3" from the bottom of the tube. Make sure the paper strip wraps over the engine hook location at least twice. Using your fingernail, press down along the outer edges of the hook to force the paper strip to conform, and to lock the hook in place. Repeat this step for the other mount. Set aside to dry.

- **Step 10** Apply glue to the line drawn at 1/4” from the top of the short mount. Slide the unmodified CR-5055 ring down from the top of the tube until it is just below the line. Set aside to dry.

- **Step 11** Apply glue to the line drawn at 1/4” from the top of the long mount. Slide the “B” ring down with the “V” notch aligned over the center reference line until it is just below the 1/4” line. Using a moist brush, clean out the notch of any glue that might have filled the opening, then set aside to dry.

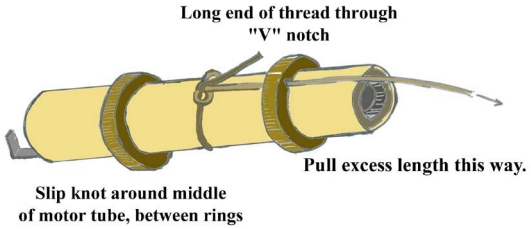


Figure 4

- **Step 12** Tie a slip knot in one end of the Kevlar thread as shown in Fig. 4 above. Slip this loop over the center of the long mount, then push the free end through the “V” notch from the back and pull the excess until the loop is tightly against the back of the ring. Do not crush the tube, just pull the loop tight. Apply a bead of glue to the thread loop, securing it to the ring. Allow to dry.

Fin Preparation

- **Step 13** Using the template found on page 4 of these instructions, cut six identical fins from 1/8” thick balsa sheet using a sharp #11 knife and a metal ruler. Clamp all six fins together and true up the shapes with a sanding block. Remove the clamp, then sand both faces of each fin with 220-grit paper to remove any fuzzing caused by humidity. Round over the leading, trailing, and tip edges. Square up the root edge; do not round this edge like the other edges.

- **Step 14** Apply a bead of thinned glue to the root edges of all six fins, and allow to dry.

Body Tube Preparation

- **Step 15** Using 220-grit paper, sand the entire outer surfaces of both the sustainer and booster body tubes. All you want to do is remove the shine from the glassine coating, so that glue and primer will have a better surface to grab later.

- **Step 16** Using the fin pattern as a measuring reference, identify one end of each tube as the bottom edge, then measure up from the bottom edge the length of the fin root edge. Draw a line around both tubes at this location.

- **Step 17** Using the Fin Alignment Guide from page 3, mark both tubes for three fins, 120 degrees apart. Extend these marks from the bottom edge through the lines drawn in step 13. Draw a line the full length of the sustainer tube at the location shown for the launch lug. Mark this line 3” up from the bottom of the tube, and 1” down from the top of the tube. Mark this line 1” below each of these locations. Apply thinned glue to the lug alignment line between these two sets of marks.

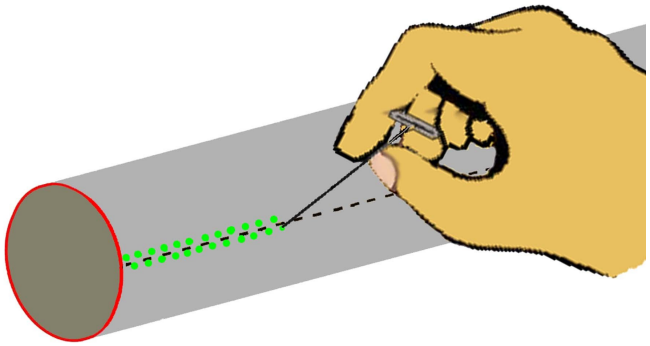


Figure 5

- **Step 18** These fins have a large surface area, and need a reinforced joint to the body tube. Using a straight pin, or a modeler's “T” pin, punch a series of holes along all six fin alignment lines, about 3/16” apart and in a zig zag pattern crossing the alignment lines. Study Fig. 5 above.

- **Step 19** Apply a layer of thinned glue along all six alignment lines, then set this aside to dry.

Final Assembly

- **Step 20** Sand the nose cone with 220-grit paper to remove the seam and to roughen up the plastic surface for primer.

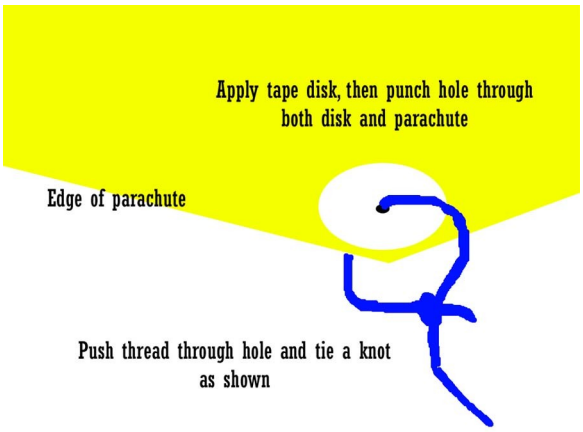


Figure 6

- **Step 21** Assemble the 18" parachute according to the instructions given, but with the changes shown in Fig. 6, above. Attach the shroud lines to one of the snap links. Apply a layer of thinned glue to the knot to secure it, and allow to dry.

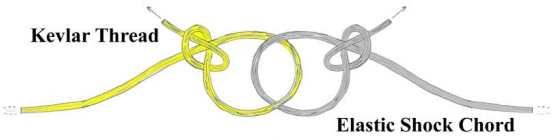


Figure 7

- **Step 22** Attach the elastic shock chord to the end of the Kevlar mount thread as shown in Fig. 7, above. Attach the other snap link to the free end of the elastic chord. Apply a layer of thinned glue to both knots to secure them, and allow to dry.

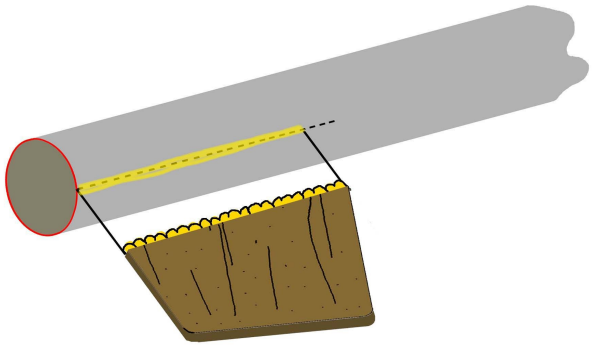


Figure 8
(Not this model shown)

- **Step 23** As shown in Fig. 8, above, apply a layer of full-strength glue to the root edge of a fin, and to one of the fin alignment lines on the booster body, starting at the rear edge of the tube forward to the mark located in step 13. The glue will be applied directly on top of the earlier layer of glue, forming what is known as a "Double Glue Joint". Press the root edge of the fin against the body tube directly over the alignment line, making sure the fin is not angled to one side of the line or the other. Hold in place for about 10 seconds before releasing. Using a moist soft-bristle brush, smooth down the excess glue that squeezes out from the joint. Slide the fin alignment guide down from the top of the tube until the fin is trapped in the slot. This guide will hold the fin at the correct angle while the glue dries. When dry, remove the guide and apply the remaining fins in the same manner until all three are attached.

- **Step 24** Use the same procedure from step 20 to attach the remaining three fins to the sustainer body tube.

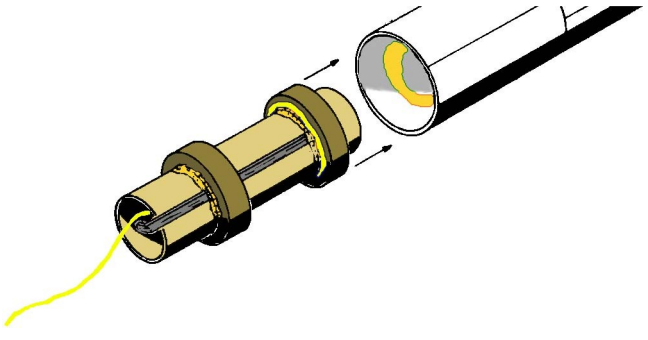


Figure 9
(Not this model shown)

- **Step 25** As shown in Fig. 9 above, apply a bead of glue 3.75” up from the bottom of the booster tube, along the inside diameter. Use a brush to spread the glue evenly. Insert the short motor mount into the tube from the bottom, with the engine hook aligned opposite one of the fin alignment lines, until the bottom end of the motor hook is even with the bottom edge of the booster tube. The top ring should push through the glue bead about 1/4” or so. Set this aside in an upright attitude to dry.

- **Step 26** Apply a bead of glue to the joint between the lower ring on the mount and the inside edge of the booster tube. Set this aside in an inverted (top down) attitude while the glue dries.

- **Step 27** In a similar way to step 22, apply a bead of glue with a long-handled, soft-bristled brush 7.25” up from the bottom edge of the sustainer tube, along the inside diameter. Pull the shock chord and Kevlar thread down through the center of the long motor mount and out the bottom end. Insert the mount into the bottom of the sustainer tube, with the engine hook aligned with the launch lug line, until the bottom tip of the hook is even with the bottom edge of the sustainer tube. The top ring should push through the bead of glue about 1/4” or so. Set this aside in an upright attitude to dry.

- **Step 28** Apply a bead of glue to the joint between the lower ring on the mount and the inside edge of the sustainer tube. Set this aside in an inverted (top down) attitude while the glue dries.

- **Step 29** Attach the two launch lugs to the sustainer tube along the lug alignment line, between the marks located in step 14. Allow these to dry.

- **Step 30** Apply a fillet of glue to each side of the fin joints, and to the launch lug joints. Spread the glue into the joints with your finger to form a smooth reinforcement. Allow these to dry.

Finishing Tasks

- **Step 31** Sand any glue smears away with 220-grit paper, then tack-rag the model to remove the dust. Pull the shock chord and Kevlar thread up into the parachute area of the sustainer body and temporarily secure to the inside of the tube with a small piece of low-tack painter's tape.

- **Step 32** Apply a grain-filling compound, such as Elmer's Fill-N-Finish, to all of the exposed wood surfaces and to the spiral seams in the body tubes. Allow to dry for about 24 hours before sanding with 220-grit paper. Tack-rag after sanding and inspect for flaws and blemishes. Repeat this sequence until all flaws are hidden and the surfaces are smooth.

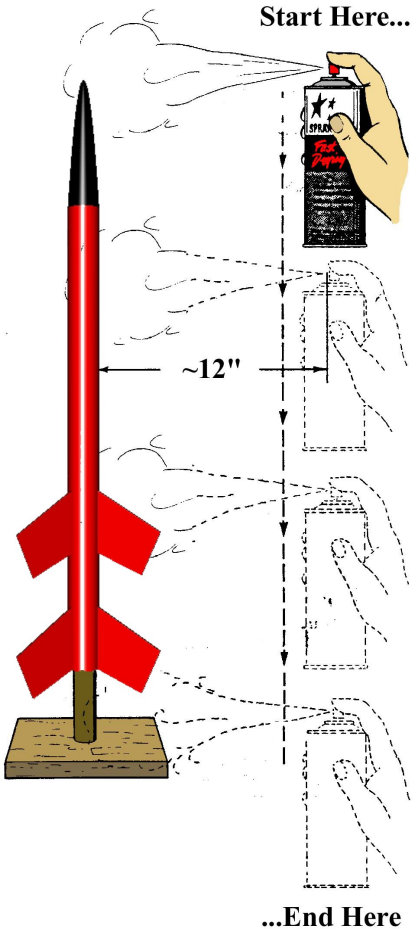


Figure 10

- **Step 33** Spray the model with at least two coats of primer and allow to dry completely before sanding with 320-grit paper. Follow the general pattern shown in Fig. 10 above. Always spray the model from the top-down to reduce the possibility of runs and drips. Maintain a distance of about 12” between the spray head and the model. Start the spray off the model, carry the spray through the contact zone, and only stop the spray after leaving the model. This will reduce the chances of splatter. When dry, sand the rough spots down, tack-rag the model, and inspect for blemishes. Repeat this sequence one spray layer at a time, as needed, until all visible blemishes have been removed. Caring for these issues at this stage of the process makes the color coat go on with fewer problems that will ruin the finish.

- **Step 34** Apply the color coats in a similar manner to the illustration in Fig. 10. The nose cone should be black, while the sustainer and booster should be a deep red. Be sure to spray the booster and sustainer a bright white undercoat first, if your primer color was not already bright white. Depending on the decal sheet you use, you will need to mask off some areas on the sustainer and booster to protect small patches of white that will show through the decals. There is some debate as to what the original red was on the Der Red Max, but we suggest you match the closest red you can find to a catalog image of that model and don't worry about it being exact. Allow each color coat to dry a minimum of 48 hours before masking off and spraying the second color.

- **Step 35** When all color coats have dried, but before the decals have been applied, spray the entire model with an acrylic gloss coat. Some decal manufacturers are recommending the use of Future Floor Finish, applied with an airbrush or a foam brush, instead of Krylon Acrylic Gloss from a spray can. The Krylon product is aggressive, and will destroy some decals. We recommend the use of Future, with sufficient time for the product to fully cure before applying waterslide decals.

Flight Preparations

- **Step 36** Attach the snap links on the shock chord and the parachute to the attachment loop on the shoulder of the nose cone.

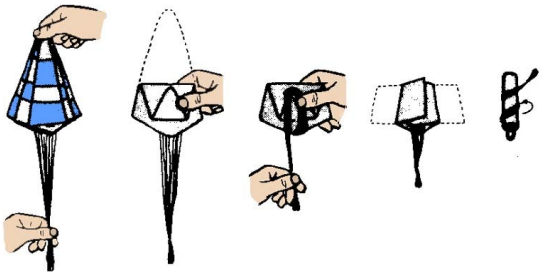


Figure 11

- **Step 37** As shown in Fig. 11 above, fold the parachute and loosely wrap the shroud lines around it.

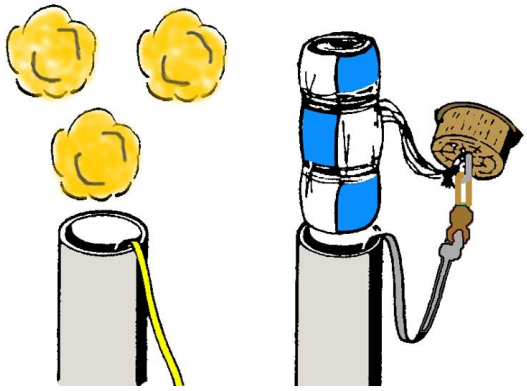


Figure 12

- **Step 38** As shown in Fig. 12 above, insert about 3” of flameproof wadding, either as sheets or as shredded cellulose fill, into the top of the sustainer body tube and push this down gently with a dowel. You must not pack this material tightly! A tight fit will not blow completely out of the model and may result in a failed recovery system, which may result in the destruction of the model. Push the shock chord in on top of the fill, followed by the parachute.

- **Step 39** Select a booster motor and a sustainer motor from this list of motor pairs.

We do not recommend other combinations of motors. There are performance issues that other combinations may introduce which could cause the loss of the model. Also, be sure to use the launch rod or tower called out to the right of the pair. These represent the minimum lengths for guidance until adequate flight velocity is reached. Any shorter length and the rocket will not fly in a safe manner. The reachable altitude using a given pair is seen at the far right of each line.

Motor Combination List

```
C11-0 / B4-4 ---- 48″ launch rod --- 600'
D12-0 / A8-5 ---- 48″ launch rod --- 850'
C11-0 / C6-5 ---- 48″ launch rod --- 950'
D12-0 / B6-6 ---- 48″ launch rod -- 1000'
D12-0 / C6-5 ---- 48″ launch rod -- 1300'
D12-0 / D12-7 --- 48″ launch rod -- 1700'
E9-0 / D12-7 -- 72″ launch tower -- 2100'
D12-0 / E9-8 ---- 48″ launch rod -- 2300'
E9-0 / E9-8 --- 84″ launch tower -- 2600'
```

Important note about this chart! The lines in green represent motor combinations that produce optimal deployment velocities below 10 FPS. The lines in red represent the highest deployment velocities of greater than 30 FPS, and when motor combinations are flown you need to take special precautions to reef the parachute shroud lines to prevent total parachute failure. The remaining lines represent motor combinations producing relatively safe deployment velocities between 10 and 20 FPS.

Choose wisely!

Developed for BARCLONE Rocketry
by C. P. McGraw

Model Rocket Safety Code

Materials: I will use only lightweight, non-metal parts for the nose cone, body, and fins of my rockets.

Motors: I will use only certified, commercially-made model rocket motors, and will not tamper with these motors or use them for any purposes except those recommended by the manufacturer.

Ignition System: I will launch my rockets with an electrical launch system and electrical motor ignitors. My launch system will have a safety interlock in series with the launch switch, and will use a launch switch that returns to the "off" position when released.

Misfires: If my rocket does not launch when I press the button of my electrical launch system, I will remove the launcher's safety interlock, or disconnect it's battery, and will wait 60 seconds after the last launch attempt before allowing anyone to approach the rocket.

Launch Safety: I will use a countdown before launch, and will ensure that everyone is paying attention and is a safe distance of at least 15 feet away when I launch rockets with "D" motors or smaller, and 30 feet when I launch larger rockets. If I am uncertain about the safety or stability of an untested rocket, I will check the stability before flight and will fly it only after warning spectators and clearing them to a safe distance.

Launcher: I will launch my rockets from a launch rod, tower, or rail that is pointed to within 30 degrees of the vertical to ensure that the rocket flies nearly straight up, and I will use a blast deflector to prevent the motor's exhaust from hitting the ground. To prevent accidental eye injury, I will place launchers so that the end of the launch rod is above eye level or I will cap the end of the rod when it is not in use.

Size: My model rocket will not weigh more than 1,500 grams (53 oz) at liftoff, and will not contain more than 125 grams (4.4 oz) of propellant or 320 N-sec (71.9 lb-sec) of total impulse. If my model weighs more than one pound (453 grams) at liftoff, or has more than four ounces (113 grams) of propellant, I will check and comply with Federal Aviation Administration (FAA) regulations before flying.

Flight Safety: I will not launch my rockets at targets, into clouds, or near airplanes, and will not put any flammable or explosive payload into my rockets.

Launch Site: I will launch my rockets outdoors, in an open area at least as large as shown below, and in safe weather conditions with winds speeds no greater than 20 MPH. I will ensure that there is no dry grass close to the launch pad, and that the launch site does not present risk of grass fires.

LAUNCH SITE DIMENSIONS

Total Impulse (nSec)	Motor Size	Minimum Field Size
0.00 – 1.25	*1/4A – 1/2A*	*50'*
1.26 – 2.50	*A*	*100'*
2.51 – 5.00	*B*	*200'*
5.01 – 10.00	*C*	*400'*
10.01 – 20.00	*D*	*500'*
20.01 – 160.00	*E, F, G*	*1000'*
160.01 – 320.00	*2G*	*1500'*

Recovery System: I will use a recovery system, such as a streamer or parachute, in my rockets so that they return safely and undamaged and can be flown again, and I will use only flame-resistant or fireproof recovery system wadding in my rockets.

Recovery Safety: I will not attempt to recover my rocket from power lines, tall trees, or other dangerous places.

Model Rocket Safety Code
developed by the
National Association of Rocketry
Revised Code November, 2004