

Ham Rag

Rockford Amateur Radio Association

APRIL 1983

RARA TO HOLD
3RD ANNUAL AWARENESS DAY



APRIL 9, 1983 • 10 a.m. to 4 p.m.
NORTH TOWN SHOPPING CENTER

President's Log

Somehow, it doesn't seem as though enough time has passed since the March meeting to be writing this column again—but it's time.

First of all, we would like to thank Terry Beckett, Director of Engineering, Rockford, Park Cablevision. Terry presented a most interesting and informative program. A good question and answer session was held.

We don't hear much about it, but remember—When and If you have an interference problem—we have a TVI Committee in the club headed up by Larry KS9B.

The Novice class is in full swing again with about fourteen students attending. You're all welcome to drop in if you get a chance. It's held at the Harlem Community Center on Tuesday nights. If you know any of the new people, give them some encouragement. Can you remember when you were a Novice?

Jim WD9FVF has really got the Awareness Day plans going well and the antenna crew checked out the roof situation the other day. Let's ALL try to turn out at some time of the day and give a hand. This is good opportunity to say something about your hobby to the community.

I was going to say that winter was just about over and out activities would start to pick up, but what about the way Spring just came in here. What a surprise! You bad weather antenna guys still have some time. We are heading into our Spring storm season though, so you might give some thought to your antenna grounding system and guy wires. Don't forget—work safely.

By the way, have you checked the expiration date on your license lately? If you haven't and you renew an expired ticket, you run the chance of receiving a new call of some kind whether you wanted a change or not. Isn't that right N9CWT.

At this month's meeting, we will be viewing a film of the raising of the Milwaukee Channel 18 television tower and possibly have a speaker from there. The engineer in charge of raising the tower is now retired and due to scheduling may not be able to come. We will work something out.

At any rate, here's hoping to see you at the meeting.

Editor's QRM

Late in January the FCC adopted a formal proposal to establish a new class of license in the Amateur Radio Service requiring no knowledge of the Morse code. This "no-code" proposal has surfaced at the commission in less formal forms from time to time over the past several years. It has generated a heated response in the Amateur community. A survey conducted by ARRL a couple of years ago indicated that most of the amateur community is opposed to the no-code license. Why

Most hams will have difficulty telling you why he or she opposes the no-code license. "We need it to act as a filter" "Code is a more reliable means of communication" "The amateur bands will soon sound like the CB band garbage if we don't have the code to keep the riff-raff out" "Code is the essence of ham radio" "It is the great equalizer, without it, we loose our identity" "Code instills pride" The anger is deep, but it is hard to pin down the underlying cause of it.

I think a story I read about an attorney just starting his law practice might shed some light on this hostility. After graduating from law school, he took a job with a legal aid agency. Located in the midwest, the country is basically rural, but it has industry, which gave rise to a fairly broad range of folk who came to him for legal assistance. If they met the requirements based on income, assets and type of problem, he took their case on. In a period of three and a half years he handled hundreds of cases. Had these people gone to a regular attorney, many would have paid thousands of dollars for the rendered services.

Of all the people he had for clients, not one of them ever so much as said 'thank you'. It was costing them nothing—and that is the value they placed on it. I think this attorney would be in agreement with the hams opposed to the no-code proposal. It is basic human nature not to respect something that you get for free.

Amateurs see a code requirement as a *price to be paid for admission*. In a very real sense that is what it is. Few prospective amateurs already know the code. It is impossible to *cram* for the code test because it is a neuromuscular skill akin to typing and shorthand. Thus, anyone to enter the hobby must be willing to invest a few hours learning the code. Having made this investment, the new ham is likely to respect his license. He *paid* for it.

Hams are angry about the no-code license, because they see it as another step by government to move toward a society that places little value on one's learning position in life. They see it as a degradation of the concept of personal achievement. They see it as a cheapening of something they dearly love. The FCC talks of "modernizing license requirements and attracting bright young people". They hams are looking beyond bureaucratic ideals to something more basic— human ideals.

Micro/Digital Corner

Well, I guess I have it easy this month. The following article was written by Don Rastede/N9AWZ. **CPU Chips — The Heart of it All**

This month's topic is right at the heart of the computer: the CPU (Central Processing Unit) chip. There are about as many of these chips as there are variations on the wire antenna, with the number of both increasing rapidly. Historically, computers have been divided into three categories, mainframe, mini-computer, and microcomputer, with one criterion of the division being bus size of the chip. The size of the bus is important because it expresses the number of bits that are simultaneously available to the CPU chip. These bits are used to express instructions as well as addresses. Thus, one can see that the larger the bus size the greater the possible number of instructions, and implicitly the higher the maximum addressable location. Traditionally, microcomputers, also known as home or personal computers, have had a bus size of 8 bits. Members of the group are the Intel 8080, Zilog Z-80, Motorola 6800, and Mostek 6502. These chips are the more popular ones, however, one will also find others such as the Texas Instrument TMS9900 and the Fairchild's F8. All of these chips have one thing in common, a 8 bit bus architecture. The maximum addressable location is 64K or 65,536. Note the capital "K", this is different from the lower case "k" we have all come to know and love. The upper case "K" means kilobytes of something and is related to the base 2 addressing used by all computers, 2 to the 10th power is 1024. This latter figure was rounded down to an even 1000 to differentiate it from the unadjusted 1000's unit, a capital "K" was used. This explains why 64K is actually 65,536 ($1024 \times 64 = 65,536$). Over the years, these two letters have been confused, so that now I am starting to see the usage of the KB for kilobyte.

It should be noted at this point in the last two years a new generation of chips has become increasingly available due to lower costs. These chips use a 16 bit bus, either internally only as with the Intel 8085, or both internally and externally, as with the Intel 8086. This increased bus size means that there are a greater number of instructions possible, and more importantly the maximum memory size is now 16 megabytes or 16,777,216 different locations!!! More will come on that topic later as this new generation will become increasingly important.

But, back to our original topic of 8 bit chips. As noted earlier, the size of the bus determines the number of possible instructions, with the 8 bit chips this is limited to 256 instructions, ($2^8 = 256$). The other thing that needs to be said is that each manufacturer has view of how and what are important instructions for controlling a computer. This translates to a potential incompatibility problem among commercially available computers. Thus the assembly level program you wrote for your TRS-80, will have about as much chance of running on your buddies Apple II as I have of striking oil by drilling through my basement floor. See table 1 for computers and the CPU chip they use. More needs to be said about language and levels of languages, but that too will have to wait. Suffice it to say that when one buys a program, one *MUST* make sure that the program is capable

of running on the computer you have or are planning on getting. One can argue about the various strengths and weaknesses of a chip instruction set. However, that is like comparing apples to oranges, they both are fruits but that is where the similarity stops. The overall consideration should be, does the chip handle what you want it to do within the specifications you are willing to accept. If you plan to write all your own programs it may not make any difference to you that there is next to no software commercially available. On the other hand, you may wish to buy all your programs commercially, or need or want to have a large user's group to help you over your learning curve. This all needs to be weighed carefully.

TABLE 1
Popular Commercial Computer and CPU Chip

<u>COMPUTER</u>	<u>CPU CHIP</u>
Radio Shack TRS-80	Z-80A
Radio Shack Color Computer	6809
Commodore Pet	6502
Apple II, II+,	6502
Apple III	6502A
Commodore 64	6510
IBM Personal Computer	8088
Sinclair ZX80/ZX81/ Timex TS1000	Z80A
Timex TS2000	Z80A
Ohio Scientific C2P, C4P, C8P	6502

Thanks Don! Anyone else that would like to submit articles, please feel free to do so.

How would you like to know who the other hams are that have the same type of computer that you do? Send a post card with your name and type of computer. If I get a response, I will print a directory. Please don't assume that I know what you have. I forget quickly (*just ask Shari!*)

73, Gene/WB9MMM

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CQ DX

By now the Heard Island DX-peditions should be history. I hope that all of you who wanted a QSO managed to find your way into one of the logs. For the rest of us, there is always next time. Whenever that may be, right Gary?

From the information that appeared in the January column, you should have that DX QSL correctly filled out and ready to be sent on its perilous journey. There are almost as many ways to send that card on its way as there are stations to send it to. The following is not meant to be complete or guaranteed (how's that for a disclaimer), but will give you an idea of some options. They are basically listed by cost, with the most expensive first.

1) **DIRECT.** Obviously the most costly, especially when you return QSL never shows up. Put your card and a self addressed envelope in an envelope with the DX's address on it. IRC's can be purchased at the Post Office for .65 each and sent along for the DX to redeem, for return postage. This could cost since it could take two, three, or more IRC's for airmail return. A green stamp (dollar bill) can sometimes be used in place of the IRC's, but be careful here. Some foreign countries do not take too kindly to their citizens possessing foreign currency. Don't put any reference to amateur radio on the outside of the envelope either. Your letter could show up minus the green stamp if it shows up at all. Honor Roll status this way could end up costing the price of a transceiver.

2) **MANAGER.** If you are lucky the DX has someone he routinely sends his logs to for taking care of the QSL chores. Even better is if the manager is stateside, in which case your cost is .40 and a QSL card. Here you don't need the green stamp or IRC, just a .20 stamp on the return envelope. Sometimes finding out who the manager is can be more difficult than working the DX. If you and your friend happen to work the same DX, some money can be saved by putting both cards in the same envelope.

3) **QSL SERVICES.** There are a few of these around, and for so much a card they will forward your QSL's. Contract them directly for more information.

N7RO DX QSL SERVICE
2935 Plymouth Drive
Bellingham, WA 98225

Howard Messing WA2NHA
16 Erli Street
Wayne, NJ 07470

4) **ARRL OUTGOING BUREAU.** This is a no cost service for members of the ARRL. Just bundle up your QSL's (sorted alphabetically by Country) and send them off along with a QST mailing label. The cost here is relatively low, but you will wait a while for your return cards.

Here's a special deal for ARRL members who also belong to RARA, or RARA members who also are League members. Either way will work fine. Sort your cards as above and bring them to the next club meeting. K9LJN and/or AK9N will collect them and have them shipped to CT. Don't forget to bring your QST mailing label.

5) **RETURN BURO.** For returns on the cards your send off as in paragraph 4, you need a supply of SASE's in Elmhurst. On a 5" x 7½ envelope put some postage, your name and address, and your call in the upper left corner. Send them to: **NORTHERN ILLINOIS DX ASSOCIATION, Box 519, Elmhurst, Illinois 60126.** They also sell enveloped/postage credits. An SASE to the above address will bring more information.

6) **USQS.** While not an outgoing DX service, I believe this one deserves mention. They handle stateside cards for stateside hams and also will accept incoming DX cards for statesiders. They have been operating for about two years now. It is a free service by and for hams with dinations gladly accepted. Send them an SASE for their file. You may even have a card or two waiting for you. **USQS — KM7Z, P.O. Box 814, Molino, OR 97942.**

LISTEN • LISTEN AGAIN • NOW LISTEN SOME MORE

As in most our daily activities, the above advice also holds true in chasing that rare or not so rare DX. Listen to what the DX station is saying. If it's "QRZ West Coast", I don't think he wants to talk to a 9 in Illinois. Up 5 means don't call him on his own frequency. If he comes back to "the XQ" don't call unless YOU are the XQ. If you are not sure if he is still listening for calls or has already answered someone, **KEEP QUIET, LISTEN SOME MORE.**

I was tuning around the low end of 20 meters late on night wile some signals were still soming in. I stopped to see who would come back to a WB7 who had been calling CQ DX. Nothing right away but eventally, and without a call sign, someone out there sent "seek and u shall find".

The grand wizard of Monroe Center has been gazing into his crystal set recently and has come up with a prediction. Gene feels that in the next six to eight weeks, conditions will improve and should be good for DXing. He also mentioned something about staking the price of a pizza on his prediction, but we couldn't think ou anyone whom we could trust to hold the pizza.

73 — I hear a band opening...
Until June — AK9N

**ROCKFORD AMATEUR RADIO ASSOCIATION, INC.
P.O. BOX 1744, ROCKFORD, ILLINOIS 61110**

OFFICERS		1983	DIRECTORS			
President	Bob Davidson	WA9NTT	877-6274	Frank Hirsch	KB9KH	397-6966
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HAM RAG Editor						
	Sharon Harlan	WB9SFT	398-2683			

Tech Topics

Let's face it, the situation is normal once more. Last summer the new tower went up, with a vow that everything would be done right. Finishing touches were in the fall, and at the Wheaton hamfest I picked up a couple of lightning arrestors for the feedlines. Now it's March (*plenty of time, right?*) and there's a thunderstorm running about already. It must be time to figure out where to put those things in. The instructions seem simple, although not explicit, and in looking around there is not a wealth of information on how to protect your station from the effects of lightning. Here's what I found in a nutshell.

First, we do need to protect ourselves and our equipment. The average lightning stroke gets going in 2 microseconds and lasts 40 microseconds. The current will be more than 17,000 amps and can get as high as 240,000 amps. Since Ohm's law will still be true, the voltage is going to end up very respectable if we put any resistance in the path. Finally, in this area we can expect almost 45 days a year when thunderstorms show up. A thorough discussion of how lightning strikes is in the December 1978 *HAM RADIO* magazine.

Where does this get us? Well it really tells us two things:

1) Let's hope we don't have to tangle with a direct hit, cause it's going to be impossible to avoid a trauma there, and 2) let's ground everything in sight and keep these things out of the house. It even seems grounding is a problem, because the lightning stroke has such a fast rise time it suffers the same problems with cable inductance and skin effect as the radio frequencies we love so much. That's what makes the results of a strike so unpredictable. We are protecting ourselves, however, mainly from nearby strikes and will hope that helps in the case of a direct hit.

Let's consider the tower first. Most antennas we put up on top use a Beta match, and are entirely at ground potential. That means there is a good chance for the current to head down the tower, and it means that the end of the coax is also at ground potential. This gives us a good start, but we need to keep the energy out of the house, and that means the tower needs to be well grounded. So we need to strap (*with ground clamps and #6 wire*) all the mechanical joints (*no, I don't know anybody that's done it, but we are doing this right*) and strapping is even more important for hinges on foldover towers. Crank-ups should have a grounding cable run all the way through. In all cases we need this to keep that current off the wax if we can. Before we leave the tower it would be a good idea to install a bonding strap from the mast to the tower, leaving just enough length to allow rotation (*braided grounding strap works well here*). At the base of the tower we need a good ground system, and we'll cover that better in the future, but installing deep multiple ground rods is the way to do it. As the coax enter the house it should be grounded and once inside a few loops of excess length or a run through some conduit will make it seem like an inductor and help prevent shield currents from the lightning getting to the radio chassis. Now we put in the lightning arrestor. I bought one of the gas discharges, and the response will be quick and uniform each time. Also, if they fail they stay shorted and continue to protect you. Other manufacturers also have similar items, just remember the main point is to get the energy on the center conductor to ground before it gets to the equipment. While we're at the equipment, it too should be grounded—more on that in the future. Note that the arrestor is best placed where a short ground run is available. After all this, it is still a good idea to disconnect or ground antennas during storms (*just hook up a small neon bulb across your 80 or 40 meter dipole leads sometime to demonstrate the potential during a storm*). Now, when done, what the heck, depend on luck for the rest!

WHAT IS MARS?

The Military Affiliate Radio System (MARS) is an organization of licensed amateur radio operators who are interested in military radio communications. MARS is a joint program under the jurisdiction of the Chief of Communications-Electronics, Department of the Army, the Director of Naval Communications, Department of the Navy, and the director, Command Control and Communications, Department of the Air Force. Policy is determined jointly, but operational control is separate.

WHAT DOES MARS DO?

Provides a volunteer facility for handling personal, third party, morale type traffic between military personnel overseas and parents, relatives, and friends at home. Differs training designed to stimulate interest in military or commercial electronic career fields. Provides an additional source of trained volunteer radio communication personnel and a system-in-being as an auxiliary means of communication instantly available to civil disaster organizations during local and national emergencies.

HOW DOES IT OPERATE?

MARS member stations meet periodically in scheduled evening nets on military frequencies outside the amateur bands for the purpose of handling, as an aid to training, MARS administrative, third party and official emergency traffic when called upon by proper authority. Weekend daytime nets meet to discuss modification of military communications equipment and to plan building of electronic projects. Training sessions in traffic handling are held on weekend nets. MARS conducts a youth training program to train young amateur operators through a planned study program usually in conjunction with a high school radio club. Official Regional membership conference's are held one weekend each summer and the general membership is encouraged to attend. A bimonthly MARS newsletter with pertinent operational information and guidance, technical articles and other information of local interest is mailed to each A.F. MARS member.

AM I ELEGIBLE TO JOIN?

The answer is yes if you ... are 14 years of age or older. Hold a valid amateur radio license issued by the FCC or other authorized agency outside the jurisdiction of the FCC. MARS membership runs concurrently with the term of your license and must be renewed or modified when your amateur license is renewed or modified. Expiration or revocation of your amateur automatically terminates your MARS membership.

...Possess a station in operation capable of operating, or can be modified to operate, on MARS frequencies as assigned by the appropriate Army Command, Naval MARS District, or Air Force Commands MARS Director. Amateur radio clubs with trustee type license and military unit amateur radio stations are also eligible for MARS membership.

...Membership in MARS is purely voluntary. It is not a substitute for, nor does it impose any obligations for military service in the armed forces of the United States.

HOW WOULD I BENEFIT?

By receiving a membership certificate authorizing operation on military (MARS) frequencies, operating manuals and operating crystals as available. By receiving on the air training in military communications procedures and instructions in the use and modification of military communication equipment. By becoming eligible for selected electronic courses offered by the U.S. Army Signal School, U.S. Navy correspondence Course Center and the U.S. Air Force Extension Course Institute, upon completion of 6 months active membership. By receiving, after 12 months of active membership, excess and obsolete electronic communications equipment and supplies for experimentation and modification. Issue of such items is based on availability of equipment, degree of participation, and possible assigned mission of individual activity.. By receiving credits for MARS participation toward retirement in the reserve military program if you are a military reservist. By receiving a MARS issued certificate to aid in obtaining a military communication assignment upon enlistment in the Armed Forces.

Novice Corner

Warm greeting to all the novices and other hams who may be reading this column. The month of April is upon us and warm weather can't be too far away. With the prospects of upcoming decent temperatures comes the thought of antenna construction. In this month's *Ham Rag*, I'll try to share with you a particular design that has worked rather well for me.

The idea of this type of antenna came to me from two of our local hams, Bill Spires/KB9UR and Dob Davidson/WA9NTT. While I was a novice, I wanted them to be simple and inexpensive enough so as to be worth putting up. I built and tried them and have had excellent results.

There are a few different names for the antenna design I'm talking about. Among them are - coaxial dipole, coaxial inverted vee, bazooka, etc. What they amount to is an inverted vee dipole type of antenna that is made out of and fed with RG-58/U coax cable. I made them for 80, 40, 15 and 10 meter bands and used them with very nice results.

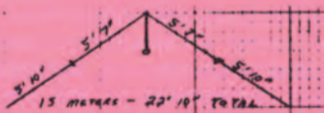
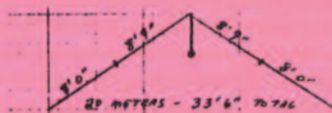
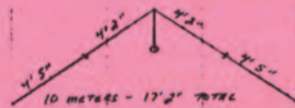
What they amount to is this. You take a piece of the proper length of RG-58/U coax (depending on the band to be converted) and in the middle you remove the vinyl jacket that covers the braided shield. Then you very carefully cut the shield all the way around the coax cable, leaving the inner insulation and center conductor intact. The two shields that you end up with become your two terminals used to connect the center conductor and shield of the transmission line to.

About half way toward the end of each side of the antenna, the shield is again cut all the way around the coax cable. Instead of leaving the center conductor and insulation intact at this point, you remove some of the insulation covering the center conductor and solder the shield wires to the center conductor wire that is exposed. This procedure also gets done at each end of the antenna. Where the connections are made, seal them with a material such as silicone RTV rubber and a good grade of electrical tape.

It is best to keep the angle at about 90° to keep the radiation pattern as omnidirectional as possible. Also try to keep the legs of the antenna in the same plane as much as is possible (in a straight line). Observing these guidelines seems to get the best results.

Below are sketches of the various lengths of antennas for the different bands. I have some xeroxed copies of information sheets on these types of antennas if anyone would like them. One more thing — on the 80 meter antenna, I made some changes in the dimensions that seemed to make the antenna more broad-banded. As soon as I can measure my antenna, I will find out what I did differently for that band. Good luck with your antenna building.

73's for now. Brad, KA9LTR



Potpourri

Well; I intended to send greetings from the sunny state of Florida this month but the day before we were to leave home, I cancelled the trip. Why would anyone in their right mind want to leave this part of the country where the temperature has been like spring? Reports from people who have spent the past two months down there say "stay here". Besides, there is plenty to do around the house this time of year and why not save the money and spend it on ham gear...

Congratulations go to Larry/KS9B and his XYL, Marsha. They are the proud parents of twin girls born March 6th. Marsha said if ever more were to be added to the Carlstrom family, they would be adopted. Most of the credit goes to Marsha because the only part Larry played was in the preliminaries. Good health and happiness to you all.

March 20th was the date for the Sterling/Rock Falls hamfest. Carol/W9TET drove down there to see if he could get rid of some of his gear. It is possible that he and his XYL may move south sometime soon. This year, as usual, there was a good crowd and many came away with something they simply had to have..

Awareness Day at the North Towne Shopping Center is Saturday, April 9th. Jim/WB9FVF, is heading this one up and has a very good group of helpers. He hopes everybody will pitch in and make this 3rd annual event the best ever. Try to be on the local repeaters and the lower frequencies to assist in some demonstrations.

We hear new call signs occasionally around the area. Frank Hirsch is now KS9X and Gerry Alberts is now KU9S. Russ Nimocks is now KU9G.

We have had a few travelers return to the Rockford area. WB9OGD and YL N9CNB returned from the clown convention in the San Antonio area. Carol Carlson/W9TET and YL KA9IMV have also returned from Texas. K9AMJ spent the month of February in Florida with his lovely wife Sharon. Wonder who has the best tan???

What EARS officer (\$\$\$\$) was seen recently falling out of a booth at Lums? He said he was looking at all the signs...

73, Chuck/N9CCH

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TEN TEN INTERNATIONAL**

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21.130 Mhz. Thursday 9:00 p.m.