

NEWSLETTER OF THE CHARLES RIVER RADIO CONTROLLERS, INC



CRRC FLIGHT-LOG

<http://www.charlesriverrc.org/>

AMA CHARTER 339

FEBRUARY 2004

VOLUME 41 NUMBER 2

2004 CRRC OFFICERS

PRESIDENT

Ken Antonellis

508-653-4513

kantone107@aol.com

VICE-PRESIDENT

Jeremy Harkin

781-894-6683

jeremy_harkin@yahoo.com

MEMBERSHIP SECRETARY

Dick Williamson

978-4438549

williamson@ll.mit.edu

RECORDING SECRETARY

Dave Walter

978-562-5400

walter@toplayer.com

TREASURER

Scott Anderson

508-839-7758

scottand100@copper.net

Ex-Officio and RAFFLE CHAIRMAN

Derick Veliz

978-266-1739

dveliz@omr-architects.com

WEBMASTER

Joel Foner

508-653-3560

jfoner@fonerassoc.com

NEWSLETTER EDITOR

Jeff Newcum

508-655-6417

newsletter@charlesriverrc.org

General Meeting

Wednesday,

February 18th

7:30 pm

Verizon Labs

Sylvan Road, Waltham

Exit 27b off I95/128

Key Note



**Jim Sbronga
and
Mitch
Buckley
Talking**

**about building the 40%
Carden Extra and 3D
aerobatics.**

Table of Contents

President's Message	2
BOD Meeting Notes	2
Membership Statistics	2
Tree Climbers	2
Instructor/Builder program	3
Video and Book Library	3
Treasure's report	4
Secretary's report	4
National Air and Space Museum	6
Indoor/Slowflyers and Lipoly cells	8
2004 CRRC Membership form	10
Mike's Battery Powered Tablesaw	11
Map to the monthly CRRC meeting	11
The Last Word	12

February Raffle Prize



(1) Sig Kadet LT 40 ARC



(1) OS LA .40



(1) R148DF Rx

WON
a
COOL TOOL
for
Show-n-Tell

President's Message



Well, weekends have been great for building but not for flying. Why not press on and get something built for spring flying. The W.R.A.M. show is coming up the weekend of the next meeting. If you have never been, it is an awesome show with lots of new “goodies” to attract your wallet. I

would guess electrics and park flyers will be incredibly hot this year.

As to club activities, thanks to Tracy Clark who has stepped up and volunteered to CD one of the glider contests. Tracy has also suggested another family day at one of the fields during the summer. Lets chat about it at the next meeting. I think it would be a great idea!

Lets have a big turnout for club member Mitch Buckley who will be showing off a really big plane, I think it is a 1/3 scale at the next meeting. I am amazed at the people who give their time for the club and surely it is not for the pay!!

In any event, see you at the next meeting, Lets have some fun!!

- Ken!

January 2004 Board of Directors Meeting

The Sudbury Library has been paid through 2004 for use of a meeting room once per month, with the exception of two months in which we must find an alternate meeting site.

It should be noted in the next newsletter that membership dues go up \$5 in March. Joel will proceed to set up PayPal to accept CRRC dues.

Dave Walter will get the AMA sanction for the Soar In next August.

Dave and John Nilsson will be the CDs for the two-day contest.

Dick Williamson will get the AMA sanction for the RES contest in July. The CD is TBD. There was also some unresolved discussion over the format of the flying for the two-day contest. Right now, it looks like a RES contest on Saturday and HLG on Sunday.

The Spring Field Cleanup is tentatively scheduled for the first Saturday in April, assuming the

weather cooperates. Bob Scott now has a Bobcat, which should prove very useful.

The 2004 CRRC Auction is tentatively scheduled for mid-November (14th?).

The Board discussed publishing a new CRRC Handbook this Spring, or possibly splitting out the membership list from the handbook and just publishing the membership list.

Recorded by Dave Walter

MEMBERSHIP STATISTICS

Here are the updated CRRC membership figures. The table summarizes the membership status, and compares recent years.

Year	Renewals	New Members	Peak Totals
1999			135
2000	112	62	174
2001	124	50	174
2002	138	58	196
2003	156	39	195
2004	87	6	93

TREE CLIMBERS

Tony Morais

A1 Tree Services- Framingham, MA
508-626-0088 800-657-7788

Kenny Greeno

Office Phone: 617-661-8591
Cell Phone: 617-201-5300

Brian Pikarski

Burlington, MA
617-797-2136

Paul Harrington

(508) 376-2573 [Medfield Area]

CRRC BUILDING AND FLIGHT INSTRUCTORS

This is our list of qualified and willing instructors. Power planes are flown only at the Bill Martin Flying Field in Medfield. Sailplanes and Electrics can be flown at the Davis Farm Field on Rte. 117 in Sudbury. For directions to the fields go to <http://www.charlesriverrc.org>. If you have any questions about the construction of your airplane, or want to have an experienced pilot preflight check your airplane before heading to the flying field, then call any of the building instructors.

BUILDING

Ruane Crummett

Wayland 508-655-2234

Fritz Bien

Concord 978-369-1720

Joel Foner

Natick 508-653-3560

John Weigel

Natick 508-653-3560

Pete Young

Watertown 617 923-4184

Derrick Veliz

Acton 978-266-1739

ELECTRICS

Bruce Schneider

Hudson 978-562-9900

Fritz Bien

Concord 978-369-1720

Dave Walter

Hudson 978-562-5400

Derick Veliz

Acton 978-266-1739

Pete Young

Watertown 617 923-4184

Lincoln Ross

Waltham 781-891-0332

HELICOPTERS:

- None Available at present-

POWER

Chief Instructor

Ruane Crummett

Wayland 508-655-2234

Bob Scott

Norwell 781-982-0268

Pete Young

Watertown 617 923-4184

Jon Leehey

Wayland 508 358 5721

Dave Walter

Hudson 508-562-5400

Fritz Bien

Concord 978-369-1720

Neil Kaufman

Sudbury 508-443-9647



SOARING

Dick Williamson

Sudbury 978 443-8549

Dave Walter

Hudson 978-562-5400

Bruce Schneider

Hudson 978-562-9900

Fritz Bien

Concord 978-369-1720

John Nilsson

Clinton 508-368-7136

Pete Young

Watertown 617 923-4184

Lincoln Ross

Waltham 781-891-0332

.....< CRRC LIBRARY >.....

The club keeps a library of videos and books. They are made available at club meetings. If you cannot come to the meeting, and would like to borrow a video or book, call Ken Antonellis at (508) 653-4513.

Videos:

1996 World Masters Aerobatic Championships

AMA - The Pioneers (25 min)

Byron - New Generation of Modeling Products (17 min)

Byron - R/C Wars

Combat Models - Fighter town

Demo (8 min)

Coming of Jets & History of the DC3

Dynamic Soaring

Elmira '97

Endless Lift

Hot Stuff Video (60 min)

Local Flying (Medfield)

Military Aircraft

Monokote 1 & 2

Old Buzzard Goes Flying

R/C Helicopters

R/C Info and Tips

R/C Ornithopter Research Project R/

C Soaring from the Ground Up

R/C Video Magazine, Vol. 1-13

Scale Aircraft Documentation

The Light Stuff (Daedalus Project)

Wring It Out, Vol. 2

Books:

1993 Don Edberg Complete Source Book

AMA - Sound and Model Aeronautics

Aviation Heritage Magazine - B2

Flying Wing

Completely Cars - Harry Higley

Trainers (R/C Magazine)

TREASURER'S REPORT

Report Date 1/30/04

Starting Balance 12/31/03	
Checking	4,654.81
Savings	5,623.57
Cash	25
Total Starting	10,303.38
Income	
Dues	1165
Events: Indoor Flying	100
Raffle:	143
Interest: Savings	3.12
Total Income	1411.12
Expenses	
Goodnow Library (meeting room) #1339	135
Ken Antonellis -raffle prizes #1340	129.08
Fritz Bien -FFFF coffee & donuts # 1341	35
Town of Sudbury -parks & rec consultant #1342	200
Ruane Crummett -raffle prizes #1343	21
Jeff Newcum -Jan newsletter & postage #1344	140.09
Derick Veliz -raffle prizes #1345	38.98
Scott Anderson -rubber stamp & postage #1346	24.39
Monthly Bank Fees	11.66
	735.2
Ending Balances	
Checking	5,327.61
Savings	5,626.69
Cash	25
Total Ending 1/30/04	10,979.30

- As reported by Scott Anderson



Secretary's Report: January 2004 General Meeting

Club President Ken Antonellis opened the meeting at 7:40 PM. Secretary's Report and Treasurer's Report were approved as printed in the December newsletter.

Field Reports

Davis Field, Sudbury

Field is frozen and covered in ice (what a surprise). Fritz is still able to pound a turnaround into it.

Dick Williamson attended a meeting with the consultant doing Field Planning for the Town of Sudbury. His goal was to raise the visibility of CRRC as a legitimate and responsible user of Davis Field. He suggested a \$200 donation, representing 50 members at \$4/member, to help fund the study.

Bill Martin Field, Medfield

Hey, this field is cold, too! Amazing, considering how far south it is compared with Davis.

Bill Costello explained the use of a queuing system, pioneered by the Millis Club, to ensure all pilots get a fair shot at flying without overloading the flight line. To help enforce the 4 pilot limit, additional fences will be added to the sides of the flight line.

Old Business

Thanks to Fritz for hosting the Frozen Finger Fun Fly (FFFF) on New Year's Day. The hot coffee and donuts were greatly appreciated.

New Business

Tom Bauer volunteered to CD the club Electric Fun Fly.

The Collings Foundation Fun Fly will be June 12 and 13 this year. We are still looking for a volunteer CD.



Dick Williamson reported 74 membership renewals this month. If you haven't renewed, keep in mind that the fee goes up on March 1.

There were no new solo pilots this month.

Visitors to the monthly meeting included the following (please forgive me if I butcher your name):

- **Ian Langley** – New to the hobby, found CRRC through the web page (Yay Joel!)
- **Burt Gordon and Al Cohen** – From the 107th R/C Flyers club
- **Mike and David Ryder** – Father/son team, one of them a commercial 767 pilot
- Three aeronautic students – Guests of Pete Young

Added to the video library: Harley Michaelis instructional video. Includes the Genie sailplane and the RADS aileron linkage system.

Ex-Officio Derick Veliz is teaching a course titled *Remote Control Aerial Photography* at the Science Museum starting May 1. Ref: <http://www.mos.org/courses>

Pete Young is organizing an R/C display for the MIT Museum.

Dick Williamson thanked the club for the Wind Dancer he received as a gift from the club last month. It's almost ready to go thermal hunting!

Bill Martin reported that the club (and Bill) donated a dozen new tables to the Natick VFW in appreciation for the use of the hall for the auction.

Raffle

1st Prize – **George Loyer** - Micro 555 receiver and two HS55 servos

2nd Prize – **Rick Walba** - GWS E-Starter kit

3rd Prize – **Burt Gordon** - Cool tool



Show-N-Tell

Tom Kellor – Easy Sport 40. Wing was warped, Fritz fixed it with a heat gun.

Lou Plavidal – Stuka, 9 lbs with a .90 engine. Beautiful scale job.

Entertainment

This month featured various modeling demonstrations by club members.

- **Mike Cormier** – Homemade battery powered table saw.

Speed-600 motor, 6-cell pack of 1200 mAHr NiCD, 3 3/8" blade

- **Dick Williamson** – How to build a carbon reinforced spar.

- **Pete Young** – Vacuum bagging equipment.

Example fiberglass skin on blue foam, balsa skin on white foam.

- **Jeff Newcum** – How to make a cool frequency pin.

Uses a color printer, some balsa, and a few simple tools.

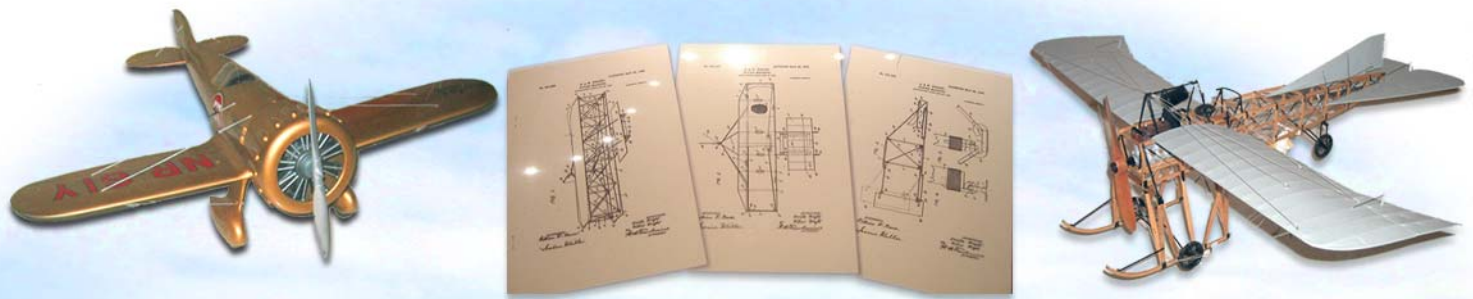
- **Jean-Pierre Riu** – A simple 12V DC power supply.

Constructed from an inexpensive PC power supply.

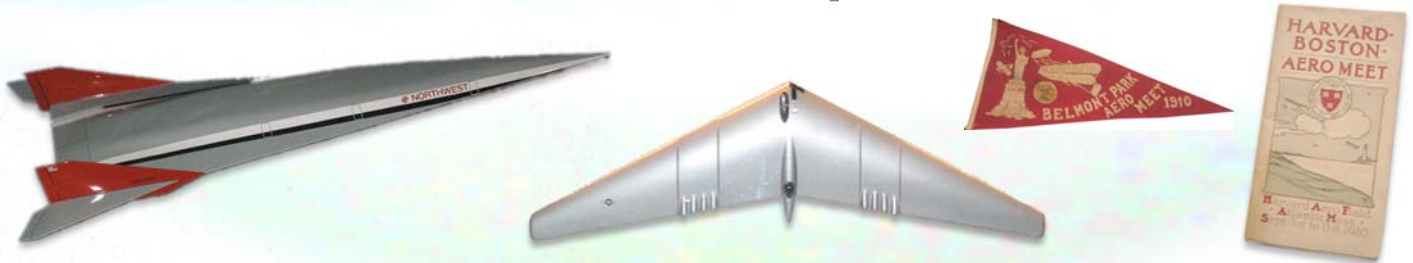
- **Phil Rossoni** – Construction of the Z-Surfer walkalong glider.

Also demonstrated the final product.

Recorded by Dave Walter



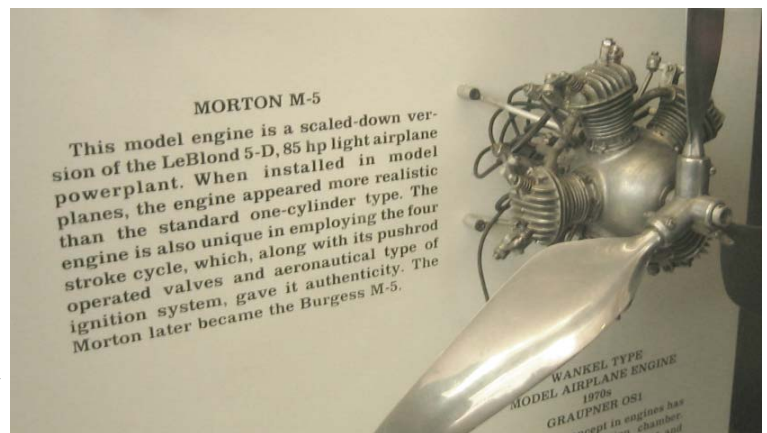
National Air and Space Museum



Last month I took a trip to the National Air and Space Museum. I really liked the Wright Brothers exhibit. They have the actual watches and prop from their first flight. They also had some memorabilia from the Harvard Boston Aero meet that the Wright's attended. I also enjoyed the R/C display. It's amazing how far we've come compared to the display. It was interesting to see the Voyager wing tip. They both ground away during takeoff and eventually blew off. More pictures can be seen at www.charlesriverrcpcictures.org and click on NASM.

- Jeff Newcum

RIGHT: The Morton M-5 is four stroke, spark ignition, five cylinder radial engine (using the usual master/slave rod arrangement), based on the full size LaBlond radial. It was designed by Glen Morton of Morton Aviation in the 1940's and was sold both as a production engine and a kit.



RIGHT: "The fastest man in the world...bullets are the only rivals of Glenn H. Curtiss of Hammondsport." In 1906 Glenn Hammond Curtiss built the worlds first V8 engined motorcycle. In 1907 on January 24th, Glenn Hammond smashed the land speed record at Ormond Beach in Florida, reaching an amazing 137mph.

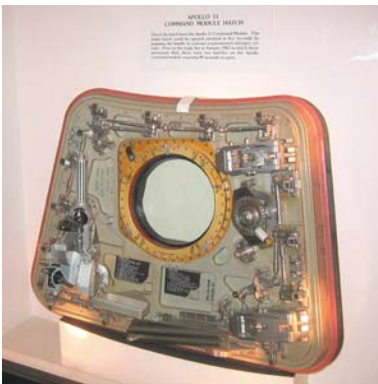




ABOVE: The *Polar Star* flew several pioneering mapping and survey flights in the Antarctic continent, including the discovery of mountain ranges and islands that were previously unknown. It succeeded in making the first crossing of the Antarctic continent in November of 1935.



ABOVE: Laird Turner LTR-14 Meteor "Miss Champion" Designed by Roscoe Turner and modified by Matty Laird, the LTR-14 won the Thompson Trophy races in 1938 and 1939 making Turner the only 3-time winner of the event. The Meteor was an elongated Gee Bee racer with very short, thin wings powered by 1000hp twin Wasp engine.

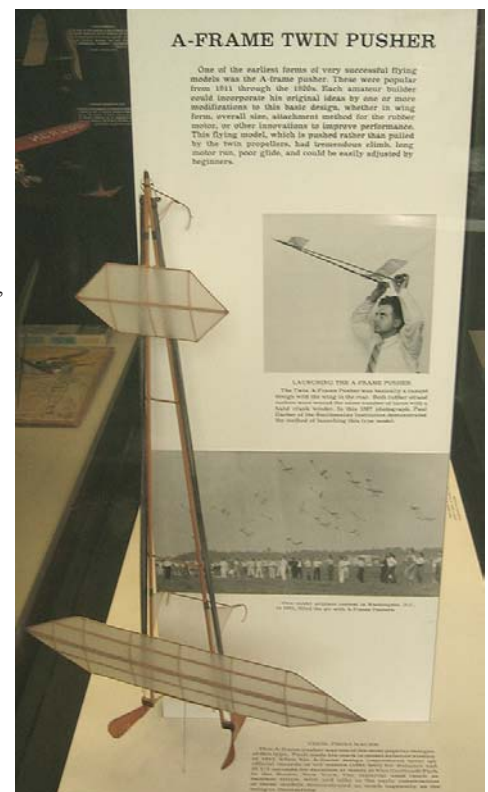


RIGHT: The hatch from the Apollo 11 command module. This single hatch could be opened outward in five seconds by pumping the handle to activate a pressurized nitrogen cylinder. Prior to the tragic fire in January 1967 in which three astronauts died, there were two hatches on the Apollo command module requiring 90 seconds to open.

RIGHT: One of the earliest forms of very successful free flight models was the A-frame pusher. These were popular from 1911 through the 1920s. Each amateur builder incorporated his original ideas by one or more modification to this basic design, whether in wing form, overall size, attachment method for the rubber motor, or other innovations to improve performance.



ABOVE: Orville carried this pocket watch while making the first flight.



BELOW: A panoramic shot of the Jet Aviation exhibit at the museum. On the far left is one the motors from a McDonnell Douglas F-4 Phantom and next to it is the Whittle W1X.



Indoor / Slow-Flyers and Li-Poly batteries



In this brief article and I'll discuss some of the basics of Indoor / Slow flyer R/C. As an example, I'll use my "Butterfly" recently bought from Northeast Sail plane products, and I'll elaborate a bit on such things as the selection of batteries, receivers, servos, and battery chargers as well as the one I used in my own particular case.

I had decided upon the "Butterfly", because of its overall construction, weight and price. Hobby-lobby also sells its version of this slow-flyer called the "cobweb". It comes to you as an "ARF", and takes very little time and effort to assemble. I found the instruction sheet adequate and simple; yet I decided to introduce a few of my own simple modifications; a few of which I feel you may also want to consider as well if you choose a similar model.

First of all, step #2 on the instruction sheet tells you to "fit the landing gear, wing struts and battery holder clips onto fuselage. Do not glue yet," it says. Here, you may want to omit the battery holder clips. Depending on which type battery you use, you may be required to mount your battery in a slightly different position (in my case, it turned out to be just under the leading edge). In step #3, you are

instructed to "fit wing onto wing struts. Glue with thin CA glue after you are satisfied with the fit." Here they show "4" glue points for the two

vertical wing mount rods. I only glued the rods to the fuselage points in order to be able to remove the main wing from the fuselage. I use two elastic bands over the top of the main wing rib / tube anchored to two hooks I had made out of paper clips wrapped around the fuselage at the



base of the vertical rods; all in order to make the wing removable transportation.

Next, in step #4 you are instructed to "install the rudder and the rudder wheel". Caution make sure the tail wheel is vertically aligned with the rudder!" it says! Here they supply you with a small piece of shrink tubing, and expect you to glue the tail wheel shaft on parallel to the rudder shaft, and then to seal the joint with the shrink tubing. I found this very difficult to do, and very much inadequate. Solution? I found a small wheel collar and slid both rods into the center, tightened down Allen's screw and voila!

Lastly, I found that the two small diameter carbon fiber push rods supplied with the kit were flimsy at best, and needed support midway between the servos and the control horns. Again, I fashioned a two-eyelet support from a paper clip, glued it onto fuselage and solved that problem.

As far as equipment is concerned, GWS servos, receiver, and speed control will work just fine. In my case, I used a GWS receiver, an FMA "SC5" speed control, two CIRRRUS CS-10 BB servos, and a "Wes-Tek DC-5.24 motor/gear combo" with a 9" carbon fiber prop. Any small receiver, servo and speed control combo should work fine. With the combination I used above, along with two "KOKAM 560T" lithium-polymer cells, I was able to achieve a maiden flight time of approximately one-hour! I've since had to replace the "Wes-Tek" motor and prop combination. Apparently the motor didn't like being run for long periods of time because it burned up at TeamWorks after only 25 minutes of flying time. I did however, replace it with a GWS motor and prop combination, and can now only



achieve anywhere between 25 and 30 minutes of flying time.

If you're considering using lithium-polymer cells to power any indoor model, there are a few things one

should be aware of right up front. Lithium-polymer batteries have a unique set of charging requirements. They're very sensitive not only to the amount of voltage applied to them during the charge cycle, but also the amount of current applied as well. These batteries require voltage to be limited to a maximum of only 4.23 V per cell and are limited to a 1C charge current rate. An example would be one of my "KOKAM 560T's". The charger must limit the input voltage to 4.23 V and 560 mA throughout the total charge cycle. You must purchase a special charger, or build your own to charge these batteries. There are now quite a few chargers on the market today. When choosing one, be sure to note it's selectable current rates, as well as the number of cells it will charge simultaneously. Make sure you chose one that will support a



charge current as close to the 1C rate for your particular cell ergo 560mA for a 560mA cell. I chose to build my own charger, and found a design on the "R/C Micro-Flight web site magazine designed by Roger Carrigan. This simple charger can be built using parts from RadioShack, and can be modified to charge smaller packs as well, a 560mA cell being about it's upper limit. In fact it was originally designed to charge the Kokam 145 mA cell. Another very important thing to consider, is the discharge rate of the pack you're planning on purchasing. You want to

make sure the cell can deliver the proper amount of current for your indoor application. The very first lithium-polymer cells available would only have a 1C or 2C discharge



capacity at best, and one had to be very careful not to draw too much current from the pack all at once. Nowadays, newer cells are capable upwards of 5C and 6C and climbing fast! For my application, the 3C capability of my KOKAM 560T's works just fine.

One last thing about lithium-polymer cells. They are very sensitive as to how far, or how low the voltage can drop in the cells. There's an absolute catastrophic minimum of 2.3 V per cell. This means if the cell reaches 2.3 V you will undoubtedly kill it for good! One thing to consider when purchasing speed control, is whether or not it is designed for lithium polymer cells. Most speed controllers these days have a built-in battery eliminator circuit that also incorporate a power cut off, that will effectively shut off the motor if the cell voltage drops below it predetermined minimum. This cutoff can range anywhere from 4.9 V - 5.2 V for NiCad's & NiMH packs depending on the cell count. These won't work for lithium-polymer cells. If you're speed controller is not designed for lithium-polymer cells, you may want

to consider some kind of "low-voltage" monitor circuit. Again, I found a small circuit on the internet that I could build on my own. This small, lightweight circuit turns on a bright read LED when the two-cell pack's voltage (nominal 7.4v) drops to 6V. This circuit, will trip occasionally when I may be applying full power, and trip off when I backed off on the throttle. I usually keep flying until the LED remains on while I am flying and half power. Then it's time to land.

Well, that's about all I have to stay on the subject for now. Hope you have in some small way found this information useful, and realize this may be something you want to pursue! I've been flying in my backyard and in parking lot's at night under the lights. Hope to see you under the lights soon, best of wishes...

— Mike Cormier

The Butterfly has been upgraded and is now called the Lazymoth. It is sold by Balsa Products which can be reached at **732-634-6131** or on the web at <http://www.balsapr.com> - Ed.

Below is the text from the web site:

New And Improved RC Lazymoth Airplane: \$59.95 with \$7.00 S/H

The RC Lazymoth is Almost Ready to Fly (ARF) indoor electric airplane. Great for beginners but also has lots of interesting possibilities for advanced flyers! The RC Lazymoth is the next generation of the RC Butterfly.

Assembly pictures from Balsa Products web site.



THE CHARLES RIVER RADIO CONTROLLERS, INC

2004 MEMBERSHIP APPLICATION

AMA Charter 339

THIS FORM EXPIRES ON MARCH 1ST 2004!

Name _____

AMA No. _____

Street _____ Birth Date (AMA req'd) _____

Town _____ State _____ Zip _____ Tel. _____

E-mail _____

Channel Number(s) _____

I PREFER TO RECEIVE MY NEWSLETTER

☐  **ELECTRONICALLY**

☐  **Via the US Mail**

To receive membership card and field pass, bring this application to a club meeting, or mail **with a copy of your Year 2004 AMA LICENSE**, appropriate dues, and a **SELF ADDRESSED STAMPED ENVELOPE** to:

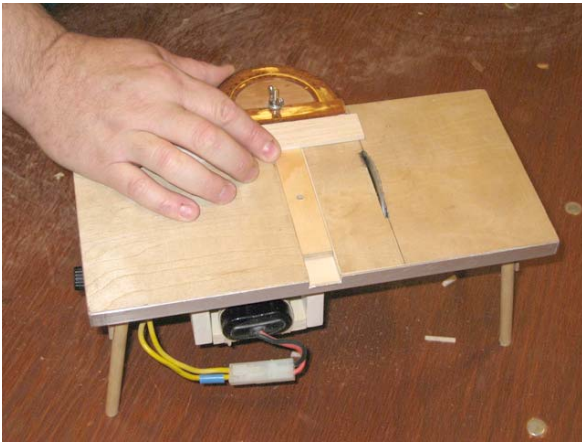
Dick Williamson /Secretary CRRC
P.O. Box 398
Lincoln, MA 01773
Telephone 978 443-8549
E-mail: williamson@ll.mit.edu

- ☐ I DO NOT want my address to appear in the club phone book

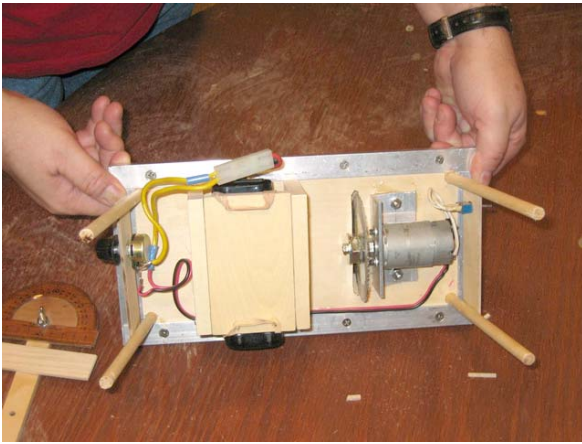
REMEMBER THE MARCH 1ST DEADLINE!	Renewal before March 1st
OPEN Member	\$30.00
JUNIOR member, (under 19 before 7-1)	\$15.00
SENIOR member, (if age 60 before 7-1)	\$20.00
full time STUDENT	\$15.00
Family member additional to OPEN membership	\$15.00
There will be a \$5.00 penalty for joining AFTER March 1st	

I'M INTERESTED IN THE FOLLOWING:

- | | | |
|--|--------------------------------------|--------------------------------------|
| ☐ TRAINERS/SPORT PLANES | ☐ ELECTRICS | ☐ PATTERN |
| ☐ GLIDERS | ☐ HELICOPTERS | ☐ RACING |
| ☐ INDOOR/PARK FLYERS | ☐ SCALE | ☐ GIANT SCALE |
| ☐ OTHER (specify) _____ | | |



This is a great little table saw for cutting those small pieces and there's no plugs.

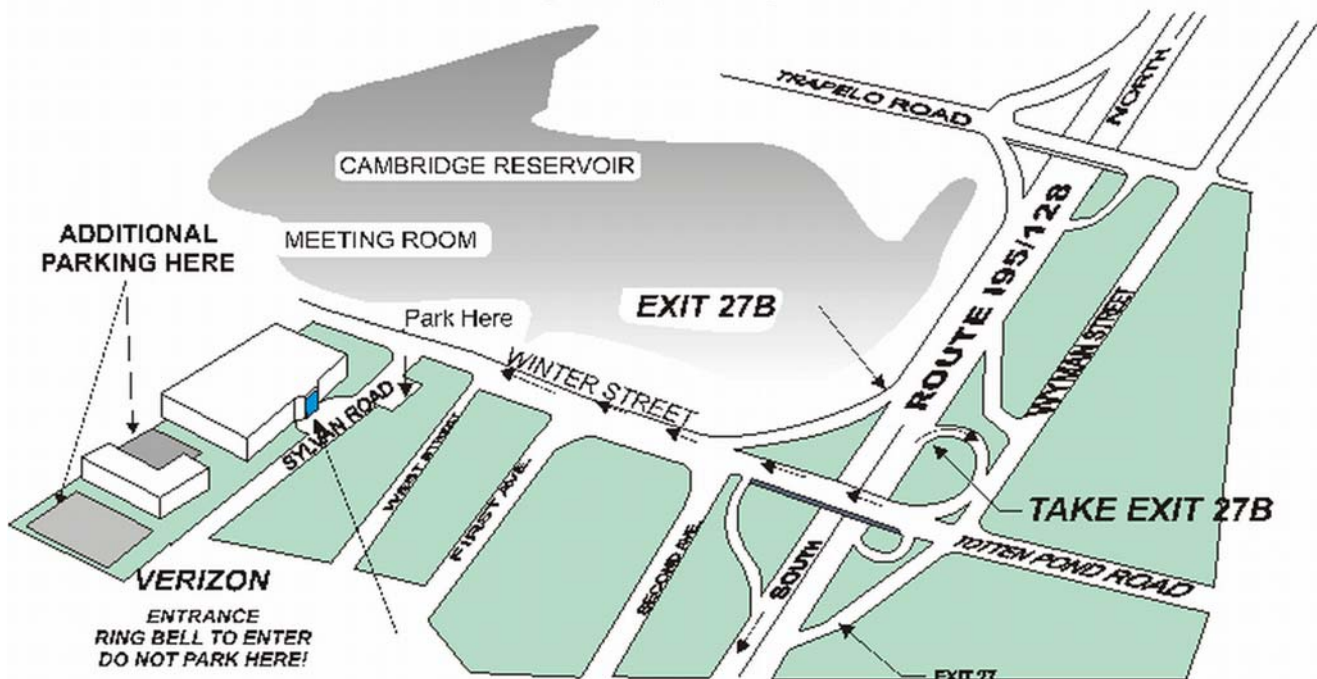


Michael Cormier's Battery powered table saw

The motor is a speed 600 12v. The saw blade can be found at Home Depot, it's a 3 3/8 plywood blade made by "MaxLife". The table is made of two standard 1/4 thick light-ply sheets you find at the hobby store laminated together (you cut one in half, then take 3/4" off one side to use as the pusher.) As I said, you laminate them together and make sure no glue goes in the pusher slot. You also need to get a length of 1 1/2" Aluminum angle (iron) and a length of 1/2" as well. All you need is a 3" piece of the 1 1/2" stuff. Measure for and center your holes on the 3" piece of 1 1/2" stock (you may need to drill a hole slightly larger than 1/2" and most standard Drill chucks just barely allow the 1/2" you will have to grind out the rest). As for the 1/2" stock, you will have to get creative in making a frame to put the table in. As for mounting the blade to the motor, I used an appropriately sized prop shaft adapter, and got creative again with washers and such to fit the blade on, centered and snug. Power is a 7.2 6 cell 1200mAh pack and a switch. For the Pusher, I found an e-cheapo protractor I found for \$1.00 at Bldg. 19, and glued it to some 1/8" Light ply and 3/8" Dowel for the legs.

- Mike Cormier

LOCATION OF MONTHLY MEETING FOR THE CHARLES RIVER RADIO CONTROLLERS at VERIZON LABS



Do you want an all out electric model than can do everything that you ask of it and more? Well I've just built a plane that fits that bill. It's called the Attitude and it's available from Todds Models (www.toddsmodels.com). The kit costs \$69.95 and has a 34" wingspan, 390 Sq. In. wing area, 39" in length, weighing in at 12-13 ounces for the completed airframe with landing gear attached. The AUW is 21 ounces and it produces about 37 ounces of thrust with it's recommended Mega brushless 16/15/4 with Astro 709 gearbox setup. It's also very versatile with it's battery requirements. You can use a basic 9 cell KAN 950 or similar sized cell and still achieve vertical performance. This kit is an easy building laser cut wood kit that has 116 Laser cut parts. It contains 13 laser cut sheets of quality SIG balsa, 85% of it Contest wood with a Carbon Fiber reinforced fuselage, pre-bent 3/32 Piano wire landing gear, 3 full size CAD drawn plan sheets, dual self-jigging spars for extra wing strength and quick easy building, control horns, aileron pushrods, and hinges included. Also, you can purchase an additional hardware kit that contains all Dubro hardware. It contains Dubro mini EZ connectors,

The Last Word



An all around easy build.



Ya I Got an Attitude!

Dubro micro pushrod system, Dubro micro EZ link, Dubro 2" super light wheels, Dubro 3/32 wheel collars and Dubro hook & loop (Velcro) for an additional \$11.95.

I put the kit together in a month's time but, I took my time. I didn't encounter any problems with the build and I'm very happy with the outcome. It really is an impressive model to fly. It will climb as high as you'd like or drag its tail on the ground with no complaints. I originally saw this model in its beta stages at NEAT Fair 2003. The pilot, Kody Knudson, could do just about any maneuver I've ever seen and some that I never thought possible. If you're in the market for a portable electric model than can do every maneuver in the book and still be begging for more than take a look at Todds Models Attitude.

- Jeff Newcum



Jeff Newcum/Editor
16 Lake Street
Natick, MA 01760
www.charlesriverrc.org
newsletter@charlesriverrc.org

