Body color is: "Medium Red Metallic"  
Color code: WA408G  
All vinyl decals are Bright Yellow.

Project: StarFire  
All dimensions are in inches  
CAD scale: 1" = 15"  
Drawn: COMPLETE AIRFRAME AND PAINT SCHEME  
Rev: C  
By: Vern Knowles  
Date: Apr. 20, 2004  

Body dimensions:
- StarFire logo width: 7.722 inches
- Length: 12 feet 5.25 inches
- Width: 5 feet 10 inches

Print scale in Inches:
Nosecone

Airframe forward section

Airframe mid section

Booster

All dimensions are in inches

CAD scale: 1" = 20"

Print scale in Inches

0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36

Project: StarFire

Drawing: AIRFRAME ASSEMBLY

Rev: C

Date: Nov. 23, 2003

By: Vern Knowles
Remove nuts and lift off bulkhead B5 for access into the booster electronics bay.

Coupler tubing 15.750" total length with 9.250" exposed beyond body tube. Reinforced internally with two layers of 6 oz fiberglass.

(1 of 3) threaded rods 5/16" x 27.650" length.

Spacers for 38mm motors for igniter wires to enter below the retainer plate.

3/8" U-bolt for recovery harness attachment.

Bottom rail guide with threaded steel insert into rear bulkhead.

Bottom rail guide with threaded steel insert into bulkhead.

Top rail guide with threaded steel insert into bulkhead.

Datum 0.000" (forward end of booster body tube)

Datum is aft end of booster body tube

0.250" ID x 3/8" OD x 41.500" length

3.002" ID x 41.000" length

0.062" wall thickness

Cutaway view for central motor tube

McMaster-Carr part number: 8565K33

1.525" ID x 24.500" length

0.062" wall thickness

Outboard motor tubes

Cutaway view for central motor tube

3.002" ID x 41.000" length

0.062" wall thickness

Cutaway view for 1 of 3 igniter wire tubes

(1 of 6) 1.525" ID x 24.500" length

0.062" wall thickness

Outboard motor tubes.
Igniter wire slot. 0.125" wide by 0.125" deep. Total of six, one for each outboard motor. Seal with modeling clay. Motor retainer plate will also cover this slot to protect wires.

Igniter wire tubing leading to booster electronics bay. (0.25" ID hole) One per pair of outboard motors for total of three.

(1 of 6) Outboard motor tubes for 38mm motors. Max internal motor length 24.5".

Central 75 mm motor tube. Max internal motor length 41".

(1 of 3) Tee nuts inside rear bulkhead for securing motor retainer plate. Use #10-32 x 0.5" screws.

0.125" thick washer for rail guide spacer.

Threaded steel insert to anchor rail guide into rear bulkhead. McMaster-Carr part number 90192A114. Use #10-24 x 1.0" flat head screw to attach rail guide button.

Delrin rail guide button for 5/16" rail slot.

Booster Bottom View

Coat bottom with epoxy to improve durability and to help protect the plywood.
FIN DIMENSIONS

Material: 0.125" thick G10 or FR4 fiberglass sheet

Epoxy root edge of fin to central motor tube and reinforce joints with 8oz fiberglass strips.

Project: StarFire

All dimensions are in inches

CAD scale: 1" = 6"

Print scale in Inches

Drawing: FIN DIMENSIONS

Rev: C

Date: Nov. 23, 2003

By: Vern Knowles
Body tubing 7.512" ID x 27.500" length. 0.080" wall thickness reinforced externally with three layers of 6 oz fiberglass.

(1 of 6) 5/32" diameter holes for #6-32 x 0.500 screws to secure this tubing to bulkhead B6. Holes are equally spaced around the circumference of the body tube.

0.250" diameter hole to vent pressure from parachute compartment.

Anti-zipper steel band embedded below fiberglass layers. Band is 0.500" wide and 0.025" thick. (Hose clamp band.)
Datum 0.000"

Top of body tube

Body tubing 7.512" ID x 27.500" length. 0.080" wall thickness reinforced externally with three layers of 6 oz fiberglass.

Coupler tubing 15.000" total length with 9.000" exposed beyond body tube. Reinforced internally with two layers of 6 oz fiberglass.

Bulkhead B7

5/16" x 12.400" threaded rod.

Bulkhead B6

(1 of 6) threaded brass inserts for securing mid section body tube to bulkhead B6. McMaster-Carr part number: 900164007. Use six #6-32 x 0.500" button head screws.

3/8" U-bolt for recovery harness attachment.

Payload bay pressure vent hole 0.250" diameter. Do not align it with altimeter vent holes. Put it halfway between them around the circumference.

Payload bay vent

(1 of 4) altimeter bay static port holes 0.250" diameter and spaced 90° around the circumference of the body tube.

(1 of 2) PVC ejection charge holders. (3/4" PVC end plugs.)

Remove 5/16" nut and lift off bulkhead B6 for access into the altimeter bay.

Shield altimeter bay from electrical interference from payload transmitters.

All dimensions are in inches

CAD scale: 1" = 6"
EJECTION CHARGE HOLDERS

Two 3/4" PVC end plugs screwed to bulkhead B6 to serve as redundant ejection charge holders.

3/8" U-bolt (top view) Drill 5/16" hole into center of U-bolt bracket plates.

(1 of 6) threaded brass inserts around the circumference of bulkhead B6. McMaster-Carr part number: 90016A007.

3/4" PVC end plug screwed to bulkhead B6. Drill center hole 5/32" diameter to pass ejection charge igniter wires into the altimeter bay. Fill with clay to seal and close with PVC cap.

3/4" PVC end plug with 3/16" center hole into altimeter bay.

(1 of 2) 3/4" PVC end plugs for ejection charge holders.

(1 of 6) threaded brass inserts around the circumference of bulkhead B6. McMaster-Carr part number 90016A007.
NOSECONDE

36.500"

4.000"

1.000"

5.375"

7.451"

Material: Plastic
Color: Bright Yellow

1/4" eyebolt with washers and nuts.

All dimensions are in inches
CAD scale: 1" = 6"
MOTOR RETAINER PLATE

1 of 6 holes ø 1.375" at 60° spacing

1 of 3 holes ø 0.188" at 120° spacing

ø 7.000"

R 2.625"

Center hole ø 2.750"

All angles are 30°

Material: 0.100" to 0.125" thick Aluminum
Drill center hole 3.126" ø

ø 7.512"

Drill three holes 1/4" ø spaced 120°

R 2.625"

Drill six holes 1.649" ø spaced 60°

ø 0.750" recessed area is 1/16" deep with ø 0.250" through hole in center.
(1 of 3 spaced 120°.)
Install tee nuts into this recess.

SECTION A-A

0.500"

SECTION B-B

Material: 0.500" thick aircraft plywood

Ignore wire slot is only 0.125" deep.

Slots are 0.125" wide and 0.125" deep. Aligned center to center on the holes.
(1 of 6)
BULKHEAD B1 PLATE P2

- Drill center hole 3.126” ø
- Drill three holes 3/8” ø spaced 120°
- Drill six holes 1.649” ø spaced 60°
- All angles are 30°

Material: 0.500” thick aircraft plywood

BULKHEAD B1 ASSEMBLY

1. Install three tee nuts into plate P1.
2. Laminate plate P1 and plate P2.
3. Install rail guide mount.

Install threaded steel insert McMaster-Carr part number 90192A114 for #10 machine screw. (rail guide mount)

NOTE: Motor tubes only extend halfway into bulkhead B1 so that the aft closure on the motors will be nested inside the bottom half of B1. The motor retainer plate then fits flush to the bottom side of bulkhead B1 to keep the motors in place.
BULKHEAD B2

Drill center hole 3.126" ø

Drill three holes 3/8" ø spaced 120°

ø 7.512"

Drill six holes 1.649" ø spaced 60°

R 2.625"

All angles are 30°

Material: 0.500" thick aircraft plywood
BULKHEAD B3

Plates P1 and P2 are identical.

NOTES:

Three holes at 3.125" radius are for 5/16" threaded rod.
Three holes at 2.625" radius are for 3/8" igniter wire tubes.

Material: 0.500" thick aircraft plywood for P1 and P2.
BULKHEAD B4

Bulkhead ø 7.348" (must fit inside coupler tubing)

Drill three holes ø 5/16" spaced 120°

Drill ø 7/16"

Drill three holes ø 3/8" spaced 120°

R 2.625"

R 3.125"

60.000°

Three holes at 3.125" radius are for 5/16" threaded rod.
Three holes at 2.625" radius are for 3/8" igniter wire tubes.

Drill ø 5/16" spaced 120°

Material: 0.500" thick aircraft plywood
This bulkhead is the "cap" at the top of the booster. It must fit onto the top of the coupler at the forward end of the booster. The three holes 5/16" diameter are for threaded rods. The two holes 3/8" diameter are for the U-bolt.

Drill three holes Ø 5/16" spaced 120°

Drill two holes Ø 3/8" spaced 180° for U-bolt

Material: 0.500" thick aircraft plywood
Note: Coat with West System epoxy to improve durability.

Material: 0.125" thick G10 or FR4 fiberglass sheet
This bulkhead is the "cap" for the altimeter bay. It must fit onto the bottom of the altimeter bay coupler. The 5/16" diameter center hole is for a threaded rod. The two holes 3/8" diameter are for the U-bolt.

There are six threaded brass inserts around the edge for #6-32 machine screws that secure the mid section body tube.

**Material:** 0.750" thick aircraft plywood

**Note:** Coat with West System epoxy to improve durability.

Install threaded brass insert
McMaster-Carr part number 90016A007 for #6 machine screw. (1 of 6)
Material: 0.500" thick aircraft plywood
Camcorder Mounting Plate

Plate ø 7.348" (must fit inside coupler tubing)

Drill three holes ø 5/16" spaced 120°

Three holes at 3.125" radius are for 5/16" threaded rod.

Material: 0.125" thick G10 fiberglass

Drill plate as needed to mount the camcorder to it.
Use screw into the tripod mount on the camcorder.

This plate mounts on the threaded rods inside the booster electronics bay. Attach camcorder and then insert it into the bay and rotate the plate so that the threaded rods are captured into the slots on the plate. Secure with nuts at desired mounting height.