Cathay Newsletter
June 2008

www.cathayradio.org

President: Ed Fong, WB6IQN **email:** *edison_fong@hotmail.com*

Vice President North: Leonard Tom, *NX6E*

Vice President South: Bill Fong, *W6BBA*

Membership Chairman: Bill Chin, KC6POF

Editor: Ed Fong *WB6IQN* email: edison_fong@hotmail.com and Bill Tom *KN6QD*

Treasurer: Vince Chinn, *W6EE*

Mission: The Cathay Amateur Radio Club is basically an active social club of Ham Radio Operators and their spouses

Monday Night Net Time: 9PM PST Frequency: 146.67MHz -600KHz PL85.4 and 442.70 +5MHz PL 173.8 The repeaters are linked. The Monday night net is the best way to find out the latest club news. All check–ins are welcome.

Message from the President*: Edison Fong, WB6IQN*

Welcome to the June issue of the Cathay Amateur Radio Newsletter. This year we have decided not to have a formal Field Day since most of our members are not active radio operators. More details on this below. We are still looking for new ideas. We have a membership approaching 100 members. Certainly we have in common ham radio but I am sure we love to do other things. Any good ideas for a picnic site? Anyway, summer is here and that is when I have more time to do things and explore new experiences. In this newsletter, we have plans for the July picnic (substituting for the Field Day picnic) at George's *W6BUR* house in the Oakland Hills. A summary of the April meeting at Hofbraus's in Redwood City. A very interesting article on rechargeable batteries by Ron Quan KI6AZB and myself.

We have 2 new members, Bill Dick *KD6DGW* and Rick. Peloquin *KG6ZDB.* I have known Bill for years from the DeAnza Swap Meet. Please welcome these folks when you see them. Bill is also a connoisseur for Motorola HT220's.

Hey, don't forget to check into the Monday night net. 9PM (2100 local). This checks out the repeater and also provides for latest announcements. How much more convenient can it be? You can check in either on VHF or UHF. You don't have to be at home and it only takes about 10-15 minutes of your time.

If you have not yet renewed your membership, please send a $15.00 check for your 2008 membership renewal to CARC, c/o Bill Chin KC6POF, 43 Norwood Ave, Daly City, CA 94015.

Report on April 12 Meeting

The meeting was called to order about 1PM after everyone had a great meal. All I can say is that George *NT6G* and Kate are fortunate to have such a good restaurant so close to their house. All the food is so fresh and tasty and at such a reasonable cost. Everyone had a great time. I handed out over 100 free 9 volt batteries. I thought these were used primarily used for smoke alarms but at the meeting I heard several other applications; remote control garage door openers, digital multimeters (DVM) when you accidentally leave them on overnight, remote control car transmitters, and not to mention old pocket radios. We had an attendance of 20 people and considering this was a work meeting, that's not bad. Here is a summary:

1. The club was open to having a joint Field Day with the SF Radio Club. Alternate was Field Day at George's House.
2. Picnic to be held at National Semiconductor Park – most likely in September – there were other suggestions, but National Semiconductor Park seem to be the clear winner. The reasons were being FREE of charge for the facility and plenty of parking.
3. Tech Session -- subject will be on *Extending Coverage on WiFi.* Tentatively scheduled for August.
4. Field Trip will be at the Computer Tech Museum in Mountain View. - Tentatively scheduled for October.
5. Banquet – No resolution
6. Christmas Party – At Ed Fong's house in Sunnyvale.

George Griffin *NT6G* was the proud winner of the GP68 Motorola hand held. Great hand held. He was sitting at the table with Tony and Connie Halog. Wait a moment, wasn't this the table that won the HDTV at last year's picnic? Um?? Maybe I will have my family sit by them at the next raffle.

Attendance:
Ed Fong *WB6IQN*, Gary Gin *KN6LV*, George Chong *W6BUR*, Howard Louie *N6MNV* Dirk Thiele *KE6ZUY*, George Froberg *NR6I*, Frank Inami *W6GSR*, Ti-Michelle Connelly *NJ6T*, Paul Kitagaki *W6NDA*, Rick Peloquin *KG6ZDB*, Bill Dick *WD6EGW*, Wayne Lake *WD6DZS*, Leonard Tom *NX6E*, Lloyd DeVaughns *KD6FJI*, Bill Chin *KC6POF*, Tony Halog *KR6EG*, Connie Halog *KF6WEA*, George Griffin *NT6G*, Kate Griffin (*XYL – NT6G*) and Jeannie Stewart (*friend of George NR6I*)

Hey, I think Kate picked out the winning ticket**.**

Here's the winner of the Motorola GP68, George *NT6G* and xyl Kate.

Now those are nice binoculars by Meade Optics. Paul *W6TRN* was the winner.

Here is Wayne *WD6DZS*, Bill *WD6EGW* , Rick *KG6ZDB* and Lloyd *KD6FJI*.

July Picnic – Saturday July 19th

Place: 13310 Skyline Blvd. Oakland CA
Phone: 510-638-6955
Time: 11 AM to 3PM
Food arrangement: potluck
Cost to members and non members: FREE!!

This year we will be doing something different. We will have two picnics. I know our original plan was to have Field Day with the SF Radio Club on the S.S. Jeremiah O'Brien but unfortunately I found out last week that it was too late for this year. I was told by the Jeremiah O'Brien Board that we need to schedule this prior to their spring Board of Directors meeting. I will have to do this next year. We know the person to contact now so mark your calendars for next year. The SF Radio Club will join us so we will have twice the fun. It turns out the Jeremiah O'Brien is quit a popular ship unlike years ago when it was a ghost ship before it was fully restored. Groups now reserve months in advance for parties on board and one can even set it out to sail around the Bay for the right price. I was told that it cost about $400 to run the ship per mile. It is the only remaining Liberty Ship that is still running.

Anyway, we have decided not to have Field Day this year. For several reasons, we couldn't get the ship, but many members of our club like to operate radios on Field Day and the Cathay Radio Club is really a social club of licensed ham radio operators. For many of us it would be better to have our own social event on a different weekend. We have chosen the 3rd weekend of July for a potluck picnic at George's (*W6BUR*) house. We like to thank George and Hetty *WB6SHU* for offering their home. This gives a chance for our East Bay members to attend another summer event since many of our events are after the DeAnza Swapmeet in the South Bay. With the price of gas these days, the Cathay Board decided to have two picnics and "yes", two raffles.

We don't need to repeat this but we went all out again. For the raffle prize the club will once again offer a Motorola GP68, your choice of either VHF or UHF. What's so unique about a GP68? Well the specs speak for themselves.

Remember, you can't buy this radio at HRO's. In fact, this radio is so unique it cannot be sold in the United States or Canada. This is because the FCC has a ruled that any commercial radio cannot be front keypad programmable. They are sold overseas since some countries, such as China and South America, do allow them. It meets all commercial MIL810E specifications for shock, dust and humidity. The radios meet all commercial spec from VHF 136-174 MHz and UHF 430-470MHz. No ham radio can do that with such wide bandwidth. Most radios designed for amateur service can go out of band with some modifications but they actually do not meet technical specifications outside the band. This is one of the very few Motorola radios that can be completely programmed without a computer (with exception of the firmware which requires a PC computer and software). There is still a serial port on this radio for computer programming and this time, **we will provide the software.** The software controls power levels on each channel, deviation on each channel, fully programmable low battery indicators, RSSI (receiver strength), etc. The VHF model can be used on ham bands, MARS, Marine, MURS, commercial and ham bands, all meeting MIL-810E specs. Some radio? Because it is a commercial radio, it has features such as totally independent transmit and receive PL. Capabilities of scrambling (not legal on the ham bands). The unit comes with a Motorola drop in charger, nicad pack, belt clip, flexible antenna, and full operations manual..

Additional accessories include: extra AA battery pack, extended battery pack (for continuous 5 watt operation), Motorola thread to BNC adapter, full length 6" antenna, speaker/mic, earphone, etc.

The UHF model is just as awesome. It covers 430-470 MHz. So it covers amateur, police, GMRS, and FRS, all in one radio. I have used this radio for months and I must say, it is a very high performance radio. It has a very good combination of body chassis and antenna design which makes it an excellent performer. In my opinion, it's a great performer and certainly can run circles around most "ham" radios. If you wish to find out more about this radio go to Google and just enter "Motorola GP68".

Specifications: VHF 136-174 MHz UHF 430-470MHz
1 Watt lo 5 watt hi (actual measured 7 watts VHF and 5.5 watts UHF)
0.25uV sensitivity
20 channels (front keypad programmable)
All PL and DPL tones – has separate transmit and receive
Fully programmable offsets on all channels
Mil 810E compliant
Various levels of battery save
Full DTMF features and auto dial.
Includes all professional software to program the internal firmware

The Motorola GP68 is a commercial hand held. The July winner will get their choice of VHF or UHF model. The accessories included a drop-in charger, belt clip, 77 page operations manual and rechargeable battery.

The GP4 shortwave radio is back. After running out of GP4 radios, we have gotten a new supply. So this time for real, one of the raffle prizes will be a GP4 - AM, FM, SW, clock radio, and LED flashlight.

The new model is now called the GP-4L (the L represents the new white LED flashlight they have incorporated into what was already a great radio). This is one of the greatest portable radios I have ever run into. It has a digital AM/FM radio, shortwave radio, including WWV

with 40 meters and 20 meters. It has a LED white flashlight and a complete clock radio. All in a small package. No wonder it was rated as the best pocket radio around by *Popular Communications Magazine.* You will end up taking this radio to wherever you go.

DIRECTIONS TO GEORGE'S (or you can always use www.mapquest.com):

FROM THE BAY BRIDGE OR EMERYVILLE:
Take #580E towards Hayward, exit on Keller Avenue, go uphill at Keller to dead end on Skyline, go North (left turn) onto Skyline Blvd for 1.75 miles....look for multiple mail boxes, turn right without passing the mail boxes up the private road. The number is 13310....We will be monitoring the 146.67 box.

FROM THE SOUTH:
Take #580W to KELLER AVENUE OFF RAMP and go uphill at Keller to dead end on Skyline, go North (left turn) onto Skyline Blvd for 1.75 miles....look for multiple mail boxes, turn right without passing the mail boxes up the private road. The number is 13310...We will be monitoring the 146.67 box.

If you have not been to George's house, it is where the repeater is located. It is perched at the peak of Skyline Blvd. in the Oakland Hills. In the past, the potlucks have been a culinary dream. Better than any buffet in town. Guaranteed!! I will bring my Motorola Service Monitor and Agilent 8591E spectrum analyzer to check out your radios. I will bring my *WiFi* setup complete with a 15 element beam to demonstrate how far *WiFi* 802.11g can really go. From George's house I can pick up my sister's *WiFi* signal about ½ mile down the road. Yes, George can get free *WiFi* from my sister if he wants to. He just needs a downconverter transceiver, gain antenna, 20+ feet of USB 2.0 repeater cable, some software and he is all set. Come on by and see this demonstration. All this hardware for under $100. All the secrets will be uncovered.

Rechargeable Batteries: *By Ed Fong WB6IQN and Ron Quan KI6AZB*

We all use rechargeable batteries to save money. But how many of us really understand how to get the most out of our batteries? Most of us assume that the recommended charging and the recommend chargers are what is optimum. From my experience, I would say that is only partially correct.

Battery technology has no doubt improved about 6x in capacity over the last 20 years. I remember when an AA penlite cell was 450mah. Today, a NiMH AA cell is at 3000maH. That is over 6x increase in capacity. Is that amazing or what? If you take a LiOn battery, it has increased on the order of 10x. But since LiOn batteries are of different voltages, we will leave it for another discussion. So how do you get the most life out of these batteries? After all, they cost about $2 each. One would not want to replace them every month. Yes, every month. If you do not take care of your batteries and charge them properly, they get destroyed. So read on and you will find out the easy way on how to take care of these batteries. This is all from my experiences and that with Ron *KI6AZB.*

Here is a hypothesis, "NiMH batteries do not perform as advertised." The latest batteries claim up to 3000maH capacity for AA penlite cell. Is this true? Well, we put this to the real test. Here are our results.

Yes, they appear to be high capacity but there are many constraints. Don't treat a 3000maH NiMH as a conventional NiCd battery of years past. They are not the same. Here is what I have found.

1. The Equivalent Series Resistance (ESR) is many times higher in a NiMH battery. The net result is that a NiMH battery cannot supply as high current as old NiCds. The NiMH does have much more capacity so it is great for medium current applications such as LED flashlights, radios, toys, etc. It is not very good for high current applications such as 5 watt hand helds (although I have found that 2 watt hand helds are acceptable). Cell phones are OK because these are medium power devices. Initially, the NiMH works fine as promised. However, after about 10 charges, they start declining in capacity and increasing in ESR thus limiting their usefulness in high current applications. This is especially true in the case where they are fast charged as with most chargers today. When you slow charge the batteries, they will last for many more charge cycles. Maybe even approaching 150 cycles if you are lucky. If your charger has a option of slow charge, leave it in this mode as the default. Only use fast charge when you have not planned ahead and need the batteries immediately. Remember, fast charge will DRASTICALLY reduce your number of charge cycles and also increase the ESR. Once the ESR has increased, I know of no way to reverse this process. Basically, you can toss the battery away unless you plan to use the battery in a low current application. For example; LED flashlight or travel clock. But even these are not very good examples because of the self leakage of the battery which typically loses 1% per day. You can try it but it may not last for more than a month.

2. NiMH batteries, when new, do deliver what is advertised. However, they quickly lose their capacity if you are not treated properly. They are much less forgiving than the traditional Nicads.

3. Not all NiMH are created equal. Like NiCds, manufacturers have different tolerances for their processes. If they use inferior materials, like the stuff from China, they tend not to be as good. Some of our test results are given below. What I have found is that the higher capacity batteries (one's approaching 3000maH) tend to have higher ESR. This makes sense since most batteries consist of two electrodes separated by a dielectric. One can imagine the construction of an AA penlite cell as a large sheet of dielectric with electrodes on each side. For a AA penlite, this is a rolled up sheet. To get more capacity, the dielectric becomes thinner so that more area is achieved in the same volume. Unfortunately, this increases the ESR. So a 3000maH battery may have more capacity, but its maximum surge current is reduced compared to a similar battery having 1800maH. This may change in the future, but most batteries we have tested follow this trend.

4. Know your NiMH battery and its manufacturer. Poor NiMH will not take high surge current loads. Only the best will survive harsh environments such as digital cameras, high power photo flashes and high power handie talkies. AA penlites will not take more than 2A of surge current without permanent damage. There are, however; some exceptions that we list below.

5. Do not leave batteries in the charger. Even the best chargers, such as the LaCrosse which claim all types of smart charging, are not adequate. After the main charge, these chargers switch to "trickle" which is about 30-50 ma. This is OK for a few days but not good beyond this. I did an experiment and left a set of new batteries for 30 days. The batteries were useless after that. They worked, but their ESR had gone up so they were no longer useful for my digital camera.

6. NiMH batteries have much more higher internal leakage than conventional Nicads. With a set of freshly charge batteries one would have to use them within a week or so. In my experience, they lose more than half of their charge in about a month. Again, making them useless for high current applications. So they must be recharged. As the battery ages (either due to time or just the number of charge cycles) this phenomenon will be more apparent.

From my experience, here is what I have found with various manufacturers and their different capacities.

Power 2000 - these are lower capacity batteries, 1800maH-2200maH, work quite well with good current surge capability. Their latest batteries, 2900maH and 3000maH, severely lack high current handling although they are very high capacity. It was the 2900maH batteries that I left in a LaCrosse charger for one month having the idea that I could have batteries ready at any time I needed them. The result was that I ruined 4 new AA penlite batteries.

Lenmar - are pretty inexpensive at Fry's and are very poor. I took about 25 pictures with my Sigma SD10 with fully charged batteries and then the "weak battery" indicator went on. I would only buy these batteries for very low current applications.

Ray O Vac - Not the highest capacity (2500maH) but seems to work fine, even after 50 charges I was still getting 75+ pictures out of one charge from my Sigma SD10 camera.

PowerEx 2000- average battery. However, the charger that comes with these batteries is not very smart. The fast charge on this device is very fast and as a consequence the batteries get really hot.

Below are Ron *KI6AZB*'s measured values for various AA penlite batteries.

Ultralast (1800 or 2000 mah NiMh) about 9 amps surge (excellent for Digital Cameras).

Eveready AA 2500mah NiMh >= 10 amps (pegged the meter)...maybe about 11-12 amps surge? This is the best one we have tested.

Power 2000 (2900 mah) about 4-5 amps surge (we expected better)

Lenmar (2000 mah) about 5-6 amps surge. Now bad but for its capacity, we would have expected a higher current surge.

Lenmar (2300 mah) with at least 20 cycles of charge/recharge has about 1-2 amps surge...just this sample, other 2300 Lenmar AA cells could be better. (unacceptable with the exception of using these in a low current LED flashlights)

Generic NiCd- 500 mah AA Nicad surge current is about 9.3 amps.

Carbon Zinc Sony about 3 amps surge

Lithium Eveready AA about 7.5 amps surge

Alkaline Eveready AA about 5 amps surge...maybe more, I have a slightly used sample.

Alkaline Ultralast about 4.5 to 5 amps surge (only use in digital cameras or flashes if absolutely necessary.)

Summary: The 2500mah Eveready and 1800-2000 mah Ultralast are the ones I would buy.

Both the Lenmar and Power 2000 (2900 mah) showed increased ESR in proportion to recharge cycles. And eventually in terms of surge current, they match Alkaline or Carbon Zince batteries, which makes them unusable in certain digital cameras.

Now what is really needed is some type of fuel gauge for AA NiMH batteries. That is, some type of internal chip that can measure the power going out and then determine what charging power should go back in. Virtually all LiOn batteries have a fuel gauge. This would be probably too costly for AA penlites since each cell would need a chip that would monitor the energy going out and the energy going in. In the case of LiOn batteries, this is an absolute must since they can catch on fire when overcharged. Besides, we typically pay much more for a rechargeable lithum pack than an AA penlite cell.

For chargers, I recommend the LaCrosse of which a picture is shown below. This charger has individual battery monitors on each battery. One can charge from 1 to 4 batteries of different

charge states and the LaCrosse handles it find. They cost about $40 each and I think well worth it. You can also control the charging current. It monitors the voltage, the current, the time and ma/HR of each battery while it is charging. One can purchased these online for about $40. A good website is www.thomas-distributing.com.

This is the LaCrosse charger. Probably one of the best on the market, but still one cannot leave batteries in this charger indefinitely due to the potential of overcharging and ruining the batteries. Leaving them for few days is acceptable**.**

Well I hope you learned something. If you have anything to add, please email me or mention it on the Monday night net.