



SAIL & SCALE

NEWSLETTER OF THE EDINA MODEL YACHT CLUB

February 2002

Volume 11, Number 2

Commodore's Corner: Here we are in February, and already my whole year is ruined. As I was preparing to write this article, a serious problem about this arrangement became glaringly evident. I realized for the first time how difficult it would be for me to properly attack myself. As I am both the chief elected official (the Commodore), and the head jackal (the news letter editor), I can not properly fulfill the duties of these two offices without demonstrating just how crazy I really am. According to Governor Ventura, to be politically correct, and a true American, as the Commodore of this club my primary duty, should be to rail against the "jackals" of the press for the irresponsible way that the news is being presented. On the other hand, as the newsletter's chief editor, I am the head "jackal", and it should be my primary duty to slander, harass, misquote, and otherwise discredit the leading elected official of our club in the name of, "The Freedom of the Press." All and all this situation makes it almost impossible to properly create any really juicy political scandals. You can imagine how disappointed I was when I realized that I have no chance of being awarded a Pulitzer this year. But as I am a true purple-blooded Vikings fan, I have no problem uttering that age old battle cry of the Vikings.... "Just wait till NEXT YEAR!"

A less obvious problem here. Is that there is no need to maintain both the "Commodores Corner", and the "Editor's Corner". Which means that I have more space to fill. That means that I will need more to write about to fill all this extra space. This is becoming a lot like work.

In response to some comments that were made to me about the January newsletter, I am making some more changes. The font that I used for that newsletter was causing some problems for some of the members, so I am experimenting in the hopes of generating a more reader-friendly newsletter. I warned you last month that there were going to be some changes. *Mike*

EMYC Club Logo Wear: Doug Person has asked me to mention that he plans to bring his logo clothing catalogs to the February meeting. Doug has requested that everyone who is interested in ordering anything (shirts, hats, jackets, etc.) should do so at the meeting. He would like to avoid ordering items one and two at a time, to reduce the shipping and handling expenses as much as possible. So lets all keep those orders as large as possible. *Mike*

Safari Island, Waconia Mn.: On Saturday, February 23rd at the City of Waconia will be holding an event at Safari Island. There will be all sorts of activities going on and we've been invited to join the festivities. Tony Johnson will be heading up a group of Ice sailors (ice available?) outside the facility in a near by ice rink. The Fast Electric Group will be running some of their slower boats (yeah, slow) indoors utilizing their 25x25 meter lap pool. Racing is set to begin around 1pm and we're planning for a couple hours of fun. Due to the warmer running conditions indoors we will be needing extended cooling time between runs, so this opens the door for any other R/C boat you'd like to bring. They would even provide large Barn Fans to push some sail boats around if there is enough interest. Please contact Tony Johnson if your interested in Ice Boating or myself if your interested in the indoor action. I will provide a list of participants to the facility manager so they may receive a complementary day pass to the entire facility. I've been told non-participants (and non-safari members) will need to pay a small fee to access the facility and its amenities. Those who participate get a free pass, and after the event can use the entire facility free of charge. They have two pools, basket ball hoops and track, gym and other facilities. Perhaps we'll see some submarines run laps?

Bring shorts or trunks if your planning to stay. FM radios are strongly encouraged, AM didn't work the best during our recent testing. Bring plenty of batteries, and a towel in case you get knocked in! Further information will provided at our next meeting 2/23 - *Andy Valentine*

Winter? What has happened to winter this year? It's not that I am complaining mind you, it's just that I am confused. The weather and the calendar do not seem to be synchronized very well this year. I know that it is suppose to be winter, because the WINTER Olympics have started. Once every four years the world comes together to share in the spirit of competition, and sportsmanship. This year the games have returned to America, and for a short time some television stations will be able to broadcast something that the entire family can watch together and enjoy. A time for everyone young and old to gather around the T.V., and try to figure out "what are the judges watching!" I particularly liked the opening ceremonies this time, though I can imagine that the presidential security team was having fits. A nations leader hanging with the athletes in the stands, instead of presiding over the events from a bullet proof box. But then we Americans have always been a little different.

Membership Meeting, 01/15/02: The Commodore called the meeting to order at 7:05PM. 32 members in attendance.

New member introduced; Bill Dickenson, interests are sail boat racing. Owns a CR914. New Commodore Mike Ross introduced himself to members. New board members Gary Anderson, Paul Olson, Doug Campbell and John Bishop also introduced themselves to members. Dale Johnson handed out new fancy full-color membership cards to members paying dues during the meeting. M. Ross asked if anyone had something to bring up. Jim Smith suggested the web-site schedule of events be updated or last years removed. Andy Valentine said last years events had been removed. New schedule to be added soon. Discussion on dues reduction brought up by Mike Ross. J. Bishop mentioned the benefits received with membership as in the board meeting. Dale Johnson said dues were fine at \$20.00 and was a small amount considering club benefits. Related discussion followed about the reserve in the treasury being OK. Future unknown expenses may come up and some guarantees of other money sources may not be there in the future. Vote was taken - all members voted unanimously for keeping dues the same. Mike Ross mentioned the form that was in the newsletter would be used to create a database that members could access for information.

Privacy issues were brought up. Mike assured that no names would be in the database unless a member gave permission to do so. Primary purpose of database would be to assist members for things such as deciding what radio to buy based on what frequencies were in use by other members. Further detailed discussion on radios and frequency problems followed. Discussion on scheduling conflicts between Lighthouse Night and the Classic Boat Show in Redwing. General discussion that the scheduling was out of club's control and not ask the Park to change their scheduling. Discussion about special interest committees was brought up and to have members sign up. Committees mentioned were; Marketing, Special Events, Sailing, Scale and Fast Electric. Topic would be in the newsletter and further discussion would be at the next club meeting. Tony Johnson mentioned he had been contacted by the City of Waconia to have a model iceboat event on February 23 as part of Waconia city event. Andy Valentine mentioned he had also been contacted to have the club run fast electrics and other model boats that same day in the City of Waconia's new pool complex. Andy said he would check out the pool January 19th and provide a map and directions for members. More discussion for the event will be at February's club meeting. - Doug Campbell

Schedule of Upcoming Events

Every Sunday	Open Boating	?	4:30PM - 9:00PM
Every Tuesday	Open Boating	?	5:30PM - 9:00PM
Every Thursday	Open Boating	?	5:30PM - 9:00PM
Feb. 19 th (Tue.)	Membership Meeting	Centennial Lakes Garage (Band Room)	7:00PM - 9:00PM
Feb. 23 rd (Sat.)	Boating Demonstration	Safari Island, Waconia, Mn.	12:00PM - 4:00PM
Mar. 19 th (Tue.)	Membership Meeting	Centennial Lakes Garage (Band Room)	7:00PM - 9:00PM
Mar. 23 rd (Sat.)	Greater Chicago Model Boat Show	Oak Brook Terrace Park District Health Club	9:00AM - 4:00PM
April 16 th (Tue.)	Membership Meeting	Centennial Lakes Garage (Band Room)	7:00PM - 9:00PM

Electronic Speed Controllers: A new generation of electronic speed controllers has been on the market for a couple of years now. They are becoming more popular, and they can create problems for the unwary. These newer electronic speed controllers are equipped with what is being called BEC (Battery Eliminator Circuitry). Current radio receivers require at minimum a 4.8v power supply, to power the internal circuitry, and to operate the controlled devices such as servos. Traditionally a separate dedicated battery pack, usually a set of four "AA" batteries is used for this purpose. These new controllers are designed to supply the radio receiver with power from the main system batteries (that is the batteries used to power your drive train) in order to save weight by eliminating this dedicated receiver battery pack.

The weight of a second battery pack is an important issue for RC cars, and electric planes. But generally speaking we could care less, since we need the added weight for ballast. The problems that I spoke of earlier arise when someone continues to use the old receiver battery pack with a speed controller that is equipped with this BEC circuitry. Because they are double biasing the receiver with two separate power sources that are not usually of the same polarity. Some of the more expensive electronic speed controllers have built in smart circuitry that will shut off the BEC if it detects another power source for the receiver. Many of the cheaper controllers not only do not have this smart circuitry, but they do not even regulate the power being supplied to the receiver.

When I replaced the speed controller in my wife's Kyosho "Majesty" with the first "Super Rooster" we experienced a great deal of servo chatter, and general control problems. Many of the control problems that we were having disappeared after replacing the original Mylar capacitors on the motors with new ceramic capacitors. But we were still having servo chatter problems, and when the first "Super Rooster" got fried, I knew that there were more problems. After I burned out that first "Super Rooster", I took a closer look at the situation. While playing with the second "Super Rooster" I discovered that: 1.) The current draw was so high that it was causing the battery "Y" connectors to arc. 2.) The servo chatter was being caused by the two voltages being supplied to the receiver. 3.) The reason that the first "Super Rooster" burned out was a combination of the high current that it was handling, the battery "Y" connectors arcing, and the fact that it was also being doubled biased by the receiver battery pack. My solutions were to remove the receiver battery pack, and splice the battery connectors directly into the speed controller making sure that the polarity to the radio receiver was correct.

If any of you are experiencing servo chatter, or if your speed controllers are failing? You might want to check if your speed controller has BEC, and to make sure that when you attach the main batteries to it, that the voltage being supplied to the receiver is the right polarity. -Mike

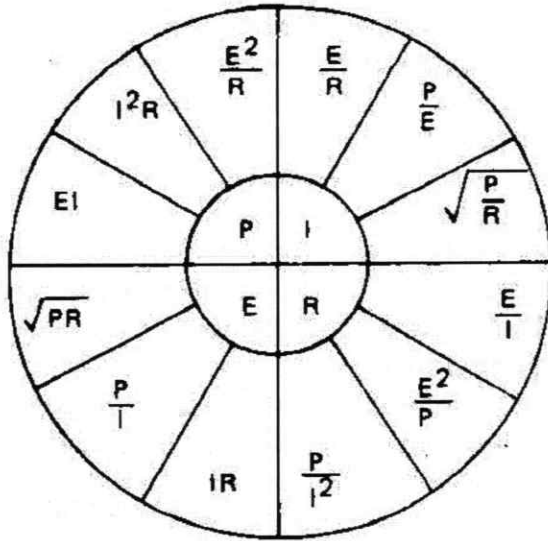


Figure 1 shows the basic Ohm's Law formula pie.

P = Power
I = Current
E = Voltage
R = Resistance

Figure 1

$$R_T = R_1 + R_2 + R_3 + \dots$$

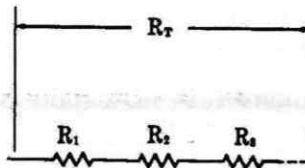


Figure 2, shows the formula for computing the total resistance in a series circuit.

Figure 2

$$R_T = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots}$$

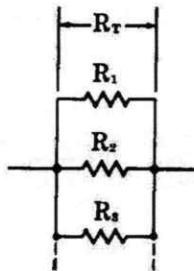


Figure 3, shows the formula for computing the total resistance in a parallel circuit.

Figure 3

$$R_T = \frac{R_1 \times R_2}{R_1 + R_2}$$

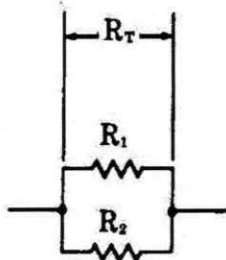


Figure 4, shows the formula for computing total resistance in a parallel circuit, were only two resistors are being used.

Figure 4

Simple DC Circuits with Pure Resistance:

In a series circuit, the current will remain constant, while the voltage drop across each resistor will add up to the total voltage applied. Therefore to calculate the voltage drop across each of the resistors in figure 2. First you need to compute the total resistance of the circuit, using the formula from figure 2. Next you want to find the total current of the circuit, by using the formula from figure 1, $I = E/R$. You want to divide the total applied voltage by the total resistance. Lastly you want to determine the voltage drop across each resistor, using the formula from figure 1, $E = I \times R$ for each resistor. If all three resistors in figure 2, were all the same value, then the voltage drop across each will equal 1/3 of the total applied voltage.

In a parallel circuit, the voltage will remain constant and the current through each resistor will add up to the total current being drawn by the circuit. First you need to compute the current draw for each resistor, using the formula from figure 1, $I = E/R$ for each of the resistors. Then adding up the currents you will have the total current of the circuit. Or you can use the formula from figure 3, to calculate the total resistance of the circuit, and then use the formula from figure 1, $I = E/R$. Which brings us to another formula, that can be used only when all resistors are the same value. $R_T = R/n$, where R_T is the total resistance, R is the value of each resistor, and n is the total number of resistors in the circuit.

LED's:

For a LED to work, it requires a resistor in series with the LED. To determine the value of a bias resistor for a LED is very simple. Lets say that a LED is rated at 3.6v @ 20 mA, and that you are using a 12V battery. As stated above, the voltage drops across components in series, is accumulative and will add up to the total voltage applied. Therefore the voltage drop across the bias resistor must be $12V(\text{total voltage applied}) - 3.6V(\text{the voltage drop across the LED}) = 8.4V$. Using the formula from figure 1 for resistance $R = E/I$, $R = 8.4V/20mA$ or $8.4V/0.020A = 420$ Ohms. If we use the formula for power from figure 1, $P = E \times I$, $P = 8.4V \times 0.020A = 0.168W$. So a quarter watt resistor works here.

Now lets say that you want to use 5 LED's on your boat. Two LED's are clear (or white), one LED will be amber (yellow), one LED will be red (port), and the last LED will be green (starboard). Your power source is a six cell NiCAD, or 7.2V battery. Since each LED requires its own biasing resistor. You will have a five branch parallel circuit. With each branch consisting of a LED and a biasing resistor See Figure 5.

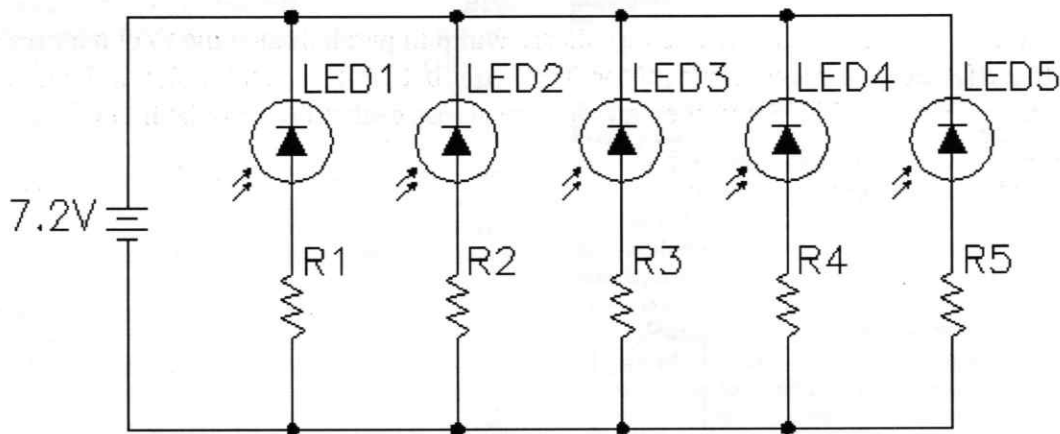


Figure 5

Solving for each resistor one branch at a time, just as before. If LED1 is rated at 3.6V @ 20mA,

then the voltage drop for R1 would be $7.2V - 3.6V = 3.6V$. R1 would then be $3.6V/0.020A = 180$ Ohm's. If LED2 is rated at $2.1V @ 20mA$, then the voltage drop would be $7.2V - 2.1V = 5.1V$, and the value for R2 would be $5.1V/0.020A = 255$ Ohm's. Finding a 255 Ohm resistor will be hard, so you may have to settle with a 250 Ohm resistor, or maybe even a 260 Ohm resistor. If you can not find the exact value of a resistor that you calculate for, then you must do with the closest value that you can find. Or you could try to build a compound circuit with parallel resistors in series with your LED, using the formula from Figure 4.

Batteries:

Batteries are rated as amps per hour. This can mean total amps of current that a battery can deliver for one hour, or it could mean the number of hours of life the battery is rated to maintain at one amp of current. Thus a 7Ah battery should deliver either 7 amps for one hour, or last at least 7 hours at a one amp current draw. A 1500 mAh battery pack, is rated to supply 1500 mA (or 1.5 amps) for one hour, or last at least 1.5 hours at a one amp current draw.

So if a 1500 mAh battery pack lasts six minutes (0.1 h), then your current draw on the battery should be about 15A, and you should be using a speed controller that is rated for at least 15A, a 20A speed controller with a 15A fuse would be better.

When combining batteries, you should stay with similar (matching) batteries. If you match two 1500mAh 7.2v battery packs in parallel, then you will get 7.2V for 3000mAh (3 Ah). Likewise if the same two battery packs are hooked up in series, then you will get 14.4V @ 1500 mAh. The general rule of thumb is that batteries in series will increase the voltage, while batteries in parallel will increase the available current (assuming matching batteries are used). Using the above illustration: Two 1500mAh battery packs in parallel, should run your boat for approximately 12 minutes now.

If you were to combine a 12V battery in parallel with a 7.2v NiCAD, in theory you would get $(12V + 7.2V)/2 = 9.6V$ output. In the real world, the 12V battery would be trying to recharge the NiCAD with an unregulated current, and the NiCAD's could explode.

Motors:

In the case that you want to use two motors, being controlled by one speed controller (one channel). Assuming that the two motors are matched, either they are the same motors (make and model), or two different motors with the same power requirements (number of windings and winding orientation etc.). You can use the circuit examples above and replace the resistors with the motors.

The examples above show us that if the two motors are wired in parallel, then the total current draw will be twice the current draw of one motor. Thus your battery life (run time), will be half. Or if the two motors are wired in series, then the voltage across each motor will be half of the applied voltage. Thus each motors max. RPM (revolutions per minute) will be approximately half (providing greatly reduced speed), and the current drain on your battery will be the same as it would be with only one motor. The resulting speed reduction may not necessarily be half though, since the speed of the boat depends on other things such as motor efficiency, gearing, and the propeller pitch etc.

In general motors are rated by maximum DC voltage, and sometimes horsepower. So a 6 volt motor, should not be powered by more than 6V. Using a 7.2V NiCAD battery pack to run a 6V motor will work for awhile, but by over powering the motor (even by 1.2V) causes it to run faster than it is designed to, and in time will burn out the bearings and/or windings. If you were to run two 6V motors, in series off of a 12V battery, will work ok since the voltage drop across each motor will be 6V. However heat will become a problem if they are run at top speed for too long. On the other hand, a 6V DC motor will run at only 1V, but the RPM, and the torque

delivered will be greatly reduced.

Very seldom is a motor rated by current draw, since the current draw of a DC motor depends on the load. The greater the load that the motor is running, the more current that it requires to deliver the specified RPM's, and torque. Since the current drain is the critical element for us, the only way to know what the current drain is, is to measure the current draw with a Amp meter, while the motor is running under load. Since the load, in our case will be the propeller rotating in water. The testing must be conducted with the boat in water, and the meter attached in series between the battery source and the motor.

Larger motors (1/4 Hp or higher) are rated by horsepower, and they can be approximated. There are 746 Watts to 1 horsepower. Thus a 1/4 horsepower motor, running at 12V will draw approximately $186.5W / 12V = 15.54A$. Using a 7Ah battery, the boat should run for about 27 minutes. A 1/8 horsepower motor, running off of a 1500mAh 7.2V six cell NiCAD battery pack, should run for about 7 minutes. ($746W / 8 = 93.25W$; $93.25W / 7.2V = 12.95A$; $1.5Ah / 12.95A = 0.116 h$; $0.116 h = 6.95$ minutes or 6 minutes and 57 seconds). Remembering that numbers in math have an absolute value, and the nothing in reality is absolute, these calculations are only approximates.

Gearing Motors:

Gearing a motor give us a mechanical advantage. Horsepower is speed x torque, and since gearing a motor can not effect the motors horsepower. If we reduce a motors speed by half with gears, then we will increase the torque delivered by 2. The more that we reduce the motors speed, the more that we increase the towing and/or pushing power of the boat.

By matching two motors in parallel, we can double the delivered torque. But this will increase the required current by a factor of two, and will decrease the running time by half.

If we match two 6V motors in series, with a 12V battery. We will drop the required 6V across each motor(doubling the torque). If we gear the motors with a 2:1 gear ratio, we will increase the delivered torque by 2 again. We can quadruple the towing and/or pushing power, all without increasing our current requirements, and maintaining a decent running time from the battery(s). And all of this power could go to waste if we select the wrong pitched propellor.

Club Committees: As I promised at the January meeting. Here is what we currently have for club committees.

Committee Structure

- 1. Marketing and Promotions Committee**
- 2. Social and Special Events Committee**
- 3. Sail Committee**
- 4. Scale Committee**
- 5. Fast Electric Committee**

Marketing, Promotions and Membership Committee:

The Marketing, Promotions and Membership Committee is established to advise and recommend to the Board ideas, projects, and promotions designed and developed to perpetuate the Club and its Membership. Assist the other committees with their promotions.

- Recruitment and membership
- Club promotions
- Advertising
- Media contacts

Social and Special Events Committee:

The Social and Special Events Committee is established to advise and make recommendations to the Board regarding the organization and programming of club events.

- Spring cleanup
- Hub Hobby Days
- Parade of Boats
- Adaptive Boating Night
- Lighthouse Night
- Dry Dock Party

Sail Committee:

The Sail Committee is established to advise and make recommendations to the Board regarding the interests and concerns of the Sail boaters in the club. The Sail Committee will also plan and run Sailing Regattas. Seek out both programs and instructors that educate and respond to areas of boat building and construction that are of interest to club members.

- Sail Regattas
- Topics for meetings

Scale Committee:

The Scale Committee is established to advise and make recommendations to the Board regarding the interests and concerns of the Scale boaters in the club. The Scale Committee will also plan and run Scale boating events. Seek out both programs and instructors that educate and respond to areas of boat building and construction that are of interest to club members.

- Big EEEEasy
- Steering Regatta
- Topics for meetings

Fast Electric Committee:

The Fast Electric Committee is established to advise and make recommendations to the Board regarding the interests and concerns of the Fast Electric boaters in the club. The Fast Electric Committee will also plan and run Fast Electric boating events. Seek out both programs and instructors that educate and respond to areas of boat building and construction that are of interest to club members.

- Races
- Topics for meetings

I have been a member of the club for a year and a half now, and I had no idea that any of these committees existed. I only found out, when Andy passed on to me the keys to the kingdom. When Jim Smith surrendered the job of newsletter editor, he provided me with a great deal of information about some of the clubs' history that I thought was very interesting. Between Andy and Jim, I have learned a lot about the club that I never knew. I think that one of the first orders of business for the "Marketing, Promotions and Membership Committee," should be to put together a "membership packet" that we could give to all new members when they join the club.

Any suggestions for other committees, will be most welcomed.

Off the top of my head!

With the increase interest in "Polo Tugs," a committee to organize "Polo Barge" competitions might be in order. Just a thought.

On a personal note: I would be eternally grateful to anyone who can explain to me what this "Big EEEEasy" thing is. *Mike*

In this month's news letter, I have included a simple basic electronics primer that I hope will prove useful for some of the members. I tried to keep the information as elementary and relative to our hobby as I could. I originally put this together last summer, at the request of a couple of members who became confused after a talk that had been given at one of the meetings. I have had a number of extra copies printed up, and they will be available to anyone who is interested. I am planning to expand this information in the future, if there is any interest

Membership renewal is going a little slow this year. I hope that is all it is, because so far only a about a third of you have renewed so far.

As for those members who have elected to receive their newsletter in e-mail format, my wife and I seem to be the only members that are interested. Maybe this option was not such a good idea after all.

The boat registration is going a lot better, and the database is growing. However there are still some members who have not responded yet, and I would like to hear from you. *Mike*

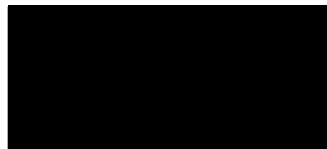
National Model Boat Building Month: Rumor has it that February is National Model Boat Building Month. Its for real! Lets get out there and build some boats.

Edina Recycles



EDINA MODEL YACHT CLUB
CENTENNIAL LAKES CENTRUM
7499 FRANCE AVENUE SOUTH
EDINA, MN 55435

First Class

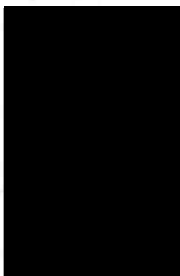


February Meeting Notice:

(Third Tuesday of the Month)
Tuesday, Feb. 19th
7:00 P.M.

**Centennial Lakes
Garage (band room)**

Commodore:	Michael Ross
Vice Commodore	John Bishop
Vice Commodore	Paul Olsen
Vice Commodore	Gary Anderson
Vice Commodore	Doug Campbell
Treasurer	Gary Phillips



Newsletter Editor Michael Ross



Web Site: www.emyc.org