### CALENDER OF EVENTS

#### CLUB MEETING
Every month - 3rd Monday at 7 PM  
American Red Cross Building  
5015 Woods Crossing Dr.

#### FELLOWSHIP BREAKFAST
Saturday morning before the club meeting  
Shoney’s - Eastern Blvd.  
8:30 AM

#### FCC EXAMS
Montgomery ARRL VE Team: Last Saturday each month at 1:00 PM at American Red Cross, 5015 Woods Crossing Dr.  
For information, contact Scott, W4SPA (334) 262-0412  
Or email (w4spa@arrl.net)

CAVEC every 2nd Monday at 6:30 PM at American Red Cross, 5015 Woods Crossing Dr.  
For Info contact Steve, K4NM (padgett@jschool.troy.edu)  
or Jim KR4JY (jeiland@knology.net)

Additional Exam Info:  

### Club Nets
Central Ala 2 meter Net on 146.84 at 8:00 PM every Sunday night. A controlled net with information about amateur radio subjects including information bulletins, hamfest info, satellite info, local club info.  
Net manager: Chris, KD6BOD

SkyWarn/Alabama Emergency Net Golf Thursday at 7:00PM on 146.84. Net manager: Mark, WB5NMZ

### Field Day!
June 27-29  
KV4AC QTH  
<<Directions inside>>

### 2008 Officers
- **President:** Mark Wintersole, WB5NMZ  
- **Past President:** Rick Seeders, KG4PNL  
- **Vice-President:** Daniel McCaffery, KE5GDK  
- **Secretary:** Chris Hall, KD6BOD  
- **Treasurer:** Paul St. John, K4APG  
- **Publicity:** Bruce Jenkins, KI4OZW  
- **Trustee:** Jim Eiland, KR4JY  
- **Trustee:** Lew Nyman, K1AZE  
- **Trustee:** Phil Salley, K4PO  
- **W4AP Trustee:** Tim Moore, K4TK

### Local Repeaters
- 146.840(-) W4AP Wetumpka  
- 146.920(-) W4AP Eastdale (DSTAR)  
- 147.180(+) W4AP Out of Service, being re-located  
- 444.5(+) W4AP Wetumpka 100 Hz  
- 53.350(-) W4AP Baptist Tower 100 Hz Out of Service  
- 444.450(+) WD4JRB Baptist Tower 100 Hz (Echolink Node 212144)  
- 446.450 (Splx) IRLP (4845) Baptist Tower 110.9 Hz  
- 147.200(+) KE4LTT Friendship 107.2 Hz  
- 444.575(+) KE4LTT Friendship 100 Hz  
- 147.380(+) W4KEN Santuck  
- 145.690 W4AP BBS  
- 144.390 W4AP-1/3 APRS Digipeaters
From the President’s Shack

By Mark Wintersole, WB5NMZ

It’s been an extremely busy quarter for the Montgomery ARC since our last ZeroBeat rolled off the presses. Here are just a few of the highlights from the past 3 months:

• We’ve had what I believe is a true milestone: our most senior member reached the century mark. About 80 members from MARC, Alabama Power, and the Antique Wireless Assn held a gala and help Pete Sides (W4AUP) celebrate his centennial.

• I’m happy to report the 146.84 and 444.5 repeaters are operating at full capability again. The repeaters, duplexer, and interconnection cables have been “tweaked” and we’re now putting 47w into the antenna feed on .84 and 6w on .5. Additionally, the 146.84 repeater is now linked to the Ft Deposit 146.67 machine. Thanks to N4AU for his continued support!

• Plans are underway to move the 6m repeater to Titus AL where it will operate in a more rf “friendly” environment. Expect to hear more on this project later in the summer.

• As most of you know by now, the club approved relocation of the 147.18 repeater to WSFA’s tower. We successfully mounted the antennas at the 1200’ (tx) and 1400’ (rx) level, but encountered technical problems with the repeater’s receiver. We’ll again scale the tower to work on the system in the coming weeks.

• The DSTAR internet gateway is now operational. If you’re DSTAR equipped, you can now connect with folks all over the world either via your radio or through a “dongle.” Stay tuned for more news, as the UHF link will become operational in the coming months.

• In April, we graduated another group of technician licensees. Oops...I can’t really say that. While we actually graduated techs, many have already upgraded to General and even Amateur Extra! Thanks to Scott (W4SPA) for his help in making this year’s class a rousing success.

• On 17 May, MARC members were again pivotal in supporting the KidOne charity bike race. This race is an annual event that takes place in Montgomery and Bullock counties. Seven members of our club provided comm support at the start/finish line and 2 rest stops, as well as operating the “saggin’ wagon.”

• MARC sponsored the 2nd quarterly Central AL ARES meeting in conjunction with its May business meeting. Our speakers this quarter were Jim Barrett of the Montgomery EMA, and two of our members Fred Springall (KR4YK) and Larry Green (KG4CSM). Thanks to all for their excellent presentations!

• As you read this, Field Day is again looming on the immediate horizon. FD 2008 promises to again be a top-notch affair at Chez Sedlak. We’ll operate phone, cw/data, and GOTAs stations. I encourage you to come out and OPERATE. Just because your cw skills may a bit rusty or you aren’t a dyed-in-the-wool PSK31 op aren’t reasons not to dive in and make QSOs -- the key to FD is participation!

Until next quarter -- 73!

“Chef Lewin” aka K1AZE
parts with secret family
Field Day Chili Recipe

Chile Verde

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>lean ground beef</td>
<td>1 lb</td>
</tr>
<tr>
<td>ground turkey meat</td>
<td>1 lb</td>
</tr>
<tr>
<td>chopped onions</td>
<td>2</td>
</tr>
<tr>
<td>8-oz cans chopped or diced tomatoes</td>
<td>2</td>
</tr>
<tr>
<td>chopped jalapeños peppers (remove seeds)</td>
<td>2</td>
</tr>
<tr>
<td>4 oz cans diced green chiles</td>
<td>2</td>
</tr>
<tr>
<td>garlic powder</td>
<td>2 tsp</td>
</tr>
<tr>
<td>oregano</td>
<td>2 tsp</td>
</tr>
<tr>
<td>course ground black pepper</td>
<td>1 tsp</td>
</tr>
</tbody>
</table>

Brown meat and onions together and drain well. Combine all ingredients in a large stock pot. Simmer for several hours. Serves about 6-8 people. Of course, you’ll need much more for FD!
MARC Field Day 2008

The Montgomery Amateur Radio Club will be holding field day in the field behind the home of club members Randy (KV4AC), Carla (KG4EVC), Anna (KI4PTD), Carrie (KI4PTE), and Rebecca (KI4PTF). The address is 4975 Snowdoun Chambers Rd., Montgomery, AL., and the phone number is 613-3848. It is located about half a mile west of Woodley Road in central Montgomery County, about six miles south of the Southern Boulevard.

We will be running two full time stations, CW and Phone, a GOTA (Get On The Air) station, and a welcome station demonstrating several sides of Amateur Radio. Setup will begin at about 1 p.m. on Friday. The operating event starts at 1 p.m. CDST on Saturday and continues until 1 p.m. CDST on Sunday. It is a great time to sharpen operating skills (Phone and CW, maybe some modes you are not familiar with), learn or teach about portable station setup, enjoy camaraderie with the club, and gain back all the weight you’ve lost since your New Year’s resolution last January. The station captains will be looking for operators of all skill levels to run the radios, or help with logging contacts. As always, talk-in will be 146.84(-).

Directions to MARC 2008 Field Day site:

From Montgomery’s Southern Blvd:
take Woodley Road South for approximately 6 miles to Snowdoun Chambers Road.
Turn right onto Snowdoun Chambers Road and follow the signs to 4975.
Come up the driveway past the pond and you’ll see the antennas!
Officers of the Montgomery Amateur Radio Club look on as Alabama Governor Bob Riley signs the 2008 Amateur Radio Week Proclamation and A Commendation for MARC on the occasion of our 70th anniversary

Pictured: seated front, Bob Riley, Alabama Governor; standing rear, (left to right): Mark Wintersole, WB5NMZ, President; Bruce Jenkins, K4OZW, Publicity Officer; Paul St. John, K4APG, Treasurer; Chris Hall, KD6BOD, Secretary, Daniel McCaffery, KE5GDK, Vice-President
MARC and Amateur Radio contributions acknowledged by the Governor.

At a recent Signing ceremony, The Governor put his signature to Commendation for the Montgomery Amateur Radio Club in recognition of 70 years of service to the community and state. This event was attended by the MARC club officers. At the same ceremony, the Governor also signed a proclamation identifying the week of 23-29 June, 2008, as Amateur Radio Week. This proclamation recognizes the public service and emergency communications efforts on behalf of their local communities and the state. The state also recognizes the role that ARRL Field Day plays in sharpening our skills as emergency communicators. It is nice to know that our efforts do not go unnoticed. (see proclamation and commendation above)

Rik Doll, KU4PY
ARRL, AL State Government Liaison

Proposed Amendments
To the
By-Laws
Of the
Montgomery Amateur Radio Club, Inc.

Proposed by:
Lamar Smith, KC4LZO
At the 16 June 2008 Board Meeting

The following changes to MARC's By-Laws and Articles of Incorporation are designed to reflect the single purpose of the organization at it highest level. Following the recommendation of another Amateur Radio Organization, it is important to the 501(c)(3) application to have a focused purpose. The rewording indicates this and the activities which support the single purpose. Therefore, these changes will not prevent any current club activity but will allow the submission of the 501(c)(3) request with the best hope of approval.

Proposed re-wording of Article 1

1.2 PURPOSE

MARC is incorporated in accordance with the laws of the State of Alabama for the purpose of assisting through the use of amateur radio in emergency situations in which normal lines of communication are disrupted or otherwise not feasible. In preparation of being of assistance in emergency situations, MARC will participate in the following activities:

1.2.1) Encourage continued education and training for prospective and current amateur radio operators by providing opportunities for both academic and hands-on training.

1.2.2) Encourage research and experimentation with new and existing technologies in an effort to facilitate the advancement of the field of radio communications.

1.2.3) Promote amateur radio by providing opportunities for fellowship among members and other interested persons.

1.2.4) Promote the public awareness of amateur radio and its many contributions to public welfare.

1.2.5) Maintain licensed amateur radio stations for operation for its membership, in the name of its Trustees, when and where feasible, under the rules of the Federal Communications Commission,

1.2.6) Exercise any and all general powers, whether herein enumerated or not, which a non-profit corporation may or can exercise under the Constitution and Laws of the State of Alabama.

Proposed By-Laws for MARC (Purposes of Corporation Article III only)

Article III: The purposes for which the corporation is formed are as follows:

To operate as a 501(c)(3) non-profit organization for the purpose of assisting through the use of amateur radio in emergency situations in which normal lines of communication are disrupted or otherwise not feasible by:

(a) encouraging continued education and training for prospective and current amateur radio operators by providing opportunities for both academic and hands-on training.

(b) encouraging research and experimentation with new and existing technologies in an effort to facilitate the advancement of the field of radio communications.

(c) promoting amateur radio by providing opportunities for fellowship among members and other interested persons.

(d) promoting the public awareness of amateur radio and its many contributions to public welfare.

(e) maintaining licensed amateur radio stations for operation for its membership, in the name of
its Trustees, when and where feasible under the rules of the Federal Communications Commission,
(f) doing and exercising any and all general powers, whether herein enumerated or not, which a non-profit corporation may or can exercise under the Constitution and Laws of the State of Alabama,

(No change in the following two paragraphs to complete section.)

Need a ride to MARC Meetings?

If you or someone you know of would like to attend the monthly MARC meetings but cannot get there, we can help.

Please contact me at 334.309.4703 or by email at secretary@w4ap.org

If you get my voice mail, please leave your name and phone number and we will make arrangements to get you to the meetings.

Please give us as much notice as you can. We have members that travel from areas other than Montgomery and would like to see you at the meetings.

WHY WE FOLLOW RECOMMENDED STANDARDS AND PROCEDURES
By Tim Moore/K4TK

In this second installment of a two-part article, Tim discusses the importance of following established standards and procedures.

Case 3: CAT 3 verses CAT 5 cable incident, the use of proper cables for the right job. Recommended Standard violated was ANSI/EIA (American National Standards Institute/Electronic Industries Association) recommendations/specifications and of ANSI/EIA 568 specifications. In this case I was again working at the same company I mentioned above. The network Local Area Network (LAN) cabling had been installed by some of our young (inexperienced) technicians before my arrival at the company. They used CAT 3 cable for the LAN implementation (no doubt probably to save some money), and the specifications for this product do not recommend using it for a data network deployment ABOVE 16 Mbps. In the beginning, the LAN was a classic Ethernet LAN running at 10 Mbps. The network functioned with no (known) problems in this configuration. In addition to using CAT 3 cable, rather than follow one of the appropriate color codes for terminating connectors (either 568A or 568B), they merely wired the connections the same at both ends using THEIR OWN color code/scheme. Now any LAN technician who has built cables can tell you that terminating connectors in schemes other than 568A or 568B CAN in fact work, if you use the same color code at both ends, AND provided you aren’t “stretching the envelope” for other limitations of the specifications for your architecture design (limitations like distances, data rates, etc.). So in the beginning, this nonstandard deployment of the violation of 568 wiring terminations worked (but again, we’ll never know if it worked perfectly or if it was taking “performance hits” due to crosstalk and other similar issues!).

Then the company decided to upgrade the network and put in new equipment and increase data rates to Fast Ethernet (100 Mbps). You no doubt already know what was about to happen! The inferior CAT 3 cable wasn’t capable of providing connectivity at 100 Mbps (true to the published specifications). But even when they finally went to the trouble (and cost) of cabling a second time with CAT 5 cable, the network still had intermittent problems. Troubleshooting the problem was again somewhat difficult. It was as if there were intermittent collisions on the wire causing retransmissions. After several days of troubleshooting, I noticed one of the connectors was terminated in a nonstandard color code. It probably would have worked fine for the old 10 Mbps data rates. Put pushing up to 100 Mbps had “pushed the envelope” enough to apparently make this standards violation implementation fail. I had the technicians redo every termination following the 568 color code, and the network worked perfectly with no more errors. Problem solved!

What did this case show us? Again, violating standards in some cases will fail (trying to use CAT 3 to run 100 Mbps). In other cases, it may work for “lower thresholds” (the nonstandard wiring color code worked for 10 Mbps, but failed at 100 Mbps). The technical reason for failure in the color code case was probably something as simple as perhaps exceeding the NXT (near end crosstalk) or FXT (far end crosstalk) specifications due to the lack of proper twist-spacing in pairs within the wire that occurred by not following the proper color code.

Case 4: The case of the router upgrade that failed where an earlier cabling implementation had exceeded the Recommend Standards length (but wait until you hear WHY it failed!). Recommended Standard violated was the cable RS-449 standard. This case involved an architecture upgrade at a military base. Our office was doing infrastructure upgrades to military bases all over the world. We would go in, obtain downtime, and completely replace the core of the base architecture. It was a complex upgrade with many links and circuits and numerous network devices to replace, configure and bring on line. Of course the new equipment
represented the latest/greatest equipment at the time. So at the inbrief when we told base personnel what we were doing and what to expect, naturally we were touting the increased performance they would see after this upgrade!

We pulled out the old routers, put in the new top of the line routers, and utilizing the same existing old link/cable/circuit, we would bring the new architecture on line. At least that was the plan! At one base in particular, almost every single serial circuit/link we attempted to bring back on line failed. One by one we tried to bring up the serial links (we were using encryption devices that dictated we use DSL modems for cross base circuits with serial links from the modems to the routers). And one by one they failed. After hours of troubleshooting, we were forced to put the OLD routers back in to bring the circuits back up (you can’t have almost your entire network down for too long!). We vowed to try again to complete the upgrade. And every time we got down time and tried again, the circuits all failed. We actually made several trips back to this base, and several times tried to make the circuits work with the NEW routers. But we had no success. Finally we had to get the vendor involved, and their Engineers and myself recreated what we thought was the same setup in my test lab. And after many more weeks of testing and scratching our heads, we finally asked the question (even though the existing circuits with the existing cables were currently working just fine with the OLD routers) how long the serial cables in question were. Interestingly or perhaps unfortunately, the existing cables EXCEEDED the recommended RS-449 length. The vendor representatives were now really scratching their heads even more. While the excessive length of cable might explain why the circuits wouldn’t work with the NEW routers, why did they function just fine with the OLD routers? They had to go back to their design Engineers to find the reason. It was discovered that the OLD router’s serial cards happened to be designed such that they EXCEEDED the RS-449 specifications. So the excessive length cables proved to be no problem for them. But the NEW router’s serial cards were designed such that they JUST MET the RS specifications. Problem solved! We had new cables made that met the maximum length requirements (the old ones had excess cable that was just rolled up under the computer floor). Now the system worked perfectly with the new routers.

Again the lesson learned is that SOMETIMES you may exceed or violate a recommended standard, and your implementation MAY work. But if you ever introduce more users, or change configuration, or add or upgrade with new equipment to your network/system, either total failure or intermittent problems may occur later!

Case 5: Here is my Ham Radio case….so pay attention! This is the case of cable mismatch (namely velocity factor and impedance mismatch). The resulting mismatch caused SWR problems and poor system performance.

Early in my Ham career one of the first antennas I used was an old CB 11 meter antenna I converted to use on 10 meters. In my initial setup, I had a pretty long length of one type of coax (it escapes me now EXACTLY what it was, most likely RG-213 or something like that?). I needed my coax to be just a little bit longer to reach the antenna from my Ham shack location. Rather than buy all new coax of the right length, I figured I would just cut cost and get a barrel connector and buy some coax down at the local Radio Shack. I figured I would get just enough coax to get the length I needed to make the connection. Again, I don’t remember EXACTLY which coax I got (probably just some plain RG-58?), but I got just enough to make the connection and placed it in line. To my delight everything seemed to work well. There was SOME SWR with this arrangement, but it wasn’t exceedingly high and I could live with it. Then about six months later I decided to move my shack into another room. So again I needed a longer run of coax to connect to the antenna. Since I had success with my earlier “splice” of two coaxes, again I elected to go to the local Radio Shack and purchase just enough of the same coax I used on the shorter run before to make this longer connection. But this time when I fired up the rig, I had VERY high SWR. I wondered what the heck was going on. I kept checking my connection on the PL-259 and whatever else I could think of. Finally, given my Engineering background, I thought maybe some research on cables would be worthwhile. And then I read in the specifications where the two cables had different velocity factors and different capacitance per 100 foot. They were NOT meant to be used together! Mixing these two cables with their different specifications had apparently resulted in an impedance mismatch, which most likely caused my SWR problem. I bought the necessary length of the same kind of coax as the original (RG-213 if memory serves me correctly) and with the matching coaxes (with identical characteristics), all was good on the longer run. Of course, I probably should have just gone ahead and replaced the whole run with one continuous piece of coax, but I was a young Engineer, and I was practicing to be a good “thrifty” Ham!

The lesson learned in this case was paying attention to recommended specifications and matching the required specifications means your system will work as it should (or as best as it can). The mismatch worked when the one piece was short, and the total run was relatively short. But when I went to a much longer piece of mismatched coax and a much longer total run, while the system did not fail, it did exhibit poor performance due to the impedance mismatch created by mixing different coax characteristics.

Case 6: And finally we come to our last case. This is related to the case above with almost identical results, though it involves the network world instead of Ham
Radio. Fast forward to several years down the road and now this Engineer has a bit more experience with coax and impedance mismatch problems (thanks to my Ham Radio experiences!). I’m the LAN administrator for my building/office (an additional duty to my primary job designing networks) on the base where I work with about 100 customers on my network. It’s back in the day when we were using 10Base2 (commonly referred to as thinnet). Come on, I know some of you have been around long enough you know what I’m talking about, so don’t act like you don’t <wink>. Thinnet used coax, and in fact it actually used the same RG-58 coax that many Hams use! I had some of my LAN segments almost maxed out per the specifications/recommend standards (oh no, not those standards again!). As I recall, because it’s been quite a few years, 10Base2 could have maximum segment lengths of about 185 meters. They rounded this up to 200 meters and then shortened that number to a “designation” of 2, thus the”2” in 10Base2. The “10” represented the speed of 10 Mbps. Anyway, you were limited in segment lengths to about 185 meters and if memory serves me, no more than 20 users per segment. The RG-58 coax had “T” segments that came off the main segment, with each “T” terminated in a BNC connector for connection to hosts/machines.

So as I mentioned, a number of my segments were either maxed out with users or very near maxed, and I was also running some lengths that were close to the maximum length recommended. I wanted to add one user on one of my segments, but had no coax to add them. I contacted a local office on the base that also did network implementations/installations. I asked them if they had some extra coax I could have, as I just needed to add one user and just needed a short piece of coax (and didn’t want to buy a large amount of coax). They did have coax and told me to come by and pick some up. Upon arrival at their shop, I immediately noticed the coax was RG-58U solid center conductor coax. I was familiar with the specifications from training I had received, and I realized that what the standards for 10Base2 called for was actually RG-58 A/U STRANDED center conductor coax. I pointed this out to them, explaining that RG-58U was in fact the WRONG kind of cable to use on 10Base2 networks. I also explained that using the wrong coax COULD result in some problems on their networks. Of course they told me I didn’t know what I was talking about, and further informed they had used this very type of coax in installations all over the world at various bases! When I asked what kind of systems they were installing, they explained they were “pilot” systems for new users that had minimal lengths of coax with only a couple of users on each segment. I reasoned from my experience with standards and my experience from Ham Radio that no doubt the improper coax might indeed work for meager systems with minimal cable lengths and only a few users. But I also realized for my application, with long cable segments and almost the maximum number of users on that segment, IF EVER this mismatch would be a problem, THIS would be THAT situation! So I took the coax, but proceeded with extreme caution.

I told all the users on my network to make sure they had their machines on, actively using their network connection, and that I was about to add another user with a suspect piece of coax. I wanted to know if ANYONE saw any questionable results or performance issues on their connection, if their connection failed, timed out, etc. The instant I connected that piece of coax, about every third user on the segment “locked up”. The instant I took the coax back off that segment, the locked up machines returned to normal. Bingo! Just as I had suspected, the use of this improper coax appeared to be causing a problem. I tossed the coax in the trash, kept calling around the base, and finally found the correct coax (with stranded center conductor). I installed the user again, this time with no problems.

Let me say I did not follow up to see what the different characteristics might have been between the two cables. Frankly, it didn’t matter to me. I knew the spec called for RG-58 A/U….and they had given me RG-58U. And I knew the latter didn’t work. And I confirmed the proper spec cable DID work. That’s all that mattered to me. Note yet again, that apparently the improper cable DID work for the system with MINIMAL characteristics (minimal users, minimal segment/coax lengths). But perhaps they had some performance issues and didn’t yet realize it? Also, it’s possible that MAYBE a system designed with ONLY the RG-58U may have worked too? Perhaps? All I know is that when I tried to use the coax that didn’t meet specs on my larger system, which was “pushing the envelope” of the requirements/specifications, my system had failures in the form of users being locked up. In fact my theory is that there was a standing wave problem, and the standing waves occurred on the cable segment about every third user and thus every third user was knocked off line. That’s my story, and I’m sticking to it!

So now you know why I say recommended standards (and RFCs and the like) should be followed if at all possible. You may get away with violating them. You may not. But in the end, quite often as your system changes and evolves or grows, even if you got away with violating standards in the beginning, usually you pay the price sooner or later. In my industry, it’s better to be safe than sorry. And more often than not, I think that can apply to Ham Radio systems too!

This article is continued from the February 2008 issue of ZeroBeat.
**MEMBERSHIP APPLICATION**

**Year**_________

_Montgomery Amateur Radio Club – PO Box 3141 – Montgomery, AL. 36109_

**Renewals** enter, *name* and *callsign* and any *changes* in status.

*Note: Senior Members* over 70 please send in application to keep roster updated.

**New Members** enter *all* available information.

Name:______________________________ DOB:______________ Call:___________ Class:______ ARRL Member(Y/N)___

E-mail:________________________________

**Family Members**

Name:______________________________ DOB:______________ Call:___________ Class:______ ARRL Member(Y/N)___

E-mail:________________________________

Name:______________________________ DOB:______________ Call:___________ Class:______ ARRL Member(Y/N)___

E-mail:________________________________

Name:______________________________ DOB:______________ Call:___________ Class:______ ARRL Member(Y/N)___

E-mail:________________________________

Class of License: N= Novice, T= No Code Technician, T+= Code Technician, G= General, A= Advanced, E= Extra

Address:_________________________________________________________________

City:______________________________ State:___________ Zip:____________

Home Phone:_______________________ Work Phone:_______________________

Indicate Membership type below. Membership fees are *due every January 1st*. There is a 60-day grace period.

**Family membership** is for immediate family with 2 or more amateur radio license holders *residing at the same address*.

**Associate Membership** is for individuals who *do not have* an amateur radio license, but are interested in the activities of the club and are preparing for exams.

**Senior Membership** is for an amateur age 65 or older.

Check *type* of membership:

_____ Single Membership ($25 per year)

_____ Family Membership ($40 per year)

_____ Senior Membership - age 65-69 ($15 per year)

_____ Senior Membership - age 70+ (no charge)

_____ Associate Membership ($10 per year)