

# Worldradio

Year 22, Issue 6

December 1992 • \$1.25

## FEATURES

Aurora, MO — QRP in big  
gun territory

Cedar Fort, UT —

Farnsworth Peak (part I)

Farmington, NM — Myth of  
the resonant antenna

Hanapepe, HI — Hurricane  
Iniki

Kauai, HI — MARS: an  
emergency resource?

Ormond Beach, FL — Amateur

Radio: there when you need it

Sacramento, CA — Brief guide to airborne ATV



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PHOTOS courtesy of ROBIN LIU, AH6CP

## HAMs were key radio links as Iniki raged

By Katashi Nose, KH6IJ

Special to the Honolulu Star-Bulletin

At the peak of Hurricane Iniki's fury, all regular communications between Kauai and Oahu were lost Friday afternoon.

Through pre-planning, teamwork and ingenuity, Amateur Radio operators provided the only remaining link between the two islands.

State Civil Defense Radio Amateurs Civil Emergency Services (RACES) had been activated at 9:15 p.m. Thursday to initiate statewide communications.

At the storm's peak fury, Kauai Mayor JoAnn Yukimora requested, through Clifford Ikeda, NH6HF, at the Kauai Emergency Operating Center (EOC), to contact Gov. John Waihee.

Ikeda accessed Billy Gomban, Jr. KH6JPL's Hawaiian Telephone ARC repeater at Mauna Kapu in the Waianae mountains to talk from Kauai into Oahu. Robin Liu, AH6CP, at State EOC at Diamond Head initiated the repeater automatic telephone patch for the governor.

Amateurs supplied vital radios

and operators to carry priority emergency traffic between Kauai and State EOC.

Ron McMurdy, WAØOJS, operated the packet cluster radio system. Pat Corrigan, KH6DD, and Ron Hashiro, KH6JCA at State EOC used voice and packet through Lance Cabral, WH6EE, and Robbie Reneau, KH6JIB, at Kauai EOC to update Kauai officials with storm positions and coordinate relief efforts.

State EOC(RACES) amateurs operated the Civil Air Patrol radio to patch Kauai officials to Radio KSSK, informing Kauai citizens and coordinating medical evacuations of wounded and kidney patients to Oahu for treatment.

Volunteers Bill Stookey, WH6EL, and Maggie Kibota, NH6TK, flew to Kauai to relieve the exhausted EOC radio operators while John Fulmer, WT6M, and Lawrence Koga, NH6NJ, relieved the State EOC operators.

Several amateurs were among the first to fly to Kauai. Liu and George Hanzawa, KH6JUJ, repaired the state government radio systems there.

Vince Soeda, NH6KW, led Hawaiian Telephone's Kauai-to-Oahu microwave repair.

Jerry Wine, KH6UH, created an EBS (Emergency Broadcasting System) interim radio link with Kauai radio station KQNG.

The KH6JPL repeater was a vital part of Hawaiian Telephone's restoration effort, linking NH6KW with Hawaiian Telephone's recovery command center.

Among Hawaiian Telephone's amateurs operating through the KH6JPL repeater were, aside from Gomban, Jr., Pat Chu, KH6KL, Francis Button, NH6JY, and N6GOZ.

Joe Keola, KH6BFZ, and John Briones, WH6CEN, are on Kauai; they set up HF and VHF stations at Koloa School shelter to provide health and welfare communications.

Operating at the Oahu Civil Defense Agency were Wayne Jones, NH6GJ, Don Donnarumma, NH6HC, and Dick Bell, WH6GQ. Hart Akaji, KH6BIO, from his home station provided interface capability between City Hall and the 146.80 MHz repeater.

Other reporting stations were Jim Connell, KH6JKG, and N6VI on the North Shore, Ralph Toyama, NH6PY, from the UH-Manoa evacuation center, and Douglass Vann, NH6BZ, from the Ala Wai Boat Harbor. Stationed at the National Weather Service were Ronald Henry, N9KWW, Bill Stookey, WH6EL, and Mike Morrow, KH6JQM.

Health and welfare traffic and inquiries were handled by 40 and 20 meter HF, VHF packet and voice. The above amateurs are just some of the Hawaii amateurs who took personal initiative and went "beyond the call" to serve their communities.

The above was compiled from reports received from Robin Liu, AH6CP, State CD RACES coordinator at State EOC Diamond Head; Wayne Jones, NH6GJ, Oahu CD Agency RACES coordinator; Billy Gomban, Jr., KH6JPL; and Ronald Hashiro, KH6JCA. — *Reprinted with permission of the Honolulu Star-Bulletin.*

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## Hurricane Iniki — the recovery

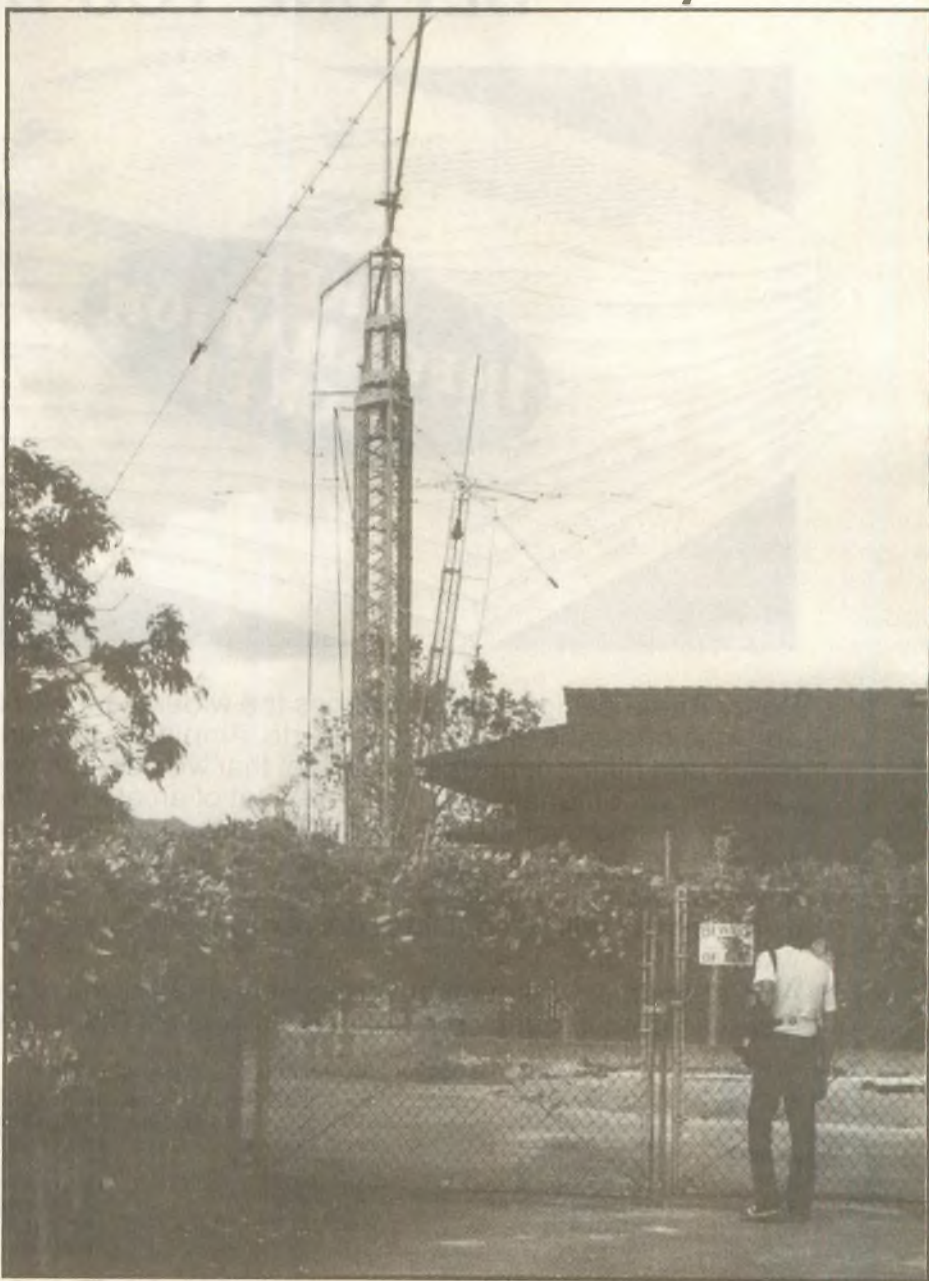
JAN RITCHIE, N6USE

With winds clocked at 165 miles per hour, hurricane Iniki, meaning sharp, piercing wind, did her best to blow the island of Kauai, Hawaii, and its inhabitants out of the water. While there is an unbelievable amount of damage, the people of this quiet island, known as the "garden island," are still firmly in place.

I arrived on the ninth "day of recovery," as each succeeding day came to be known, and I left on the 19th day of recovery. While I was there I had a chance to see both the devastation and the triumph. It will be months, and in some cases even years before the island will be back to normal. Large groves of banyan trees are twisted and broken, resembling a child's deserted game of pick-up sticks. Power poles lay on the ground snapped off like broken bats. Second floors of homes have, in some cases, only one wall or a bathtub to show that there ever was a second story. With the winds of Iniki came the downpour of rain. After roofs were blown off everything that was left was thoroughly soaked. Appliances, bedding, clothes, furniture, *everything*.

Along the south shore there are empty foundations where once there stood homes. The first floors of many of the hotels had whole palm trees sticking out of the guest rooms, and there are so many roofs missing it is a wonder that statistics did not include more injuries and deaths. Island locations are now difficult to find because many famous landmarks are no longer visible. The beautiful Tree Tunnel, for instance, resembles a very bad trim job by a crazed individual.

Most of the people of Kauai are not wealthy and, like so many other people, live from paycheck to paycheck. Many work two jobs just to make ends meet. Lots of people (especially the younger people) have to choose between health and home owner's insurance. With young children the obvious choice is health insurance, so for many, possessions are not covered by insurance. Now with 50 percent of the jobs on the



Jack Wada's KH6LG, antennas were heavily damaged by Iniki.

island either gone or on hold, many people won't have any income for a long while. Replacement of even the necessities will take a very long time.

But these people have their sense of humor, they are gutsy, and if they can

do anything for a harder hit neighbor, they will. They are sharing what they have with each other. They have pooled their resources to meet the needs of the neighborhood. Many are living in large

(please turn to page 12)

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# Toy Rally

**BRUCE NOLTE, N6TFS**

About three years ago I was trying to think of a way that we as amateurs could expand our public service activities as well as gain more positive public relations attention. Remembering a holiday event that the motorcycle riders of Los Angeles do each year, the Modified Motorcycle Association Toy Run, I thought, why not apply that concept to our hobby?

For many years motorcycle riders of all types have gathered together from all over the Los Angeles area to collect toys for underprivileged children. Many of the riders mount stuffed animals on their handlebars or on the backs of their seats. The riders converge at a large parking lot near Dodger stadium where the Salvation Army collects the toys for distribution to the children. Besides helping the kids, one of the benefits of the event is the positive media attention; television and the print media are usually in attendance.

After thinking about this idea for some time I decided to give it a try. I contacted the US Marine Corps Reserves in our area and got their approval. I decided that the best date would be in late November or early December, and Sunday, 1 December 1991 was chosen as the day. I reserved public space down near the Rose Bowl in Pasadena, California. The major expense was having a 10 ft. banner made—that was about \$125. I designed a flyer and press release and advertised the event in the local ham stores, many local club newsletters and all of the ham magazines. Peter Fogg,

**Chris Banta, KB6ZER, and daughters Adrian and Monica make their donations.**



KA6RJF, came forth to organize a special event station honoring the event.

Many amateurs came from all over the area and we collected about 150 toys for the Marine Corps Reserves Toys for Tots program. They signed our guest book and we all had a great time meeting each other. The KA6RJF special event station made about 125 contacts from all over the country. I expect the event to grow even larger as more hams become aware of it.

If your club or group is looking for a fun and easy event that can aid others and promote public awareness of Amateur Radio, give this a try. Contact your local US Marines or other local charity to accept your collected toys. If you have any questions or comments please write me. I would like to help: Bruce Nolte, N6TFS, P.O. Box 41446, Los Angeles, CA 90041.

And if you live in the Los Angeles area, strap a toy bear to your antenna and come out to the 1992 Toys for Tots Ham Radio Rally. This year we will be holding it on Saturday, 28 November. Drop by after the TRW Swapmeet, Jun's Electronics, 5563 Sepulveda Blvd., Culver City. Rally hours are 10 a.m. to 4 p.m. Toys should be new and unwrapped with a value of at least \$5. Special event station KA6RJF will be operating on 10M. □

<b>CONTENTS</b>	<b>FEATURES</b>	
	ATV to STS-50 — 24 Farnsworth Peak — 30 Hurricane Iniki—the recovery — 1	MARS—an emergency resource? — 16 The myth of the resonant antenna — 6 Running QRP in big gun territory — 18
	<b>COLUMNS</b>	
	10-10 International — 48 Advertisers' Index — 83 Aerials — 72 Amateur Hi — 35 Amateur Radio Call Signs — 8 Computers & Basic Stuff — 57 Construction — 70 Contests — 74 Continuous Wave — 49 Digital Bus — 52 DX Prediction — 46 DX World — 41 FCC Highlights — 8 Hamfests — 74 MART Classifieds — 80 Mobile — 50 New Products — 75	Off the Air — 38 Old-Time Radio — 62 Product Review — 36 Propagation — 60 Publisher's Microphone — 4 QCWA — 54 QRP — 68 SAR Communications — 66 Special Events — 34 Silent Keys — 32 Station Appearance — 35 Subscription, <b>Worldradio</b> — 9 VE Exams — 79 When will AMSAT OSCAR-13 be in range? — 78 With the Handi-Hams — 40 YLs on the Air — 64

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## PUBLISHER'S MICROPHONE

We now present a list of Amateur Radio operators who, already having served as the models for the heroes in Ayn Rand novels, have decided to add even more luster to their lives by becoming **Worldradio** Super-Boosters (lifetime subscribers):

Robert Gorman, WA1SCH, Millis, MA  
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Bob Murphy, WB6JLL, Dutch Flat, CA  
Laura Lee Tyler, KD6GIP, Sacramento, CA  
Albert Henry, N7HZE, Independence, OR  
Kenneth Russel, K7VLG, Burlington, WA  
Billy Capers, AL7BB, Anchorage, AK

Recently an executive with one of the major companies manufacturing Amateur Radio equipment was advocating the lowering of the General Class code requirement from the present 13 wpm to 10 wpm.

The purpose of such would be to greatly increase the number of licenses. While such a move would most likely increase the sale of transceivers (and magazine subscriptions) we must speak out against such a move.

Strange, years ago the only way to master CW was the crude Instructograph and/or just sweating it out on the air. Today there are all sorts of audio tapes, subliminal and otherwise, computer programs, etc., and we hear more complaining than in days past.

The question is, can't there be something left in society that has high standards? Today, young people are given high school diplomas (unearned) because "to do otherwise would harm their psyche."

Even a college diploma has been drastically reduced as far as effort goes. Every employer today is faced with college graduates who couldn't find their belt with both hands.

Even the normally staid *Wall Street Journal*, a publication not given to levity, said the other day, "Ask a student where Europe is and they'll tell you it is in Spain, or maybe Cleveland."

Magazines are printing articles entitled "The Dumbing Down of America." There can be no doubt in anyone's mind that this country is sinking into the quicksand of mediocrity.

If such is irreversible, when the last picture is taken showing only a hand reaching up from the pit, let the last item to drown be an Amateur Radio license.

Special mention should be made of one of the great QSL managers. I sent a card for TR1G (Gabon) to Dan Morehouse, AK1E, Shelby, North Carolina, for a contact made in 1990.

Back came, "Not in the log." Oh, pain, embarrassment, shock. "However," Dan said, "I found a contact of yours in 1987, will that do?"

Yes, there are some good guys left in the world.

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Those who say that Amateur Radio can't get any publicity in the press should take a lesson from Larry Amann, K5TQN, Ormond Beach, Florida. He sent in an article he wrote, "Amateur Radio: There When You Need It," explaining the many benefits of Amateur Radio, which ran for 163 lines in *The Ormond Beach Observer*.

You'll find this article reprinted in this issue of **Worldradio**. If you too are motivated to share your endorsements of Amateur Radio, consider creating an article or writing a letter to the editor of *your* local newspaper.

Those who are concerned about the warnings that RF may be bad for you, get in contact with Bernie Peak, N4CR (ex W8HAR), Melbourne, FL, who has been on the air since he was licensed in 1932 at the age of 20. His beautifully typed, error-free letter told about PP 813s in the final.

It's often said that among Amateur Radio operators photography ranks the highest as the other hobby.

So, for the budding new Ansel Adamases or Eugene Smiths, here is your opportunity. **Worldradio** would like to print pictures of newsworthy events around the country.

While we prefer black-and-white prints, we can take color prints too. If you prefer to shoot color and you are able to have black-and-white prints made, their reproduction in publishing will be of higher quality.

Converting color *slides* to black-and-white is not too successful, however—it never really looks good. Try to have color negatives printed on Panalure paper, if possible—it looks great.

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—Armond, N6WR

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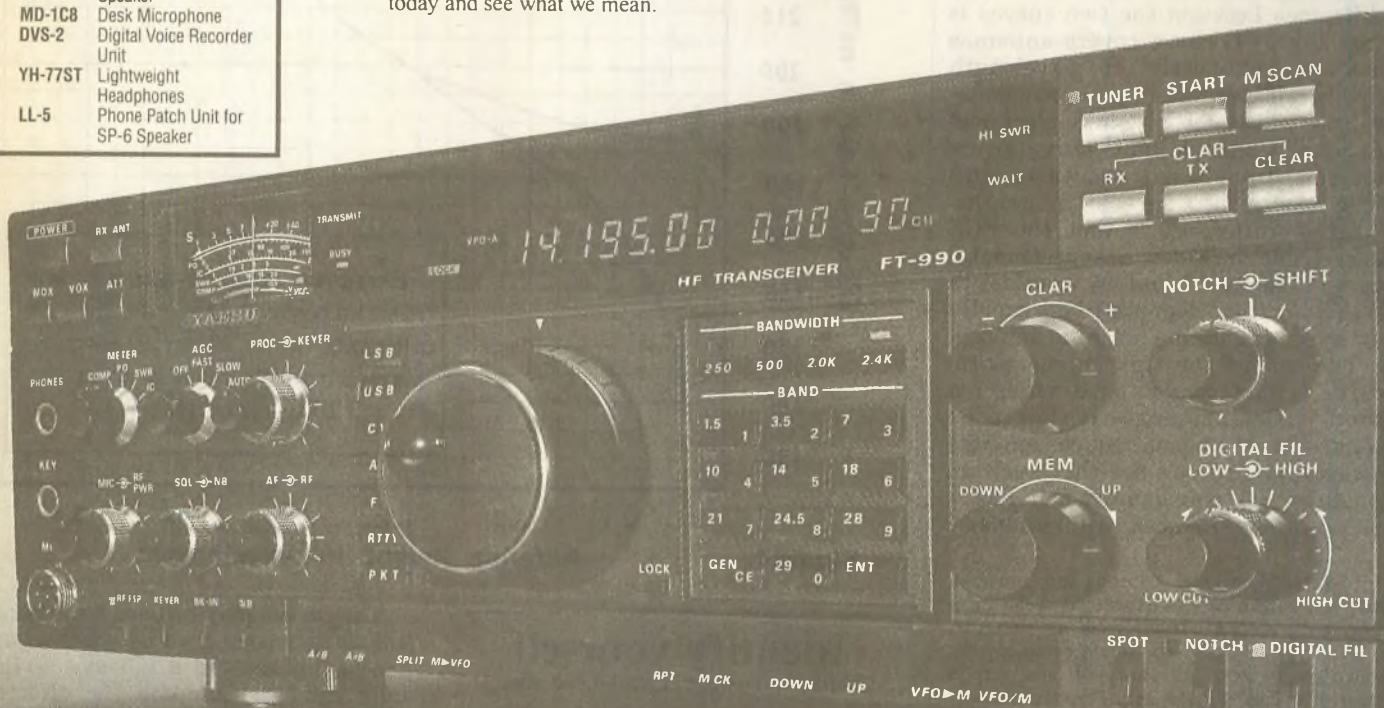
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# The myth of the resonant antenna

RON NOTT, K5YNR

Many QSOs on the HF bands discuss tuning or pruning an antenna to achieve resonance as indicated by what is commonly called a VSWR meter. There is a belief that if an antenna is resonant at its input terminals, it is somehow more efficient or better than one that has reactance at this point. As far as the actual antenna performance is concerned, this is totally untrue.

Some discussions and written material on the subject often get caught up in transmission line loss and impedance matching, so this discussion focuses solely on the effects that resonance and non-resonance have on the antenna.

## Field gain curve

For many years the FCC rules and regulations have included a curve to assist engineers in predicting the groundwave field intensity of vertical antennas for AM broadcasting (Fig. 1). The same curve in expanded form is also found in a book by Carl Smith<sup>1</sup> (Fig. 2) as well as in other sources. One difference between the two curves is that the FCC curve covers antennas from approximately .05 wavelength (18 electrical degrees\*) to approximately .68 wavelength (244.8 electrical degrees), while the Smith curve covers antennas from zero to one wavelength (360 electrical degrees) in height. Another difference is that the FCC curve also includes a supplemental curve between .05 and .33 wavelength (118.8 electrical degrees) which rapidly drops off as antenna height is reduced.

The reason for this supplemental curve is that conventional series fed short vertical antennas have low radiation resistance which reduces antenna efficiency. You can see that such an antenna .05 wavelength tall has a substantially reduced field intensity

compared with the lossless theoretical curve. Incidentally, this curve assumes the antenna is placed over a ground-plane of 120 quarter-wavelength radials.

Interestingly, .05 wavelength at 3800 kHz is about 13 feet, taller than most 80M mobile antennas that also do not have the ideal groundplane. So the curve doesn't say that the antenna won't work. It just says that it won't work as well as a taller antenna. But this reduction has nothing to do with

resonance or non-resonance. It has only to do with the relationship between the radiation resistance and the ground loss resistance. Recall that resonance is defined as: "when inductive reactance is equal to capacitive reactance."

Getting back to the curves, note that each rises smoothly to a peak at about  $\frac{5}{8}$  wavelength (225 electrical degrees) and then rapidly drops until, in the case of the Smith curve, it reaches zero at one wavelength. Remember that this is groundwave field intensity, so at a height of one wavelength all the radiation has become skywave.

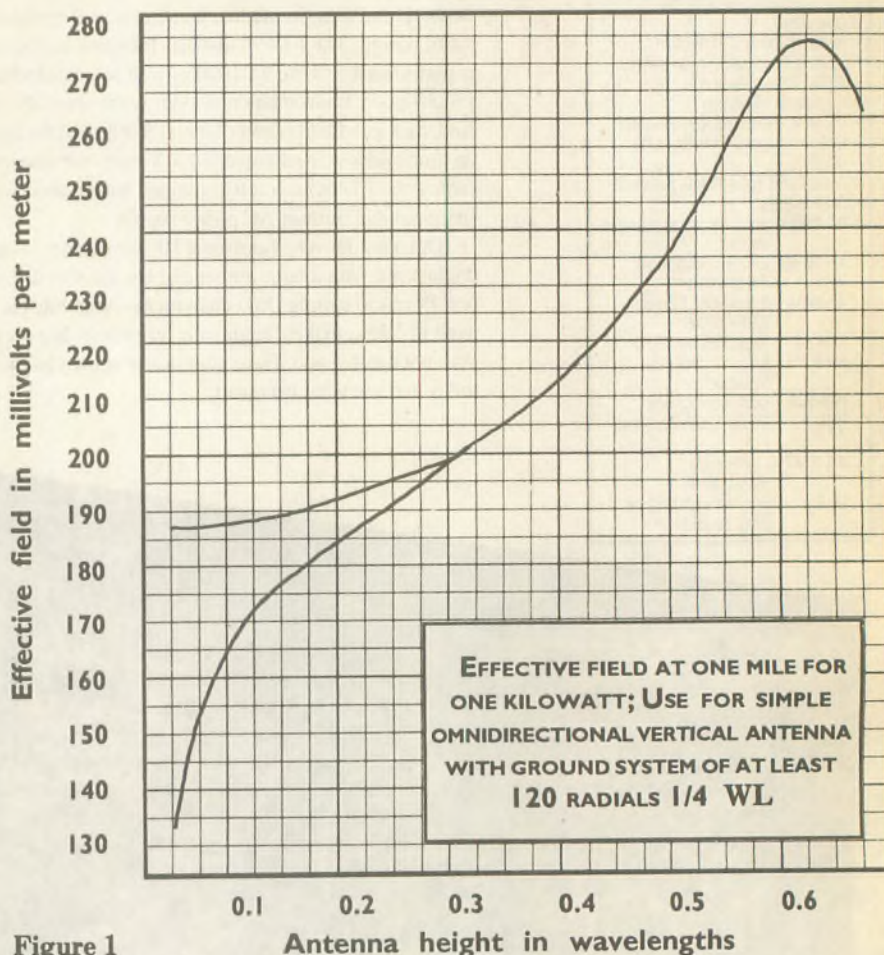


Figure 1

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The curves may be used to illustrate the difference in gain between a quarter-wave whip and a  $\frac{5}{8}$  wave vertical over ground. Compare the effective field voltages of the two, do a bit of arithmetic and you can see that the  $\frac{5}{8}$  wave antenna has about 3dB greater field gain than the quarter-wave whip.

But something is wrong here. The quarter-wave antenna is a resonant antenna while the  $\frac{5}{8}$  wave antenna is non-resonant, requiring a tapped loading coil or some other means of matching it. How can a non-resonant antenna have greater field strength than a resonant one? Obviously it's taller, but the fact that it is not resonant has nothing whatsoever to do



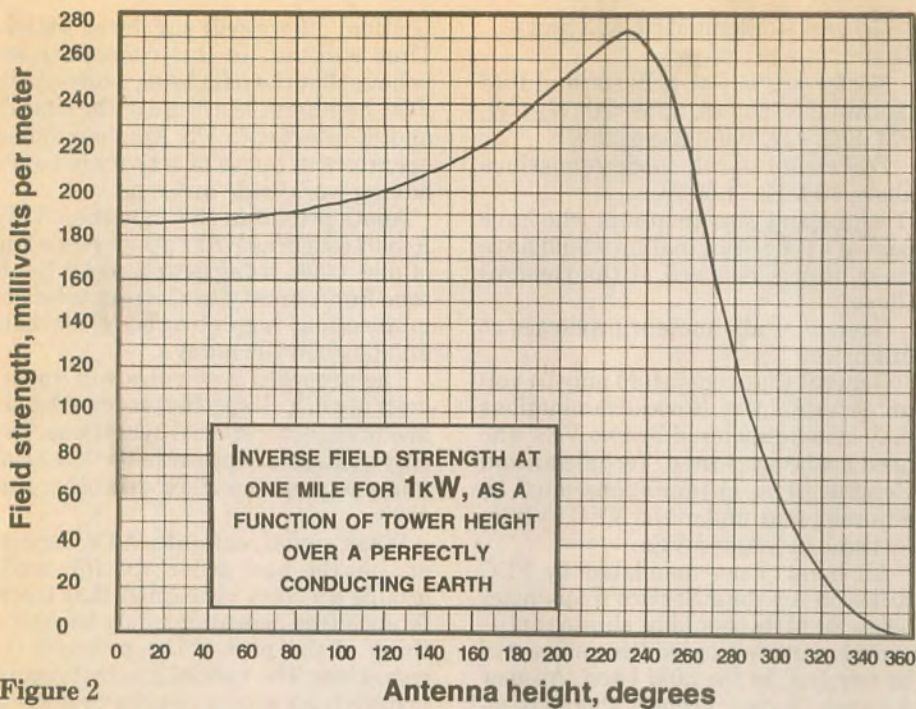


Figure 2

with its field gain or radiation efficiency.

For that matter, if a resonant antenna is more efficient than a non-resonant one, shouldn't there be peaks in the curves where the antenna is resonant? Quarter-wave antennas and half-wave antennas are resonant. If they truly are more efficient than non-resonant antennas, there should be peaks in the curves at 90 and 180 degrees, but there is not the slightest indication of this in the curve shape.

Look at the  $\frac{3}{8}$  wave (135 electrical degrees) antenna, for instance. In addition to resistance it will also have inductance at its input. Because of this, it would need a "loading capacitor" rather than a "loading coil" in series with it to cause it to appear to have a purely resistive input. It would then have a resistance greater than a quarter-wave antenna but less than a half-wave, but provided that a matching network was provided to match it to the transmission line, it would work very well according to the curve. The curve predicts that it should have more gain than the quarter-wave whip, but not as much as the half-wave. Actual field intensity measurements will prove that this is true.

Again, however, this is a non-resonant antenna. Shouldn't we get out the wire cutters and begin pruning it until the SWR meter indicates resonance? If we did this, it would decrease the gain of the antenna.

If this is the case, then why do we take such pains to make an antenna have a resonant input? For simplicity in matching impedance between the line and transmitter, but not for antenna field performance or efficiency. For im-

pedance matching at HF, all that is needed is a good antenna tuner and low-loss transmission line, and don't be concerned about a self-resonant antenna input.<sup>2</sup>

#### RF on the coax shield

If you are concerned about RF on the shield of the coax, use a W2DU type balun.<sup>3</sup> It consists of ferrite toroidal beads slipped over the coax for a distance to keep RF current off the outer surface of the coax. The beads have no effect on the current on the inner surface of the coax shield (provided high quality, high percentage shielding coax is used). After all, that's what the shield is for—to contain and isolate the RF energy inside the coax from the outside world.

In his book, *Reflections*, Maxwell points out that there can simultaneously be two RF currents, one on the inside and one on the outside of the coax shield, that are not directly related. This is due to skin effect and the

shielding of the outer conductor. The current on the outer surface can be effectively blocked by the W2DU balun while having no effect on the transmission line current on the inner surface of the coax shield. The purpose of a 1:1 balun is to transform the unbalanced coax to a balanced antenna in order to prevent RF current from flowing on the *outer surface only* of the coax shield. The ferrite balun does this very effectively.

#### Antenna test instruments

The VSWR bridge (which is really a reflection coefficient meter) is assumed to somehow have qualities with which an antenna may be evaluated. In fact, it has no value whatsoever for this purpose. It is somewhat useful for evaluating the impedance match into an antenna or other device, but it does nothing to analyze antenna pattern shape or radiation efficiency. Connect it to a good dummy load and it will tell you that you have an excellent antenna.

The only device for truly evaluating an antenna is an accurate, calibrated field intensity meter (FIM). There are only two things wrong with it: 1) it is expensive, and 2) to get valid results one must have plenty of uncluttered real estate surrounding the antenna site with no re-radiating objects nearby. These two factors have discouraged (please turn to page 11)

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G5RV JR	40-10	51'	\$29.95 PPD
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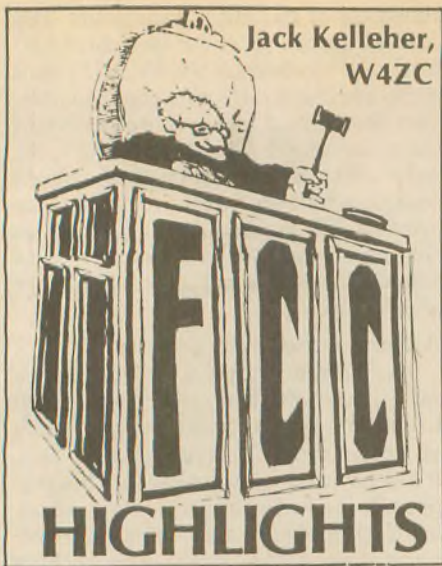
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The *W5YI Report* for 1 October reports that William C. Wells, WA8HSU, has submitted a lengthy Petition for Rule Making to the FCC suggesting that the number of Amateur Radio operator license classes should be reduced from five to three and that all FCC-mandated mode subbands be abolished. Wells asks that only the Novice, Technician and General Class licenses be retained, but that "licensees currently holding the Advanced and amateur Extra Class would be allowed to retain their license class, though with no additional privileges above General."

This is the latest in a long string of similar proposals. Wells' specific proposals are as follows:

**Restructured test elements:**

- Element 1* — Morse code at 5 wpm;
- Element 2* — Rules and regulations, good amateur practice, amateur station operating procedure (35 questions);
- Element 3* — safety (25 questions);
- Element 4* — technical questions from current Element 2 and 3 (40 questions).

**License requirements:**

- Novice* — Elements 1, 2 and 3;
- Technician* — Elements 2, 3 and 4;

*General* — Elements 1, 2, 3 and 4.

**Operating privileges:**

*Novice* — CW, FM, SSB 160 and 10M (200W) CW 80, 40, 15M (200W) CW, FM, SSB 6, 2, 1¼M, 23cm (25W)

*Technician* — all modes/emissions above 30 MHz (1,500W);

Technician Class amateurs who have passed a code examination would have their license renewed at the General Class;

*General* — all amateur privileges at full power.

General Class operators may be volunteer examiners. Novice examinations may be administered by two VEs who need not be accredited. Technician and General Class examinations must be administered under the VEC system by three accredited VEs.

All band plans mandated by FCC Rules on Amateur Service frequencies below 30 MHz should be eliminated — except narrow bandwidth modes will be required in the 30M band. All new Amateur Service licenses should be issued for the life of the holder.

Wells, an Extra Class amateur, argues that his "petition remedies the injustice done to the General Class licensees who had earned privileges taken away as the result of the American Radio Relay League, Inc. sponsored incentive licensing program."

Wells goes on to offer other arguments for his proposal which are too lengthy for the "highlights" intent of this column. At this time the proposal has been received at the FCC, but no formal action thereon is underway. Some will view the proposals as simpli-

fication; others will say deregulation. Time will tell. In this connection we believe that the next item, while not an FCC highlight, is a "sign of the times"; and of interest to US Amateur Radio operators in terms of activity in bands having worldwide coverage.

Another item in the 1 October *W5YI Report* concerns *W5YI's* understanding of new rules being proposed by Deutsche Bundespost (the German telecommunications regulating body) for radio amateurs in Germany.

The proposed new rules will apparently abolish all specific mode subbands and licenses for special operations. The only guidelines appear to be that amateurs may not interfere with other services.

Weak signal, satellite, ATV, repeater, packet and other specific mode groups are very concerned that interference-free operations may become a thing of the past if the proposal becomes law. The special interest groups believe their modes require protection from interference. And many German amateurs want regulations to protect their right to experiment.

On the other hand, many radio amateurs do not want the government to interfere in their hobby and see regulations as a reduction of their democratic rights.

The DARC (German Amateur Radio Society, member of the IARU) is suggesting some amendments to the Bundespost in order to prevent what they believe could be complete chaos. If DARC fails, the new regulations go into effect on 1 January 1993.

## Amateur Radio Call Signs

Amateur Radio operators often ask the FCC what call signs have been assigned lately. This list shows the last call sign in each group to be assigned for each district, as of 1 October 1992.

For more information about the call sign assignment in the Amateur Radio Service, see Section 97.17(f) of the FCC Rules, or write to the FCC, Consumer Assistance Branch, Gettysburg, PA 17325-7245.

Radio District	Group A Am. Extra	Group B Advanced	Group C Tech./Gen.	Group D Novice
0	AA0KI	KG0BF	N0UGS	KB0KSR
1	AA1EE	KD1KS	N1NOE	KB1AKO
2	AA2LK	KF2KT	N2SPQ	KB2PLW
3	AA3CF	KE3EY	N3NLN	KB3AIR
4	AC4WF	KQ4GU		KD4TJB
5	AB5IK	KJ5FI		KB5VMX
6	AB6OQ	KN6BD		KD6OAB
7	AA7RT	KI7HG		KB7QGM
8	AA8IX	KF8XK	N8VUN	KB8OIC
9	AA9FE	KF9LR	N9RDV	KB9IEK
North Mariana Is.	AH0P	AH0AL	KH0AW	WH0AAT
Guam	NH2G	AH2CP	KH2GK	WH2ANB
Johnston Is.	AH3D	AH3AD	KH3AG	WH3AAG
Midway Is.		AH4AA	KH4AG	WH4AAH
Hawaii		AH6MD	WH6JI	WH6CPZ
Kure Is.			KH7AA	
American Samoa	AH8F	AH8AE	KH8AI	WH8ABA
Wake Wilkes Peale	AH9C	AH9AD	KH9AE	WH9AAI
Alaska		AL7OM	WL7GG	WL7CGE
Virgin Is.	NP2U	KP2CA	NP2FY	WP2AHT
Puerto Rico		KP4UH		WP4LLW

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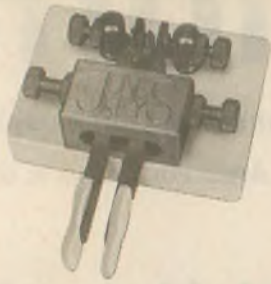
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W5YI notes that Canada deregulated their service in 1990 to permit use of any mode on any band, including voice, in historically CW spectrum and that the anticipated turmoil did not take place. (Those of us who operate CW on 40M may not agree!)

### Permissible communications

In June of this year the FCC issued a Notice of Proposed Rule Making (docket 92-136) on this subject, proposing changes to Part 97.113 of the Rules for the Amateur Service, along the lines proposed by ARRL earlier this year. The deadline for comments was 1 October, and for reply comments 1 December.

We understand that surprisingly few comments were submitted in response to the NPRM, especially in view of the numerous proposals submitted, over the years, for just such a housecleaning. We intend to give you highlights of the comments and replies as soon as possible after 1 December.

Just when some amateurs thought that the FCC was not interested in pursuing the obscenity and indecency provisions of Section 97.113(d) due to the difficulty of prosecuting such cases, comes word that the FCC's Field Operations Bureau has just issued a \$2,000 Notice of Apparent Liability against General Class amateur Allen Burton, KA4URC, of Hornbeak, Tennessee. It is believed to be the first monetary forfeiture ever issued for an over-the-air Amateur Service speech violation that was not linked to an additional easier-to-prove offense.

Burton was charged with using obscene and indecent language during an on-air argument on the 20M ham band (14.300 MHz) on 29 June 1992 between

the hours of 3:53 and 4:22 p.m. — a time when children might likely be listening. The NAL was issued by the FCC's Enforcement Division in Washington, D.C. Burton was monitored and his transmissions transcribed by FCC engineer Tom Shirley of the FCC's Kingsville, Texas, monitoring station. (W5YI Report, October 1, 1992)

*ED: Is obscene and/or indecent language necessary? We have been bombarded for years with arguments over the First Amendment "right" to use strong language (Incidentally the Supreme Court has said that obscene speech is not protected by the First Amendment). It seems that people sometimes go to extremes to test that right by inundating us with the stuff.*

*You older folks may remember what some of us were taught in our youth, that use of profanity is usually an indication of a limited vocabulary.*


### 10 MHz for Novice and Tech??

W5YI reports that Bill Welsh, W6DDB, of Lancaster, California, has petitioned the FCC (on 2 September) to make the 30M (10.1-10.15 MHz) amateur band available to Novice and Technician Plus licensees.

He argues that the 10M band is almost useless at this low point in the sunspot cycle, that the 15M band is very erratic, and that the 40M band is subject to interference from international shortwave broadcasting. The 40M Novice band is also not available to amateurs in other parts of the world. (ED: The subband 7.1-7.15 MHz is allocated for the Amateur Service in ITU Region 2, but not in Regions 1 or 3.)

Welsh says: "... about half of our American amateurs (Novice and Technician Plus) have very limited operating opportunities. They need the 30M band."

Welsh does not believe that voice



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privileges for Novices and the code-free Technician license benefits the Amateur Service since "it reduces the possibility that they would acquire the increased code proficiency that is needed to upgrade ..."

### A continuing success story

It is no secret that the Technician Class is the fastest growing amateur level. What is news is the rate at which the Technician Class is expanding. There are 25 percent more Techs than just a year ago, and the number has doubled in the last five years.

The Amateur Service grew by 48,431

licensees during the past year. 36,980 (or 76.4 percent) of them were Technicians. Here is what happened over the past decade:

August	Technicians	Percent increased
1982	75,703	
1983	77,298	2.1
1984	80,680	4.4
1985	82,867	2.5
1986	86,025	3.8
1987	90,675	5.4
1988	98,944	9.1
1989	111,708	12.9
1990	124,778	11.7
1991	148,229	18.8
1992*	185,209	24.8

It is interesting to note that the number of Technicians increased by an average of 3.8 percent per year between 1982 and 1987, 11.2 percent per year between 1988 and 1990 and jumped to an annual rate of 21.8 percent per year after the adoption of the codeless Tech Class. It can be said that dropping the code from the Tech Class has had the impact of increasing the number of Amateur Radio operators by nearly 10 percent per year. If the current growth rate continues, there will be half a million Technician Class amateurs within five years ... and possibly more than all other ham classes combined!

## Myth

(continued from page 7)

aged most amateurs from using the FIM. It should be noted that a relative field strength meter has very limited value compared to a good calibrated FIM.

The reason the VSWR bridge is so popular is that it is cheap, there are plenty of them available, and it is simple to use. Over the years we have become familiar with it and somehow assumed that we were evaluating antenna performance and efficiency with it. It has its uses, but for these two purposes it is absolutely worthless.

For evaluating the input impedance of an antenna, transmission line or other device, an RF impedance bridge or even a good noise bridge is far superior to an SWR bridge. However, a knowledge of complex impedance is required and this is oftentimes avoided by many.

Antenna pattern shape, efficiency and overall performance are not related to whether an antenna is resonant or reactive at its input. There is no scientific evidence to indicate any relationship between a resonant antenna input and improved antenna performance. The curves used by the FCC certainly do not indicate this.

The performance of an antenna is determined by its geometry, dimensions, quality of construction and materials and in no way by its input impedance. It is perhaps simpler to have a pure resistance rather than a complex input impedance, but it makes no difference to the field being radiated by the antenna.

Get a good antenna tuner and use quality, low loss transmission line and don't worry about being precisely on resonance. The only thing that a resonant input impedance may do is to reduce or eliminate the need for a tuner. Even at resonance, it is highly unlikely that the antenna resistance will be precisely 50 ohms, so the SWR will not be 1.0:1. For best results, the new HF

transceivers with untuned outputs really need a tuner to take the place of the output tuning components found in older transmitters and transceivers.

The question pool for the Advanced Class Amateur Radio license contains the following question: (4AI-12.3) Why are self-resonant antennas popular in amateur stations?

- They are very broad banded.
- They have high gain in all azimuthal directions.
- They are the most efficient radiators.
- They require no calculations.

Answer C is given as the correct answer. This is patently untrue and cannot be confirmed in any credible antenna reference publication (e.g.,

Kraus, Jasik, LaPort, etc.). None of the answers given are correct. A credible answer might be, "To reduce or eliminate the need for an antenna tuner." Upon request that this question and its erroneous answer be eliminated from the FCC question pool, ARRL VEC manager Bart Jahnke, KB9NM, has responded and will advise the VEC Conference Question Pool Committee accordingly.

### References

- C. Smith, *Directional Antenna Patterns*, Cleveland Institute of Electronics, 1958.
- W. Maxwell, W2DU, *Reflections--Transmission Lines and Antennas*, ARRL, 1990.
- Ibid.

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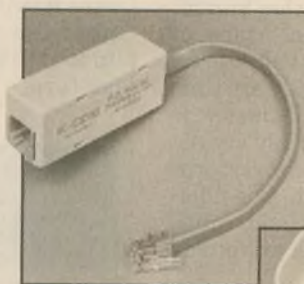
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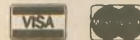
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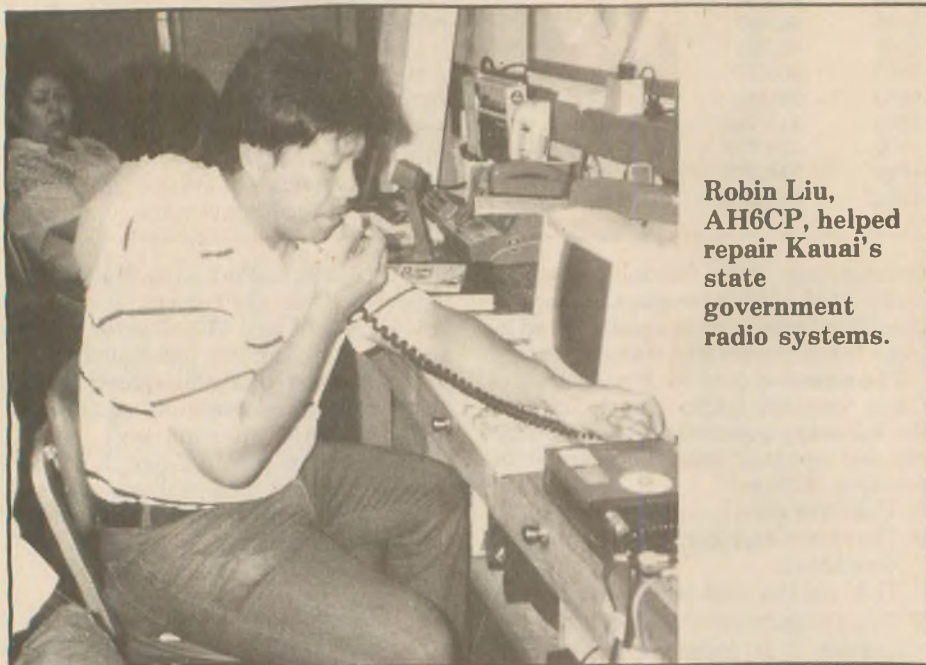


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# Hurricane Iniki

(continued from page 1)

camping tents, cooking on two-burner camp stoves and, after the sun goes down, moving about by lantern; most



**Robin Liu, AH6CP, helped repair Kauai's state government radio systems.**

munications were non-existent as there were no working telephones for a long while. I took two of my radios and was placed in a DAC (Disaster Assistance Center) in Hanapepe, on the southwestern shore of the island. My assignment was to be the messenger between

I had brought my Kenwood 440TS, Astron power supply, Icom 24AT hand-held (complete with Larson mag-mount antenna, a 40 and 20M dipole that I made for the occasion, power cord, coax, tools, sleeping bag and mat, a few items of clothing, some water and some food items. I was surprised when I stepped off the plane in Kauai and our friends, the Bartons, were there to meet me! A couple of amateurs were also there to meet me. They gave me instructions as to where to meet the person I was to work with. Jack and Jean took me to the Red Cross headquarters where I signed on as a volunteer and received my assignment, the Hanapepe Armory. We then drove to the Armory where I got the lay of the land and checked in with the head of the DAC. (It was late, he was tired and less than warm to the idea of having a "message center" cluttering his very busy and noisy operation.) We left and went to the Bartons' condo for some much needed nourishment and rest. The only damage that Jack and Jean sustained was the loss of some of the shingles on their roof. With the winds came the rain, and so there is water damage to the ceiling of the living room. However, compared to what I had already seen, their damage is very minimal, and insurance will cover it.

of the equipment has been provided by the Red Cross.

FEMA is in there doing the claims, making the paperwork as easy as they possibly can so that these people can get back on their feet as soon as possible. Insurance company "catastrophic teams" are there by the grove, living in the couple of tourist hotels left, with no hot water and trying to sleep to the sound of large generators. All of these people are working two to three weeks straight before they get any time off. The hours are long, the weather humid, and the people are stressed. Many of the agencies are staffed by volunteers, some are retirees who work part-time for little pay, some are full-time who are not paid for overtime. They are doing a terrific job. What I saw restores my faith in the common man. Considering the mass of individuals, both military and civilian, I was extremely impressed.

My purpose in going was to fill in a gap. Along with electricity, com-

the Red Cross at Hanapepe and the Red Cross headquarters located in Lihue. In the afternoons, along with my regular assignment, I was able to pass messages from the local people to the mainland.

On the 19th day of recovery 85 percent of the island was still without electricity or phone service. At first there were no phones. Then the telephone company distributed phone trailers throughout the island. Each trailer had two banks of three phones. The calls were free if they were within the state; otherwise there was a toll. Calls were limited to three minutes each—one call per turn.

Monday, 21 September, I got to the center at about 9:30 a.m. I was introduced to a Sergeant Randy Mau. He assigned two young men from his unit to help me set up the radio station. He also assigned me to a small storage room with three windows that opened and a door that locked! The Armory had electrical power, and the room had a table, so with the addition of a chair I was ready to go. I couldn't have been happier or in better hands. The two young men climbed up to the roof area and hung the 40/20M dipole. For the rest of the day I passed traffic and did some paperwork for the Red Cross.

Our operating bands were 40 and 2M. All the centers operated on one of two 2M repeaters. The South Shore operated on 146.68 while the North shore operated on 147.16. These repeaters were monitored by the communications headquarters. Our HF band was 40M. We started out on 7.288, but because of some interference we moved to 7.228. There was a 20M frequency, 14.268, that was primarily used to relay health and welfare traffic to the mainland. There were many amateurs who extended their help in this endeavor.

While in my little storage room, I heard about some of the losses people suffered. One family with seven children ranging in age from eight months to 15 years, described their situation like this: The roof blew off, two walls

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Indirectly heated oxide cathode tubes (like the \$400 3CX800A7) can be rendered instantly useless if their electron emitting layer is stripped off because of a severe current overload due to mistuning.

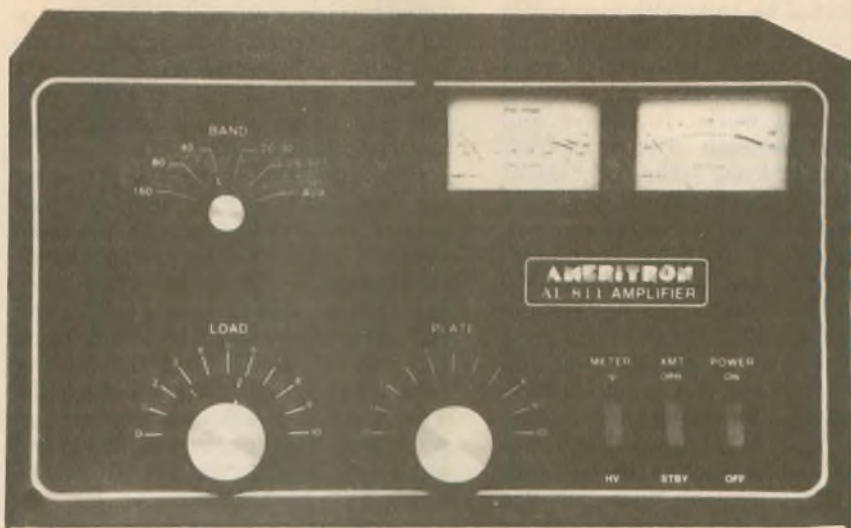
The Ameritron AL-811 is excellent for the newcomer because it's tough enough to withstand momentary mistuning. And the tubes are so inexpensive that you can replace one for mere pocket change.

**The Ameritron advantage: extra heavy duty power supply that gives you peak performance year after year**

The heart of the AL-811 power supply is its heavy duty power transformer with a high silicon steel core weighing a hefty 17 pounds.

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The Ameritron AL-811 power supply is built tough so you get peak performance year after year.

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collapsed, and all of the contents were damaged because of the heavy rains. Ninety percent of the homes of Kauai were affected by Iniki. Driving around revealed the destruction: roofing material, shingles, tin and plywood gone from houses, roofs sitting on the ground with walls, furniture and clothing underneath. Almost all trees have been at least "trimmed." Most have no leaves, some have no branches! The Macadamia nut trees are all down and brown from wind burn. The plantation owners are not planning to replant. The coffee trees are leaning badly, but appear to be in pretty good shape. The sugar doesn't look bad and could even recover. But sugar has been on its last legs for a long time and the Kekaha mill is among the badly damaged. Debris, such as tin roofs, wet furniture, roofing and plant remains line the roadway. The Corps of Engineers, as well as local heavy equipment operators, are doing the heavy cleanup. Everyone seems to be cooperating beautifully.

The story that sticks with me is one I heard from several people. It involves living through the hurricane itself. People were able to identify Iniki as she approached and crossed over onto the land of Kauai. She was a visible visitor. Her dark, wet winds blew for a long time, and from all directions, then the sky became a light grey, and the air stilled—the eye of the storm. "Eerie" was the word I heard most. Like being in a dome. The trouble with being in the eye of the storm is that you have to get out of it, which means living through the dark, wet winds again. The second time around was worse than the first; the anticipation heightened the fear.

I stayed at the radio until 4:30 p.m. and returned to the home QTH for a "bath" which consisted of a swim in the slightly green pool. I was happy to get that. The condo had received their 6kW generator and had several (but not all) refrigerators running. We had what Jean called "hurricane casserole" consisting of sauce from a jar, canned chicken and spaghetti noodles, and a neighbor passed around a fresh fruit salad to each unit. It was much more than I had expected to be eating during this week.

With the road being cleared of debris, a piece of equipment knocked a

fire hydrant over; buckets, bowls, plastic and glass containers were filled and the water purified for use. Electrical services were still non-existent in all areas and candles, flashlights, camp lanterns and fluorescent flashlights provided light. Mostly, however, people went to bed when it got dark and were up with the sun.

On Tuesday, 22 September, I opened the radio shack at 8:30 and got myself settled and checked in with the radio center in Lihue and the Red Cross tent at Hanapepe. Hanapepe was a very busy center. Large military helicopters flew in and out regularly. People came for rolls of plastic and the feeding center had a steady stream of people. The Red Cross efficiently set up appointments so the crowd moved in and out easily. Beside the Red Cross the DAC had such groups as FEMA, Unemployment Assistance, Agriculture Assistance, SBA, State Loans and Stress Recovery, and the Army provided medical assistance. Real Estate Damage Assessment, Hawaiian Telephone, Tax Assistance, Aging Services, Individual and Family Grant Program, State Loan Program, and the Salvation Army were all represented.

Members of the Armed Forces helped in many ways all over the island, but at Hanapepe they assisted the citizens in loading things into their vehicles—things such as large rolls of plastic for roofs, canned drinks, bottled water, camp stoves and lanterns. They were great. Ice was finally distributed to the people. How did the pioneers ever manage without ice? That was the one commodity that everyone wanted.

In an effort to make things as normal as possible for the kids, school began its post-Iniki session Tuesday. It was only half day, but the restored routine was as good for the parents as for the kids. As a result, the crowd at the Center consisted mostly of very young families and the elderly.

I had some 40M difficulty with the

antenna. The domed roof of the Armory had blown out during the storm, and there were pieces of rain gutter and roof debris hanging off the edge; I went outside at one point and could hear a tone as the wind blew the debris against the antenna wire. There was also a low-level (about an S-2) white noise that was constant, and sometimes the signal would "shut off" for seconds at a time. The Army was running microwave and their own very powerful communications, and I was told that the silent seconds may have been microwave and/or RF "hits."

VK3JFK, Richard, and AH6KG, Sean, arrived to check out my antenna problem and they found that a piece of metal roofing was touching the 40M part of the dipole. They tied it up out of the way and then the antenna tuned up. There was still the problem of 40M sometimes dropping out and the rig shutting itself off. When I spoke to Don on 20M he suggested a fix.

When I arrived at the shack on Wednesday, 23 September, I implemented Don's suggested fix on 40M and the problem went away, except for the RF hits. The radio activity picked up somewhat on this day. I passed several messages, one of which concerned the unexpected arrival of a 10 x 40 ft. office trailer. The Red Cross manager knew nothing about it, and the Army wasn't excited about having it in the helicopter pad area! The problem was solved by using some of the space in the parking lot. Meanwhile, the rain continued most of the day.

Our friend KH6FK, Sonny, popped up on 2M to request that an ambulance be dispatched for his stepfather, who had an aneurysm while cleaning up his yard. Unfortunately, the following day brought more sadness, and Sonny's stepfather passed away.

That evening Koloa Gardens' electrical service was reestablished and one of the cellular services came back on line.

Friday, 25 September, brought news that another hurricane, Roslyn, was headed for Hilo on the Big Island. The announcement of the impending event got everyone's attention. We were all interested in knowing the progress; storm clouds filled the sky all day and we all kept an eye on the weather. It was still, sultry and very warm. Hand-held Motorola 800 radios were delivered to the Red Cross group so my job appeared to be coming to a close. I would work through Sunday, dismantle the station on Monday, take Tuesday off and go home on Wednesday as planned.

On the afternoon of Sunday, 27 September, a security unit from the Army plugged in and a small band began to play some great music. It was a

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wonderful treat for everyone and was really appreciated.

Monday, 28 September, was breakdown day—first my HF rig and then the VHF. HQ moved their location to Wailua on the east shore, which made it impossible for them to hold the repeater that had been assigned to the southwest locations. They could hear just fine, so the messages were passed and we were able to keep the local operations people happy.

Tuesday, 29 September, was the day that we planned to tour the island. First we went to the south shore area. The sights were unbelievable. Whole houses had slid several yards off their foundations. Of some, all we could see were roofs on piles of rubble. Most were completely open to the elements, their tenants occupying the lower floors or living in tents outside. The beach narrowed because the sand had been deposited far on the other side of the road. Water and sewer pipes were exposed where once they had been buried.

We went down to the Nawiliwili Harbor where warehouses had their roll-up doors bent and misshapen. We saw roofs being fixed from the framework out. Many old buildings that managed to make it through Iwa 10 years ago were not so lucky this go-around. We stopped at the Kauai Resort Hotel where the Red Cross and Communications have moved, and I met Sean again, and met Mike Riley for the first time. (Mike gave me his call when we shook hands, but I don't remember it.) The other operators were out in the field somewhere. I was especially disappointed that I missed meeting WV6K, Rick. He was one of several amateurs from Hilo. I appreciated his sense of humor on the air. It helped make the job fun in spite of the sadness each of us felt.

Next we went up through Kapaa. It looked like a war zone. Buildings that were left to the storm must have been closed up tight, because they looked as if they had exploded. On the North shore we stopped at the Anahola DAC where I had the chance to meet Don, N7OGT. Then on to a lookout where we could see the Kilauea Point Lighthouse and the north coast. It was not only a sea of blue water, but a sea of blue tarps covering blown off roofs. We went through Kilauea and Princeville on to Hanalei. Because of time I was unable to meet eye-to-eye with the other two amateurs up on the north shore. K7PXV, Bruce, was stationed in Kilauea, and KB7IO, Dick, was in Princeville.

I now know that there were underlying currents of political happenings during this operation, but I have to say that at no time while I was on duty did I feel or know of these things. Those

PHOTOS courtesy of ROBIN LIU, AH6CP



**Hurricane recovery will require a lot of work, patience, and money.**

who worked the long hours and exposed themselves to the less than comfortable conditions did so because they truly wanted to be a help to the people of Kauai. This was most certainly more than a Field Day.

This was a useful experience in exercising our skills and abilities. A good example: I paid a visit to the Waimea Red Cross Family Service Center, where Sam, VK2BVS, resided. With five hours notice this Australian packed his HF and VHF rigs, antennas and a generator. He hopped a plane for the island of Kauai, a place that he did not know. He was assigned to the Waimea High School Cafeteria where he established his station. His bed—a cafeteria table. In his “quiet” times he taught Morse code to at least two young Hawaiian kids. The other Australian, Richard, VK3JFK, was very busy in the Red Cross headquarters in Lihue, where messages and requests were relayed to the outlying

Disaster Assistance Centers' Red Cross staffs. Their friendly demeanor and their sense of humor carried the day for those with whom they came in contact. They were a joy to work with.

There were many amateurs whom I met on the air, and all were courteous and helpful to me. At least twice my husband, Don, K6PGT, and I have received urgent assistance by some wonderful people, amateurs included. There is no way to repay that kind of help except to “pass-it-on.” I appreciate that I was able to help the people of Kauai. □

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# MARS — an emergency resource?

**ANN SHAVER,  
AH6KY/ABM6AS**

All amateurs know that MARS is a great resource for national emergencies. Precise training enables operators to handle traffic swiftly, accurately and competently. The uncrowded frequencies make it possible to pass this traffic readily. Moreover, MARS operators provide an important service to our deployed military personnel by handling phone patches and messages to their loved ones back home.

That's the theory, anyhow. Recent experiences with MARS in Hawaii suggest that perhaps the organization could be improved.

Hawaii has active Army, Navy and Air Force MARS groups. Each has an HF gateway station and enthusiastic members. In addition, Army MARS has a VHF repeater and a packet BBS which are open to members of the sister service groups. From the proper location, it is possible to access the Army MARS repeater from each of the outlying islands with only an HT and rubber duck. Sadly, only Navy MARS performed to expectations during Hurricane Iniki, which recently damaged Oahu and devastated Kauai. To my knowledge, Air Force MARS made no response whatsoever during or after the emergency, and Army MARS did "too little, too late," after some initial egregious errors.

"When the hurricane warning was issued Friday morning, we activated ourselves," explained Navy MARS operator William Boykin, W6HTH/NNNØHTH. "We have that authority in this area. Everybody called everybody else, and we activated the emergency net. Only hours after the storm hit Kauai, one of our members had a wire up in Kapaa (Kauai) and away we went."

Boykin estimates Navy MARS handled 386 Kauai messages. "I'd get up at 5 a.m., pound out as many messages as I could before making myself too late for work, then I'd come home and get back at it until late, late at night. I'm not blowing my own horn—we all pitched in like this."

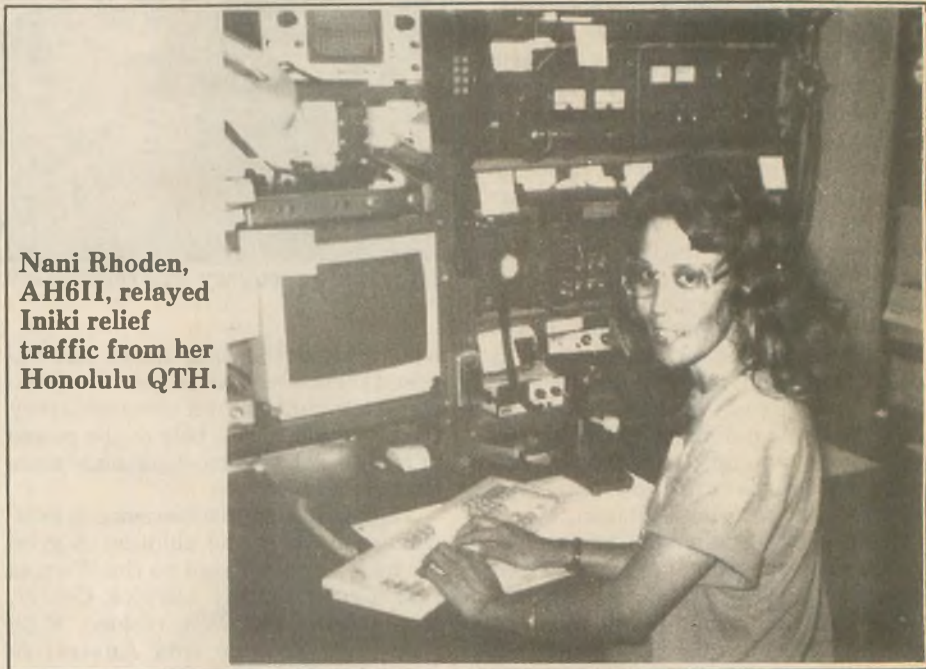
The Army MARS experience, how-

ever, was quite different. "When I heard the sirens at 5:30 that morning, I came up on frequency expecting to receive information and instructions," remarked Al Shaver, AH6KX/ABM6AT. "That's SOP, or so I thought. Our emergency communications plan states that 'our island environment requires a maximum of local latitude and initiative.' "

toward the repeater, several stations conducted the regular Aloha Net. As they do every morning, they practiced handling messages, technically correct but utterly unrelated to the impending disaster. Indeed, before, during and after the ferocious hurricane, repeater use was always "ops normal." Regularly scheduled nets continued to be held, and only casual mention was made of any type of relief efforts.

"Actually, there was nothing we could do," explained Joe Hao, WH6F/AAM6HI, State Army MARS direc-

**Nani Rhoden,  
AH6II, relayed  
Iniki relief  
traffic from her  
Honolulu QTH.**



Instead of any emergency activity, the repeater carried ordinary morning chitchat traffic. After several stations checked in on the frequency and admitted they didn't have any specific information on the storm, one person did repeat the bulletin issued by Civil Defense, broadcast over commercial radio. Then, only one hour after the sirens indicated the approach of a Category 4 hurricane headed right

tor. "Our hands are tied; we cannot act until the Army tells us to."

Several individual Army MARS members, however, did not need orders from headquarters to get involved in the very real emergency facing them. Using their skills and common sense, they switched to amateur frequencies to be of assistance.

"I got a dipole up right after the storm passed," said Chuck Burch, AH6IN/ABM6AB, whose Oahu neighborhood was lightly damaged by the hurricane. "This is what I did 10 years ago when Hurricane Iwa hit. Nobody needs to tell me the importance of health and welfare traffic and to get started. Being of service is an important part of this hobby."

"There's a difference between national and state emergencies. In a local emergency, we shouldn't have to wait to be told to help," added Bill Rhoden, AH6IH/ABM6JD. "Nani, AH6II/ABM6JH, and I got started right after lunch and went straight through until 2:30 the next morning. It doesn't matter who you are or whose hat you wear when you help. But it's too bad we couldn't be using the Army

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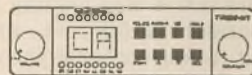
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Five banks of 20 channels each. Covers 29-54, 118-174, and 406-512MHz. Features scan, search, delay, priority, memory backup, lockout, service search, & keylock. Includes AC/DC cords, mtng brkt, antenna. Size: 7 3/8 x 6 15/16 x 1 5/8. Wt: 4.1lbs. Fax fact document #570.

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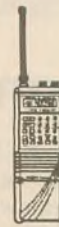
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MARS frequencies. They're less cluttered and you can get a faster response." The Rhodens used both Navy MARS and amateur frequencies.

In the days following the storm, Army MARS employees at the gateway station handled 100 messages or phone patches. "We were going to have some volunteers help with patches from their own stations, but there just wasn't the demand for our services," explained Hao, who also helped on amateur frequencies.

Clearly, a MARS response to a local disaster depends largely on the local leadership and its perceptions of its operating latitude. One wonders what

MARS really can be expected to do in an emergency. How, if at all, should MARS interface with other organized efforts such as RACES and ARES?

I enjoy my involvement with Army MARS in Hawaii. Through MARS, my husband and I have made a number of close, lasting friendships. We enjoy the regular MARS nets. But I have trouble answering any new amateurs' questions about the value of MARS membership. What is the point of being able to send a MARS message, complete with proper day/time and group count, if I'm never going to use this skill for anything other than practice?

As a citizen and a taxpayer, I am convinced that there needs to be a thorough, honest evaluation of MARS. What is its function in today's world? Are present MARS procedures and activities relevant, in sync with current communication technologies? Are MARS activities sensible and flexible enough to meet local emergencies? Do we need three parallel MARS services? What can we civilians do to make MARS a real asset to our communities and our military in the high-tech future? Let's make MARS worthy of the scant federal funding it receives, or let's use the tax dollars to better advantage. □

## Running QRP in big gun territory

GARY E. MEYERS, KY0B

It was Saturday morning, 11 July. I had been awake about 30 minutes and knew that my sleeping time had come to an end. Not wishing to disturb the XYL, I slipped out of bed and crept quietly from the bedroom, down the hall, and into the radio room. As I switched on the light, a quick glance at the clock on the operating desk told me it was 5:30 a.m.

I don't know why I had awakened so early but I had. I headed for the kitchen to arm myself with a cup of fresh coffee as my thoughts centered on the new Curtis keyer chip I had just installed inside my HW-8 earlier in the week. I decided that now would be a great time to try it out with a QSO or two.

It only took a couple minutes to hook up the little rig, connect the antennas to the feeders and position the headset on my head. As a rule I don't operate at this time of day so I didn't have any idea what I might hear. I was delighted to find the band jumping with activity. As I tuned slowly across 20M, I found a station calling CQ and zeroed in on it just as it was beginning to sign. "DE W1AW TEST K" sounded in the headset.

I had worked W1AW before but never on QRP, so I gave a quick call. "W1AW DE KY0B/QRP K."

The reply came as quickly as mine was sent. After clearing with the station I grabbed my copy of QST and

checked the contest section where I discovered it was the annual IARU HF Worldwide Championship Contest. At first I thought of abandoning my QRP notions, knowing that most of the big boys would be on with their "big guns," but I had that sudden urge to give QRP a try in a real honest-to-goodness, no holds barred CW contest. Just how well could a QRP station really do when up against the big guns?

The band of choice would be 15M, mostly due to the fact that this was a worldwide contest and chances for making a few DX contacts might be better than on 20. I also felt that the DX stations would be listening more eagerly in order to get every contact possible, thus increasing my chances of being heard.

The HW-8 was feeding into a CL-33 tribander at 50 feet, and measurements taken earlier in the week showed that the rig had an output of 3.48W (this was determined by attaching two 100-ohm resistors in parallel to the antenna connector, measuring the RF voltage across the resistors and applying the results to the formula  $P = E^2/R$ ). Actual radiated power would probably be less after traveling through 100-plus

feet of coax, but it is close enough for our purpose.

One last hindrance that needed to be overcome was the list of things I had planned on doing during the day. Because I had no original plans to work the contest, I decided I would not attack it with the same effort that I might have done otherwise. Instead, at different times throughout the day, I would work the contest QRP-style in between my errands and chores.

At day's end, approximately two hours of operating time had been logged. Most of the stations worked were DX, as I was concentrating on working DX and didn't answer very many stateside calls (sorry, fellows, get you next time!). The following prefixes were added to my QRP log during this time: KL7, F5, DF0, HA7, YV2, G3, OH2, OG4, EI9, GM0, FF1, LZ1, W1, RY8, ZA1, KT3, HG9, UC2, JA4, UA9, SM3 and AM7. This list includes ITU zones 2, 7, 8, 9, 18, 27, 28, 31, 38 and 45. Among those worked were the following ITU headquarter stations: the United States, W1AW; France, FF1REF; Albania, ZA1A; and Hungary, HG9HQ.

In conclusion, I was really amazed. I have used QRP for years but always before it was under less challenging conditions and never in a contest (except for the bonus points during the ARRL Field Day). Oh, there were some unanswered calls, to be sure, but the ones that responded on my first call more than compensated for the others. It was a lot of fun and has given me a desire to work more QRP.

If you have been thinking about trying your hand at QRP, I hope this small testimonial as to what can happen will give you that needed push. Whether you need to blow the dust off some discarded rig or fire up the soldering iron and build one from scratch, you will be in for a lot of fun! □

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# Amateur Radio: there when you need it

The following letter appeared in The Ormond Beach Observer, 5 June 1991.

Amateur Radio continues to make history in the field of high tech, high-speed radio communications, as well as in its ability to provide public service in any area under any conditions requiring dedication and sacrifice above the call of duty.

Recently, the astronauts aboard the space shuttle *Atlantis*, all licensed amateur radio operators, communicated with grade school children via Amateur Radio, under the supervision of their teacher, an Amateur Radio operator.

The children were thrilled with a once-in-a-lifetime opportunity to talk to the astronauts and asked them such questions as, "How does it feel to be an astronaut?" and "How can I become an astronaut?" The answer to the last question was to stay in school, seriously study math, and later major in electronics and aeronautical sciences. They were also advised that an Amateur Radio license would greatly enhance their chance to obtain an interview at NASA.

During the last terrible forest fire in the far west that destroyed thousands of acres of choice timber, hundreds of amateurs volunteered their services and their equipment under very dangerous conditions. In one instance, due to the unbearable heat and the nature of the terrain, vital radio communications seemed impossible. One amateur persisted, at great danger to himself, until he had located a suitable location. The firefighters' camp was then built around his choice of location. Officials responsible for the preservation of forestry publicly recognized that without Amateur Radio, thousands of additional acres would have been destroyed.

Locally the Volunteer Amateur Emergency Communications System, on Thursday, 25 April, under the able leadership of local businessman Frank Haas, KB4T, completed another practice drill. This drill was to establish and maintain vital radio communications between the Red Cross and Memorial, Halifax, Humana, and Peninsula hospitals in response to a simulated disaster of major proportions striking our area. The many amateurs and the members of the hospital staffs participating are gratefully commended for their dedication to this cause.

There are many other facets to Amateur Radio which the general public may not understand or appreciate. Amateur Radio is many

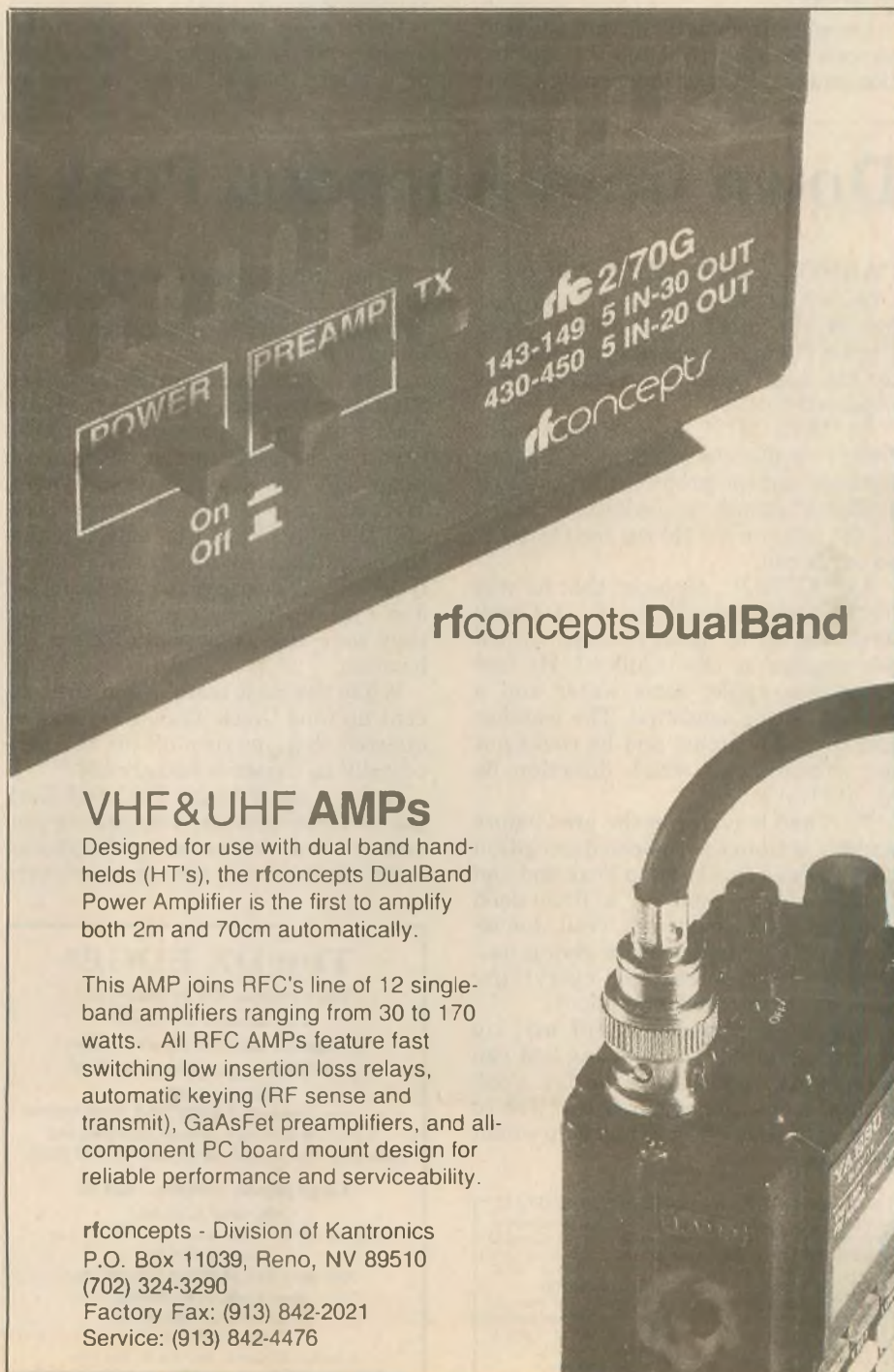
things to all people everywhere in the world. Millions of amateurs are bound together in an indestructible bond of international friendship, good will and mutual understanding of the encompassing purpose of Amateur Radio.

There are no political barriers in Amateur Radio. There are no ethnic, cultural, or religious limitations within its ranks. No amateur traveling the world as a tourist will ever be without a friendly greeting or a helping hand

from a fellow amateur he has probably met on the air.

Yesterday, somewhere an Amateur Radio operator was busy handling volumes of messages as a public service through his own designed highly sophisticated system of rapid communications called packet radio.

Today, an amateur somewhere is busy bouncing radio signals off the moon to other amateurs, using highly specialized antennas he designed for



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Tomorrow, an amateur will be continuing to probe the universe and even beyond, possibly to the edge of infinity, listening for strange sounds that might be interpreted as intelligence from a planet in outer space, so far a distance that it will take light years at 186,000 miles per second to reach our earth.

Amateur Radio, as we know it today, is a far cry from radio communications at the turn of the century, when a few dedicated pioneers fell in love, so to speak, with a mistress known as radio telegraphy.

I would be remiss if I did not add that anyone desiring to enter the fascination and educational inner circle of this

fabulous fraternity will find a helpful amateur awaiting. You could be a grade school student inquiring as to how to become an astronaut. You could be a housewife and mother who would like to be able to talk with her loved ones away in their car, boat or plane via Amateur Radio, and the compliments of Southern Bell. All it takes is a hand-held radio transmitting into our local amateur repeater which will dial the telephone number requested.

Last, but not least, you could be a widow or widower (and we have them in our radio club), who is lonesome and could be searching for a secure and compassionate social climate.

In closing, when you notice an amateur antenna hanging from a tree or a tower, please do not be unduly

disturbed, for all that he can accomplish as an amateur must first start with an efficient antenna.

Above all, take comfort in remembering that when another sea witch, such as Camille, rises up out of the violent turbulence off shore to vent havoc on our beautiful shorelines, destroying millions of dollars of property and endangering the lives of hundreds of unfortunates trapped in the path of her wrath, Amateur Radio will be there first to reestablish vital communications completely destroyed by the velocity and strength of her howling rage.

Yes, my friends, please be kind to Amateur Radio. It will never let you down.

LARRY AMANN, K5TQN  
Ormond Beach, Florida

## Down from Abandon Peak

### CARROLL BURGETT, N0PUU

On 4 August a 69-year-old man hiking in the mountains northeast of Pagosa Springs, Colorado, made a call on his ham radio for help. He was hopelessly lost!

At 15:10 MDT Fred Harman Jr., N0JSP, a lifetime resident of Pagosa Springs and the proprietor of the Red Ryder Museum, immediately picked up the mike on his 2M rig and responded to his call.

Joe, KB7BJC, reported that he was lost somewhere off the Coal Creek Trail. Earlier in the day he had signed the register at the trailhead. He had taken one apple, some water and a peanut butter sandwich. The weather had turned overcast and he could not get a bearing in which direction he should travel.

Fred had traveled in the area before and knew from the radioed description that Joe was on Abandon Peak and had gotten sidetracked on a little-used stock trail off Coal Creek Trail. Joe informed Fred his legs were giving out. This information changed everything to a life threatening emergency.

The high altitude, cold air, no matches and the fear of being lost can be very hazardous late in the day. Realizing the emergency, Fred told Joe to stay right where he was and help would be coming.

Fred immediately notified the Sheriff's Dispatch. Deputy Earl Gibbs was assigned for the search and rescue operation.

With the information Fred had given SAR, Earl moved a crew with horses to East Fork and a team on foot to the Coal Creek Trail. In the meantime a plane left for a verification flyover. With the help of Joe, the dispatcher, and the pilot, Fred was able to guide the plane into the correct area. With only 25 feet of clearing, the pilot spotted Joe's jacket. Using a position locator they were able to pinpoint Joe's exact location.

While the SAR team began their ascent up Coal Creek Trail, Fred had requested that Joe turn off his HT periodically to conserve battery life.

Around 18:00 hours Fred and Earl, the SAR coordinator, were getting concerned about Joe as he was beginning to be confused and his responses were

not well-organized. He was also having problems reading the time on his watch. Fred was very concerned and changed their contact period to every 10 minutes. He also had him walk around in tight circles, not leaving his location. The periodic exercise seemed to help.

The light on the trail for the SAR team was getting dim. To make things worse, a bear had been following them for 30 minutes.

During all of this, Fred realized that no one had contacted Joe's wife. The sheriff located her about two miles from the Eastfork Campground. She had already realized something had gone wrong when Joe had not returned from his hike.

As the SAR team got closer they built a smokey fire to see if Joe could tell where they were in relation to him, but the visibility was too limited. They fired three rounds from their pistol. Joe heard them. They knew they were close. Joe called Fred and said he could see the lights from the team and was going to meet them. Fred immediately called back to tell him to stay in place. It was too late, Joe's HT batteries went dead.

At 20:35 Fred received a call from the search team that they had located Joe and he was safe. The time was too late to return to the trailhead, so they decided to stay and camp the night. Joe was finally brought out at 08:28 the next day.

"The end"? Not on your life. A week later Fred received a call on the local repeater: "N0JSP this is KB7BJC, you will never guess where I am—up Coal Creek Trail. Don't call the sheriff, I'm not lost this time. Thanks for saving my life. KB7BJC clear."

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Russell Dwarshuis, KB8U, is a renowned bicycle ham.

## Hamming on the open road

### RUSSELL DWARSHUIS, KB8U

Packing a few ham radios for fun and company, I took a 3,000-mile solo bicycle trip last summer. My route went from Ann Arbor, Michigan, north to the upper peninsula, then west through Wisconsin, Minnesota, North Dakota, Montana, the panhandle of Idaho and on to Washington, where my trip ended at my grandfather's house in Lynden, near the Canadian border. I took along the following gear: an Icom IC-2AT for 2M, a 5W crystal-controlled 20M CW transmitter, and an AEA DXHandy for 10M SSB. I built a 20M to 10M receive converter to accompany the transmitter. For CW I used an electronic keyer with push buttons attached to the handlebar. I used a boom microphone headset. I was only planning on using the radio when pedalling got monotonous, so it was

just a sideline to the sightseeing I did.

20M CW while bicycle mobile was a first for me. I was so busy preparing for my trip that I didn't get a chance to test it out. I wasn't sure I'd get out with just a whip antenna on the bicycle. I tried it on day one and immediately made a few contacts. Satisfied that all was well, I turned it off and enjoyed the scenery for a few days.

Unfortunately, old Sol didn't cooperate. A big string of solar flares made operation impossible or very difficult, once I made it past Michigan. *CQ* magazine said June 1991 was one of the worst months ever for shortwave propagation. Of course, the bulk of my trip was during June! I did manage to make a few contacts, however, 10M only opened up a few times. I made all of one contact on SSB (that was from North Dakota).

I was really hoping to make a lot of contacts for Field Day. Band conditions previous to that fateful day seemed completely flat. I could hear a few weak signals. My suspicions got aroused when I could hear them work stations one after the other. I discovered I had a shorted coax cable on the

receive converter! Somewhere along the road the solar flares subsided, but the short tricked me into thinking conditions were worse than they really were. I got the rig going again on the last day of Field Day and managed to make 10 contacts, so the weekend wasn't a complete failure.

My favorite 20M CW contact of the trip was with WN9U, who was running 2W output. After I returned from my trip and got his QSL card, I found out he's a fellow member of BMHA! I always get a charge out of the reaction I get when I tell people I'm bicycle mobile, especially on CW. I have a feeling a few of them don't believe me, since they don't acknowledge it. I've gotten more than one QSL card that said they didn't believe me until they got my QSL card—it has a picture of my bicycle on it.

The best part of a bicycle vacation is meeting people. After one long day in North Dakota, I got on a 2M repeater in Minot to chat a bit. I talked to a ham who runs a store in a shopping mall. He invited me over to his store to talk awhile—I was camped just outside of town. The next morning we met again over breakfast. He said he wanted to call the local paper and the TV station. I was skeptical I'd be newsworthy, but it must have been a slow news day. I got a spot on TV, and they put me on the front page of the newspaper, with a big photo! A nice moment of my vacation. The campground I arrived at that evening said they were expecting me since they saw me on TV!

It's always nice to meet other bicyclists while en route. Outside of Pelican Rapids, Minnesota—the middle of nowhere—I saw a bicyclist ahead of me after I rounded a corner. I muscled up the bicycle and caught up with him. We talked for a bit, then the inevitable question about the radio came up. "Is that a two-way radio?"

I told him yes, it's a ham radio. Usually when I say that, I get a blank stare and an "Oh." I was more than a bit surprised when he said, "Oh, well I'm WJ0Q." We wound up riding about 70 miles together that day. He showed me the sights around Fargo that only a ham operator could appreciate: the tall repeater towers. Unfortunately, they were all on top of a steep hill that I had to climb!

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The trip wasn't without its usual problems. I got three flat tires (not bad, considering I was riding on racing tires), and my freewheel quit freewheeling only 700 miles into the trip. (I managed to get a replacement after riding carefully for a day.) I started the trip with a bicycle generator to charge the battery. After about 1,000 miles, it froze up. They just aren't made for that

kind of abuse. Now the generator made AC, so I already had a bridge rectifier wired up.

How was I going to drop 120VAC down to 12VAC? The proverbial light bulb lit up above my head. That's it, I'll use a light bulb! I stopped at the next hardware store and bought a rough service 150W light bulb as a voltage-dropping resistor. In an hour the bat-

tery was charged up, and I was on the air again.

Was it worth hauling nine pounds of ham radio gear 3,000 miles on a bicycle? YOU BET! Despite miserable conditions on the shortwave bands, I still had a ball when it worked, and 2M can't be beat for introducing yourself to the locals. —*Bicycle Mobile Hams of America*

## A successful endeavor

### WAYNE THALLS, KB6KN

Students from 25 area schools gathered at Del Mar Middle School in Santa Cruz, California, to make contact with the space shuttle *Endeavor* on the morning of Sunday, 13 September. The school was one of only three in the US chosen to participate in SAREX (Shuttle Amateur Radio Experiment) for mission STS-47. Catherine Gunderson, N6OOS, persuaded NASA to include a local school—several hundred applied. Catherine, a part-time teacher, pursued her dream despite the fact there was no classroom committed for the project. She arranged for use of the Del Mar facility after receiving approval for the contact. Significantly, this unique educational experience was achieved without cost to the schools.

This contact may have been unlike any prior SAREX contacts. The entire operation was conducted by the kids, not adults. No automated tracking antenna was utilized; a team of young hams manually reoriented the beam every 20 seconds during the six-minute-plus window. Rather than just one young operator at the mike, there were three. Gary Spangler, KD6ISR, was joined on the air by Hannah Lewbel, KC6NXXB, and Sarah Tuttle, KC6PPC. Each directed several questions to mission commander, Captain Robert L. (Hoot) Gibson, USN. The queries were gleaned from submissions of several dozen participants. They concerned the environment, mission goals and personal experiences in space. These novices at space communications managed to hold the contact from horizon to horizon—slightly over six minutes.

The Santa Cruz County Office of Emergency Services made available their RACES/ARES communications van. It was manned by the kids for a special event station operation. Other

“We will set examples later, so youth are the future of Amateur Radio. It's our duty to preserve it.” —*Mary Alestra, KB2IGG*

students competed in designing a special QSL card to acknowledge these contacts. Another QSL was designed for the shuttle. While only a few students could actually operate the equipment, all 41 of the participants were actively involved in some facet of the project.

The 20 or so behind-the-scenes amateur volunteers made a special contribution. Russ Mackey, NW6U, coordinated the overall volunteer effort. Equipment was loaned by local hams. Other amateurs taught the elements of space communications to the kids and provided behind-the-scenes support. They all helped to make the Sunday morning contact look routine. Local newspaper and television coverage,

before and after the event, bolstered the image of Amateur Radio.

One of the three control operators, 13-year-old Gary Spangler, KD6ISR, summed up the experience: “I was amazed how clear the shuttle astronaut sounded. Afterwards, I realized that everybody's hard work had really paid off.”

Sarah Tuttle, KC6PPC, age 14 and another of the operators, said, “I thought it was really neat. It was a once-in-a-lifetime chance.”

Eleven-year-old Brian Corbett, who only recently passed his license examination stated, “It was the most exciting thing I've ever done in ham radio.”

These kids learned about more than just science—they now have a better understanding of those much referred to points of light. □

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Lakeside Jr. High students, waiting for the shuttle to come into range.

## ATV to STS-50

DAVE BIRD, AA6DB

Lakeside Jr. High is situated in Norwalk, California. It is one of two junior high schools within the Little Lake City School District. Mrs. Wanda Shaffer, one of the science teachers, talked to Sheila, N6LXW, the school librarian, about Amateur Radio. They both agreed on the great potential this hobby could offer students and parents—something they could do as a family.

Wanda was determined to secure a grant for equipment which was forthcoming. Sheila, with my assistance, implemented a teaching program for persons showing an interest in radio, with everything aimed toward teaching at the junior high school level. This was to be an after-school event, one evening a week. A number of students and parents enrolled and the first class was ready. Since I had never taught code and theory to children, I would find this a real challenge.

I installed antennas atop the library. This was to augment the teaching program by showing would-be hams on-the-air demonstrations with an em-

phasis on technique. Our classes were going to be fun. The class studied from books donated by the Downey Amateur Radio Club. As the classes progressed and skills improved I sent for the ARRL's Novice testing program. I recruited the help of several fellow amateurs and we tested the group over a three-week period. Unfortunately at the start of the program we had several students drop class, but most of the ones who remained passed their Novice tests, later upgrading at local VE testing centers. Of course our star pupil was Wanda; even with heavy scheduling, she still devoted time to becoming a radio amateur and is proud of her call, KC6LCA.

Sheila, meanwhile, had notified SAREX that we would be interested in

communicating with astronauts on future missions. Consequently when Jim Steffen, KC6A, contacted several schools about sending ATV (amateur television, fast scan) on an upcoming mission we wanted to be included. He and several other radio amateurs had successfully transmitted video pictures to the astronauts on a previous mission, becoming the first amateurs to send live ATV pictures to the shuttle.

Lakeside Jr. High School was chosen from a list of many schools, since the geographical location was best suited to transmit video to Jim's QTH. He would in turn retransmit the video to the shuttle. He has some very sophisticated equipment which would be difficult to use in the library because of its immobility. The audio and initial contact would be transmitted directly from the school library on 2M.

Plans were made and a team of ATVerS were dispatched to install and test equipment at the school. It was not known at this time the exact date the shuttle would be in range. Wanda, KC6LCA, was assigned the task of coming up with an idea in the form of an experiment. Sheila, N6LXW, would use her call and make the initial contact. We knew the time allotted to complete the experiment would be very short. The task on hand was to condense the experiment with remaining time devoted to actual live communications between the children and the crew.

In the interim before the launch the SAREX crew had to get everything ready. Test after test was performed trying to achieve perfection. We put up and took down antennas, the ATV crews adjusted and readjusted equipment, checked and double-checked everything. We thought we were ready.

Wanda came up with the idea of asking the crew of STS-50 to relate how Newton's third law of physics worked in space (for every action there is an equal and opposite reaction as demonstrated by the Newton cradle). Everyone thought this would be a great project since the children were learning this in school.

At first it was planned that STS-50 would be accessible during the Field Day weekend. (Boy, what a contact that would have made!) But this would be changed with NASA's launch date. Everyone was getting excited. Dave, WB6PMX, who was in charge of public relations, was advising the media. A few days before the pass antennas and equipment tests were performed and a final check was made. Two days before the actual pass, which had been rescheduled for 1 July, it was decided that Wayne, N6NB, would bring his

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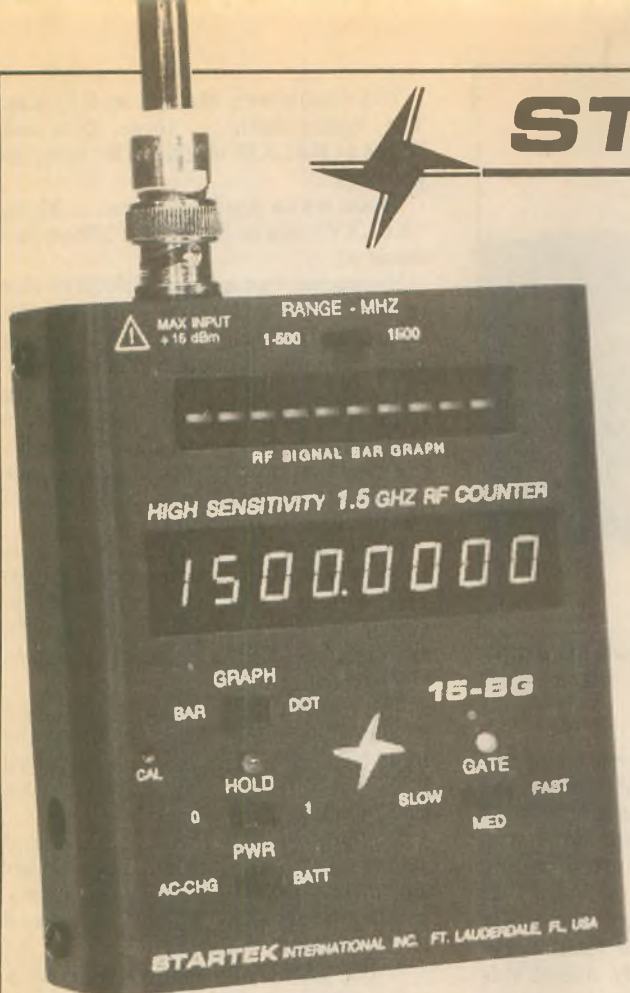
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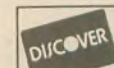
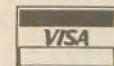
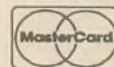
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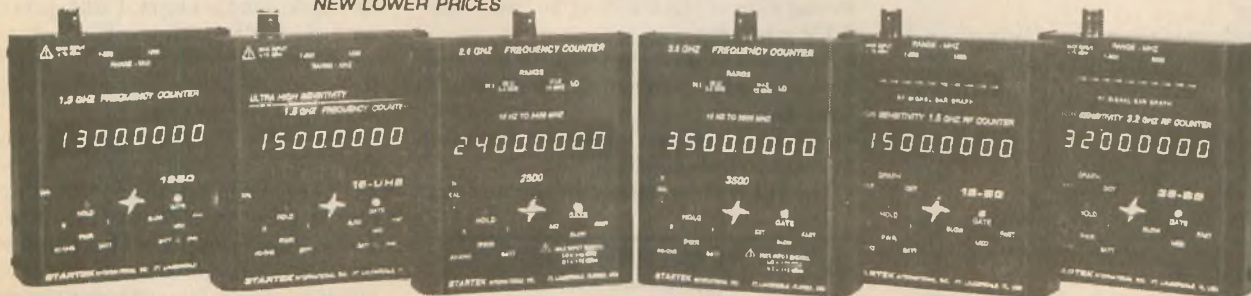


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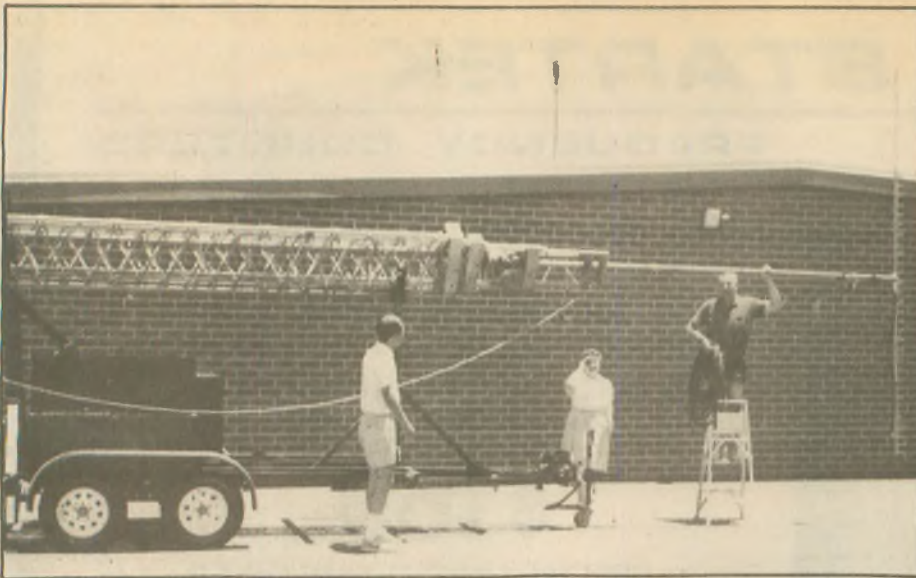
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Ken Yee, school counselor, and Sheila Bird, N6LXW, school librarian, attend Wayne Overbeck, N6NB, with the installation of his mobile antenna.

portable system (60 ft. tower on a trailer) and use it instead of the array on the roof of the library; more height would make for a better picture. Sheila and Wanda had been there all day while Jim, KC6A, and the SAREX crew tried to get everything operational for Wednesday's pass. On Tuesday, the day before, everything was ready.

Seven a.m. 1 July: Everyone including the media were assembled at the school. Dave was briefing the assembly, explaining the SAREX purpose and indicating that the shuttle would pass to our south with an opening of four minutes. Everyone was tense, wondering if we would make contact since there wasn't much time to

call the shuttle, make contact and run the experiment. The 2M equipment was tested along with the amplifier to make sure we could be heard, when suddenly a local amateur started calling CQ STS-50.

Would this ever mess up the contact if we have to compete for their attention! Jim, KC6A, quickly asked this station to move off frequency since the school was about to establish contact with the shuttle, and in good, friendly amateur spirit he moved. Everyone assembled in the room sighed with relief. Our computer technician monitoring the shuttle's orbit had the crew stand by, then gave the command to the cameramen.

The countdown started at 8:15 a.m. Ten, nine, eight . . . three, two, one "This is N6LXW calling KB5SIW, do you copy?"

There was a deadly silence . . . Then, "N6LXW this is KB5SIW." Wow, we made it!

Everyone was quiet. "KB5SIW this is N6LXW—you are 5 x 5 at the Lakeside Jr. High School. How do you copy my video signals?" Very quickly the team sprang into action executing their assigned tasks. The news media filmed the entire event; history was being made on the first occasion amateur television had been sent from a school involving non-amateurs.

Four minutes seems such a short time; it would have been nice if it had been longer, but the children—Kelly, Gloria, Christine and Richard, aged 13 through 14—did get to briefly speak to the astronauts.

The experiment was concluded, and it was determined that in space the balls become weightless and therefore lose the effect of any opposite reaction, as they have on earth.

By 8:20 the event was finished, and several AM news stations aired coverage of the event immediately. Television coverage was shown on several networks that evening.

A big effort was made by SAREX radio amateurs and NASA, as well as Jim, KC6A, and his team; without them none of this could have been accomplished. Others responsible in achieving this success include WA6PMX, Dave; N6NB, Wayne; WA6LXB, Doug; John (cameraman); and several other amateurs who assisted with the equipment. □

## A brief guide to airborne ATV

### STANLY E. HARTER, KH6GBX

A proper demonstration of airborne Amateur Radio television (ATV) requires several factors coming together precisely at the chosen time and place. They are:

1. Good weather for flying and steady camera transmissions.
2. Good visibility and adequate light.
3. A competent camera operator.
4. A camera operator capable of describing what he is shooting.
5. Being on target at precisely the right time for those watching the demonstration.

Murphy's Law says that if something can go wrong, it will. There are marvelous opportunities in "live" ATV demonstrations for Murphy to step in and show his stuff. Here are a few examples I have seen:

- Rain, snow, windstorm or other hostile weather problem.
- ATV crew can't find targets of interest to those watching the demo.
- The receiving antenna is set up on the wrong side of the building to "see" the ATV aircraft.
- Some of the government officials and hams scheduled to see the demo don't show up.
- Some key viewer shows up minutes too late to see the demo.
- The ATV crew, either in the aircraft

or at the receiver site, discovers they forgot a crucial connector, cable, or piece of equipment.

- The camera operator is untrained in how to shoot and pans dizzily, leaving viewers unimpressed and woozy.
- Battery goes dead.

These problems may be overcome by a few simple steps. First, prerecord aerial ATV demos. Pick a clear-weather day and record a "perfect" five-minute video. Anything longer may bore the viewers.

The video should always be shot in the area of interest to those for whom the demo is being made. Select known landmarks and points of interest. These might include the courthouse, freeway through town, a fair or other outdoor event, lake or reservoir activity, hospital, city hall, or any other location that viewers can readily identify. Always ask the agency for whom you are doing the demonstration if there are any particular points of interest



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which they want to see.

Look for unplanned targets of opportunity. These can often offer some of the best material to demonstrate ATV. Targets of opportunity could be a traffic accident scene, a fire, racetrack action, any outdoor crowd, downed aircraft, etc.

Proper camera technique is essential. Do not pan. We must remember that the majority of viewers are unfamiliar with seeing things from a few hundred feet up in the air, in motion. Hollywood uses a device (Steady-Cam) to keep their aerial shots rock solid, with no jitter, jump, bump or vibration. Since they cost more than some airplanes we use, and since your ATV group will not likely be able to afford one, the basic rule with regular cameras that bears repeating is, don't pan. That leaves two basic techniques for ATV:

1. Level, straight line flight. The camera picture travels at the same ground speed of the aircraft. The camera operator can announce where he is and in what direction he is traveling. Help the viewer to locate where you are. If the viewer cannot identify with what is on the screen, ATV serves no purpose. The sooner the viewer knows where he or she is in respect to the picture, the better your work is.

It helps when the pilot can make all turns in one direction. If all turns are left-hand turns, for instance, all camera shots can be out the left side and vice versa. In this manner the picture never leaves the ground; you don't acquire unwanted shots of the sky, camera gyrations, shots of your feet, the back of the pilot's head, etc. If you are only recording and not transmitting live, shut off the camera when you don't want to record and transmit junk. A good camera operator can literally edit on the spot.

2. Orbiting the target. The aircraft does 360s over the target, or a helicopter hovers or does slow flight 360s.

When the ATV transmitter, whether airborne or on the ground, is too far from the receiver to adequately provide a high-quality picture, either (a) don't show it, or (b) videotape it in the field and retransmit it later when you have a Circuit Merit 5 path. The ATV aircraft may be down in a canyon, for example, taping an incident. It is out of range of the receiver for a CM5 path. After recording material to be transmitted back to the EOC or IC (Incident Command), the plane can climb to an altitude sufficient to assure the reception of a CM5 playback transmission.

Aerial ATV platforms I have seen or used have included slow flying fixed-wing aircraft owned and operated by the RACES personnel, Highway Patrol helicopters, Civil Air Patrol aircraft, and county fire and police

helicopters. Needless to say, fixed-wing aircraft must be of the high wing variety.

Because of Murphy's Law and daylight limitations, it is now standard operating procedure for the State RACES ATV unit to prerecord ATV demonstrations. In this manner the crew can pick ideal flying and lighting conditions. Targets with which the viewers can relate are determined in advance. When the day (or night) of the presentation arrives, a proper video demonstration can be made to the local government officials regardless of

weather conditions at the time.

The officials aren't interested in the aircraft installation, hardware, wiring, cameras, radios and so forth. They are interested only in results, good results. Remember that they are used to seeing professional helicopter news video. ATV results can be close in quality with the right equipment and skilled operators. If it isn't or it's still in the "gee whiz" hobby stage, don't demonstrate it. More harm can be done by failures; the memory of a poor presentation is far longer lasting than that of a successful one! □

## Shuttle blackout

Amateur Radio became a new star in space at 3 a.m. Friday, 18 September, when a small, battery-powered ham radio aboard the space shuttle *Endeavour* successfully linked the astronauts with NASA mission control after computers handling official communication from earth failed briefly.

The tiny 2M transceiver installed on the shuttle as part of SAREX is used by astronauts to talk with school children and licensed Amateur Radio operators on earth. Shuttle crew members Jay Apt, N5QWL, and Mamoru Mohri, 7L2NJY, operated the radio during contacts.

Ordinarily, mission-related communication is controlled by computers in White Sands, New Mexico. The computers coordinate the flow of data between mission control in Houston, Texas, and orbiting communications satellites around the globe. The satellites, in turn, relay messages to the shuttle, providing virtually constant communication regardless of the shuttle's position. But a glitch in the White Sands computers plunged the shuttle into a temporary communication blackout. Mission controllers could hear pilot Jay Apt but could not respond to him as the shuttle orbited the earth.

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At the time of the outage, the shuttle was coming over the horizon toward a scheduled Amateur Radio rendezvous with Queensland University of Technology in Brisbane, Australia, where ham operator Andy Joyce, VK4KIV, was standing by for a scheduled contact. Mission control in Houston asked Lou McFadin, W5DID, and Doug Loughmiller, KO5I, ham operators in the nearby SAREX control room, to relay a message to Apt via Australia that communication would soon be restored.

"Even though SAREX is primarily an educational program, we've always recognized that Amateur Radio could be a backup link in a NASA space shuttle mission," says Roy Neal, K6DUE, chairman of the SAREX working group. "Thankfully, this was only a routine problem. Even so, the performance of hams operating SAREX lived up to our expectations and helped keep the astronauts posted. This kind of people-to-people communication is what Amateur Radio is all about, whether it's contacting friends and family after a major storm here on earth or getting around a minor malfunction in space."

McFadin says that the students in Australia were so startled by the unexpected turn of events that they were unable to remember the questions they had prepared to ask Apt as the shuttle passed overhead. McFadin says the communication outage lasted 20 to 25 minutes. SAREX is an educational program developed jointly by the ARRL, AMSAT and NASA. □

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# Visual Code

**CHARLENE BABB KNADLE,  
WB2HJD**

It's true that the sooner you can let go of all aids to learning Morse code, the better. You won't be truly proficient at receiving until you can hear and understand simultaneously, the way you hear and understand spoken language without having to visualize the words in your mind.

You became a faster reader (one with better comprehension) when you could stop focusing on one word at a time and could blend several words together. In that same way, you will become a faster (and better) receiver of Morse code when you can stop focusing on one "dit" or "dah" at a time and can hear the whole letter — perhaps later the whole word — before you jot it down.

But there are those for whom the language of Morse code seems to remain perpetually foreign. They listen to W1AW, they enlist the advice of friends, they purchase tapes. They follow the advice to practice frequently but never more than twenty minutes at a time, since studies have shown that longer practices produce greater fatigue but seldom add more learning.

And still they flounder. Still they have trouble distinguishing "F" from "L" and "Z" from "X" when they hear them being transmitted.

Most teachers of code don't know what to do with these people. "Just keep working at it," is the usual advice, and often that works.

But maybe there's a mechanism that quick code learners use that the others don't. Maybe those who use it don't even recognize it as a tool they employ, because they let go of it so quickly in the process of learning Morse code. But skipping the step may be a handicap.

They say that good spellers, if you ask them to spell an unfamiliar word, may be able to figure it out by "seeing" the word in their minds. Somewhere, they've run across the word in their reading, and their minds have retained the visual image. That's why elementary school spelling instructions usually tell the student to

<b>A</b> di-dah · /	<b>J</b> di-dah-dah-dah · / — — —	<b>S</b> dididit · · ·
<b>B</b> dah-dididit   · · ·	<b>K</b> dah-di-dah   · —	<b>T</b> dah —
<b>C</b> dah-di-dah-dit · / ·	<b>L</b> di-dah-didit   · · ·	<b>U</b> di-di-dah · · /
<b>D</b> dah-didit   · ·	<b>M</b> dah-dah — —	<b>V</b> di-di-di-dah · · · /
<b>E</b> dit ·	<b>N</b> dah-dit / ·	<b>W</b> di-dah-dah · · \ \
<b>F</b> didi-dah-dit · · ·	<b>O</b> dah-dah-dah — — —	<b>X</b> dah-didi-dah · · · —
<b>G</b> dah-dah-dit · · =	<b>P</b> di-dah-dah-dit · / ·	<b>Y</b> dah-di-dah-dah · / ·
<b>H</b> didididit · · · ·	<b>Q</b> dah-dah-di-dah · / ·   · /	<b>Z</b> dah-dah-didit · · · /
<b>I</b> didit · ·	<b>R</b> di-dah-dit · / ·	

first look at the word. The idea is to fix it in your mind.

Some people automatically do that with code.

They learn pretty quickly, though, that all those dots and dashes begin to blend in their minds, when they must be "seen" one right after the other in rapid succession. So they make the transition away from the confusion by taking the "leap" to remembering each letter by its sound.

What they may not realize is that the visualization may have been a necessary step — a step that some people find hard to do.

Personally, I found it impossible to remember code letters as horizontal arrangements.

Oh, I suppose I could have con-

quered them, if I'd made myself a set of flash cards of one letter at a time, and could perhaps have conquered them faster by gluing black sandpaper dots and dashes onto the cards, thus involving two senses at once (according to the Slingerland company, which makes a business of producing learning aids for dyslexics and slow learners, the more senses you involve, the better and faster the learning).

But instead, my visually-oriented mind provided its own special learning tool, and I mentally "saw" each letter in its own unique shape — one I could associate with the alphabet as I already knew it.

So, for what it's worth, here's my alphabet. If you think it will help you, try it. Say the "dits" and "dahs" in the rhythm I've written them, associating that sound with the visual image.

Then when you next receive code, listen without guessing until the pause, then mentally assemble the "dits" and "dahs" into one of the handful of arrangements possible for the beginning combination you heard, adding the rest to form the letter (this may sound like "mental gymnastics," but it happens faster than you think).

Use the parts that work for you, and discard the rest. Or form your own unique visualization of each letter's sound.

But as soon as you've "latched on-to" code like never before, get ready to let the mechanism go. □

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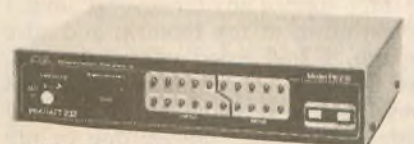
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# Farnsworth Peak

(part one of two)

DANIEL METCALF, KF7TA

Eleven a.m., 30 April 1991:

Sitting here in the semi-lit solitude of the transmitter room filled with the constant low din of the blowers, I adjust the computer monitor closer, within range of my reading glasses, and contemplate the happenings of the past few days. I have been so depressed lately I couldn't even muster up the desire to write about it all, resorting instead to reading and TV viewing.

A half hour or so ago, while standing at the kitchen sink being revolted by the now-dehydrated remains of some pudding I spilled there last night, my mind seemed to revive a bit. Realizing that rehydration was the obvious answer, I ran some water over the whitish-yellow gobs and waited for them to return to paper-towel wiping consistency, praising myself for such clever thinking. I wondered about dehydration. If a person died up here, would he rot, or just dry up, like jerky?

The air is so dry and thin up here at 9,000 feet that the ice cubes evaporate in the freezer. They just get shiny and smaller and smaller. A washcloth will completely dry out in a couple of hours. A slice of bread becomes a warped chip in about the same time. Human skin dries out too, especially after a shower (two a week at most, due to a limited water supply). We go through lots of lotion up here. This morning, while reading the back of one of the lotion bottles, its language extolling all the many virtues of the skin-moistening emollients contained within, I was reminded that I hadn't applied any for several days. I looked down at my forearm and sure enough, I had dried out again. Oh, well. No surprise in this or in the fact that I had also neglected to take my normal mid-shift shower, due to my low frame of mind.

I am thinking of life on this mountain, what it has become, how it started two years ago and where it will

go from here. Quite surprisingly, I have become accustomed to this place. Looking back five or 10 years I never would have thought I could survive the loneliness of this situation, let alone enjoy it. I wish I had recorded my feelings the first time up here. I try to remember what it was like but can't seem to recall the feelings of that time. Since nothing can substitute for on-the-spot reporting, I guess they will have to remain forever lost. I do remember having some fear of going nuts in solitude when I took this job back in March of 1989. But, despite my fears, my first shift up here wasn't nearly as rough as I had anticipated (for me, most things never turn out as scary as imagined, with a few notable exceptions).

Coming off a long period of unemployment after an aborted career in cable television, the prospect of having a job (any job) was quite appealing. Being unemployed had provided me with two things: the ability to enjoy unstructured time and the realization that I needed a financial base and some measure of security. I wanted a part-time job, something that I could do easily, something with low stress for a change, a job that would give me lumps of time to enjoy and to use to invest my energy in my little homestead, with its unfinished house. Something like a transmitter engineer job.

I had known of TV transmitter engineer jobs through an ex-CATV associate who had gone back to such a job after his cable dreams, like mine, had been consumed by the fickle world of cable television. I mentioned my interest to him and a few weeks later he called to let me know this station was looking for a transmitter engineer. I applied, interviewed with the chief engineer and got the job. By the time I readied myself to come up the mountain, I had undergone quite a bit of self-examination, but I had never managed to rid myself completely of the fear of being in an isolated place,

all alone, with no one but myself to relate to (a person with whom I'd had several bad experiences in the past).

And so, I began my first solo shift that cold Wednesday morning in March. As I stood outside the transmitter building and watched the chopper slip away down Coon's canyon and disappear around the mountain 1,000 feet below me, I had a real mixture of feelings—excited about the new experience, while fearful of the possible outcome. I felt confident I could keep the transmitters operating although not so sure I could keep my mind operating. I was exhilarated at the sight of the vast expanse of the Great Salt Lake, the desert to the west toward Nevada, the snow-capped mountains all around me, both close-by and in the distance, the panoramic view of Salt Lake valley and all its communities, all the way down to Utah valley, its lake and all its towns. It was breathtaking.

It was also scary, all alone up here at 9,000 feet. No car, no road, no quick escape. And then there was the snow. Drifts of four to six feet covered the road, which I had never seen and could only trust existed beneath it. Luckily, one of the other engineers had left his telescope up here. I spent quite a bit of time looking through it, getting a perspective of where I was in relation to the rest of the world. Down in the town of Tooele, which sits at the western base of my mountain, I could make out the yellow arches of McDonalds, the red Coronet store sign and traffic lights. I also had full view of about 10 miles of railroad and watched several trains creep through the valley. Those sights served to keep me connected with life as I knew it. Thank God for the nice windows in the corner of the second-story transmitter room. I spent a lot of time that first week gazing out those windows,

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reassuring myself that all was well.

Just before my first solo week I had made the decision to get back into Amateur Radio after 21 years of inactivity, since the mountain top location and work schedule would be ideal for hamming. So I brought up an old National NCX-3 loaned me by my good friend Fred, N7IVW. I strung up a makeshift 40M dipole and started copying CW, getting in all the listening practice I could during that first week. I progressed to where I felt I could pass the 13 wpm, then started calling around to find out the next exam session would be held on the Saturday morning following the end of my shift on Wednesday.

After Wednesday's chopper ride back down to the studio, followed by a warm reception from a somewhat relieved engineering staff (they had been wondering if I would fare any better than one guy they brought up here who came back down looking like he had been through a war). I was clean-shaven, smelling of Old Spice, acting cool and giving matter-of-fact answers to their many questions about the week (after all, you can be cool after the battle is over). This really impressed them (not to mention myself). I had passed the solo test. And I was going to be a ham again.

I immediately headed for the Amateur Radio store to buy study materials. For the next three days, I hit the books hard, studying for the Novice, Technician and General Class licenses, getting no more than four hours sleep each night. At 0700 Saturday, after only two hours sleep on the couch (fully dressed) I hit the road to Salt Lake City for the test at 0830. Upon arriving at the exam place, I was amazed at all the weird call signs on the examiners' nameplates, things like NU7X, AD7V, etc. I thought I was at a DX convention. It turned out they were the latest in Extra Class call signs, a product of the new incentive licensing rules which had been adopted during my absence from the hobby.

With some trepidation, I started the examination, beginning with the 20 wpm code test, just to "clear out the cobwebs," as the VE said, missing by two or three characters. I then passed the 13 wpm and proceeded with the written tests, first the Novice (how demeaning, I was a Novice back in 1954), then Technician, then General. As I was about to leave, one of the VEs urged me to go ahead and take the Advanced, which I didn't want to do, since I hadn't bought the book for that one, but he insisted I had nothing to lose, so what the heck? I took the test and handed it in.

In a few minutes I was informed

that I had neglected answering one question and that I had missed the maximum possible for passing. I answered the missing question and handed it back to the VEC. He quickly confirmed its correctness and announced that I was now in the waiting line for my Advanced Class license, which would probably come in about five weeks. I was the talk of the group that day, some moldy old coot who came in from nowhere, out of it for 21 years, grinding his way through test after test, to the amazement of all the NUs and ADs and who-knew-what-else. I was on a real high, not noticing my lack of sleep until that night, when it all caved in on me and I slept for 12 hours.

The next few shifts on the mountain were filled with work on the NCX-3, antenna projects and anxious anticipation of my ticket, which finally came in April. From then on, I did a lot of operating, both SSB and CW, and built up my code speed to 20 wpm. I passed the Extra in August, keeping my two-by-two call, since by now they had run out of those tricky three-letter NUs, ADs, etc. I really didn't care; I only wanted to be able to operate in any portion of the bands. Eventually, thanks to my old friend Rick, KA7CHT, I was able to own a decent radio, a Drake TR7, which I bring up

in a suitcase. I also scraped together enough money to get myself a used 2M rig, a Kenwood TM211, which I also bring up. Perhaps I should say *brought up*, after the events of the past week.

My life seems to run in cycles, from panic, through survival, to boredom, followed by another panic or crisis. In keeping with that pattern, about three weeks ago things started to liven up again. First, the output transistors in the TR7 gave out, completely unprovoked, in the middle of a 10M CW QSO. In addition to that, I had a miserable shift due to several gremlins in the TV transmitters. Then I spent my last day fretting while seven people with two snowcats tried for 12 hours to get my replacement here, finally aborting at 9 p.m., hence one more night (probably caused by my prematurely stripping the bed, which never fails to cause a disruption in the changing of the guard). Upon arriving home, I found a large county tax notice and deadline to deal with. Just to add variety, I snapped the fiberglass upper section of the boom on my aerial ladder truck (they don't make these anymore) trying to lift a heavy piece of junk. I figured things were about as lousy as they could get, when Murphy's Law once again proved me wrong.

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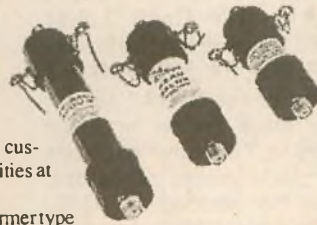
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Three days ago, on the second day of this shift, after several hours of painstaking work installing the new RF output transistors in the TR7, I discovered a bogus oscillation at about 9.5 MHz on the 7-10 MHz band. This concerned me greatly, since it could wipe out the new finals, so I treated the situation with caution. Somewhat discouraged but undaunted, I worked around this problem, looking forward to Monday when I could call Drake to secure further light and knowledge on the subject. Meanwhile, I went ahead and did several alignment steps on it and was pleased with the results.

Then, while talking to Ron, KF7BD, on 2M, something apparently burned out in the Kenwood, probably due to high SWR from ice on the antenna. The power dropped to about half of normal, then the rig got hot and stopped transmitting altogether, leaving Ron wondering where I had gone. Holding onto hope, I cooled it down and found that it would still transmit, if only at reduced power. I tried to accept this disappointment, reasoning that after all, even if it didn't work up to snuff, I could still communicate with it. And so the weekend ended on a mixed bag of notes, mostly positive.

Then came Monday morning. From a deep sleep, I awakened to a snapping sound from the kitchen, which is also

the ham shack. I immediately recognized it, having heard it many times before: The antenna tuner was arcing from static buildup on the antenna. No worry, it would simply bleed off across the tuning capacitor as it built up to a few kV, making a sound like a spark plug. And I had been smart enough to disconnect the

TR7 from the tuner the night before. Also, I knew the shield of the coax was grounded at the base of the TV transmitting tower, so nothing more than some static discharge could come into my living quarters. Little did I know.

*To be continued in next month's issue...*

## Silent Keys

### Gene Stephens, KA6HOQ

Gene was a native Californian, born in La Canada and grew up in San Diego. After graduation from Point Loma High School he entered the Navy-sponsored radio material school. At the conclusion of his training he joined the Navy as a warrant officer.

Upon completion of his Navy service in 1946 he became involved in the building material industry. He lived in Pasadena, Huntington Beach and Westminster for many years.

He was largely responsible for getting Amateur Radio into yachting. He helped set up the communications

systems at the Seal Beach and Long Beach yacht clubs, and the radio installation at the Long Beach club is active with various boat races, and was the communications center for the Olympic yachting events in 1984.

He organized training classes in Amateur Radio and assisted in the administration of amateur exams. He was secretary/treasurer of OOTC Chapter 2, past president of QCWA Chapter 7, and a member of the SOWP and Morse Radio Club, to list a few.

A memorial service was held in Long Beach and, accompanied by a flotilla of boats, his ashes were scattered at sea. —*Information submitted by Ken Johnson, W6NKE* □

### Henry Warner, W1HRQ

One of the stalwarts of the Society of Wireless Pioneers, W1HRQ, Henry K. "Hank" Warner, succumbed to a heart attack 24 August 1992 at the age of 78.

Mr. Warner had been a long-time radio, computer and television technology teacher at the RCA Institutes in New York City. He also is credited with having taught Morse code to Howard Hughes during his preparation for the one-time flight of the Spruce Goose.

Having received his licence at the age of 13 and being listed as the second-youngest ham operator in the US, he was chagrined to learn that the youngest was a girl!

During the 1930s, Hank was a marine radio officer aboard merchant vessels for several shipping lines. He also worked as a radio operator and meteorologist for the former Civil Aeronautics Authority, and later as a controller at La Guardia Airport.

Mr. Warner spent many hours operating from his shack next to his home in Kennebunkport where he had been retired since 1974. One of his worldwide contacts was with the Vatican. His favorite band was 40M where he mainly operated CW.

—*Information submitted by Arthur E. Schermerhorn, W8FEC.* □

## The Great Lakes Award

The Great Lakes Award is presented by The Michigan Amateur Radio Alliance (MARA). The Great Lakes Award is offered for working the states (MI, IL, IN, WI, OH, PA, NY, MN) and Canada that border the Great Lakes.

All contacts must be on or after August 31, 1991. You may use any band and any mode except repeaters. Contacts must be verified by QSL cards. This is not a special event award; we will be offering this award on a permanent basis.

So hoist your sails and send for an application today. Send an SASE to: Great Lakes Award, O-11555 8th Ave. NW, Grand Rapids, MI 49504. □

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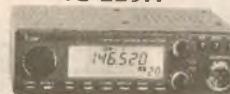
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# Special Events...

## Cuban-American Fraternity Day

The Guantanamo Bay ARC will operate KG4CA 5-6 December to celebrate the 40th anniversary of Cuban-American Fraternity Day.

Operation will be SSB and CW on 20, 15 and 10M from 0001Z 5 December to 1700Z 6 December.

For QSL, send QSL and SASE to Guantanamo Bay ARC, PSC 1005 Box 73, FPO AE 09593-0146 USA.

## Christmas in Santa Claus

The Spencer County ARC will operate a Christmas Radio Station from Santa Claus, Indiana, on 19 December.

Operation will be on 28.400, 7.240, 14.250 voice and 7.125 CW from 8 a.m. to 8 p.m. CST.

For certificate, send QSL and #10 SASE to Spencer County ARC, RR #1, Box 154, Dale, IN 47523.

## Ava Gardner honored

The Triangle East ARA will operate N4SXG 23-24 December to commemorate the 70th anniversary of the birth of the late Ava Gardner.

Operation will be on CW 3.715, 7.135 and phone 14.260, 28.335 from 1300Z 23 Dec. to 2300Z 24 Dec.

For certificate or card, send QSL and appropriate SASE to TEARA, 209N. Third St., Smithfield, NC 27577.

## From Santa's home

The North Pole Hamsters ARC will operate WL7CX 19-20 December from the home of Santa Claus, North Pole, Alaska.

Operation will be on 20M and the Novice portion of 10M.

QSL and SASE to NPHARC, Box 56424, North Pole, AK 99705.

## Anniversary of transistor

The Underground Discharge ARC will operate N2DP on 5 December celebrating the 45th anniversary of the discovery of the transistor.

Operation will be on SSB 7.230, 14.295 and 28.355 from 10 a.m. to 4 p.m. EST.

For QSL, send QSL and SASE with contact number to UDARC-WB2AZE, David R. Kanitra, 74 Port Reading Ave., Woodbridge, NJ 07095.

## Tournament of Roses

The Relay Repeater Club will operate KF6UF 30 December to 1 January from the Wrigley Mansion in Pasadena, California, to commemorate the 104th anniversary of the Tournament of Roses.

Operation will be on 28.460, 21.335 and 14.260

from 1600Z to 0200Z each day.

For certificate, send QSL with contact number and 9X 12 SASE with 58 cents postage to Relay Repeater Club, Box 81, Arcadia, CA 91066-0081.

## Toys for Tots

The Toys for Tots Ham Radio Rally will operate KA6RJF on 28 November from Culver City, California, to commemorate the second annual Toys for Tots Ham Radio Rally charity event.

Operation will be single sideband on 28.450+/MHz from 1600Z to 2200Z.

For certificate, send QSL and \$1 to KA6RJF, 1302 Mar Vista, Pasadena, CA 91104.

## North Pole Limited Steam Train

The Hams of Orange Empire Railway Museum will operate KC6TKT and other calls on 19 December to celebrate their annual North Pole Limited Steam Train operation. Operation will be on SSB 28.340 MHz from 1900-2359Z. For QSL, send QSL and #10 SASE to OERM, Box 548, Perris, CA 92572-0548.

## Fair demo

The Nichols Elementary School (K-6) in Lodi, California, operated a demonstration booth at the Labor Day Field and Fair Day to show off Amateur Radio and what the school ham club is doing. The kids made 40 QSOs on 40M from 0930 to 1530. The hams who contacted our station were very helpful

with the kids. The only "down side" so far is, those stations that said they would QSL haven't yet sent cards to the kids.

We used a 30 ft. tower and two Hamstick 40M mobile antennas back to back as a dipole. Transceiver used was a Yaesu 757GX at 75W.

The club was started by Mike Zane, K6URI, retired Lodi police sergeant, in

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Mike Garcia (sixth grade); James Daire (seventh grade); Mike, K6URI, club advisor; Annie (fifth grade) all helped with the booth.

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January 1992 to give interested kids an alternative to just hanging out and getting into trouble. So far we have had 37 kids in the club off and on (our school district is very overcrowded and the system is on year-around school, so the kids change tracks all the time). The kids are very interested and attend the weekly club meetings.



Andrew Finick,  
N9FXT

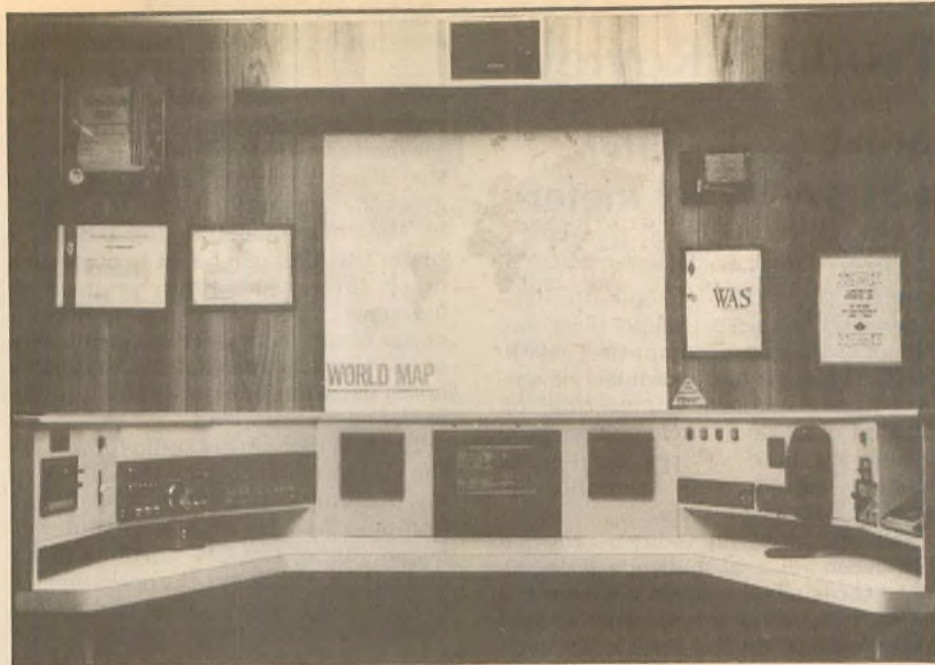
## STATION APPEARANCE

Send Worldradio a picture of your shack and the staff will choose a winner to receive a free one-year subscription! Stations will be judged by neatness (wires tucked away, etc.) and accessibility of equipment. Monetary value of equipment is not a consideration.

Winners will also receive a top quality, Laserjet-printed copy of the DXCC and WAS BeamHeadings list (a \$15.95 value) compliments of Jack Hurray, W8JBU.

This month's winner is Andrew Finick, N9FXT, of Highland, IN. He insists this is his home station, and not from the starship Enterprise . . .

This station consists of a Yaesu 767 and a matching FT7000 amplifier on the left side. The center screen is for my digital communications. The row of colored LEDs above the screen are activated when each antenna is connected. My computer is located under the tabletop on a drawer that pulls out.



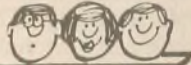
The right side consists of a PK232 with a row of illuminated switches to power up various equipment. That side also includes a weather station, 2M Kenwood TM2550, and ATV equipment (monitors, not shown, are recessed in the wall to the right). The monitors are also covered with black-out screen. Both left and right

shelf tops hinge up for accessibility to the equipment.

Not shown in the photograph is an executive-type chair; placed in each arm of the chair is a switch and wireless transmitter, which keys up either HF gear or 2M gear (Look ma, no hands!). Behind the console wall is a small room for easy access to the units. □



## Amateur "Hi"



Ever had a funny or strange experience with Amateur Radio, either on or off the air? If so, type it up (or print neatly) and send it to us for

consideration in our monthly AMATEUR "HI" contest. You could win a free year's subscription to Worldradio!

This month's winner was sent to us by Gary B. Fox, Jr., W2VVC. His "honey" of a tale could have turned into a sticky situation . . .

Several years ago my wife and I lived in suburban Rochester, New York. One day the doorbell rang and when my wife answered the door, the caller identified himself as the bee inspector.

Now, my wife was unaware that the county had a bee inspector, and she was particularly mystified as to why the bee inspector was calling at our home. She asked him if there was something she could do for him. He said he was there to inspect our bees. My wife told him that we had no bees, whereupon he said a neighbor had reported that we had bees, and wasn't that a beehive at the rear of our back yard?

My wife told him again that we had

neither bees nor a beehive. Further explanation by the bee inspector led my wife to realize that he was referring to my antenna tuning box, which indeed had a strong resemblance to a commercial beehive.

When my wife related the story to me, after I stopped laughing I told her that tuning boxes were frequently referred to as doghouses, but this was the first time I had ever heard of a tuning box being confused with a beehive!



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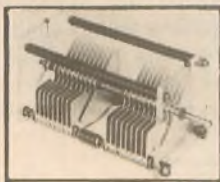
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# Product Review

## Autek audio filter and SWR/watt meter

RICHARD ARLAND, K7YHA

Autek Research offers a dynamic duo for the active HF operator. The Autek QF1-A active audio filter and the Autek WM-1 computing SWR/watt meter are two examples of outstanding American engineering offered at a reasonable cost. I have been evaluating both devices for several months and am very favorably impressed with the results.

HF operation on today's crowded bands can be a real challenge, especially to those of us who do not own the latest state-of-the-art rig with several switchable IF crystal filters. Not only are crystal filters expensive, the installation normally requires the radio amateur to go inside the rig. On the newer radios, this can be anything from an exercise in frustration to a terrifying experience owing to all the surface-mount devices and extremely small interior spaces.

The Autek QF1-A active audio filter is a cost-effective alternative to the IF crystal filter dilemma. While the QF1-A is not a crystal filter the device works extremely well in the audio chain, providing additional audio filtering of received signals. Installation of the QF1-A is very simple. The unit operates on 110VAC. Plug in the AC cord, connect the 1/4 in. phone plug to the audio output of your transceiver (or receiver) and plug your headphones (or an external speaker) into the 1/4 in. phone plug in the back of the filter. That's all there is to it!

The front panel controls are clearly

marked and offer many variations of filtration at the turn of a knob. The filter audio bandwidth is variable between 250 and 2500 kHz. The notch/peak width can be reduced to a few hertz and moved anywhere within the selected audio passband. This gives the impression of having a combination of passband tuning and notch filter. The filter can be set to emulate a notch filter, peak filter, lowpass or highpass filter. There is a second notch filter that works independently of all other controls and can be used to notch out additional unwanted signals in the audio passband.

The real test of this audio filter is on the air. After connecting the QF1-A to my Argonaut 509 (with a standard four-pole 2.4 kHz crystal IF filter), I began tuning the CW portions of 40 and 20M to check out the operation. It took a very short time to become familiar with the filter's controls. The QF1-A performed very well on the CW portions of both bands. I was able to notch out interfering CW signals with the notch filter and narrow the passband down to copy only one signal buried under a mass of others. In short, I was impressed.

After a wring-out on the CW bands, I ventured into the SSB portion of 40 and 20M. Using the QF1-A in the highpass mode and varying the audio passband resulted in a noticeable reduction of the annoying high frequency "hash" that makes for uncomfortable listening. The second notch filter came in very handy on 40M SSB where large megawatt shortwave transmitters abound. It was a simple

matter to eliminate these offending heterodynes using the notch filter.

On the down side, the QF1-A does tend to "ring" when the audio passband is narrowed beyond reasonable limits. This is not a real problem; just don't crank the passband down too much in the presence of large signals and you won't make the filter ring.

The QF1-A can be powered from 12VDC so you can drag it out into the bush on camping trips and Field Day. Paragraph H in the manual tells how to wire the unit for 12VDC operation. In addition, if you specify DC operation when you order the unit, Autek will include a rear panel jack and do the internal wiring for you. The export version (for Europe and Asia) is wired for DC operation only.

In the past I have used many active audio filters—some I've built and others I've bought. The Cadillac of all active filters is the Datong FL-3 made in the UK by Datong, Ltd. This is the standard by which I compare all other filters. The FL-3 is a very expensive active filter (about \$275) but has some unbelievable flexibility. The Autek QF1-A compares very well with the FL-3 in overall ease of operation (the FL-3 is a real pain to adjust sometimes) and end result (you can hear the signal you want). The price of the QF1-A is only \$99—not a bad deal at all! The QF1-A is a very cost-effective way to increase your receiver's selectivity. Bottom line: the Autek Research QF1-A active audio filter is a great value for the money. It is easy to install and use. It is well-built in a metal cabinet and should

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The Autek Research WM1 SWR/watt meter is a stand-alone SWR/power metering system that employs a remote RF sensing head and dual meters, one measuring SWR and the other measuring forward power. The WM1 measures power output in three ranges: 20, 200 and 2000W. It can also read peak power and average power at the flip of a switch. Average is normally used during tune-up, and the peak reading is used for normal SSB and CW transmission. SWR is computed automatically and displayed on the SWR meter. No more switching back and forth between forward and reflected power to accurately check your SWR.

The RF head of the WM1 is connected between your transmitter output and the load (antenna) or antenna tuner using short coaxial jumpers. Be sure to observe the markings on the RF head so that the input and output are connected correctly. The small AC power supply block is plugged into any available AC outlet and plugged into the back of the dual meter box. Turn the power switch on and you are ready to measure SWR and forward power simultaneously with the WM1. Accuracy of the WM1 is extremely good in a unit costing a fraction of

commercial units' prices. Manufacturer's specs show accuracy at 5 percent of full scale and 10 percent of .2 full scale. Insertion VSWR is less than 1.1:1 across 1.5 to 30 MHz.

One feature of the WM1 that I really like is the ability to accurately assess SWR at power levels of 1W or less. This unit functions very well as a highly accurate QRP SWR/watt meter. The manual states that the WM1 can be used to accurately adjust antenna tuners and check overall antenna condition at power levels of 1/2W or less! Exactly how accurate and sensitive is the WM1? The manual suggests trying this experiment: Key the transmitter in CW; note the power reading in the average position; then switch to the peak reading position. Normally you will notice a slight increase in output (in the peak position). This is due to the increase in power supply ripple under key-down.

The WM1 costs only \$119. Both the QF1-A filter and the WM1 SWR/power meter are backed by the Autek Research one-year limited warranty. Both units are made in the US and are examples of American engineering at its best. For further information contact Autek Research, Box 302, Odessa, FL 33556, and tell them you saw it in *Worldradio!* □

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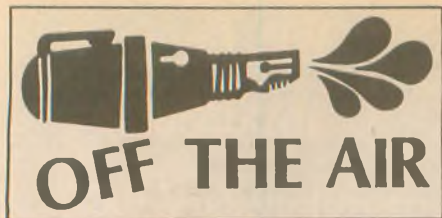
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## Bureau QSLs

Recently, I advised the ARRL not to give away to another person any of my DX QSL cards accumulating in an ARRL QSL bureau.

In reply, I received a letter from Luck Hurder, KY1T, at the ARRL regarding his policy of giving away, rather than destroying, DX QSL cards at the W1 bureau.

Well aware that amateurs condemn this highly questionable activity, Hurder writes, "I'll most certainly continue to advertise—and provide—this free service." Still, anyone can get another's QSL cards simply by sending SASEs to the ARRL headquarters.

J. BRUCE SIFF, W2GBX  
Jensen Beach, FL

## Novice/Tech special events

I am a new amateur and have been on the air only three months. I spent at least six months with a longwire and a Drake R7A listening and studying. I also read everything I can get my hands on—books, magazines, etc.

As an SWL I sent off for several "special event" certificates and found that practice to be a rewarding pastime. Sort of like QSLing without the two-way QSO. Now that I exchange QSLs, I am interested in QSOing special event stations.

The problem is that special event stations that work the Novice/Tech

bands, ie. 7.100-7.150 CW, are few and far between. Almost all state "General phone and CW bands." Yes, many run 10M phone just for Novice/Tech, but what about "our" CW bands?

To all those clubs who sponsor the special events, I say, "Give us new guys a break, will you?" We would also like to have the QSLs and certificates. It might take you a bit longer for a Novice CW QSO. I realize I can't QSL with rare DX on a 40M dipole in the attic and 50W from a 40-year-old all-tube transmitter. But I could work a special event station in Kentucky, New Jersey or Texas. To me, right now, an Arizona QSO would be rare DX. Remember, old-timers, be patient with us old (age 41) newcomers.

JAY F. CHAMBERLAIN, KD400I  
Fredericksburg, VA

## Back-stamped

Some of my QSL cards return back-stamped from the post office if sent to a wrong post office or missent mail. My post office is so small they do not have a machine to cancel so the postmistress hand cancels when it comes to post cards—she doesn't deface them by back-stamping as the regulation requires.

Post office form 4314-C is available to us and if enough hams take the time to complain and fill out a form, the regulation will surely change; no postage is necessary.

ROBERT HERRMANN, N2NTO  
Lockwood, NY

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## Toss the key

I grew up around Amateur Radio. My father was a ham for as long as I can remember. His call sign was WA8CXP. I listened to him make all kinds of contacts, both from home and on a mobile unit when we went on trips. I got interested in becoming a ham myself when I got a little older and asked him how I could do it. When I found out I had to learn the Morse code, I decided to give it a try. Several times over the years I tried to learn the code. But after the first set or two of letters, they all started to sound the same. I gave up. I still do not understand this requirement. My dad used his ham gear for years and I never heard him use CW.

Now today, my brother-in-law and several friends are hams. Most of them are Extras. They all encouraged me to get my ticket when the no-code Tech came out. So, two and a half years after my dad passed away, I took the no-code Tech test and passed. It would have been really great had this happened while he was still alive.

As for those who look down upon us no-code Techs, I say that we learn the same things everyone else does with the exception of CW. I will keep trying to learn the code, mainly because I want to advance to at least General. But when and if I pass I will throw away my key. If you want to "keep the riff raff out," make the *written tests* harder, but forget the code.

JOHN J. CROM, N8PNJ  
Findlay, OH

## Prestige plates

When my Nevada automobile license renewal arrived in the mail the other day, I had quite a shock. Tacked on to all the other taxes and fees was a \$20 charge for "prestige" plates.

Amateur Radio license plates in Nevada have been issued in the past at no additional charge. My XYL called the DMV and was told that effective January 1, 1992, the law had been changed to require this additional \$20 charge for prestige plates. (not to be confused with personalized plates).

Over the years I've read several articles and letters from amateurs in other states who have fought long and hard for the removal of any additional fees for Amateur Radio license plates. Apparently here in Nevada the budget crunch caught up with our previously "free" ham plates. Until I received my license renewal bill, I had not read or heard anything about this new fee. If

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Nevada is an example of what may be happening elsewhere, I hope amateurs in other states will be more alert than we were in order to stop such legislation from slipping through unnoticed, as it did here.

**NORM PETERSON, N7JDU**  
Henderson, NV

## Sad CQ

On 10M I heard a W9 calling CQ, but it was very distorted. I called him and told him that he was distorted and FM-ing, and I said I would help him to correct the situation.

I asked what rig he was using but, due to the distortion, I couldn't understand him. I suggested he turn down the gain, and he did. I said turn it down some more and he did, but no luck. I said turn it down some more, and he answered, "If I turn it down anymore, I won't be able to hear you."

I said "73" and went off the air.

Sad, isn't it?

**RALPH SAROYAN, W6JPU**  
Fresno, CA

## "Know code"

Upon the establishment of the no-code license, many holders of Amateur Radio licenses dreaded the influx of "brilliant young engineers" who, despite their brilliance, had been "unable to learn Morse code," and thus "shut out" of the Amateur Radio fraternity. What kinds of interests could these people possibly have outside of acquiring a license only for prestige or the privilege of radio communication made easy as a phone call?

But something wonderful is beginning to happen! The combination of intelligent minds and the old Morse magic is producing some exciting results. Recently I QSOed on CW one excellent operator who upgraded from a no-code license to Extra in only four months! "I just went wild when I tried CW!" his QSL card states.

Another similar contact revealed an operator who upgraded from no-code to a "know-code" General in only three months. "And I'm not stopping there," he sent in Morse! Another said, "I'm upgrading. Morse is kinda like a secret language!"

Welcome, welcome to Amateur Radio! We're as proud of your achievements as you are! Let's hear from more of you who aren't satisfied with a minimal status of license. We *knew* you had what it takes!

**JEANIE GALLINGER, W7JAW**  
Kingman, AZ

## The calf path

One day, through the primeval wood,  
A calf walked home, as good calves should  
But made a trail all bent askew,  
A crooked trail as all calves do.

Since then two hundred years have fled,  
And I infer, the calf is dead.  
But still he left behind his trail,  
And thereby hangs my moral tale.

The trail was taken up next day  
By a lone dog that passed that way  
And then a wise bell-wether sheep  
Pursued the trail o'er vale and steep,  
And drew the flock behind him, too,  
As good bell-wethers always do.

And from that day, o'er hill and glade,  
Through those old woods a path was made;  
And many men wound in and out,  
And dodged, and turned, and bent about  
And uttered words of righteous wrath  
Because 'twas such a crooked path.

But still they followed—do not laugh—  
The first migrations of that calf.  
And through this winding wood-way stalked,  
Because he wobbled when he walked.

This forest path became a lane,  
That bent, and turned, and turned again;  
This crooked lane became a road,  
Where many a poor horse with his load  
Toiled on beneath the burning sun,  
And traveled some three miles in one.  
And thus a century and a half  
They trod the footsteps of that calf.

The years passed on in swiftness fleet  
The road became a village street;  
And this, before men were aware,  
A city's crowded thoroughfare;  
And soon the central street was this  
Of a renowned metropolis;  
And men two centuries and a half  
Trod in the footsteps of that calf.

Each day a hundred thousand rout  
Followed the zigzag calf about;  
And o'er his crooked journey went  
The traffic of a continent.  
A hundred thousand men were led  
By one calf near three centuries dead.  
They followed still his crooked way,  
And lost one hundred years a day;  
For thus such reverence is lent  
To well established precedent.

A moral lesson this might teach  
Were I ordained and called to preach;  
For men are prone to go it blind  
Along the calf-paths of the mind,  
And work away from sun to sun  
To do what other men have done.  
To follow in the beaten track,  
And out and in, and forth and back,  
And still their devious course pursue,  
To keep the path that others do.

But how the wise old wood-gods laugh,  
Who saw the first primeval calf!  
Ah! many things this tale might teach—  
But I am not ordained to preach.

Sam Walter Foss (1858-1911)

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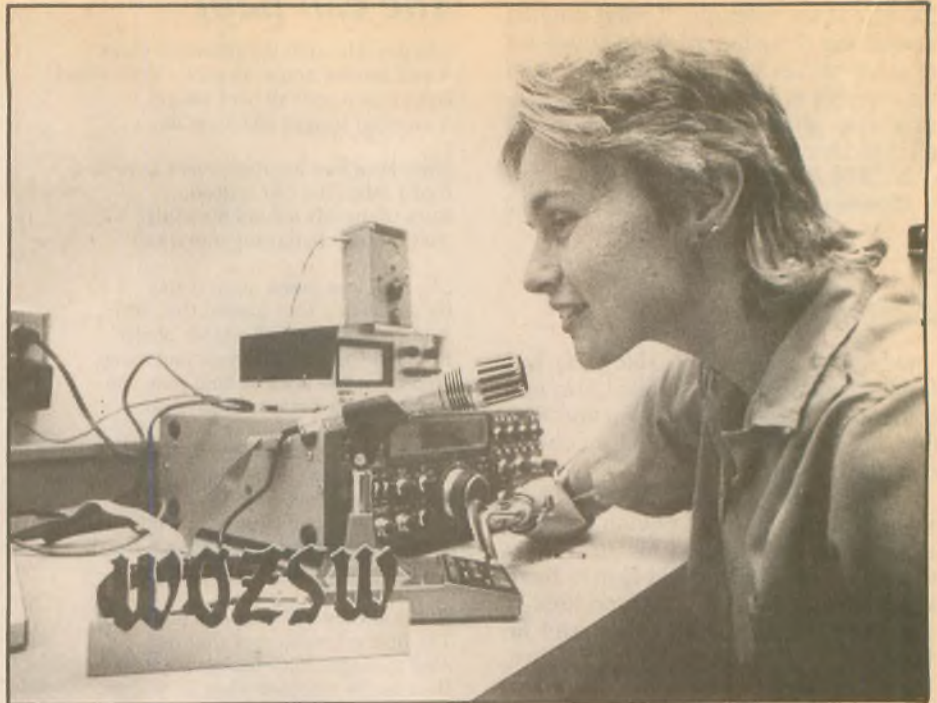
## PAM WESTLING, NØEFI

"Hey, Pam! Isn't it about time you wrote an article for *Worldradio*?"

Me? I was shocked! What, after all, do I know enough about to be able to write an article that will be read by all levels of Amateur Radio operators? But the more I thought about it, the more I was reminded that we are *all* in the daily process of learning about Amateur Radio, a technical hobby that is always growing and changing.

So let me tell you about something I think I understand: who I am and what I do as Student Coordinator at Handi-Hams.

I graduated from Southwest State



Uninhibited by prosthetic arms, Pam, NØEFI operates Handi-Hams station WOZSW.

University in Marshall, Minnesota, with a degree in sociology/anthropology and began working at Courage Center in 1977, first as a switchboard operator, then as a clerical worker and a receptionist. I earned my Novice license through the Courage Handi-Ham's Radio Camp in 1982 and upgraded to General a few months later. Life was busy and afforded me little spare time. I became less and less radio active until I was, as we anthropologists say, *extinct* on the airwaves.

When Maureen Pranghofer, KFØI, decided to go to graduate school, Pat Tice, WAØTDA, Handi-Hams manager, asked me if I would consider accepting her position as Student Coordinator. After much thought and a few sleepless nights, I accepted the challenge. I hadn't been keeping up with radio very well, after all. Would I be able to do a good job?

As Student Coordinator I work primarily with the Handi-Hams members who are new students—those who do not yet hold licenses and the Novice members. I contact new members by phone or letter, find out more about them, and decide what study materials are best suited to their needs. Because Handi-Hams is primarily a volunteer organization (only four of us are actually paid), I usually call a volunteer helper to help a new student. Handi-Hams volunteers live almost everywhere—we have members in all 50 states and many countries around the world. I try to find a one-to-one volunteer for each new student, someone who lives close by the student

and who can take a few minutes on a regular basis to help.

So I plunged right in, got on the phone, and started talking with people. I've gotten back in touch with fellow amateurs, brushed up on rules, regulations and theory, and even (yes, it's true) gotten back on the air. I'm studying Spanish, and I even have a copy of the *Handbook* in that language. I guess you could say that I've come out of extinction!

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# DX WORLD

**John F.W. Minke III, N6JM**

6230 Rio Bonito Drive Carmichael, CA 95608

## Activities Calendar

- 14-15 Nov. DARC European DX Contest (RTTY)
- 14-15 Nov. CCRC Czechoslovakian DX Contest (CW)
- 28-29 Nov. CQ Worldwide DX Contest (CW)

## W-100-N

The following DXers were awarded *Worldradio's* Worked 100 Nations Award during this past period:

- 436) Christos Maragoudakis, N5PIX; 17 Sept. 1992
- 437) Richard Frye, N3KEM (all CW); 17 Sept. 1992

## Barbados (8P)

Dr. Rick Dorsch, NE8Z, was scheduled to have operated from Sam Lords Castle on the southeastern portion of the island of Barbados from 26 October through 3 November. Unfortunately, we did not receive his letter in time to make advance notice in an earlier issue. QSL requests go via K8LJG. Rick's call may have been 8P9DR, 8P9EE, 8P9MD or something else.

## Algeria (7X)

Don't pass up 75M for a possible contact with Algeria. Near 3.798 MHz from 1900 UTC 7X2BK has been found working the Europeans with 7X4AN on 3.795 MHz at 2200 UTC. With the winter months approaching there is a good chance that these DXers may be working North America.

The most active station reported this fall is 7X2DG who has been reported on at least three bands. Check 15M between 21.310 and 21.350 MHz after 1400 UTC. Also on this band 7X4AN has been found on 21.303 MHz around 2100 UTC. 7X2DG is also active on 17M between 18.131 and 18.155 MHz after 1130 UTC with 7X2BK reported near 18.116 MHz at 1130 UTC. His single 10M report was 28.506 MHz at 1700 UTC.

On 20M 7X4AN has been reported on CW between 14.008 and 14.020 MHz after 2330 UTC.

Forty meters has also been represented with 7X2BK on SSB near 7.049

MHz at 2000 UTC and 7X4AN on CW near 7.013 MHz at the same time.

## Ethiopia (ET)

We understand that Carl and Martha Henson, WB4ZNH and WN4FVU, have been visiting this one, according to a few of the attending DXers at DXPO '92 at College Park. We had no other information at the time this column was due. The deserving DXer will have been pleased to have worked the Hensons.

## Reunion Island (FR)

There has been much activity from Reunion Island this fall with at least eight different calls reported. Twenty meters appears to be the most active with FR5DD between 14.003 and 14.026 MHz several times during the day. FR5AB was reported on RTTY near 14.084 MHz at 1230 UTC working into Florida on September 19. Other activity on this band includes the following:

FR5DX	14.188 MHz	0300 UTC
FR5FI	14.048 MHz	0245 UTC
FR5GL	14.006 MHz	1300 UTC

With the winter months coming be sure to check 75M. This fall FR5DX has been on the band several times between 3.790 and 3.798 MHz from 0200 UTC. On 40M look for the following:

FR5DX	7.045 MHz	0200 UTC
FR5GG	7.005 MHz	1800 UTC
FR5GL	7.003 MHz	1700 UTC
FR5ZN	7.043 MHz	1800 UTC

Fifteen meter reports include:

FR5DD	21.028 MHz	2100 UTC
FR5DX	21.260 MHz	1830 UTC
FR5GG	21.019 MHz	1700 UTC
FR5ZN	21.259 MHz	2345 UTC

You can't pass up 10M either with the following reported:

FR5CR	28.490 MHz	0900 UTC
FR5DD	28.449 MHz	1100 UTC
FR5DX	28.499 MHz	1400 UTC
FR5ZN	28.490 MHz	1400 UTC

All three of the WARC bands have been represented from Reunion Island with FR5DX and FR5GG reported.

## Greece (SV)

We found a few calls reported in the DX news bulletins and the activity appears to be very sparse. These include the following:

SV1AKX	14.006 MHz	2230 UTC
SV2AVP	21.039 MHz	1945 UTC
SV7BAY	14.008 MHz	2300 UTC

## Rhodes (SV5)

*Long Skip* reports SV5TS on 14.162 MHz around 0100 UTC working into

the west coast of Canada and later on 14.263 MHz at 2235 UTC at the eastern reaches. We have heard this call often with the operator giving his mailing address with almost every contact.

Also reported from Rhodes was SV5/DJ2GM near the end of September on 28.010 MHz around 1400 UTC. Evidently, this was a visiting DXer on holiday.

## Crete (SV9)

*Long Skip* also reports SV0IG/9 on 14.006 MHz at 2045 UTC by Ontario DXers. Incidentally, this publication is the official voice of the Canadian DX Association, John Sklepkowycz, VE3IPR, editor. Further information is available from Canad-X, P.O. Box 717, Station Q, Toronto, ON, CANADA M4T 2N7.

The only other calls reported from Crete were SV9ANH who was reported on 75M near 3.796 MHz at 1900 UTC working Europeans, and another DXer on holiday signing SV9/DL4EBN near 21.014 MHz at 1500 UTC the early part of October.

## Iceland (TF)

On 80M recently TF3CW was working the Europeans around 2100 UTC one Sunday evening on 3.506 MHz. Although the time is rather early for

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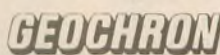


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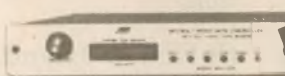
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North America, we hope this is an indication of activity from this one this winter.

TF3CW is more workable on 40M, as he has been found between 7.006 and 7.026 MHz from 0200 UTC.

Active on 15M have been TF3GBN who has been found near 21.058 MHz at 1830 UTC, and TF3GCN between 21.013 and 21.030 MHz after 1800 UTC. We suspect that these are Novice calls.

Also reported during this last period was TF3AW on 14.034 MHz at 1515 UTC and TF5TP on 7.004 MHz at 1700 UTC.

### Central African Republic (TL)

Twenty meters SSB is the best band to check for this one. TL8DF has been very active and has been found between 14.174 and 14.290 MHz from 1900 UTC. Also on the band TL8IM has been worked on 14.226 MHz around 0100 UTC. Try 15M SSB for the following:

TL8CK	21.272 MHz	1300 UTC
TL8DF	21.230 MHz	2145 UTC
TL8FZ	21.332 MHz	0800 UTC
TL8NG	21.310 MHz	1600 UTC

If CW is your thing look for TL8GR near 14.013 MHz at 2100 UTC or 21.007 MHz at 2100 UTC. TL8LVP was reported on 14.015 MHz at 1900 UTC.

TL8NG has been very active on 10M between 28.464 and 28.502 MHz from 1500 UTC. TL8DF was on CW at 1500 UTC one Sunday afternoon working Europeans on 28.001 MHz.

The only call found on the WARC bands was TL8CK between 24.960 and 24.980 MHz around 1400 UTC.

### Brunei (V8)

Nigel Cawthorne, G3TXF, showed as expected in September and was busy working the deserving DXer signing V85XF-all on CW. From the reports he included the new three bands. *DX News Sheet* reports that in his four days of operation he collected 5,028 contacts with 57 percent of them being Europeans. Only 607 contacts were with state-side DXers.

We understand, according to John Allaway, G3FKM, in *Radio Communication*, that Mike, G3JKX/V85KX, is now operating from a new location and

is looking forward to the 1.8/3.5 MHz season. Mike invites written requests for schedules. He also requests that when filling out QSL cards to please be accurate with your times in UTC. Ten minutes off can mean two pages in his logbook! V85KX was reported recently on 3.502 MHz at 1245 UTC, 14.003 MHz at 1900 UTC and 21.004 MHz at 1600 UTC.

Other calls reported active from Brunei include the following:

V85AA	14.227 MHz	1600 UTC
V85FX	7.003 MHz	1300 UTC
V85GA	21.206 MHz	1800 UTC
V85PB	18.145 MHz	1345 UTC
V85XV	14.019 MHz	1830 UTC

### Heard Island (VK0)

The HIDXA DXpedition to Heard Island has been cancelled. According to Jim Smith, VK9NS, the organizer of the DXpedition, not enough support had been received. Unlike most DXpeditions this operation needed upfront financial support prior to the DXpedition but only received about \$3,000.

From what we understand there were no major sponsors of this DXpedition. There had been conflicting feelings about whether this group (mainly Jim and his XYL, Kirsti) could handle the pileups. Perhaps this could have been the reason for the lack of support. Most DXers want to make sure they work the DXpedition before including a donation with their QSL requests.

The last HIDXA DXpedition to Heard Island visited the island the same time as another DXpedition. Neither team wished to combine forces for the operation.

### St Helena Island (ZD7)

Not too long ago there was only about one active station from St. Helena Island. The reports have been showing an increase with a good selection on 15M that includes the following:

ZD7AY	21.027 MHz	2100 UTC
ZD7DB	21.261 MHz	2100 UTC
ZD7DP	21.236 MHz	2145 UTC
ZD7VC	21.256 MHz	1930 UTC

On 20M only ZD7CRC had been reported at least two times at 2115 and 2300 UTC on 14.226 MHz.

ZD7SM was reported on 10M in early October between 1630 and 1700 UTC on 28.447 MHz.

One lone RTTY report for St. Helena was found-ZD7AY on 15M near 21.084 MHz one Saturday evening at 1800 UTC, working Europeans.

### IOTA

Look for XF1SI who will be operating from Ignacio Island (NA-171) from 20-22 November. QSL requests go via XE2EAA.

Art Phillips, NN7A, is making plans for operating from the Caribbean Sea Coast South group off the coast of Belize this coming February. No IOTA reference number has been assigned as the islands have yet to be activated. Art will be accompanied by Mike Sharp, NG7S. Both are members of the Northern Arizona DX Association.

Here is another selection of islands or island groups that have been active recently.

EU-052	Ionian Islands	SV/G4WUM
	14.254 MHz	0800 UTC
EU-057	Ruegen Island	DL4KUM
	21.260 MHz	2000 UTC
EU-155	Baron Island	I3BQC/IL4
	14.255 MHz	1045 UTC
NA-034	Anna Maria Island	KM4RX
	21.260 MHz	1315 UTC
NA-036	Vancouver Island	VE7DIH
	14.032 MHz	0230 UTC
NA-092	South Padre Island	KD7EC/P
	21.261 MHz	1930 UTC
NA-149	Torgunga Island	4V4H
	21.260 MHz	1500 UTC
OC-139	Kangaroo Island	VK3AJJ/5
	14.202 MHz	0815 UTC

Dave Gillooly, AA6RE, recently received a QSL card for a CW contact made during the French Contest last January and indicated that the operation was from Batz Island (EU-105). At the time of the contact the operator made no indication that he was operating from an island. Check back through your logs.

### DXCC credits

The American Radio Relay League now accepts the following for DXCC credit:

5R8GW: Operation beginning 12 December 1991.  
5R8JD: Operation beginning 6 July 1988. Previously rejected cards for both of these operations may be returned for DXCC credit.  
S92IJ: Operation beginning 10 March 1992.  
S21ZA: Operation beginning August 1992.

### Slim

One time or another all of us have worked Slim. Slim is an acronym for pirate or a phoney operation. The work of Slim recently has included such calls as FP1AW, SY0NA, 5A0DX, 701ZZ, and probably others that have gone unreported.

Sometimes Slim thinks it is real fun-

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ny to use a DXpedition's call. The sad thing about it is some poor soul works him and will pass up working the genuine call, as he thinks he has already worked him. A real nice way to treat your fellow radio amateur.

### Miniprop Plus

Shel Shallon, W6EL, author of the *Miniprop Plus* software program we evaluated last month, wrote to us concerning our comment regarding the amount of running time for the mode-searching option. Shel's comment: "But suppose it does take 20 or 25 minutes to run a prediction on a slow computer. Isn't it better than not knowing when to expect band openings when that DXpedition fires up from the new one?"

Glenn Padsen, AE0Q, also wrote to us as follows: "I can't help writing a note about your *Miniprop* review. The ads all say 'math co-processor, highly recommended.' Believe it! I did a test on my PC before and after adding the math co-processor. Using his example from the manual, from Texas to the mid-east, took five minutes, 30 seconds for five bands, menu option 1 (with mode searching). With the math chip installed, it now takes 33 seconds! The computer is a 286 (16 MHz), co-processor is an ITT. Without the co-processor, the Quick predictions, menu option 2, are much faster, forget the mode-searching option! I run *Miniprop* every time I turn on the rig, its always right on, (not counting solar storms, etc.). I don't think you did justice to a great program. Read the manual."

Shel went on further to say that a typical five-frequency prediction on his 486 computer (33 MHz) was five seconds, considerably faster than that of Glenn's machine.

Perhaps my evaluation and running the program was based on my own opinion on propagation. Sure, it is nice to know what and when is the best path to a particular location you are interested in working. But, tell the guy at the other end that he is supposed to be on that frequency at that time. Maybe he is in bed asleep. Maybe this reflects my own operating habits. Nothing on? Click!

### Antique QSLs

Here is another QSL card from the collection of Al Miller, VE7KC, of Pen-ticton, British Columbia. Al worked HS1BJ in Siam (now Thailand) back on 5 September 1937 on the 20M CW band. The HS1BJ station consisted of a home-brew transmitter running 50W output from a 203A power amplifier tube into a full-wave Zepp antenna with an ACR 175 receiver. This evidently was a club station and the operator signed the card as Sangiem Powtongsook. Al was



signing VE5KC while residing on Hoy Street in Vancouver.

### QSL Information

The latest information on the FO5BI QSL cards is that the operator is reported to be computerizing his logs. Due to his workload it won't be until around January before the logs will be sent to his QSL manager, F6HSI.

Henry Andersson, VK8HA, informs us he now handles the VK8 QSLs; the bureau is now at P.O. Box 619, Humpty Doo, N.T. 0836 Australia.

Although we have listed several QSL routes to former Soviet stations in the CIS, we do not recommend sending mail to these stations due to the chaos in the mail system. We have no answers for this one. More and more of the CIS stations are now using routes outside their borders. Box 88 is a total disaster!

### QSL Routes

3B8CA	—3B8AB	4L2FP	—UF6DZ
3D2BG	—SM4DHF	4N5RB	—YU5XTC
3D2SL	—P29AA	4N7DW	—YU7GMN
3D2ZG	—JH9XZG	4V4H	—KA9RLI
3Z0EMC	—SP6FER	4X0AI	—4Z4DX
4G2BAG	—DU3DO	4Z0DX	—4Z4DX
4K30MT	—RA10A	4Z2DX	—4Z4DX
4K4UA6WCG	—18YRK	4Z5DX	—4Z4DX
4K4BEU	—Y25FG	4Z6DX	—4Z4DX
4K4LC	—UA6LU	4Z8DX	—4Z4DX
4L1MFA	—UF6FIM	5H3YT	—JK1HSQ

5J0RCA	—HK4RCA	JU1T	—JT1KAA
5W1MS	—DJ3QG	JU830C	—JT1KAA
6V6U	—K3IPK	JW6VM	—LA6VM
6W6/K3IPK	—K3IPK	K1EF1VP9	—K1EF1
6W6/WB2P	—WB2P	K9EL/VS6	—K9EL
7S6QW	—SK6QW		(see note 3)
7X7AN	—DJ2BW	KC6WW	—JA2NVY
8A2P	—YB2UIJ	KH0JR6IQ1	—JR6IQ1
8P9Z	—K4BA1	KH0JK6UER	—JK6UER
8Q7AA	—JG2XYV	N4ZDA/VP9	—WB2YQH
8Q7VU	—DL7VU	OD5/SP7LSE	—SP7EJS
9A3ER	—YU2LLL	OH0W	—OH1MRR
9J2KY	—JA8XPX	OH1AF/OJ0	—OH1NOA (CW)
9K2GO	—KD4RSP	OH1AF/OJ0	—OH1EH (SSB)
9M6AG	—JA9AG	OX3IO	—OZ1JLL
9N1DX	—DL4DBR	P29JA	—JH7MSB
A22CA	—W5VML	P29VZF	—G30ZF
A35VG	—P29DX	P30WN	—5B4WN
AM92GXQ	—EA7GXQ	P40J	—WX4G
AP/WA2WYR	—KK6TX	P40P	—NX1L
BV2JJ	—ON6ES	P40PI	—K4PI
BZ1A/J9	—JA4HCK	P40W	—N2MM
C6AFT	—AA5NT	PJ4/WA3LRO	—K2SB
C6AHG	—WB2LMA	PR4Y	—PY4OY
C6AHH	—N50ON	PS4B	—PY4BA
C6AHI	—WA3YVN	PS4Y	—PY4OY
C6AHM	—N5TVL	PU4B	—PY4BA
CJ3XN	—VE3XN	PW4Y	—PY4OY
CN2MB	—I3JTE	R40Z	—UZ4RWS
CR3DIG	—DJ8OT	R60Z	—UA1ZZ
CU3/N0PHL	—KB3RG	RK3B	—UZ3AWO
CY0NSM	—VE1CBK		(see note 2)
CY0SAB	—VE1CBK	RO200T	—G3MTL
EA8BH	—OH2BH	RW3AA	—N1KSO
ED1I/T	—EA1JP	RY5K	—RB4GJ
ED5CCR	—EA4EBO	RY9DI	—RB5HT
ED6EIA	—EA6VC	S2IA	—W4FRU
EH6VQ	—EA6VQ	S21ZD	—G4MTC
EU00	—DL1GWS	S79J	—JA1ELY
FM5FE	—F1NCZ	SL1HF	—SK7QJ
FP/K1RH	—K1RH	SO4CW	—Y21CW
FR4FA	—F1OYM	SO5AIL	—G4AIL
FR5FA	—F1OYM	SO9PAR	—SP9MCY
GB10TA	—G3PMR	SP25TRM	—SP1KQR
GB40NY	—G4SSH	SU1AY	—OE6EEG
HB0/DL1FZ	—DL1FZ	SU1CS	—9K2CS
HC8A	—WV7Y	T20CB	—ON4QM
HS0ZBB	—K9EL	T31AP	—VK4AP
	(see note 3)	T31KW	—VK4WKB
IB0Z	—I0CHF	T32CW	—N16T
ID9/W7SW	—KC7EY	T32GG	—KE6GG
IL8/181YW	—181YW	T32GV	—W6OTC
IL8/18KUT	—181YW	T32RA	—KN6J
J28BG	—FD1RRH	T32RS	—N60XR
J3/G3VOU	—G3VOU	T32SS	—KE6V
J37E	—NY8E	T32WS	—WU6A
J37K	—W8KKF	TI29JJP—	TI2AOC
J37L	—WA8LOW		(see note 3)
J37V	—K8CV	TT8/WA4OBO	—WA4OBO
J5UA1	—NW8F	TU2QW	—F6EXQ
J68ZR	—W7ZR	U3A	—K1M2B
J80X	—JH41FF	UB5KG/4K3	—UB5KDD
JA1K/JW/JD1	—JA1KJW	UF7FWW	—UF6FFF
JT1T	—JT1KAA	UY7E	—UB5EM

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# DX Prediction — December 1992

Maximum Useable Frequency from West Coast, Central U.S. and East Coast (courtesy of Engineering Systems Incorporated, Box 939, Vienna, VA 22183).

The numbers listed in each section are the average Maximum Useable Frequencies (MUF) in MHz for contacting five major areas of the world centered on Africa-Kenya/Nairobi, Asia-Japan/Tokyo, Oceania-Australia/Melbourne, Europe-Germany/Frankfurt, and South America-Brazil/Rio De Janeiro. Chance of contact as determined by path loss is indicated as bold \*MUF for good, plain MUF for fair, and in parentheses for poor. UTC in hours.

## CENTRAL USA

UTC	AFRI	ASIA	OCEA	EURO	SO AM
8	(15)	10	*16	*10	*16
10	(15)	10	*15	(10)	15
12	25	10	*15	(10)	21
14	31	*13	*26	18	*33
16	34	(13)	22	(16)	*36
18	*33	(12)	(20)	(12)	*37
20	27	(12)	26	(11)	*37
22	*23	20	31	(10)	*33
24	*19	(17)	29	10	*24
2	*17	(12)	20	10	*19
4	*16	(11)	18	10	*17
6	(16)	(11)	(17)	10	*16

## WEST COAST

UTC	AFRI	ASIA	OCEA	EURO	SO AM
10	(12)	*13	*16	(10)	15
12	(12)	*13	*15	(10)	15
14	(19)	*12	*15	(10)	29
16	(24)	*13	*22	(14)	*35
18	26	(12)	(20)	(11)	*37
20	26	(12)	26	(11)	*37
22	22	25	30	(10)	*35
24	*20	*27	34	(10)	*30
2	15	22	30	10	*20
4	*14	16	20	10	*18
6	(13)	14	18	10	*17
8	(12)	*14	*17	*10	*16

## EAST COAST

UTC	AFRI	ASIA	OCEA	EURO	SO AM
7	15	10	(16)	*10	*16
9	15	10	*15	(10)	*15
11	26	10	15	16	22
13	32	11	*28	19	*32
15	35	(10)	24	18	*35
17	*35	(10)	(19)	14	*37
19	*30	(10)	(24)	(12)	*37
21	*25	(16)	29	11	*34
23	*19	(16)	29	10	*24
1	*18	(12)	(20)	10	*19
3	*16	(11)	(18)	10	*18
5	*16	(11)	(17)	10	*16

V29SW	—DL1HH	XX9NTH	—CT4NH
	(see note 1)	Y30MD	—ON4QM
V31DX	—KA6V	YJ0AAA	—JH7MSB
V83DB	—N6KNJ	VJ0B	—SM5LNE
V63KM	—JG1EGG	VJ0C	—SM4DHF
V63SM	—JG4EEL	YN0TI	—TI2MCL
V73IO	—AH6IO	VV500EA	—YV5ARV
V73UY	—NH6UY	ZA1E	—I2MQP
V85XF	—G3TXF	ZB2FX	—G3RFX
VD925E	—VE3XN	ZB2X	—OH2KI
V13MEL	—VK3CRP	ZC4DX	—4Z4DX
VK9CY	—VK6XW	ZF11Q	—G4FRE
VP2EX	—N6DLU	ZF21B	—4Z4DX
VP500CC	—W3HNC	ZF21B/4X	—4Z4DX
	(see note 3)	ZF21J	—KG6AR
VP8AQ	—G3TRF	ZF2JR	—N6RJ
VP8CIL	—G0EHR	ZF2RJ	—N6RJ
VR6RC	—WD6GUD	ZK1AL	—I4ALU
VS6WO	—AA0CR	ZK1HJ	—G3MNC
VY6QST	—K1ZZ	ZK2XP	—ZL2TT
XF1SI	—XE2EAA	ZK2XG	—P29DX
XL1FG	—VO1FG	ZK2XM	—DJ3QG
XO3XN	—VE3XN	ZK2XS	—DJ3QG
XO9TP	—VO1GDY	ZL7AMO	—ZL1AMO
XQ0X	—CE3ESS	ZL8RS	—ZL4DO
XT2DK	—OE3DKS	ZV4B	—PY4BHB
XU3UN	—SP5AAS	ZW9A	—PY5CC
XU4OF	—DJ4OF	ZX4V	—PY4VD
XU7VK	—JG2XYV	ZY0FZI	—JH1ROJ
		ZZ4V	—PY4OY

CN8HR	—P.O. Box 6577, Rabat, MOROCCO
CN8NA	—Zed, P.O. Box 6577, Rabat, MOROCCO
CN8RH	—P.O. Box 6577, Rabat, MOROCCO
DLAKUM	—Peter, P.O. Box 10, O-2334 Baabe, Ruegen Island, GERMANY
EX1SS	—P.O. Box 32, 164500 Severodvinsk, RUSSIA
GB100SBC	—P.O. Box 88, Rayleigh, Essex, ENGLAND
GB2NTS	—P.O. Box 59, Hamilton ML3 6QB, SCOTLAND
HJ0VGJ	—Abel, P.O. Box 852, San Andres Island, COLOMBIA
HP1XQN	—Mark Hill, PSC 2 Box 56, APO AA 34002
J69BB	—P.O. Box 1809, Castries, ST LUCIA
P40RY	—P.O. Box 5194, Richmond, CA 94805
RO0Q	—Lysy W., P.O. Box 112, Kishinev 277012, MOLDOVA
S92SS	—C. Postal 522, Sao Tomé (via Portugal)
TL8PS	—P.O. Box 265, F-67500 Haguenau, FRANCE
UC50	—P.O. Box 1, 348034 Lugansk, UKRAINE
UD8DWC/UA3P	—P.O. Box 222, 370000 Baku, AZERBAIJAN
W0WWB/KH0	—P.O. Box 5062, Saipan, MP 96950
XY0Q	—P.O. Box 288, Sapporo, JAPAN
XY0Z	—P.O. Box 288, Sapporo, JAPAN
YN1IMM	—P.O. Box 264, Managua, NICARAGUA
YN7JL	—P.O. Box 2376, Managua, NICARAGUA
ZF1WM	—Bill Myers, P.O. Box 30004, Grand Cayman, CAYMAN ISLANDS
ZK2XG	—Steve Telenius-Lowe, P.O. Box 1783, Port Moresby, NCD, PAPUA NEW GUINEA

3X0HLU	—Daniel, P.O. Box 4927, Conakry, GUINEA
4F1AXP	—P.O. Box 3152, Manila, PHILIPPINES
4V2PK	—P.O. Box 1095, Port-au-Prince, HAITI
5H3CO	—P.C. Mission, P.O. Box 65, Mikumi, TANZANIA
9K/CE3EOL	—UNIKOM Chile Air (Adolfo) P.O. Box 1425, Safat 13015, KUWAIT
9Y4TP	—Colin Fraser, P.O. Box 40, Port of Spain, TRINIDAD
A35VG	—Steve Telenius-Lowe, P.O. Box 1783, Port Moresby, NCD, PAPUA NEW GUINEA
A45ZO	—P.O. Box 981, Muscat, OMAN
AP92STF	—P.O. Box 65, Lahore, PAKISTAN

## Notes:

- This is the bureau route for V29SW. Direct cards may be sent via P.O. Box 1203, St. Johns, ANTIGUA.
- This is the bureau route for RK3B. Direct cards may be sent via P.O. Box 132, Moscow 107005, RUSSIA.
- The QSL managers for these stations request that cards be sent direct only. Do not QSL via bureaus.

Many thanks to the following contributors: UO4OWQ, VK8HA, W6EL, AA6OZ, AA6RE, W6TUR, W8KKF, NE8Z, AE0Q, American Radio Relay League (K5FUV), Salt City DX Association (KB2G), Northern Arizona DX Association (W7YS), Western Washington DX Club (WA0RJY), Long Skip (VE3IPR), The W6GO/K6HHD List, DX News Sheet (G4DYO), The Long Island DX Bulletin (W2IYX), QRZ DX (W5KNE), and The DX Bulletin (VP2ML).

Plan ahead! That's the most logical thing to do prior to a DXpedition. That's what I did for my 1991 Sierra County DXpedition. Or so I thought. I left the bottom section of my Butternut vertical antenna at home and had to improvise. I later found it when cleaning the garage. This year, plan ahead! 73 de John N6JM. □

## DX disenchantment

ARNOLD SMITH, KA3NTZ

I must admit I am just a bit disappointed. I received a gift for Christmas that would make any amateur delirious with joy — a brand new HF rig. Now, for the first time, I could chase DX and do all of those things amateurs are supposed to be fond of doing.

Fortunately, all the wires were up and it was just a case of out with the old and in with the new. Within the hour I was on the air with my new Ten-Tec.

No problems at all. For the very first time I had a QSO with a DX station on a band other than 80M.

In the ensuing month I made many such QSOs. In checking over my log (which I keep in a meticulous fashion), I find that 95 percent of all my DX contacts are extremely brief. This is not of my choosing, but rather it seems to be the option of the other station.

To my thinking a QSO is a heck of a lot more than just an exchange of signal reports. OK, a few even told me the WX and some named the equipment they were using. However, not one would allow me to start any sort of ragchew.

Now that ticks me off. Here I get hold of a Greek in Athens and have a whole bunch of questions I want to ask,



but all I get is a fast 73, QSL via BURO. Hey, I'm trying to find out how much a bottle of Twelve Star Metaxa is going for.

Yes, I am fully aware of the language problem that exists. That has no bearing on my statements. I speak an excellent German, and in three dialects. So far no German amateur seems willing to chat with me. I also speak an abominable, but understandable, French. It's always the same RST and QSL via BURO. Did they not ever hear of "Talk to the World?"

Then there was the shock of being asked for an IRC. I could understand a rare station getting a massive response, and postage becoming a problem. However, this was not the case here. The station I refer to was in Colombia and, so I am told, is no big deal so far as DX goes.

I won't even comment on the asking for green stamps, as it is too ridiculous to mention. Can anyone see me sending real American money for a QSL card? They gotta be kidding!

In all honesty I have to admit that

the ARRL QSL Bureau is a godsend to any and all DXers. That department alone makes it worth the dues. I know very well that I could never keep up with current postal rates.

All in all, like I said, I'm disappointed. DXing ain't what it's cracked up to be. Very few things are. The way I feel right now, I wouldn't trade one person in my local club for all the DX in the world. At least they (the guys in the club) buy me an occasional lunch. — Penn Wireless Association, Langhorne, PA



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# 10-10 INTERNATIONAL News

Chuck Imsande, W6YLJ  
10-10 19636

## Our youngest member?

Casey Haley, KB5UEO, just may have taken over the honor of being the youngest member of 10-10. Casey, who is seven years old, received his 10-10 number 62168, just days before the Summer 10-10 QSO Party on 1-2 August 1992.

"I like Amateur Radio because I can make lots of new friends all over the country and even in other countries without leaving home. I also think the contests are fun," says Casey. He received his Novice license from the FCC on 27 July 1992 and immediately fired up the family Kenwood TS-940S at home. His first contact was with W5RRR/KB5GWG from the Johnson Space Center employees' club station (10-10 #1123), and his second QSO and first DX contact was with W7GMH in Hawaii. "That was so exciting that I try to make as many contacts as possible every day," says Casey.

The Summer QSO Party made Casey eligible for his first 10-10 award, the 10-10 100BAR. He plans to fill the walls of the family ham shack with awards, as he has a young headstart to enjoy his hobby for a lifetime.

When Casey is not making contacts on the radio or studying for his license upgrades, he has other interests to keep him occupied. He is a straight-A student at Pearl Hall Elementary School where he is in the third grade. He is a member of the Gulf Coast Youth Rodeo Association where his events include riding the bareback ponies and calves. He is a voracious reader and enjoys Cub Scouts, swimming, roller-skating and cycling.

Casey broke his leg for the second time roller-skating, and two days after the accident, using crutches to walk, Casey passed his Technician license! At the rate Casey is going he will have passed his General Class CW test and possibly have his Advanced Class license by the time he is eight years old. His brother, Cody, nine years old, is studying for his Novice license, and that will make the entire family amateurs.

## 10-10 special event station

John Johnson, KA5ACT, #31008, will be operating a special event station



Casey Haley, KB5UEO, 10-10 #62168

on 10M through 30 December 1992, celebrating the 50th anniversary of Fort Hood, Texas. For a certificate send a #10 SASE to John Johnson, KA5ACT, #31008, 1212 Bonnie Drive, Killeen, TX 76542-1226.

## 10-10 from Kalawao County, HI

Jim Koch, NH6YH, #56474, along with a group from the Kalawao Amateur Radio Club will be operating from one of the most sought-after counties in the US, Kalawao County, Hawaii, on the weekend of 13-15 November. Kalawao County, formally known as the Kalaupapa Leprosy Settlement, has no amateur population. Kalawao is by far the smallest, most remote and least populated of Hawaii's five counties. The only way to make a

contact with this four-square-mile county on the island of Molokai is when an individual or group go to Kalawao and put a station on the air. The Kalawao ARC group will be operating from Kalaupapa, and it is the first time a group of unaffiliated outsiders have been invited to operate from Kalaupapa itself. Normally operation takes place from a campsite perched on a cliff two-thousand feet above the peninsula below.

## Winter CW QSO Party

Coming soon, the Winter CW QSO Party. The date is the weekend of 6-7 February 1993. For details and rules see the October issue of the *10-10 International News*.

## Highest 10-10 number

Records manager Lee Pasewalk, WB6MGM #213, reports that the highest 10-10 number issued through September 1992 was 63226, issued to KD4IGP. Lee also reports that through the third quarter of 1992, 10-10 gained 415 new members. District 4 had the largest new membership with 110, followed by District 8 with 46 new members. Districts 6 and 9 tied for third place with 40 new members each. 10-10 just keeps growing, growing, growing!

If you are not now a 10-10 member and would like to learn more about the 10-10 organization, or if you have let your 10-10 membership dues expire or have lost your 10-10 number, send me a green stamp (\$1) to help cover postage, along with two first-class stamps and an address label for the return of the 10-10 Information Package. You will receive a copy of the 24-page 10-10 Information Manual along with a copy of the latest issue of the 32-page *10-10 International News*. Send to: Chuck Imsande, W6YLJ #19636, 18130 Bromley Street, Tarzana, CA 91356-1701. 73, es see you next time. □

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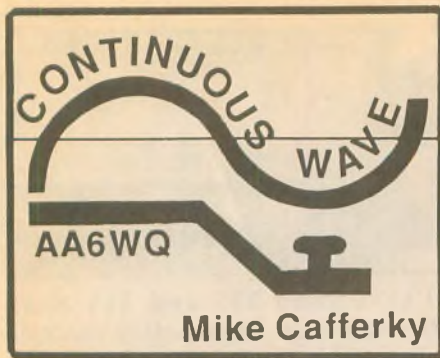
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### Marketing your mode

When I talk with other CW operators, I encounter a fear that someday the CW mode of operation will become extinct. As a professional marketing executive I sometimes view CW from the marketing point of view and ask: Are we nearing the natural end of the CW product life cycle? Are there any marketing tactics which can revive an interest in CW? I think the answer to both questions is *yes*.

Left to itself, the CW mode will have a difficult time competing with some of the more popular modes of communication. Let's be honest. The rapid diffusion of technical innovations has almost swamped CW. And this advance of technology will continue. Add to this the fact that, in general, we are still tied to sluggish paper and pencil methods of learning to copy code. What a bore to people who also have interests in digital-based methods of communication. Without a boost, the continuous wave mode will proceed on a slow slide toward becoming a silent key. Where can we find a boost to revive this pleasurable product? We will find it in the principles of *word-of-mouth marketing* and product development.

We all talk, but social scientists know that some people talk and are listened to more than others. So to which talkers do we listen? The most effective talkers are the ones who are perceived to be believable, genuine, experienced, and interested in what they are discussing. If someone can document that he has recent personal experience with a certain aspect of Amateur Radio, he will more likely be well received. Positive talkers are self confident and innovative; they have a high degree of social interaction. They can be old-timers or new operators. What we are looking for is leadership: those to whom others listen.

It is this leadership which is the focus of successful word-of-mouth marketing. Opinion leaders help CW succeed by giving helpful information about it to others. With their own personal experience to draw from, they

can reduce someone else's risk of having a bad experience with CW. These champions are highly persuasive because they are seen as having nothing to gain by their positive talk. I guess that 99 percent of new radio operators know about the existence of CW. But an opinion leader will help shape their *attitudes* as they make their decision whether to give CW a try.

### Product development

As a marketing professional I suggest several tactics which can revive a slumping CW product:

A. Lower the price required to enjoy CW. Price includes both the economic barrier of purchasing equipment and the psychological barriers to CW enjoyment. These barriers include preparation for tests and official testing protocols. I'm not suggesting that code speed requirements be lowered to accommodate barrier bashing. I do suggest we create a few more categories of code speed achievement. For example, achievement could be recognized at 5, 7, 10, 13, 15, 18, 20, 22, 25, and 30 words per minute. I am also suggesting that, in addition to having a written code test, testing protocols should offer an alternative more suitable for operators who learn to copy code in their head. Don't we already have these alternatives for blind operators?

B. Make major improvements in CW. Here the major improvements most needed are in teaching/learning methods and in paddle-keyer systems. The essence of Morse code teaching has changed little over the years and we are in danger of thinking that the old methods are the best. Amateur Radio consumer needs and preferences are changing rapidly. If the *CW product* expects to compete it must change with the times and be more *consumer oriented*.

C. Reposition the perception of CW.

In the market, *perception is reality*. If new operators perceive that CW is enjoyable and that preparing for the test is no more difficult than preparing for the written theory test, more will become CW operators.

### Practical ideas

1) Encourage demonstrations of CW operating skill and new CW operating equipment. In some clubs this will simply be a demonstration of head copy or new electronic keyers. In other organizations it will be contests and demonstrations of high speed CW or of manual dexterity with paddles and keys. Conventions and hamfests are the logical places for the word to spread about how much fun it can be to operate CW. Corporate sponsorship of these high-visibility events will not only promote CW but also the commercial interests of sponsors.

2) Teaching and learning of CW must quickly get beyond the paper-and-pencil methods which are perceived as drudgery. If we have the attitude that consumers must conform to an antiquated standard, it will be our loss, not theirs. This is another form of lowering the price (lowering the agony) of learning and enjoying code.

3) Formally celebrate when operators upgrade and pass increasingly challenging code speeds. Remember how good you felt when you passed your code speed test? To have a group of committed CW operators formally celebrate this achievement will drive home the positive aspects of the experience. Ideally, this should be done right at test time when no-code operators are present.

4) Code teachers must be champions or we are in big trouble. I recently met a code teacher who told me he didn't enjoy CW all that much, that he almost never operated in CW and that someone needed to help others upgrade so he was "drafted." This teacher is a great guy, but he is not cut out to teach code for enjoyment. Whoever recruited him made a mistake. It's no wonder to me that on the day I met him no one showed up for class.

5) Lower the price of new paddles and electronic keyers. Product suppliers can help here by introducing equipment priced in the same range as straight keys. This will generate more enthusiasm for more sophisticated paddle-keyer systems and extend the life cycle of all CW related products. Compared with the cost of a radio, a straight key or a paddle system should represent a low financial risk. □

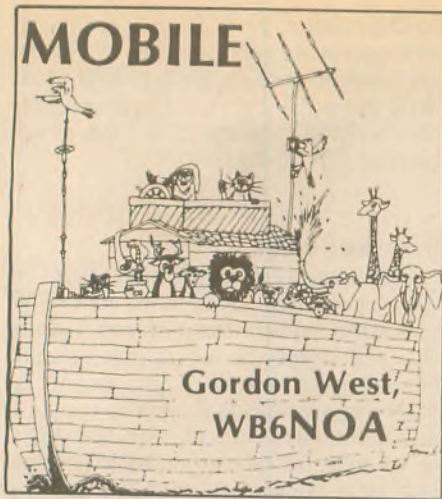
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wrapped up in one. You get all of 2M plus aeronautical receive, marine radio receive and all of those other VHF out-of-band frequencies too. Same thing with the UHF side—most dualbanders cover 440-450 MHz and, after modification, can receive down to the FBI frequencies near 400 MHz, and all the way up to some metropolitan police departments at 507 MHz. Some dualbanders, like the Alinco DR-599, also receive 800-999 MHz.

The modern dualband mobile transceiver may also feature a detachable head. This allows you to bury the transceiver innards under your front seat and have the tiny little head sitting on top of the dashboard. The remote-control cable is generally a tiny, ultra-flexible multi-conductor that can be tucked away under any little crevice on the dashboard.

Dualband mobiles, along with dualband hand-held transceivers, might also be modified for crossband relay operation. Two of the most popular dualband mobiles for this specialized application are the Alinco DR-599 and the Icom IC-2410. Both units easily go into crossband relay operation. I have worked both of these rigs in the crossband mode, and it is some simple keyboard button-pushing that lets you turn your mobile unit into a mobile



The Alinco 590 and 599 dualbanders may be remotely channel-changed in the relay mode.

repeater/relay station.

Let's say you go camping with your wife and kids. Everyone is licensed, and everyone owns small dualband hand-holds. You park your mobile unit on the top of a hill and set your 2M VHF frequency on 146.580 MHz simplex, 88.5 Hz encode and decode. You would set your UHF band at 446 MHz simplex with a tone of 88.5 Hz. Start off with low power on both bands, and go into the crossband repeat mode.

With your hand-holds, plug in the same frequencies, but leave off the decode function. This allows you to listen on both frequencies before transmitting to insure your mobile relay station does not cover up any ongoing transmission. Remember,

### Crossbanding with dualband rigs

Dualband transceivers for the 2M/440 MHz bands are enjoying increased popularity because of their small size, twin-band capabilities and attractive pricing. You can buy a 45W, dualband, mobile transceiver, brand new, for around \$600. You won't find many used dualbanders out on the swap tables; once you own one, you might not want to give it up.

The obvious benefits of a dualband mobile transceiver are two radios

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Many dualband mobile units are coming up on crossband repeat at high-level base stations, with high powered amplifiers and high gain antennas. This leads to a high amount of interference on both 2M and 440 MHz, as well as major frequency coordination questions. Should these crossband repeat stations fall under frequency coordination standards? Can you put them up on almost any frequency? Are they 100 percent legal without additional control and ID circuitry?

These are the gray areas that are presently being addressed by spectrum managers throughout the country. With the proliferation of crossband radios set up as personal mini-repeaters, the problem is growing by leaps and bounds. Worse yet, these systems are ending up on repeater inputs, satellite subbands and even down at the bottom portion of the dualbands

reserved exclusively for weak signal SSB and CW.

So I recommend you *cautiously* use the feature of crossband mobile relay only when you are well away from the city, and only when you need temporary mobile-relay communications to stay in touch with hand-helds. Don't leave these stations on big base station antennas, and stay away from amplifiers. It will just lead to spectrum problems.

If you use your crossband mobile relay capabilities sparingly and properly, you can add a new dimension to crossband operation that may not cause interference. But keep these stations out of your big base setup, and use the established frequency coordinated repeaters as the normal range extender. Crossband mobile relay stations should only be used for temporary setups, and always on low power, with a careful check of the frequency chosen to insure you are not causing interference. □



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My Christmas wish list for this season begins with a new computer for my writing chores. I would like to relegate this slow-moving "old" 386-25 machine (with eight megs of RAM, a 125-meg hard drive, modem, CD-ROM, multimedia cards and software) to my ham shack where it will supplement an aging 8088 machine (with a V-20 chip) in Amateur Radio operating. Why do I want a 486 DX2-66 with a huge capacity hard drive and all the same stuff? Because my hard drive is nearly jammed with programs and graphic files for my desktop publishing efforts.

My 386 machine is a far cry from my first SOL computer (circa 1976) on which I wrote my first column for this publication (1982). It featured 48K (K, not megs) of RAM and two floppy North Star drives of 77K each. The SOL is now ready for the museum—it's a rare antique. Since then, I've tried to keep up, but progress goes faster than I can finance easily.

My daughter and a high school chum, Susan, were recently back in Fargo for their 20-year high school reunion. Susan works for Intel in

Arizona. When she looked into my office and saw the computer she asked, "386 or 486?"

"386," I said.

"Wait 'til you see the next generation!" Susan was excited.

"I know," I lamented, "I'm always one or two generations behind. Every new thing I buy is out of date before I unpack it."

Susan smiled. She knows. Technology planned it that way.

So, Santa, please put an out-of-date 486 in my elastic support stocking this Christmas. I ain't gonna wait for the next generation. At three quarters of a century plus one year on my lifetime clock, I'll just keep computing "behind the power curve," as we used to say in my airplane flying years.

### Packet traffic

I can't remember how many years I've been running a packet BBS, but it's been since the early days of the sport. It started with beta test hardware and one user. I kept up my BBS for a number of years with the latest software, and then, when the local club put a BBS on the air, I let my system sort of drop behind the power curve in packet operation. My BBS acts only as a backup for the club station which has its ups and downs. I'm running V.11.3 instead of V.14.2 in the software department, but it works.

I have never redone the forwarding file for the BBS from scratch. It is really a mess. If I printed it to paper it would probably reach 25 feet long or more. I've thought about redoing it, but when I sit down to actually do the job, it frightens me, so I drop the idea. The FWD.MB file is like Topsy, it grew and grew and grew. But it works. It sends traffic where it should go.

I have the feeling that a lot of BBS SYSOPs have let the same thing happen to their files, but it's only a guess. The reason I've arrived at this conclusion is that incoming personal traffic

really shows no real direction of flow in many cases; it all seems so random. I've had two messages from the same guy mailed the same day arrive by two completely different paths.

My latest hobby is sending the incoming header list back with my answer to a message. In other words, if you send me a packet message and ask for it, I'll add the header from your message to the answer I send you. Then you can compare the routes the two messages traveled. You'll probably find it very enlightening. If you'd like to try it, send me a message.

Here's what I learned by looking at the message header from my friend Larry, KA0JRQ, in the Omaha area. It was dated in Larry's BBS near Omaha at 0359Z on 28 September. It arrived in Fargo at 0521Z on 1 October. The route from Larry's BBS went to Omaha, then to South Sioux City, Nebraska, where it was bumped to Denison, Iowa, and then on to Ames, Iowa, where it was switched to high frequency for the trip to Baltimore, Maryland. In Maryland it went through two local relays (taking four hours) and then switched back to HF for the long journey to Baton Rouge, Louisiana. The next leg was again via HF to Apple Valley, Minnesota, where it switched to VHF for the trip to Fargo by way of Little Falls, Minnesota, and Parkers Prairie, Minnesota.

I've looked at a lot of message headers and wondered what the forwarding tables must look like in some of the relay stations. There hardly seems to be any logic in the way things move around the country. Maybe the packet system needs some "route managers" to help route traffic.

### Old log books

I was digging in my archives and I found one of the early logbooks for W9LHS, my first call. It was from the 1930s and it contained a lot of good stuff to jog a person's memory. For example: in those days a signal was reported as QSA (signal readability on a one-to-five scale), R (strength on a one-to-nine scale) and T (tone on a one-to-nine scale).

The RST scale was instituted by the ARRL as an outgrowth of the QSA-R-T system of the early days. Before the RST system you would report to the other guy by keying something like this: "UR T9 SIGS QSA 5 R 7 HR IN FARGO NODAK HANDLE IS BILL." On phone it was "QSA 5 R 9." The T was eliminated, but on CW we would add an "X" if the signal was pure and had a "crystal sound" to it. If your T report included the letters RAC it meant "raw alternating cur-

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rent" or an AC buzzer sound.

The log also showed that we didn't give RST 599 to everyone like most do today. There are QSOs logged where the reports were QSA 3 (meaning "fairly good, readable with some difficulty"). For example: on 26 October 1934 I gave VE3TT a QSA 4 R7 T4 report on 14.118 MHz CW. Boy, he must have had a buzzy signal to get that kind of report from me. On 13 November of the same year, I reported to VK3BX in Australia that his 7.059 MHz CW signals were QSA 3 R5 T8; today it would have been RST 5NN.

I recently finished a couple hours in the CQ WW RTTY contest where I gave every contact RST 599 and everyone gave me 599 back. Signal reporting has boiled down to just one all-purpose report, 599.

I wish now that I had put more notes in my logbooks, they are great diaries. I did, however, make notes about transmitters, receivers and antennas. For example: "Bought 5M portable transceiver from W9DTP on 27 December 1934." I remember paying Clarence Bates \$10 for it. In the logbook I listed the color coding of the battery wires and the fact that the circuit was taken from the "Tool Box Transceiver" article on page 23 of the August 1934 QST. I had a lot of fun with that transceiver and I used it for a number of years.

Other logbook notes of interest: "866 rectifier tube blew while operating"; "Fixed buffer power supply problem caused by open bleeder resistor"; "Drew plans for 6L6 crystal oscillator—6L6 buffer—203A final"; "Antenna completely covered with hoar frost rendering it inefficient"; "Key clix complaint from the neighbors"; "Porch light blinks when on CW"; "Power supply for receiver blew sending tar all over the wall."

One of the notes was the last entry in that logbook. It was dated 7 December 1941. It stated simply: "War declared—Amateur Radio suspended."

In 1946, when I returned from three years Signal Corps duty in the Pacific Theater, I started a new logbook. Unfortunately, I lost some of the books from those early years, but it's fun reading the old ones I do have. So, kiddies, keep your logbook like a diary and make a lot of notes for your old age. They'll really jog your memory!

### Eavesdroppings

I THINK WE WOULD NEVER KNOW THAT WHEN WE THINK A THING, THE THING WE THINK IS NOT THE THING WE THINK, BUT ONLY THE THING THAT MAKES US THINK THE THING WE THINK WE THINK WE

THINK . . . MY WIFE IS CALLING ME TO EAT—ALWAYS SOMETHING TO SPOIL A NICE QSO . . . SORRY MY ENGLISH IS QRP-QRP HERE . . . THE ART OF DIETING: THAT'S WHERE THE BLUBBER MEETS THE GOAD . . . HOPE TO SEE YOU IN THE CONTEST ALTHOUGH I'M NOT PLANNING ON ENTERING . . . I TOOK THE DAY OFF FROM WORK SO I WOULDN'T FEEL GUILTY WHILE PLAYING CONTEST . . . YOU HAVE A NICE SIGNAL FOR AN ANTENNA REPAIR JOB . . . RTTY CONTESTS ARE GOOD THERAPY FOR ME . . . YOU ARE MY FIRST CONTACT WITH DENMARK, SO IT IS NICE TO SEE YOU AGAIN . . . I JUST FINISHED OPTIMIZING MY COMPUTER, BUT I DON'T KNOW EXACTLY WHAT IT DID . . . OUR PACKET LINK WAS DOWN FOR THREE DAYS AND I REALLY DIDN'T MISS IT CAUSE I DON'T READ ALL THE JUNK MAIL ON THE BBS ANYMORE . . . OUT OF THE FOUR OF US IN OUR TOWN WHO

USED TO CHASE RTTY DX, I'M THE ONLY ONE LEFT—THE OTHERS SOLD OUT . . . I MISSED ALL THE GOOD JUICY COUNTRIES WHO SHOWED UP IN THE CONTEST LAST WEEKEND, BUT THAT'S MY LUCK . . . I CALL A RARE COUNTRY "JUICY" BECAUSE WHEN I SEE A COUNTRY CALL SIGN I DON'T HAVE I START TO SALIVATE LIKE HUNGRY HORSE NEAR A HAY STACK . . . MY COMPUTER IS AN OLD WRECK LEFT OVER FROM THE DAYS WHEN THEY USED TO MAKE THEM HERE IN THE USA . . . I WANT TO MAKE A POINT, BUT I KNOW NOT EVERYONE IN HAM RADIO WILL LISTEN . . . 73SSS TO YOUUU FROM MEEE."

Thanks to WZ7P, W0HAH, AB6MC, W7NYB, K7OJ, W7VFR, KA0JRQ, W6RCW, KI5XP and others for their input. Write me: Bill Snyder, 1514 South 12th Street, Fargo, ND 58103. My packet address: W0LHS @ W0LHS.ND.USA.NA. 73 DIT DIT. □

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### The code of silence

QCWA seems to be one of the best kept secrets in Amateur Radio. We hear so many people say they have been trying for years to find out how to join QCWA. Others complain they have never been invited. We really aren't a "secret society" and we'd like to break this apparent code of silence.

First off, you don't have to be "invited" to join QCWA. If you were licensed as an amateur at least 25 years ago (and are currently licensed), you are eligible. We would love to have you. Just drop a note to the QCWA headquarters (or to this columnist) and we will get an application to you promptly — along with information on the nearest local chapter(s). The headquarters office address is 159 East 16th Avenue, Eugene, OR 97401-4017

It is not necessary to affiliate with a local chapter. You can remain an "at large" member but we feel it is the fellowship at local chapter activities that really makes QCWA great. There are now 186 local chapters throughout the world—and more springing up every month. Most of you should find a chapter within a reasonable commuting distance. Naturally, some chapters are more active than others. Some meet every week, others meet once or twice a month, and some only once or twice a year. But regardless of how frequent or how seldom the chapters meet, you will find chapter membership rewarding.

You will find a QCWA booth at most major Amateur Radio conventions and hamfests. You will hear QCWA nets on the air. The International Net meets every Sunday at 2000Z on 14.347 MHz SSB. There is a CW net every Wednes-

day evening at 8 p.m. EST on 7.035 MHz and there are a multitude of local chapter nets. You are welcome to check in to any of them. There are also QCWA QSO parties (low key contests), many operating awards and a great quarterly magazine. Try it. We guarantee you'll like it.

It is true that QCWA members consider themselves pioneers, but we also recognize that there has been as much real pioneering done in the past 25 years as was done in the first 25 and we are eager to attract these latter-day pioneers. Remember, too, that a quarter century dates back to 1967 and we are getting more and more members who are only 33 or 34 years old. It delights us to hear so many people say they are counting the months (or years) until they will be eligible to join. We know it is these "young squirts" who will carry QCWA into the future. You will also find that even our oldest old-timers are not runningspark-gap transmitters! The majority are deep into the very latest technology. You won't find any generation gap in QCWA.

If you didn't get to the annual convention in Scottsdale in October, you missed a great event. There were close to 250 people there from all over the continent. (I don't think we had any DX members this year, but we have had several in the past.) It was a beautifully run convention and a wonderful opportunity to meet and greet the QCWA people we have been talking to on the air. The board of directors met for two days ahead of the convention, then held an open forum Friday morning to report to the membership and receive input. There were a number of pertinent comments made and the board then went back into session for final deliberations. A final report was made at the Saturday evening banquet. There will be more details in the winter *Journal*.

There will be another meeting of the board in mid-April. If any chapter or individual has a subject they would like to see considered, get in touch with the

QCWA secretary or general manager or any member of the board. Member-ship input is eagerly solicited.

Nominations for honor awards will also be considered at the April meeting. Get your nominations in early. We know there are many members out there who are deserving of recognition, but they will never get it unless someone puts their name on the list. Look on page 116 of the fall *Journal* for the list of available awards and the people who have been recognized in the past. Remember, too, that each chapter is entitled to issue one meritorious service award each year. Isn't there someone in your chapter who has earned this bit of recognition? Chapter secretaries should send nominations for meritorious service awards to the QCWA general manager.

The next time you do some ragchewing on the air with a station whose call appears to date back to 1968 or earlier, be sure to ask if they are a member of QCWA and, if not, give them an information pitch and an invitation. There is an application blank on the inside back cover of every issue of the *Journal* and there are copying machines in most communities. Let's break this code of silence and let the world know about QCWA.



## Super ground rod

STANLEY STATEN, W3INK

I was looking for an easier way to ground my tower than to drive another eight ft. ground rod into the rocky ground.

I remembered seeing my father-in-law drive a water well 90 feet down by using water pressure. He simply connected his garden hose to a pipe and stuck the pipe into the ground. The water flowing from the open end cleared the dirt out of the way and the pipe went in. I decided to try it with a 10 ft. piece of 1/2 in. copper water pipe.

As it turned out the pipe just fit into the end of the garden hose. A small radiator hose clamp held it in place adequately. The water was turned on and the open end of the pipe was stuck into the ground. It penetrated easily until it apparently struck a rock at about nine feet.

Since that was deeper than the standard eight ft. ground rod would go, I left it. A piece of 1/4 in. copper tubing was clamped to the bottom of the tower and to the exposed end of the copper pipe ground. —DLARC □

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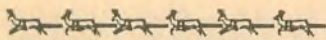
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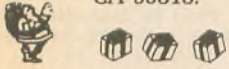
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### ALABAMA

**Montgomery Amateur Radio Club (W4AP).** P.O. Box 3141, Montgomery, AL 36109. Meets 3rd Mon./monthly, 7 p.m., State Trooper Dist. Office, Coliseum Blvd. & Federal Dr. Nets Sun. 8:30 p.m. 146.84 and Thurs. 8:15 p.m. 147.18+. Info: Fred, K8AJX, (205) 270-0909.

### ALASKA

**Arctic Amateur Radio Club.** Geophysical Institute West Ridge U of A, P.O. Box 81389, College, AK 99708. 1st Fri./monthly, 7:30 p.m.  
**North Pole Hamsters ARC.** Meets 1st Mon./monthly, 7 p.m., VFW Bldg., Old Rich Hwy. & VFW St., P.O. Box 56424, North Pole, AK 99705.

### ARIZONA

**Central Arizona DX Assoc. (CADXA).** Meets 1st Thurs./monthly, 7 p.m., Salt River Project Pera Club, 1/2 mi. West of 68th & Continental Dr., Scottsdale, AZ. Rptr. K5VT 147.32/92. PacketCluster nodes (S): 145.09, 144.93, 145.03. Info: Warren Hill, KF7AY, (602) 396-2218.

**Cochise Amateur Radio Assn. (CARA).** Meets 1st Mon./monthly, 7:30 p.m. at club facility on Moson Rd., Sierra Vista, AZ. WA7KYT/R 146.16/76 rptr.

**Scottsdale Amateur Club.** Meets 1st Wed./monthly, 7:30 p.m., Scottsdale Sr. Cntr., 7375 E. 2nd St., Scottsdale, AZ. Net Tues., 7 p.m., 147.18 rptr. Info: Barney Fagan, KB7KOE, (602) 861-2817.

**Tucson Repeater Assoc.,** P.O. Box 40371, Tucson, AZ 85717-0371. 2nd Sat./monthly, 7:15 p.m., Pima Co. Sheriff Bldg., 1750 E. Benson Hwy. Net Thurs. 7:30 p.m. 146.22/82 (146.88, 147.08, 448.550, & 145.15 Packet).

### CALIFORNIA

**Amador County Amateur Radio Club.** P.O. Box 1094, Pine Grove, CA 95665. Meets 1st Thurs./monthly, 7:30 p.m., Jackson Sr. Cntr., 229 New York Ranch Rd., Jackson, CA. Info: call 146.835.

**Amateur Radio Club of El Cajon. WA6BGS.** P.O. Box 50, El Cajon, CA 92022. Meets 2nd Thurs./monthly, 7 p.m., La Mesa Church of Christ, 5150 Jackson Dr., La Mesa, CA. Rptrs. 147.675(-), 224.080(-). PL 107.2. Nets 147.570 Wed./Sat., 7 p.m. Info (619) 697-2700.

**Associated Radio Amateurs of Long Beach, W6RO.** P.O. Box 7493, Long Beach, CA 90807. Meets: 1st Fri./monthly, 7:00 p.m. Signal Hill Recreation Hall, 1708 E. Hill St., Signal Hill, CA.

**Conejo Valley Amateur Radio Club (CVARC).** P.O. Box 2093, Thousand Oaks, CA 91358-0917. Meets 1st Thur./monthly at King of Glory Lutheran Church, 2500 Borchard Rd. Newbury Park, CA, 7:30 p.m. Info on 147.885/285 and 445.925/0.925 (PL 123) or call N6LQ Ernest (805) 499-5398.

**Corona Norco ARC, (CNARC).** Meets 1st Mon./monthly, 7:30 p.m., The Pizza Palace, 1197 Magnolia Ave., Corona, CA 91719. Talk-in 146.535 S.

**Downey Amateur Radio Club.** Meets 1st Thur./monthly, 7:30 p.m., So. Middle Sch., 12500 S. Birchdale, Downey, CA. Wkly nets—Thur., 7:30 p.m. 146.595 (S). For info: P.O. Box 207, Downey, CA 90241-0207.

**East Bay Amateur Radio Club, Inc.** Meets 2nd Fri./monthly, 8 p.m.-10 p.m., Northbrae Community Church, 941 The Alameda, Berkeley, CA. Info: Gordon Firestein, (415) 527-9382.

**Fullerton Radio Club, Inc. W6ULI.** P.O. Box 545, Fullerton, CA 92632. Meets: 3rd Wed./monthly, 7:30 p.m., Sr. Citizens Center, 340 W. Commonwealth, Fullerton. Net ea. Tue., 8 p.m. 147.975 (-600). Info: Bob Hastings, K6PHE (714) 990-9203.

**Gabilan Amateur Radio Club GARC.** P.O. Box 2178, Gilroy, CA 95020-2178. Meets: First Interstate Bank, 751 First St., Gilroy, CA, 2nd Thur./monthly, 7:30 p.m. Talk-in 145.47/144.87.

**Golden Empire Amateur Radio Society (VEC).** P.O. Box 508, Chico, CA 95927. Club call W6RHC, Repeater 146.25/85. Meets: 3rd Fri./monthly, 8 p.m. at 1528 Esplanade, Room 110B, Chico.

**Livermore Amateur Radio Klub, (LARK).** Meets 3rd Sat./monthly, 9:30 a.m., City Council Chamber, 3575 Pacific Ave., Livermore, CA. Net Mon. 1900 on 147.12+. For info: Rosalie Powers, KC6RKK, c/o LARK, P.O. Box 3190, Livermore, CA 94551-3190. (510) 447-3815.

**Marin Amateur Radio Club (MARC) W6SG.** Box 151231, San Rafael, CA 94915-1231. Meets 1st Fri./8 p.m.; MARC Clubhouse Bldg. 549, HAFB, Novato, CA (415) 883-9789 (Summer exceptions; contact Pete N6IYU, 924-1578). Sun. AM Club at Red Cross, San Rafael.

**Monterey Park Amateur Radio Club (MPARC), K6GIP.** P.O. Box 403, Monterey Park, CA 91754-0403. Meets 2nd Thurs./monthly, 7:30 p.m., Community Rm.—City Hall, 320 W. Newmark, Monterey Park. Nets: Tues. 7 p.m. 147.48 Simplex — 7:30 p.m. 28.385 MHz. Info: John Duce, N6EDX (818) 280-7052.

**Moreno Valley Amateur Radio Assoc. P.O.** Box 7642 Moreno Valley, CA 92303. Meets 4th Mon./monthly, 7 p.m., City Council Chambers—City Hall, corner of Cottonwood & Frederick Sts. Net Tues. 8 p.m. 146.655- (PL 1A). Info, Larry Marcum, KA6GND, (714) 656-1643.

**Mount Diablo Amateur Radio Club.** P.O. Box 23222 Pleasant Hill, CA 94523. Meets 3rd Fri./monthly, 8 p.m., Our Savior's Lutheran Church, 1035 Carol Ln., Lafayette, CA. Net Thurs. 7:30 p.m. on 147.06(+). Info, George K16YK, (510) 837-9316.

**North Hills Radio Club.** Meets 3rd Tue./monthly, 7:30 p.m., Elks Lodge, on Cypress at Hackberry in Carmichael, CA. (P.L. 162.2) Net K6IS Thurs., 8:00 p.m. 145.190. 220 Net, Tue. 8:00 p.m. 224.40(-).

**Orange County Amateur Radio Club.** Meets 3rd Fri./monthly, 7:30 p.m. at 907 E. Vermont, Anaheim, CA. (Between Anaheim Blvd. & State College) Call in on 146.550 simplex. Contact Ken Koehechy W6HHC at (714) 541-6249.

**River City A.R.C.S.** Meets 1st Tues./monthly, 7 p.m., SMUD Bldg., Don Julio at Elkhorn, Sacramento, CA. License classes offered. For info contact Lyle, AA6DJ, (916) 483-3293.

**Sacramento "Old Timers" Amateur Radio Society and Sacramento Valley Chapter #169 CQWA (Quarter Century Wireless Assn.).** Meets 2nd Wed./monthly, 8 a.m., Lyon's Restaurant, 1000 Howe Ave. For info contact Paul Wolf, W6RLP (916) 331-1830.

**San Fernando Valley ARC.** Meets 3rd Fri./monthly, 7:30 p.m., Red Cross, 14717 Sherman Wy., Van Nuys, CA. Net every Thur., 8:00 p.m. KB6C/R 147.735(-).

**San Gabriel Valley ARC.** P.O. Box 88, Monrovia, CA 91017-0033. Meets 1st Tues./monthly, 7:30 p.m. (except Dec.) at Bowling Green Clubhouse, 405 S. Santa Anita Ave., Arcadia, CA 91006. W6QFK, Rptr. 147.165/765.

**Santa Clara County Amateur Radio Assoc. (SCCARRA) W6UW & W6UU.** P.O. Box 6, San Jose, CA 95103-0006. (408) 249-6909. Meets: 2nd Monday/monthly, 7:30 p.m. at United Way, 1922 The Alameda, San Jose. Net all other Mon., 7:30 p.m. W6UU/R 146.385 +/442.425 + PL 107.2

**Santa Clara Valley Rptr. Society (SCVRS).** P.O. Box 2085, Sunnyvale, CA 94087. (408) 247-2877. 146.76 (-600 kHz), 224.26 (-1.6 MHz), 444.60 (+5 MHz). 2 meter/220 net Mon. 9 p.m. Mtgs-3rd Fri.

**Santa Cruz County Amateur Radio Club, Inc.** Meets last Friday/monthly at Dominican Hosp. Ed. Bldg., Soquel Dr., Santa Cruz, 7:30 p.m. Net K6BJ 146.79 Mondays at 7:30 p.m.

**Santa Monica—Westside Amateur Radio Club.** Meets 3rd Thurs./monthly, 7:30 p.m., Santa Monica Red Cross, 1450 11th St., Santa Monica, CA. Info Net every Tues., 8 p.m., 146.670, -600.

**Shasta Cascade Amateur Radio Society (SCARS) P.O.** Box 664, Anderson, CA 96007. Meets: 3rd Wed./monthly, 7 p.m. at the C.D.F. Conf. Rm., Grape St., near Parkway Ave., Redding, CA. Net 146.64, Wed., 8 p.m.

**Southern California Six Meter Club.** P.O. Box 10441, Fullerton, CA 92635. USB Net Tue., 8 p.m., 50.150. FM Rpt. Net Thur., 8 p.m., 51.80/51.30 tx. FM Smplx, call freq. 50.300.

**Stanislaus Amateur Radio Assoc. (SARA).** P.O. Box 4601, Modesto, CA 95352. Stanislaus Co. Administration Bldg., 12th & H Streets, 3rd Tues./monthly, 7:30 p.m. 145.39 MHz WD6EJF, 224.14 MHz.

**Tehama County ARC.** Meets 1st Fri./monthly, 7 p.m., Sept.-June, CA Div. Forestry Training Rm., Antelope Blvd., Red Bluff, CA. For info: 144.850/145.450 W6SYY/R.

**The Trinity County ARC.** P.O. Box 2283, Weaverville, CA 96093. Meets 2nd Wed./monthly, at the CD Hall in Weaverville, 7:30 p.m. WA6BXN Rptr. 146.13/73.

**Tri-County Amateur Radio Assoc. P.O.** Box 142, Pomona, CA 91769. Meets: 2nd Mon./monthly, 7:30 p.m., Covenant United Methodist Church, corner of Towne Ave. & San Bernardino Rd. in Pomona, CA.

**United Radio Amateur Club K6AA.** L.A. Maritime Museum, Berth 84, Foot of 6th St. San Pedro, CA 90731. Meets 3rd Fri./monthly except Dec., 7:30 p.m. Monitors 145.52 Simplex 10 a.m.-5 p.m.

**Vaca Valley Radio Club.** Meets 2nd Wed./monthly, 7 p.m., Vaca Fire Dist. Stn. on Vine St. in Vacaville, CA. Repeater: K6HIH 147.475 (-1 Meg) PL 127.3. Ph: (707) 448-4633.

**Victor Valley Amateur Radio Club.** P.O. Box 869, Victorville, CA 92393. Meets 2nd Tues./monthly, 7:30 p.m., Yucca Loma Elementary School, Yucca Loma Rd., Apple Valley, CA. Talk-in 146-940/340, info net Sun. 7 p.m. 146.940/340.

**West Valley Amateur Radio Assoc. P.O.** Box 6544, San Jose, CA 95150-6544. Meets: 3rd Wed./monthly, 7:30 p.m. (except Dec.) Cambrian School Dist. Office, 4115 Jackson Dr., San Jose, CA. W6PIY/R. Net Tue., 8:30 p.m. 147.39 +, 223.96.

### COLORADO

**Denver Radio Club.** Meets 3rd Wed./monthly, 7:30 p.m., Denver Red Cross, 444 Sherman at Speer. Club net: Sundays, 8:30 p.m. 147.33 MHz.

### CONNECTICUT

**Middlesex Amateur Radio Society, (MARS).** 5 North Rd., Cromwell, CT 06416. Meets Tues./weekly 7 p.m., Portland Methodist Church, Main St., Portland, CT. Novice classes, VE sessions monthly. Contact Jack, WA1K, (203) 347-8745. Rptr. 147.090 +.

**Tri-City Amateur Radio Club.** P.O. Box 686, Groton, CT 06340. Meets 2nd Tue./monthly, 7:30 p.m. St. Lukes Lutheran Church at Rt. 12. Novice classes. Info, contact Bob, KA1BB, (203) 739-8016.

### FLORIDA

**Gulf Coast ARC, Inc. P.O.** Box 595, New Port Richey, FL 34656. Meets 4th Mon./monthly, 7:30 p.m., 3852 Prime Place, New Port Richey. WA4GDN Rptr. 146.67/07.

**Indian River ARC, Inc. (IRARC).** 597 Capri Rd., Cocoa Beach, FL 32931. Martin Andersen Senior Center, 1025 S. Florida Ave., Rockledge, FL. Meets: 1st Thur./monthly, 7:30 p.m.

**Platinum Coast Amateur Radio Society, (PCARS).** Meets 2nd Mon./monthly, 7:30 p.m., Red Cross Bldg., 1150 S. Hickory St., Melbourne, FL 32901.

**Sarasota Amateur Radio Assn. (SARA).** P.O. Box 3182, Sarasota, FL 34230. Meets 3rd Thurs./monthly, 7:30 p.m., Sarasota Memorial Hosp. Auditorium.

**South Brevard Amateur Radio Club.** P.O. Box 2205, Melbourne, FL 32902. Meets 1st Tue./monthly, 7 p.m., Melbourne Public Library, 540 Fee Ave., Melbourne, FL

**Suncoast Amateur Radio Club.** P.O. Box 7373, Hudson, FL 34676. Meets 2nd Mon./monthly, 7:30 p.m., First Lutheran Church, corner of Polk & Delaware, New Port Richey, FL. Sponsor of WC2G/Rptr. on 145.35, serving west Pasco County.

### GEORGIA

**Dalton Amateur Radio Club, Inc. (DARC).** Meets 4th Mon./monthly, 7:30 p.m., Old City Park Sch. Bldg., corner of Waugh St. & Thornton Ave., Dalton, GA. Info, Bill Jourdain, N4XOG, (404) 226-3793.

**Metro Atlanta Telephone Pioneer Amateur Radio Club.** Meets 1st Tues./monthly alternately between 12 p.m. at 675 W. Peachtree St. and 6:30 p.m. at Morrisons on Jimmy Carter Blvd., Atlanta, GA.

### HAWAII

**Big Island Amateur Radio Club.** P.O. Box 1938, Hilo, HI 96721-1938. Meets: 2nd Tue./monthly, 7:00 p.m., HELCO Auditorium, 1200 Kilauea Ave., Hilo. Talk-in on 146.760(-), 146.880(-), 147.020(+) and 147.040(+).

### ILLINOIS

**Amateur Cross Link Repeater Club.** 29.680, 52.825, 147.225, 224.480, 921.225, 1292.10 and ATV on 916.25. Meets 1st Fri./monthly, 7:30 p.m. For info call (312) 594-1628. KD9FA Repeater/Chicago.

**DuPage Amateur Radio Club, (DARC).** P.O. Box 71, Clarendon Hills, IL 60514. Meets 4th Mon./monthly, 7:30 p.m., Holy Trinity Catholic Church, 110 Cass Ave., Westmont, IL. Sun. net on 145.25 MHz PL 107.2 at 2100 hrs. local time. Rptrs. 145.25 MHz PL 107.2, 224.68 MHz, 442.55 PL 114.8. Info. (708) 985-9256.

**Fox River Radio League.** Old Bank Bldg., 900 N. Lake St., lower level, Northgate Shopping Ctr. & Rt. 31, Aurora, IL. Meets 2nd Tue./monthly, 7:30 p.m. VEC Xams 3rd Tue./monthly, 7:30 p.m.

**Hamsters Radio Club, W9AA.** P.O. Box 42792, Chicago, IL 60642. Meets 1st Fri./monthly, 8 p.m. Crestwood Civ. Ctr., 139th & Kostner, Crestwood, IL. Nets: Sun. (local) 0100 UTC, 28.410 MHz; Mon. 9 p.m. 146.43 S.; Packet Mailbox 145.07. Info: (708) 535-3496.

**Peoria Area Amateur Radio Club, (PAARC).** Meets 2nd Fri./monthly, 7 p.m., 1401 N. Knoxville Ave. For info: (309) 685-6698. Rptrs: 146.25/85 & 147.675/075.

**Schaumburg ARC (SARC).** Meets: 3rd Thurs./monthly, 7:30 p.m., Schaumburg Park Dist. Community Rec. Cntr. at Bode & Springinsguth Rds., Schaumburg, IL. Net 145.23, 8 p.m. Thurs. Info (708) 213-0910.

**The Starved Rock Radio Club, W9MKS.** P.O. Box 22, Tabor St., Leonore, IL 61332. Meets 1st Mon./monthly, 7:30 p.m. Rptr. net 7 p.m. Wed./wkly., 147.72/12.

**Tri-Town Radio Amateur Club.** P.O. Box 302, Hazel Crest, IL 60429. Meets 1st & 3rd Fri. (Sept.-June), Hazel Crest Village Hall, 3000 W. 170th Pl. Net Wed. 146.49, 8 p.m. Info: (708) 335-9572.

**Wheaton Community Radio Amateurs, (WCRA),** P.O. Box QSL, Wheaton, IL 60189. Meets 7:30 p.m., 1st Fri./monthly, College of DuPage, Glen Ellyn, IL. Nets Sun. & Tue. 8:00 p.m., 145.39 MHz.

**York Radio Club.** Meets: 3rd Fri./monthly, 8 p.m., Elmhurst College (Science Bldg.) Elmhurst, IL. Net Mon, 8 p.m. W9PCS/147.42 simplex. Rptr. 442.875

## IOWA

**Central Iowa Radio Amateur Society (CIRAS).** Marshalltown, IA. Meets 3rd Sun./monthly, 6:30 p.m., Community College, Rm. 612, (except July & Aug.) Sun. Net 8 p.m. local 146.88. For more info: WBOZKG, (515) 484-4837.

## LOUISIANA

**Baton Rouge Amateur Radio Club.** P.O. Box 4004, Baton Rouge, LA 70821. Meets last Tues./monthly, 7 p.m., Catholic H.S. cafeteria, 855 Hearthstone Dr. Rptr. 146.19/79 & 28/88. Net Sun., 8:30 p.m., 146.19/79.

**Southwest LA Amateur Rptr. Club, Inc. (SWLARC).** Meets 4th Tues./monthly, 7 p.m. in the Parish EOC Rm. W5B11R 146.073/146.013. Net MWF, 7:30.

## MICHIGAN

**Oak Park Amateur Radio Club.** Oak Park Community Center. 14300 Oak Park Blvd. (same as 9 1/2 Mile Rd., west of Coolidge). Oak Park, MI 48237. 2nd Mon./monthly, 7:45 p.m. Talk-in on our 224.36 MHz or 146.64 MHz.

## MINNESOTA

**Minneapolis Radio Club.** P.O. Box 583281, Minneapolis, MN 55458-3281. Meets 3rd Fri. (exc. June, July, Aug.), Mpls. Red Cross, 11 Dell Place, Mpls, 7:30 p.m. Making waves since 1916. Net 147.03(+), 7 p.m. Mon.

## MISSISSIPPI

**Jackson Amateur Radio Club, Inc.** Meets 3rd Thurs./monthly, 7 p.m., American Red Cross Bldg., Riverside Drive, Jackson, MS 39202.

## MISSOURI

**Gateway To Ham Radio Club, N0DN.** Young hams of all ages. Meets 1st & 3rd Sat./monthly, 1-3 p.m., Sacred Heart Sch., 10 Ann Ave., Valley Park, MO 63088 (St. Louis) Net Sun., 8:30 p.m. 146.94 rptr. Beginners classes, VE exams, Club station & mtgs. Info: Rev. Dave Novak—Fax (314) 225-1952.

**PHD Amateur Radio Assn. Inc.** P.O. Box 11, Liberty, MO 64068. Meets last Tue./monthly, 7 p.m. Gladstone Comm. Bldg. (816) 781-7313, Volunteer Examiner Coordinator.

## NEBRASKA

**The Ak-Sar-Ben ARC of Omaha, NE.** Meets 2nd Fri., 7:30 p.m. at Omaha Red Cross near 38th and Dewey Streets. Main 2M Net Sunday night 0200Z on 146.94R.

**Pioneer Amateur Radio Club, (PARC).** Meets 4th Fri./monthly, 7:30 p.m., Fremont Fire Station, Fremont, NE. ARES net 146.67 19:30 CDT/19:00 CST. Info: Dick Klebe, KB0HEC (402) 721-1326.

## NEVADA

**Frontier Amateur Radio Society, (FARS).** Meets: 3rd Mon./monthly, 7 p.m. Denny's Restaurant across from Nevada Palace, 5318 Boulder Hwy, Las Vegas, NV. Net Mon. 7:30 p.m., 145.39 Rptr. on Black Mountain. Club info, Jim Frye, NW70, 456-5396.

**Sierra Intermountain Emergency Radio Assoc. (SIERA).** P.O. Box 2348, Minden, NV 89423. (702) 265-4278. Meets: 2nd Tue./monthly, 7:30 p.m., Douglas County Lib., Minden, NV. Talk-in: 147.330.

## NEW HAMPSHIRE

**Great Bay Radio Assn., WB1CAG.** P.O. Box 911, Dover NH 03820. (603) 332-9137/332-7343. Meets 2nd Sun./monthly, 7 p.m., Rochester Court House/City Hall. Talk-in 147.57.

## NEW JERSEY

**10-70 Repeater Assn., Inc. 235 Van Emburgh Ave., Ridgewood, NJ 07450.** Meets 1st Wed./monthly (except July & Aug.), 8 p.m., VFW, Valley Rd., Clifton, NJ. Rptrs.: 146.10/70, 223.24/224.84, 449.15/444.15.

**Bergen Amateur Radio Assoc. (BARA).** P.O. Box 304, Hackensack, NJ 07601. Meets 1st Sun./monthly, VFW Post #6699, E6 Winslow Pl., Paramus, NJ. Nets 28.350 Mon. 9 p.m., 144.400 9 p.m. Wed.

**Delaware Valley Radio Assoc. (DVRA).** Meets monthly, alternating 2nd Tues./Wed., 8 p.m., Our Lady of Good Counsel Church, West Upper Ferry Rd. at Wilburtha Rd. in W. Trenton, NJ. W2ZQR/146.07/67. DVRA Ham Hotline (609) 882-2240.

**South Jersey Radio Assoc. (SJRA).** Pennsauken Sr. Hi Sch. at Hylton Rd. & Remington Ave., Pennsauken, NJ 08109. Jan.-Oct. 4th Wed./monthly, 7:30 p.m. Nov.-Dec. 3rd Wed. due to Thanksgiving and Christmas. Talk-in 145.290 rptr. Club call K2AA.

## NEW YORK

**Amateur Radio Assoc. of the Tonawandas, (ARATS).** P.O. Box 430, No. Tonawanda, NY 14120. Meets 3rd Tues./monthly (except July & Aug.), 7:30 p.m., Sweeney Hose Co., 499 Zimmerman St., No. Tonawanda, NY. Talk-in 146.955/355 rptr. W2PVL.

**Genesee Radio Amateurs (GRAM).** N.Y.S. Civil Defense Center, State St., Batavia, NY 14020. Meets: 3rd Fri./monthly, 7:30 p.m. 147.285 + W2RCX.

**Hall of Science Amateur Radio Club.** P.O. Box 131, Jamaica, NY 11415. HOSARC, 2nd Tue./monthly, Hall of Science Bldg., 47-01 111 St., Flushing Meadow Park at 7:30 p.m. For info call Arnie, WB2YXB, (718) 343-0172.

**Orleans County Amateur Radio Club (WA2DQL).** Meets: Office of Disaster Preparedness (CD), West County House Rd., Albion, NY 14411, 4th Wed./monthly, 7:30 p.m., 145.270 – WA2DQL.

**PROS, Pioneer Radio Operators Society.** Meets: 1st Wed./monthly (except July/Aug.) 7 p.m., Masonic Temple, Rt. 78, Java Village, NY. Other Wed., 8 p.m. 145.170/144.57 Repeater KC2JY.

**The Radio Club of J.H.S. 22, N.Y.C., Inc.** WB2JKJ, P.O. Box 1052, New York, NY 10002. 24-hr. hotline, (516) 674-4072, FAX, (516) 674-9600. Non-profit org. using Ham Radio to enhance the education of youngsters, nationwide. Join us – "Classroom Net", 7.238 MHz, 7 a.m. E.S.T. PSE QSL!

**Suffolk County Radio Club.** 3rd Tue./monthly, 7:30 p.m., Bohemia Rec. Ctr., Bohemia, NY. Ruzicka Wy., off Smithtown Ave., approx. 8/10 mi. so. of Veterans Mem. Hwy. W2DQ/R 144.610/145.210, 223.080/224.680, 441.625/446.625 rptrs.

**Westchester Amateur Radio Assoc. (WARA).** Meets 1st Thurs./monthly, 7:30 p.m., Scarsdale Town Hall, Scarsdale, NY 10583. (914) For info call Dan Grabel, N2FLR, Pres. (invited) 723-8625.

**Yonkers Amateur Radio Club (YARC).** Meets 2nd Sun./monthly, 10 a.m., 1st Pct., Yonkers Police Station, E. Grassy Sprain Rd., Yonkers, NY. Info: P.O. Box 378, Centuck Sta., Yonkers, NY 10710. (914) 963-8995. 146.265/865, 445.150/440.150.

## NORTH CAROLINA

**North Carolina Chapter TSRA.** Meets: Mondays, 28.350 on the air, 8:30 p.m. local time, Sat. 10 a.m. on 7240 and Wed. 9 p.m. on 7259. "The Alligators" — all mouth, no ears.

**Stanly County Amateur Radio Club.** P.O. Box 188, Stanfield, N.C. 28163. Meets 4th Thur./monthly, 7 p.m. at Stanly Community College, Albemarle, N.C.

## OHIO

**Ashtabula County ARC.** Ken Stenback, A18S (964-7316). County Justice Center, Jefferson, OH. 3rd Tue./monthly. 7:30 p.m. County Rptr., 146.715.

**Clyde Amateur Radio Society (C.A.R.S.)** Meets 2nd Tue./monthly, 7:30 p.m., Municipal Bldg., Clyde, OH 44811. NF8E Rptr. 447.625/442.625. 444.60 (+5 MHz). Net Sun. 9 p.m.

**Firelands Area Repeater Assoc. Inc.** Meets 4th Tue./monthly, 7 p.m., First Federal Savings of Lorain, Huron, OH. Freq. of Rptr. 146.805/205. Info: Eugene Hutchins, AA8DL, 45 Welton Ave., Norwalk, OH 44857.

**Lancaster & Fairfield County A.R.C.** Meets 1st Thur./monthly, 7:30 p.m., American Red Cross, 121 W. Mulberry St., Lancaster, OH 43130. Info Net every Mon., 8 p.m. K8QIK/R 147.63/03 Rptr.

**North Coast A.R.C.** P.O. Box 30529, Cleveland, OH 44130. Meets 2nd Thurs./monthly, 7:30 p.m. at North Olmsted Middle Sch. cafeteria, 27351 Butternut Ridge Rd., North Olmsted, OH.

**Northern Ohio Amateur Radio Society (NOARS).** Meets 3rd Mon./monthly, 7:30 p.m., Gargus Hall, Rt. 254, Lorain, OH. Info: Rptr. K8KRG 146.70, DX Alert Rptr. 145.15. "Ohio's Largest General Interest Club"

**Springfield Independent Radio Assoc., (SIRA).** Call-in 145.45—224.26. Meets 2nd Tues./monthly, 7:30 p.m., Mercy Hosp. and 4th Tues./monthly, 7:30 p.m., Am. Red Cross. Info: Rodney Myers, KB8WV, (513) 399-1022.

**Toledo Mobile Radio Association.** P.O. Box 273, Toledo, OH 43697. Meets 2nd Wed./monthly, 7:30 p.m., Luke's Barn, Lucas County Rec. Ctr., 2901 Key St., Maumee, OH. WB8HF 147.87/27 Rptr. Rptr. info/swap & shop, Sundays, wkly — 8:30 p.m.

**Triple States Radio Amateur Club.** Meets Wed./weekly on 28.480 at 8:30 p.m.; 7260 at 9 p.m. Rptrs. 146.31/91 and 146.115/715. P.O. Box 240, Rd. #1, Adena, OH 43901. (614) 546-3930.

## OREGON

**Central Oregon Radio Amateurs, (CORA).** P.O. Box 723, Bend, OR 97709. Meets last Thur./monthly, 7 p.m., Bend Senior Cntr., 1036 NE 5th, Bend, OR. Net Sun. 7:30 p.m. 147.06 + MHz. Info call: (503) 382-1685.

**Keno Amateur Radio Club.** P.O. Box 653, Keno, OR 97627. Meets 3rd Thur./monthly, 7 p.m., Keno Fire Station. Rptr. 147.32+ W7UFM. Info: Tom Hamilton, WD6EAW, (503) 883-2736.

**Umpqua Valley Amateur Radio Club, Inc.** 450 S.E. Leland St., Roseburg, OR 97470. Meets 3rd Thurs./monthly, 7:30 p.m., Douglas County Courthouse, Rm. 311, Douglas St., Roseburg, OR. Info: W5PII/R 146.90/30.

## PENNSYLVANIA

**Mercer County Amateur Radio Club W3LIF.** P.O. Box 996, Sharon, PA 16146. Meets 4th Tue./monthly at 7:30 p.m., Shenango Valley Med. Center, Farrell, PA. Net, Thur. 9 p.m. on 147.75/15 W3LIF, Digi. 145.010.

**Warminster Amateur Radio Club, WA3DFU.** P.O. Box 113, Warminster, PA 18974. (215) 672-9985. Meets 1st Thurs./monthly, 7:30 p.m., Neshaminy-Warwick Presbyterian Church, Warminster, PA. Net on 147.690/147.090 Wed. 8:30 p.m. and 28.450 Sun. 9 p.m.

## TENNESSEE

**Nashville Amateur Radio Club.** Meets 3rd Thurs./monthly at Lock 2 Metro Park, located off Pennington Bend Rd. Grilled hamburgers at 6 p.m., mtg. at 7. Info: Jim Lynn, 1621 Jackson Valley Pl., Hermitage, TN 37076.

## TEXAS

**Brazos Valley Amateur Radio Club (B-VARC).** P.O. Box 1630, Missouri City, TX 77459. Meets 2nd Thur./monthly, 7:30 p.m., Sugar Land Community Cntr., 226 Matlage Wy., 3 blks SW of Imperial Sugar Co. at HWY US-90A & Brooks St. (HWY 58) in Sugar Land, TX. Talk-in 145.47, 442.5 rptrs.

**Sun City Amateur Radio Club.** Meets 1st and 3rd Fri./monthly, 7:30 p.m., 3709 Wickham Ave., El Paso, TX. K5WPH 147.240, 443.4 with remote operation on 6M and 10M.

## VIRGINIA

**Southern Peninsula Amateur Radio Club (SPARK).** Meets: 1st and 3rd Tue., Salvation Army Community Bldg., Hampton, VA. Rptrs: 146.13/73 & 449.55/(-5) T. VE Exam Info: (804) 898-8031, WARTZ.

**Virginia Beach Amateur Radio Club, Inc. (VBARC).** Open Door Chapel, 3177 Virginia Beach Blvd., Va. Beach, VA. Meets 1st Thur./monthly, 7:30 p.m. Info on WA4KXV rptr, 146.97/37.

## WASHINGTON

**The Mike & Key Amateur Radio Club.** Meets 3rd Sat./monthly, 10 a.m. Salvation Army Renton HQ., 720 Tobin St., Renton, WA. Talk-in on 146.82 rptr. Doors open at 9:30 a.m.

## WEST VIRGINIA

**Jackson County Amateur Radio Club.** Clark Stewart, W8TN, Pres., 104 Henrietta St. Ravenswood, WV 26164. Meets 1st Thur./monthly, 7:30 p.m., United National Bank of Ripley. Net Mon. 9 p.m. on 146.67/07 WD8JNU/R.

**Tri-state Amateur Radio Assn.** Meets: 3rd Tue./monthly, 7 p.m., Green Valley Vol. Fire Dept., Norwood Rd. & 16th Street Rd., Huntington, WV. ARES net Thur. 9 p.m. on 146.76(-) W8VA/R. Info Bud Cyr, KB8KMH (304) 522-1294.

## WYOMING

**Sheridan Amateur Radio League, 146.82.** 926 La Ciede, Sheridan, WY 82801. Meets 4th Thur./monthly, 7 p.m., Sheridan College Tech. Cntr.; Saturdays, 8 a.m. at J.B.'s Info: (307) 674-6666, WA7B.

## PUERTO RICO

**Puerto Rico Amateur Radio Club.** P.O. Box 360693, San Juan, Puerto Rico, 00936-0693. Meets every Thurs., 7 p.m., Civil Defence, Rio Piedras (next to AMA & San Francisco Shopping Cntr.). Nets Sun. 9 a.m. on 147.090, 28.450 & 7.250 MHz. Info: Raul Escobar, KP4QL, (809) 765-2745 (daytime).

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## BASIC antennas—cheap beams

When many of us think of beam antennas, we often visualize a multi-element Yagi strapped to a tower high enough to scratch the stratosphere. Maybe it's the ads or the magazine covers that glamorize these antennas, and perhaps we feel we really can't compete with the "big guns" without owning one or more of these big radiators.

Yet Yagis aren't the only beam antennas. Whole volumes deal with other designs, from phased verticals to wire beams. This month we'll explore one of the easiest and least expensive of wire beams, the longwire antenna.

Longwire antennas are, as their name implies, *long wires*. Technically, I suppose, the name fits only if the wire is at least one wavelength long at the operating frequency. But such short longwires offer very little advantage; the antenna really shines when the length exceeds three wavelengths, and at 10 or more wavelengths the beam width is relatively sharp and gain figures begin to exceed 7dBd.

Nor do longwires have to be skyscrapers to get their signals out. A lot of old-timers just ran them out their second story windows to a tree or post "way out back." Heights of 30 feet, more or less, were typical and seemed to work fine (the antenna relies less on ground reflections than, say, a dipole or Yagi, so height is not as critical).

And, for a horizontal antenna, the longwire radiates a vertically polarized signal. Yet this doesn't seem to hurt DX, even from distant horizontal antennas, simply because ionospheric reflections will shatter polarization. All in all, it might be fun to experiment with a longwire antenna; maybe even use one with the QRP kit or as a "cheap beam" on Field Day.

## The theory

Most of us are familiar with the half-wave dipoles and the doughnut-shaped radiation fields around them. And, as a dipole is made longer its field changes. A dipole several wavelengths long ex-

hibits a very different pattern—one with a series of radiation lobes and nulls where the doughnut used to be, and most of the radiation is found in the lobe closest to the wire's axis. In ef-

fect, at a number of wavelengths, the doughnut becomes two "scrunched up" ice cream cones (see Figure 1).

Another factor affecting the radiation angle of an antenna is its feedpoint

Figure 1. Radiation patterns around (a) a half-wave dipole and (b) two-wavelength dipole. The major lobes of the longer antenna are cone shaped patterns.

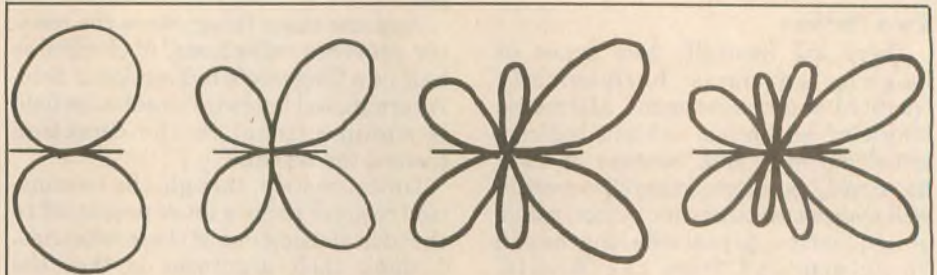
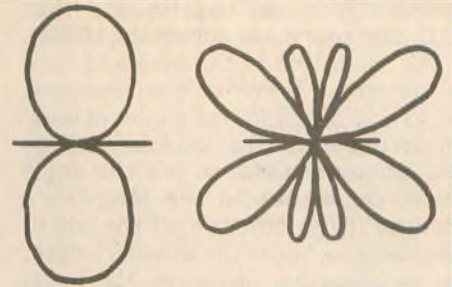
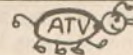


Figure 2. End-fed longwire patterns: (a) half-wave, (b) full wave, (c) 1½ wavelength and (d) two-wavelength.

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Maryann (WB6YSS)

location. The doughnut shaped field of a half-wave dipole is from a center-fed antenna; if the wire were end-fed, the doughnut would be tilted away from the fed end. Figure 2 shows end-fed antenna patterns for several wavelengths (from the experiments that D.C. Cleckner made during the 1940s).

So, the length of the wire and, to a lesser extent, the effect from feeding it at its end determine the angles of maximum radiation. The first lobe exhibits the strongest field, so it's the angle most important to the longwire's design. It can never be off the end of the antenna, but as the antenna length, in wavelengths, increases, the beam width narrows and lies closer to the wire's axis.

## Two flavors

There are basically two types of longwire antennas: harmonically operated and non-resonant. Harmonic longwire antennas exhibit bidirectional patterns and, because of their harmonic operation, generally operate well over a two-to-one (or better) range of frequencies. Actual wire lengths can be determined from the BASIC formula:

$$L = 492 * (H - .05) / F$$

where L is length, in feet, H is the number of half-wavelengths and F is the operating frequency in MHz. The characteristic impedance of the antenna is about 500 ohms.

Non-harmonic antennas also radiate. In the longwire variety, the antenna isn't necessarily non-resonant because of its length, but because it is terminated at the far end with a resistor equal to its characteristic impedance. This resistor prevents current reflections from the antenna's end, thus eliminating standing waves. And without standing waves the antenna becomes very broad-banded—enough so

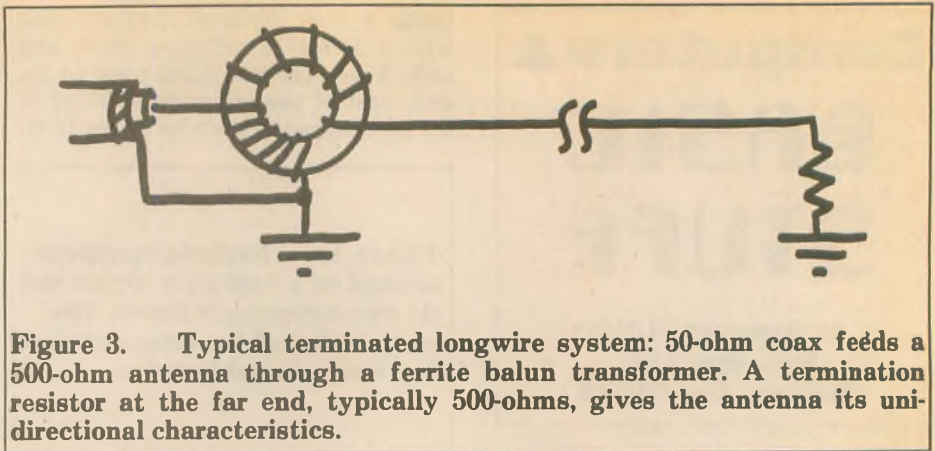


Figure 3. Typical terminated longwire system: 50-ohm coax feeds a 500-ohm antenna through a ferrite balun transformer. A termination resistor at the far end, typically 500-ohms, gives the antenna its unidirectional characteristics.

as to be considered an all-band antenna.

And one other thing: Since the resistor prevents reflections, it eliminates half of a longwire's bidirectional field. A terminated longwire's radiation field is unidirectional in the direction toward the resistor.

Unfortunately, though, the termination resistor turns a lot of people off to the idea of using one of these antennas. I think their argument is that the resistor consumes half of the transmitter's power, so they believe that a terminated longwire is only half as good as it should be. But the power it consumes is not the power going in the forward direction, which is mostly radiated before it gets to the resistor, but rather the power that would normally reflect back from the end. The forward field pattern is unaffected, but the reflected signal is eliminated, and this is what makes the antenna unidirectional. While the harmonic and terminated longwires might not seem to make much difference on transmit, the terminated antenna will dramatically reduce the "back end" QRM on receive.

## The program

This month's generic BASIC listing can help provide fairly reasonable expectations of longwire directivity and gain. The program assumes a terminated longwire antenna about 30 feet above ground and fed from one end. It asks for an antenna length, in feet, and an operating frequency. Lines 40 and 50 examine the field pattern for the first lobe's maximum radiation, and line 60 derives a gain figure. The rest of the program prints the results, then wraps back to ask for a new frequency so you can get a relative idea of the antenna's performance over a number of bands. The program was written in GW-BASIC, but it should be generic enough to run on most personal computers.

```

0 REM: LONGWIRE.BAS, BY KD5DL
10 CLS: INPUT "LENGTH (ft) ",
  L: P=3.1415926#: K=180/P
20 INPUT "FREQUENCY (MHz)",F
  :W=(L*F)/984+.025: A=1: C=0
40 B=ABS(SIN(A/K)*(SIN(W*P*(1-
  COS(A/K)))))/(1-COS(A/K))
50 IF B>C THEN C=B: A=A+1:
  GOTO 40
60 G=INT(100*(.9882*W-.0183*W
  ^2-.485))/100: PRINT: PRINT
70 PRINT "A LONG WIRE ";L;"
  FEET LONG, AT ";F;" MHz, IS
  ";INT(100*W)/100;"WAVELENG
  THS.":PRINT
80 PRINT TAB(7)"EXPECT THE MA
  JOR LOBE AT ";A;" DEGREES"
90 PRINT TAB(7)"AND A GAIN OF
  ABOUT ";G;"dBd.":PRINT:
  PRINT:PRINT: GOTO 20

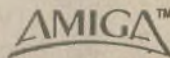
```

Test the program by running it with inputs of 400 feet at 14.2 MHz. You should get 5.79 wavelengths, 21 degrees of tilt and 4.62dBd of gain.

Antenna construction is simple. Although the terminated antenna has no standing waves, an antenna tuner might come in handy to match the 500-ohm characteristic impedance and the radiation resistance mismatch to



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that of the line and rig. A balun, as shown in Figure 4, can match 50-ohm coax to the expected 500-ohm antenna impedance by using a ferrite toroid bifilar wound with a three-turn primary and a 10-turn secondary. Amidon Associates, as well as several other manufacturers, make toroids ideal for this purpose. The terminating resistor should be a non-inductive 500 to 600-ohm resistor capable of dissipating half of the input power. Resistors for

this purpose can sometimes be found at flea markets and from surplus dealers, or you can construct your own by series-parallelizing a number of higher-value lower-wattage resistors.

By the way, the actual impedance of a longwire antenna can be very closely determined by the formula

$$Z_o = 59.93 * \text{LOG}(H/D)$$

where LOG computes the natural (base e) logarithm of the ratio of antenna height, H, above electrical ground and

D, the antenna diameter, where H and D are in the same units. For example, a 1/8 in. diameter antenna wire 30 feet above an electrical ground will show an impedance of 477 ohms.

Happy Holidays from KD5DL. □

## Oops

The BASIC formula for wire size in the October column omitted a functional sign. The corrected formula is:

$$D = .46/92 \wedge (1/39) \wedge (G+3)$$

## Too much time

J.E. McDERMOTT, NS5N

Don't you just love our worldwide system of time? Just think, no matter where you are you can look at the sun high in the sky and say, "Gee, it's just about lunch time." Do we really need a clock for that?

Ever tried to figure out the time tables for buses on long hauls or airline flights? I know it isn't really that difficult, but why should it be necessary at all to have to run through all of those mental calculations in the first place?

One world, one time. Since the beginning Amateurs have had a better grasp of world time than perhaps even the military. For an Amateur who has been on the air on a regular basis, UTC is a way of life. Some of us even wear dual time watches that display both local and UTC. I don't even want to get into the clock manufacturing end of this topic.

We seasonally change our clocks along with our bodies to "Spring Forward" and "Fall back." This only adds to the confusion of the rest of the world. They had been happily synchronized with us for the last six months and suddenly have to figure out if it is an hour earlier or an hour later than it was yesterday.

UTC or Greenwich has been accepted as a reference nearly worldwide. Why not just use that time as a reference? I am sure there would be a lot of opposition at first, but look at the advantages.

It is especially handy for those traveling overseas. If you got on a plane leaving at 1300 UTC and it was supposed to arrive at 1536 UTC, you wouldn't have to ask what the local time would be there or how long the trip was going to take.

There would be no confusion if you knew you were supposed to make a telephone call between the hours of 1600 UTC and 0100 UTC. And it would be easier to avoid any of those embarrassing middle-of-the-night calls about the shells you found on the beach today.

While on Guam Island, 0000 UTC would come at 10 a.m. everyday. At 0200 UTC, or noon, we would start

eating lunch. What is so difficult about that?

Adjustment really wouldn't be that difficult. It is like the old adage of the man who used the string for a weather

gauge: If it was hanging loose, it was a calm day; if it was standing out, it was windy; if it was wet, it was raining; and if it was gone, it was too stormy to worry about the string. —Auto-Call □

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It's hard to believe that two years have passed since the last hand-wringing in public about my "sins of omission and commission." But the calendar doesn't lie so I'd better face up to the constituents and "eat some humble pie."

First, in the way of omission, I must confess that I've failed to be the "weatherman" that some people might have expected from a columnist on propagation. Unlike the folks on TV, I do not cut a handsome figure and, moreover, cannot keep a cool, level voice when excited. And besides, there are plenty of others working that side of the street, from Amateur Radio magazines, weekly DX newsletters and even propagation bulletins on W1AW. With publication of my remarks coming no sooner than two months after they're put on paper, my crystal ball is just not up to that task.

Without saying it in so many words, however, I have alerted you to the fact that the solar cycle is advancing, even declining now. And being the good DXers that you are, you know in your heart of hearts just how the bands shape up, month in and month out.

And in the short term, I didn't try to tie the daily values of the 10.7cm solar flux to actual sunspot numbers. That's just impossible, the variations in one variable against the other being quite remarkable. But on that subject, the real omission on my part is not bringing that data to your direct attention. Maybe I'll sit down, punch

some representative numbers into my computer and show you the result. In some ways, that figure would look like what you'd expect from a chimpanzee dripping paint on a canvas. Stay tuned.

Given the wild pace of computing and falling prices, I have not nagged you about upgrading your old CPU and associated hardware. That was an omission requiring great self-restraint but nobody is mad at me for it. After all, it's your money and you don't need my help in spending it.

Nor have I nagged you about software, especially for propagation predictions. I did intrude on the national scene to the extent that QST tried, at my suggestion, a different prediction format for an ARRL DX contest. That's the way to go, based on ideas that are over 50 years old, but judging by a few reactions, not everybody is ready for rapid progress. Maybe listening to dead bands that are predicted to be open 24 hours a day, even during solar minimum, will get folks moving incrementally in the right direction.

And I didn't hound you about upgrading your antenna system so as to take advantage of the great propagation that was in hand earlier. As you know, antennas are on Kurt Sterba's turf and I stay out of there lest he sink his fangs into my hide. For those who insist in hiding antennas inside their attics or the foliage surrounding their dwellings, all I can do is quote an old curmudgeon I met earlier, "Think what you could do with a real antenna!" In saying that now, I've made up for my omission.

I've continued to ignore the astrological theory of HF propagation. So much for the planets and their conjunctions. But you'll soon see an article of mine that's about the moon, our

satellite, which I think you'll find interesting. So the goddess Diana is getting some attention, but the rest of the astrological signs and symbols are still out in the cold as far as I'm concerned.

Turning to my sins of commission, I have to say that my review of previous columns brings some to mind at once. Take long path DXing; my obsession with that stands out like a sore thumb. Maybe you're tired of hearing about it but it still fascinates me. I went so far as to devote a whole year to LP, nothing else, and writing a booklet about it. You'd think that would get it out of my system. Not so; I'm still on the bands every morning, listening hard for LP and making more notes in my log. But you'll be spared, having suffered enough already.

I've tried to sprinkle my columns with doses of radio history, especially on propagation, thinking that you'd enjoy learning where it all came from. These additions have been largely on the technical side; I failed to treat the more human side that's so well covered in the fabulous book, *200 Meters and Down*, by the late Clinton B. DeSoto. It's an ARRL book and worth every penny you pay for it. And there's no software license that goes

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I must confess to dabbling on the sociological side of Amateur Radio, citing some aspects that might not be apparent to the casual observer. I'm sure there's more to it than I've been able to present and I'd welcome any remarks or examples that you might have to offer, especially those which might serve to reveal or conceal aspects of propagation.

On the technical side, I've presented you with some of the more global aspects of HF radio, foF2 critical frequency maps and a figure showing how the height of the ionosphere varies with location. Implicit in doing that was the assumption on my part that the reader could readily interpret the results and see how they could be used.

But now I'm getting some feedback indicating that's not exactly the case. So I have my work cut out for me in the next two years. If you think about it, I'll be undoing some of the results of the computer revolution, showing the young whipper-snappers some of the rigors that old-timers went through with the global maps and plastic overlays used before PCs came on the scene.

On my agenda for the time ahead, I'd like to extend my reach, dealing not just with the HF (3-30 MHz) bands, but going above and below those frequencies. The ionosphere is involved there, both at VHF (30-300 MHz) frequencies, and at MF (.3-3 MHz) frequencies. Indeed, on the low end of the frequency scale is controlled propagation right down through the low frequency (LF, 30-300 kHz), very low frequency (VLF, 3-30 kHz) and extreme low frequency (30-3,000 Hz) range.

The sun plays both passive and active roles in regard to radio propagation at those frequencies, the active role being related to flare outbursts and their consequences and the passive role related to the diurnal and seasonal variations of solar illumination. And this discussion will not be just in the abstract, as there are Amateur Radio audiences at both ends of the scale—the VHF crowd and the LOFERs down below the broadcast band.

I'd also like to extend the geophysical view of HF propagation and bring more up-to-date material into the discussion. Here I have in mind the present model of the earth's magnetic field, especially at the higher latitudes. To date, I have stayed very close to the classical, pre-satellite era where the model for the geomagnetic field is something like that from a bar

magnet located at the earth's center. In many ways that's adequate for latitudes just below the auroral zones; after that, life gets a bit more involved.

And, of course, there's the real field, measured all over the surface of the earth or by low-earth satellites; that's important for ionospheric purposes. And there's the geophysical trauma that results when shock waves of solar plasma collide with the outer reaches of the geomagnetic field. These have their consequences for HF propagation and we should not only talk about them but recognize them when they show up on the bands.


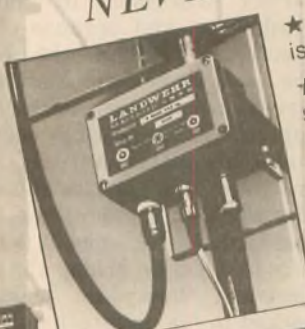
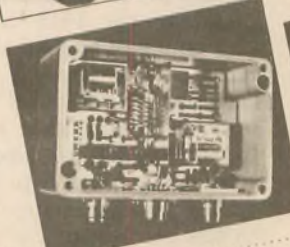
I hope you don't think that I'm going to try making you into a modern-day "rocket scientist," as they say. It's just that with solar minimum coming our way, we'll have more time to think about some of the newer developments and be ready when Cycle 23 shows up on the scene. With the end of that cycle, radio will have its first centennial and even though we're only amateurs, we should be all dressed up for the occasion, intellectually that is.

Let me close with "Season's greetings and my best wishes for a happy new year." 73 to all de NM7M, dit dit. □

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## A sense of values (part one)

ALLEN R. BREINER, W3TI

People who are troubled by the way they see science changing their world today usually single out the technological changes, such as viewing television over reading the newspaper; there is a shift from home-like comforts such as the family gathering around the kitchen stove or living room fireplace. There is a carelessness about what is taking place in the science-politics of the world around us, and it seems there are fewer people who wish to know the how and why of our modern world.

It was back in the mid 1960s while studying for my bachelor's degree at Temple University that one of the professors prodded me into a bit of research regarding the many unanswered questions in the field of early electronic experimentation and exploration. In particular, I wondered about the problems of Galileo, Maxwell, Ampere, George Ohm, and others who were mentioned in the various research materials I had uncovered. What type of instruments or measuring equipment was used by these early experimenters for conclusions taken from their models? Since my profession deals with electricity I have focused many hours of research to this facet.

It was not until the year 1875 that a calibrated system of electrical measurements came about. Just how did these early pioneers in electricity associate, differentiate or confirm that one volt was *one volt*, or that one ampere of electrical current was *one ampere*?

Within the last 40 years a school of philosophy has grown which holds that no statement is meaningful if it cannot be put to the test of factual truth, at least in theory and as applied to the mathematical association of the model, or experiment. There are, however, a number of grounds why logical positivism is not sufficient, as this piecemeal philosophy models itself so as to derive all mathematics, including such difficult ideas as the continuous and the infinite, from a finite number of axioms. Mathematics, as we know it, was built up step by step from a set of particular propositions, and though not wholly

successful, this important work in logic remains a monument to the masters who created it. In the electronics field we honor Maxwell and Faraday for their association of the model to the mathematics.

The positivist philosophers made an attempt to model the picturing of knowledge in the same way as it was built up from pieces of particular fact. But, if mathematics had difficulty in fitting this structure, it is plain that empirical knowledge does not begin to fit. How or what is the means in which we differentiate between a particular fact and its associated mathematics?

I consider James Maxwell to have been one of the greatest theoretical physicists of the 19th century. His discoveries opened a new epoch of science, and much of what has distinguished our world of electronics is due to his work. Because his ideas found perfect expression in mathematical symbolism, and because of his most spectacular triumph, the prediction of the existence of electromagnetic waves, he has often been cited as the supreme example of a scientist who builds his system entirely with pencil and paper. To gain an appreciation of Maxwell's stupendous contribution to this branch of science, it is first necessary to describe briefly the position of electrical theory on which he embarked in his applications.

During the 18th century, Charles Coulomb established the fundamental facts of electrostatic attraction and repulsion. He showed that an inverse law resembling that of gravitational forces applied to electrical charges: Attraction or repulsion between charged bodies is directly proportional to the product of the charges and inversely proportional to the square of the distance between them, as shown in mathematical form by:

$$F = K \frac{q \ q'}{r^2}$$

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F equals the force or the sensation of push or pull upon the material being tested for applied electrical charges, and K is a constant or value given the medium or material through which the force (push or pull) must pass. For example, air has a K value of one (1), while other dielectric materials would increase in numeric value as a constant; q and q' are the charges applied to the materials between two different locations, and r represents the distance between the two materials. This was the beginning, the foundation upon which Maxell was able to build his transitional model from a sense of feel. It was a push or a pull to a mathematical explanation of its concept.

The next major advancement was that of Hans Oersted who, in 1819, found that the flow of electric current through a wire parallel to a magnetic needle makes the needle swing to a position at right angles to the direction of current flow. In other words, he found that an electric current produces a magnetic field around the wire. Andre Ampere advanced this one step further and learned that a coil of wire through which an electric current is passed behaves like a magnet. He also suggested that a magnet owes its property to tiny electrical currents inside the steel core molecules. This was proven later in 1897 by the discovery of the electron by Niels Bohr. Ampere showed how to calculate the mechanical forces between circuits carrying currents from an assumed law of force between each pair of elements of the circuit.

Another of these early fundamental researchers was Michael D. Faraday. He found that an electric current flowing in one circuit can cause (by induction—not known then) a current to flow in another circuit adjacent to it. Faraday's explanation, associated with Maxwell's understanding of this phenomenon, was that imaginary lines of force were running through space as the instrument of electric and magnetic actions taken from the two associated circuits. Maxwell further based the equations on four principles: 1) An electrical force acting as a conductor produces a current proportional to the force applied; 2) An electrical force acting on a dielectric produces displacement proportional to the force; 3) A current produces a magnetic force at right angles to the current's lines of flow and proportional to the intensity of the force.

Have you noticed that there still has been no mention of the use of any type of measuring instruments associated with testing the strength of these "acting forces" or their "intensity"? Thus far all measurements were made



by a sense of feel, or a gravitational pull or push experienced by the experimenter. There had been no mention of voltage until the introduction of the storage battery by Alessandro Volta in 1807.

The first mention of the use of a measuring device was by Faraday in his experiment on 17 October 1831 whereby he thrust a bar magnet quickly into a coil of wire causing the galvanometer needle to be deflected. Luigi Galvani, professor of anatomy at Bologna, Italy, devised the galvanometer around 1780 which was used exclusively by Maxwell, Faraday, Oersted and Ampere for many years. However, none of them had associated its proportional movements in magnetic fields, nor did they associate it with the amount of electrical currents traveling through a circuit.

It can be concluded that none of these early pioneers in the field of electrical experimentation had the availability of measuring instruments to prove their theoretical model. However it should be noted that, at this point in time, they were very close to such actual measuring machinery but failed to recognize its association at the time. Seemingly, the only association of measurement was a notation in 1750 by John Michell of Cambridge, who discovered the inverse square law, previously explained, of repulsion between similar magnetic poles. By suspending a magnet by a thread, Michell brought up another magnet and measured the repulsive force between them by means of the twist or turns imparted to the thread holding the magnet.

Charles Coulomb in 1785 rediscovered Michell's torsion balance, as it was called, and utilized it to prove there was some type of comparison to be made between an electrical force and a magnetic force. Michell's torsion balance was, in fact, some improvement over Luigi Galvani's galvanometer which only showed the presence of a magnetic field and the direction of flow of magnetic flux lines. The torsion balance was capable of presenting a magnetic force into a mathematical model for the first time.

It was not until 1826, when George Simon Ohm, professor of physics at Munich, Germany, set down the relations between potential force (voltage), an electric current, and the resistance in an electrical circuit. He was the first to set up something conclusive or a standard to be added in the science of electricians.

Up until this era, it can be noted that all associations from the mechanical to the mathematical model were dependent upon two of our human senses: sight, or the use of a

visual reading, and feel, or the use of a sense of push or a pull. It was George Ohm who formulated the standard of what *one unit* of resistance in an electric circuit should consist of. The unit bears his name and is called an ohm, or the unit of resistance that prevents or restricts the flow of an electric current. George Ohm concluded that a uniform column of mercury, 106.3 centimeters in length and weighing 14.45 grams, should consist of one ohm electrical resistance. For a more up-to-date example, a #10 gauge copper wire, 0.101 inches (2.6 mm) in diameter, at a given length of 1,000

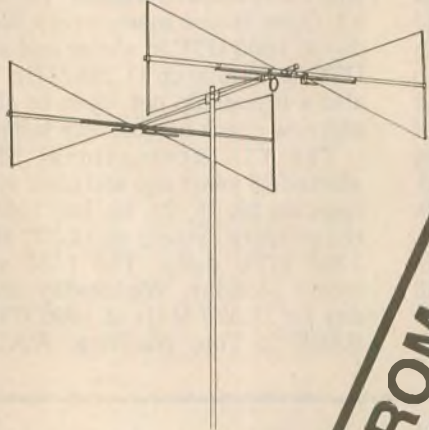
feet shall be equal to one ohm of resistance.

From this beginning, George Ohm further noted that for a fixed voltage, the amount of current through any material depends on the type of material and the physical dimensions of the material. Hence, a material is said to have a resistance of one ohm if a voltage of one volt results in a current of one ampere. Therefore, the ohm can be credited as being the forerunner, the beginning of a calibrated system of electrical measurements in use today.

*To be concluded in our January issue.*

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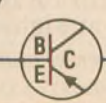
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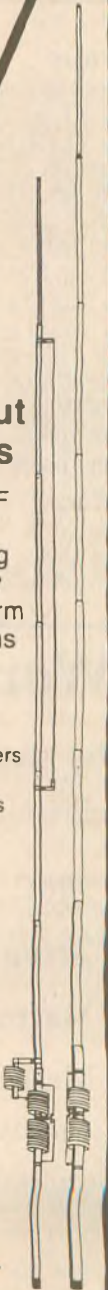
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## YLs on the Air

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### YL nets

Does anyone know when or where the first YL net was established? I know that YLRL had a scheduled YL net in operation on 3.610 MHz in January of 1940, and there were plans underway at that time to start a second net on 7.220 MHz, so the same crystal could be used. The primary purpose of both nets was to give YLs a place to meet so they could get better acquainted and have a chance to talk about things of general interest. In addition to these two CW nets, YL phone nets were added on 160 and 20M and, by June 1940, it was possible to check into a YLRL net any day except Tuesday and Sunday. While none of these nets is still operating, others have taken their place and around the world you can

hear YL nets every day of the week and on all bands.

In addition to the local nets on 2, 40, and 80M, there are several nets with wider coverage. One of the oldest is the YL Tangle Net which meets Thursdays at 1800 UTC on 14.298 MHz. This originally began in the early 50s and received its current name from the net control, Mary Meyer, W9RUJ, in 1956. Mary had YLs checked in from across the country and was battling bad conditions and QRM when she asked a YL to take over "this tangle net" while she went to find some aspirin. The name stayed with the net, but the YL Tangle Net is run smoothly today by Marte Wessel, K0EPE; Dot Bedford, K4AOH; and Sue Ludemann, KA6SOC. This is strictly a friendship net and all YLs are welcomed.

YL Open House is another popular net that has also been running for over three decades. Irma Weber, K6KCI, is the present net control, and she helped organize the net in the late '50s and served as one of the original net controls. Irma is often assisted by other net members and her bird, Squeaks, who has learned to whistle "Hi" in CW. YL Open House meets every Wednesday at 1800 UTC in winter and at 1900 UTC in summer on 14.288 MHz. This is also a friendship net, open to all YLs, and new check-ins are very welcome.

The YL International SSBers started 28 years ago and their systems meet on 10, 15, 20, 40, and 75M, with the primary system on 14.332 MHz at 1200 UTC daily. The 15M system meets Monday, Wednesday and Friday on 21.373 MHz at 1900 UTC. An SASE to Tom Wuelfing, WA1GAG,

will bring full details on all of the YLISSB systems.

The Quarter Century Wireless Women were issued Charter #120 on 1 November 1979 by the Quarter Century Wireless Association, and they meet Tuesdays on 14.295 MHz at 1900 UTC. Maxine Dixon, K4KUU, is the net chairman. They also offer a very nice certificate for working 20 QCWW members.

One of the newer nets is the YL Roses Net, which meets Mondays on 28.433 MHz at 1800 UTC. The YL Roses of Texas club organized this, and the net controls are Ann Benway, KE2US; Joan Pegram, KC6IAK; and Terezinha Felix Cardoso, PT2TF.

There are occasional DX check-ins for all the nets listed above, but the 222 DX YL Net is one of the best places to look for DX contacts. This net meets at 0600 UTC Mondays, on 14.222 MHz, and the net control is Dave Johnson, ZL1AMN. There are usually several VK and ZL YLs, as well as YLs from Europe and North America.

On the local scene, there are many 40 and 80M YL nets around the country. In Ohio, the Buckeye Belles have three nets. Two are on Monday; one is at 1400 UTC on 3.950 MHz, and one is at 0200 UTC on the 146.82 repeater. The Tuesday net is at 0100 UTC on 3.972 MHz. In Indiana, the HAWKS get together on Saturday morning at 1330 UTC on 3.910 MHz.

The Texas YL Round-Up Net (TYLRUN) meets each Thursday morning at 1400 UTC (or 1300 UTC during the summer) on 3.942 MHz. Myrtle Stinnett, WB5FGM, is the net manager. Helen Douglass, W5LGY, is a charter member of TYLRUN, and when she decided it was time to move into a nursing home, she organized an antenna party. She didn't move until the 80M antenna was installed in September, and she checked in right on schedule!

On the West Coast, you might listen for the Ironing Board Net on 7.235 MHz at 1800 UTC (or 1700 UTC in the summer) on Tuesday mornings. The West Coast Round Table meets on the same frequency on Fridays at 1900 UTC. The MINOW Net also meets Fridays at 0800 local on 3.913 MHz.

On the East Coast, SAYLARC holds three nets each week. The CW net is on Thursday at 1400 local, on 3.725 MHz. One phone net meets on Friday at 1300 UTC (1400 UTC in summer) on 3.945 MHz, and the second meets on Saturday at 1300 UTC (1400 UTC in summer) on 7.245 MHz. The Floridoras meet at 1400 UTC on 3.933 MHz, with Thelma Bolvin, WB4AUR as net control.

New YLs are always welcome in the nets, as are the old friends who haven't been active lately. Make it a point to

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**Irma Weber, K6KCI, YL Open House net control.**

find out what's going on in your area and join the group! And let me know if there are other YL nets to be published.

#### DX YLs

Peggy Klinedinst, N0TTJ, just received her master's degree in meteorology, and her first job will be at the South Pole. Peggy will be operating

from KC4AAA for one year, and her QSL manager will be Ruthanna Pearson, WB3CQN. (And Ruthanna certainly knows about QSLs, as she's worked all countries on the ARRL list and has 204 YL countries confirmed, with #205 enroute from Albania.)

Monica Maconi, EL2PP, can often be found around 21.275-21.285 MHz and on the 14.226 DX net. QSL direct to her at P.O. Box 2274, Monrovia, Liberia. Maggie Peters, ZD7SM, is also active on 15M, and her QSL address is P.O. Box 86, St. Helena Island, South Atlantic Ocean.

Lenny Mendel, K5OVC, who has 261 YL countries confirmed at this time, writes that Maureen Martin now holds 3B8GB in Mauritius and that A41LA in Oman is a newly-licensed YL.

Carol Hugentober, K8DHK, was installed as the new president of the Buckeye Belles recently. She also serves as the corresponding secretary of the OH-KY-IN club and as the DX area manager for 10-10 International.

TYLRUN members gathered in Broken Arrow, Oklahoma, in October for the 38th annual birthday party of TYLRUN, and officers for 1993 were elected. The new president is Alma Lang, AB5BA; vice-president is Myrtle Stinnett, WB5FGM; secre-

tary/treasurer is Dorothy Jones, KA5DWR; and publicity manager/historian is Judi Jaksa, N0IDR.

Nellie de Lazard, XE1CI, who completed Five Band WAS with all YL contacts, was delighted when the ARRL did endorse her award 5BWAS-Worked All YLs, which is a first. She holds award #2447.

Vilate Zitting, WJ7M, of Salt Lake City, Utah, is the winner of YLRL's \$1,200 scholarship. Vilate is now attending the Salt Lake Community College and plans to earn a BS in Nursing. Her grade point average is 3.9, and her all-ham family includes her mother, father, five sisters, and four brothers.



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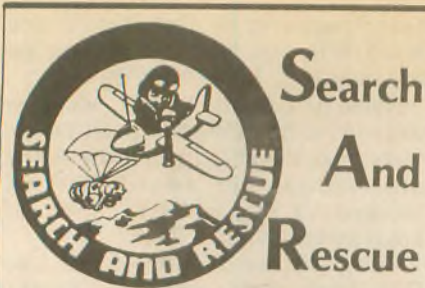
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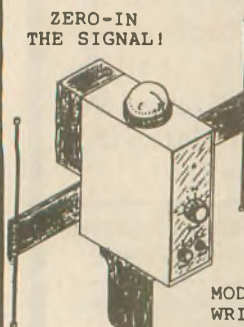
"There is something about nature out of control that touches a primal terror. We are used to believing that we're the masters of our domain. . . . We need this illusion like a good night light. The truth is more fearsome. We are as frail as young trees in tornadoes, and our beloved homes are one flood away from driftwood. . . . When you stand in muddy water that is rising toward your waist and you hear people shouting against the darkness and see their figures struggling to hold back the currents, . . . you realize the truth of it; we will not win, but we cannot give up."

—Robert R. McCammon, *Boy's Life*

I've watched rescue efforts following earthquakes, hurricanes, tornadoes, floods and aircraft crashes and have been profoundly amazed at the dedication and effort that volunteers contribute. Yet, after it's all over, the volunteers seek to be included in future planning and come away empty handed. It befuddles me!

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What's going on? Politicians claim the answer to many of our problems can be found with volunteers. Points of light are given to many for selfless service to others. Yet ask your government (albeit political) office how your skills can be used and you get put on hold.

An editorial in *QST* by a California police chief, Jerry Boyd, KG6LF, hit a resonant chord with his urgings that we now start using our political influence. YES!

The local ARES group tackled one small part of the federal machine recently and it was encouraging. Without getting into specifics, the group was simply told "no." No reasons were given except that the ARES group did not qualify under the rules.

### Don't give up!

"But wait!" said ARES, "Your own materials support our claim." And the answer was still no. Not only no, there was no dialog, no offers to explain, no offers to listen. Just "no." Frustrated, a couple of letters were dispatched to a member of the governor's staff and to a congressman. A call was also made to a very influential (and rich) businessman. We sought to be listened to and given reasons for the rejected application.

Talk about reaction! All the sudden

we were long-lost buddies. We were sought-after friends. We were needed. Our views were important. Please, please come talk to us, said the department head. No longer were we dealing with the hired help. We were being courted by the head honcho and he wanted an audience with us.

The meeting was productive. I hate to think the paper on his desk with congressional and governor seals had anything to do with it. I want to think the phone calls from the influential (and rich) friend didn't cause interest. I'd like to think that ARES (and Amateur Radio) was respected at face value.

Hey folks, get political! Flex some muscle. Get your act together (if it's not already) and stop getting beat up by people who just tell you "no" because you're a volunteer.

Once we had the opportunity to meet face-to-face, we had the chance to review the federal guidelines. Now we're getting somewhere. Armed with a state attorney general's opinion, it looks like ARES might get a "yes." It happened because John Parken, KA7GZH, would not take no for an answer. He knew what his ARES group could do and what would help them do a better job, and he dug his heels in.

### Positive outlook

The final outcome (government wheels turn slowly) may still be a "no." But at least we'll get some reasons. We'll have gone by the book and will feel better about the final answer. If all goes well, ARES and the agencies we serve will gain—lots.

Boyd pointed out in the editorial that Amateur Radio is often asked to participate and the question now is how to use Amateur Radio to maximum advantage. He says it's time to strike while the iron is hot. I agree!

The editorial was aimed at Congress' bills and urged us to solicit support for pending legislation. I think we need to push further. We need competent Amateur Radio operators on emergency planning committees. We need Amateur Radio antennas on our public buildings and in mobile command centers. Seldom is a rescue or disaster depicted in news accounts without a volunteer being a critical participant.

Mankind may not subdue the elements and conquer natural disaster. We will not "win." But as volunteers we will make a difference in the recovery.

### A price to pay

Now, before you pin a medal to your microphone, I must remind you there is a price to pay. Being a volunteer professional means you put in time and effort preparing and spend long hours on the front lines when disaster hits.

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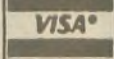
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I call this an "emergency response attitude" and it implies having a view of the total effort needed. This means you include communications, logistics and planning when you plan your mission response with aircraft. This means communications people learn about airplanes if they're part of a flying group. With this kind of understanding you see the need for ALL elements of a response. You know that it's just as important to get your pilots ready for search missions as it is to have planners and communicators.

When the search group is lopsided in their preparations, there is no mission understanding! If the group is a dog rescue team, there *must* be understanding of search elements and how these components fit together for the total effort.

### Total outlook

Understanding requires learning and experience. Learning requires time, and experience requires involvement. Experience means you get out and observe what happens, ask questions, take notes, form ideas and make observations. When your group members have a "total mission outlook" they're motivated. And as group leader you don't have to prod them or threaten them into attending training.

When members are excited about the total mission, they motivate themselves. They seek ways to learn. And how do you get people excited? Simply involve them.

If members participate in planning, in setting directions and in responses, they'll get excited. Conversely, if you want to get rid of someone, just exclude them. Don't ask their opinions and don't listen to their suggestions. They'll eventually go away.

Here's some suggestions. Ask for written opinions. Listen to your members (always listen more than you talk). Limit written policies. Forget writing job descriptions! Encourage members to use their own common sense—let them learn and gain experience.

There is no way you're going to put on paper procedures and policies that will cover everything your group will be asked to do. *No way!* Sure, having a qualification sheet for flying the group's plane is okay, but it should be perceived as the *minimum*. Having a radio operator test isn't the end, it's the *beginning*. Don't allow the attitude that the written word covers everything. It can't!

### Making mistakes is okay

Yet, members who can make smart decisions in a variety of situations are the volunteer professionals you need. These people do make mistakes—they must, in order to learn. They must also

be active and do things regularly. With an attitude toward the whole mission, their efforts on a daily basis will be toward preparedness. Meeting nights are *not* the time to get prepared. That's when you share stories and motivate members to keep ready. Meetings are when you look inward, as a group, and figure out what went wrong in the last effort and what needs to be changed. This is where members share their experiences, and failures, so we can all learn.

Simply put: When your members share a common vision, your job as group leader is to make minor course corrections to keep on track.

### Uniforms?

Is there something wrong with your SAR group having a uniform appearance? I'm not talking clones here, but what's offensive in group identification?

Many years ago as a Cub Scout den leader I observed significant changes in attitude as eight boys obtained uniforms. Pride and effort increased. They couldn't fade into the "unknown" be-

cause they were identifiable. They stood for something because of the uniform they wore. People suddenly expected certain behavior from them.

Watch actions at a crime scene. Honchos are often in plain clothes. Who do people respond to? The uniformed officer. How would you like it if your NFL team wore dissimilar uniforms? How would the quarterback find a receiver?

I think we sell our programs short when "anything goes" as far as visual identification. Shirts or jackets of the same color with a patch or even ball caps with a logo can be a "uniform." And we're off the mark when we argue uniforms are a thing of the past. We respond to uniforms. Walk down the flight line. How many private pilots wear aviator sun glasses? Even that's a uniform. Look around your next club meeting. Notice how many walkie-talkies are clipped to belts? Those are part of our "uniform."

Uniforms, visual awards, clip-on ID cards, decals and patches are all valid for volunteer group consideration. Encourage it!

Until next month, 73. □

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The September QRP column on SATCOM has generated some interesting correspondence from the readership. Overwhelming feedback was extremely positive. However, several readers criticized my comment, "Will QRP ever grow up?" stating that QRPer's had evolved beyond the mere ham radio existence. Some stated further that low-power communicators were much more in tune with the hobby than high-power operators, and how dare I suggest that QRP needed to "grow up"! I think these people missed the entire point of my article. Sigh, here we go again.

For those of you out there who are active in the low-power arena and want to expand your horizons above the mundane "HF, CW, homebrew experience" this column is for you. For the rest of you who are entirely satisfied with your current level of participation in QRP, go back and reread some back issues of *Spark-gap Forever* magazine.

Satellites, the lure of trying to snag signals from space: This is high adventure at its best! Working satellite DX using QRP power levels is tremendously gratifying—right in the same league as QRP DXing on the HF bands. Luckily there are some easily accessible low earth orbit (LEO) satellites that can provide many DX contacts. The nicest thing is that you don't have to mortgage the family farm to get into SATCOM. Most active amateurs own all the gear they need to immediately start in working contacts through the Radio Sputnik series of LEO satellites.

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What is the minimum equipment necessary to access these skyborne repeaters? The "mode" you choose will dictate what equipment you need. Mode A calls for 2M unlink (ground-to-satellite) and 10M downlink (satellite-to-ground). Therefore, to access a Mode A transponder (think of a transponder as an extremely wide band repeater) using a CW signal, you could use a 2M FM rig capable of tuning 145.8-145.9 MHz for your uplink and a standard HF transceiver tuned to 10M (29.3-29.5 MHz) for your downlink. Note: The 2M FM rig would *not* be used for voice communications. By keying the PTT line of the 2M FM radio, you can generate a CW signal. Power output of between 5 and 25W will put a nice signal into the uplink passband of the RS-10 transponder. As long as you can hear your signal in the downlink passband you can be reasonably assured of being able to work your share of QSOs via RS-10.

The SATCOM station at K7YHA consists of a Yaesu FT-726 multi-mode V/UHF transceiver for Mode A. Seldom will I use more than 5W output to a 2M J-pole antenna to access the RS-10 transponder. There are those times, when the bird is low on the horizon (like below 5 degrees elevation), that it will take some additional power (in excess of 5W output) on the uplink signal to stay in the transponder. During these times I will crank the power up in order to stay with the bird.

If you choose to operate RS-12 Mode K (15M uplink and 10M downlink) then all you need is an HF transceiver tuned to 15M to generate a CW or SSB uplink signal and a spare HF receiver to receive the 10M downlink. This mode and bird are quite unique. RS-12 has been on Mode K for most of 1992. The 15M uplink receiver is quite sensitive and responds well to QRP power levels. Using my Ten-Tec Argonaut 509 to generate the uplink signal (a massive

2W on CW) I am able to access the Mode K transponder on RS-12 reliably, as long as the bird is 20 degrees above the horizon. Below 20 degrees, access becomes difficult due to my antennas and their height above ground. Interestingly enough, increasing the Mode K uplink power by 10dBm (from 2 - 20W output) has very little effect.

The transmitting antenna for Mode K at K7YHA is a Radio Works Carolina Window at 25 feet. Receiving antenna is a converted British CB antenna (vertical half-wave) fed at one end, 12 feet above ground. If these antennas were changed out to rotating dipoles or a set of vertical antennas cut for the satellite subbands, then low-angle performance should improve dramatically.

With the amount of SSB CB gear seen at hamfests lately, it would require only a token effort to convert one of these rigs over to the satellite subbands to act as the 10M downlink receiver. In fact, you could probably modify a second CB rig to operate on 15M to provide a Mode K uplink signal. How about using a Tejas RF Technologies (17 South Briar Hollow Lane, Suite 101, Houston, TX 77027) Backpacker-1 QRP transceiver on 15M to access RS-12 in Mode K? Who says that SATCOM operation and homebrew gear are a contradiction of terms?

In my September column, I was lamenting the lack of beginners' information on the LEO birds. Since that column hit print, AMSAT-NA has released a new publication by Gould Smith, WA4SXM, entitled *The RS Satellite Operating Guide*. This is a very informative and well-written publication that explains to the new satellite user the methods used to successfully get on the former Soviet LEO satellites. Smith's writing style is precise and to the point. He gets the maximum information across to the reader in the minimum amount of space. *The RS Satellite Operating Guide* is a must-read publication for anyone desiring a painless way to enter the satellite communications arena. The guide is available from AMSAT-NA, 850 Sligo Ave., Silver Spring, MD 20910 (check with AMSAT-NA for current pricing).

Two other AMSAT-NA publications that might be of interest to the new satellite user are *A Beginner's Guide to OSCAR-13* by Keith Berglund, WB5ZDP, and *The PAC-SAT Beginner's Guide* by Mike Crisler, N4IFD. Both of these publications are geared to the neophyte satellite communicator. Packed with solid information on how to get on and use OSCAR-13 and the new PAC-

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SATs, these two publications will be a welcome addition to the SATCOM operator's bookshelf. Both are available from AMSAT-NA.

Speaking of AMSAT, you may join this organization easily. Dues are \$30 per year and they have a high-quality bimonthly newsletter, *The Journal*, edited by Drew Deskur, KA1M. A small portion of your yearly dues goes to support and mail the newsletter. The remainder goes directly to fund research, development, construction and launch of future amateur satellite projects. Current plans call for a Phase 3D launch in 1995. Costs of this project have escalated to over five million dollars! The Phase 3D project is a multinational effort with emphasis being placed upon replacing the aging OSCAR-13 which will be destroyed by late 1996 due to reentry into the earth's atmosphere.

Of this five-million-plus-dollar price tag, AMSAT-NA is pledged to provide \$1.5 million dollars. Hardly a small sum. AMSAT-NA needs your support. Whether you are an active amateur satellite user, a newcomer to the SATCOM arena or just interested in satellite communications in general, join AMSAT-NA now. It will be the best \$30 you have spent in a long time.

There is one other publisher that provides a unique perspective into the world of satellite communications. R. Myers Communications (P.O. Box 17108, Fountain Hills, AZ 85269-7108), publishes several newsletters of interest to the satellite communicator. In addition they publish a nifty beginner's package which includes a booklet entitled *Have Fun Getting Started on the OSCAR and Weather Satellites!* and a copy of TRAKSAT tracking software for the IBM/PC, for only \$9! The 24-page guide to getting started on satellites is very easy to read, answers many often asked questions and outlines what you *really* need as far as equipment and antennas to start in working through the satellites. The guide covers the microsats, the RS series as well as OSCAR LEO and elliptical orbiting satellites. This offering from R. Myers Communications is a very easy-going approach to the fascinating world of satellite communications.

The *OSCAR Satellite Report (OSR)* for short) is a biweekly newsletter with up-to-the-minute news concerning the world of OSCAR satellites. *OSR* is to the SATCOM community what the *DX Newsletter* is to the DX'er. The news, views, comments and editorials are of interest to everyone engaged in amateur satellite communications. Criticized by some as being "anti-AMSAT," *OSR* provides some real insight into the inner work-

ings of satellite communications and the smoky backroom politics involved with designing, constructing, launching and controlling satellites. Each issue (remember, *OSR* is mailed twice per month) is four pages in length (a total of 96 pages per year) and is chock full of late-breaking information of interest to OSCAR users. Subscription price is \$29 per year.

Publisher Bob Myers, W1XT, provides a forum for satellite users to express their wants, fears, desires, and comments about the current state of affairs of satellite communications in general and AMSAT-NA in particular. Many times the input from *OSR* readers is in conflict with published accounts or policies of AMSAT-NA. When this happens, it is imperative to remember that there are two sides to every story, with the truth lying somewhere in between.

*Satellite Operator* is the second publication from R. Myers Communications that will interest the satellite communicator. *Satellite Operator* is published monthly, consists of 12 pages (144 pages per year) and contains in-depth discussion of satellite topics including OSCAR, SAREX, RS-series and NASA missions. Emphasis is placed upon the background and technical aspects of satellite communications. This publication is geared to the advanced satellite user and also to the SATCOM neophyte who desires to increase his or her knowledge of the *practical* side of satellite communications.

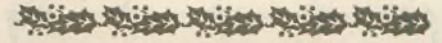
*Satellite Operator* does not duplicate information contained in *OSR*. It is a thoroughly interesting publication that answers lots of questions and provides a wealth of interesting topics. Subscription price is \$33 per year. Bob

offers a special dual-subscription to both *OSR* and *Satellite Operator* for \$56 per year, which is a steal of a deal.

A third publication, *Weather Satellite Report*, by R. Myers Communications is geared to the weather satellite user. Material on HRPT, APT and WEFAX systems, Keplerian data for weather satellites, product reviews, etc., make this monthly newsletter a must-read for anyone interested in weather satellites. Subscription price is \$30 per year.

About the only other thing you need to get active on the satellites is a good tracking program. One of the best (and one of the least expensive) is *TRAKSAT* satellite tracking software for the PC at a cost of \$5, available from R. Myers Communications. I have personally used *TRAKSAT* software for almost a year and find that it is an extremely useful and accurate tracking program. AMSAT-NA also has a large selection of tracking software available for most small computers. Prices are relatively high, but they reflect the level of sophistication of the programs. Proceeds of AMSAT software go directly to the funding of satellite programs.

All that is left is for *you* to take the initiative and get active on the satellites. Good luck and I hope to work you on the birds. 72 and 73, Rich, K7YHA. □



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# CONSTRUCTION

## Heathkit SB220/SB221 input circuit modification

*Because of the danger of electrocution, the following modification should be attempted only by amateurs experienced in electronic projects.*

### FRANK JEROME, W5AT

Driving the Heathkit high power linears to full power with the latest all-solid-state transceivers from JA-land is nearly impossible since the input or matching circuit of the 3-500 tubes is not 50-ohm resistive. The solid-state 100W exciters require a very low standing wave ratio, or the built-in protection circuit shuts down or lowers the output, preventing damage to the output transistors.

The problem can be resolved by making the Heathkit input matching circuit 50-ohm resistive. Increase the Q of these tuned circuits while making the better match. The solid-state exciters prefer the higher Q circuit.

The matching circuit cannot be set or adjusted by using a noise bridge,

antenna bridge or grid dip meter. The readings obtained are not correct. The composite impedance of the 3-500 tube cathodes, the filament choke, and the coupling and bypass circuit require current and voltage to be present. Without current and voltage, the matching circuit gives false readings to this standard-type test equipment.

Because of the safety circuits, the Heathkit linears cannot be turned on with all the covers removed. However, the safety circuits are not foolproof anyway. The safety circuits prevent only the presence of high voltage. The 220 VAC and filament and bias voltage remain in the cabinet. You may get an electrical shock by other voltages with the high voltage shorted out by its interlock.

Test fixture components are: a 2 x 2 in. aluminum piece, a 1 in. aluminum angle 14 inches long, and one 400pF variable capacitor and one 150pF variable capacitor. The sizes of the capacitor settings need to be measured to determine the fixed capacitor size. This requires an instrument such as the Heathkit digital LC bridge, model IT-2240.

Proceed as follows to modify, test and adjust the Heathkit 220/221 linears.

1. Shut the linear off and unplug from the wall outlet.

2. Observe the hv meter position. When the reading declines to zero, remove the outer case. Remove the inner case top and right side.

3. Unsolder the red and yellow high voltage transformer lead connected to a capacitor in the capacitor bank. This lead is easily identifiable. The red lead from the high voltage transformer goes to the lower center of the diode rectifier board. Leave that lead in place. Use electrical tape and positively tape the end of the red and yellow disconnected

lead. Bend away from the other components or tape back out of the way.

4. Place a rear rubber foot under the spring shorting bar in the high voltage circuit. You have disabled the high voltage by disconnecting the red and yellow transformer wire and there is no voltage present. Always observe the hv meter switch position to insure high voltage is absent. Connect a voltmeter at the spring shorting bar area as a double check for the presence of high voltage.

5. Remove the three large front panel knobs and the shaft nut and flat washer on the bandswitch. Fabricate a 2 x 2 in. aluminum piece from scrap metal. Drill a hole in the center to fit the sheet metal screws. Remove the two remaining screws at the front panel, left side, and open the front panel as if it were hinged on the right side. Do not move too fast or too far. Movement is limited by the several wires between the front panel and the linear.

6. After moving the front panel 90 degrees, use one sheet metal screw to attach the front panel in this position. Pass the sheet metal screw through the 2 x 2 in. piece and then through the front panel hole of the tune/SSB switch. Tighten the sheet metal screw into the chassis edge hole nearest the front.

7. Place the bandswitch knob on the bandswitch shaft. Connect a dummy load or antenna to the linear output. The Heathkit must be turned on to obtain the correct reading (the tubes should be lighted). Switch to the proper band or start on 10M. In my case, using a TS-940, select send at the 5W level and observe reflected power or the SWR reading. The linear's changeover relay must close like normal operation. Your exciter should be on your most used frequency or 28.500 MHz.

8. Attempt improving the reading by adjusting the 10M coil slug in the linear. When the SWR cannot be adjusted to less than 2:1, the fixed capacitors of the 10M tuned circuit must be changed to values that allow resonance and proper impedance matching. Turn off and unplug the linear.

9. Fabricate a bracket from a 1 in. aluminum angle piece about 14 inches long. Drill two holes to line up with chassis screw holes nearest the front panel in the left side and center shield. Drill two holes to provide a mounting place for the variable capacitors. The capacitors sizes are 400 and 150pF. The 400pF capacitor mounts above the 80M coil and the 150pF capacitor mounts above the 40M coil. Solder six inches of wire with an alligator clip to each capacitor.

10. Clip the 150pF capacitor to the

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left side ear of the 10M coil. Set the capacitor for minimum value. Turn on the linear. Apply drive and read the TS-940 built-in SWR bridge. Vary the capacitor and adjust the slug for best SWR.

11. Shut off the driver and linear if improvement is not possible. Remove the original fixed 10M 115pF capacitor. Clip the 150pF variable to the left side ear of the 10M coil and test again by turning on the linear and applying drive. Vary the slug and the capacitor.

12. Again shut off the driver and linear if improvement is not possible. Unclip the alligator clip from the left ear of the 10M coil. Remove two turns of coil wire from the coil (easier said than done—all of these coils are fragile and can be destroyed easily). Clip the coil wire at the left side ear and carefully unwind using forceps or other long-reach devices. It may be easier to unsolder the two 22pF capacitors on the right side ear and remove the coil from the cabinet to remove two turns. The coil-to-chassis spring fitting is not easily removed, but that can also be done to remove the two turns.

13. Clip the 150pF capacitor to the left side ear of the 10M coil. Set the capacitor for minimum value. Turn on the linear. Apply drive and read the TS-940 built-in SWR bridge. Vary the capacitor and adjust the slug for best

SWR. The desired result of 1:1 SWR will likely be achieved. The capacitor now has to be measured with the LC bridge. The value should be about 66pF. Install a 66pF fixed capacitor (use three 22pF capacitors in parallel).

14. Turn on the linear, apply drive and read the TS-940 built-in SWR bridge. The results must be the same as the previous step with the variable capacitor.

This completes the modification for the 10M band. The above 14 steps need to be repeated for each of the remaining bands of the SB220/SB221. Some bands will require using both variable

Test for driver SWR and power output. The driver SWR should be nearly 1:1 and SB220/221 output should be 900W-plus on 10M. The performance should be similar on the other four bands.

Figure 1 shows the result of this complex test on all bands. These values put you in the ball park, but you should do the slug adjustment with the front panel open. If moving the slug of the various band coils does not give the desired results, then you have to do all 14 steps on that band.

Note that only the 80M coil is not

Band	Coax side cap.	Coil	Filament side cap.
10M	66pF	remove two turns	44 pF
15M	270pF	remove two turns	180pF
20M	444pF	remove one turn	156pF
40M	1040pF	remove four turns	680pF
80M	1360pF	no change	1300pF

Figure 1

capacitors to obtain the desired results.

After completing testing and adjusting all five bands, remove the test fixture bracket and put the front panel in place. Enable the high voltage by connecting the red and yellow wire of the transformer to the proper place. Assemble the inner top and inner right side covers.

changed. You could begin this modification by disassembling the coils and capacitors and removing the turns first. Reassemble with the above capacitor values. The capacitor values are achieved by paralleling capacitors.

Good luck, and be *very careful* when the covers are off; leave the linear unplugged when doing this modification testing.

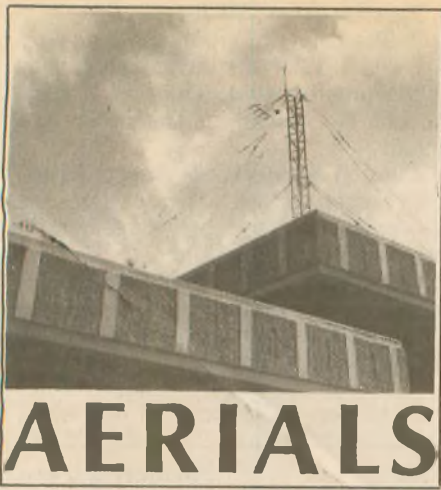
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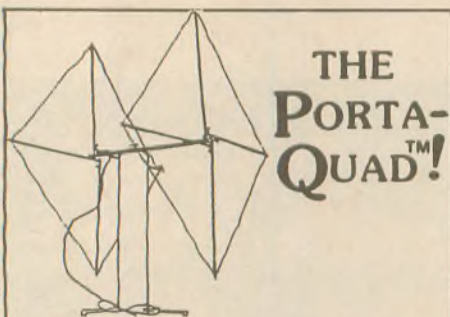


## KURT N. STERBA

There are, among the ranks of our fellow amateurs, those who think you are a real dunce. They believe you are a dolt. Yes, they feel you are dumber than all get-out.

I'm talking about the makers of antennas who insist on making claims that no knowledgeable person would believe. Obviously, these devils have the opinion that they can pull the wool over the eyes of most.

What a revoltin' development. (Those of an age to remember who used to say that, however, will probably not



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be the victims of the charlatans.)

In the most recent issue of one of the hammymags, a new company has come along with a dipole that has a claimed gain of 3dB over a dipole. Hopefully, the company will reap its just desserts by nobody buying one.

Another advertisement for a dipole claims "better DX than a dipole." They, we can only assume, expect you to fall for that. Just how gullible do all these merchants of deceit think you are? Alas, all is not lost. Here comes the cavalry to the rescue.

I quote: "Austin Antenna announces the availability of *free* software to analyze antenna gain. The program uses an aperture algorithm that is highly accurate to calculate maximum theoretical gain of an antenna based on its frequency and physical characteristics.

"Amateurs who are interested in knowing the capabilities of a contemplated antenna before purchase will find this program well worthwhile. The software is IBM compatible and requires VGA graphics. Please send \$5 to cover a 5¼ in. floppy, copying, mailer, postage and handling to Austin antenna, 10 Main St., Gonic, NH 03839."

Then, a letter from Roger Cox, WB0DGF, antenna project engineer at TELEX/Hy-Gain said: "All of our YO and YS input files are available to Amateurs *before* they make a purchase decision. All they need to do is to send me an SASE or a blank MS-DOS formatted diskette. We are not really concerned with our competition copying our HF monoband beam designs, since they could do the same thing by purchasing a product or even just the instruction manual. We feel that if we provide amateurs with accurate, verifiable information, we will benefit with less customer complaints and increased sales and loyalty."

Roger also said: "The 'CA' versions of our monobanders have been de-

signed on *Yagi Optimizer*, verified with other computer codes and measured on our antenna range. We are also now using YS (*Yagi Stress*) to check wind survival. These are both invaluable aids in designing monoband HF Yagi antennas. Plus, our customers can check our design with the same programs on their own computers at home."

What I found most interesting there was the "measured on our antenna range." Hmmm. Not too many others are willing (or able) to say *that!*

Also included were pages of computer printouts of gain at various frequencies in the 15M band, F/B ratios, resistance and reactance figures for their antenna when set up for either broad-band or maximum gain.

Their claim for a 5L Yagi is 7.6dBd. (With my stubby pencil I figured out that the boom length is a tad over one half-wavelength.)

I wish them well. The problem that Hy-Gain is facing is that, in fact, there are some dimwits out there who will look at Hy-Gain's (straight-arrow) figures and say, "Gee, the Pookey-Pookey Antenna Company says they have 2dB more gain with only a 4L antenna. I think I'll get that one instead."

On to a letter (in part) from Hank Scharfe, W6SKC/7: "I have just read *Aerials* and enjoyed it very much. I relearned some of the things I have forgotten in 40 years of hamming.

"When my automatic high-speed antenna tuner committed suicide, I was faced with the prospect of being an SWL for "15 working days." My antenna is a GIL (Grounded Inverted L) and probably contains about 150 feet of wire.

"Although I could hear very well on the bare wire, the 781 would not generate any power to what was probably a very high SWR. The little 'band-expander' tuner in the 781 was of no use at all, so I decided I had to trick the 781 into generating some useable power. I screwed a coaxial T connector into my Waters dummy load. Of the other two ports, one went to the 781 and the other went to the GIL's feedline.

"The power meter on the dummy load indicated 150W on peaks, and the inline SWR bridge indicated the world's finest SWR, 1:1 on all frequencies between 1.8 and 29.7 MHz! Best of all, instant loading.

"I checked into my normal sked and Tucson (60 miles away) gave me my usual 30 over 9 report. Then Yuma (250 miles to the west) volunteered that I was the same old 20 over 9.

Although the power meter in the dummy load was still indicating 150W,

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it was obvious that some power was escaping up the GIL's feedline. The only noticeable difference was that the receiver seemed to be 'quieter.' Being a low-Q lashup, i.e. broad-banded, the residual noise was down. I thought the coupler with a 10 to 20 millisecond tuneup time was fast, but zero tuneup time is faster and more convenient when band-hopping.

"Not wanting the big Waters DL on the operating table all the time, I replaced it with a 15W dummy load from Radio Shack (P/N 21-506: \$21.95). It handles the 150W of the SSB rig without getting hot, since the duty cycle of casual SSB is probably less than 5 percent. For a few dollars more, Ten-Tec and MFJ offer 300W units that will handle 1500W SSB easily."

Now to a letter from Dr. Robert Kurth, W5IRP. He included a photocopy of a page from the 1954 *ARRL Hints and Kinks*. W2CEI related using (on 40M) a length of RG-59/U coax run under the rug on the floor.

## HT battery drain

ED JUGE, W5TOO

When you choose an HT, there's a lot more to consider than just features and power output. One of the least considered factors — and one that can make your final choice either a good one or a bad one — is the amount of use you will get from a battery charge.

What's right or wrong for you depends largely on your intended use. Since packet precludes the use of a battery-saver, even if available, squelch-closed drain is all-important.

If you do lots of listening and not too much talking (normal for most FM operations) then the battery-saver drain is the most important factor in battery life. — *Tandy RAC, Ft. Worth, TX*

HT Mod.	Batt/Save (if avail)	Squelch Closed	Open Sq. 1/2-Vol.
<b>Heath:</b>			
HW-24	4 mA	26 mA	50 mA
<b>Icom:</b>			
IC-2AT	n/a	23	51
IC-2N	n/a	15	46
IC-02AT		60	82
IC-32AT	3	32	55
<b>Kenwood:</b>			
TH-25AT	**	53	60
TH-45AT	**	57	64
TH-41AT		26	80
TR-2500		25	90
<b>Tempo:</b>			
S-4		23	95
<b>Yaesu:</b>			
FT-207	4	45	150
FT-470	13 (1)	56	75
	13 (2)	92	122
FT-33R	6	42	77

(1) Single band receive

(2) Dual-band receive

\*\* Couldn't get good reading

The inner conductor went to the ground side of the transmitter and the shield went to the "hot" or antenna side (opposite of running normally as we do).

Claims were made that instead of the over 30 feet needed for one quarter-wavelength, the velocity factor of the coax required only a run of about 21 feet to be resonant.

This is an interesting idea. I have thought of it but haven't got around to trying it. In my pondering I've wondered if it wouldn't be a workable way of running a shorter vertical but without traps, etc.

Never having actually tried it, I can't really comment. Any real experimenters out there willing to give it a try?

Send in your results. I have fooled around with scaling the Multee (in all the handbooks) down to 20M size. Not bad. And the one that bears more work is a 20M Discone, no, not with the zillion wires in the cage but with just two. I think you'll be pleasantly surprised. If you can't lay in a lot of radials, this is the answer.

And to the YL who wrote in about radials: Get out what you can, and don't fret. Also, what may help is a piece of aluminum a couple feet square right under the vertical, wired to the ground side.

*(Just like the Shadow, KNS knows what evil lurks in the hearts of men. Like the Whistler he wants to come to the rescue of those who need his protection and he speeds to his job like the Green Hornet.)* □

## HIGH-ACCURACY ANTENNA SOFTWARE

**MN 4.5** provides fast and accurate analysis of wire antennas using an enhanced MININEC algorithm. MN corrects fundamental problems in MININEC for improved accuracy. MN features 3-D antenna-geometry and wire-current displays, polar and rectangular plots with overlays, automatic wire segmentation, automatic frequency sweep, symbolic dimensions, skin-effect modeling, polarization analysis, near-field analysis for RF hazards and TVI, current sources for phased arrays, up to 256 pulses for complex models, and pop-up menus. MN 4.5, \$85. MNC 4.5 (much faster), \$110. MNH 4.5 (huge-model option), \$25. GUY 1.0 (guy-wire modeler), \$25.

**YO 5.0** optimizes monoband Yagi designs for maximum forward gain, best pattern, and minimum SWR automatically. YO models stacked Yagis, dual driven elements, tapered elements, mounting brackets, matching networks, skin effect, ground effects, and construction tolerances. YO works from HF to microwave with Yagis of up to 50 elements. YO runs hundreds of times faster than MININEC. YO is calibrated to NEC for high accuracy and has been extensively validated against real antennas. YO is intuitive, highly graphical, and fun to use. YO 5.0, \$100. YOC 5.0 (assembly language algorithm kernel, much faster, coprocessor required), \$130.

**NEC/Yagis 1.0** provides highest-accuracy analysis of Yagi designs with the professional-standard Numerical Electromagnetics Code. NEC/Yagis 1.0, \$50. Coprocessor, hard disk, and 640K memory required.

The MN and YO packages include both coprocessor and noncoprocessor versions as well as comprehensive antenna-design libraries. All programs include extensive documentation. Inquire about commercial licenses. Add 7.25% CA, \$5 overseas. Visa, MasterCard, U.S. check, cash, or money order. For IBM PC, 3.5" or 5.25" disk.

Brian Beezley, K6STI, 507 1/2 Taylor, Vista, CA 92084  
619-945-9824, 0700-1800 Pacific Time

## PREAMPLIFIER



Can't hear the weak ones when conditions are bad? Receiver lacks sensitivity on 20, 15 or 10? Get the world famous Palomar preamplifier. Tunes from 160 to 6 meters. Gives 20 db extra gain and a low noise figure to bring out those weak signals. Reduces image and spurious responses too.

An RF sensing circuit bypasses the preamplifier during transmit. The bypass handles 350 watts.

**Model P-410X (for 115-v AC) or Model P-412-X (for 12-v DC) \$179.95. Model P-408 (SWL receive only for 115-v AC) \$159.95.**

Add \$4 shipping/handling in U.S. & Canada. California residents add sales tax.

## LOOP ANTENNA



Loops pick up far less noise than other antennas. And they can null out interference. Palomar brings you these features and more in a compact desktop package. The wideband amplifier with tuning control gives 20 dB gain. Plug-in loops have exclusive tilt feature for deep nulls. Loops are available for 10-40 kHz, 40-150 kHz, 150-550 kHz, 550-1600 kHz, 1600-5000 kHz and for 5-16 MHz.

**Model LA-1 Loop Amplifier \$99.95. Plug-in Loops (specify range) \$89.95 each.**

Add \$4 shipping/handling in U.S. and Canada. California residents add sales tax.



Send for FREE catalog that shows our complete line: Noise Bridge, SWR Meters, Preamplifiers, Loop Antennas, Baluns, VLF Converters, Keyers, Toroids and more.

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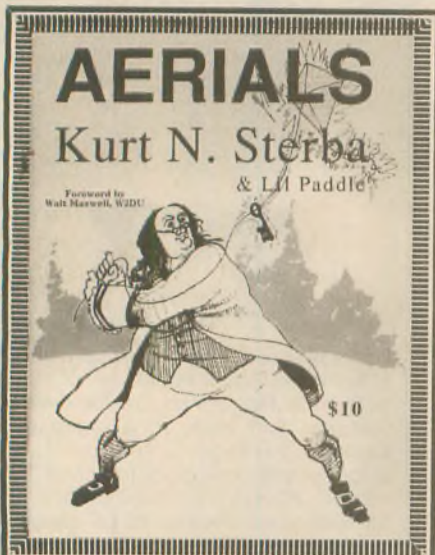


## Arizona

THE SUPERSTITION ARC will hold Hamfest 1992 all day 5 December at Mesa Community college in Mesa. Features include equipment displays, swap meet and drawings for equipment. Admission is \$2 per car. Commercial \$10, sellers \$5. Talk-in on 147.120 (+.600), 146.84 (-.600). Contact Bill Howes, KG7XB, 718 N. 94th St., Mesa, AZ 85207; 602/380-4839.

## California

THE LIVERMORE ARC is sponsoring a monthly swap meet on the first Sunday of each month from 7 a.m. to 12 p.m. at Las Positas College. Features include covered spaces in event of rain, free parking and refreshments.



*I've read it four times and I laughed every time.*

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*This book taught me a lot and I've held a license 57 years.*

—K6FO

*Certainly this book will win the Nobel for Science.*

— N6WR

*Obviously the antenna book of the decade.* — W8IXO

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Admission is free. Vendors \$10 space fee. Talk-in on 147.045+ from the west and 145.350- (100Hz) from the east. Contact Noel Anklam, KC6QZK, at 510/447-3857 evenings or leave message days at 510/783-2803.

## Maryland

THE GODDARD ARC AND TRI-COUNTY ARC are sponsoring HolidayFest '92 to benefit Prince George's County Maryland RACES/ARES on 6 December from 8 a.m. to 4 p.m. at Prince George's Community College in Largo. Features include symposium presentations, CW speed challenge contest and free VE exams. Admission \$4. Tables \$20. Talk-in on 147.180-, 146.520 simplex. Contact HolidayFest '92, Box 1037, College Park, MD 20740; 301/572-2362.

## Michigan

HAZEL PARK ARC is holding their 27th annual Swap and Shop on 6 December from 8 a.m. to 2 p.m. at Hazel Park High School. Free parking. Admission \$3. Tables \$12 in advance. Talk-in on 146.64- (DART). Contact HPARC, Box 368, Hazel Park, MI 48030.

## Minnesota

THE ANNUAL COURAGE CENTER HAN-DI-HAM WINTER HAMFEST will be held 5 December from 8:30 a.m. at the Eagles Club in Faribault. Features include a Handi-Ham equipment auction, lunch and program. Talk-in on 19/79. Contact Don Franz, W0FIT, 1114 Frank Ave., Albert Lea, MN 56007.

# Contests

## Minnesota Frostbite

The Minnesota Frostbite Falls Beach Party, sponsored by the St. Paul Radio Club, will be held from 1800Z, Saturday, 2 January, through 0600Z, Sunday, 3 January 1993.

**Object:** Minnesota stations work as many non-MN stations as possible; non-Minnesota stations work as many MN stations as possible.

**Frequencies:** CW: 3.540, 7.040, 14.040, 28.040, 3.690, 7.140, 21.140, 28.140 +/-; SSB: 3.850, 7.250, 14.250,

21.350, 28.350 +/-.

**Procedure:** CW: call "CQ BP;" phone: "CQ Beach Party."

**Exchange:** Minnesota stations: county, current temperature in celsius; Other stations: ARRL/CRRL section, current temperature in celsius.

**Awards:** Various awards will be given.

**Logs:** For log sheets or further information, send SASE to Jay Bellows, K0QBE, 3420 Golfview Dr., Eagan, MN 55123.

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1993 Calendar measures 11"x22" when opened, and is spiral-bound to hang or lie flat. Has 12 large, full color photos. Three-color printing on high quality paper for Calendar body. 32 pp. total.

## Ham Photo Calendar

A contest and DX-oriented calendar combining color photos and radio event dates. Ideal seasonal gift for your ham friends.

- Photos of amateur radio operators and activities, including: VP8SSI, KP1/NOTG, ZA1A, JA7FWR, FT4WC, AA2U
- Dates and times for over 100 operating events, info sources.
- 1993 radio propagation tutorial by Chod Harris, VP2ML
- Radio and physics historical dates, plus commemorative feature by Tom Lewis, author of "Empire of the Air".
- Lunar, solar, meteor shower data, plus all U. S. & Canadian public and popular holidays.

To order your calendars, send \$12.95 ea. (or \$11.95 ea. when ordering 3 or more). For each address in U. S., Canada or Mexico, add \$2.50 for the first Calendar, plus \$0.50 for each additional. Overseas (air mail), add \$6.00, plus \$2.00 each add'l. Asia, Africa, Pacific, add \$7.00 plus \$3.00 each add'l. Call for quantity 10 "club pack" discount: 603-673-4100.

**KB1T Radio Specialties, Box 1015-W, Amherst, NH 03031**

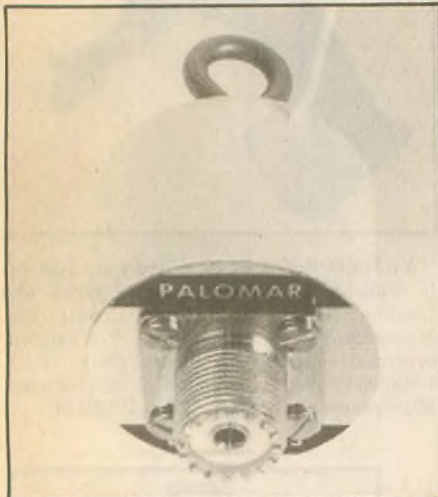


**NEW PRODUCTS**

Information in "New Products" is supplied by the manufacturers to acquaint *Worldradio* readers with new products on the market.

## Palomar baluns

Palomar Engineers announces its new Magnetic Longwire Balun. This new device solves the major problem of long random wire antennas: noise pickup on the feedline. The longwire is usually up in the clear above



household noise sources, but the single wire connecting the antenna to the radio comes down near the computers, light-dimmers, television sets, fluorescent lights and other sources of noise.

Palomar's Magnetic Longwire Balun™ connects at the antenna and allows use of shielded coaxial cable between the antenna and the radio. Coaxial cable does not pick up the noise and thus gives much quieter reception in noisy locations.

The balun is for reception only and works from 500 kHz to 30 MHz. An eyebolt on top of the balun is used to support it from the antenna's end insulator. A teflon insulated wire on the side connects to the antenna. An SO-239 connector is provided for the coaxial cable (not supplied). The balun is completely weatherproof and requires no electrical power.

Model MLB-1 is available for \$39.95 plus \$4 shipping in the US and Canada.

Palomar also has a new addition to their balun transformer line, the UU series Ununs (unbalanced to unbalanced transformers).

The Ununs match 50-ohm coax to unbalanced loads such as Beverage antennas, folded verticals, etc. The UU series are

available to match loads of 75, 100, 150, 200, 250, 300, 375, 600 or 800 ohms at power levels to 350W PEP in the frequency range 1.8-30 MHz. Price is \$26.95.

For further information on these baluns contact Palomar Engineers, Box 462222, Escondido, CA 92046; 619/747-3343; FAX 619/747-3346. □

## MFJ 5W 20M CW TR

MFJ Enterprises, Inc. announces a neat go-anywhere 5W 20M CW transceiver that is small in size and big in performance, and priced at only \$179.95.

The new MFJ-9020 is perfect for radio amateurs everywhere. It covers 14.000-14.075 MHz with a stable 5W output transmitter, superheterodyne receiver, RIT, audio-derived AGC, adjustable semi break-in, CW sidetone, and built-in speaker plus earphone jack. This compact transceiver measures only 2.25 × 6



× 6.50 inches, has a razor-sharp eight-pole crystal filter with 500 Hz bandwidth and Vernier tuning to give the performance of a "big rig." It operates from 12-15VDC and fits in a briefcase with plenty of room to spare.

The MFJ-9020 is great for traveling, vacationing, and QRP DXing. It is an outstanding performer you will enjoy for many years operation on Amateur Radio's all-time favorite band of 20M CW. A QRP delight!

An optional MFJ-726 plug-in narrow CW filter (audio type) is available for \$29.95. An optional MFJ-412 plug-in Curtis-chip keyer is also available for \$39.95.

It comes with MFJ's one full year unconditional guarantee. For more information or to order, contact any MFJ dealer or MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762; 601/323-5869; FAX 601/323-6551; or order toll-free at 1-800/647-1800. □

## Ham View software

PDK Co. has announced an extensive line of MS Windows based software and hardware; Ham View Products include separate but integrable programs for logging, packet and rig control. The Ham View Product line also includes rig interfaces for Yaesu, Icom and Kenwood.

The *Log View* program provides powerful, fast, unlimited real-time QSO entry and database windows, extensive award tracking, real-time and batch QSL management, contest modes, keyboard keyer and more.

*Pack View* has been designed to provide fast point-and-shoot DX spot selection and communicates spot information to *Log View* and *Rig View* for automatic log information and rig tuning. *Pack View* has 48 operator configurable buttons that can be programmed with commands for your TNC or bulletin board. *Pack View* comes with the on-

# HTs, HTs, HTs ...



**FT-411 SERIES. MAXIMUM SINGLEBAND PERFORMANCE.**  
2-meter FT-411 and 440 MHz FT-811. 49 memories. Dual VFOs. PL encode/decode. DTMF autodialer (10 memories, 15 digits each). Auto repeater shift. Scanning features. Auto power-off. Battery saver. Extended receive. Audible command verification. Keypad and rotary-dial frequency entry. Many battery packs available, from 2.3 to 5 watts. More.

FT-411/811

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ly Morse code announce feature that keys your PC speaker with the latest DX spot call sign. Extensive filter options allow you to select only desired spot information.

*Rig View* programs come in three different models, each supporting a different rig manufacturer. Each model has been customized to take advantage of the different manufacturers' capabilities while providing a constant interface with both *Pack View* and *Log View*. *Rig View* features include 48 operator configurable buttons that can be programmed with manufacturer defined commands, six control knobs that turn your mouse or trackball into a tuner encoder, a large frequency and status display and many other convenience features for operating your rig.

Ham View Products rig interfaces, called Plus 232, can be used with any one of the three major rig suppliers. The Plus 232 is a low power (50mW) active cable that connects your rig to your computer's RS232 port. The Plus 232 has been carefully shielded to provide protection against RF interference; it can be run from 7.5V to 15V (AC or DC).

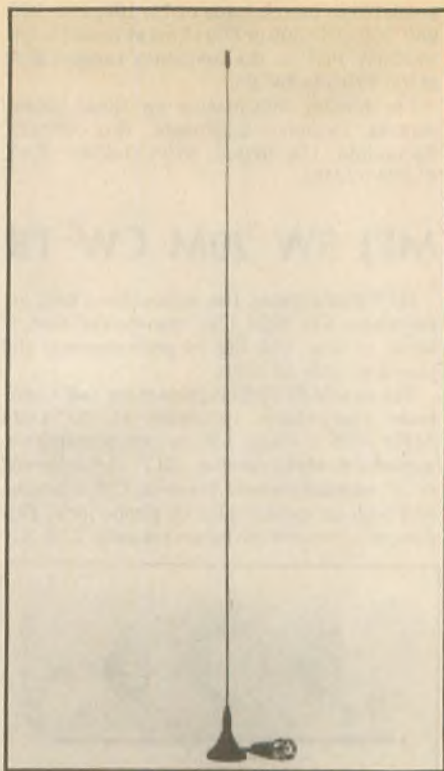
All Ham View products are supported through both voice and data telephone lines.

Ham View Product prices are: *Log View*, \$85; *Pack View*, \$35; *Rig View*, \$35; Plus 232, \$49.95. Ham View Products can be purchased through PDK Co., 46 Oak Street, Dunstable MA 01827; 508/649-4360. □

## Pro Am mobile antennas

Pro Am, a division of Valor Enterprises, announces a hot new trio of designer-type VHF/UHF mobile antennas: the 2M MM144, 70cm MM450 and the dualband MM240. These new ultra trim magnet mount antennas feature a slender black chrome whip and small candy kiss-size base that is barely visible on an auto's roof. The 1 1/2 in. base is fitted with a newly developed titanium magnet which is several times stronger than a regular magnet.

Pro Am's 19 in. tall MM144 2M and 6.5 in. tall MM450 70cm monoband antennas use always-popular quarter-wave whips for good range and ease of slipping into parking garages. The 19 in. tall MM240 2M/70cm dualband antenna uses a quarter-wave

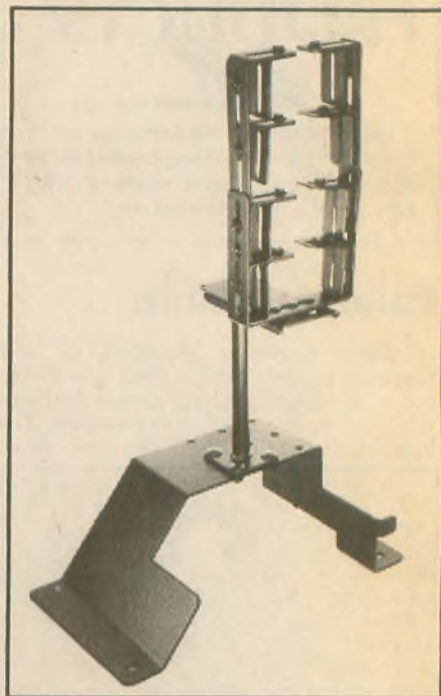


radiator for 2M and 1/2 wave radiator for 2dB gain on 70cm. All models are fully assembled, pretuned, and supplied with eight feet of RG-174 coax plus BNC connector. They cover 144-148 and 430-470 MHz with low SWR and handle up to 25W.

These new micro magnet antennas are made in the USA and built to last through many years of rigorous mobile service. They are available from Amateur Radio dealers nationwide and are backed with Pro Am's one-year warranty. For more information contact Pro Am, 185 West Hamilton St., West Milton, OH 45383; 513/698-4194; or order toll free at 800/543-2197. □

## Gamber-Johnson mounts

StackMaster multiple unit mounts for mobile communications equipment are now available with No Holes Bored bases. These mounts, which hold up to four pieces of equipment, can be installed without drilling holes in the vehicle floor.



No Holes Bored StackMasters are currently available for Chevy Camaro, Caprice, and Lumina Sedan, and Ford Crown Vic, Mustang, Tempo, and Taurus. For detailed information, call 1-800/456-6868; FAX 1-800/934-3577, or contact Gamber-Johnson, 801 Francis St., Stevens Point, WI 54481. □



**SUPER VR85 — OSCAR Satellite Tracking Program For The Commodore 84.**

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## Collins radio videos

Two new videos for the Collins enthusiast were introduced at the '92 Dayton Hamvention. One of the videos covers the most popular models of the famous Collins S line, the 75S-3 and the 32S-3. The other video takes a look at the 30L-1 linear amplifier. Both videos follow the now well-known style of the first Collins radio video, The KWM-2 video. The 75S-3/32S-3 Video is 3½ hours long and the 30L-1 Video is one hour long. Both cover everything from basic operation to complete modification and alignment. These videos contain loads of important information that every Collins S line and 30L-1 user will find indispensable!

As with the KWM-2 Video, world renowned Collins radio expert Dennis Brothers, WA0CBK, reveals the inner workings of these very popular rigs. With almost 30 years of continuous experience with Collins radio equipment, starting with his 13 years at Collins, Dennis has unique insight into this equipment.

Floyd Soo, KF8AT, of Hi-Res Communications, Inc., an avid Collins radio admirer, works closely with Dennis to produce highly informative reference materials to help other Collins radio operators in using and maintaining their equipment.

With three complete videos covering some of the most widely used Collins radio equipment, and a fourth covering the history of Collins amateur gear from its infancy, this set of videotapes is destined to become as much a classic as the equipment itself!

These videos are available directly from: Dennis Brothers, WA0CBK, West. Neb. Electronics, HC-84, Box-1, Potter, NE 69156; 308/879-4552; or from Floyd Soo, KF8AT, Hi-Res Communications, Inc., 18464 Ash Creek Dr., Mt. Clemens, MI 48044; 313/228-1600. □

## Innova DC Power Pack

Innova Electronics introduces the DC Power Pack, a 12VDC cordless, rechargeable power pack designed for a wide variety of ham radio applications. With a suggested retail price of \$79.95, this convenience-oriented product is now available to ham radio retailers throughout the US and is currently carried by Ham Radio Outlet.

The DC Power Pack has a 6.5 Ah rechargeable battery that can power a handheld for up to 36 hours. The innovative modular product design is both attractive and easy to carry. An entire line of modular accessories will be available this year, enabling customers to personally accessorize each DC Power Pack to their specific needs. All accessories are mounted by simply sliding the attachment onto the side mounting brackets.

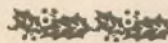
The entire DC Power Pack unit measures 7 x 10 x 3 inches and weighs only seven pounds. Each unit comes complete with a built-in male plug for recharging and a handy shoulder strap. The product is for use with any 12VDC negative ground system or battery. The unit can be easily recharged through the cigarette lighter socket of any running automotive or marine vehicle (one to three hours recharging time); or through an optional AC/DC adapter or solar panel (eight to 10 hours recharging time).

In addition to DC Power Pack, Innova manufactures Power Charger, a 15V, 10A cordless battery charger designed for charging other battery packs. Also available from Innova are a number of accessories for use with the DC Power Pack including the DC Power Iron, a 12VDC, 45W portable soldering iron which heats up to 600 degrees within 45 seconds.

All Innova products are covered by a one-year limited warranty. For more information



on the Innova product line, contact Innova Electronics Corporation, 17287 Mount Herrmann St., Fountain Valley, CA 92708; 714/241-6800 or call tollfree 800/544-4124. □



## ARRL Handbook

The ARRL Handbook for the Radio Amateur has been the indispensable reference and projects book for the ham radio operator, engineer and technician since the 1920s. The 70th edition, with its new projects and updated theory explanations, maintains its hard-won reputation as the one book that covers everything related to Amateur Radio and radio electronics.

The Handbook's 39 chapters cover electrical fundamentals, radio principles, modulation methods, radio-wave propagation, construction techniques, test equipment, operating aids and interference—and much, much more.

New to the 1993 edition: 4.5 - 25V, 2.5A precision power supply; gel-cell charger that also works for all lead-acid batteries; expanded discussion of color and computer slow-scan television; comparison of propagation-prediction programs; a low-cost HF frequency counter; the ChipTalker, a voice "memory keyer"; a receiver spectral display using digital signal processing; discussion of feedback-loop design; discussion of simple wire antennas and baluns; an on-glass VHF/UHF antenna project; updated list of parts suppliers.

Copies of the book (order #1700) are available from most Amateur Radio dealers or from ARRL publication sales (\$25 plus \$4 shipping), 225 Main St., Newington, CT 06111; 203/666-1541. □

## BALUNS



For beams 3-30 MHz, 6 Kw PEP 1:1 or 4:1 ratio. Model BA-2000 \$89.95



For rhombics, etc. 6 Kw PEP 2-30 MHz, ratios from 1:1 to 12:1. Model MB \$165.00



For dipoles 3-30 MHz, 6 Kw PEP 1:1 or 4:1 ratio. Model 2K \$84.95



1.7-30 MHz, 3 Kw PEP, 1:1 or 4:1 ratio. Model 1K \$49.95



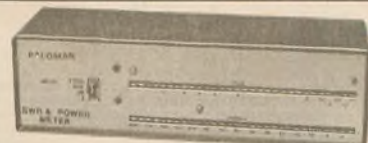
1.7-30 MHz, 350w PEP ratios from 1:1 to 16:1. Model PB \$26.95 Model UU \$26.95



For high SWR applications—tuners, multiband dipoles. 2 Kw CCS @ 10:1 SWR, 1.7-30 MHz, 1:1 or 4:1 ratio. Model SB \$79.95

Add \$4 shipping/handling in U.S. & Canada. California residents add sales tax.

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- Shows PEP output directly, accurately, instantly.
- No "Cal." control. It's automatic.
- Shows SWR while transmitting — even on SSB.
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# When will AMSAT-OSCAR-13 be in range?

## ROSS FORBES, WB6GFJ

Those just starting out in the world of OSCAR communications would like to know when they can hear a satellite. The following charts are produced to give you a rough idea as to when OSCAR-13 will be within range of your location. The three charts as printed are centered on the following geographic locations: East = New York City; Mid = St. Louis, MO; West = Reno, NV.

As you read the chart nearest your location,

keep in mind the following details — all dates and times are given in UTC. The date is printed on the left hand column and the UTC hour along the top.

A dash mark indicates the satellite is out of range and therefore not able to be heard. The letter "B" indicates OSCAR-13 is audible at that location and signals should be heard between 145.810 and 145.880 MHz (SSB and CW). A letter "O" indicates the satellite is audible, but the only signal you will hear is the

telemetry beacon on 145.810 MHz. The letter "L" indicates the satellite is audible but you will hear signals between 435.650 and 436.000 MHz (SSB and CW).

Remember, if a letter is printed on the chart, you should be able to hear OSCAR-13.

For more information about OSCAR, please send a SASE to either of the following: Project OSCAR, P.O. Box 1136, Los Altos, CA 94023-1136; AMSAT-NA, P.O. Box 27, Washington, D.C. 20044. □

Station East	HOUR - UTC
	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
1/01	-----B-----
1/02	-----B-----
1/03	-----B-----
1/04	-----B-----
1/05	-----B-----
1/06	-----B-----
1/07	-----B-----
1/08	-----B-----
1/09	-----B-----
1/10	-----B-----
1/11	-----B-----
1/12	-----B-----
1/13	-----B-----
1/14	-----B-----
1/15	-----B-----
1/16	-----B-----
1/17	-----B-----
1/18	-----B-----
1/19	-----B-----
1/20	-----B-----
1/21	-----B-----
1/22	-----B-----
1/23	-----B-----
1/24	-----B-----
1/25	-----B-----
1/26	-----B-----
1/27	-----B-----
1/28	-----B-----
1/29	-----B-----
1/30	-----B-----
1/31	-----B-----

Station Mid	HOUR - UTC
	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
1/16	-----B-----
1/17	-----B-----
1/18	-----B-----
1/19	-----B-----
1/20	-----B-----
1/21	-----B-----
1/22	-----B-----
1/23	-----B-----
1/24	-----B-----
1/25	-----B-----
1/26	-----B-----
1/27	-----B-----
1/28	-----B-----
1/29	-----B-----
1/30	-----B-----
1/31	-----B-----

Station Mid	HOUR - UTC
	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
1/01	-----B-----
1/02	-----B-----
1/03	-----B-----
1/04	-----B-----
1/05	-----B-----
1/06	-----B-----
1/07	-----B-----
1/08	-----B-----
1/09	-----B-----
1/10	-----B-----
1/11	-----B-----
1/12	-----B-----
1/13	-----B-----
1/14	-----B-----
1/15	-----B-----

Station West	HOUR - UTC
	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
1/01	-----B-----
1/02	-----B-----
1/03	-----B-----
1/04	-----B-----
1/05	-----B-----
1/06	-----B-----
1/07	-----B-----
1/08	-----B-----
1/09	-----B-----
1/10	-----B-----
1/11	-----B-----
1/12	-----B-----
1/13	-----B-----
1/14	-----B-----
1/15	-----B-----
1/16	-----B-----
1/17	-----B-----
1/18	-----B-----
1/19	-----B-----
1/20	-----B-----
1/21	-----B-----
1/22	-----B-----
1/23	-----B-----
1/24	-----B-----
1/25	-----B-----
1/26	-----B-----
1/27	-----B-----
1/28	-----B-----
1/29	-----B-----
1/30	-----B-----
1/31	-----B-----

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# VE exam schedules

As a service to our readers, Worldradio presents a feature listing those VE exams, times and locations which are sent to us. Please remember that our deadline for publication is three months in advance. For example, if your VE group is scheduling an exam for September, please have the information to us by mid June. Worldradio, 2120 28th St., Sacramento, CA 95818.

Please mark the envelope "VE Exams."

List the location, any information examinees should have (advance registration, etc.) and the name and telephone number of a person to contact for further information.

p/r=pre-register

w/i=walk-in

Date	City	Contact	Notes	Date	City	Contact	Notes
<b>Alabama</b>				<b>Missouri</b>			
Dec. 19	Tuscaloosa	Kelly, WD4DAT 205/339-7882	w/i OK	Jan. 2	Hillsboro	WD0GDY 314/671-4243	p/r only
<b>Arizona</b>				Jan. 16	St. Louis	N0IS 314/892-4434	w/i OK
Jan. 2	Tucson	Joe, K7OPX 602/886-7217	w/i only	Jan. 9	Sullivan	N0GLN 314/764-2777	p/r only
Jan. 19	Tucson	Robert, WV7P 602/577-1050	w/i OK	<b>Nevada</b>			
<b>Arkansas</b>				Dec. 19	Reno	K7HRW 702/827-8450 day, or 702/972-3933 night	p/r 30 days prior, w/i OK
Dec. 19	Little Rock	Chuck, KI5HA 501/888-7517	w/i OK	<b>New Jersey</b>			
<b>California</b>				Dec. 19	Bayonne	WA2QYX 201/451-9471	w/i OK
Dec. 19	Downey	KA3DSE 213/923-5598	w/i	Jan. 9	Cranford	24-hr hotline: 201/377-4790	
Jan. 30	Fairfield	Jerry, AA6NO 916/662-0801	w/i only	<b>New York</b>			
Jan. 5	Fremont	KJ6EP 510/791-6818	w/i only	Jan. 20	Lancaster	Chuck, WD2AIK 937-3592	p/r only
Jan. 30	Long Beach	W6LRF 714/847-6370; N6LUH 310/592-1713	w/i OK	Jan. 30	Lockport	Bob, KA2EGC 716/433-4584	p/r only
Dec. 19	Monterey	408/243-8349	w/i OK	Jan. 9	North Tonawanda	Vern, AA2AC 716/634-5276	p/r only
Dec. 19	Redwood City	408/255-9000	w/i OK	<b>Ohio</b>			
Jan. 16	Sacramento	Lyle, AA6DJ 916/483-3293	w/i OK	Jan. 2	Cincinnati	Herb, WA8PBW 513/891-7556	w/i OK
Dec. 19	Santa Monica	310/398-8538	w/i OK	Dec. 20	Elyria	Ola, WD8MOU 216/647-5116	
Dec. 19	Stockton	Ed, N6XMA 209/952-5996	w/i only	Dec. 19	Springfield	Ralph, WA8KSS 513/325-1456	
Jan. 30	Vacaville	Irene, KK6XB 707/446-8376	w/i only	Jan. 9	Westerville	William, K8NIO 614/861-6916	w/i OK
Dec. 19	Westminster	Walt, KM6MQ 714/373-6077	w/i only	<b>Oregon</b>			
<b>Colorado</b>				Jan. 10	Portland	KA7MIF 503/642-5803	w/i OK
Jan. 11	Boulder	Barbara, N0BWS 303/530-2903	p/r pref.; w/i OK	Jan. 13	Roseburg	AA7GC 503/672-7564	w/i OK
Dec. 26	Pueblo	719/948-2291	w/i OK	<b>Pennsylvania</b>			
<b>Connecticut</b>				Dec. 19	Erie	K3ED 814/825-8703	w/i only
Dec. 20	Milford	NB1M 203/933-5125; WA1YQE 203/874-1014	w/i	Dec. 19	Hermitage	WM3H 412/347-5960	w/i OK
<b>Florida</b>				<b>Rhode Island</b>			
Dec. 19	Fort Pierce	Fred Newmann, W2EUX 407/340-1069	w/i OK	Jan. 14	Providence	NN1U 401/231-9156 or 401/454-6848	w/i OK
Jan. 16	Melbourne	WB9IVR 407/724-6183	w/i OK	<b>South Carolina</b>			
Dec. 22	New Port Richey	Marv, WC2G 813/938-7810	p/r or w/i	Dec. 19	Charleston	Pat, AC4IH 803/553-3871	w/i
<b>Georgia</b>				Dec. 19	Columbia	Ray, N4WR 803/345-3373	w/i OK
Dec. 27	Atlanta	Dale, N4REE 404/396-1332	w/i OK	<b>Tennessee</b>			
Dec. 26	Dalton	Bert, N4BJZ 404/673-2214	p/r only	Dec. 19	Knoxville	Ray, N4BAQ 615/688-7771	w/i OK
<b>Idaho</b>				Dec. 19	Memphis	Win Guin, W2GLJ 901/754-4552	w/i OK
Jan. 9	Boise	Leon Allen, W7JMH 208/343-9153	w/i OK	<b>Texas</b>			
<b>Illinois</b>				Jan. 9	Houston	Jim, KB5WAM 713/486-2032	
Jan. 16	Loves Park	Paul, WB9HGZ 815/987-6754	p/r; w/i	Jan. 12	Houston	ND5F 713/464-9044	p/r pref; w/i OK
Jan. 3	Paris	WO8X 217/463-2213	p/r; w/i	<b>Washington</b>			
<b>Indiana</b>				Jan. 23	Bremerton	Dave, AA7IA 206/698-9205	w/i
Jan. 12	New Carlisle	219/654-3007; or KK9T 219/654-8084	p/r	<b>Wisconsin</b>			
<b>Iowa</b>				Jan. 23	Appleton	KD9IA 414/788-3823	w/i
Jan. 17	Des Moines	NA0R 515/964-0900; or 515/967-3890	w/i				

Don't forget to send in your VE exam schedules for 1993, if you haven't done so already. Please include exact dates and make note of any contact changes.

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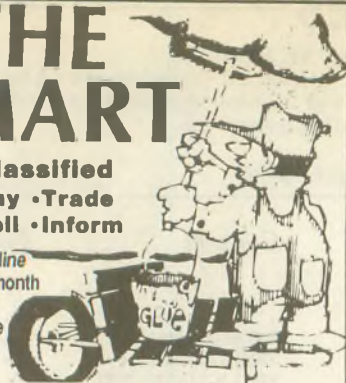
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# RFI

Radio frequency interference (RFI) and television interference (TVI) have been with us for a long time now, but it has only been within the last few years that we have heard the term "electromagnetic compatibility," or EMC. It is the job of the EMC specialist to investigate interference problems, test new electronic items for emissions they produce or find areas of susceptibility.

For many years only the military was interested in EMC. They had discovered that aircraft might crash when susceptible, shipboard engines might stop operating in the presence of a high-powered SSB transmitter or the most sensitive receivers could be completely blocked by noise from early computers.

However, all this changed a few years ago with the introduction of the personal computer for home and industrial applications, followed by the advent of solid-state controllers for appliances and automobiles. While the former often couldn't be operated within several hundred feet of radio or TV receivers, the latter was often so susceptible to RF fields that human life was endangered.

From the introduction of FCC Part 15, Subpart J, to medical equipment standards issued by the FDA, to automotive standards issued by the SAE, to commercial aircraft standards produced by RTCA, there was a plethora of new controls placed on electronic manufacturing.

The effect of all these paper controls was not immediately seen in the marketplace. Most amateurs who operate on HF are sadly familiar with the inexpensive telephones which flooded the market and their extreme susceptibility to an RF environment. Until recently, commonplace light dimmers made life miserable for the unsuspecting amateur, and who knows how many unfortunate amateurs have purchased new cars, only to discover that their warranty was void if radios having outputs in excess of 5W were used in the vehicle!

Fortunately, most EMC problems can be solved with some simple circuit changes, but unfortunately, if the changes must be made to a neighbor's equipment, there could be some obstacles. An alternative approach to taking a soldering iron to your neighbor's stereo might be to use ferrite beads to keep RF out of it. In other words, if RF susceptibility is a problem, prevent the RF from getting into the equipment at the antenna lead, power cable, speaker leads, photo or tape pickup leads or any other wires. It may be possible to solve the problem by adding ferrite beads without any further modification.

There are several commonly used types of ferrite beads which are available to amateurs. Ferrite type 43 is normally used for transformers in the 10 kHz to 1 MHz frequency range, where its efficiency is high and losses are low. If used on a wire in the 40 to 20 MHz range, it is lossy and will serve to keep RF in that range from traveling on the wire. Keep in mind that the bead is placed over the wire, insulation and all, without making direct contact with the circuit.

Ferrite type 73 is normally used to suppress RF up to 40 MHz and type 64 is used above 200 MHz.

So far, we have talked about susceptibility, or keeping RF out of equipment. The same rules apply to keeping it *in*. The fish tank heater which makes all that racket on 80M is using its power cord and the house wiring to radiate interference. A toroid on the power cord right at the heater can substantially reduce the level of interference. In some transmitter installations, even though a good low-pass filter is installed, RF (especially at harmonics) will flow on the shield of the coaxial cable, bypassing the filter and causing nightmares to the amateur and some poor neighbor.

The most important point to be gained from this article is that each interference problem is different and is usually solved through the use of sound troubleshooting techniques and use of good ferrites. — Santa Barbara ARC, Santa Barbara, CA

## ADVERTISER'S INDEX

A & A Engineering — 52	Fallert's Engraving — 6	QSLs by W4MPY — 24
Ace Communications — 17	G.G.T.E. — 38	R & L Electronics — 29
Aerials — 74	Glen Martin Engineering — 60	Radio Engineers — 66, 72
Amateur Radio Specialties — 72	Grapevine Group, The — 58	Radio Place, The — 75
Ameritron — 13	H & M Jewelry Co. — 51	Radio Works — 15
Amsoft Ham Radio Software — 79	HAAM Radio / ARS — 62	RF Concepts — 19
Antennas West — 14, 22, 28, 30, 34, 79	N8KDW — 62	RLD Research — 76
Antique Radio Classified — 27	Ham Radio Outlet — 42, 43	Rose — 44
Artsci Inc. — 70	Henry Radio — 2, 61	Rupp Electronics — 12
Austin Antenna — 64	ICM — 71	Rusprint — 35
AVC Innovations — 15	IMRA — 10	S. Douglas RF Devices — 16
AXM Inc. — 24, 32, 38	Jeff's Electronics — 60	Software for Amateur Radio — 32
Azimuth — 3, 40, 59	Jun's Electronics — 47	Solder-It Company — 36
Aztec RF — 26	K-Com — 11	Startek Int'l, Inc. — 25
B.A. Fox — 79	KB1T Radio Specialties — 74	Synthetic Textiles, Inc. — 60
Battery Tech — 50	Kilo-Tec — 35	Texas Towers — 21
Bilal Company — 27	Lakeview Co. — 39, 66	Tibi Productions — 14
Box Products — 18	Lawailoa Retreat — 44	Townsend Electronics, Inc. — 36
Brian Beezley, K6STI — 73	Lightning Bolt Antennas — 54	Transel Technologies — 67
Buckmaster Publishing — 6, 22, 35, 54	M. Bohnhoff, Inc. — 16	Tripp Lite — 53
Butternut Electronics Co. — 63	Maxcom, Inc. — 37	Turbo Electronics — 26
C-Comm — 33	Media Mentors — 49	Unadilla — 31
Caig Laboratories — 37	MFJ Enterprises, Inc. — 84	Universal Radio Inc. — 8
Callbooks by Mike Klein — 4	Midwest Wood Products — 10	Van Gorden Engineering — 7
Courage Center — 70	Microcraft Corp. — 7	VIS Study Guides — 28
Cubex Co. — 34	Oak Hills Research — 69	Visit Your Local Radio Club — 55, 56
DX Edge — 20	ONV Safety Belt Co. — 12	Visit Your Local Radio Store — 78
Electron Processing — 20	P.C. Electronics — 57	W2JO Software — 68
Embroidery Warehouse — 48	Palomar Engineers — 10, 51, 67, 73, 77	W5YI-VEC — 69
Engineering System, Inc. — 68	Pass Publishing — 65	W9IIN Antennas — 18, 30
	Personal Database Applications — 45	Wallace & Wallace — 41
	QCWA — 22	Williams Radio Sales — 23
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**Reason 2.** It's built like a tank -- 1.050 inch diameter, thick wall aluminum radiator, all welded construction, no mechanical joints,

welded butterfly capacitor with no rotating contacts.

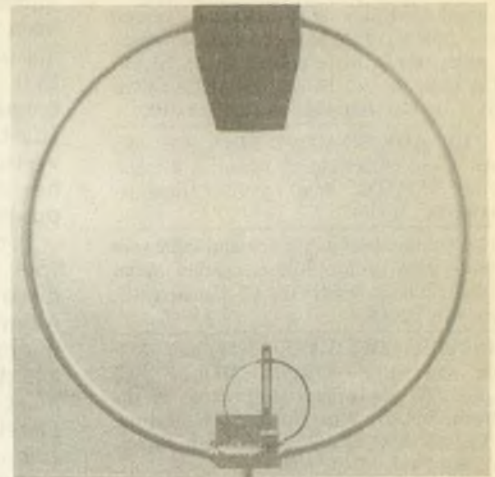
**Reason 3.** You don't need a separate control cable -- the coax feedline carries both RF power and tuning control signals. The feedline is decoupled and isolated by a balanced to unbalanced transformer (balun) so the feedline does not radiate.

**Reason 4.** MFJ's exclusive Automatic Band Selection™ auto-tunes to your desired band and lets you know with a beep.

**Reason 5.** Dual Fast and Slow tune push buttons make the remote control much simpler to use.

**Reason 6.** A Cross-needle SWR/Wattmeter with two ranges is built into the remote control.

**Reason 7.** The remote control is completely self-contained because it



because most of the strip carries very little current ... it is not the amount of conductor surface that determines the resistance to alternating current, but rather the way in which the conductor material is arranged."

**Fact:** A large round conductor has much less RF resistance than a thin flat strip.

Because the MFJ Super Hi-Q Loop™ uses a large 1.050 inch diameter round conductor for its radiator -- not a thin flat strip -- it's more efficient. You radiate more precious power and waste less as heat.

**How can MFJ make the Super Hi-Q Loop™ so affordable?**

By setting up an entire operation to build the MFJ Super Hi-Q Loop™ in volume, MFJ can reduce production and material cost and improve quality.

A production machine was custom built to automatically form thick wall aluminum tubing into precise loop antenna radiators.

MFJ builds the variable capacitor, does the welding, punching and forming and builds the electronics.

By doing as much as possible in-house MFJ reduces cost and brings you a better quality product -- it's Made in USA at its best.

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You get MFJ's famous one year *No Matter What™* unconditional guarantee. That means we will repair or replace your MFJ Super Hi-Q Loop™ (at our option) *no matter what* for a full year.

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## Remote Control (included) makes MFJ Super Hi-Q Loop™ easy-to-tune and extra portable



Super Loop™  
Remote Control™

MFJ's exclusive Automatic Band Selection™ feature auto-tunes to your desired band and lets you know with a beep.

It's extra portable because ...

... you don't need a separate control cable -- the coax feedline carries both RF power and tuning control signals.

... you don't need a separate SWR meter Remote Control-- a two range Cross-Needle SWR/Wattmeter is built-in.

... you don't need a separate power cord because it's battery powered -- you can also use isolated 12VDC or 110 VDC with optional MFJ-1312B, \$12.95. 3 1/4 x 6 x 2 1/2 inches.

uses internal AA batteries (not included).

You can also use isolated 12 VDC or 110 VAC with MFJ-1312B. \$12.95

**Reason 8.** It's an incredibly low \$199.95 -- that's 40% less than the nearest competition.

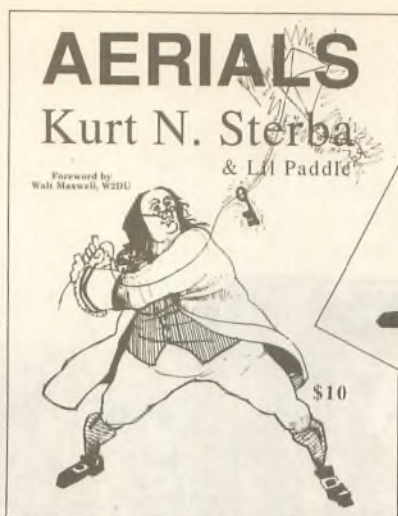
**Reason 9.** You're protected by MFJ's famous *No Matter What™* one year Unconditional Guarantee.

**Reason 10.** If you ever need help with your MFJ Super Hi-Q Loop™, you can call MFJ's exclusive toll-free technical help line 800-647-TECH(8324) and get expert help from a friendly MFJ Customer Service Technician.

**Round conductor has less RF resistance than flat conductor**

The following is quoted from *Electronic and Radio Engineering* by Frederick Terman, 4th edition, page 22:

"... with a conductor consisting of a thin flat strip, ... the current flows primarily along the edges, ... the true or effective resistance will be high



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*Debris litters the landscape in Iniki's wake.  
Photo courtesy of Robin Liu, AH6CP*



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