SPECIAL SERVICE CLUB

the RaRa Rag

Published by

ROCHESTER AMATEUR RADIO ASSOCIATION, INC.

VOL. 38 JANUARY 1986 NO.5

HAMS HAVE HIGH "POTENTIAL" TOPIC OF JANUARY RaRa MEETING

Have you ever built up a circuit, wondered why it didn't work, and found that one or more of the transistors or IC's had failed? Have you ever received a shock from a doorknob? There may be a connection between these events, even though the doorknob still works and the IC doesn't? The same static discharge problem plaguing the electronics industry may be affecting your home projects, even if you don't see or feel a static shock.

There are other kinds of shocks which we do feel and which are harmful to people (the circuit may still function, but the people may not). Few of us get more than several of these per lifetime.

We can reduce the risks of damaging our equipment or ourselves by understanding some of the "*potential*" problems facing us and avoiding them. That's the topic of the January 3rd program to be presented by Gil Chapin, WB2UTI.

January's meeting will return to the 40/8 Club at 933 University Avenue, across from Gleason Works. Starting time is 8:00 p.m. sharp. Be prepared for a resumption of our outstanding awards program as well as refreshments prepared courtesy of of our resident "*pro*", George Muller. Hope to see you there !

A REMINDER

By the order of the City Fire Marshall and Monroe County Law, there is to be NO SMOKING at any public gathering or meeting of 50 or more persons. This affects the RaRa meetings. Please be courteous to your fellow hams and if you must smoke, do so outside of the meeting room. Your cooperation will be greatly appreciated.

SECOND ANNUAL WINTER FUNFEST FEB 8th AT MENDON PONDS PARK

by Ed Kohl, WA2UBD

The second annual RaRa Winter Family Funfest will be held Saturday, February 8th at Mendon Ponds Park (Hopkins Point Lodge). We have reserved a lodge and have planned an enjoyable event for everyone. The fun begins at 12 noon and doesn't stop until 6 p.m. Hot food and hot beverages will be served.

In addition to cross-country skiing, sledding and other outdoor activities, there will be plenty of room inside for visiting with old friends and making new acquaintences by the fire. (Maybe we can even have a rematch in Trivial-Pursuit !)

There will again be a dessert-baking contest with prizes awarded to the winning entries. So plan to bring some type of baked '*goodie*' (cookies, cakes, pies, rolls, etc.) to enter in the contest and to share with everybody when the judging is over.

The cost for this Funfest will be only $2 per person, up to a maximum of $5 per family. **If you plan to attend, please tell us how many people in your family (including yourself) will be attending by sending a QSL card or post card with your name and call to:** *RaRa Winter Funfest, P.O. Box 1388, Rochester, NY 14603-1388, or by calling Ed Kohl, WA2UBD, at 223-2872.* **Do not send any money with your reservations.** The fee will be payable at the Funfest. We look forward to seeing everyone there !

STATE SCHOOL AT INDUSTRY NEEDS HELP

Rich Sykes, WA2EIV, tells us that he is involved with building interest in Amateur Radio with the young residents at Industry. If you have any old Ham gear that they could use for building interest and experimentation, contact Rich at 442-4761.

Items being sought include old coax, antennas, tripods, receivers, etc. Your interest would be greatly appreciated.

the RaRa Rag

Published by
ROCHESTER AMATEUR RADIO ASSOCIATION, INC.
P.O. Box 1388, Rochester, NY 14603-1388

Editor ..... Ronald J. Jakubowski, K2RJ
446 Cedarwood Terrace, Rochester, NY 14609 (716-482-6308)

Associate Editor ..... Don Taylor, KB2BU
109 French Road, Rochester, NY 14618 (716-586-3158)

Contributing Editor ..... Dwight Hill, K2KWK
265 Norcrest Drive, Rochester, NY 14617 (716-544-2332)

Advertising Manager ..... Frank Pollino, K2OS
149 Whittier Road, Rochester, NY 14624 (716-594-0502)

VOL. 38 JANUARY 1986 NO. 5

The RaRa RAG (USPS 605-440) is published monthly except July and August by the Rochester Amateur Radio Association, 446 Cedarwood Terrace, Rochester, NY 14609. Subscription price $3.00 per year (included in $7.00 annual membership dues). Second class postage paid in Rochester, New York. Postmaster - send address changes to RaRa Rag, P.O. Box 1388, Rochester, NY 14603-1388. Full permission is granted for reprinting articles provided a credit line is given to the RaRa RAG. The RAG exchanges with other organization's publications.

RADIO PRIVACY?

A major confrontation has developed between amateur radio and the cellular telephone industry. It has occurred because of the cellular lobbying group's intransigent stand against the current right of the general public to monitor telephone – type communications transmitted by radio, including amateur autopatches. This dispute has been long in the making, and one which will be fought in the halls of Congress in the form of House Bill HR - 3378 and Senate Bill S - 1667. The cellular telephone interests, intent on legitimizing their misleading advertising, have managed to convince several Senators and Representatives that a law is needed that will "*guarantee*" privacy to car phone users.

The Cellular Telecommunications Industry Association has lobbied hard and long to sell the idea to the Congressmen that it is possible to keep the general public from listening in on radio relayed telephone conversations, and thus give phone users privacy on a par with regular phones connected to a twisted pair. It appears as if the communications industry in general, and the cellular telephone sector in particular, have become "*paranoid*" over the subject of communication security. They apparently figure that passing a law to prohibit ownership by the public of various forms of receiving gear will afford them with the advertising legitimacy they seek.

The combined bills, which are called the "Electronic Communications Privacy Act of 1985", are not limited in their scope to keeping scanner manufacturers from selling radios for the 800 MHz cellular band. The original purpose of the legislation was to stop computer hackers from violating the security of data processing systems. The Cellular Telecommunications Industry Association latched on to the proposal and politicked for certain amendments. Now, the twin House and Senate bills are designed to make any form of even inadvertent eavesdroping on any data communication, telephone call or radio communications into a crime, unless it falls under a specific list of exemptions.

The list is very vague at best, with five rather broad categories. These are "*electronic communications made through a system designed so that the communications are readily available to the public... any communication which is for use of the general public as relating to ships, aircraft, vehicles or those persons in situations of distress ... communications by walkie-talkie; police or fire communications system ... [and] amateur*

(Continued on next page)

PRIVACY (Continued from previous page)

and CB radio, excluding GMRS citizens radio communications."

The kicker is that the CTIA wants the monitoring of amateur radio autopatch calls made illegal unless you are a party to the conversation. In fact, the group demands that the legislation direct the FCC to set aside designated subbands where ham auto-patches would be operated in total security! As an alternative amateurs might be permitted to encrypt their autopatch communications, currently a violation of Part 97 rules. Another information source indicates that the CTIA has also become aware of HF autopatching, RTTY, Packet, AMTOR and other so-called specialized modes, and is in the process of modifying its demands to place a "*security of communications blanket*" over these as well.

Word from Washington sources who attended the recent hearings on the proposed new law is that as far as the CTIA and other cellular and telephone lobby support groups are concerned, this amateur radio matter "*is a non-negotiable point*". They say, if it is telephone or personal communications, it must be protected, whether the users of the service want the protection or not. CTIA has refused to supply any information to this reporter, although ascertaining their view has been attempted. If the bills become law, they will affect almost every US citizen who may own an old TV capable of "*intercepting*" "*private*" communications.

We amateurs must become activists working in opposition to the proposed law. We must let the general public know that, irrespective of CTIA claims, that it is too late for any law to give 100% content security to cellular telephone, unless the cellular service suppliers are willing to encrypt their transmissions. The public and legislators must be made aware that there are hundreds of millions of television receivers and VCRs which have the ability to easily tune in the cellular channels, which are the former UHF TV channels 70 -83. The new law as proposed would make their owners into criminals, subject to fine or imprisonment, if they even inadvertently overhear something on a TV sent not meant for them. Imagine a federal marshal or FBI agent forced to arrest a homeowner and confiscate his VCR because it receives cellular radio communications! It is most important that we inform the public and the politicains that what cellular telephone really wants is to legitimize the false advertising of some Cel-Tel suppliers – those whose ads make the unsuspecting consumer believe that the security of a call made over a cellular phone is as good as one made at home. If these facts are made known, the bills will be killed. No politician wants his name connected to a "*lie*", and this is the "*Big Cel-Tel Lie*". Expose it by going to every newspaper and radio and TV station in your area. And consider registering a complaint with your local Better Business Bureau or state Public Utility Commission when you come across an ad for a Cellular Radio Phone Service that claims to be totally secure but is not encrypted! Perhaps this advertising is a good place for federal officials to increase their regulation.

DE WA6ITF, Tnx WESTLINK REPORT

JANUARY RAG CALENDAR

3 - RaRa Meeting, 8:00 p.m., 40/8 Club, 933 University Avenue

8 - RaRa Board of Directors meeting, 7:30 p.m., K2JD Club Station

9 - Rochester Packet Group meeting, 8 p.m. Monroe County Social Services Bldg., 111 Westfall Road

10 - Rochester VHF Group Annual Contest-Kickoff, 8:00 p.m., County Social Service Bldg., 111 Westfall Road

11-12 - January VHF Sweepstakes

14 - RDXA meeting, 8:15 p.m., Colonial Hotel, 1127 Empire Boulevard

15 - February *Rag* Deadline

17 - RRRA meeting, 8:00 p.m., Pittsford Town Hall

18 - Amateur Radio Exams, County Social Service Bldg., 111 Westfall Road

ARRL UPDATE

Last month you may have received a special invitation to join the ARRL if our database indicated you were not an ARRL member. Only those who checked the ARRL block YES on the RaRa Membership Renewal form are counted as members of ARRL. If you left the blocks blank, you were entered into the database as NOT a member of ARRL. The bottom line is that if you received a mailing and ARE an ARRL member, let our membership chairman Lloyd Caves, WB2EFU, know so that the records can be corrected. Also, if you are a life member of ARRL, please let us know. With our new database program, we are now capable of noting ARRL Life members so you will not have to be bothered by an ARRL membership solicitation again.

AMATEUR RADIO NEWS SERVICE

ANNUAL
PUBLICATION AWARD

FOR THE ADVANCEMENT OF AMATEUR RADIO JOURNALISM

* * * RARA RAG * * *

EDITED BY: Ronald J Jakubowski, K2RJ
having been judged

EXCELLENT

is hereby awarded this testimonial in official recognition of the excellence of its performance and outstanding contribution to Amateur Radio journalism during .

Dated November 1, 1985

Hugh Winter
Vice-President A.R.N.S.
W5HIO

Lee Kimble W9HOL
President, A.R.N.S.

THE ANATOMY OF A RAG

by Ronald J. Jakubowski, K2RJ, Editor

I have received many compliments on the *Rag* in the course of my editorship, both from members of RaRa and editors of other publications. One of the most coveted compliments, however, comes in the form of an award that is reproduced above, an Excellent rating from the Amateur Radio News Service Annual Publication Award. I must take this time, however, to give a little background on how the *Rag* gets put together each month and to give credit to those who assist, mostly behind the scense, each month.

We start by collecting inputs from our *reporters* – you, the members, board members, affiliate clubs, etc. and getting them together at deadline time. I also extract articles from other clubs' newsletters, ARRL Letter, W5YI Report and Westlink Report. Within a day or two of the deadline, I meet with Associate Editor Don Taylor and we get things ready to send to the printer for typesetting. Don usually takes care of the delivery of the copy. Joyce Ray, wife of printer Don Ray, WA2PKS, is in charge of typesetting all the copy submitted. The typeset copy is returned, waxed on the back, ready to be cut up and "paste-up" into preliminary format.

Don Taylor and I usually get together for the paste-up session. We determine which articles go where, what has to be cut or stretched. Its analogous to putting together a jigsaw puzzle with variable shaped pieces. Sometimes we determine that an article can wait until next month, or sometimes we must make room for a late breaking story that needs to be typeset yet. After paste-up of a page is complete, it is proofread by each of us and the gallies are marked for corrections. Don then delivers the paste-up pages to Don and Joyce Ray.

Joyce then makes the corrections and any last minute typesetting and does a final paste-up in perfect form. She and Don are as much a part of the staff as those listed in the masthead and often must make last minute decisions when things don't fit or look quite right.

After the paste-ups are camera ready, Don Ray takes over and makes the photographic plates necessary for offset printing. He then prints, cuts and folds the pages of the *Rag*.

After the printing, the *Rag* must be collated and stuffed into envelopes. Sometimes we have a collating and stuffing party at my house or the club station and get some club members involved.

(Continued on next page)

LIGHTNING PROTECTION SIMPLIFIED

by Howard Hull

1. FIRST ORDER PROTECTION –

On the tallest object associated with your structure, mount an extended umbrella-like fixture a few meters in diameter, with numerous sharp points along the periphery and across the crown, spaced about 1 meter apart. (You can make the thing from re-bar and heavy duty chicken wire unless you have high winds like we have around here.) Use a large diameter conductor (1 to 2 cm.) to connect the umbrella points together at the center and thence down to a suitable ground stake located at a place where soil moisture is prevalent, but more importantly, try to make the conductor run in a straight line with *no* sharp corners; use a minimum radius of 1.5 meters on any bends in the ground wire. Keep this wire at least 2 meters from any power or communications conduit at all places along its route.

THEORY:

The multitude of points will emit a trickle corona continuously, resulting in a space charge of ionized air within 20 meters of the umbrella. The space charge will terminate the cloud-to-ground electric field across a broad hemisphere and will reduce the local field gradient to a value below that needed to form "leaders". The umbrella will likely not even be hit by lightning; however, the conductor gauge is set to minimize the damage inherent in such a strike. (A strike, if it occurs, will likely be a secondary, (resulting from the shift in electrostatic field just after a strike) to another object within a fraction of a km.) This approach, you should note, puts additional stress on your neighbors (they will see a slight rise in their hit statistics) as it only postpones the discharge until the cloud has moved past your installation. The ground conductor is spaced from other conduits so that the Electromagnetic Pulse (EMP) associated with the 10000 Ampere surge will not be able to develop equivalent currents in parallel conductors adjacent to the ground wire. Using a large diameter and avoiding bends reduces the per length inductance discontinuities. This discourages the abandonment of your ground conductor in favor of nearby metal objects such as power conduits (resulting in hazardous elevation of the system ground potential to thousands of volts above the mains).

2. SECOND ORDER PROTECTION –

Protect your primary power entry by use of a surge protector having four main elements

a.) Line fuses for each hot main NO FUSE FOR THE WHITE NEUTRAL. No circuit breakers (too slow).

b.) Self extinguishing gas discharge tubes or arc chutes routed to a primary ground stake *separated* by 3 or more meters from the umbrella ground mentioned above, *not* using the same stake, even, and using the same linear routing algorithm mentioned above.

c.) Heavy gauge inductors, 1 microhenry or thereabouts for typical 30 to 50 Ampere per phase service levels, to choke the surge out of the consumer side of the system. NONE IN THE WHITE NEUTRAL.

d.) Post choke line clamping to WHITE NEUTRAL. This is where the witchcraft comes in. One candidate is the Metal Oxide Varistor (MOV). They have two disadvantages: They age, gradually reducing their threshold over time until one day they evaporate in a ball of fire during a line surge. They have a rather remote threshold characteristic compared to, say, a Silicon TransZorb. They have several advantages: They are cheap. They come in packaging that is familiar to professional electricians. They are generally more robust than Selenium or Silicon protectors. They have a smaller geometry than a Selenium protector. Another candidate is a combination protector made up from a ground referenced 50 Ampere triac in series with either a lower rated voltage MOV or TransZorb element, with the triac gate wired back to (an artfully positioned) tap on the gas tube/arc chute ground. From here (this stuff belongs in a fire-rated NEMA box) the WHITE NEUTRAL and GREEN NEUTRAL are tied together at this one point only, and passed through a medium size conductor to the primary ground stake by a route that is separated by 1.5 meters from the gas tube/arc chute ground.

THEORY:

If your power line gets hit, the gas tube fires and conducts the surge current to ground. The 20 kilovolts experienced by your service entry (for about 10 microseconds) will go through the chokes and will cause the MOV or complex protector shunt to break down and draw a steadily rising current (to many tens of Amperes), but immediately choked to a reduced voltage. The fuses will, after a while, be blown away. Until then, the MOV's will clamp the WHITE NEUTRAL to the mains (perhaps resulting in noticeable rise of the common-mode voltage). It is this common-mode elevation which destroys your out-of-building communications interfaces. With everything in the building coming

(Continued on page 8)

LIGHTNING (Continued from page 7)

to 2000 volts above the neighbors (including your local telephone operating company), any common-mode paths will be severely stressed. However, especially within the building, they will be less stressed than they would have been if the mains were allowed to diverge from the WHITE NEUTRAL.

3. THIRD LEVEL PROTECTION –

The most effective common-mode protection is an Ultra-Isolator Transformer. It is also rather expensive compared to differential line protectors and secondary Silicon TransZorb protectors. Although many Ultra-Isolator Transformers were utilized during the 1970's by sensivitive computer installations, it was realized eventually that the most damage to main-frame equipment was done by differential surges (main to main on three-phase systems). The common-mode threat was seen as too little to justify the cost and complexity of installation of an ultra-isolator, which, by the way, can also be done ineffectively, resulting in no net improvement in the level of protection. The companies that make ultra-isolators issue complete and effective instructions concerning their installation. The difficulty is in getting industrial electricians to follow the directions. Thus for the benefit of the main-frame and peripheral power supplies, for cost effective purposes, a good differential surge eliminator inside the enclosure of each system power supply is recommended. However, remember that the common mode is the most destructive to your distributed data communications peripherals; unfortunately, to protect them you must provide the entire computer room and distributed CRT terminal load with an ultra-isolator transformer, or see that each unit is designed to withstand momentary local and global differences of thousands of volts on the signal returns. Even then, on occasion, only one violator located in a critical location and tied to a non-isolated power system elsewhere in the building can blow the whole scheme.

THEORY:

Not much theory here. The entire primary winding of the transformer may get lifted to 2000 volts, but the secondary remains referenced to the computer room ground stake. The box shields around the windings are tied to the stake, and short out the electric field that might otherwise couple to the secondary. Saturation of the transformer core protects the differential mode. The differential protectors installed in each power supply dissipate the surges locally and since each takes a small part of the surge energy, no concentration of damage will like occur.

4. FOURTH ORDER PROTECTION –

You may get surge protectors for all communication lines leaving the building. Each will need a reliable path to a stout ground. (DEC usually specifies that the computer frame GREEN WIRE ground be done with a heavy gauge wire, and all surge protector grounds be separately returned to the distribution transformer secondary neutral grounding point.) You may add Silicon TransZorbs to power supply rails in data communications equipment.

THEORY:

If one of your comm lines get hit, or gets involved in an induced surge, the elevation in voltage not dissipated by the protector is conducted through the internal diode clamps included in most IC line drivers and receivers to a ground or supply rail, and thence to a TransZorb (a back-to-back zener with a heavy silver anode and thermally conductive silver leads). If enough protectors are in place, the common-mode surge is clubbed to death by the collective capability of all peripheral surge protectors operating together.

And that about does it. Needless to say, if you do a good job of protecting your site, and one of your neighbors gets hit, you may be damaged anyhow by currents resulting from the elevation of your neighbor's electrical ground. This is especially true in Hawaii (and even more so on their mountain tops) where the ground is made of lava rock. If you get hit by lightning, your entire site goes to 25000 volts with respect to the surrounding neighborhood. This bleeds down to appx 2000 volts over the next 100 microseconds or so.

If you have several buildings to worry about, such as may be the case for a university campus, putting an umbrella protector on every building will only cause the cloud to ground potential to develop to the point that when you finally do get a strike, it will be a *real killer*. It has been pointed out elsewhere that most lightning strikes are from the ground up to the cloud.

THUS, MORE THEORY (speculation):

I suspect that the mechanism is something like this: Collisions of air molecules with each other and the things that make up the surface tend to knock electrons off the air molecules. There are other charge pair generation mechanisms as well, such as natural radioactive decay of Radon 222 and its decay products. (This specific mechanism is not my theory – see JGR Vol. 90, No. D4, Pgs. 5909-5916, June 30, 1985, Edward A. Martell, NCAR.) The electrons, because of their charge, are sticky. They cling to the surfaces of various semi-insulators (rock and dry dirt) and near the

(Continued on page 9)

ANATOMY (Continued from previous page)

Often, however, I call upon a member who lives by me, Herb Jordan, WA2MSA, and his wife Dorothy to do this job when I am running short on time or have conflicts with scheduling.

While the printing is going on, I print the labels from the RaRa membership database which now resides in Profile 3 Plus on a TRS-80 Model 3. The labels are printed on an Epson MX-80 and placed on the envelopes by myself or members of the family. The envelopes are kept in zip-code order for stuffing after the printing is complete.

After collating and stuffing is complete, I band and bag the *Rag* per post office requirements for Second Class publications and deliver the bags and paperwork to another neighbor, Joel Rossbach, N2EZV, who delivers them to the Jefferson Road Post Office.

There is also much cross-training that has taken place. Don Taylor has been called upon to do the paste-up by himself and do the banding and bagging for the Post Office. Joel has just been checked-out on the banding and bagging routine and has done it in my absence over the Thanksgiving holiday. Bud Young, WA2UGE, has also been very helpful over the years with many of the tasks when personal conflicts have arisen.

So you can see that the *Rag* is far from a one-man show, but is a carefully maintained machine that is made up of many faithful members. I salute them all and wish them to fully share in the award depicted above.

Mexico Thanks Amateur Operators..

"**[Mexico City, Nov. 22, UPI]** The mayor of Mexico City and Mexican officials wish to thank all amateur radio operators in the world who helped to send and receive more than 320 thousand messages after Mexico City was struck by several earthquakes."

"We also thank the amateur radio operators in other provinces that assisted by relaying traffic to people here. A total of 200 thousand messages were sent to Mexico City from abroad and 120 thousand originated in Mexico were sent to other countries."

"We thank the amateurs for their behavior and for the help that they rendered Mexican government agencies such as the Minister of Internal Relations and international organizations like the Red Cross and Salvation Army and many others. Thank you from the city of Mexico."

[UPI Release – Translated from Spanish.]

Tnx W5YI REPORT

FCC ANNOUNCES 1986 MAXIMUM REIMBURSEMENT ALLOWED FOR AN AMATEUR VOLUNTEER ADMINISTERED EXAMINATION

The Commission announced today that effective January 1, 1986 the maximum allowable reimbursement for out-of-pocket costs for a volunteer administered amateur radio examination will be $4.29. This amount is based on a 3.2% increase in the Department of Labor Consumer Price Index between October 1, 1984 and September 30, 1985.

Each volunteer examiner and each volunteer examiner coordinator may be reimbursed by examinees for out-of-pocket expense incurred in preparing, processing or administering examinations for amateur operator licenses above the Novice class. The amount of such reimbursement fee from any examinee for any one examination at a particular examination session, regardless of the number of examination elements taken, must not exceed $4.29.

This announcement is made pursuant to Section 97.36 of the Commission's Rules for the Amateur Radio Service.

NEW FCC FORM 610 MUST BE USED

On October 17, 1984, the Commission released a Public Notice alerting Amateur Radio Service applicants that a date would be set after which all previous editions of the FCC Form 610 (prior to June 1984) would no longer be acceptable for filing.

Effective January 1, 1986, only the June, 1984 and later editions of FCC Form 610 may be used to obtain an Amateur license. Applying on earlier editions of the form after January 1, 1986 will delay issuance of your license as your application will be returned without action and you will be required to refile on a current form.

CONTEST – the final chapter

by Ev Tupis, WB2ELB

Well, this is it, folks! This is our last installment in the CONTEST series. There are only Two things that will be covered in this finale. The first is ACTIVITY. Will YOUR station be active during the January VHF SS '86? How about YOUR CLUB STATION? All we need is SHEER NUMBERS of active stations. All we need is to INCREASE the ACTIVE PARTICIPATION in the Rochester area. Yet, we forget about activating club stations. Irv Goodman, AF2K, was kind enough to supply me with a list of club stations in the Rochester area. They are as follows:

STATION	CALL CLUB
WB2WXQ	Kodak Park ARC
WB2GNR	MCC ARC
WA2LDQ	Webster Explorer Post K2EAW - Trustee
K2GXT	RIT ARC
K2VWI	U of R ARC
WB2PSI	Harris/RF Communications
WA2MBW	Kodak Office ARC
K2JD	RaRa
W2RCX	Genesee Radio Amateurs Inc, Batavia
WA2AAC	RRRA
WA2EGL	Kodak Apparatus ARC
WA2JKQ	McQuaid Jesuit H.S. ARC

Who will man these stations? Does it really matter? Yes, it does! Sweepstakes '85 came and went with the average station scoring 7800 points. If we activate these additional 12 stations, we should be able to effectively increase the club score by 7800 x 12 = 93,600 points !!!!!! YOU tell ME if it is worth it. Besides, remember the new multi-operator awards! Secondly, the rules for Sweepstakes '86 have changed slightly. The first change is scoring. QSO's will have the following point values:

6/2 meters - 1 point	220/430 - 2 points
902/1296 - 4 points	2300+ MHz - 8 points

That means they have half the value as they did last year. This makes VOLUME participation even MORE imperative.

The second change in rules reflects the ability for a ROVING operator to participate in the contest. You can now operate from grid FN13 contact 200 stations, and move to grid FN12 and begin again! The only restriction is that you must submit separate logs for both locations! If anyone is interested in being a ROVER station, I suggest that you sign your station as in this example: "This is WB2ELB ROVER FN13".

This will help to cut down any confusion to stations that may have worked you when you were in a different grid. Be on the lookout as there MAY be a couple of rovers out there.

Last month's Journal made mention of a way to boost your score 15% or more without much additional effort. Yes, it's true. There is an easy way, but I won't tell you about it until the January Journal hits. If all goes well, we will have a contest mailing of just over 1000 this year to help bolster activity for us in the Rochester VHF Group to take advantage of. (Oh well, my English teacher always told me "Never use a preposition to end a sentence with.")

Just keep sing'n that 'ole song, "Who 'ya gonna call? ..... Cheese-busters !"

THE RaRa RAG 20 YEARS AGO – JANUARY 1966

by Ed Gable, K2MP

Featured in this *Rag* is a report of the Eddie Meath Pennython which collected 66,300 pennies for the Children's Hospital Fund. With Eddie Meath and Eddie Dunn (WA2KMI) on-the-air at WHEC, area amateurs took to the road to collect pledges. With some fifty amateurs taking place in three nets on 75, 10, and 6 Meters, this was truly a fine example of amateur involvement in their community.

The results of RaRa's entry into the ARRL HF Sweepstakes contest was announced with these area amateurs high in the running; LaMar Ray, WB2FMX; Phil Liccardi, WA2WQC; U of R Club station, K2ZWI; Bob Houston, W2ADN, Chuck Hilliker, K2IML; Ray Leigh, W2SNI; Bill Kuehne, WA2ZQN; Wally Kincaid, WB2HZG; and on CW, George Batterson, W2GB.

Gil Crossley, W3YA, was announced as being elected Director of the Atlantic Division. Charlie Hooker, W2SXV, has been appointed director of the 10 Meter Mobile group by Civil Defense Radio Officer Chuck Oneske, K2YCO. OSCAR IV was just put into orbit with a 144.1 to 431.94 translator.

Club Historian Bruce Kelley, W2ICE/QCP, published a then 25 year old photo of RaRa Officers: Al Grabb, W8DOD; Doc Smith, W8RGA; Bill Hamp, W8BCP; and Milt Miller, W8FNT. Also described was AWA's amateur station, W2AN, with equipment ranging from 1898 to modern 210's of circa 1929.

Helen Smith, WA2YRH, urged everyone to buy a $4.00 ticket to the Dinner-Dance to be held at the Manger Hotel.

LIGHTNING (Continued from page 9)

surface of conductors until enough of them are implanted to provide a counter electrical field gradient to repel later arrivals. The positive air ions are separated by thermal energy, and molecular screening prevents the immediate recombination. The charge separation is effected by the rising of the warmed positively ionized air.

Once the charge is separated, mutual repulsion drives the electrons into the conductive ground layers. Later, as the air rises and water condenses, positively charged droplets accumulate in descending air columns at the front of the storm just ahead of the rising column. A field gradient is thus established with respect to the ground, where all the electrons are. As the ground is conductive, the electrons follow the cloud until, with the aid of conductive moisture and the turbulence of the rising and descending air column interface, leaders are established and a strike path is ionized and carried into the descending air. The electrons travel up the path in a flash (parts of which will have oscillations at radio frequency) and then distribute themselves (at a more leisurely pace, accompanied with local flashes and secondary flashes) in accordance with upper level gradients until there is no longer sufficient gradient to ionize the cloud-to-cloud paths.

TIMES SCALES:

Main strike and individual secondary strikes each about 10 microseconds.

Duration of ionized path, reversals and secondaries about 100 microseconds.

Duration of high altitude electrical coronae readjustment about 1 millisecond.

Localized differences in the final potential may result in some reverse strikes from a few overcharged negative clouds to the ground, or subsequently more numerously (after air motion), cloud to cloud "readjustments".

Well, I've done it again. Darn. If this is too long, I suppose you should flame me for it, or if I am guilty of mis-representing known (un)truths, that would qualify as well. But I wanted to at least try to clear up the nature of lightning and its hazards a little.

AR NS
Amateur Radio News Service

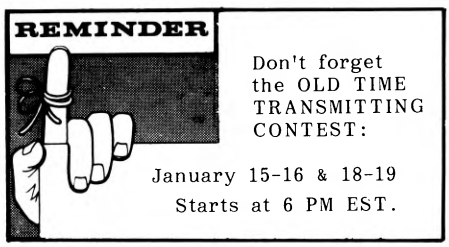
ROCHESTER RADIO HISTORY BEING PRESERVED

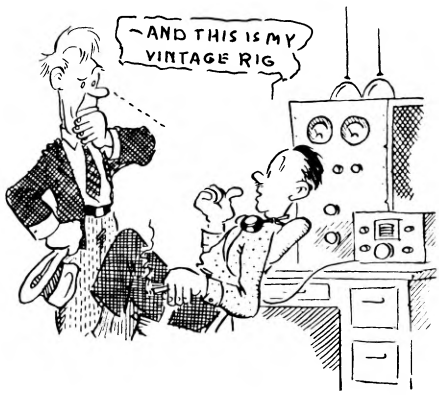
Early Rochester radio history is being preserved in the archives of St. John Fisher College. Rooms in the new library are devoted to recordings, photographs, books and other memorabilia relating to early broadcasting in the city. In addition, early broadcast and studio equipment on loan from AWA is on display. The material is available to students and others doing research in the communication field.

W2ICE and W2ROC (former General Manager WHAM) participated in a recent dedication ceremony when the rooms were officially named the Lowel MacMillan Archives. MacMillan was a well-known WHAM sportcaster and, in later years, General Manager of WHEC. The occasion found RaRA-AWA members mingling with broadcasters Louise Wilson, Homer Bliss, Mort Nusbaum, Will Moyle, Carl Dengler, just to name a few. It was a happy occasion with much reminiscing as the group admired pictures of early broadcast stations and spoke with fondness of former Rochester personalities Bill Fay, Al Segal, Gunnar Wigg, Gordon Brown and others.

Of particular interest, it was noted that in the old days most of the engineering staff of Rochester stations were licensed radio amateurs. The first officers of RaRa were members of WHAM's engineering staff and our public safety station (WPDR) was maintained by local amateurs.

– Bruce Kelley, W2ICE, Club Historian





A REVIEW: TNC STATUS INDICATOR

BY Gil Frey, K4JST, via AUTOCALL

The following is a review of the Heathkit HDA-4040-1 TNC Status Indicator. This accessory is designed for use with the Tuscon Amateur Packet Radio (TAPR) TNC-1, the Heathkit HD-4040 TNC and the AEC PKT-1 TNC (which are essentially the same unit and produced under licensing agreement with TAPR).

The TNC-1 comes equipped with a 6502 parallel users port (the AEA PKT-1 has the circuit on the PC board, but the owner must install the socket, DB25 jack and the chip). The original purpose of this output is to allow a sampling of link state information and as a diagnostic signal port for tracking down problems and verifying certain operations. While there has been some information available for using this port, there has been no equipment available commercially that uses this connection.

The Heathkit HDA-4040-1 TNC Status Indicator is connected to the parallel port and derives its power from the TNC through two of the wires in the ribbon cable/DB25. The link status is indicated on the front panel with eight labeled LEDs (Light Emitting Diodes). The two Green diodes indicate CMD: and Disconnected. This is handy if your TNC has been monitoring for a while and the screen alert has scrolled out of view. The two Red LEDs indicate CONNECTED and FRMR. The FRMR is a frame reject condition that should never occur between two TNCs using AX.25 protocol, but with a growing number of devices using X.25 and other protocols very similar to AX.25, this FRMR serves as a safeguard to alert the user to the presence of an incorrect protocol. The four Amber LEDs indicate: 1- CONVER mode, 2- CONNECT ATTEMPT, 3- DISCONNECT IN PROGRESS, 4- transmit BUFFER active. The first of these just indicates tht you are in the conversational mode rather than CMD. The Connect Attempt and Disconnect in Progress are handy to tell what is going on when nothing seems to be happening. The Disconnect in Progress may also alert you that the link has been broken during a long automatic file transfer (and save those endless strings of unconnected packets). The BUFFER diode indicates that the transmit buffer is active and that one or more packets that have gone to the TNC have not yet been sent out (keeps you from executing a DISCONNECT before the end of a file has left your TNC).

The feature that makes the Status Indicator worth owning is an audible alarm that sounds whenever someone connects with your TNC. Since many operators leave their TNC on and monitoring while doing other things in the shack, there is a real need for an alert that another operator has connected with you. The Heath unit sounds a tone for 1 or 2 seconds to catch your attention. I've had this unit in use for two days and would not be without it just for that one feature.

The unit is a small 5 x 2 inch (front panel) in Heath's present brown color scheme. Construction is easy (a circuit board with plenty of room for a change) and should take no more than one short evening. The checkout requires no test equipment though Heath does give several resistance measurements that can be made before applying power for the first time. The manual and troubleshooting guide are typical Heathkit ie first rate documentation. Price: $24.95 plus shipping from Heath Company, Benton Harbor, Michigan 49022.

A $2 INSURANCE POLICY

by Bob MacCallum, VE3NIO

Many of us have seen surge protectors advertised in the computer magazines offering protection for delicate computer power supplies from the evils of the power line. Most of these devices consist of a Metal Oxide Varistor (or Varistors) and in some deluxe models an RF filter.

My first experience with Metal Oxide Varistors came last year at Field Day. John, VE3NOC, and I were setting up stations for 15 and 80 meters when we heard a loud pop in the direction of my 20 amp power supply which was connected to the extension cord to the generator. When I turned the supply on a few minutes later, I blew the AC line fuse. Undaunted, I made the rounds and came up with a second 6 amp fuse only to find that it also blew. Opening up the cover, I found a red disc-like component with a nice black hole in it connected across the AC line. The component was shorted. I discovered then that the component was a Metal Oxide Varistor or "MOV" as they are commonly called. A voltage spike when the generator was starting had likely caused the MOV to blow.

Unfamiliar with this component, I later found out that the MOV had performed just as designed. They are normally very high resistance devices that lower in impedance when large amounts of electrical energy are momentarily applied. At that moment, the MOV either absorbs the peak or fails and thereby shorts the circuit. Either way, the MOV serves its purpose of protecting the circuit behind it, in this case the power transistors.

MOVs are now used to protect most solid state devices and are available with a variety of ratings.

RF HAMS GET THE PICTURE

by Jim Lill, WA2ZKD

SPACE SHUTTLE CHALLENGER, August 1-5, 1985. History was made this week as the shuttle astronauts transmitted television pictures directly to the general public for the first time.

No one read this in any newspaper, but it did happen and members of the Harris/RF Amateur Radio Club participated in the historical event. After years of space shots and live network TV pictures from the Moon, something like this may seem insignificant, but to those that participated or even just watched, it was nothing short of spectacular!

Amateur Radio operation aboard the shuttle is nothing new, but to date has been limited to voice transmission. Television transmission by Amateurs is commonplace also, in both Fast Scan and Slow Scan mode so why not TV from Space! Members of the Amateur Radio fraternity, Hams as you may know them better, said the same thing. The cooperation of NASA and a ready willingness on the part of Astronaut Tony England, Ham callsign WØORE, made it all possible.

Anyone could have received these pictures with equipment that could be built with a home television set for less than $300. But in the case of the Harris/RF Amateur Radio Club Station WB2PSI, a bit more elaborate set-up was used. Earlier in the year Dean Keyser/WB2QCJ, of LR Engineering, started building the station that was used. With homemade equipment, commercially made Ham gear, company test equipment, old car telephone base station filter cavities, and a Robot SSTV converter borrowed from a Systems Division program, a "deluxe" system evolved. Along the way Jim Lill/WA2ZKD and Jim Scorse were bitten by the bug and aided Dean in the assembly and testing.

Of course we weren't the only Hams involved in this and thanks to the Goddard Space Center Radio Club on launch day, an around the clock voice radio net was put in operation on the RF Hams' bands, so interested parties could monitor the status of the SSTV experiment or just listen to a rebroadcast of general shuttle communications.

When the time finally arrived for the first tentatively scheduled TV transmission, all ears were affixed to the receiver tuned to 145MHz and oops! nothing that sounded like SSTV signals were heard. Instead, a big fat interfering signal was found, necessitating an all-out search for the culprit. A few hours later still no shuttle pictures but no more interference either. Our ultra-sensitive SSTV gear had sniffed out an innocent RF-745 on burn-in. A simple change in the burn-in frequency moved the harmonic of question out of the picture. During the following days, success came and went as orbit placement and other interference made reception a challenge. In spite of the odds the accompanying photo gives an indication of the results and on a color TV the effect is incredible!

This picture was taken as a frozen frame and transmitted back to Earth via VHF-FM slow scan amateur television.

INVENTOR OF PINPLUG ATTACKED

(From GEARVAKf, Joe Ventolo, K8MDZ) via ARNS Bulletin

Mr. Jark Gulpnip, inventor of the universally despised RCA pinplug was attacked, stomped, and had his clock cleaned last Wednesday night as he headed for his car after a meeting of the Difficult To Use Connector League of which he is permanent president. Mr. Gulpnip was founded whimpering by a security guard at the Gorbinski Mushroom Farms Auditorium where the meeting was held. According to guard Angelo Gombone, Gulpnip had apparently been left for dead by his assailants. The victim was rushed by emergency bicycle to the GEARVAKf Mobile Automatic Surgical Hospital (GEARMASH) for treatment. According to GEARMASH Chief Surgeon, Dr. Pierce Eyehawk, Mr. Gulpnip suffered over 100% of his body. After treatment with herbs, Mr. Gulpnip was expected to "get better someday" and pay a large medical bill. Policeman stated that Gulpnip was attacked by a man and a woman wearing ski masks, pocket protectors and carrying calculators. The man was identified only as a adult male hillbilly. The woman was described as 5 ft. 1 in. tall, 100 pounds, excellent figure, dark hair, green eyes, sensuous lips, soft hips, and wearing no bra.

DECEMBER MEETING "SKIPPED" AROUND THE WORLD

Those of you who missed the December RaRa meeting at Kodak Park missed one of the most outstanding meetings of the year. Mike Rice, KB2SG, president of RDXA had some very good slides of past members' expeditions to far-away lands for the purpose of creating pile-ups, as well as some very good advice as to how the ordinary Ham can have fun starting out his or her DX career.

The best news, however, is that there is much more material that is on its way into the RDXA archives to update and expand the show and present it in years to come. We will certainly look forward to an encore.

FROM THE BENCH

Q. We've been mobile radios for years but automobile technology is changing all the time. Have any guidelines come out about interference between new automotive electronics and mobile radio?

A. Yes, indeed. General Motors Electromagnetic Compatibility Department has recently published a free set of installation guidelines from the car maker's point of view. Many of the hints given would not be readily apparent to even the most experienced installer.

For instance, there is a preferred side of the trunk for installing remote mount radios. In not all, but certainly a majority of cases, an electronic component called the engine controller is located on the passenger side of the trunk. Mobile radios should be installed on the driver's side to avoid interference with engine operation.

Other electronic modules are often located behind the glove compartment or underneath it. These areas need to be avoided when routing cables carrying RF. This can become a challenge particularly when using disguised antenna that resemble broadcast receiver antennas. It's almost impossible to route cable to that side without passing near the car's modules. "In many cases, an exposed antenna presents less risk than the degraded communications or automobile performance if the disguised unit is in the usual location," says William Sperber of GM.

Also, antenna cabling should never be routed with vehicle wiring anywhere.

Power cabling is best run down the left side under the door sills to keep it away from sensitive components. Cable should be #10 AWG or heavier, and stranded. Another point installers often miss is the grounding should be done only at the battery, never on the body. Many apparent grounds in the passenger compartment are not really grounded and several current loops may exist within the car body.

"It's surprising how many dealers have told us that some of the strangest problems were solved by grounding at the battery," Sperber said. And to be on the safe side he also suggests that a fuse be put in the ground line near the battery. Apparently there have been instances of overvoltage conditions on engine start that surge the radio from the ground side. It doesn't happen often but it's possible and a fuse in the ground connection prevents radio damage.

Power contactors are another recommendation from the GM Proving Ground. When ignition control of the radio is desired, a contactor (merely a relay closure) further separates the radio power circuitry from the vehicle's.

If you'd like a copy of the Radio Telephone/Mobile Radio Installation Guidelines, write to the Electromagnetic Compatibility Department, EMC Bldg, 40-MR, General Motors Proving Ground, Milford, MI 48042-2001.

WANTED – Key paddles or bug; recent back issues of *73*, *QST*; Good crystal mike; Photocopy of manuals for Collins 32S1, 75S1 and 136A-1 noise blanker; 6U8A vacuum tubes. Call Jackson (Jack) Wright, NN2P, 477-5205.

FOR SALE : Heathkit SB - 200 Linear Amplifier – $275; Heathkit SA - 200 Antenna Tuner – $175. Both are in excellent condition. K2RHS, 716-889-2536.