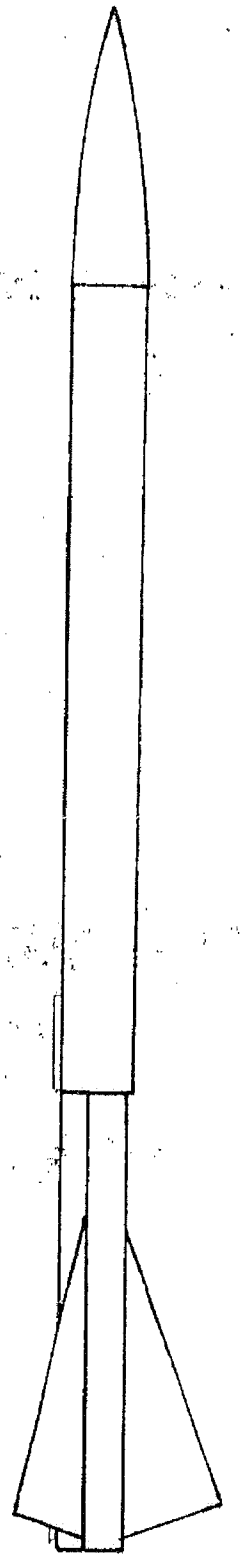
ACE
MINI ALLEGRO

HIGH POWER ROCKETRY SERIES

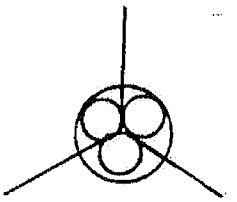


FEATURES:

* Ogive Nose Cone
* Three Motor Cluster Configuration
* 18" Nylon Parachute Recovery
* Aircraft Plywood Fins & Ring
* Accepts all .695" (18mm) Motors

SPECIFICATIONS:

Length	37.25"
Diameter	1.6"
Fin Span (max)	4.75"
Net Weight Without Motor	12 oz.
	340 g.



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INTRODUCTION

The **ACE/MINI ALLEGRO** is a great 1.65" diameter cluster rocket, ideal for the first time cluster project. Designed as the smallest version in the ACE/ALLEGRO series, it satisfies those people who wish to remain within the legal limits of Model Rocketry. The original **ACE/MINI ALLEGRO** design used a BT-18 for the Air Frame and four BT-7s to form a four motor cluster. Today it has been revised to scale with the other rockets in the *ALLEGRO SERIES*. The availablilty of 18mm composite motors promises even better flights using a three cluster configuration than were capable with four motors using black powder.

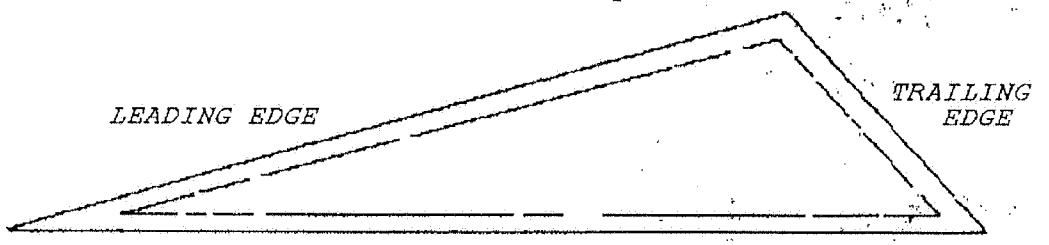
PREPARATION

ACE assumes the builder has some rocketry experience. Materials needed: Fast setting epoxie adhesive, 120 and 320 grit sand paper, Sanding sealer, Spray primer and color.

While the **ACE/MINI ALLEGRO** can be assembled using a TiteBond type adhesive, we recommend all "glueing" should be done with epoxie. If your starting to get into High Power you should become familiar working with epoxie. All surfaces to be bonded with epoxie should be sanded and cleaned thoroughly. Pre-fit all parts before applying epoxie, and read all instructions before beginning.

CONSTRUCTION

Epoxie two of the BT-7 Motor Tubes together making sure their ends are even. Use a flat table to ensure the tubes are aligned. Once they are set epoxie the third BT-7 into the valley created by the first two tubes. Set aside to set up.



Sand the three Fins with 120 grit sand paper putting a taper on the Leading and Trailing edges of each Fin. When finished sand a taper to the Root Edge of each Fin. Apply a good portion of epoxie into the valley between two to the BT-7s and work it so that the epoxie flows from one end of the assembly to the other. This will form the base of a nice fillet between the tubes and also bond the tubes together more soundly. While this epoxie is settling insert one of the fin's tapered root edge into this epoxie so that the trailing edge is 1/2" from the end of the tube assembly. Set this so that the epoxie will set and the Fin will be correctly horizontal to the two tubes it sits between. When this is set repeat for each of the other remaining Fins. Make sure the Fins are positioned properly, and not leaning out of alignment (which will cause poor flight performance.

Make a mark 6 1/2" from the top end of the three BT-7s. Locate the Centering Disk, it has the three large holes. Epoxie the 1/4" center hole shut, then epoxie the Centering Disk to the top of the three BT-7s. Do a nice job with the epoxie making sure the three tubes are centered on the three holes of the Centering Disk. After this has set up apply a large amount of epoxie into the bottom inside of the BT-16 Airframe Tube. insert the three tube assembly into the BT-16, Centering Disk first. This should be twisted inward until the 6 1/2" mark is even with the BT-16. Let this set up in a "fins down" position so that the epoxie will form a good bond on the top side of the Centering Disk. Allow this to set up then turn everything upside down and pour good amounts of epoxie into the three chambers created by the three BT-7s and the BT-16. Swirl this around so as to form a good bond with all pieces involved.

Epoxie a 1/8" Launch Lug on the apex of one of the BT-7s, between any two fins. Make sure the end of the Launch Lug is 1/2" from the end of the BT-12. Epoxie the second 1/8" Launch Lug even with the bottom of the BT-16 in correct aligment with the first Launch Lug at the bottom. Place a nice epoxie fillet on each Luanch Lug and set aside.

Find the Shock Cord and the Shock Cord Mount. Insert the Shock Cord into onehole on the Shock Cord Mount and out the other. Tie a secure knot and add epoxie to help it set. Apply a good portion of epoxie to the Shock Cord Mount and insert it into the BT-16 as far in as you can reach (make sure the Nose Cone will have enough clearance). Tie the other end of the Shock Cord to the eye of the Nose Cone. Attach the Parachute to the Eye of the Nose Cone also.

The ACE/MINI ALLEGRO does NOT have a Baffle Disk. We advise you to use Fiberglass (or whatever) Wadding to insure safety to the Recovery Device.

FINISHING

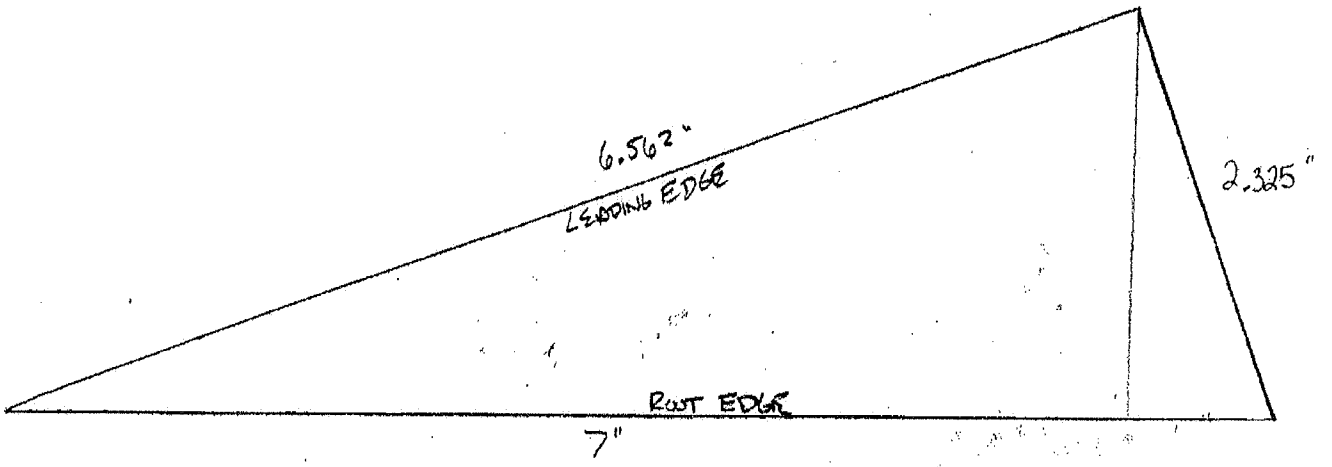
Finish your ACE/MINI ALLEGRO as you would any rocket. Make sure your fillets are nice and apply sanding sealer to all wood surfaces. It is advisable to apply sanding sealer to the entire surface of the rocket. Once dry sand everywhere with 320 grit sand paper. Repaet this process several times, especially on the fins, until you obtain that super smooth finish. Paint the ACE/MINI ALLEGRO any color you desire. The original paint pattern was all flat black Fins, Motor Tubes, and Payload Section, flourescent red Body Tube and Nose Cone. The builders imagination and creativity will lead to uncountable possibilities.

MOUNTING THE MOTORS

You will notice there are no Thrust Rings inside the Motor Tubes. To mount motors wrap 1/4" duct tape around the tail of each motor to be used until the diameter is the same as the BT-7. Insert each motor into its Motor Tube until the tape wrap stops at the tube. Next wrap 1/2" duct tape around each motor overlapping both the motor and the Motor Tubse at least three or four times. Do this for all three motors. This will safely secure the motors and you're ready to go.

MINI ALBEGO 3X18mm

3 FINS OF 3/32" PLYWOOD



Mini Allegro 3X18MM

Parts list -

18.5" LOC 1.5" body tube
3 @ BT-20 "tough tubes", about 17" long each (these are the motor mounts and lower airframe)
1.5" LOC Nosecone
1.5" LOC plywood bulkhead
3 fins, 3/32" plywood, pattern follows in OpenRocket format
18-24" parachute
Shock cord mount, shock cord
Launch lugs (the original came with 1/8" which is way too small, I would use 1/4")

1) Glue the three motor mount tubes together, symetrically and with all ends flush.
2) Take the plywood bulkhead and drill 3/8 diameter holes which will sit over the motor mount tubes and provide a gas seal so that the ejection charge won't blow out between the motor tubes. Glue this bulkhead to one end of the motor mount assembly.
3) Glue the bulkhead end of the motor assembly into the body tube. You will want to insert it about 6.5" into the tube, leaving approx 10.5" of motor mount tubes protruding from the end of the body tube.
4) It's fin time. Glue them into the valleys created by the motor tubes, about 3/8" up from the motor end. Use plenty of glue. I would use yellow wood glue throughout.
5) Add shock cord mount according to your preference. I would use the LOC style nylon cord with epoxy, and then tie off the shock cord to that. The original uses an 18" nylon parachute, which is enough because this thing is built like a tank.
6) Launch lugs. You can do this without my help.
7) Finish the tube valleys and fin joints with fillets of glue, and paint the rocket.

The finished rocket weighs about 9 oz, and I only fly mine on C6-3's or C6-5's using 1/2" masking tape for thrust rings and taping all three motors in place with a swath of 3/4" tape. I have used Estes and Quest motors, but recommend only the Estes motors since they have a higher average thrust and this thing is perty heavy.

This is my first time using OpenRocket, so the attached file does not show the fins being 3/8" from the end of the rocket. And I probably goofed up a few other things too, but you get the idea, and if you don't, email me.

Have fun! And let me know what you think!