



the **RARA RAG**

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MARCH MEETING QRM "On The Web?"

by George F. Lloyd, N2UIO
Vice President RaRa

Here is something a little different. I have always been curious as to how our telephone systems work. Many curious and interesting things happen when the receiver is picked up and a number is dialed. Ever wonder how all of this works?

Well, here is a chance to find out all about it. At our March meeting, we will be treated to a discussion on Telephony and several other related items. John Woika K8NJV is going to discuss many of the fine points and functions of Telephony. There is a great deal that goes on while using our phone systems. Among the many subjects John will touch on will be QRM on the web, fact or fiction? Also discussed will be a variety of technical reviews such as point to point telephone calls for local calls as well as long distance. Along with information on how long distance are performed will be discussion on how 800 numbers work.

I suspect many of us will find this next item of particular interest. Many of us now have personal computers and have access to the Internet. John will also speak about PC modems. Data transfer rates and modem comparisons such as are two 28.8 kbs modems better than one? Is a 56 kbs modem really faster? These are all questions that will be raised at our March meeting and a great opportunity for us to learn what there is to all of this. I know I have often wondered how all these systems work and I hope you will all share my curiosity and come to the March meeting and listen to what John is going to discuss. See you there!

SILENT KEY

Norman D. Thompson
WA2CBW
February 12, 1997

RaRa MEETING

March 7, 1997

8:00 P.M.

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the *RaRa Rag*

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1997 Hamfest Programs, Part III

by Lloyd R. Caves WB2EFU

As each month goes by we keep getting a little closer to the hamfest season. It won't be long now and the weather will start to warm and everyone will be more in the mood to think about getting out to the hamfests and flea markets. Don't forget that this year the Rochester Hamfest will be even more enjoyable as it will last longer than in the past. Yes, the Dome will be open on Friday afternoon, May 30, for everyone to see and buy new equipment. This is in addition to the flea market being open all day on Friday. So mark your calendars now for May 30, 31, and June 1 and plan on attending all three days.

With the Dome being open on Friday afternoon it will give you more time to attend some of the programs that will be held on Saturday without missing out on any deals. So that you will know what the programs are, check this column each month as it will give you a little background on them. Remember that you have to check each *RaRa Rag* from January through May as every month different programs are covered. Lets see what we have this month.

As in past years the renowned speaker Harry Dannals, W2HD, President Emeritus of the ARRL will be with us. This year he is collecting a lot of data and input on a subject that should be near and dear to our hearts. The title of his talk will be **Technology-Friend or Foe?** If you want to know more about where today's technology is taking Ham Radio you won't want to miss this talk.

Are you a new Ham? Have you heard a lot about all types of antennas and the pluses and minuses of each but are still confused as to what the real differences in performance are? If so, be sure to schedule yourself to see **Hands On Antenna Assy. For The New Ham**, by Ed Hare, KA1 CV, of the Laboratory Staff at the ARRL. Learn to build a "J" Pole, Ground Plane, and a Three Element Yagi for two meters. Also, see their efficiency tested with a field strength meter. This will help you decide which antenna is best for your needs.

ARRL Field Organization and NTS, lead by Bill Thompson, W2MTA. Bill is the Western New York Section Manager and welcomes all that are interested in Nets, Public Service, ARES, and RACES. Join Bill to see what is new and exciting in the Western New York Section. Some changes have taken place with the Northern New York Section being formed. This is a good time to hear

what has taken place and ask questions that you may have.

Are you a CW operator: If so plan on testing your skill at the **W2RUF Code Proficiency Tests** conducted by Kevin Kedzierski, WA2FKV, Special Evens Coordinator for the Radio Association of WNY. A certificate (pictured else where in the *Rag*) will be given to those participants who copy at least one perfect minute at 7.5 WPM. There will be endorsements for levels from 10 WPM to 75 WPM in jumps of 5 WPM. You will find Kevin in a booth on the Dome floor all day Saturday.

Watch this column next month to learn about more programs to be presented. All programs are being listed in the January through April issues of the *Rag*. The May issue will list the schedule for all the programs and the room numbers so you can make the best of your time while enjoying the Hamfest. You will also find this schedule in the flier that will be mailed to you soon.

FCC FINDS MISSING CALL SIGNS; VANITY PROCESSING COULD RESUME SOON

via The ARRL Letter

Following up on "a few inquiries" into why certain call signs were not assigned when they were available, FCC personnel in Gettysburg report they found some 3355 call signs (mostly 2x2 and 2x3 format) that should have been made available for the vanity program but were not, for some reason. An FCC spokesman in Gettysburg reports a search of all vanity applications (including those that required special handling) comparing requested call sign(s) against the 3355 turned up four to be resolved. The other call signs now have been made available for future vanity grants.

As reported in The ARRL Letter Vol 16, No 3, callers to the FCC's Gettysburg office were being told that processing of vanity call sign applications would not resume until early March because of "unspecified computer-related problems." Gettysburg now seems to be pulling back from that date, and a spokesperson said this week that the FCC hoped to resume vanity processing by February 1. Before processing the backlog of vanity call sign applications, personnel in Gettysburg first plan to deal with those applications that required special handling--the so-called "WIPS" (work in process) stack--which is backlogged from early November. A spokesman said Wednesday that the FCC will resume work on the WIPS stack "in about a week." Also, contrary to what several callers were told, the FCC did not issue a public notice about the vanity call sign program this week.

March Calendar

- 7 - RaRa Meeting - 8:00PM - Henrietta Fire Hall, 3129 East Henrietta Road
- 15- RaRa VE Testing - 111 Westfall Rd. 8:30 AM
- 18 - RDXA testing & Meeting - 111 Westfall Rd., 7:30PM Meeting, 5:30 Testing

QST COVER PLAQUE AWARD

by Ed Gable K2MP

RaRa would like to acknowledge and congratulate RaRa member Bruce Kelley, W2ICE, for winning the ARRL QST Cover Plaque award. This award recognized Bruce's excellent historical article "Hams Span the Atlantic on Shortwave." The article appears in the December, 1996, QST and is wonderful reading. Bruce is a RaRa Past President, a co-founder of the Antique Wireless Association, a co-founder of the Rochester DX Association, a Fellow of the Radio Club of America and....well my fingers are getting tired. Congratulations, Bruce Kelley.

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ANNOUNCING NEW LICENSES

The following candidates successfully completed the required elements to qualify for a Amateur Radio License at recent RaRa Testing Sessions:

NEW LICENSES:

Technician

- Montione, Carl, KC2AQZ
- Johnson, Andrew, KC2AX1
- ARNEY, Laura, KC2AXH
- Roberts, Raymond KC2AXG
- Voss, John, KC2AXJ

Technician+

- Guillod, David, KC2AQY
- Brewely, Clement, KB2HYP

UPGRADES:

Technician+

- Becker Clement, KB2HYP
- ExtraStackpole, William, N2KPA

To the above, and others who passed elements or, their way to a new license or upgrade

CONGRATULATIONS!

Note: because of the use of the latest advanced methods of transmitting test data to the FCC, the new licensees who took exams on the Saturday test session were able to obtain their call signs and go on the air the following Tuesday.

Rochester Hamfest

May 30 - June 1, 1997

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"STANDARD" TVI REMEDIES

Install a low-pass filter between the transmitter and the ante-a tuner. If the TVI is on channel 3 harmonically related to 15 meters, i.e.. channel 3 and channel 6, this will probably be the cure. Even if not, put it on anyway. The TVI might stem from both station harmonics and fundamental overload. This way you will be confident that it is not your station.

Purchase some FT140-43 ferrite cores. (#43 is the material of choice for 15 meters. If you also operate on 80, get some FT-140-J, FT-140-75, or FT-140-77. If you have RG-8 (or equivalent size) cable, or a BIG line cord or plug, you may need to use an FT-240 size core.)

Wrap about 10 turns of the transmitter's AC line cord around one of these cores, as close as possible to the transmitter. This is a common-mode choke. (If you have other AC-powered equipment connected to the transmitter, i.e.. keyer, SWR meter, TNC, etc., Install one of these on its AC line cord, too. The idea here is to prevent any chassis RF (harmonics or fundamental) from seeking earth via the power lines.)

Do the same thing with the coax cable between the transmitter and the tuner. This is also a common-mode choke.

Now you know that the transmitter is probably clean.

Simplify the TV installation. Multiple TVs, VCRs, etc. make it impossible to troubleshoot. Get it down to one antenna or cable and a TV. If it is cable and a non-cable-ready TV, use the set top converter or VCR as you normally do. After you get the bugs out, you can start adding stuff back one at a time.

If you have a TV preamp, booster or distribution amp, get it the heck out of there. These things are notorious for overload.

Install a high-pass filter on the TV (or before the set-top converter/VCR.) If using a set-top converter/VCR, you may need to use one before the converter AND before the TV.)

Install a common-mode choke in the same location(s). If the TV is using a CATV or community antenna, I would try the common-mode chokes before the high-pass filter, just to play the percentages.

Install a common-mode choke on the TV and set-top converter/VCR AC-line cords.

If you still have interference, try using a differential-mode AC-line filter on the TV, set-top converter or VCR, and the station transmitter. Radio Shack catalogue 15-1111 is universally available.

From ARRL HQ via The EMITTER

FCC ON SCANNING RECEIVERS: POST-SALE CELLULAR MODS ARE ILLEGAL

via The ARRL Letter

In the wake of the Newt Gingrich cellular telephone taping incident, the FCC has made it clear that it's illegal for manufacturers or dealers to modify scanning receivers to enable reception on cellular telephone frequencies. A Public Notice, DA 97-334, issued February 13, declares that scanner modification is included in the ban on manufacturing cellular-ready scanners.

The notice comes as members of Congress raised concerns over the widely publicized incident where a cellular telephone conversation of House Speaker Newt Gingrich was intercepted and taped and its contents ended up on the pages of the New York Times. A House subcommittee hearing on cellular telephone privacy that also stemmed from the Gingrich cellular taping and disclosure also addressed the issue earlier this month.

Among those testifying before the Subcommittee on Telecommunications, Trade and Consumer Protection was Bob Grove of Grove Enterprises (and Monitoring Times), who tried to argue that a legal loophole allowed him to sell and then retrofit scanners to pick up cellular conversations. Other testimony focused on the low priority that Congress has placed on prosecution of cellular eavesdropping cases.--FCC/Steve Mansfield, N1MZA

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RaRa YEARS AGO

by Ed Gable K2MP

20 Years Ago, March 1977: In this issue Bruce Kelley, W2ICE, continues a two part article on the history of the Rochester Hamfests. The post war years (that's WW2 for you kids) started at the main ballroom of the Powers Hotel and the moved around to various club locations for many years. The Doud American Legion Post served well until the memorable year 1964, when the Hamfest moved to it's current location at the Fair Grounds in Henrietta. Causing much excitement were the new OSCAR Satellites and the March program featured Bob Crumrine, WB2DNN, area AMSAT coordinator, along with Fred Becker, W2GV, who explained how easy it was to work the birds. Ed Valmore, K2EVJ, writing for the Rochester VHF Group, reported on the VHF contest where the local winner was WA2SEY, just beating out always high scoring Chuck Oneske, K2YCO. A new advertiser was JR's at 3327 Lake Avenue.

40 Years Ago, March 1957: All about Wire Communications pleased a standing room only crowd as the always enjoyable Frank Morris, K2LIK, of Stromberg-Carlson gave one of his popular presentations. The May 4th Hamfest was announced. Member price was three dollars including banquet. A new comer to the bands was Cappy Capauldy, KN2UXF, who would become RaRa President and founder of the popular RaRa Dinner Dances. The RaRa Directory, way back then, was a popular item and ready for delivery. The mimeograph, mostly proof-read typed copy didn't quite come to today's standard, however. From the want ads you could buy a NC-183D from Hank Blodgett, W2UTH, for \$265.00.

DIGITAL JOURNAL, QRT

Digital Journal (formerly RTTY Journal) has ceased publication with its January 1997 issue. The move to shut down the 45-year-old publication came shortly after the magazine's publisher, the International Digital Radio Association (IDRA), announced that Digital Journal would switch from monthly to bimonthly publication.

On his Web page, the magazine's editor, Jim Mortenson, N2HOS, cited a combination of flagging advertiser support and "a decline in the number of members willing to pay for hard copy of what they felt was available for no cost on the Internet."

Mortenson said that the phone and fax numbers at IDRA headquarters will no longer be in service. All correspondence goes to the IDRA at Box 2550, Goldenrod, FL 32733.

Tnx ARRL Letter

AT THE TONE THE TIME WILL BE...

(Ed: From the United States Department of Commerce, National Institute of Standards and Technology, Special Publication #559-Time and Frequency Users Manual)

High frequency (HF) short-wave radio broadcasts are a popular source of time and frequency information. HF signals from stations such as WWV (Ft. Collins, Colorado), WWVH (Kauai, Hawaii), and CHU (Ottawa, Canada) are readily available and provide essentially worldwide coverage. A number of foreign countries operate services in these frequency bands, and the signals can be received with relatively low-cost receivers.

In addition to the simpler, low-cost receivers, several manufacturers now provide more elaborate receiving equipment. These receivers pick the best signal automatically by re-tuning from one frequency band to another. Also, you can now buy receivers with a built-in computer interface, making it possible to obtain a time code to reset a computer clock. Of course, any shortwave radio receiver from the simplest to the most elaborate can be used.

COORDINATED UNIVERSAL TIME

Coordinated Universal Time (UTC) was adopted in 1971 and became effective in 1972. UTC is based on an Atomic Time Scale. As a result, a UTC clock gradually gets out of step with the Sun. This is the same situation that causes us to have leap years. Since the year is not an exact multiple of the day, we add a day every 4 years to keep our calendar in step with the seasons.

The same scheme was adopted to keep clocks in step with the Sun, and the "leap second" was born. To make adjustments in the clock, a particular minute would contain either 61 or 59 seconds instead of the conventional 60 seconds. You could, therefore, have either a positive or a negative leap second. It was expected and proved true that leap seconds would normally occur about once a year.

By international agreement UTC is maintained within 0.9 second of the navigator's time scale UT1. By adding positive or negative leap seconds, a good clock can keep approximate step with the Sun. Since the rotation of the Earth is not uniform, we cannot predict exactly when leap seconds will be added or deleted, but this is usually done on June 30 or December 31.

If you tune to a frequency and time broadcast, the time is uniform. It will never differ from UT1 by more than 0.9 second. Most users, such as radio and television stations and telephone time-of-day services, use UTC so they don't care how much it

differs from UT1. Even most navigators don't need to know UT1 to better than 0.9 second, so UTC also meets their needs.

However, a small number of users need UT1 time to less than 0.9 second. To meet the needs of these users, most standard frequency and time radio stations broadcast a correction which can be applied to UTC to obtain UT1. On WWV, for instance, the corrections, in units of 0.1 seconds, are encoded into the broadcasts by using double ticks or pulses after the start of each minute. The amount of correction is determined by counting the number of successive double ticks heard each minute, and the sign of the correction is given by the location of the double ticks within the minute (most frequency and time stations worldwide have some such scheme for UT1).

Keep in mind that UTC prevents you from simply subtracting the dates of the event to get the time difference between them. You must take into account any leap seconds that were added or deleted.

WWV AND WWVH

Standard time and frequency stations WWV and WWVH are operated by the National Institute of Standards and Technology (NIST). Both stations broadcast continuous time and frequency signals on 2.5, 5, 10, and 15 kHz. WWV also broadcasts on 20 MHz. All frequencies carry the same program, and at least one frequency should be usable at all times. As a general rule, frequencies above 10 MHz work best in the daytime and the lower frequencies work best at night.

The stations get their signals from a cesium beam frequency source. They each use three "atomic clocks" to provide the time of day, audio tones, and carrier frequencies. The rates or frequencies of the cesium oscillators at the stations are controlled to be within 1.00E-12 of the NIST frequency standard located in Boulder, Colorado. Time at the stations is kept within a few microseconds of the NIST atomic time scale, UTC(NIST).

The seconds pulses or "ticks" transmitted by WWV and WWVH are obtained from the same frequency source that controls the carrier frequencies. They are produced by a double sideband, 100 percent modulated signal on each RF carrier. The first pulse of every hour is an 800-millisecond pulse of 1500 Hz. The first pulse of every minute is an 800-millisecond pulse of 1000 Hz at WWV and 1200 Hz at WWVH. The remaining seconds pulses are brief audio bursts (5-millisecond pulses of 1000 Hz at WWV and 1200 Hz at WWVH) that sound like the ticking of a clock. All pulses occur at the beginning of each second. The 29th and 59th seconds pulses are omitted.

Each tick is preceded by 10 milliseconds of silence and followed by 25 milliseconds of silence to avoid interference from other time stations and to make it easier to hear the tick. The total is a 40 millisecond protected zone around each seconds pulse. This means that the voice announcements are also interrupted for 40 milliseconds each second. This causes only a small audio distortion. The ticks have priority and must be received clearly.

THE WWV/WWVH TIME CODE FORMAT
The broadcasts from WWV and WWVH include a time code. The time code signal is 100 Hz away from the main carrier and is called a subcarrier. The code pulses are sent out once per second. With a good signal from a fairly high quality receiver, you can hear the time code as a low rumble in the audio. HF receivers that receive and decode this signal can automatically display the time of day.

The WWV and WWVH time code is continuously broadcast in binary coded decimal (BCD) format on a 100-Hz subcarrier. The time code is a modified version of the IRIG-H code. The code is transmitted serially on a 100-Hz subcarrier at a rate of one pulse per second.

The time code is in binary coded decimal (BCD) format. Groups of binary digits (bits) are used to represent decimal numbers. The binary-to-decimal weighting scheme is 1-2-4-8. The least significant bit is always sent first. The decimal number is obtained by multiplying each bit in the binary group by the weight of its respective column and then adding the four products together. For example the binary group 1010 is equal to 5. This is derived by: $(1 \times 1) + (0 \times 2) + (1 \times 4) + (0 \times 8) = 1 + 0 + 4 + 0 = 5$

In the standard IRIG-H code, a 0 bit consists of exactly 20 cycles of 100-Hz amplitude modulation (200 milliseconds duration), and a 1 bit consist of 50 cycles of 100 Hz (500 milliseconds duration). The WWV/WWVH code differs from the IRIG-H because all tones are suppressed briefly while the seconds pulses are transmitted.

Tone suppression also delete the first 30 milliseconds of each binary pulse in the time code. This makes the WWV/WWVH bits 30 milliseconds shorter than the IRIG-H bits. Therefore, the 170 millisecond pulses are recognized as 1 bits. The leading edge of each pulse coincides with the positive-going crossing of the 100-Hz subcarrier; but due to tone suppression, it occurs 30 milliseconds after the start of the second.

Within 1 minute, enough bits are sent to express the minute, hour, and day of the year, the UT1 correction, and Daylight Saving Time (DST) indicator. The coded time information refers to the time at the start of the 1 -minute frame. Seconds are determined by counting pulses within the frame.

Two BCD groups are needed to express the hour (00 to 23) and minute (00 to 59); and three groups are needed to express the day of year (001 to 366). Some bits in the BCD groups are unused, but may provide additional information in the future. To represent units, tens, or hundreds, the basic 1-2-4-8 weights are multiplied by 1, 10, or 100 as appropriate.

Each frame begins with a unique spacing of pulses that mark the start of a new minutes. During the first second of the minute, no pulse is transmitted. This creates a 1 second (1000 millisecond) hole. Since the pulses are already delayed 30 milliseconds by the tone suppression, the UTC minute actually begins 1030 milliseconds (1.03 seconds) earlier than the first pulse in the frame. For synchronization purposes, a position identifier pulse is transmitted every 10 seconds. The position identifier pulse lasts for 770 milliseconds (77 cycles of 100 Hz).

UT1 corrections are sent during the final 10 seconds of each frame. These corrections are to the nearest 0.1 second. The UT 1 correction is expressed with bits called control functions. Control function #1 occurs at 50 seconds and tells whether the UT1 correction is negative or positive. If a 0 bit is sent, the correction is negative; if a 1 bit is sent, the correction is positive. Control functions # 7, # 8, and # 9 tell the amount of the UT1 correction. They occur at 56, 57, and 58 seconds, respectively. Since the UT1 corrections are tin tenths of seconds, the binary-to-decimal weights are multiplied by 0.1.

DST information is sent by control function #6, at 55 seconds. If DST is in effect, a 1 bit is sent. If Standard Time is in effect, a 0 is sent. The setting of this bit is changed a few hours prior to 0000 UTC on the date of change. This schedule notifies users in the continental United States of the time change several hours before it occurs locally (usually at 2:00 a.m.). Receivers that display local time can read control function #6 and make the 1-hour adjustment automatically when the time changes occur.

Tnx Metroplex

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