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Worship Radio

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Power lines were tangled like spaghetti amid the rubble in Plainfield. (photo courtesy of the Herald-News, Joliet, IL.)

The Crest Hill lawnmower tornado

FRANK W. RASMUSSEN, KA9VPH

It was the afternoon of Aug. 28; Tony Culyat, KA9WZW, who was working in my back shop came to me at about 3:25 p.m. and said, "Hey Frank, it sounds like there are some strong thunder storms on the way in." Little did I know at the time how close things would strike to home, my family and the area.

Lois, my XYL, and I went outside to see what was reported to us. All three of us are trained weather observers, so we were especially interested to see what was happening.

The sky was black, as it usually is during a typical mid-western thunderstorm. We watched the cold front arrive with its gusts of wind and saw lightning on the horizon. We went back inside the office and then, at 3:34 p.m. the power went off. The power stayed off about 10 seconds and then came

back on for about another two minutes — then it went off again. Since one cannot operate a TV repair shop without power, we went back outside. Soon three-quarter-inch hail fell, and we knew that severe weather was in store for us. About a minute later a sheet of plywood with shingles still attached to it came crashing down in the middle of the street in front of the shop. I said, "We're in for a tornado."

No sooner did I make that statement than we saw the funnel cloud passing almost directly over the shop. It came from a wall cloud just 500 feet or so above the ground with its funnel extending downward, vertically tilting about 5 degrees, then bending 90 degrees or so to the rear and extending another 350 feet straight back. As the funnel cloud passed it made a churning sound, rotating clockwise about 150

feet above the ground. It looked like a large lawnmower in the sky.

We ran back inside the shop and tried to call home. Amazingly, the phone worked and my son Frank reported that the house was basically unharmed, but many of the antennas were down and a large tree had come down in the back yard.

We all left the shop to further check out our property damage. Tony went toward Plainfield where his son was at a baby-sitter's, and Lois and I headed for Crystal Lawns where some of our family have a home.

We turned on the hand-held 2AT, tuning in our local 146.82 GYPSY repeater. I heard the voice of Mike Kelly, AD9Y (normally a very calm person), come on the air with a strain in his voice reporting that there were 20 homes (please turn to page 3)

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TORNADO

(continued from page 1)

flattened — moments later his voice returned with cracking unsteadiness saying that there were more than 40 homes damaged. This was about 3:45 p.m.

Lois and I discovered that the house in Crystal Lawns was OK, and we turned to Crest Hill Apartments where our oldest son, Patrick, had lived for three weeks. We arrived at 3:52 p.m. before emergency equipment was on the scene. Patrick's apartment complex was completely devastated. The entire third floor and most of the second floor was gone. Luckily, my son was out of town.

As I walked through the rubble I heard a woman scream, "I need to contact my son!" Amateur Radio to the rescue; I told the woman that I was an Amateur Radio operator and asked how I could help. She said she needed to contact her son in Bolingbrook but the phone service and power were out. Switching over to the IC3-SAT and tuning in on the Bolingbrook 224.54 repeater, I asked for a phone patch. Jim Jones, N9DIX, answered, as well as Bill Dropski, NW9K. The traffic was passed and I saw at least one person begin to feel a sense of relief, as Amateur Radio worked when nothing else did.

And so went the first hour and a half of check-ins and verifications. Radio-telephone connections were made for families, and spouses checked in on each other over the airwaves. Calls to emergency personnel were made, and damages were reported.

After that, "things snowballed like crazy," said Larry Ward, WD9HZH, who moved to the Will County Building to act as main operator for the Amateur Radio Network, which



Remains of the Plainfield branch library in Grand Prairie School.

formed almost immediately. Radio operators were dispatched to mobile communications vans, shelters at Troy Junior High, Silver Cross Hospital and the Plainfield Fire Department.

Amateur Radio operator Art Hostert, WD9HZF, was contacted by his wife Eileen, WD9HZG, who is a laboratory supervisor at St. Joseph Medical Center. Because of the magnitude of Art's reports, she ordered more blood supplies from the Heartland Blood Center in Aurora. By this time Tony, KA9WZW, arrived at Grand Prairie School to inform net control that the fire department had no way of contacting Northern Illinois Gas to shut off leaking mains. "They are unable to make contact — can you do it?" Tony's requests echoed the anxiety felt by all, and most transmissions were kept to the point.

One of the mobile communications vans arrived at the Crest Hill Lake apartments and a command post was set up by Gary Hicks, W9DJR, Thomas Schmitt, KA9ZID, and myself. The van had to be powered by its own 15 kW generator since the commercial power was hopelessly interrupted; mains were tangled up like spaghetti and the poles were missing from five spans of high tension leads.

Later that evening Mr. Dimas of Commonwealth Edison came to the

site. I asked him how long he thought it would be before we could get commercial power to the van. He said that there wasn't a live wire within blocks and that it would take at least 11 hours. Telephone service was finally provided to the van by 11 p.m., but it didn't make much difference, since other devastated areas had no service. So the net kept handling the traffic — calls for fuel trucks, calls to let emergency personnel through, and so on.

Two days later we still had no commercial power for the communications van when the decision came from net control to relocate to Grand Prairie School. The van was now moved to a location just 200 feet from where my son's apartment stood.

Arriving at the scene at 7 a.m. the devastation was again evident with (please turn to page 31)

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good things for us all at an APO ad-
dress), and Arthur Peterson, KB7FXJ,
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pride!

You may be reading elsewhere that
in 1965 Amateur Radio went into some
"dark ages" from which it has never re-
covered.

Reality seems to suggest something
else. Armed with the *World Almanac*
and a telephone conversation with
Herb Nelson at the Radio Amateurs
Callbook we find that from 1964 to
1970 there was a 27 percent increase in
the Amateur population (which ran
way ahead of the population as a
whole). Over the next ten years ('70 to
'80) there was a 37 percent Amateur in-
crease, while the general population
grew but 11 percent.

Over the past 20 years there has been
a 62 percent increase in Amateurs,
while the general population has grown
22 percent. So there has been an almost
triple skew. In 1964 we had 264,810
Amateurs and today it is well over
467,000. The gain has been over 75
percent.

I received a nice letter from James
Stanton, KC6HRC, another APO ad-
dress who is keeping Uncle Sam's
radios running in Korea. He likes the

articles about what Amateurs do in
emergencies.

The Davenport (IA) Amateur Radio
Club wrote about keeping sharp, so as
to be proficient during times of need, in
their newsletter: "If Field Day is in-
tended to sharpen Amateur Radio
operator skills, then this year's Field
Day was successful. If the purpose of
this event is to make the public more
aware of the valuable contribution ham
radio operators make to the communi-
ty every day, this Field Day helped ac-
complish that as well."

Later in the newsletter it said, "Two
local television stations (WQAD and
WHBF) provided local coverage of the
event on their evening news broad-
casts."

Also in the Davenport RAC newslet-
ter was an article on how they provided
communications (two weeks before
Field Day) during the flooding caused
by ten inches of rain in 24 hours.

About Field Day, The Fort Wayne
(IN) Radio Club said: "It's about hav-
ing fun... most of the people that have
tried it won't miss the opportunity to
do it again, and again.

United ARC, San Pedro, CA called
Field Day, "the weekend ham radio
was meant for!"

Cape Ann ARA, Gloucester, MA, puts
it this way: "Field Day is a venerable
tradition. For those who have been
hams for long, Field Day holds fond
memories of camaraderie."

San Francisco (CA) ARC: "We will
be sharing the site with a Boy Scout
troop so we may have the opportunity
to spark an interest in ham radio in
some of them."

How was your Field Day? Getting
ready for next year yet?

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—Armond, N6WR

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Antenna tuning with the

NORM BROOKS, K6FO

Those of us who attended the Southwestern Division ARRL Convention in San Diego on Aug. 26, 1990 were fortunate to be able to attend a forum presented by Jack Althouse, N6NY, president and chief engineer of Palomar Engineers.

The usual statement Jack encounters is, "My friends tell me I should have a noise bridge to tune my antenna, but I don't know much about it." His seminar was designed to answer that comment.

The noise bridge

Jack showed the noise bridge that Palomar makes; it is small enough to put in your pocket, climb aloft and work on your antenna.

Inside the box is a diode noise generator. It makes noise throughout the high frequency spectrum, from 160M to below 6M. There is an amplifier to build the noise up so that when you connect it to your receiver you'll hear the noise S-9.

There are two controls, an R knob and an X knob. The R knob operates a potentiometer (variable resistor), and the X knob operates a variable capacitor. With complex circuitry, the capacitor is always half-way meshed when you're measuring a non-reactive (resonant) antenna. Thus you turn the capacitor one way to measure inductance and the other way to measure capacitance. Unlike bridges that came before this, you don't need a bunch of plug-in coils. There are no coils in it at all. This makes the unit simple and relatively inexpensive. It has everything you need, except a good receiver with an accurate calibration.

How to use it

Let's say you want to tune a dipole antenna. String it out, not too high above the ground, so you can work on it to change the length if necessary. The

object is to make the antenna resonant in the part of the band where you do most of your operating. First, determine the length of wire from formulas in your handbook. Put a coax connector in the middle to connect your transmission line.

Working at the antenna, use a male-to-male connector to connect the center of the antenna to the "unknown" terminal on the noise bridge. Then connect the long coax line which goes back to your transceiver to the "receiver" terminal of the noise bridge. Go to your shack and tune your receiver to the frequency where you want the antenna to resonate. Arrange somehow to be able to hear the noise from the receiver at your work location. You can extend your headphone lead via a twisted pair, or you can use wires in your rotor control cable, for example.

Adjust the two knobs on the noise bridge to find a null in the noise. Go back and forth from one knob to the other; you will ultimately find a good null. Make sure you have a deep null by turning up the gain on the receiver if necessary.

Then read the knob settings. If the X knob reads on the "L" side of center, it means you have an inductive reactance, and the antenna is too long. If the X knob reads on the "C" side, you have capacitive reactance, and your antenna is too short. So if your antenna is too long or too short, you know what to do next. Shorten or lengthen the wire (equally on both ends) and take additional readings until the X knob reads straight up and down (resonance).

If your R reading is not 50 ohms, there isn't anything you can do with a dipole to change it, except to raise the entire antenna higher or lower. The higher you raise the dipole, the higher the resistance will be.

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Noise bridge

The SWR meter

Most modern transceivers have an SWR meter. You can use this to determine the resonant frequency of an antenna simply by tuning the transceiver up and down the band and looking for the lowest SWR. For a dipole this would be pretty accurate, but if you're tuning up a sophisticated antenna, such as a directional beam, this method can get you into trouble.

Let's say you are checking an antenna with the SWR meter on your transceiver, and the antenna resistance is 25 ohms. The SWR meter, being in a transceiver that wants a 50 ohm termination, shows an SWR of two to one.

Now, suppose the antenna resistance is really 100 ohms. Again, the SWR meter would show a two to one standing wave ratio. But at this point we don't really know the antenna resistance. The noise bridge on the other hand tells us the resistance reading as well as the kind of reactance and we know immediately whether to lengthen or shorten the antenna.

The beam antenna

The resistance of the driven element on a Yagi beam antenna is very low. To match the transmission line to 50

ohms, we use a "gamma" match. Reactance is adjusted with a capacitor in the gamma match. Thus, you have two adjustments to make. The length of the gamma match adjusts the resistance, while the capacitor setting tunes out the reactance, and they interact considerably. If you tried to make these two adjustments using an SWR meter, you'd get into trouble very quickly, as we mentioned above.

Shunt feeding a tower

You can shunt feed your tower with a feed similar to the gamma match. Here, again, the noise bridge will tell you whether your resistance or reactance is off and which way to adjust to get to resonance.

Multi-band trap vertical

The usual complaint is that when the trap vertical is installed according to instructions, it works fine on all bands but one. What to do? Connect the noise bridge right at the base of the antenna. Start making adjustments on the high frequency end. Set your frequency on the 10M band and adjust the length of the antenna tubing to get resonance on 10. Then go to 15M, adjusting the 15M trap so the antenna resonates on your favorite frequency. Repeat for the other bands.

The Butternut vertical uses a different trap method and you start tuning at the lowest frequency. The instruc-

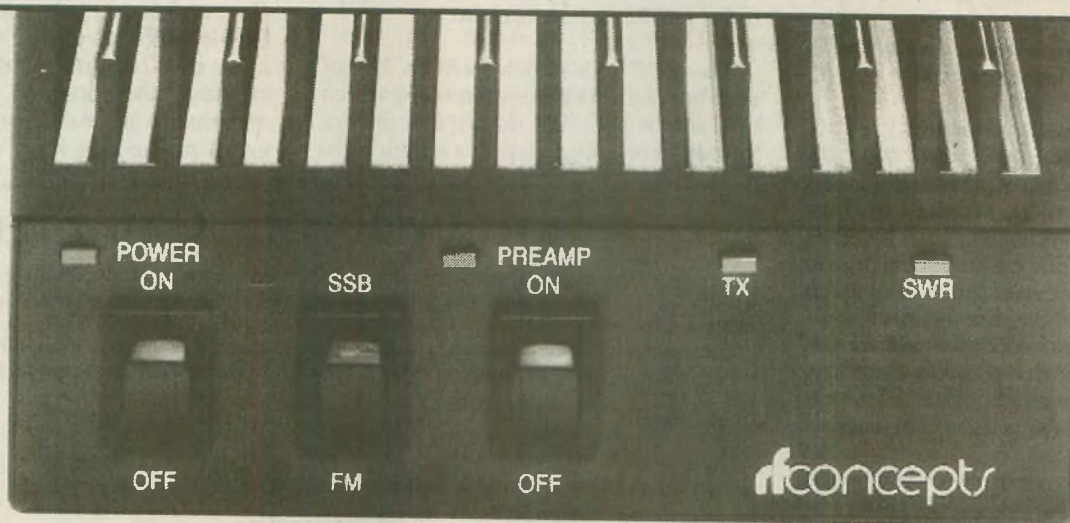


Behind this wry smile lurks the soul of one who can tell you more than you ever wanted to know about noise bridges, Jack Althouse, N6NY.

tion manual that comes with the antenna tells you how to do this. The Butternut has a short piece of 75 ohm cable used as a matching stub. Remember to put the noise bridge at the 50 ohm cable end of this matching stub.

Being "at the antenna"

All of this discussion calls for making readings "at the antenna." How do you do this for a high antenna? Lower it to where you can reach it. Resonance adjustments made this way will keep as the antenna is raised. It is the resistance of the antenna feed point that changes (higher) as you raise the antenna. □



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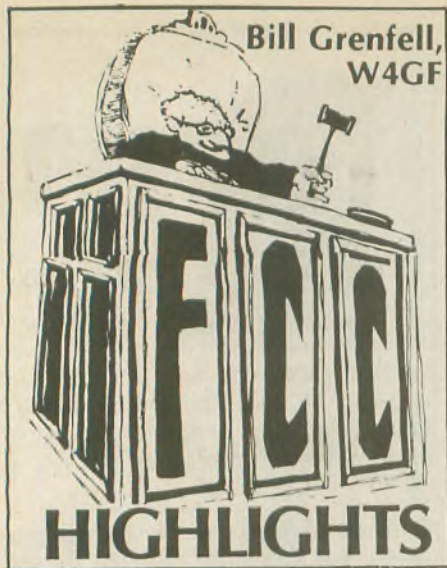
RFC 3-22, 2W in= 20 out
RFC 3-211, 2W in=110 out
RFC 3-112, 10W in=120 out
RFC 3-312, 30W in=120 out

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On August 1 the FCC issued a Notice of Proposed Rule Making on Morse code testing of persons with disabilities. At an open meeting, the commissioners announced NPRM 90-356, proposing amended rules to accommodate those persons who, because of severe handicaps, have extraordinary difficulty in passing the higher speed Morse code telegraphy examinations for Amateur operator licenses. The subject had been broached earlier in the June 29 and July 13 *ARRL Letter*. For some initial reactions to the FCC's proposal, see "Happenings" in the September *QST*. (*ARRL Letter* 8/10, 8/24/90; *W5YI Report* 8/15/90).

Richard A. Burton, formerly WB6-JAC, was convicted in federal court on July 20 for illegally operating a radio transmitter. Burton, arrested in May following an investigation by Los Angeles area FCC engineers acting on complaints from Amateurs, had been charged with three felony counts of violating sections 301 and 501 of the US code. In the early 1980s Burton's license was revoked for Part 97 violations. After his appeals were turned

down he was ordered off the air, but he continued to operate using his rescinded WB6JAC call sign. On Jan. 15, 1984, US District Court Judge Manuel Real sentenced Burton on four misdemeanor counts of operating a transmitter without a license. Following appeals, Burton served seven months in jail and five years on probation. (*ARRL Letter*, 8/10/90).

On August 2, FBI agents assisted by FCC investigators arrested Anthony V. Marcantonio, KA2ZGE, of Queens, New York, and seized 20 pieces of his radio transmitting equipment. The FCC earlier had responded to complaints that Marcantonio was interfering with Amateur Radio communications by transmitting unidentified disruptive signals on the 2M band. On July 27, FCC investigators, using direction finding equipment, traced the signal to the Marcantonio home. The investigators discussed the situation with a family member who then shut the transmitter off. The transmissions resumed that evening and continued into the next day. It was then, according to the FCC, that Marcantonio made death threats over the radio against an FCC investigator. Marcantonio was charged with making threats by radio, a felony carrying a penalty of up to five years in prison, a \$250,000 fine or both. A federal judge set Marcantonio's bond at \$50,000 following a hearing. (*FCC public notice*, 8/14/90.)

The FCC has sent letters to 19 net and bulletin stations managers which operate in the 20M band and are involved in ongoing disputes which have

been occurring for some time. Commenting on the response received, the FCC observed that it is obvious that the Amateur community desires that the disputes be resolved amicably and that potentially restrictive rule making be avoided. The plans recommend that the Amateur community be allowed to continue addressing this problem internally. Interest in this approach as a model for future dispute resolution in the Amateur community has also been expressed by other observers. FCC's Special Services Branch Chief, Robert H. McNamara wrote on August 9, "Therefore, I am extending until February 1, 1991, the date for you and other interested Amateur service licensees to develop the joint plan." The League (*ARRL*) maintains that the disputes can be resolved by enforcing existing FCC regulations: one-way broadcasts, if they go beyond accepted norms for such transmissions on the Amateur bands, are illegal; third-party traffic is allowed only when a formal agreement exists between countries; and malicious interference is always illegal. (*ARRL Letter* 08/24/90; *Westlink Report* 08/17/90).

On July 27, the ARRL filed its legal brief with the US Court of Appeals for the District of Columbia Circuit in the matter of the proposed reallocation of the 220-222 MHz band to the private land mobile service. The brief reiterates the League's position, which already has appeared in *QST*. Oral arguments in the case of ARRL vs FCC (please turn to page 10)

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 September 1, 1990.

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 17326.

Radio District	Group A Am. Extra	Group B Advanced	Group C Tech./Gen.	Group D Novice
0	AA0BW	KF0MM	N0MKQ	KB0HLY
1	WJ1Q	KC1WU	N1IAA	KA1WIT
2	AA2BB	KE2VY	N2LFL	KB2LAX
3	WD3Z	KD3TR	N3IMS	KA3WUO
4	AB4YT	KN4OJ		KC4SSO
5	AA5UN	KI5IU	N5RGO	KB5NPM
6	AA6XU	KK6PA		KC6NMS
7	AA7FT	KG7HZ	N7PLR	KB7LOQ
8	AA8CC	KF8JD	N8MWQ	KB8KPK
9	WV9E	KE9YY	N9KCF	KB9FLB
North Mariana Is.	AH0I	AH0AG	KH0AM	WH0AAN
Guam	KH2N	AH2CH	KH2EP	WH2AMR
Johnston Is.	AH3C	AH3AD	KH3AD	WH3AAG
Midway Is.		AH4AA	KH4AD	WH4AAH
Hawaii		NH6XM	NH6XM	WH6CIP
Kure Is.			KH7AA	
American Samoa	AH8D	AH8AD	KH8AI	WH8AAZ
Wake Wilkes Peale	AH9A	AH9AD	KH9AE	WH9AAH
Alaska		AL7MJ	NL7UU	WL7BZI
Virgin Is.	NP2G	KP2BU	NP2DX	WP2AHD
Puerto Rico		KP4QZ	WP4YU	WP4JIH

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FCC Highlights

(continued from page 8)

and the United States of America are scheduled for November 16, 1990. (ARRL Letter, 08/24/90).

While it is not allowable to request a specific call sign, any Amateur may swap his current call for another one. This option is available by filing Form 610 with the FCC and requesting a change in call sign (Item 2E). In return, the applicant will be issued a call appropriate for his license class from the standard rotation of new calls. (ARRL Letter 08/24/90).

Amateurs in New Mexico and western Texas using the 420-450 kHz band have been asked by the Department of Defense to step up efforts to avoid interference to the White Sands Missile Range. Amateurs in the area already are restricted to 50W PEP on a secondary, non-interference basis within the White Sands Restricted area. The US Air Force recently asked the FCC to add an additional rule for the White Sands Restricted Area. This would require Amateur operators to coordinate any operations in the

420-430 MHz band with the White Sands DOD AFC before operating there. We understand that this request has been approved in principle by the FCC and will be incorporated in the future. (ARRL Letter, 08/24/90).

At least one United States Amateur now faces severe sanction from the FCC for violating Part 97 rules dealing with restrictions on news gathering for the press using Amateur Radio. It appears that William Parker (licensee of Amateur station W4YKH) may now be in serious trouble after he was monitored and recorded while allegedly acting as an information source for NBC's Network News Department during the Trinidad incident three weeks ago (late July). For example, C6ANX to W4YKH: "... a truce has been arrived at, let's put it that way ... at this time. QSL?" W4YKH: "Oh that's very good. Yeh, we're just feeding this stuff into NBC News up here in Washington, DC, and you've been doing a good job all day; we've been listening ..." (Westlink Report 08/05/90). □

Operators' success at the Campbell fire

CHARLIE JAKOBS, KC6LKC

It is not unusual for California to have hot days in August, and 1990 was no exception; in fact, many records were broken this year. As a result, utility companies all over the state exceeded peak demands. Additional electrical energy had to be brought into California from as far away as Canada via a 500kV line which runs the entire length of the state.

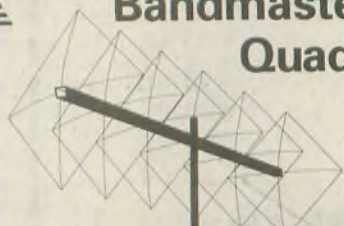
Monday, Aug. 6, was one of the record setting days that spelled trouble for firefighters throughout the state. In an effort to meet the demand, PG&E was forced to run 750kV through their 500kV line, causing the line to sag. In eastern Tehama county, the line contacted a 50ft pine tree and immediately a fire was sparked in the tinder-dry wildland of Northern California.

Just 24 hours before this fire broke out, I passed my FCC examination for Technician. Subsequently I was assigned to this fire, and I began one of the most interesting and fascinating experiences possible for a newly licensed Amateur Radio operator. The fire came to be known as the "Campbell Complex" and I was there as Fire Information Officer with a special emphasis on community relations. My duties included acting as coordinator



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

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Q-28-2	10 Meter 2 Element Quad	\$179.95
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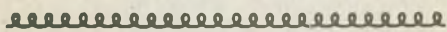
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for the 78 radio operators who converged in the area and worked tirelessly through the 12-day Campbell Complex seige.

Our system was very large, covering Butte and Tehema counties as well as parts of Shasta and Lassen counties. This volunteer staff worked in 17 separate management functions throughout the fire area. Some of these functions were fire information communications, forward observation, base operations communications, shadows, FIO escorts, repeater installation and repairs, videography and photography. By cross-linking three repeaters and two simplex channels, we were able to pass traffic anywhere in four counties on a handheld using low power.

Unfortunately there isn't enough space to list all 78 of these operators but, as in all organizations, some people are key to the success. Some of our key volunteers were Gordon Fuller, WB6OVH, personnel manager and primary net control; Les Ballinger, WA6EQQ, miscellaneous spare parts, antennae etc. and overall packet "Guru"; P. Grover Cleveland, WT6P, systems design repeater procurement manager (no operation should ever be attempted without your own "Grover") and Marty Wyatt, WA6GUT, shadow supply officer, videographer, public relations specialist, administrative assistant, recruiter, long



A screwy tip

DON CHAPPELL, W2AZD

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At the Cohasset Fire Information Center, from left to right: Don Ohrt (VIP); Charlie Jakobs, KC6LKC; Jim Rich, N6SZQ; Noel Bertelson, KA7EZO; John Webb, 46RCW.

time VIP member and friend.

Most of the radio operators involved were members of the California Department of Forestry and fire protection volunteers in the Prevention program from the Nevada/Yuba/Placer Ranger Unit. You might remember us from two years ago when 107 radio Amateurs participated in communications in much the same way on the 49er fire near Grass Valley. The primary difference for me was that this time I could play an even more active role because, as a licensed operator, I had more technical knowledge than before.

Once again, as during the 49er fire, the Amateur Radio operators functioned like a well-oiled machine and the success of this operation was due largely to their efforts. They are a group of fantastic individuals who always come through and who know how to make it work! □



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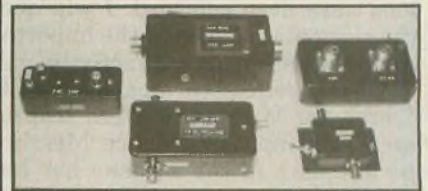
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The Isoloop

DONALD K. REYNOLDS, PhD

A series of articles published in the May, June and July issues of Worldradio have been brought to my attention. I am the developer and co-developer of several different antennas for the AEA Corporation of Lynnwood, Washington. These include the "Isopole," a vertical "gain-type" antenna for VHF bands, the "Hot-rod," a telescoping half-wave vertical antenna for hand-held transceivers and, most recently, the "Isoloop" antenna (an electrically small loop antenna covering 14 to 30 MHz). I am a retired educator, having been a faculty member in the Department of Electrical Engineering at the University of Washington, Seattle for 26 years. One of my special fields of interest has been antennas, and for many years I taught a graduate course entitled "Antenna Engineering."

I will describe below how the rather remarkable characteristics of the Iso-loop have been achieved. I will quote the calculated values of the important electrical parameters: directivity, gain, efficiency, effective area (also called "receiving cross section" or "capture area") and input impedance. Measured performance of the antenna has been

found to conform closely to the calculated.

Those who wish to see the design formulas from which all of the above quantities may be calculated (and how these formulas are derived from Maxwell's Equations and associated physical laws) are referred to an excellent book, *Antenna Theory and Design* by Warren L. Stutzman and Gary A. Thiele (John Wiley & Sons, 1981). Both authors are well known and highly respected in the antenna field, and their book is widely used as a textbook in graduate level courses at many universities. Basic theory is covered in Chapter 1, and an excellent coverage of electrically small loop antennas is included in Chapter 2.

Directivity of electric dipoles

One commonly used measure of the power radiated in a given direction from an antenna is called the "power density," which is the power radiating through one square meter of area oriented perpendicular to the direction of wave propagation. There is no such thing as a radio antenna which radiates with equal power density in all directions of space. All antennas must radiate with more intensity in some directions than others. The "directivity" of an antenna gives the ratio of power density radiated in a given direction to the average power density. The average power density at a distance of R meters from the antenna is simply the total radiated power divided by the surface area of a sphere of radius R, that is, $P/4\pi R^2$. This is also called the directivity "with respect to an isotropic source." A center-driven electric dipole antenna whose total length is

less than about 0.1 wavelength has a maximum directivity of 1.5, a value which remains constant even as its length approaches zero. The "directivity pattern" of an antenna measures the way that the directivity varies as a function of the polar and azimuthal angles about the center of the antenna. Since the directivity pattern is a three-dimensional figure, it cannot be accurately represented on a flat surface. A sketch of this pattern for a vertical short dipole is shown in Fig. 1. It is seen to resemble a slightly squashed donut shaped figure with a zero-diameter hole in the middle.



Fig. 1

Power gain and efficiency

The "power gain" (or simply, "gain") of an antenna is equal to the directivity, reduced by the efficiency of the antenna. There will always be some power loss in any antenna, arising from the finite resistance of the conducting parts. The efficiency is equal to the ratio of the total power input to the total power radiated from the antenna.

The maximum directivity of a center-driven half-wave electric dipole is 1.64, which is only 0.39dB greater than that of a short dipole whose length may be well under 0.1 wavelength! A fact that you, Mr. "Sterba," don't understand, is that the maximum directivity of a short dipole stays at a constant value of 1.5 as its length shrinks to zero. Are we getting something for nothing? No; of course the efficiency will also go to zero, making the power gain go to zero. Furthermore, for a very short dipole, the input impedance will consist of a high capacitive reactance in series with a very low resistance, which will be practically impossible to match to a transmission line.

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Effective area

The receiving properties of an antenna are characterized by what is called its "effective area," or "capture area," called A_r , and usually measured in square meters. To calculate the maximum signal power which can be delivered by a receiving antenna to its load, one multiplies the power density of the incoming signal by the effective area. Naturally, the effective area depends on the orientation of the receiving antenna with respect to the direction of arrival of the incoming signal. It is easily shown (see the previously referenced text book) that the same directional characteristics prevail for both transmitting and receiving. What is probably not known by a majority of ham radio operators is that there is a fundamental relationship between the maximum value of the directivity of a transmitting antenna and the maximum value of its receiving cross section. For a lossless antenna, this relationship is $(A_r)_{max} = D \times \lambda^2 / 4\pi$. D is the maximum value of the directivity, and λ is the wavelength of the signal in meters. For a short dipole, with $D = 1.5$, the receiving cross section is $0.1194 \lambda^2$. At 14 MHz, this gives a value of 54.8 square meters! What we are saying is that neglecting losses, the maximum power

that can be extracted from an incoming wave by a short dipole is independent of its length! Of course a very short dipole will have a very low efficiency, which would reduce the effective area to a much lower value. However, if one could come up with a virtually loss-free impedance matching network between a short dipole and its load, one could realize most of this "capture area" for reception, and its maximum possible gain of 1.5 in transmission.

Small loop antennas

The electrical characteristics of small loop antennas with circumferences less than about 0.3 wavelength are well known. The radiation resistance is proportional to the square of the area and the fourth power of the frequency, and is essentially independent of the shape of the loop (square, round, etc.). The loss resistance is directly proportional to the circumference and square root of the frequency, and it also depends on the diameter of the conductor and the conductivity of the metal.

The radiation pattern of a small horizontal loop is exactly the same as that of a short vertical dipole, except that their respective electric and magnetic fields are interchanged. It is for this reason that the small loop is called a "magnetic dipole." The dipole radiates a vertically polarized electric

field, while the loop radiates a horizontally polarized electric field. At a distance from the vertical dipole, the magnetic field lies in circles concentric with the axis of the dipole, while in the case of the horizontal loop, the electric field lies in circles concentric with the axis of the loop. The directivity patterns of the two are identical, and both have a maximum directivity of 1.5, 0.39dB below that of a half-wave electric dipole. Just as with the electric dipole, the maximum gain is reduced from 1.5 by the efficiency factor. We now come to the crucial part of the design of small loops, which allows them to be successful competitors to other much larger antennas. Here, Mr. "Sterba," is where the laws of physics and nature can be applied to achieve a successful design.

Controlling losses

Precise formulas are well known, giving the radiation resistance, loss resistance and inductance of small loops of various geometries, conductor sizes, metal types, etc. With a little computer programming of the design equations, one can soon strike a balance between all of the conflicting factors. The final design of the Isoloop was set by considering the desirability of allowing all five of the Amateur bands between 14 and 29.7 MHz to be tuned. Since the radiation resistance of a small loop falls off very rapidly with decreasing frequency, this objective could only be reached by allowing the efficiency at the 20M band to drop to 50 percent. (This reduces the radiated power by half of a standard S unit.) The efficiency in the 15M band averages 75 percent, and in the 10M band, 92 percent.


The crucial design feature that allows this performance to be obtained is the method by which low-loss impedance matching to a 50 ohm co-ax line is achieved. Here is where the physical configuration of a loop antenna has a distinct advantage over a

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short electric dipole. Since the loop is simply a one-turn inductor, the use of inductive coupling to a "primary coil" is suggested. Figure 2 shows the circuit diagram of the radiator loop (which we will call the secondary circuit) inductively coupled to a much smaller loop (the primary circuit).

The equivalent circuit of the Isoloop is shown to the left in Fig. 2. The inductance of the radiating loop is called L_s , the tuning capacitor, C_s , the radiation resistance, R_r and the loss resistance, R_l . The inductance of the primary coil is L_p , and the mutual inductance between primary and secondary is M . At series resonance of the secondary, the total series impedance of the secondary circuit is just $(R_r + R_l)$. AC circuit theory tells us that the effect of the mutual coupling between primary and secondary is as shown to the right in Fig. 2. The effect of the secondary on the primary is to place an impedance in series with the primary coil, with value $Z_c = (2\pi f)^2 \cdot M^2 / (R_r + R_l)$, where f is the frequency. This is a pure resistance, since the secondary circuit has been adjusted for resonance.

It is now a simple matter to calculate the value of M at a given frequency that will make $Z_c = 50$ ohms. For example, to obtain a perfect match at 21 MHz, where the sum of the radiation resistance and loss resistance is 0.41 ohm, we find that $M = .0343$ microhenries. This is very much smaller than the inductance of the loop, which turns out to be 2.89 microhenries. The small primary loop thus appears to have a series resistance of 50 ohms, which is overwhelmingly greater than its loss resistance, which can be totally neglected.

The small inductive reactance of the primary loop can be eliminated by tuning the secondary loop slightly off resonance so as to couple enough capacitive reactance in series with the primary to cancel the inductive reactance. This is actually done automatically by the user when the antenna is

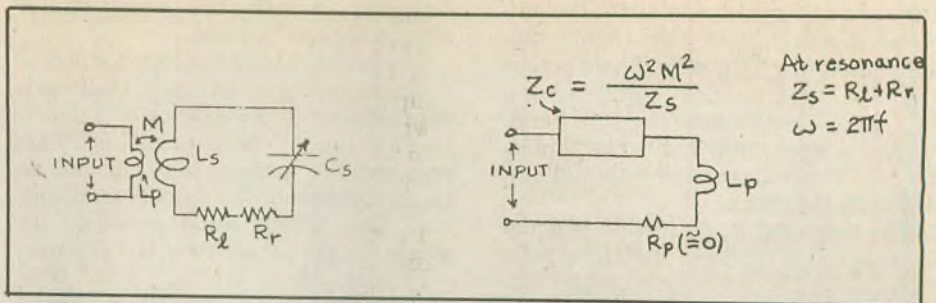


Fig. 2: Impedance matching circuit used with Isoloop antenna.

being tuned, so as to minimize the reflected power.

Mutual inductance between air-core coils is a circuit parameter which has no losses. Thus, the impedance transformation from a secondary circuit with a very low series resistance to the 50 ohm level can be accomplished with essentially zero loss. The same cannot be done for the input impedance of a short electric dipole, since its impedance is a high capacitive reactance in series with a low series resistance. The fact that the magnetic dipole already consists of a loop makes this fortuitous impedance transformation possible.

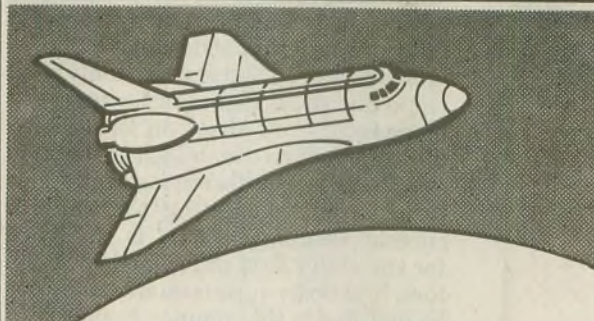
To achieve the lowest possible loss resistance in the loop, special care is needed in the design of the resonating capacitor. A split-stator capacitor has

been used, with the two sets of stator plates connected securely to the two ends of the loop. Two sets of rotor plates are fastened securely to a single cylindrical shaft which is rotated by means of a toothed belt-drive to a stepper motor. The tuning capacitor thus consists of two air dielectric variable capacitors in series, without the presence of any rotating contacts. An excellent photograph of the tuning capacitor and how it is fastened to the loop is shown in the article entitled "CQ Reviews: The AEA Isoloop HF Antenna" in the July '90 issue of CQ.

The Isoloop antenna, when mounted horizontally, has a horizontally polarized omnidirectional radiation pattern. The radiation pattern is the same as that sketched in Fig. 1.

The gain toward the horizon varies

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from about 0.8dB below that of a half-wave dipole across the 10M band, 1.4dB below a half-wave dipole across the 15M band, to about 3.5dB below a half-wave dipole across the 20M band. Unlike a horizontal half-wave dipole, there is zero radiated power straight up and straight down.

The receiving cross section is equal to that of a lossless electric dipole, reduced by the previously quoted efficiency factors: 92 percent in the 10M band, 75 percent in the 15M band, and 50 percent in the 20M band. Received signal strength should be about half an S unit below that of a half-wave horizontal dipole at the same height above ground in the 20M band, less than 1/3 S unit below a half-wave in the 15M band, and less than 1/6 S unit below a half-wave in the 10M band.

The tuning bandwidth varies from about 7.3 kHz between half-power points in the 20M band, to about 70 kHz between half-power points in the 10M band. This extremely sharp tuning brings a number of significant benefits, including reduction in TVI and reduction of off-signal noise from all sources, which can otherwise mix with signals in the rather wide receiver input bandwidth.

Since the antenna is impedance matched to 50 ohms at its terminals, no tuner is necessary at the transmitter;

however, a reflected power meter should always be used.

The primary coupling loop connected to the incoming co-ax line is itself made of coaxial line in a well known "balance-to-unbalance" configuration. This prevents the coupling of r-f currents on to the outside of the coaxial transmission line, which could seriously degrade the performance of the antenna.

Finally, Mr. "Sterba," your complaint about the suggested retail price of the IsoLoop indicates to me your lack of knowledge of the costs of producing products for small markets, such as the ham radio market, as well as your probable age; I too remember when a loaf of bread cost 12 cents, and a coke cost five cents. □

Kurt replies

In any scientific or engineering report that proposes a mathematical model to simulate a real-world problem, there is, almost without exception, an actual verification of the accuracy of the proposed model by means of either direct measurements or comparison with available data generated by other approaches.

To attach any credibility to his proposed model, Dr. Reynolds must support his claim by data that confirms, not just merely suggests, the accuracy of this model. The model suggested is a simplistic model of the matching device. It assumes uniform current in both primary and secondary loops. It ignores stored energy in individual loops due to all higher order spherical modes and their effect on localization of surface currents, which ultimately results in nonuniformity of total surface current, correcting the uniform current assumption that is the basis for the above first order model. Therefore, first order approximation may not be justified in the complex geometry of this antenna.

Incidentally, what has been said so far has no bearing whatsoever on the issue of the gain of loop antennas, which is of primary importance here. It should be pointed out that proper matching of a radiating element has absolutely no relevance to the radiator's efficiency. Proper matching only reduces mismatch losses and has no effect on ohmic losses of the radiator, nor does it affect its radiation characteristics.

Another very important factor is the efficiency of coupling power to this loop antenna, which was not addressed. We suspect there is considerable loss in coupling a 50 ohm transmission line into a small loop (in wave lengths) with a load of less than 1 ohm at 14 MHz.

This brings us to the subject of the gain of loop antennas. As Dr. Reynolds reports, the gain of loop antennas is strongly frequency-dependant. Theoretical formulas for determining the efficiency factor are well known and his use of such equations is justified, *theoretically*. However, these equations are only used as first-order design tools and rely on the following assumptions, which are far from being true in real-world situations: 1) All currents are uniform and constant. 2) All losses are due to traveling waves, i.e. there is no standing wave on the loop (no stored energy, no self inductance!). 3) An ideal feed device would have no transmission line or power cable for the capacitor drive motor in the antenna aperture. 4) No depolarization effect due to the mounting pole (or boom) in the near field.

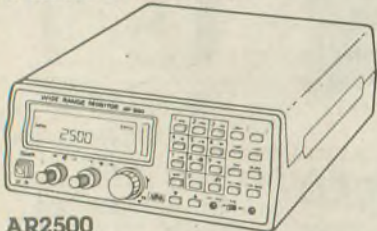
Let us address these assumptions as they pertain to the above antenna.

1) As far as the current distribution is concerned with the feed loop device — because the feed line and power cable are in the aperture of the antenna, this antenna is far from having a uniform current distribution.

(please turn to page 39)

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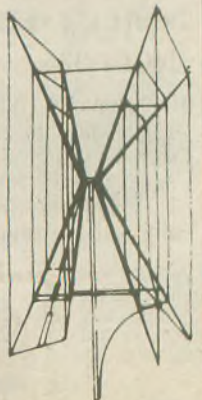
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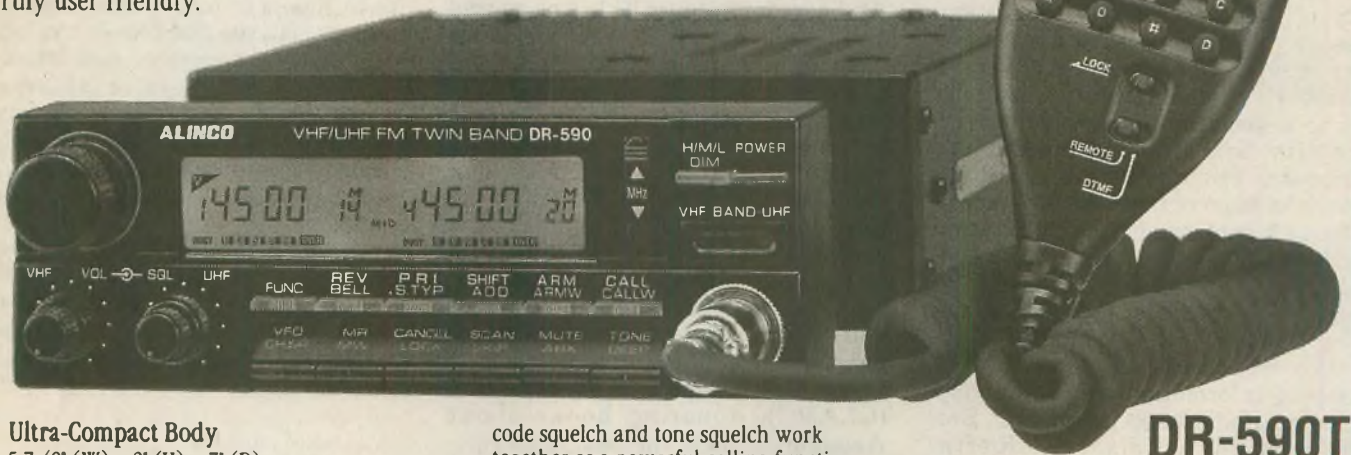
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AEA's Amateur Ambassador

Advanced Electronic Applications, Inc. awarded James "Jim" Heil, KB5AWM, of Houston, Texas its 1990 Amateur Ambassador Award at the ARRL National Convention in Kansas

City, Missouri on June 9, 1990. The award was presented by Mike Lamb, N7ML, president of AEA.

AEA presents the Amateur Ambassador Award on a yearly basis to the radio Amateur who demonstrates extraordinary efforts in promoting the Amateur service to individuals new to Amateur Radio. Jim Heil was chosen Ambassador because he has organized and taught numerous Novice classes, "elmers" a number of new hams and has served as a VE and as a VE coordinator and liaison.

Jim has also been instrumental in a variety of local activities promoting Amateur Radio. As ARRL Public Information Officer, Jim was able to get an Amateur Radio announcement run on the local cable system and has written articles about ham club activities and Amateur Radio for the local newspapers. Jim was also instrumental in Clear Lake Amateur Radio Club (CLARC), donating books about Amateur Radio to the local library.

Since becoming licensed in 1986 at the age of 18 (and upgrading to Extra Class the following year), Jim helped establish the CLARC, which grew from seven to over 130 members in the last three years. He also serves as editor of the club's newsletter, *CLARC Chronicles*. Jim held the office of CLARC vice-president for two years, is a member of several emergency networks including Skywarn, RACES and ARES and has faithfully supported

local parades, fun runs and other events that benefited from Amateur Radio assistance.

Jim is a full-time student at the University of Houston at Clear Lake and is pursuing a degree in Computer Information Systems.

Former recipients of the AEA Amateur Ambassador Award include Mary Duffield, WA6KFA; Barry Goldwater, K7UGA; Byron Lindsey, W4BIW and Bob Wallar, WB6QNR.

AEA will accept entries for the 1991 AEA Amateur Ambassador Award through May 1, 1991. All entries need to include a letter or report outlining activities of the nominee in the following three categories: dedication to Amateur Radio, positive influence on those outside of the Amateur service and initiation of special projects or programs to promote Amateur Radio. The recipient of the award is chosen by a panel of judges from AEA, and is awarded \$1,000 and an all-expense paid trip to the ARRL National Convention. Entries may be forwarded to AEA, Attn: Amateur Ambassador Award, P.O. Box 2160, Lynnwood, WA 98036. □

Special Events...

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Sampson County Amateur Radio Service (Clinton, NC) will operate special event station AB4TT on Thursday, Nov. 8 from 1700 to 2400Z in conjunction with the Sampson County Expo and Pork Festival.

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This month's winner is Jim McDonough, W3CY, of Rockville, MD, who has been continuously active since 1932. Following is a description of his equipment.

Far left is the 2M station; FT 207R; Astron RS 12A power supply, atop which is a homebrew coupling unit to link power supply; HT and Mirage B 23 linear with meter to keep track of over-all voltage. The square meter at the rear is a VU meter to check levels on FM audio signals received.

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Product Review

Realistic HTX-100

MAX BODENHAUSEN, W0ZZQ

Radio Shack is back on the ham radio scene with the Realistic HTX-100. Is this neat package of 10M SSB and CW fun the one for you? With 25W, a QRP-option, and the equivalent of 11 VFOs, it just might do the job. More about the "11 VFOs" when I describe the use of memory channels. Suffice it to say that this rig hits its target market, the Novice and the Technician. It will serve more seasoned hams as a second or mobile rig.

After over two weeks of intensive use, I'm ready to go beyond the magazine ads to tell you more about the capabilities of the HTX-100, how it works on the air, and how it compares to its brother, the Uniden HR2510. My testing was Amateur in nature, using the HR2510 for comparison, the Kenwood TS-680S both as a monitor and a signal source, and tape-recordings made at the station of KD5UK.

Quick assessment

The HTX-100 has a clean exterior design with displays and controls that are easy to interpret and use. It covers the entire 10M Amateur band. The receiver is tailored for SSB and CW operation with good sensitivity and reasonable selectivity. In fact, selectivity is narrower on CW than on SSB. Transmitted signals are clean both on USB and CW.

Displays

On the upper right face of the rig, the frequency display has bold black numerals on a green background. It's easy to read even in direct sunlight. Memory, mode, tuning step and transmit indications are also shown on the LCD display. Just left of the frequency display, relative power output and S-meter readings are shown by five red LEDs in a horizontal line. The S-meter seemed a bit oversensitive at S-3, -5 and -7 levels, but agreed loosely with my TS-680 at the S-9 level. The red LEDs were easy to see at the home station, but not in the mobile on a bright day.

Controls

All controls are on the front of the rig. Their use is virtually intuitive. For the new Amateur and those who haven't been exposed to push-buttons and memories, the owner's manual explains them clearly and thoroughly. Exception: while the manual covers memory storing and retrieving very well, it does not reveal that you can tune away from the frequency stored in memory. More on this in a moment.

Let's make a quick trip around the front panel starting with the power and volume control knob on the lower right — easy to find with your eyes on the road. Just above the volume control is the RF gain knob. Logical. Pull it out and you are on low power for transmitting. To the left of these knobs is



another set of two. The top one is the RIT control with detent at the center point. The lower one is the squelch control.

Moving left we find the frequency tuning knob. Seven momentary push-buttons are located to the left of the tuning knob. The first two buttons are used to tune up or down or to select memory channels when the memory function is active. The next two switches serve memory activities. Touching the top one transfers control from the "main" VFO to the memory channel shown on the display. "MEMO" appears on the display above the channel. Another touch of the memory button transfers control back to the VFO. Below the memory button, the store button can be used to enter the frequency and mode shown on the display into the memory channel shown. (I'll discuss tactics for using memories in the operating tips section.) The next pair of switches to the left deal with moving about the band. The top button, labeled "500k," moves you 500 kHz up the band. (please turn to page 22)

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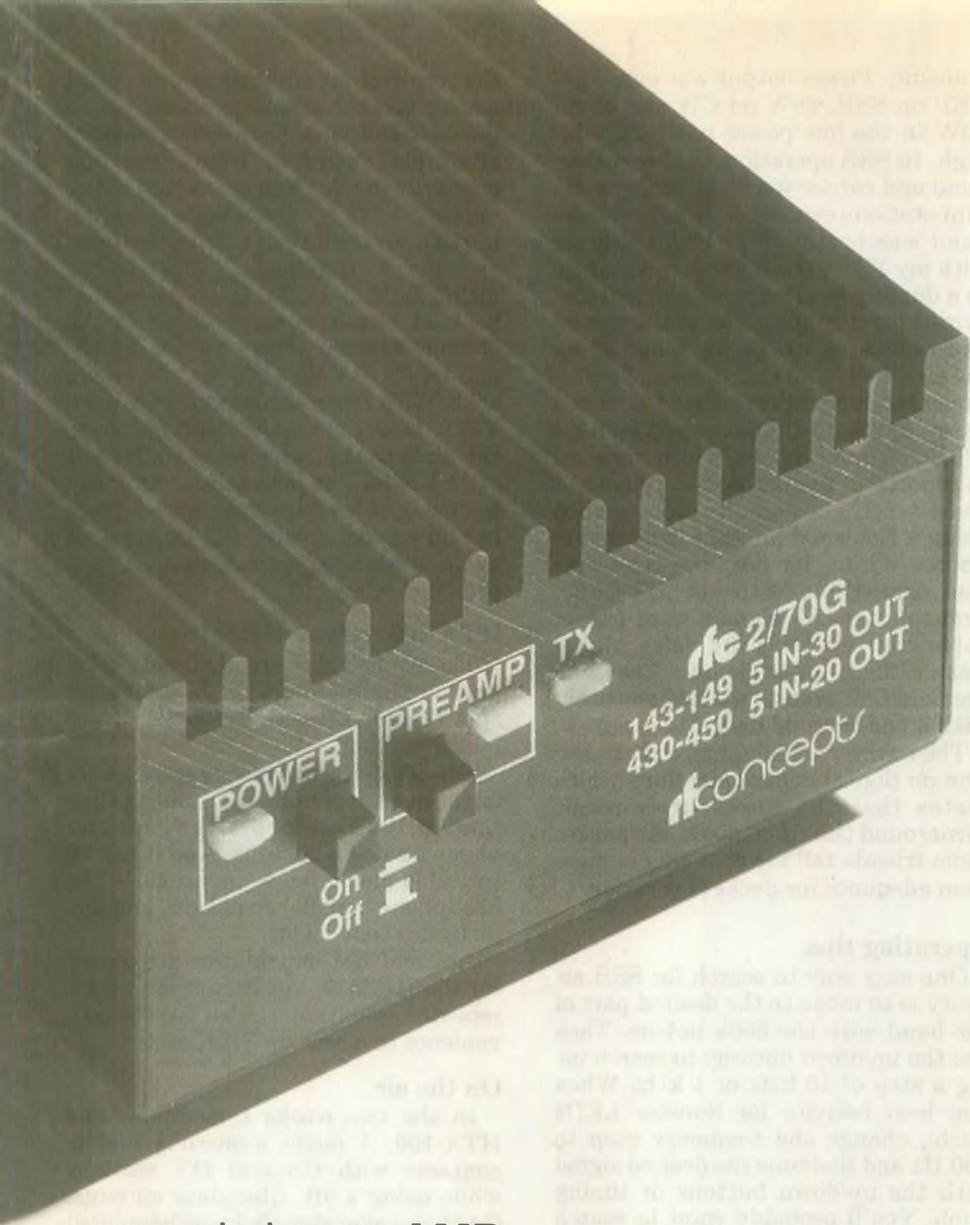
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Product Review

(continued from page 20)

above 29,500 kHz, the frequency will jump to the lower segment of the band. The lower button, labeled "step," changes the rate at which the tuning controls step the frequency when tuning. Steps of 10 kHz, 1 kHz, and 100 Hz are available. The step currently active is shown by a line under the appropriate digit on the frequency display. The remaining button to the left is used to select the operating mode, SSB or CW.

Three toggle switches on the top left of the front panel allow activating the transmitter, noise blanker, and frequency lock respectively. Of course the transmitter is normally controlled by the mic button or key.

Microphone and headphone jacks are located on the lower left of the front panel. The coaxial connector and the auxiliary speaker and key jacks are found on the rear panel.

Performance

The HTX-100 appeared to meet or beat specifications noted in the owner's manual. No birdies were noted on receive. Sensitivity was quite good. Weak signals, just perceptible on my TS-680, were also heard on the HTX-100. While SSB selectivity didn't match that of the TS-680, it was reasonably good and matched that of the Uniden HR2510. The HTX-100 has sharper selectivity on CW than on SSB. On both the small rigs, you can hear a weaker false signal about 1600 Hz below the true signal in the CW mode. When tuning for a CW signal, it might be well to tune from a higher frequency down so as to intercept the true signal first. The noise blanker on the HTX-100 was marginally effective in my mobile.

I didn't find any spurious signals on

transmit. Power output was over 25W PEP on SSB, 25W on CW and about 10W in the low power position, a bit high. In SSB operation, the lower sideband and carrier were inaudible to distant stations even when the upper sideband was heard at S-9+. Monitoring with my TS-680 (while transmitting into a dummy load with the test rig) confirmed good suppression of the carrier and unwanted sideband. When using the supplied hand microphone, I sometimes received reports that I sounded bassy or muffled. I borrowed another HTX-100 microphone which resulted in reports of crisper audio. I also got consistently good quality reports when using a Kenwood MC-43S hand microphone. Wiring for its 8-pin connector was compatible with the HTX-100. Transmitted CW signals were free of chirp and clicks. (The false signal wasn't there on transmit.) The semi break-in CW system worked smoothly with its one-second delay.

The owner's manual has a short section on digital communications which states that the receive-to-transmit turnaround time is 40 msec. My packet radio friends tell me that this is more than adequate for packet operation.

Operating tips

One easy way to search for SSB activity is to move to the desired part of the band with the 500k button. Then use the up/down buttons to search using a step of 10 kHz or 1 kHz. When you hear activity (or S-meter LEDs flash), change the frequency step to 100 Hz and fine tune the desired signal with the up/down buttons or tuning knob. You'll probably want to search for and tune in CW signals using the 100 Hz step.

Alternatively, you may want to store a memory every 100 kHz up the band — say channel 1 at 28,100, channel 2 at 28,200, channel 3 at 28,300 etc. Then if, for instance, you want to search the area above 28,300, activate the memory function, select channel 3 and tune up from 28,300 with the tuning knob at

the step desired. (In this case, you can't use up/down buttons to tune. In the memory function, they select memory channels above or below the one presently in use.) You can return to the "main" VFO by touching the memo button. You will be at the last frequency tuned by the "main" VFO. Hit the memo button again and you will be back at the frequency stored in the channel number shown on the display and ready to tune away from it if you wish. With 10 tuneable memories and a VFO, it doesn't take high math to calculate that you have the equivalent of 11 VFOs! The possibilities for keeping track of favorite frequencies, keeping an ear on several DX pile-ups, or even operating split frequency are pretty obvious.

HTX-100 versus HR2510

These small rigs are identical in size and virtually identical in technical specifications. However, some of the features differ.

The HTX-100 has more versatile tuning options, including the ability to fine tune in 100 Hz steps with the microphone up/down buttons. And it has 10 tuneable memories as mentioned. The headphone, auxiliary speaker, and key jacks are convenient.

AM and FM capabilities are pluses for the HR2510, but it isn't set up for repeater operation. It also has the convenience of a built-in SWR meter.

On the air

In the two weeks I evaluated the HTX-100, I made numerous mobile contacts with US and DX stations while using a 3ft. fiberglass antenna. On the weaker signals I was hampered by a hashy noise. The noise blanker didn't help this problem, but it did seem to help read through pulsed noise. From the home station, I easily worked all continents with the HTX-100 connected to a tri-bander yagi. It was fun working Japan at the lower power level. I frequently received 5-9+ reports from both coasts of the US.

Summation

I really liked the feel of the HTX-100 and its ease of use. Add FM and it would be a near perfect 10M rig. As is, it certainly meets its objective of being a good first rig for Novices and Technicians. Many old-timers will enjoy it too. □

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Silent Keys

Shlomo Hertz, 4X6LB

On Monday August 14, many members of the IARC accompanied their very good friend Shlomo Hertz, 4X6LB, to his eternal resting place. He was only 47 years old. At the grave site Avi, 4Z4AB, spoke moving words expressing the feelings of the entire Amateur community.

Shlomo was the man who actually brought the computer into the daily life of the Israeli hams. For years he gave weekly lectures on the secrets of programming and operating the various types of computers to an ever growing audience. When he first started out he believed that the subject would probably interest only a handful of hams. But the word got around, and more than forty Amateurs were at the first lesson. Soon the room of the Holon/Bat-Yam Radio Club was too small and the lectures had to be moved to a bigger place, the lecture hall of OPT-Israel

in the Atidim industrial park in northern Tel-Aviv. Unfortunately these lessons ceased when OPT went out of business. Still, Shlomo was always around with help and advice.

About two years ago it became apparent that Shlomo had cancer. He fought hard, receiving various types of treatment, but finally yielded to his illness. All the members of the IARC will remember this gentle, kind and helpful man for many years to come. May he rest in peace. — Information submitted by X1AT. □



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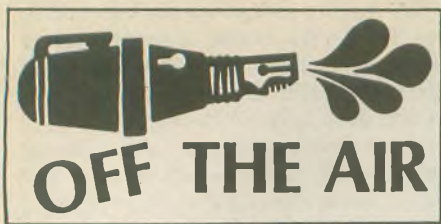
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They'll find us

There seems to be a phenomenon pervading Amateur Radio these days, and it resembles the evangelistic effort put forth by some religious groups. Among a number of Amateurs, the need to search for, recruit and indoctrinate candidates for the Amateur ranks is almost an obsession. I find this disconcerting, because historically the initiative to join the ranks was taken by someone who, in most cases, was already involved in some aspect of communications or electronics. Becoming acquainted with an Amateur, usually through common interests, and watching him operate his station, provided the incentive to get involved. While some of the larger metropolitan radio clubs conducted code classes, help in preparing for the license examination was provided on an informal and personal basis.

I don't think Amateur Radio has to be sold. Like any other avocation, its appeal will generate its own response.

But not everyone is going to be interested, even among the technically-minded. There are individuals trained as high speed CW operators during military service and those who are involved in the computer world and other "high tech" areas of electronics, who have absolutely no interest in becoming an Amateur Radio operator.

Then, there are those whose interest reflects the desire to use Amateur Radio to circumvent toll charges for personal communications in support of other activities. Are they, in the true sense of the word, Amateur Radio operators?

Let's keep Amateur Radio a hobby for those who enjoy it for what it is. It's not a training ground for aspiring astronauts or scientists; that's what our schools are for.

If someone shows an interest, welcome him or her gladly and offer all the assistance you can in getting started. But don't go beating the bushes for that elusive potential Amateur. If he or she is out there and is really interested, they will be around asking questions.

BOB McDONALD, KE6VB
Imperial Beach, CA

A satisfied customer

Every once in a while, a business comes along that needs to be recognized. In this case it is Antennas West, located in Provo, UT, and operated by Jim Stevens, KK7C.

I recently purchased a product from Antennas West because of an earlier recommendation from another Amateur and subsequently from advertisements in your publication, of which I received a complimentary copy.

The situation involved a component of the product which came apart during installation. This could very well have been partially my fault, as I misread the instructions as to where the component was to be placed. In any event, I called Jim at 7 a.m. local time on a Monday, discussed the problem with him and by 11 a.m. on Wednesday, I had the replacement part. Now if that isn't service and quick response, I don't know what is.

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No-code not detrimental

My, my, how the codeless license debate does go on. Red Barger's letter (*Off the Air*, March 1990) invited criticism, but his saying he has "plenty of answers" hints that he will not be swayed by it.

Most of the advantages listed for CW are perfectly valid. It is definitely a useful mode and people should use it if they want to. However, as far as I can tell, nobody is suggesting that CW be made illegal... just not required. If you want the very real benefits of CW, nobody's stopping you from learning Morse code.

All Amateurs are now forced to learn code to get a license. Very few ever use it and most forget it completely. The requirement is a "seriousness" hurdle, an initiation rite to weed out "undesirables." I'm sorry, but if you want to be a snob, get out of radio and join a snooty country club.

I see no logic in the argument that a no-code license will turn Amateur Radio into another citizen's band. Any idiot can buy an Amateur Radio right now and jam the airwaves with silliness. Learning Morse code only allows you to get a license, not a radio. (It apparently doesn't teach you courtesy, either.)

The point that people are "lazy with no ambition to study" is irrelevant: The FCC's job is not to legislate against laziness, just to allocate the frequency spectrum. This argument is mistaken, anyway; disagreeing with a requirement that you feel is a waste of time does not make you lazy. Personally, I am against a Morse code require-

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ment, yet I'm not lazy and I love to learn. I also love radio and will get a license, code or no code, but I would much rather spend my time learning something that's useful and interesting to me. Learning advanced first aid would undoubtedly come in handy in an automotive emergency, but nobody's yelling at the DMV to make it a requirement for a driver's license.

Nobody builds their own radio nowadays, so what's the point in learning all that electronic theory? If people were really so lazy, wouldn't they complain about that, too?

The only people I've ever heard of being in favor of the Morse code requirement had to learn it themselves and like the feeling of tradition and exclusivity. Logic has nothing to do with it.

Finally, calling people with different opinions "blasphemous, yackers, blabbers, whiners, misfits and lazy" only reveals Mr. Barger's depth of thinking.

CRAIG HAGGART

Sunnyvale, CA

Breaking the backbone

When I was in school in the 1940s, I wanted very much to learn Morse code and did learn some while I was in the Boy Scouts. Unfortunately, I never

knew Amateur Radio was available to the general public, so it was bypassed. I agree that it should be advertised in every magazine that young people read.

During the 1960s I met an Amateur who explained the hobby and what was necessary to become involved. Not until two years ago was I fortunate enough to be offered a course in code and theory. Being in my 50s I was a little hesitant, but my prior interest held and I studied.

It took me longer to get my Novice license than the rest of the class, but the instructor lived in the same trailer park as I and he kept encouraging me. I am very grateful to him because he took the time to help me.

I never gave a thought to becoming an Amateur without learning Morse code, and I cannot understand someone wanting to get into Amateur Radio without that basic qualification. It would be like giving a driver's license without having to learn to drive.

The no-code license is just another way of degrading the principles on which this great nation was built. The CB channels which have no code or theory requirement tell very plainly what will become of Amateur Radio if this is allowed. All you hear on CB is garbage mouths and illegal linears.

Is this what we want on the Amateur bands? I would hope not because a long time before getting my Novice license I simply gave up even listening to my CB.

All these experts and committees should gather all the information for and against an issue and then send a return postage paid survey to every licensed Amateur so they will feel as if they are a part of the decision making process.

BUCK BURDETTE, KA7YVZ
Quartzsite, AZ



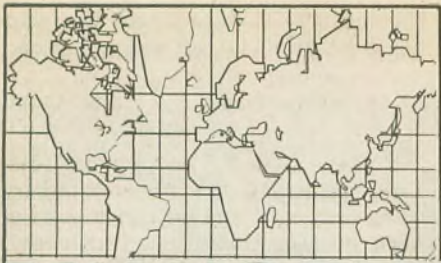
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DX WORLD

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Activities Calendar

- 09-11 Nov. 59 Japan International Contest (SSB)
- 10-11 Nov. DARC European DX Contest (RTTY)
- 11 Nov. CRCC Romanian DX Contest
- 10-12 Nov. RSGB Second 1.8 MHz Contest (CW)
- 17-18 Nov. OVSV All Austria Contest (CW)
- 24-25 Nov. CQ World Wide DX Contest (CW)

For details on contest activity, consult your favorite contest column. We have no advance notice on some of the above and are basing the dates on those from previous years.

The Worked All Germany Contest replaces the former Worked All Y2 Contest and celebrates the forthcoming union of the two Germanys. West Germans will be exchanging their DOK numbers while the East Germans will give their Kreiskennner (KK) numbers.

The World Wide DX Contest is the biggest DX event of the season and is a very good source of DX for new DXers wishing to add to their totals. Don't miss it!

For the last several months Tom Christian, VR6TC, and his family have been touring this country of ours after attending a Seventh Day Adventist Convention in Indiana.

Tom and his family also were in Sacramento in August. We had an opportunity to meet him. He is indeed a remarkable person. Those of you who are familiar with *Mutiny on the Bounty* should know that he is a direct descendant of the famous Fletcher Christian.

Crozet Island (FT8W)

DX News Sheet reports that FT4WB on Crozet Island, operated by Jean, FD1OUR, has equipment problems and may be off the air for several months. When he does get back on, check the net frequencies on 14.226 MHz around 1200 UTC or 28.470 MHz at 0900 UTC. He is a good CW operator, but he has a limited knowledge of English.

Kerguelen Island (FT5X)

Jean Pierre Berthoumieux, F6ITD, reports on the status of the stations on Kerguelen Island which includes three calls. FT5XA, Rafik, who signs F5CQ in France, can often be found on 28.470 MHz at 0900 UTC. He works all bands, SSB, CW, and RTTY. FT5XH is the call used by Francois, F6GYV, and can be found near 28.440 MHz at 0800 UTC or 21.153 MHz and 21.265 MHz. He uses the latter 15M frequency for working Americans. The third call is FT4XG, but he is not very active. The above information should be valid through November.

Malpelo Island (HK0)

The latest word we have on the Malpelo Island DXpedition is that HK0TU will be active on or about Nov. 3 and run for four days; 15 operators are scheduled to participate in the affair on all bands 10 through 160M. On CW they will be on 5 or 25 kHz up from the bottom of the bands listening up. On SSB their transmitting frequencies will be 1.835, 3.795, 7.085, 14.145, 21.195 and 28.395 MHz. RTTY activity is also expected.

Jan Mayen Island (JX)

After giving out contacts to happy DXers, JX7DFA returned to Norway on Aug. 4. He is scheduled to return on Oct. 5 and should be there by the time you read this.

Vanuatu (YJ8)

Formerly known as New Hebrides, not too much activity has been



Tom Christian with his two daughters, Sherileen and Darlene, and his wife, Betty. (WA6OHB/VR6HB photo)

reported from this one. Perhaps the most active recently has been Jack, YJ8AB, who seems to prefer 20M SSB. Look around 14.203 to 14.208 MHz between 0600 and 1000 UTC.

Other calls reported during the month of August include the following:

YJ8AIM	14.226 MHz	1130 UTC
YJ8CW	21.225 MHz	1300 UTC
YJ8FB	21.272 MHz	0500 UTC
YJ8RN	14.226 MHz	1000 UTC
YJ0AJD	14.261 MHz	1000 UTC
YJ0AKY	14.242 MHz	2115 UTC

Notice the call YJ8CW reported on SSB. We wonder if he works CW too.

Tristan da Cunha and Gough Island (ZD9)

Andy, ZD9BV, is reported to be active on 21.082 MHz between 1600 and 1800 UTC operating RTTY. Andy has been showing on 10M SSB often recently. Try listening near 28.405 MHz around 1300 UTC and later.

Over on Gough Island ZD9CN is on 20M from 1400 to 1700 UTC. QSL requests for either station may be sent via W4FRU.

There was a recent report of a ZD9CO on 28.405 MHz around 1245 UTC on Sept. 1. We have no other information on this one.

Malta (9H)

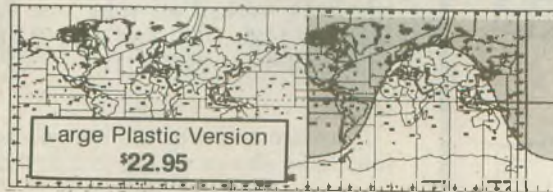
The *Long Island DX Bulletin* and others report that DL2GBT was to

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have operated from Malta signing 9H1XX from Sept. 23 to Oct. 21 and probably should be on right now.

Other activity, especially on 10M, includes that of 9H1ED found on 28.495 MHz at 1430 UTC, 9H1EL between 28.470 and 28.485 MHz at 2200 UTC, 9H1FBJ on 28.476 MHz at 1445 UTC and 9H3NH on 28.483 MHz at 1645 UTC. On CW 9H1EL was on mid-August at 1500 UTC at the lower end on 28.010 MHz.

On 15M SSB we have 9H1FG on 21.270 MHz at 0430 UTC, 9H1GD on 21.265 MHz at 2015 UTC and 9H3DN near 21.268 MHz at 2115 UTC. One lone 20M report was that of 9H4R on 14.186 MHz at 0500 UTC working into Japan.

West Malaysia (9M2)

Reported fairly active recently from West Malaysia was 9M2AX. This station was found in the CW portion of 20M between 14.010 and 14.026 MHz from 1100 UTC. He was also reported on 30M working into Japan around 2100 UTC on 10.103 MHz. And a South Carolina DXer worked him on the other two WARC bands on Sept. 3 around 1600 UTC at 18.080 and 24.895 MHz.

Fifteen meters SSB is a popular band for this one as indicated with the following calls reported:

9M2AR	21.265 MHz	1630 UTC
9M2DW	21.270 MHz	1430 UTC
9M2FL	21.185 MHz	1800 UTC
9M2JA	21.248 MHz	0800 UTC
9M2JL	21.321 MHz	1830 UTC
9M2RI	21.300 MHz	0845 UTC
9M2RJ	21.247 MHz	1800 UTC
9M2SH	21.247 MHz	1800 UTC
9M2UR	21.337 MHz	1745 UTC

There has also been some activity reported on 20M SSB with 9M2ZA found between 14.161 and 14.167 MHz around 1130 UTC and 9M2ZZ between 14.175 and 14.242 MHz after 1630 UTC. Also found was 9M2CW on 14.136 MHz at 2145 UTC working into Europe, 9M2FL working into

Japan on 14.203 MHz at 1930 UTC and 9M2DM on 14.177 MHz at 1130 UTC in the Texas area.

The CW mode is not excluded either. 9M2FB has been heard on three bands working into Europe on 14.026 MHz at 1400 UTC, 18.072 MHz at 1715 UTC and 21.037 MHz at 1700 UTC. He has also been reported on two bands in Europe near 18.068 MHz at 1715 UTC and 24.892 MHz at 1645 UTC. Stateside DXers worked 9M2ZE on 14.009 MHz around 0330 UTC and 21.031 MHz at 0130 UTC. 9M2ZZ also appeared on 14.003 MHz around 1230 UTC in early August after mostly SSB activity.

We also have a report for RTTY with 9M2MU on 14.087 MHz around 1845 UTC. This was a contact in the second call area of Japan.

Only two reports on 10M were found. In Japan 9M2LK was found near 28.010 MHz around 0900 UTC and 9M2JA was working into Europe near 28.495 MHz at 0800 UTC.

Finally we have a single report of 40M activity with 9M2NL on SSB near 7.088 MHz around 0900 UTC.

East Malaysia (9M8)

Twenty meters SSB is a popular band for stations in East Malaysia. Look for 9M8FH between 14.210 and 14.241 MHz around 1200 UTC and 9M8MG between 14.199 and 14.230 MHz from 1000 to 1400 UTC.

Three other calls were reported with 9M8PV on 14.203 MHz at 1200 UTC, 9M8ST on 14.227 MHz at 1630 UTC and 9M8WB near 14.188 MHz at 1345 UTC.

The Long Island DX Bulletin reports that 9M8MKS is a new club station in Kuching. He is reported to be on daily around 0900 UTC near 14.200 MHz. He has also been reported near 14.190 MHz at 1330 UTC and 21.280 MHz at 1500 UTC.

Fifteen meters included 9M8PV near 21.220 MHz at 1500 UTC, 9M8STA on 21.300 MHz at 1600 UTC and 9M8UM on 21.209 MHz at 1630 UTC.

For CW contacts, look for 9M6HF who was worked on 40M near 7.007 MHz at 1130 UTC and on 20M near 14.026 MHz at 0930 UTC.

IOTA

Here are a few of the many islands that have shown on the bands during

the summer. Included with the island name is the IOTA reference number.

AF-65	Shérbro Island	G0GWA/9L3
	21.160 MHz	1830 UTC
AS-05	Dickson Island	4K4/EK9JG
	14.025 MHz	1915 UTC
AS-22	Bear Island	4K4QQ
	14.032 MHz	1630 UTC
AS-36	Tsushima Island	JA6WIE
	21.260 MHz	0900 UTC
AS-42	Severnaya Zemlya	4K4BAN
	21.278 MHz	0730 UTC
AS-44	Shantarskiye Island	EK0AC
	14.010 MHz	1045 UTC
AS-45	Ullung Island	HL8V/5
	21.260 MHz	1630 UTC
AS-65	Kolyuchinskaya Bay	4K4POL
	14.031 MHz	1630 UTC
EU-12	Shetland Islands	GM3ZET/P
	14.212 MHz	0700 UTC
EU-34	Hiiumdaa Island	ES0WN
	21.005 MHz	1600 UTC
EU-35	Novaya Zemlya	4K3BB
	21.020 MHz	1400 UTC
EU-37	Oland Island	SM7KDB
	14.165 MHz	0500 UTC
EU-40	Berlenga Island	CT0B
	18.077 MHz	2045 UTC
EU-45	San Stefano Island	IB0M
	21.265 MHz	0830 UTC
EU-48	Hoedic Island	TV6ODI
	14.255 MHz	1030 UTC
EU-49	Samos Island	SV8/I5DCE
	21.260 MHz	1730 UTC
EU-59	St. Kilda Island	GM0EVV
	7.063 MHz	1000 UTC
EU-66	Solovetskiye Island	R1SO
	14.007 MHz	0545 UTC
EU-68	Sein Island	TV6SEN
	14.230 MHz	1930 UTC
EU-69	Columbretes Islands	ED5ICE
	21.293 MHz	1730 UTC
EU-74	Brehat Island	TM1BRE
	14.260 MHz	0645 UTC
EU-84	Stockholmslan group	7S0HS/5
	14.199 MHz	0600 UTC
EU-88	Kattegat Island	OZ/DK6AO
	28.494 MHz	1200 UTC
EU-101	Sandstrom Reef	OH1MDR/P
	14.025 MHz	1445 UTC
EU-108	Treshnish Islands	GM3NUF/P
	14.260 MHz	1945 UTC
NA-17	Isla Cedros	XF1C
	14.002 MHz	0600 UTC
NA-83	Kent Island	W3WPY
	14.186 MHz	2300 UTC
NA-112	Topsail Island	N4VRR/4
	14.185 MHz	2300 UTC
OC-104	Banks Island	YJ8BKS
	21.260 MHz	1100 UTC
OC-121	Malolo Island	3D2CC
	21.158 MHz	1930 UTC

The above listings are for islands that do not have a separate DXCC listing. Those islands with a separate DXCC classification can easily be identified by the prefix. An example

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would be Isle of Man where GD3TXF is easily identified by the prefix as a separate DXCC country and also counts in the IOTA program.

That GM3ZET/P call was active in the National Field Day, a European event the beginning of September, and was located in the Shetland Islands. The Callbook also indicates that it is a permanent call on the islands.

DXers interested in chasing the islands might want to check out 14.260 or 21.260 MHz, the gathering place for island hunters.

Stateside DXers may obtain an up-to-date IOTA listing for \$4 from The DX Bulletin, P.O. Box 50, Fulton, CA 95439.

OM award

According to *Inside DX* there is an award for working those Czech OM calls you have heard on the bands during the summer. North American DXers need only work five of these calls. The period runs from May 17th through the end of the calendar year. The cost of the award is 10 IRCs. Send your log extracts, certified by two licensed Amateurs, to Radioclub KRYSTAL, OK3KWW, Bierutova 40, 851 02 Bratislava, Czechoslovakia.

DXCC

As of Aug. 14 the DXCC Desk was processing DXCC applications received on March 13. They are a bit behind.

Antique QSL department

This month we shall pay tribute to Gus Browning, W4BPD. Many old-time DXers will remember Gus from his around-the-world DXpeditions to give the deserving a new one.

Sponsored by the World Radio Propagation Study Association, Gus traveled around the world in the early 1960s working as an international lecturer and photographer and visited many rare spots. One of these spots was Bouvet Island where he signed LH4C in Nov. 1962.



Dave Kennedy, N4SU, was one of the deserving DXers who worked Gus from Bouvet Island. The card indicated that Gus was using Collins equipment, which was provided through Ack Radio Supply Company in Birmingham, Alabama. This was E.C. "Ack" Atkerson, W4ECI.

About six months later Gus



operated from Kamaran Island which is located in the Red Sea off the coast of Yemen. Dave, then operating as W8BRA, worked Gus on June 21 on 20M SSB. Kamaran Island now counts towards the IOTA awards program as reference AS-09. However, this particular card is too early to count.

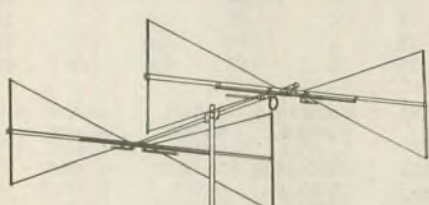


Some of the places Gus visited were quite exotic, such as Sikkim, where he signed AC3PT. Dave Kennedy also provided this one but did not include a copy of the data side of the card. Sikkim became a deleted country in 1975 when it became part of India.

In later years Gus established the *DXer's Magazine*, which he ran from

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
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DX Prediction — November 1990

Maximum Usable Frequency from West Coast, Central U.S., and East Coast (courtesy of Engineering Systems Incorporated, Box 939, Vienna, VA 22180).

The numbers listed in each section are the average Maximum Usable 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.

NOVEMBER 1990 WEST COAST

UTC	AFRI	ASIA	OCEA	EURO	SO AM
10	(13)	14	18	(11)	17
12	(13)	14	17	(11)	17
14	(23)	14	17	19	33
16	(28)	14	24	18	39
18	30	14	(21)	(13)	40
20	30	(18)	29	(12)	41
22	26	29	34	(12)	40
24	23	31	38	11	34
2	17	26	34	11	23
4	15	18	24	11	21
6	(14)	16	21	11	19
8	(14)	15	19	(11)	18

his home in South Carolina. Gus had always wanted to make one more Dx-pedition to another one of those rare ones. But this was not to be. Gus died on August 21, 1990 after a long illness. He was 82 years old.

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C30CAG	-F6BKP	CT0B	-CT4UW
C31EMA	-ON4AAQ	ED1ISI	-EA1ANE
C31SD	-CT1AMK	ED5PIH	-EA5DLD
C6A/WA2ICE	-WA2ICE	EK0AQ	-UA90BA

CENTRAL USA

UTC	AFRI	ASIA	OCEA	EURO	SO AM
8	(17)	11	18	(11)	17
10	(16)	11	17	(11)	17
12	30	11	16	19	32
14	36	15	28	22	36
16	39	(14)	24	19	39
18	38	(14)	(21)	14	40
20	31	(17)	29	(13)	40
22	26	24	34	12	34
24	22	(20)	33	11	24
2	19	(14)	22	11	21
4	18	(13)	20	11	19
6	(17)	(12)	(19)	11	18

EAST COAST

UTC	AFRI	ASIA	OCEA	EURO	SO AM
7	17	11	(18)	11	18
9	16	11	17	(11)	17
11	31	11	16	19	29
13	37	12	30	23	34
15	39	(11)	26	21	38
17	40	(11)	(20)	18	40
19	35	(11)	(26)	13	40
21	29	(19)	32	12	35
23	22	(19)	33	12	26
1	20	(14)	22	11	22
3	18	(13)	(20)	11	20
5	17	(12)	(19)	11	19

G0GWA/9L3	-G0GWA	KC6CW	-JA2NQG
GD3SXW	-G3SXW	KC6DX	-JH2BNL
GD3TXF	-G3TXF	KC6GV	-LA2GV
GM/DL1SCQ	-DL1SCQ	KC6MZ	-J12UIY
GS6UW/P	-G3ZAY	KC6TH	-JA0DCQ
GT4RAF	-GD4WBY	KH2/	
GX6UW	-G4BAH	JM1HJG	-JM1HJG
H71A	-SM0KCR	KH21/KH0	-JA1KRS
HK0TU	-HK3DDD	KH9AC	-KH6AQ
HR1LW	-JA1LW	LZ1KVZ	-LZ1WR
J20X	-F2VX		(See Note 1)
J37DX	-W8KKF	OH2AQ/OJ0	-OH2BVF
JE7RJZ/JT	-JA7FWR	OK8ALU	-G4FDC
JH1QDB/JD1	-JH1QDB	OM2BTI	-OK2BTI
K1EFI/V9P	-K1EFI	OM6BCI	-OK2BCI
KB7HM/KH3	-KB7HM	OM6VA	-OK2VA

OM7EA	-OK3EA	ZF2PN	-NE4L
P29SC	-WB1GWB	ZY8EA	-PY8EA
R1SO	-RA3YF	3D2YA	-SP5DYO
S79DBI	-JL1ARF	4K2PGO	-RA9LA
S79NBD	-JG1NBD	4K2SS	-RA3SD
ST0YD	-F6AJA	4K3PWB	-RA3TG
SV8/15DCE	-15DCE	4K4BAN	-RB5FO
SV0HM	-DK6AS	4K4QQ	-RA1QQ
TA0WEA	-LA5NM	4N7N	-YU7BPQ
TM1BRE	-F6GMB	4U1VIC	-WB4FNN
V13TU	-I0IA	4X1AJ	-KC4MJ
V73BL	-WB4CSK	5H3OH	-OH2BAA
VP2EXX	-KC8JH	5H0KG	-Yasem
VP2M/N6CL	-N6CL		(See Note 3)
VP8CDJ	-GM4KLO	7Q7CW	-DK7PE
VP8CEA	-G4JLV	7Q7DB	-IK81PL
VU2KIY	-JF4PTQ	7Q7JA	-JH8BKL
W1CDC/R81	-AB1U	7Q7KG	-Yasme
WB4CSK/			(See Note 3)
KH9	-WB4CSK	7Q7XB	-LA7XB
WL7BZE	-KL7AF	7X4AN	-DJ2BW
XU8DX	-JA1NUT	7Z1A	-WB2WOW
	(See Note 2)	8H9HT	-K4BA1
YB5NOC/P	-11HYW	8J6JEN	-JARL
YC4GDZ	-YB4FNN	8J6FGM	-JARL
YJ8AB	-KC4NJ	8J90XOP	-JA3RL
YU90TW	-YU2TW	9H1XX	-DL2GBT
Z2/OX3SG	-LA5NM	9H3CT	-VS6CT
ZD8S	-AK0M	9Q5PL	-OE7MCJ
ZF2ML/8	-WB2P	9Q5TE	-SM0BFJ
ZF2MZ/8	-K31PK	9X5HG	-DJ3FW
ZF2PM	-NE4L	9X5SW	-DK5QB
			(See Note 4)

A22JP	-P.O. Box 1022, Gaborone, BOTSWANA
ES9WN	-Ivo, P.O. Box 55, Kaerda 203 300, Estonia, USSR
GD4UOL	-Steven Cluff, Flat 4, 60 Geneta Road, Westcliff on Sea, Essex SS0 8DB, ENGLAND
P29NEP	-Nathan, P.O. Box 789, Goroka, EHP, Papua, NEW GUINEA
UH8W/	
UA4FEG	-Pavel Bogachev, P.O. Box 222, Penza 440 011, USSR
UI8I/	
UA4FEG	-Pavel Bogachev, P.O. Box 222, Penza 440 011, USSR
V63AN	-Mine Sugiyama, P.O. Box 5, Ninomiya 259-01, JAPAN
V63AR	-Yuji Wada, P.O. Box 73, Sekishi 431-31, JAPAN
ZK1XY	-P.O. Box 3, Tokaimura 31911, JAPAN (See Note 5)

Notes

1. This applies for YL operator Petia only.
2. The Callbook address for JA1NUT is incorrect. Use 200-9 Naka, Mohka, Tochigi, Japan. Include one green stamp or two IRC s for direct reply.
3. The address for the Yasme Foundation is P.O. Box 2025, Castro Valley, CA 94546.
4. You may also QSL direct to P.O. Box 420, Kigali, Rwanda.
5. Do not QSL via W0RLX, who held this call in 1987. The 1990 Callbook lists him as the holder of ZK1XY, which has been reissued to a Japanese YL operator.

Many thanks to the following contributors: F6ITD, N4SU, WA6OHB, KB7HM, UA0FF, Salt City DX Association (KB2G), Washington DX Club (K7WA), *The DX Magazine* (VP2ML), *Long Skip* (VE3IPR), *DX News Sheet* (G4DYO), *The Long Island DX Bulletin* (W2IYX), *Inside DX* (N2AU), *QRZ DX* (W5KNE) and *The DX Bulletin* (VP2ML).

With the fall weather upon us it is the time to look for that DX. Don't forget the two big contests coming up. Good luck DX! es 73 de John N6JM. □

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TORNADO

(continued from page 3)

better than 50 percent of the school building flattened by the tornado, and the order came that the temporary sheriff's office set up inside had to be removed immediately. The sheriff's office took up temporary residence on site in the communications van with the Amateur Radio operators.

Over the days that followed I overheard a man say that he had never seen a community come together so fast for the common good of all. He recognized how important Amateur Radio had been in this disaster. *Help came from all over.* Wheaton Community Radio Amateurs set up and operated emergency communications van W9CCU in Plainfield and coordinated shipments of supplies with the Salvation Army and the Red Cross. Other Amateurs came from states all around us, as far away as Florida. I wish I could remember all the call signs and names so I could properly thank them.

Something I learned: whatever hand-held radio you use, be sure to make some provision for operating it on regular dry cells. Nicads and battery chargers work well when power and chargers are available to recharge the

packs. I used an alkaline battery holder with the 2AT 2M radio, and there was no waiting to recharge when time was of the essence.

Secondly, I learned how valuable a magnetic antenna can be for your hand-held. Just picture yourself in an area that looks as barren as the surface of the moon. They both worked excellently.

No matter how much equipment any agency may have, they just cannot have operators everywhere; our ham operators came with their own equipment, so there were eyes watching and ears listening throughout the entire area. Amateur Radio worked to make emergency communications complete.

If anyone would like to work Crest Hill, IL, I will be operating my own station on 7,110 kHz (CW QRP) and 7,040 kHz CW most mornings between 8 a.m. and 9:30 a.m. CST daily, or Sundays from 8 a.m. to noon. I will QSL upon receipt of your card confirming contact. Why am I just on 40M? It's the only antenna system that survived, and the QRP rig is the only one that still operates since the tornado came through. □

Amateur Radio to the rescue

The Bay Area earthquake occurred on October 17, 1989. But Richard Allison, AB4EZ, of Alabaster, AL, will remember that date for another reason: It's the day Amateur Radio kept him alive.

Richard was driving to work after stopping at his doctor's office for his weekly allergy shot. He had been taking the shots for a year, but this time something happened. He began suffering an allergic reaction.

"I decided to turn around and head back to the doctor's office," he said.

Richard used the autopatch on the 146.940 MHz repeater to call the Hoover Fire and Rescue Service. "They were asking me what my intentions were and I told them I was going to try to make the doctor's office, but if I couldn't I would call them right back."

But Richard's symptoms worsened quickly — he realized he wouldn't be able to complete the trip.

"I knew I was in some kind of critical situation and had to get help immediately," he said.

Richard called the fire department a second time and asked for paramedics to meet him in a department store parking lot. He says firefighters arrived 30 seconds after he did.

"They treated me on the scene. It was a life-threatening illness — time was of the essence."

He says he vaguely remembers being treated by ambulance technicians. "I was in and out. I couldn't see anything, but I remember what was going on. At one point they were trying to get a pulse from different places on my body and they couldn't get anything," he said.

Richard says the paramedics told doctors in the hospital emergency room that he had used his radio to call for help. "The doctor informed me that Amateur Radio saved my life because of the time I saved using the autopatch rather than waiting by a phone and waiting for paramedics to get to me," he said. Richard spent two days in intensive care.

"Usually, we think about hams helping others in distress, but Amateur Radio helped me, personally."

Richard says his wife's views of Amateur Radio have changed because of the incident. "She's always been at arm's distance away from Amateur Radio, but now she's glad that I have it. She really appreciates it!"

Will he keep an Amateur rig handy in the future? "Absolutely. Wherever I go!" —ARRL Alabama Section News

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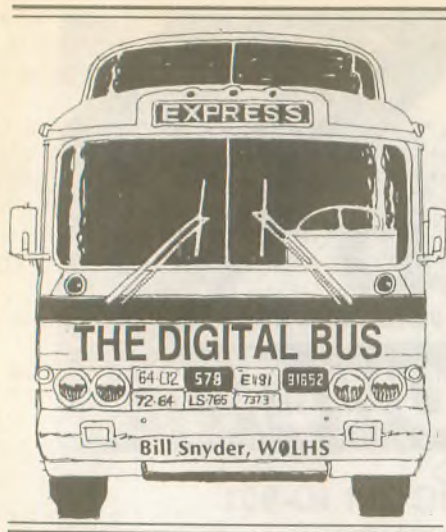
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How did you get into Amateur Radio? When a friend asked me that question it sent me reminiscing, as if I don't already do that enough without a trigger question. Old guys do, you know.

My entry to the wonderful world of dits and dahs was an outgrowth of a crystal set (yes, kiddies, we had crystals back in the 1920s). I, like many of my young friends, built a simple broadcast receiver with only a cat-whiskered galena crystal and a set of earphones. My home-spun set had no coils, no capacitors (called condensers in those days) and no antenna, unless you call my wire bed springs an antenna. Crystal sets were cheap, and they did not require batteries.

I could receive local WDAY on 970 KHz with good earphone volume by juggling the position of the little cat-whisker wire on the exposed face of the galena crystal. Every night I would fall asleep listening to WDAY. If I awoke after midnight, when WDAY was off the air, I could sometimes get DX stations like Chicago. Without any tuning coil and variable condenser (capacitor) it was sort of a potluck which station you would hear; the strongest signal took possession of the system.

I was happy with my BC DXing until one frigid winter night in the early 1930s. It was way below-zero and I was walking home from a downtown Fargo movie theater, a distance of about 12 blocks. The North Dakota winter got to me and I was cold. So I stopped in Thorne's Cigar Store to warm up.

Thorne's store had tobacco products on one side and a big rack of magazines on the other. We kids liked to stop there and browse, first through the pulps: *Battle Aces*, *Wings* and other World War I aviation fiction; and then the pop slicks: *Popular Aviation*, *Popular Mechanics* and *Popular Science*. Now and then, we would buy a pulp to read in junior high school behind the mask of a three-ring binder.

I took a copy of *QST* from the rack and paged through it. The word "transmitter" leaped out at me. Somehow it triggered my imagination; I instantly had visions of hammering away on a telegraph key sending dits and dahs out over the air. My father was a railroad telegrapher and had taught me the rudiments of the American Morse Code. From that minute on I knew I wanted to be an Amateur.

I had just enough money to buy that issue of *QST*, so I did. I read it so many times I wore the cover out. I had a hard time understanding many of the articles, but by studying the advertisements along with the editorial contents, little-by-little I began to get the idea of what it was all about.

My first step was to switch from the American Morse Code with its click and clacks to the International Morse with its dits and dahs. I rigged up a code practice unit by using one of my dad's straight keys and a buzzer. I found two other school chums who were also interested and we started to study the theory along with the code.

We all took the "Temporary" class license exam by mail. It only required ten words per minute in those days. Our grasp of the theory was quizzed by essay questions, and we were required to draw a complete transmitter schematic.

On the day before Christmas, 1932, my temporary operator's permit and my station license arrived in the mailbox. What a present! I was then W9LHS. I didn't have any ham gear but I had a license! So, I started to

build my first ham receiver, a two tube regenerative RX featuring 201-A tubes that ran off of batteries.

Everyone built their own ham gear in those days, both RX and TX. The parts came from the radio section of S.S. Kresge's dollar chain store. They had a counter with tube sockets, coil forms, Fahnestock clips, Bakelite panels, antenna wire, tubes, grid leaks, and all the other parts necessary to construct a receiver. The salesgirl always said, "Don't ask me what they do, I just sell 'em."

When I smoke-tested my first effort, it worked. I only wound a 40M coil, so I didn't know how it worked on the other bands. I could hear dits and dahs, and that was all I needed to spur me on.

At that point I got a letter from the FCC announcing that Amateur examinations would be held in the Fargo Post Office in April. My temporary operator's permit would expire and I was required to report for an examination.

There was a big crowd in the Post Office basement when I arrived at exactly 9 a.m., the hour scheduled for the examination. I wound up in the very back of the room about as far from the code machine as I could be. Though all my buddies passed, I flunked the code. Now I owned a callsign without the right to use it!

Luckily I had a pass on the railroad, so when my "flunk-out" waiting period was over I jumped on the night train to St. Paul and passed the FCC test with no problems. In those days you took the test and then waited for the license. Mine took about six weeks to arrive.

My first transmitter was a long time in construction; money, other than my allowance, was hard to extract from my father. I chose to build a push-pull, tuned-plate, tuned-grid rig with two 210 tubes running at about 550 volts on the plates. I purchased a used power supply (less rectifier tubes) from another Amateur for ten bucks. I ordered the 281 half-wave rectifier

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tubes from Uncle Dave's Radio Shack in New York. When they arrived I discovered both filaments were broken. Tears flowed, believe me.

During the summer I erected an antenna mast of 2x2 lumber on my parents' house. It supported a 66ft. end-fed Zepp antenna which ran to the neighbor's garage where an "A" frame held up the far end of the wire. It worked great for receiving.

In those days it was impossible to tune in your own signal and listen to your own code, so I built a monitor which featured battery operation and a UV-199 tube in a tin box. The plans were right out of the *ARRL Handbook* of that year. The monitor provided two functions, the most important of which was setting the frequency of the self-excited transmitter. Although there were articles about crystal-controlled transmitters in *QST*, the self-excited rig was the norm for most Amateurs. We had one in our high school radio club with two 852 50W bottles doing the oscillating. It was the "rock-crusher" of its day.

With a breadboard (literally) receiver and transmitter and the monitor in a tin box, I was ready to belt out my first CQ. Now keep in mind that in those days you called CQ wherever you tuned the TX and then you listened all around the band for answers. The VFO transceive style operation was not in use at that time.

My first CQ went out on 40 CW. No answer. Another, no answer. Another and longer CQ. My mother called me from downstairs to come and eat dinner. I tuned around carefully. I thought I heard my call — yes, it was. I had an answer. My heart began to pound; I had an answer!

There was a weak signal from Kentucky calling me. I went back to him. What a thrill! I didn't know what to say and I was so excited I couldn't write down what he said; I was really out of it, but I had made a contact!

When I bounced down the stairs after the QSO my mom and dad were at the dinner table. "I talked to a guy in Kentucky!" I shouted with glee.

My dad was cutting me a chunk of meat from the roast in front of him. He stopped and looked up at me without a smile. "That's nice, but how come the porch light blinks on and off when you hit the key?"

My mother stopped stirring her tea and asked, "And how come the radio loudspeaker thumps like crazy? Is that you?"

At that moment I knew I was a qualified Amateur operator!

Eavesdroppings

"A FRIEND OF MINE IS OFF FREQUENCY WAITING TO CALL YOU BECAUSE HE NEEDS A NEW ONE ... 73 AND MAY ALL YOUR ALLIGATORS BE FRIENDLY ONES ... YOUR SIGN OFF IS

GREAT BUT IT SUCKS ... I WORK AS AN AIR TRAFFIC CONTROLLER STARING AT A CRT SCREEN ALL DAY, THIS RTTY SCREEN IS MY HOBBY ... I'M SO BIASED TOWARDS A C-64, I HAVE AN EXTRA SPARE IN MY CLOSET ... I'M A HUNT AND PECK, CLICKITY CLICK, OPERATOR ... I HAVE ONLY ONE BOUNCING NEEDLE TO WATCH HERE IN THE SHACK ... I LIKE TO IMPROVE PUBLIC DOMAIN COMPUTER PROGRAMS, BUT SO FAR MY SCORE IS ZERO ... I DISCOVERED IT IS HARD TO WIN AT SOLITAIRE WITH A 50-CARD DECK ... DO YOU NOTICE ANY DIFFERENCE IN ACCESS TIME BETWEEN A 28 AND 45 MILLISECOND HARD DISK? ... YOUR ANGLISH IS VERY GOOT ... WE GROW ALFALFA HAY, CORN, RICE, AND CATSUP ... I RETIRED FROM MY JOB WHEN THE SLIDE-RULE WENT OUT OF STYLE ... I HAVE TROUBLE FINDING HIDDEN FILES, WHEREVER THEY ARE ... I AM NOT EXCITED ABOUT WORKING RTTY DX AS THERE ARE TOO MANY BIG GUNS TO OUT SHOOT ... THE BEST CURE FOR RFI IS CHOPPING DOWN YOUR ANTENNA, IT'S PERMANENT ... I WON'T KEEP YOU BECAUSE I THINK I SMELL SMOKE FROM THE FINAL ... THE THUNDERSTORM SEASON IS OVER AND THE BLIZZARD SHOVELING HAS BEGUN ... I HAVE A NEW 386 COMPUTER, BUT IT HASN'T IMPROVED MY TYPING ... WOULD YOU RANK THAT GUY AS A WORLD-CLASS OR INDUSTRIAL STRENGTH LID? ... I AM ALWAYS A LOSER IN THE LOCAL TRANSMITTER FOX HUNT, I ONLY GO FOR THE LUNCH AFTERWARDS ... WHEN YOU TALK ABOUT THE WEATHER THERE AIN'T ANY RULES TO FOLLOW, ANY LIE WILL DO."

The Boston Computer Society, an Amateur Radio Special Interest Group, publishes a nifty newsletter. Contact the editor, Tom Walsh, KITW.

If you wish to write me, it's Bill Snyder, W0LHS, 1514 South 12th St., Fargo, ND 58103. 73 and DIT DIT. □



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Act out the following scene in your mind. You want to convince the local search and rescue team leader that Amateur Radio should have a place in the next search.

You've been scheduled to address the SAR team and now you're up in front of the group. You list statistics of how many Amateur Radio operators you could provide, how many radios and antennas, and the team members nod OK. You even mention field day and generators. Now you're going to dazzle them and punch up the autopatch on your walkie-talkie and make a call.

They watch. You smile and you're done with your demo, right? Now the SAR team leader explains that they've got more radios (and they're commercial quality), dispatchers (who have been to many training classes) and maintenance people, and then he whips out a cellular phone and puts your autopatch to shame. Do you think they are going to call you based on your presentation?

Last week the local ARES group was called to provide communications for the sheriff. Two very bad convicts engineered a prison escape and the manhunt involved some very rugged country. The Amateur Radio operators were called to assist in providing communications from the sheriff's office to the field command post. Several weeks prior to this the ARES groups were called to assist during a large forest fire — again assisting with communications.

Why do the local ARES groups get called? Quite simply, they have a skill which they've demonstrated well. They've proven their ability to perform.

Amateur Radio is unique. We install and fix equipment, train each other, communicate, improvise and have many, many modes, paths and frequencies. Often the only limlits we have steam from a lack of creativity.

Equipment

Some of you asked me to recommend equipment or endorse specific models based on what I use. I'm not qualified to do that. I use equipment that fits my needs. My needs are not your needs. Before you can consider buying equipment, you must first outline your role in public service. When you know what you'll be doing, then you can match equipment to your needs.

When I got called to help the sheriff with the missing convicts' search, my equipment needs were different than what they were the previous weekend for the Wasatch 100 Mile Endurance Run.

Over many years I've developed many checklists of what equipment I need based on the type of event. The first year that I was net control for the Deseret News Marathon I prepared a checklist. Now each year I pull out the list, assemble needed equipment and I'm off to the marathon.

Here's your homework for this month. Create some emergency scenarios such as being a net control for a search mission, communicator for an on-scene command plane search (a back country rescue), staff member for the state EOC following an earthquake, and so forth.

List the equipment you would need for each scenario. Show the lists to

your spouse or significant other and have them check it for common sense. List only items you have or could reasonably procure (don't go through and list the whole radio catalog).

This homework will do several things for you. First it will get you thinking RESPONSE. You'll be considering getting involved and being prepared. It could become a wish list of meaningful items rather than more bright LEDs for the shack.

Involvement

If you've been around the block a few times it's clear that no public safety official is going to let you get involved without some demonstrated performance or ability.

Start small. Help on the next city public service event (such as a parade). Volunteer with the Red Cross. Let your local hiking and race groups know you exist and volunteer to help with their aid stations or checkpoints.

Local Amateur operators are called for most benefits including fun runs, walks, runs, bike races, horse riding events, etc. Amateur Radio operators are now members of the Wasatch 100 Endurance Run committee, on the committee because of their demonstrated performance.

In Casper, Wyoming Amateur Radio operators are on the Red Cross board of directors, again because of demonstrated ability. Across the country Amateur Radio operators serve as communications officers in the Civil Air Patrol and the Coast Guard Auxiliary.

Bottom line. Get involved. Let your community and elected leaders know you can respond. Our neighborhood had an emergency preparedness fair. It was fun having a table loaded with Amateur Radio gear, and at least two of those that came by are now practicing code to get a license. I also learned quite a bit about home canning, 72-hour kits and food storage. Don't expect a big role the first time out. Prove yourself ready to respond and willing to contribute to the event.

Basics

Compare notes and share ideas with your group. If a dozen of you put together a communications equipment response list for an airliner crash, each will have good ideas. Now combine all dozen lists into a better list. It's fun and just as important as participating in the next emergency exercise.

My equipment meets several criteria. It must be reliable. The SAR victim cannot afford to have it break. It has to run on 12VDC. Everything has to be available for mobile use.

All my microphones and power connectors are wired the same way. I've seen several magazines publish letters

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pushing the standardization of connectors. Watch out for that trap. Think local, think *situation* and think *cost*. Why should you want to match my mic/power connectors if you live in Florida? I'm not coming down there and you're not coming up here. If your local ARES group has its own standard, that's great. Worrying that you don't match Billings, Montana is no good unless you live in Billings.

Have "critical" spares. I have a couple extra microphones (the cords always seem to break when least expected). Fuses are handy, especially in the correct sizes and ratings. Don't you think it would be non-professional to plug a 25 amp fuse into a 5 amp holder on your \$700 radio because you forgot to get spares?

I like to build J pole antennas out of copper pipe. I've got some for VHF, UHF, public safety, aircraft and 220 MHz. When I found they were too long for my storage trailer, I cut them down and put in threaded mating connectors. Now they just unscrew and store nicely. They work great too. You can never go wrong having a quality antenna available. The copper pipe J pole is an efficient antenna, easy to build and cheap. If it gets broken or loaned out and not returned I don't lose sleep.

Try to incorporate spares. My packet TNC has a TTL output and my por-

table RTTY has a place for TTL input. Now if my computer dies I have a spare terminal by hooking my RTTY to the TNC.

Try not to build complex switching devices for audio or antenna. Keep it simple. Label your antennas, especially in the field. (Just try sorting through five or six coax runs in the rain or snow at 10,000 feet in the middle of the night.)

Keeping it simple also means placing equipment for operator comfort. It's fun to rough it if you have to, but operate for a long time and you'll get tired of getting up to cross the tent each time that radio over there makes noise.

Quality

If you spend \$10 at the swap meet for a 20-year-old crystal rig, expect it to hear lots of noise and maybe generate interference. If you run RG-58 a couple hundred feet into a mis-matched antenna, expect problems.

If you take the time to do it right, use quality rigs and antennas with low SWR, ground your station and plan your communications setup, you'll have less interference than if you just pile stuff into the tent and hope it works.

During last weekend's Wasatch 100 the computer, UHF, packet and VHF were all stacked next to each other. No

interference. No intermod. No packets coming through voice. Everything was grounded, the coax was double shielded (RG-214) and the antennas (J poles and a Ringo Ranger) tuned for the frequency in use.

My shack runs a packet BBS, a couple of HF rigs, VHF, UHF and some scanners, yet the *only* radio in the shack that gets interference is an old air/ground radio that picks up packet. Yes it is a pain in the neck. It was picked up at a bargain and the price included the funnel front end that even a tuned J pole can't cure!

Let's Trade

By next week I'll commit to having my scribbled folder of checklists typed up so you can read them. You send me some of yours (even if they're from the homework you did above) and I'll send you mine. An SASE (legal size) and your equipment lists will bring you my set (and some other stuff). Trade only! (You gotta use the brain this month.) No freebies. You've as many good ideas as I have, maybe more.

And remember. There is no better way to prepare for emergencies than participating in public events such as fun runs, marathons and neighborhood fairs. A lot of what you do there will be exactly what you'll do when an emergency strikes! □

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Third party communications — something new

Recently (1989) the FCC reviewed and rewrote Part 97 of the Amateur Radio operation rules. This was in accordance with the Administrative Procedure Act which was enacted by Congress in 1946. Part 97.115 deals with third party traffic. The rewritten segment reads, "This prohibition does not apply to a message for any third party who is eligible to be a control operator of the station." A control operator is an Amateur Radio operator. This is taken to mean that we can now send third party traffic to any Amateur Radio operator anywhere, whether or not we have a third party traffic agreement with that country.

Any Amateur to Amateur traffic is OK. One only needs an Amateur call in the address to verify that the message is going to an Amateur. The text can be tricky. Recently a message was refused because the text carried a line which read, "Say hello to Bob." As with commercial matters, each person will have to make decisions when handling this kind of Amateur to Amateur traffic.

Sweden/NTS traffic net

Holger, SM7GWF, noticed this rewrite and suggested that we establish a CW net to pass traffic. This has been done. At the present time, we meet once a week (Saturday mornings), on 20M. If we get much traffic, we will

increase this sked to as many times a week as needed. Traffic going to a Swedish Amateur Radio station should be sent via the NTS (National Traffic System). It will be routed to the IATN (International Assistance and Traffic Net) via EAN/4 where it will be cleared and sent to Sweden the following Saturday. Replies can be requested. We have been passing an average of one piece of traffic per week since we started in August, 1990. Reps who help on this end are N4GHI, W4FRR and KB9LT. Several Swedish stations are listening and ready to help on the other end. In between our Saturday skeds Holger and I have tried packet messages. They have taken from four to 11 days to clear.

From where does the traffic come?

A letter was received asking where on earth we find all the traffic which is reported each month in *QST*. Well, it arrives from many places. We generate a lot of traffic sending reports to each other. Each net control station sends a report of the session to the net manager, who needs the data to send a monthly report to the STM (Section Traffic Manager). So each net can generate 30 to 31 pieces of traffic per month.

Many Amateurs send messages to friends and relatives throughout the year wishing them ARL 46 and holiday greetings. Some Amateurs merge other radio activities such as sending a "thanks for the nice QSO." QSL bureaus let fellow Amateurs know when they have cards waiting.

Special events (fairs, festivals and jamborees) account for a great amount of traffic. As I write this, we just concluded the yearly CNE (Canadian National Exhibition), the Norwalk Oyster Festival in Connecticut and the Puyallup fair in Washington. Boy Scouts hold various jamborees throughout the year with a national jamboree every few years.

While these events account for great amounts of traffic, many smaller special event stations add to the traffic count. The Richmond Virginia Radio Club set up a display recently at a local library to draw attention to Amateur Radio classes being offered, another opportunity to send messages.

Roster traffic — Messages such as

"We hope you have been able to enjoy the fellowship of QCWA, 73" and "Will we see you at the next reunion?" pass through all the time. Without these few stalwert people who generate roster traffic, traffic handlers would have much less to do.

Emergencies such as earthquakes and hurricanes can generate thousands of pieces of health and welfare traffic. Many hams who enjoy the NTS also work in a community ARES group. Their service to the community generates good will and they become known as a place to turn to when health and welfare traffic is needed.

Whenever an Amateur delivers a piece of traffic, he can offer to take a reply. Such phone calls can be great PR for Amateur Radio by explaining what it's all about. Delivering traffic certainly runs the gauntlet from A to Z. One person might say, "You've made my day." The next might say, "Bah, humbug." Another may have a 24-hour answering machine. I once delivered fair traffic to someone who had sent it to himself to see how it all worked. All of this is good publicity.

Packet BPL (Brass Pounder League)

A comment in the August issue of *QST* (p. 68, "BPL for Digital Sys-Ops?") stirred up a hornets nest. Scanning my PBBS, I noted several people seemed ready for combat. They were oiling their guns and saying things like, "I'll kill all NTS traffic on my PBBS." When someone hollers "fire," it takes a disciplined mind to keep some perspective. The ability to send a bulletin throughout the US creates quite a soapbox. Jim, K9JM, wrote a sensible reply in *The Relay*, (Sept., '90), a newsletter for Northern California traffic handlers. He said in "Packet vs. NTS," "There has been a verbal battle between packet operators and NTS of late. I am not certain if anyone is serviced by these fights. Computer and packet radio are just machines which are controlled by man."

We are a group of people who possess licenses to communicate but we often fail to communicate. We simmer until the boiling point and then lash out. The NTS is a system created to move and deliver traffic. Packet is a mode in this system. Sometimes a system can look like a rock: unmovable, uncaring, and too heavy to lift or move.

Perhaps part of the problem is that some packet sysops are not traffic handlers. They put up a board for the enjoyment of the board. There are enough traffic handlers to insure that a successful merge of packet into the system is done, given some uniform direction. Anything merging into an established operating system needs leadership,

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especially with packet which has been in a continuous state of evolving. This leadership should come from ARRL HQ. Staff there should listen to field representatives and be able to take action as needed, when needed.

Many of us have visions of how our future should look, but someone must compile the portrait and move things forward. The more traffic handlers on multimodes, the better. When you use a mode and talk to the people on it, you have a good chance of becoming friends. It's easy to ask a friend questions and discuss issues. Let us at least respect each other enough to talk and not yell. I suspect that this fire is still raging in many hearts. As K9JM said, the machines are controlled by men. Let's communicate.

Who is in charge of the NTS?

Without going into the history of how it got to be the way it is, let's try and see who is making current decisions. Who is in place to affect the needed changes any system must make to stay productive in a constantly changing world? The buck must be allowed to stop somewhere.

Three groups are currently in place.

1) Area staffs — Pacific/Central/Eastern. Eastern Area staff members are elected by other staff members after the position has been announced. Once you become a member, you seem to be able to hold it for life. The duties are not spelled out. The Eastern Area Staff consists of the net managers of

each region, two TCC directors, two Eastern Area net managers (a day and night cycle manager for each), and three "members at large." It also has a packet manager for each region. The staff used to meet once a year to make recommendations to the Board and ARRL personnel at Headquarters in Newington, Connecticut. It was decided a few years back that the meetings were no longer necessary. Are the area staffs supposed to keep the NTS fine tuned or is their function to collect and hand in monthly reports for publication in *QST*? How can they fine tune it if they don't meet?

2) ARRL is run by a board of directors. These people are also elected. They meet several times a year. Are they in charge of fine tuning the NTS or is it their responsibility to make sure someone else does?

3) There is a section at ARRL Headquarters in Newington, Connecticut, called Field Services. Are these people in place to hand out supplies, compile monthly reports or evaluate information from the field and make daily decisions to fine tune the NTS?

Between these three groups, who has the final say on daily NTS matters? Who is in charge of directing our future? NTS seems to be lumbering along trying to deal with the trauma of a new mode. Its strength is to remain a universal system. It cannot if local groups push it in different directions. Where does the buck stop? □

KURT REPLIES

(continued from page 16)

2) Having two tightly coupled loops, the antenna requires strong reactance and strong stored energy, thus increasing total ohmic losses due to reactive currents which are certainly present.

3 and 4) Theoretical values of radiation resistance as well as loss resistance are outlined in Table 1. As you see, the values of radiation resistances are very low (compared with a short monopole of 0.1 wavelength long with radiation resistance of 7.9 ohm). This results in a high current which can easi-

ly couple to any metal in the close vicinity of the loop, including the pole or even the transmission line and motor drive cable.

If the pole or the transmission line are not properly shielded, because of their higher radiation resistance, they become the primary radiator. (You may be vertically polarized and not know it!)

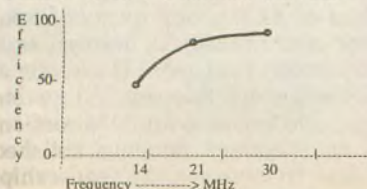
Furthermore, since the radiation loss has extremely low values (in the same order as ohmic losses) from the standpoint of error analysis, the efficiency factor which is a ratio depending on these small values (see Table 1) is less reliable than the theoretical prediction of individual losses.

Because of these practical difficulties in computing the gain of small loop antennas, the gain of such antennas is always measured directly, and the theoretical expressions are used only as crude design tools. The only way we can be sure of the real-world gain, VSWR, and the efficiency of this loop antenna, is to measure it. We suggest the manufacturer do just that, on a qualified commercial antenna range. □

Table 1

Frequency	Loss Resistance	Radiation Resistance
14 (MHz)	0.0497 (ohm)	0.0645 (ohm)
21	0.06086	0.32665
30	0.7275	1.36048

$$\text{Efficiency} = (\text{Rad. Res.}) / (\text{Rad. Res.} + \text{Loss Res.}) \times 100$$



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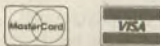
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YL Roundup



While the number of women practicing Amateur Radio is steadily increasing worldwide they still remain a rarity in the hobby because they often face obstacles that men take for granted in studying for a license. Basic electricity, for most women, was not learned at their mother's knee, as was sewing or cooking, so a woman in a class full of males who already know the lingo and some electronics theory may feel threatened simply by being female. If the male instructor further complicates the issue by using unfamiliar analogies, such as comparisons to parts of a car's ignition system, a woman might have to ask for a different explanation, making it more obvious that she is entering a male-dominated hobby. A timid woman might just give up.

Still, there are plenty of YLs (Young Ladies, a term for women in radio) who enter the hobby with no difficulties and who can hold their own in any technical conversation. But there are many who just need extra YL encouragement to earn their license or upgrade. Even when the OM (Old Man) is supportive, the YL may need a bit of feminine aid to join the ranks.

For me, becoming an Amateur was a hard task. But I was lucky, because during the nearly year-long process a group of female Amateur Radio operators known as the YL Roses of Texas Amateur Radio Club encouraged me throughout every step. Each time I thought I'd give up, Cindy Brazzel, N5MUJ; Dorothy Jones, KA5DWR;

Judi Jaksa, N0IDR; Martha Cowan, N5QFN; Maureen McClain, N5FFB; or Teresa Hogue, N5IXW, would tell me about a QSO (radio contact) or show me a QSL (confirmation) card. Cindy, who was working on her Advanced, spent some of her study time working with me on Morse code; Maureen offered constant moral support by accompanying me to class, so I was never the only woman in my class.

These women still offer inspiration as I work toward my General. And though not every YL has this kind of local support, the Young Ladies' Radio League (YLRL) is available to every licensed YL.

There are approximately 1,500 YLRL members. YLRL is a non-profit national organization begun in 1939 to encourage and promote Amateur Radio among women. The organization sponsors several nets:

- YL Open House, Wednesday, 1900 UTC (1800 spring and summer) on 14.288 MHz
- YL Tangle Net, Thursday, 1900 UTC (1800 spring and summer) on 14.298 MHz
- YL Roses Net, Monday, 1900 UTC (1800 spring and summer) on 28.433.

YLRL also sponsors numerous contests each year. Details are published in the bi-monthly magazine, *YL Harmonics*. YLRL promotes international goodwill by offering members opportunities to sponsor and host foreign YLs. YLs meet other YLs from across the country, work to promote Amateur Radio and much more.

The 1900 YLRL officers are led by Joan Upton, KD7YB, an Extra, who lives in Independence, OR and joined the hobby in 1961. She says, "I'd heard about Amateur Radio and it stirred the romantic in me. My OM (Orland, N7FLE) came along for the ride."

She teaches radio classes, talks on nets, has been president of two local clubs and enjoys being president of YLRL. "YLs approach Amateur Radio differently," Joan says. "They just tend to be more caring, more conscientious and more low key. They also have mutual interests outside radio. My suggestion is, if you want it (an Amateur Radio license) go for it. Don't study CW for more than 20 minutes at a time — 10 times a day is okay, but only 20 minutes at a time. And never let family members talk you out of trying, especially when you're treading on their egos."

Dana Tramba, N0FYQ, is vice-president of YLRL, and lives in Peck, KS. Her entire family is licensed and you can usually find her at the family's Radio Shack store. She says, "I got into ham radio because my OM said he would take square dancing lessons. And I love to have eyelash QSOs with ladies at hamfests."

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Sue Ludemann, KA6SOC, of Richmond, CA, is secretary of YLRL. Her OM, Bill, is not a ham. She received her Novice license in January 1982.

"I fell in love with CW and got my Extra class ticket in 1985," Sue says. "To this day my favorite activity is chasing DX (foreign, rare, or long-distance stations) on the CW bands with 4W output. I will run my power up to 100W, if I want another station badly enough. But seldom do I have to. I find 4W works quite effectively with my quad antenna.

"I do not restrict my Amateur activities to women!" Sue emphasizes. "I am an active member of the QRP Amateur Radio Club Inc. and an active member of the East Bay Amateur Radio Club."

Carol Noack, KK5L, of Port Arthur, TX, the YLRL disbursing treasurer, is also an Extra class Amateur. She says she got into Amateur Radio in 1977 because "I was impressed by the fun Martha Moore, WD5CWQ, was having with CW contacts and by all her interesting QSL cards and certificates." Since then, Carol has become active in YL nets, chasing DX and contests. One of her most exciting contacts, she says, was "a 2M contact with cosmonaut Aleksandr Volkov, U4MIR," for which she received a QSL.

Jean Chittenden, WA2BGE, lives in Syosset, NY. She is the YLRL receiving treasurer for districts one through four. Now an Extra, she got her Novice in 1975. She entered Amateur Radio by way of listening to shortwave, and now enjoys DX. She holds offices in five radio clubs and is a volunteer examiner, an official observer, a local emergency communicator, and more. "And I was the only YL to go to China in 1980," she says.

The YLRL receiving treasurer for districts five through seven is Jean Baptie, W6ZYD, who lives in Magalia, CA.

Roxann Moss, NO9W, of Downs, IL, the YLRL receiving treasurer for districts eight through ten, has been an Amateur operator since 1986. Her OM introduced her to Amateur Radio and she holds an Extra class license.

"He encouraged me by telling me if I got a license, I might get to talk to a missionary," she says, "so I did. And I've been privileged to run phone patch traffic for some military deployed, as well as missionaries. Someone did that for me when my OM was in Vietnam, and it's nice to be able to help someone else.

"Since joining YLRL, it has been such a pleasure to meet so many of the ladies personally, and have so many new friends!" she says.

Mary Ketzler, WO9R, of Mondovi, WI, is the YLRL receiving treasurer

for DX. "My husband John (W0NKU) had been an Amateur for 20 years when we married 11 years ago. What sold me on radio was listening to Gerry Spiess in a sailboat in the mid-Pacific in the fall of 1981. It was unbelievable and exciting to think maybe I could, one day, talk to people all over the world.

"I enjoy international friendship, DXing, some contesting — CW, especially — and QRP," she says. "I went on a DXpedition to the Fiji and Wallis Islands in 1989 with NM7N (Mary Lou Brown), N7HAT (Audrey White) and N4DDK (Alice King)."

As a school teacher, Mary set up a station at her school in Roseville, MN,

and taught fourth and fifth graders an introductory radio class. She also demonstrated Amateur Radio at the St. Paul science museum.

Belonging to YLRL can put a YL in touch with a very exciting network. To join or receive more information about YLRL, write to Membership Chairman Sylvia Soble, W3SLF, 9357 Hoff St., Philadelphia, PA 19115. For information about clubs in your area, write Affiliated Clubs Chairman Phyllis Chanks, W2GLB, 1345 W. Escarpa, Mesa, AZ 85201.

If you have suggestions for YL columns, write to: Connie Dunn, 1916 Parkside Dr., Denton, TX 76201. □

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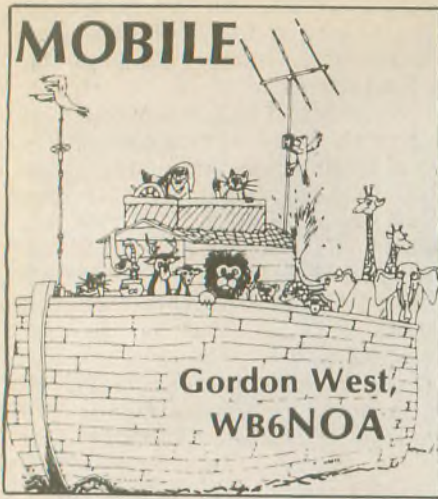
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Taking your HT mobile

I don't go anywhere without my 2M handie-talkie. Now don't get me wrong — I'm not an HT addict and no, I don't bring the rig to the dinner table, nor do I sleep with it tuned to the local emergency repeater. But I do travel with my HT a lot!

Everyday I get phone calls wanting to know which hand-held transceiver is best, ICOM, Kenwood, Alinco, Heath, Yaesu? Hey, they are *all* good. But each one has its specialty when you plan to run it for a particular application.

When I'm participating with the Red Cross communications emergency teams, I need a hand-held with simultaneous receiving on both 2M as well as 450. That's my Kenwood 75. Out on the boat, I need a dual-band hand-held where I can see the keypad numbers

back-lighted at night, so I use my dual-band Yaesu FT-470. For extremely loud audio in classroom demonstrations, both the Heath (a Standard Radio product) and the Alinco are real ear-blasters. And when I need a little tiny rig that gives me all-band scanning, I run my little ICOM 24AT. You see, a radio for every application. You need to pick the rig which best meets your specific needs.

When you run your HT mobile, always connect it to an external antenna. You will have the lousiest signal around if you try to use the rubber duck inside a vehicle. Go for an outside antenna.

The first dual-band, on-glass antenna I have seen for 2M and 450 was announced by Mobile Mark. I saw it first at the giant Van Valzah antenna display at a recent hamfest. Van Valzah is truly the hamfest antenna king, and whatever you're looking for at a hamfest, chances are he has it (800/HAM-0073).

Several companies make dual-band mobile antennas with a single feedline to fit your single antenna connector on your dual-band hand-held. In fact, you can probably replace your single-band antenna with a dual-band mobile antenna without having to change out the mount. I am also impressed with the imported dual-band and tri-band antennas from Comet (NCG Inc.; 714/630-4541) and Diamond (RF Parts Co.; 800/854-1927).

Both Comet and Diamond are dueling it out for imported antenna supremacy — and both companies import a selection of single-, dual- and tri-band antennas with a variety of unique mounts. In fact, the mounts from Comet and Diamond are like none you have seen before for mobile applications, so if you have a car or mini-van that you just don't think will accommodate an antenna mount, guess again — and call Diamond and Comet for their catalogs.

The gang at Comet regularly demonstrates their products to our weekend



This ICOM is both a dual-band *plus* an all-band scanner.

class students throughout the country, and I am most familiar with the excellent line of Comet antennas because of their high gain, sturdy construction and guaranteed performance.

When you hook into your HT in your car, mobile home, camper or boat, make sure not to stress the HT's BNC jack. In other words, don't run RG-213 directly to the jack; it will cause it to fracture the internal circuit board, and you'll be in for a delicate fix.

Rather, splice on some RG-174 to spare your HT's connector post. For under \$25 you can get a little set-up called "duck clip" which is intended to run the hand-held on your belt, with a rubber-duckie antenna affixed to a couple of feet of RG-174 and a BNC post with a hat clip.

When you run this affair on your hat you look like a geek, but it truly is a great way to interconnect a rubber duck or an external mobile antenna system onto a piece of tiny coax that ultimately feeds your HT (The Cable Factory, 3420 Breezy Point Road, Tower, MN 55790).

Running your hand-held mobile on 12 volts requires great caution! First of all, use only the adapter recommended by that hand-held manufacturer. Even though an inexpensive cigarette lighter plug and associated HT plug may be easily available, these have absolutely no voltage regulation and no filtering. If you run your HT directly off 12 volts, be careful!

First of all, an HT on 12 volts gets red hot on transmit after only a few seconds of TX. You can literally burn up a seat cover or roast your hand under long TX with 12 volts going into the top of the radio. I suggest you buy the 12-volt factory-recommended assembly that trickle charges the bat-

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tery, so the battery runs the rig with a little less than 12 volts of power. Most rigs will run all the way down to 8 volts, and this is a comfortable level to keep the set-up from getting red hot. So be careful when running your HT mobile from 12 volts directly feeding the transceiver. It's going to get red hot on transmit, and could ultimately destroy the PA output brick.

An external speaker/microphone is a handy item to run your HT mobile. Again, use the one recommended by the factory or an after-market (such as MFJ, 800/647-1800) remote speaker-mic specifically designed for your particular type of transceiver.

You could also run a one-earpiece headset, but don't run it VOX; voice operated relays within the headset circuitry will often trip on wind noise, and you may not even know the VOX circuitry has tripped because you will hear nothing out of the speaker. When you think your rig is squelched, it is actually locked on transmit — and the next thing you smell is your front seat getting burned up by a red hot transmitter. Don't run VOX with a headset mobile!

If you do plan to carry on a lengthy conversation while HT mobile, run it on low power to keep it from getting roasty-toasty. Or remove it from 12 volts. Or talk briefly. Just remember that running your HT mobile, when 12 volts is added, will usually get it red hot.

Finally, do consider dual-band unless you are in an area where there is absolutely no activity on the other band. In this case, single-band is adequate. Too bad they don't make a tri-band HT covering 2, 220 and 450M!

And with what HT do I travel around the country when I go to different hamfests, out on the water, and RV mobiling? I chose the new ICOM IC-24AT because of its all-band scanning capabilities. Not only is it a powerful dual-band transceiver, it's also a full-blown, all-band scanner with general band limits as follows: 75 MHz - 195 MHz, 200 MHz - 490 MHz and 740 MHz - 960 MHz. This sure beats bringing along my Bearcat pocket scanner!

Here are the band limits where sensitivity is better than 1 microvolt: 110 MHz - 174 MHz, 360 MHz - 468 MHz and 850 MHz - 925 MHz. This lets me

tune in police, fire, marine, cellular telephone, business and even the aeronautical band. This rig is a great way to tune in the local aircraft ATIS upon landing to get the weather report.

Sorry, the 220 MHz band isn't overly sensitive. This ICOM also may not "step" directly on the 220 MHz frequency you wish to pick up. Same thing with cellular; cellular steps are 30 kHz, but the UHF side of this transceiver does 12½ kHz and 25 kHz. Nonetheless, I can still pick up some juicy conversations.

No, this unit will not transmit on 220 or 900 MHz. However, it may be modified for transmit on Coast Guard marine frequencies and REACT GMRS frequencies in an emergency. No, I'm not suggesting for a second that this rig is type-accepted for marine or business-band use, but I am suggesting that the modification is nice to have when it's a life-or-death call you need to make to the local Coast Guard on 156.8 MHz.

On the ICOM IC-24 hand-held transceiver, you may enable the all-band reception by the following procedure: turn set off; turn set on; simultaneously depress the light button, the "B" button, and the "#" button; use your left foot, or ask a friend to turn the set off and then back on while holding these buttons down; after the display goes bonkers, release all the buttons and your new dual-band transceiver is now an all-band scanner receiver. If you have a very early set, you may need to have it opened up and have diode #6 removed.

To modify the unit further for direct entry: turn the rig off; depress "light," "#," and "3"; and turn the rig on. This now allows you to set the leading digit.

And you can even turn your rig into a cross-band repeater by holding down the function button and then depressing "C," "5" and "D." To get out of the cross-band repeater mode, depress "function" and "D."

Modification of the rig for emergency transmit is tricky. Let a pro do it. If you're near Los Angeles, give a call to Jun's Electronics (800/882-1343). For those of you in the Midwest and on the East Coast, call "The Mod Man" (317/852-5544) and ask for a free modification list. They will modify all

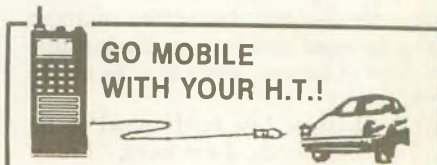


Comet tri-band trunk lip lay-down mount.

ham transceivers with the proper paperwork that may illustrate MARS, CAP or Coast Guard Auxiliary affiliation.

The ICOM IC-24 is not sold with built-in CTCSS tone. That's too bad because there are few parts of the country that don't have some sort of PL repeater access. So when you order your unit, be sure to also order the PL tone deck and ask your dealer to install it as well. Despite what the instructions say, it's not quite as easy as they would lead you to believe. The first time I opened up my IC-24 to add tone, two little widgets fell out and I still have no idea where these little clips go. The rig works fine, though it's missing a couple of goodies on the inside!

So don't let anyone tell you what is the best hand-held for you for mobile use. They are all good! Play with each one at your local dealer and find the one that is just right for your particular mobile and portable application. Hear you on the airwaves! □



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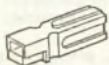
KENWOOD - Order Model L for TH-21/31/41AT. Model KI for TR-2500, 3500, 2600 series. Slides on bottom of radio. Model K for TR-2400. Through battery plug. YAesu - Order Model Y for FT-207R, Wilson. Fits in battery compartment. Model N for FT-203R, 208R, 209R, 727. Powered through plug on radio bottom. ICOM - Order Model I for all Icom (2A7/02A). Slides on bottom of radio.

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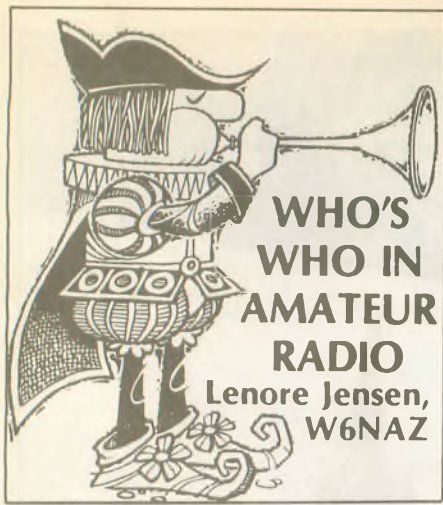
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Do you have much of a grocery bill? Well, John Thompson, K6OHM,



orders more than \$20,000,000 worth of food every year — not for himself, but for the Walt Disney Company and its millions of visitors to Disneyland, the Disneyland Hotel and its other operations, for which he manages consolidated purchasing. But that's far from all.

Mr. Thompson and his staff of at least 50 handle an amazing variety of merchandise: huge vehicles, costume fabrics for performers, employee uniforms, scenery for the many entertainment shows and events — a nearly endless list of needs. Mickey Mouse alone has a large wardrobe which must be kept in perfect condition. Those audio-animatronic characters manage to create wear and tear on their duds, too. And of course, there are the cleaning bills!

And all those live birds need to be fed. In other words, John says, "I may be ordering French fries one day, swimming pool supplies the next or juke

boxes for our '50s style restaurant." Then, we musn't forget that there are 30 tons of trash "to put by the curb" every day. (Of course, it's more complex than that!)

He must constantly be seeking fireworks, as they use \$5,000 worth every night. They sell about 10,000 different items at the theme parks. John must know how to buy anything and everything!

With so many different demands, there is no chance for him to get bored, especially since he has a fine ham station at home. He was attracted to Amateur Radio and, in addition to becoming an Eagle Scout in 1954, he became WN8SAQ; a year later, after moving to California, he earned the easily remembered K6OHM. His inspiration must have come from his dad, an engineer who had a Masters from MIT by the age of 21 and helped to invent the jet engine. Because his father had difficulty convincing people of the jet possibilities, he asked Walt Disney to prepare a cartoon describing the action.

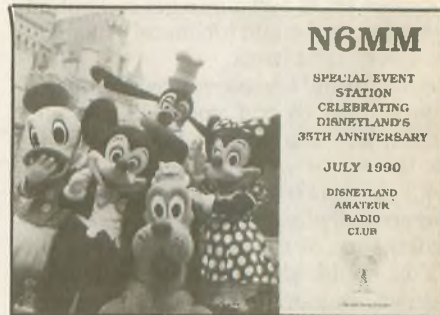
John worked for CBS eight years before joining Disney in 1968. He was a Systems Analyst for the film studio in Burbank and then joined the Imaging Division where so many clever things are first "imagined," then engineered and executed, such as the newer ride Splash Mountain.

He was active with the grand opening of Epcot Center at Orlando, FL, as well as the Disney affiliation with the Los Angeles Olympics. He's also been helping with plans for the Euro Disneyland Theme Park near Paris, due to open in Spring 1992.

He will be assisting with the plans for major expansion (two billion dollars!) in Long Beach of the Disney Seas theme park which includes the Queen Mary owned by the city and operated by Disney. It is hoped that the operation of the ship's former Amateur Radio station W6RO will resume shortly.

John is active with the 40 members of the Disneyland Amateur Radio Club who recently set up their Field Day stations at Tennis Land, adjacent to Mickey's headquarters in Orange County. "We managed to borrow the batteries from the famous Main Street Electrical Parade," he said.

For the 35th anniversary of Disneyland, the club ran a very successful special event station using call letters borrowed from Harvey Hetland, N6MM (guess why they wanted them!) John proudly points out that they made 2,217 contacts that weekend and



are now receiving a surprising 75 percent QSL response. Their repeater operates on 146.94 atop the Disneyland Hotel.

Cards attract John. For the W6 DX-QSL bureau, he handles about 2,500 a month. His other hobby is playing a good game of tennis.

He's interested in community activities and also serves as treasurer of the employees' \$60 million credit union.

John is popular as a speaker both to outside groups as well as within his company. Recently he spoke at an international conference of purchasing managers. Does he enjoy his work? "Not only that" he says, "I feel extremely fortunate to be involved with so many different experts and things, it's exciting!"

He is married and has two children. K6OHM — another example of how many interesting individuals populate Amateur Radio! □

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ALABAMA

Montgomery Amateur Radio Club (W4AP). Alabama State Trooper Dist. Office. Intersection of Coliseum Blvd. & Federal Dr. Fred Springall, KB4EGH, (205) 288-5831. Meets 3rd Mon./monthly, 7:00 p.m.

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.

ARIZONA

Cochise Amateur Radio Assn. Meets 1st Mon./monthly, 7:30 p.m. Located 3 mi. East of Sierra Vista and 3 mi. South of HWY 90 on Moson Rd., Sierra Vista, AZ. Net each Thur. at 7 p.m. on 146.16/76. Further info call Rich (602) 458-3928.

Tucson Repeater Assoc., P.O. Box 40371, Tucson, AZ 85717-0371. 2nd Sat./monthly, 7:30 p.m., Pima Co. Communications Bldg., 2545 E. Ajo. Net Thurs. 7:30 p.m. 146.22/82 (146.88, 147.08+, 145.01s & 15-PKT), 448.550.

Western Arizona Radio Club. Meets 2nd & 4th Thurs./monthly, 7:30 p.m., First Baptist Church, 1700 Palma Rd., Bullhead City, AZ. Net Tues. 7 p.m. on 147.12+600. Info call Dave Adams, W6DRM, (602) 758-5171.

CALIFORNIA

Amador County Amateur Radio Club. P.O. Box 1094, Pine Grove, CA 95665. Senior Citizens Center, Jackson, CA. Meets: 1st Thur./monthly, 7:30 p.m. WA6WY Rptr., 146.835, 146.235. Net Tues. 7:30 p.m.

Amateur Radio Club of El Cajon, (WA6BGS). P.O. Box 50, El Cajon, CA 92022. Meets 2nd Thur./monthly, 7:30 p.m. at Buck Knives, 1900 Weld Ave., El Cajon, CA. Club Rptr. 147.675 (-); Nets Sat. & Wed. 7 p.m. on 147.570 simplex. Info (619) 698-6644.

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.

Butte Amateur Radio Club. Meets 1st Fri./monthly, Loma Vista School, 8:00 p.m. Marigold and East Avenue, Chico, CA. For info KE6EP or KB6COH, 893-5208.

Contra Costa Communications Club W6E2C/R. P.O. Box 661, San Pablo, CA 94806. Meets 2nd Sun. at 9:00 a.m. Hickory Post Restaurant/Lucky Lanes. For info call Don K6DPQ, (415) 222-2449.

Downey Amateur Radio Club. 12708 Glynn Ave., Downey, CA 90242. Meets 1st Thur./monthly, 7:30 p.m., South Middle School, 12500 S. Birchdale, Downey, CA. Weekly nets Thurs. - except 1st, 7:30 p.m. 144.930 (S) Voice - Tues., 8:00 p.m. 145.700 (S) RTTY.

East Bay Amateur Radio Club. P.O. Box 1393, El Cerrito, CA 94530. Meets: 2nd Fri./monthly 8 p.m., Salvation Army, 4600 Appian Way, El Sobrante. Nets: Slow CW, Wed., 8 p.m. & SSB Net, Wed., 9 p.m., 21.395. Info, Bob Fields, KC6AOH.

The Electronic Museum ARC. Meets 1st Fri./monthly, 7:30 p.m., Electronic Museum at Foothill College, Los Altos, CA 94022. Call-in 145.27/145.67.

Escondido Amateur Radio Society (E.A.R.S.). Meets 4th Thurs./monthly, 7:30 p.m., New Life in Christ Church, 300 N. Broadway, Escondido, CA 92025. Info Net Sundays, 8:00 p.m., 146.88 (-) or 743-4212.

Fresno Amateur Radio Club, Inc. P.O. Box 783, Fresno, CA 93712. Meets 2nd Fri./monthly, 8:00 p.m., Manchester School, 2307 E. Dakota, Fresno, CA. W6TO/R 146.34/94.

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. Common Wealth, Fullerton. Net: ea. Tue., 8 p.m. 147.495 simplex. Info, Gracie Hastings, N6FSL (714) 990-9203.

Gabilan Amateur Radio Club GARC. P.O. Box 2178, Gilroy, CA 95020-2178. Meets: South Valley Jr. High School, 385 I.O.O.F. Ave., Gilroy. 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.

Hilltop Amateur Mastertite System (HAMS). Informal mtgs. weekly/Mon. 5 p.m. at Shakey's Pizza, 12924 Washington Blvd., Mar Vista, CA, except 3rd Mon. Call for location. Info, N6FD 213/823-0767.

Kern River Valley Amateur Radio Club. P.O. Box 2611, Lake Isabella, CA 93240. Meets 4th Sat./monthly at 4 p.m. (Pot Luck). Veteran's Hall, Lake Isabella WB6ODZ Rptr. 224.50 down 1.6 low-level, 144.50 simplex.

Livermore Amateur Radio Club, (LARK). Meets 3rd Sat./monthly, 9:30 a.m., City Council Chamber, 3575 Pacific Ave., Livermore, CA. Net Mon. 1900 on 147.12+. Elizabeth Zalaznik, KB6DLT, (415) 455-0361.

Marin Amateur Radio Club (MARC) W6SG. Box 1231, San Rafael, CA 94901. 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.

Moreno Valley Amateur Radio Assoc. P.O. Box 7642 Moreno Valley, CA 92303. Meets 4th Mon./monthly 7 p.m., Park & Rec. Bldg., 13671 Frederick Ave. Net: Tues. 8 p.m. 146.655- (PL 1A) & 224.460-. Info: Larry KA6GND (714) 656-1643.

Mount Diablo Amateur Radio Club. P.O. Box 23222, Pleasant Hill, CA 94523. Meets: 3rd Fri./monthly, 8 p.m., Grace Presbyterian Church, 2100 Tice Valley Blvd., Walnut Creek, CA. Net Thur., 7:30 p.m. 147.06+. Info, Vicki, (415) 458-4527.

North Hills Radio Club. P.O. Box 41635, Sacramento, CA 95841. 3rd Tue./monthly, 7:30 p.m., Carmichael Elks Lodge, 5631 Cypress Ave., Carmichael, CA. Net 145.19 Thur. at 8:00 p.m.

North Shores ARC. (619) 272-1409 So. Clairemont Recreation Center, 3605 Clairemont Dr., San Diego, CA. 1st Tue./monthly, 7:30 p.m.

Orange County Amateur Radio Club. Meets 3rd Fri./monthly, 7:30 p.m., Mercury Savings & Loan, 1895 Irvine Blvd. (4th becomes Irvine), Tustin, CA 92680. Net each Wed., 9 p.m., 146.55 Simplex.

Radio Amateur Mobile Society. P.O. Box 214091, Sacramento, CA 95821-10091. Meets 2nd Tue./monthly, 7:30 p.m., Carmichael Elks Lodge, 5631 Cypress Ave., Carmichael, CA. Net Saturday a.m., 224.84 at 8:30 & 146.79 at 9:00.

River City A.R.C.S. Meets: 1st Tue./monthly, 7 p.m. SMUD Bldg., Room B & C, Elkhorn & Don Julio, Sacramento, CA. For info: (916) 483-3293.

Riverside County Amateur Radio Assoc. c/o County Emergency Services Div., 4080 Lemon St., Ste. 8, Riverside, CA 92501. Meets: 2nd Thur./monthly, 7:30 p.m., Riverside County Office of Ed., 3958 12th St. Nets: Mon., 7:15 p.m., 222.860/224.46 and 7:30 p.m., 146.28/88. Info, call Steve Rathbone, KF6ZH, (714) 687-7793.

Sacramento Amateur Radio Club. Contact: Gary Bryant, KB6KZZ, (916) 646-1171. Meets Sacramento Blood Bank, 32nd St. & Stockton Blvd., Sacramento, CA, 2nd Wednesday/monthly, 7 p.m. Info net every noon on Rptr. W6AK/R 146.910.

Sacramento "Old Timers" Ham Radio Brkfst. Club and Sacramento Valley Chapter #169 QCWA (Quarter Century Wireless Assn.). Meets 2nd Wed./monthly, 8 a.m., Lyon's Restaurant, 1000 Howe Ave. For info contact Paul Wolf, W6RPL (916) 331-1830.

San Gabriel Valley ARC. P.O. Box 88, Monrovia, CA 91017-0088. 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. (SCCARA) W6UW & W6UU. P.O. Box 6, San Jose, CA 95103-0006. (408) 249-6909. Meets: 2nd Mon./monthly, 7:30 p.m. at Agnews Developmental Center Aud., corner of Circle Dr. & Palm Dr., Santa Clara. Net all other Mon., 7:30 p.m. W6UU/R 146.385+ PL 100.0 / 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.

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 Parkview Ave., Redding, CA. Net 146.64, Wed., 8 p.m.

Sierra Foothills Amateur Radio Club. P.O. Box 3262, Auburn, CA 95604. Meets: 2nd Fri./monthly at Auburn Fire Station, 226 Sacramento St., Auburn, CA. Nets 7:30 p.m. Tue. 28.443 MHz, Thur. 145.43 MHz link with 223.86 MHz.

Simi Settlers Amateur Radio Club. P.O. Box 3035, Simi Valley, CA 93063. Meets: 2nd Thur./monthly, 7:30 p.m., at Seventh-Day Adventist Church, 1636 Sinaloa, Simi Valley. Rptr. 147.93/33.

Solano County Amateur Radio Society. P.O. Box 457, Fairfield, CA 94533. Meets: 3rd Wed. 7:30 p.m., Vanden High School. 441.150+5 (Remote 145.69 simplex) PL 77Hz, (707) 448-1461.

Southern California Amateur Transmitting Society, SCATS, WB6LRU. P.O. Box 1770, Covina, CA 91722. Meets 1st Mon./monthly, Community Presbyterian Church, 540 E. Vine St., West Covina, CA. Net, Sun., 7 p.m. 147.765-. W6QFK/R. Classes. Contact: Pat McNulty, N6GXZ (714) 622-8315.

Southern California Six Meter Club. P.O. Box 10441, Fullerton, CA 92635. USB Net Tue., 8 p.m., 50.150 and 8:30 p.m., 28.400. FM Rpt. Net Wed., 7 p.m., 52.18/98 and Thur., 8 p.m., 52.28/88. FM Smpx call freq. 50.300.

Southern Humboldt Amateur Radio Club, (SHARC). P.O. Box 701, Redway, CA 95560-0701. Meets 4th Mon./monthly. 8 p.m. SHARC Clubhouse, Garberville. Rptr. 146.19/79. Info (707) 923-2373.

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 W6EJF, 223.68 MHz.

The Trinity County ARC. P.O. Box 228, 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., 703 N. College Way, "The Faculty House," (lower level), Claremont, 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., 8:00 p.m. Talk-in 145.58 Simplex.

West Coast Amateur Radio Club. Fountain Valley School. Talbert/Bushard. Fountain Valley, CA. Meets 3rd Thur./monthly. 145.44-4Z.

Western Amateur Radio Assoc. Meets 1st Tues./monthly, 7:00 p.m., Cerritos Park East, 166th St. and Carmenita Ave., Cerritos, CA. Rptr., N6ME 145.400/224.180MHz.

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.

West Valley Amateur Radio Assoc. 18011 Saratoga - Los Gatos Road, Los Gatos, CA 95030. Meets: 3rd Wed./monthly, 7:30 p.m. W6PIY/R. Net Tue., 8:30 p.m., 147.39+, 223.96 -.

Yucaipa Valley Amateur Radio Club (YVARC). Meets 3rd Mon./monthly, 7:30 p.m. Far West Savings & Loan Community Rm., 1195 Calimesa Blvd., Calimesa, CA 92320. Pres: Don Ames W6RTM, (714) 795-5743.

CONNECTICUT

Tri-City ARC. Groton Public Library, Route 117, P.O. Box 686, Groton, CT 06340. Meets: 2nd Tue./monthly. 7:30 p.m.

DELAWARE/PENNSYLVANIA

Penn-Del Amateur Radio Club. P.O. Box 1964, Boothwyn, PA 19061. Sponsor of KA3TWG/Rptr. on 224.220 serving all of S.E. Pennsylvania and Northern Del. Info/net every Thurs. at 20:00 hrs. or call Hal Frantz (302) 798-7270.

FLORIDA

Gulf Coast ARC, Inc. P.O. Box 595, New Port Richey, FL 34656. Meets 4th Mon./monthly, 7:30 p.m., Colonial Hills Civic Ctr., 87 Peacock Dr., 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.

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.

West Palm Beach Amateur Radio Club, Inc. P.O. Box 6834, Southboro Station, W. Palm Beach, FL 33405. Meets: 2nd Tue./monthly, 7:30 p.m., Palm Beach Emergency Op. Cntr., 3723 Bevelvedere Rd., W. Palm Beach. Info: Jeff, WB2DUK, 586-5120, Henry, WA4HXZ, 655-4632 or Hyacinth, N4QWN, 848-0513.

GEORGIA

Dalton Amateur Radio Club (DARC). P.O. Box 143, Dalton, GA 30722-0143. Meets 4 Mon./monthly, 7:30 p.m., Dalton College Voc. Tech. Bldg., Dalton, GA. Info net: Sun. 9:30 p.m., 145.230 MHz; Wed. 9 p.m., 147.135 MHz.

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, Hilo. Talk-in on 146.76(-).

ILLINOIS

Amateur Cross Link Repeater. 10, 6, 2 mtrs., 220, 440, 900, 1.2 MHz, ATV. Meets: 1st Sat./monthly, 7:30 p.m. Info: net Sun., 8 p.m., 147.225 MHz. KD9FA Rptr./Chicago.

Bolingbrook Amateur Radio Club. Meets 3rd Mon./monthly, 7:30 p.m., Bolingbrook Pk. Dist. Rec. Ctr., Briarcliff Rd., Bolingbrook, IL. Info net Thursdays, 8 p.m., WD9AKO/R 147.33 MHz +600 and WA9DIP/R 224.54 MHz -1.6. Info hotline (708) 759-7005. ARRL affiliated club.

Central Illinois Radio Club, W9AML. Meets 4th Wed./monthly, 7:30 p.m. (from Sept. to May), McLean Co. Law & Justice Center, ESDA Rm., Bloomington, IL. Club Rptr. 146.94 - 600kHz.

Chicago Amateur Radio Club. Founded 1926. Meets 1st and 3rd Wed./monthly on Northside of Chicago, 7:30 p.m. Info call (708) 869-HAMS or (312) 545-3622.

Dupage Amateur Radio Club, (DARC). Meets 4th Mon./monthly, 7:30 p.m., Holy Trinity Catholic Church, 111 S. Cass Ave., Westmont, IL. Club rpters. are 145.25-CTCSS 107.2; 224.68- and 442.55+ CTCSS 114.8.

Elgin Amateur Radio Society. P.O. Box 1351, Elgin, IL 60120. Meets in EOC Rm. of Elgin Municipal Bldg. 2nd Fri./monthly, 8:00 p.m.

Fox River Radio League. Valley National Bank, Lower Level, Northgate Shopping Ctr. & RT. 31, Aurora, IL (312) 584-4925 for more info. Meets: 2nd Tue./monthly, 7:30 p.m.

Hamfesters Radio Club, W9AA. P.O. Box 42792, Chicago, IL 60642. Meets 1st Fri./monthly, 8 p.m., Crestwood Civic Center, 139th & Kostner Ave., Crestwood, IL. Nets: Sun. 8 p.m., 28410 MHz and Mon. 9 p.m., 146.43 MHz.

Metro DX Club. Meets 3rd Fri./monthly (except Dec.), at Oak Forest Hospital, (employee quarters), 159th St. and Cicero, Oak Forest, IL, at 8 p.m. Christmas party in Dec. Net: DX/Club info, every Tues., 8 p.m., 146.46 Simplex.

Northwest ARC/W9LM. Meets: 2nd and 4th Tue./monthly, 7:00 p.m., Oehler Funeral Home downstairs community room, Lee & Perry Street, Des Plaines, IL. Net 28.375, 8:30 p.m., non-meeting Tuesdays.

Peoria Area Amateur Radio Club. Meets 2nd Fri./monthly, 7 p.m., Red Cross Bldg., corner of Knoxville & Armstrong, Peoria, IL. Info on W9UVI rpt. 146.250/146.850.

Schaumburg ARC (SARC). Meets: Schaumburg Park District Community Rec. Cntr. at Bode and Springinguth Roads, Schaumburg, Illinois. Third Thur./monthly, 7:30 p.m. Net 28.350, 8:00 p.m. Thur.

Six Meter Club of Chicago K9ONA. Bank of Lyons, Lower Level, 8601 West Ogden Ave., Lyons, IL. 2nd Fri./monthly, 7:30 p.m. Club Rpters: 146.37/97, 448.30/443.30.

Wheaton Community Radio Amateurs, (WCRA), P.O. Box QSL, Wheaton, IL 60189. Meets 7:30 p.m., 1st Fri./monthly, College of DuPage, Glen Elynn, 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.

KANSAS

Pilot Knob Amateur Radio Club. Meets 1st Thurs./monthly, 7 p.m., 525 Shawnee St., Leavenworth, KS. ARES net every Thurs., 7:30 p.m. 147.60/147.00. For info call (913) 682-6904.

LOUISIANA

Baton Rouge Amateur Radio Club W5GIX. P.O. Box 4004 Baton Rouge, LA 70821. Meets last Tue./monthly, 7 p.m., Catholic High School cafeteria, 855 Heartstone Dr., Baton Rouge, LA. Net 8:30 p.m. each Sun. on 146.79.

MARYLAND

The Peninsula Radio Operators Society (PROS). Family oriented activities, training and exams held throughout the year. PROS Rpters. 146.925 and 146.625. PROS, P.O. Box 2315, Salisbury, MD 21801.

MASSACHUSETTS

Mohawk Amateur Radio Club. Meets: 4 Wed./monthly, 7:30 p.m., American Legion Hall, 325 Pequoig Ave., Athol, MA. (One block north of downtown traffic lights, past the bridge.)

MICHIGAN

Black River A.R.C. Meets 2nd Sat./monthly, 7 p.m., Chicken Chalet, Hwy 43 East, Bangor, MI. Contact Wm. Lee, KB8DWO, (616) 764-8480. Rptr. 147.360+.

Farmington Amateur Radio Club. Meets 2nd Wed./monthly, 7:30 p.m., Wheeler Street Fire Station, Farmington Hills, MI. Contact: Jim, WA8SEL, 474-8765. Talkin: 146.49MHz.

Hazel Park Amateur Radio Club. Hoover Elementary School-Hazel Park, P.O. Box 368, Hazel Park, MI 48030. 2nd Wed./monthly, 7:30 p.m. Sept. thru May. 147.51 Simplex Call-In. W8JKU Club Call.

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.

Top-Of-Michigan A.R.C. Meets 2nd Tues./monthly, 7 p.m. at the State Police Pst., Gaylord, MI. Net Tue., 9 p.m. EDT 146.82/22.

MINNESOTA

Minneapolis Radio Club. P.O. Box 25167, Minneapolis, MN 55458. Meets 3rd Fri. (exc. June, July, Aug.), Mpls. Red Cross, 11 Dell Place, Mpls, 7:30 p.m. Making waves since 1916.

MISSOURI

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

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, Tom Bull, NW7S, 642-5033.

Las Vegas Radio Amateur Club (LVRAC). Meets: 2nd Tue./monthly at 7 p.m., Nevada Power Bldg. Wengert Rm., 6226 W. Sahara Ave. (Near Jones). Net Tue. 8:00 p.m. on 146.94 MHz. Info: Call George at 459-2586.

Sierra Intermountain Emergency Radio Assoc. (SIERA). P.O. Box 2348, Minden, NV 89423. (702) 782-8266. Meets: 2nd Tue./monthly, 7:30 p.m., Douglas County Lib., Minden, NV. Talk-in: 147.330.

NEW HAMPSHIRE

Great Bay Radio Assn., W1C1AG. P.O. Box 911, Dover NH 03820. (603) 742-0130/142-1374. 2nd Sun./monthly, 7:00 p.m. Dover City Hall. Talk-in 147.57.

NEW JERSEY

Bayonne Emergency Mgt. ARC (BEMARC). 16th St. & Ave. A Firehouse, Bayonne, NJ 07002. Meets 2nd Tue./monthly, 7:30 p.m. Tri-Band linked repeaters: 145-430/224.280/445.575 MHz.

Delaware Valley Radio Assoc. (DVRA). Our Lady of Good Counsel Church. 137 W. Upper Ferry Rd., West Trenton, NJ 08628. Meets: 2nd Tues, Wed./monthly, 8 p.m.

Jersey Shore Chaverim. Meets 1st Sun./monthly, 9:30 a.m., JCC, 100 Grant Ave., Deal, NJ, Sept. thru June. Net 1st Thurs./monthly, 9 p.m. local on 145.110, KC2Q. For info call (201) 222-3009.

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

Communications Club of New Rochelle, NY. Harrison Street Firehouse. Richard Sandell, WK6R, (914) 834-2322. Meets: 1st Mon./monthly, 8 p.m.

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. The trisates' only 3-band linked rptr. system 144.300 S1223.600 -/445.225 -.

Lancaster Amateur Radio Club (LARC). Aurora Meets 1st Tues./monthly, 7:30 p.m., Aurora Middle School, 147 Aurora St., Lancaster, NY. Net: W2UJR every Monday, 7:30 p.m. 146.55. Contact Luke Caliano, N2GDU, (716) 683-8880.

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, 8 p.m. Bohemia Rec. Ctr., Ruzicka Wy. W2DQ/R 144.610/145.210, 223.080/224.680 rptr. Info call Jim Heacock (516) 473-7529.

Westchester Amateur Radio Assoc. (WARA). Scarsdale Village Hall, Scarsdale, New York. Meets: 1st Wed./monthly, 8:00 p.m. For info call Dan Gabel, N2FLR, Pres. (914) 723-8625.

Westchester Emergency Communications Assn. (WECA) 147.66/147.06, 222.80/224.40, 447.475/442.475. Meets: 2nd Mon./monthly, 7:30 p.m., Westchester County Ctr., White Plains, NY. Info: P.O. Box 831, N. Tarrytown, NY 10591. (914) 631-7424.

NORTH CAROLINA

North Carolina Chapter TSARC. Meets: Mondays, 28.350 on the air, 8:30 p.m. local time. "The Alligators" - all mouth, no ears.

OHIO

Amateur Radio Fellowship (ARF). Greg Ash, KA8TOA, Sec. 423 Pioneer Ave., Kent, OH 44240. Meets: 1st Sat./monthly at Kent Wally Waffie. KA8YKT rptr. 147.075.

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 Repeater 144.75/145.35. Net Sun. 9 p.m.

Dayton Amateur Radio Assoc. P.O. Box 44, Dayton, OH 45401. Meets 1st & 3rd Fri./monthly (Sept. thru June) 8 p.m., Career Academy on River Corridor Dr. Info on W8BI 146.34/94 & 222.34/223.94.

Lancaster & Fairfield County A.R.C. Meets 1st Thur./monthly, 7:30 p.m., City Hall, Basement Club Rm., Broad & Main. Info Net every Mon., 8 p.m. K8CIK/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 Town Hall on Dover Center Rd. between Lorain & Butternut Ridge Rds. 10 miles west of downtown Cleveland.

Silvercreek Amateur Radio Assn. (SARA) Meets 3rd Thur./monthly, 7:30 p.m., Doylestown Village Hall, Doylestown OH. W8BPNF/R 147.99/39 rptr. For info call 216-925-2363.

Triple States Radio Amateur Club. Meets Wed./weekly on 28.480 at 8:30 p.m.; 7259 at 9 p.m. Rpters. 146.31/91 and 146.115/715. P.O. Box 240, Rd. #1, Adena, OH 43901. (614) 546-3930.

Warren Amateur Radio Assn. Meets 1st & 3rd Tue./monthly, 7:30 p.m. at Kent State Univ. Trumbull campus, Rt. 45 in Champion, OH. Club rptr. W8VTD 146.97MHz.

OREGON

Keno Amateur Radio Club. P.O. Box 678, Keno, OR 97627. Meets 3rd Thur./monthly, 7 p.m., Keno Fire Station. Rptr. 147.32+ W7UFM. Info: Tom Hamilton, WD6EAW, (503) 883-2736.

PENNSYLVANIA

Butler County Amateur Radio Club. P.O. Box 1787, Butler, PA 16003-1787. Meets 1st Tue./monthly, 7:30 p.m. at Red Cross Bldg., 312 Mercer St., Butler PA 16001. Call-In: W3UDX 147.96/36. Net 10:10 p.m. nightly.

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

Warminster Amateur Radio Club, WA3DFU. P.O. Box 113, Warminster, PA 18754. (215) 443-5428. Meets 1st Wed./monthly, 8 p.m., St. John's Evangelical Lutheran Church, Hatboro, PA. Net on 147.690/147.090 Wed., 8:30 p.m.

TENNESSEE

Nashville Amateur Radio Club. Meets 3rd Thurs./monthly at Lock 2 Metro Park off Pennington Bend Rd. Grilled hamburgers at 6 p.m., mtg. at 7 p.m. Call Jerry, KK4TV, at 754-2326 for info.

TEXAS

Beaumont Amateur Radio Club. Meets last Tues. of each month at the GSU Aud., South and Oxford Streets, Beaumont, TX, 7:30 p.m. Talk-in on 146.16/76 or 146.10/70. Join the fun!

Sun City Amateur Radio Club. Meets 1st and 3rd Fri./monthly, 7:30 p.m., 3709 Wickham Ave., El Paso, TX. K5WPH 147.240/147.840 Rptr. with remote operation on 220, 440, 6M, and 10M.

VIRGINIA

Southern Peninsula Amateur Radio Klub (SPARK). Meets: 1st and 3rd Tue., Salvation Army Community Bldg., Hampton, VA. Operates 146.1373 Rptr., VEC Information (804) 898-8031.

Virginia Beach Amateur Radio Club (VBARC). Open Door Chapel, 3177 Virginia Beach Blvd., Va. Beach, VA. Meets First Thur./monthly, 7:30 p.m. For info (804) 497-1235.

WEST VIRGINIA

Jackson County Amateur Radio Club. Robert D. Morris, WA8CTO, Sec.-Treas. 308 Edgewood Circle, Ripley, WV 25271. Meets 1st Thur./monthly, 7:30 p.m., United National Bank of Ripley. Net Mon. 9 p.m. on 146.67/07 W8JNU/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 KB8EHJ (304) 824-5958.

WASHINGTON

Mike & Key Amateur Radio Club. 3rd Sat./monthly, 10 a.m. Tukwila Com. Ctr., 4101 So. 131st St., Seattle, WA. Net. Wed. eve., 7:30 p.m. 146.22/146.82 rptr.

WYOMING

University ARC. 146.01/61 Meets: 1st Tue., 7:30 p.m. Sept.-May U.W. Physical Plant Bldg., 15th & Lewis St., P.O. Box 3625, Laramie, WY 82070. June-Aug: Bernie Club picnics Wed.



President's Theme

At the QCWA National Convention in Kansas City, President Harry Danals, W2HD, set forth the "theme" for his second year in office. It is a theme of encouraging much greater membership participation in the affairs of the organization.

One goal is to provide opportunities for "members at large" to take a very active role in the affairs of the QCWA. This will be accomplished by assigning non-Board members to the newly revised standing committee structure. Members whose interests lie in the fields of finance, administration, membership services and activities, plans and programs, the scholarship program, and membership expansion and publicity will be asked to serve actively on standing committees having those assignments.

Another important item for consideration during the next year is the encouragement of QCWA members to take active roles in the training of new radio Amateurs. It is anticipated that this very important program will be kicked off during the early part of 1991. While most training programs of today place the primary target group in the younger generation, QCWA will not only play a role in the training of this group, but will also place emphasis on those in their "golden years."

There is a full and challenging agenda to be presented at the national convention. (Deadlines being what they are, this column is being written prior to the convention. We will have details and pictures in next month's column.) The Saturday Open Forum always gives the Board an opportunity to discuss matters openly with the attending members and provides the members with an opportunity for true involvement in the Board activities. New approaches are often offered to the Board and final Board actions are not established until after the Open Forum has been held.

75 Year Awards

One of the highlights of the convention was the presentation of 75 Year awards. That's right — 75 years of

radio operation! Ten people are on the list and it is hoped that all of them will be present to receive their awards. They are W7CA, W4KC, K1AC, W2ID, W9PH, N8DR, W0AQ, W7OS, W4AR and W3CBP.

And would you believe there are several people who will soon be eligible for awards for their 80th year of radio operation? Amateur Radio licenses weren't issued that long ago, but from 1910 the Navy issued "Certificates of Proficiency" to something like 250 Navy radio operators. Those certificates have been accepted by QCWA as proof of "license" and on this basis Ray Meyer, W6MLZ, was issued the first 70 Year certificate in 1980. Ray is now a Silent Key.

If you were one of that distinguished group who received a Navy Proficiency Certificate, be sure to let our headquarters know so that information can be added to our records.

Scholarship Winners

Winners of the seven 1990 QCWA scholarships have been announced.

Four awards for the QCWA Memorial Scholarships went to William Bagged, AA5DF, Texas; Thomas Brown, KA2UGQ, New Jersey; Victoria Green, KA2VHR, New Jersey and Paul Hoffman, NK3M, Pennsylvania.

The Leo Meyerson Family Living Scholarship went to Robert Popella, KA3HIE, Pennsylvania.

The Robert S. Cresap Memorial Scholarship went to Jason Lovett, N1EJD, Maine.

The Cresson Donbar Scholarship went to Heather Ludtke, KD0RU, Colorado.

Each award pays \$750.

A most sincere note of thanks to the donors who have made these scholarships possible. Thanks also to the Washington, DC Foundation For Amateur Radio which administers the program and to Hugh Turnbull, W3ABC, and his committee for the considerable amount of work done in connection with this effort.

Bargain Hunters Special

Would you like to see your money appreciate 20 percent in less than two months? Well, that is what QCWA is offering right now. New memberships and renewals of membership now cost

\$25 for three years, but the price is going up to \$30 at the first of the year. If you make a \$25 renewal now, it will be worth \$30 in January. There is no limit on the number of years you can renew at the present rate. And if you are feeling relatively young and healthy the thing to do is take out a Life Membership. For \$125 (the equivalent of just five 3-year renewals) you can get a Life Membership. If you are under 75 that should be an outstanding value. No more worries about keeping up renewals, no more worries about the impact of inflation. In fact, it's too good a bargain to last. Life Membership rates will be going up next year, too.

Esther Given Retires

This month we say farewell to "Baby Doll Esther," W6BDE, who has been writing this QCWA Column in Worldradio for the past six and a half years. Esther has been one of the hardest working Directors on the QCWA Board for the past seven years and she has contributed much to the organization. Her conscientious efforts and her warm, delightful personality have brought her many, many friends and admirers, and her timely and interesting columns in Worldradio have brought many new members into QCWA. Esther has now decided it is time to put aside deadlines and try the leisurely life. We wish her the very best. Are there any volunteers to try to take her place? There is no monetary incentive, but the job does offer a lot of pleasure and a great opportunity to help spread the word about QCWA. What better inducement could you want! □

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The DX report

I do not have many reports of DX being worked in August. That doesn't mean that there was no DX being worked. It means no one has taken the time to report any activity to me. There was the usual Pacific activity that occurs around this time of year. There was a very rare opening to Brazil (and other South American countries) into this and other parts of the country the latter part of August. Brazil is seldom heard or worked in this part of the world. There has been the usual Sporadic Es activity as the summer Es season winds down. I gather everyone is waiting to see what happens with the Fall/Winter F2 season this year.

DXpeditions and results

QSL Robin Gist, ZF2PM, (NE4L) or Joy Keen, ZF2PN, (KA5PEP) via NE4L.

QSL Giuseppe d Aurelia, HV3SJ, Vatican City, via Antonio Fogazaro 87, I-00137, Rome, ITALY.

There was a Malpelo Island, HKO DXpedition scheduled after November 10. It is hoped they will take 6M with them. The DXpedition is being headed up by Arturo, HK3BED. He can be contacted at 011-57-1245-7536. Hopefully, something can be worked out for 6M before they leave. Unfortunately, SMIRK does not have any equipment it can loan.

QSL XW8KVF, Laos, or 6K10FM, Korea, via Yoshi Yiyashi, JA1UT,

4-20-2-401, Nishi-Gotanda Shinagawa-ku, Tokyo 141, JAPAN.

BT4AG was a DXpedition by JA9-AG, in case you worked that station.

QSL VK9CD, Norfolk Island via Bill Hamer, ZL2CD, 187 Seatoun Road, Miramar, Wellington 6003, NEW ZEALAND.

If you worked Wallis & Futuna Islands, FW, during the latter part of September by FK8DD and FK8EL, QSL with SAE and 2 IRCs (donations accepted) via Box 3040, Noumea, NEW CALEDONIA.

VK3AWY might be on from Cocos Island, VK9Y in December. More later.

If you worked Palau Islands or Koror Island, KC6, or Yap Island, V63, in September, JH2BNL on SSB, QSL via JA2NVY, P.O. Box 73, Sekishi Post Office, 431-31 Hamamatsu, JAPAN. JA2NQG on CW, QSL via: Minekazu Sugiyama, Box 5, Ninomiya 259-01, JAPAN. JI2UAY on FM, QSL to his CBA.

Who's on six!

Father Cavanaugh, V63JC now has a FT-620B and a dipole. QSL direct to KC6JC, his old call, or his V63JC QTH.

Ian, 3D2PO, Fiji, is running 8W to a yagi 6ft. off the ground. QSL via the Fiji Bureau.

Kiyoko, NH6RT is still kicking around the Pacific, last heard as ZK1XY in the Northern Cook Islands. QSL via Box 3, Tokemura 31191, JAPAN.

Gerard Leroi, FO5KF is on the band with 4W to a dipole. He is on Raitea, one of the Society Islands, which makes three different islands now active from French Polynesia. QSL via P.O. Box 3, Uturoa, Raiatea, FRENCH POLYNESIA.

Tony, A45ZN, Oman, has asked for 6M permission, including beacon operation. More details as I learn them.

Andy, ZC4AD has joined ZC4MK and ZC4AB on 6M.

Reports out of India confirm that Dasan, VU2AID has either a TS-600 or FT-620B and a 5-element yagi on 6M. In addition, it is reported that Grace, VU2AIG, has also been given 6M operating privileges!

Ron Macfarlane, 7Q7RM, has been reported active on 6M working into Europe in recent weeks. He can be QSLed via P.O. Box 472, Blantyre, MALAWI. He has company on 6M

by virtue of the 7Q7JA activity of Yoshitaka Kawaku, JL1IHE, who is running a IC726 and 6-element yagi. QSL via Katsuhide Kawase, JH8BKL, Shinkai-douri 8, Teshio-cho, Teshi-gun, Hokkaido 098-33, JAPAN.

The SMIRK supplied 6M ring on Diego Garcia is still in use, says VQ9TB. It stays on the island as long as it is needed. I see VQ9 contacts into the Pacific often being reported by JA's and others.

Apparently the SMIRK supplied FT-620B of Victor, ZK1CG, has a problem in the USB oscillator which has caused bad sending and receiving on FM. I am told that Joel Paladino, N6AMG, who coordinated efforts to get the gear there, is trying to get a replacement crystal to him.

Willis Island is now QRT, as reported by Nev, VK2QF, who says Trevor, VK9TR has left. There will be no more permanent operations from that island because of remote operation of the facility in the future.

Simon, YJ8GP, was using YJ10IND through August 31, as a 10th Anniversary of Vanatu Independence celebration. QSL via Ron, VK4BRG.

YO2IS, Romania, is reported now active on 6M. That is all I know.

Beacon updates

FX4SIX is on 50.047.5, soon to run 50W. LA0BY is on 50.051, 6W to a yagi.

Rene Delamare, FO5DR, should have a beacon on 50.050 or 50.060 soon. Pat Bunn, N4LTA, is donating the beacon IDER board. The beacon will probably be on 50.050.

Okinawa now has a beacon running on 50.044, signing JR6YAG, as does Chichi-jima, Ogasawara Islands, on 50.102, signing JD1ADP.

The 5B4CY beacon is reported to have been put back on the air this summer, on a frequency of 50.5.

Technical info

If you think modern TVs are better protected from TVI problems, think again! It is being reported that a California 6M enthusiast recently killed his big screen TV set in a big way! Apparently, with the TV set on the outside antenna and tuned to Ch. 2, his 200W solid state amplifier zapped the tuner and the power supply. Luckily, the repairs were covered under warranty. However, you might not be so lucky. His TV technician told him that today's TV set is unprotected from front end overload from 6M transmissions. It seems a good idea to keep your big TV on the cable or off altogether when you are running some power on 6M.

See you on the Magic Band all of a sudden! □

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10-10 INTERNATIONAL News

Chuck Imsande, W6YLJ
10-10 19636

10-10 scholarships

Each year 10-10 awards two \$750 scholarships to two Amateurs who are chosen from a group of applicants. The Foundation for Amateur Radio (FAR) administers the 10-10 Scholarship award program and has announced the 1990 winners. They are Mark Horwath, KA1SPU, 10-10 #51203 of Derry, New Hampshire and Nathan S. Willingham, KA0UFO, 10-10 #48785 of Bevier, Missouri.

Mark did very well in the college entrance tests and plans to major in Biology at Penn State. Both his mother and father are licensed hams and they are currently in the process of relocating to Florida. His sponsor was John O'Neill, KA1LEV, 10-10 #40403.

Nathan is a three-time previous winner and will be a senior studying Electrical Engineering at Oral Roberts University. He was recommended by Dale Bagley, NZ0S, 10-10 #8655.

We congratulate these two fine young hams and wish them well in their studies.

The 10-10 Scholarship Fund could use your support. Your donation, no matter how small (even a "green stamp") will help to build a fund that some day may be expanded to three or four scholarships. There are few of us that cannot afford to send a buck or two to this worthy cause. Send your donation to Gerry Gross, WA6POZ, 10-10 #21274, 10-10 treasurer, 643 N. 98th #142, Omaha, NE 68114. Please, do it now. 10-10 thanks you and next year's winners will also.

New Arlington, VA net

Jim, N4ZAV, 10-10 #56905, advises that he is starting a local 10M net in the Arlington, Virginia area on Sundays at 1300 UTC (EDST). The net will meet on 29.200 MHz. Jim says he covers most of Arlington County and Washington with his HTX-100. Look for the Arlington Top Ten Net Sunday mornings at 9 a.m.

1991 10-10 National Convention

It has just been announced by President Norm Lefcourt, W6IRT, that the 1991 10-10 National Convention will be held on June 7-9, 1991, in Arlington,

Texas. The host Chapter is the Republic of Texas Chapter. Note this date and plan to attend. Watch for more details coming soon.

The numbers keep growing

New members keep coming into 10-10, as noted by the latest report from our records manager, Lee Pasewalk, WB6MGM. Lee's latest report of June, 1990 indicates that the highest number issued was 57149 to AA5NE. Remember that this does not mean that 10-10 has issued a total of 57149 numbers, as number blocks are issued to each district manager. District managers issue numbers from their block until that block is gone and then receive a new block from Lee. It does indicate that 10-10 is continuing to grow and will soon be at the 60,000 member level.

It is also noteworthy that a number is *never* reissued. Once you receive your number, it is yours forever. Several years ago, a few scattered blocks of numbers were never used. It was the Board of Directors' recent decision to use these few previously unassigned numbers, so they are being issued to new member DX stations by DX Manager Carol Hugentober, K8DHK.

Finally

If you are interested in obtaining an information pack and application form for joining 10-10, send me a "green stamp" (\$1) and one of your address labels. You will also receive the latest copy of the official 10-10 magazine, *10-10 International News*. My address is 18130 Bromley St., Tarzana, CA 91356-1701.

If you have lost your 10-10 number or do not know to whom to send your dues, send a note and an SASE to the above address. If you are looking for your lost 10-10 number, please enclose a list of all of your previous calls as well as your current call. Previous address information is not required. □

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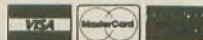
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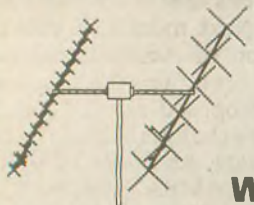
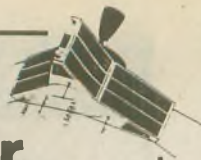


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Amateur Satellites



WB5ZDP
Keith Berglund

As I promised last month, here's a survey of the Amateur satellites now flying. At the present time there are 11, count 'em, 11 to choose from.

A bit of history

For those of you who think that Amateur satellites are a new happening in Amateur Radio, guess again. The Amateur space program is more than eligible for membership in the QCWA. OSCAR 1 was launched Dec. 12, 1961, aboard an Air Force Agena-Thor launch vehicle. It was the world's first non-military satellite.



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What's up?

The 11 active Amateur satellites now in orbit are AMSAT OSCAR-10, Radio-Sputnik-10/11, UoSat OSCAR-11, AMSAT OSCAR-13, UoSat OSCAR-15, AMSAT OSCAR-16, DOVE OSCAR-17, Weber-OSCAR-18, LUSAT OSCAR-19, Fuji-OSCAR-20 and BADR-1.

Communications birds

The main satellites now flying that are used everyday by Amateurs around the world for two way communications are: OSCAR-10, OSCAR-13, RS-10/11, OSCAR-16, OSCAR-19 and OSCAR-20.

OSCAR-10

OSCAR-10 was the first Amateur satellite to be placed into a Phase III high altitude elliptical orbit. It was launched on June 16, 1983. This bird was revolutionary in that up until AO-10, all satellites had low altitude, circular orbits. This is significant because communications could only occur for about 20 minutes per pass, six or so times per day. With a Phase III orbit, communications could occur with virtually half of the world at a time for eight to 10 hours per day.

OSCAR-10 was launched with a Mode B and Mode L analog transponder. Unfortunately, AO-10 did not achieve the exact desired orbit and its path takes it in and out of the Van Allen radiation belt twice a day. The cumulative effect is that its on board housekeeping computer is now "brain dead." Don't despair too much, though; fortunately the mode B transponder is stuck in the "ON" position and worldwide communications are possible whenever the solar cells get enough sunlight to power the transponder.

OSCAR-13

In my opinion OSCAR-13 is *the* showcase of Amateur satellites now flying. It was launched on June 15, 1988, aboard a French ARIAN vehicle

from French Guyana on the northern coast of South America. AO-13 is not an American satellite, but rather a truly international effort. Portions of the bird were made in Germany, Japan, South Africa, Great Britain, Hungary and the United States, and probably a few other countries.

AO-13 has four transponders on board, consisting of Mode B, Mode J, Mode L and Mode S. Usually the Mode L and J transponders are on simultaneously. The bird fully achieved its desired orbit, enabling it to provide worldwide coverage for 10 or so hours per day.

As with Mode A, the equipment to operate AO-13 does not have to be exotic or expensive. The Mode B transponder is probably the most used, however a lot of people get started on AO-13 by graduating from Mode A to Mode J. With the 2M transmitter that was used on Mode A and the addition of an inexpensive 432 to 28 MHz receive converter, you're there.

The Mode L transponder is gaining popularity very quickly. When you start getting up in frequency, there is room to spread out. The Mode L transponder has more than 350 kHz of band-pass! To put this into perspective, that means that on OSCAR-13 Mode L, you have more room than on all of 20M!

A good source of information on how to get started using OSCAR-13 can be found in the AMSAT publication *A Beginner's Guide to OSCAR-13*. Write or call AMSAT HQ at 301/589-6062 to obtain a copy.

RS-10/11

If you've been keeping up with my column for the past year, you know that I think that RS-10/11 is a fantastic satellite for beginners and experts alike. Each satellite has an identical set of transponders. Each bird has a Mode A, K and T transponder and, in addition, the K and A and the K and T transponders can be turned on simultaneously. Since the sunspot cycle is fair-

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ly active, the Russians have had the Mode K and T transponders turned off in favor of Mode A.

RS-10/11 is actually riding piggy-back on another satellite called Cosmos 1860. The good news is that RS-10/11 uses the power buss of the primary satellite and does not have the usual power budget problems associated with most Amateur satellites. This means that the receivers are sensitive, the transmitters can output plenty of power and the bird is easy to work.

AO-16

AMSAT OSCAR 16 is one of the microsatellites launched on Jan. 22, 1990. This satellite is physically small, only nine inches on a side. The transponder on board is a packet digipeater and a store-and-forward mailbox. The development for the microsats was aided, in part, by experiments done on UO-9 and UO-11.

The transponder is a Mode J type, meaning that the uplink is on 2M and the downlink is on 435 MHz. The format of the digital communications uses the AX.25 protocol, however, it is not compatible with standard terrestrial packet. The uplink is 145 MHz Manchester encoded AFSK FM and the downlink is 435 MHz BPSK SSB.

As of late August the satellite is digipeating well and the BBS software is expected to be on-line soon.

LO-19

LUSAT OSCAR-19 is another of the microsats and is administered by AMSAT Argentina. It was launched at the same time as OSCARs 14 through 19. For all practical purposes, LO-19 is a clone of AO-16. The present condition of the bird is about the same as OSCAR-16. The bird is digipeating well and BBS software should be loaded soon.

The main difference between AO-16 and LO-19 is that LO-19 has a 12 wpm CW beacon on 437.125 MHz. The beacon is plenty loud and is easy to copy. The telemetry sent by LO-19 can be easily decoded in exactly the same manner as that of RS-10/11 even though the formulas are somewhat different. When decoded, this telemetry gives an up to the minute picture of the health and operating conditions aboard the satellite.

FO-20

Fuji-OSCAR-20 was built and launched by AMSAT-JA. The bird was launched on Feb. 7, 1989, by NASDA, the Japanese equivalent of NASA. FO-20 is an exact clone of the now inactive FO-12.

FO-20 is a Mode-J satellite with two transponders on board. As you recall, on Mode-J you uplink (transmit) on 2M and downlink (receive) on 435 MHz. The first transponder on FO-20 is an or-

inary analog transponder with a passband of 100kHz. This transponder is used for SSB, CW, RTTY, etc. The uplink passband is 145.900 to 146.000 MHz, while the downlink frequencies are 435.800 to 435.900 MHz. The beacon on this Mode JA (J-Analog) transponder can be found on 435.795 MHz, sending 18 wpm CW.

The second transponder is a digital packet store and forward mailbox. The protocol is AX.25, however the modulation format is Phase Shift Keying (PSK) and is, unfortunately, not compatible with regular terrestrial packet. The format of the digital transponder is exactly that of the microsats and

anybody who can work one can work the other. A PSK modem can be purchased, though. On the Mode JA side, anybody equipped to work Mode J on OSCAR-13 can work FO-20.

Next month

Well, it looks like I've run out of space (pun). Next month I'll continue the discussion of Amateur satellites presently in orbit. In addition, there are several proposed satellites on the drawing board that may fly in the next two to five years. As always, the latest bulletins from AMSAT can be found on many packet BBS stations or on the AMSAT dial-up BBS at 214/394-7438.



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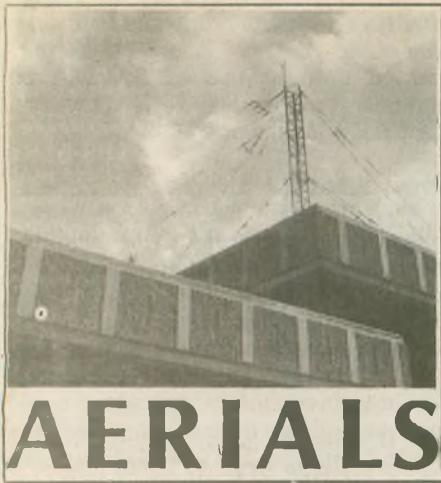
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AERIALS

Bits and pieces of conversations have been relayed to me. I sit puzzled.

First, let me say that I have nothing "against" any product or company. I am a bit concerned about what I hear, though.

An enthusiastic Amateur was proclaiming that he "had worked Europe" with a particular antenna. When the question was asked, "what kind of location did he have?"

The answer, with a straight face was, "On a hill overlooking the Atlantic Ocean."

Is there anyone out there who really

needs me to explain why I find that a bit . . . ?

Norman Brooks, K6FO, was told by the manufacturer to put the antenna in question "up as high as you can get it" for testing.

Wait a minute. This is supposed to be an attic or balcony antenna, not a "get-it-up-as-high-as-you-can" antenna.

Brooks said he put it up 18 feet. Well, if you can go up 18 feet, you can most likely go out 16 feet in each direction and have a regular dipole for 20. A little more wire and you've dipoles for all bands up from there.

How well will such a dipole work relative to cost?

A magazine tested one of the antennas and put it on top of a pole 36 feet high.

Hey, if you've got a tower/mast 36 feet up, why are you worrying about putting anything else on top of it?

That's a half-wave on 20, and you can hang other band vertical dipoles from it. It's a quarter-wave vertical for 40. Why is an antenna touted as being for apartments and condos being tested on top of a 36 ft. support?

I see that Barker and Williamson has a small whip 57 inches long which, when used (with a counterpoise wire, sitting on a windowsill) puts one on all bands from 2 to 40. Price: \$65. How well does it work? Relative to what? Does something else priced five times as much work five times better?

How would you judge five times better? How many dB or microvolts makes something five times better? Should a double in price be worth 3dB? Or, put another way, is a 3dB increase worth double the price?

How many "S" Units difference is five times the cost worth? The answer to that is of course in the eye (or the wallet) of the beholder.

Hey, if you can go up 18 feet with no problem from neighbors, instead of putting an eye-catching device on top of the pole, just run vertical wires up the wooden pole. No room for radials? Just run a wire to the faucet from where the lawn water comes from.

How much, at swapmeet prices, has that bit of wire cost you — and you've spliced a bit of wood to make a pole. Pretty cheap!

MFJ has a little antenna, no radials, 55-inch whip, all bands from 40 to 10. \$75. How does it work? One ham in the midwest has made DXCC plus with it.

I would like to drop the subject. No more. I don't care even if I hear that some have used it on a copper sheet ten wavelengths long in all directions.

Elsewhere in this issue you'll find an article about the antenna, as well as my very short rebuttal.

Some have said that they would like to see the discussions here in more technical terms. OK. You want science, I give you science. See elsewhere, this issue.

(Kurt N. Sterba, masked man, keeps to himself the fact that a \$1.34 toilet float on top of a 36-foot pole makes a very effective low-angle radiator when it is fed with ladder line.) □

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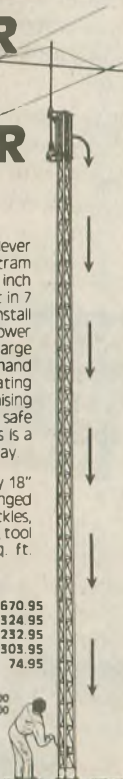
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150 Watts. Rated up to 150 watts, the IsoLoop transmits and receives on any frequency between 14 to 30 MHz. When mounted with the loop in the horizontal plane, the radiation pattern is omni-directional and horizontally polarized, with about the gain of a dipole. Maximum radiation is at low angles which is ideal for DX operation. The IsoLoop may also be mounted with the loop in the vertical plane to provide a null in a desired direction. Tuning is provided by a precision stepper-motor and a small remote control box, the LC-1.

The IsoLoop does not need ground radials and its balanced, shielded feed-loop isolates the feedline from the antenna. The IsoLoop is well-isolated from the feedline. Like AEA's Isopole antennas, your signal is radiated by the antenna and not the feedline. With end-fed antennas, the outside of the coax becomes part of the antenna, resulting in noise and computer hash pickup and increased TVI problems.

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Compact. The IsoLoop is square, with rounded corners, and measures 32 inches on a side and weighs only 12 pounds. Because of the IsoLoop's small size, it makes a perfect attic or balcony antenna. It's also excellent for portable operation, recreational vehicles or camp-site use. A rotator is not necessary when used in the

omni-directional, horizontally polarized mode.

Revolutionary. The AEA IsoLoop antenna represents years of research and development. Others may try to imitate the IsoLoop, but none can match the patent-pending design.

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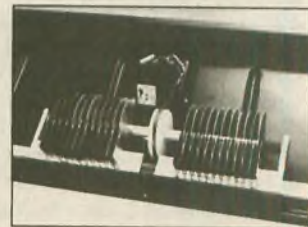
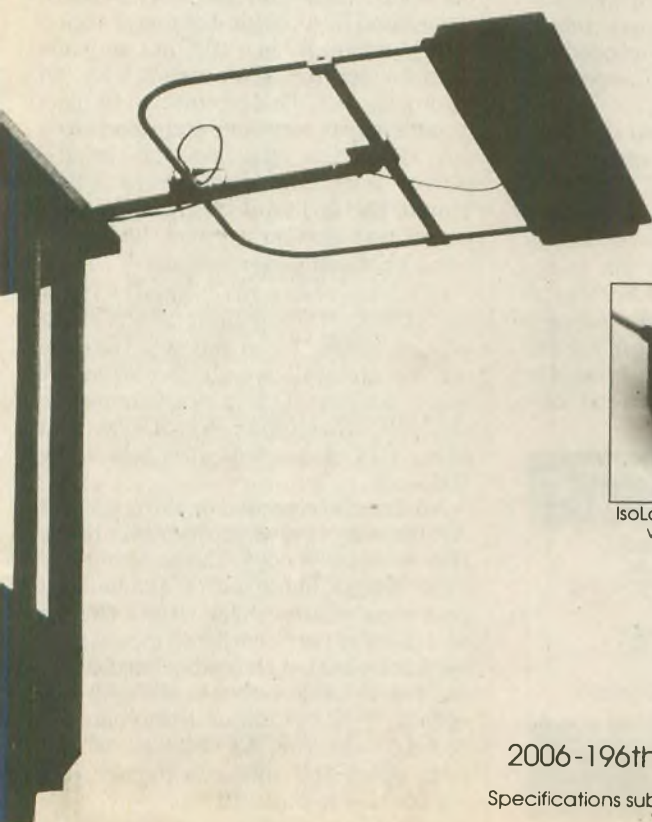
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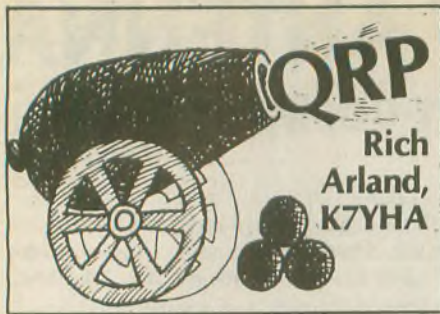
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Several months ago we looked at some serious mods for the Heathkit HW-8 QRP rig. Without a doubt, this little radio has done more for QRP than any other, except perhaps the Argonaut series by Ten-Tec. So many mods for this radio have appeared in print since the early 80s that several people have tried to condense them into one source book, *The Hotwater Handbook*.

Fred Bonavita, W5QJM, edited the first edition of the *HW Handbook*, followed a couple of years later by Mike Bryce, WB8VGE. The second edition has long been out of print. However, there are some distant rumblings that an updated third edition will be available one day and will include a bunch of mods for the HW-9.

In the interim, I have made arrangements to have the first edition copied in its entirety (since all mods in this edition are non-copyrighted) for anyone interested in obtaining HW-8 mods. I will pass these along at cost plus shipping, which will be \$6, plus 75¢ for first class postage. Send a check or money order to me at P.O. Box 522, Dallas, PA 18612-0522.

Since there is a decided lack of info currently available on the HW-8 mods, this month's column will be a brief run-down of my favorite mods for this QRP workhorse. One of the first things to do is locate an HW-8. These rigs can be had for \$50-\$85, depending on the con-

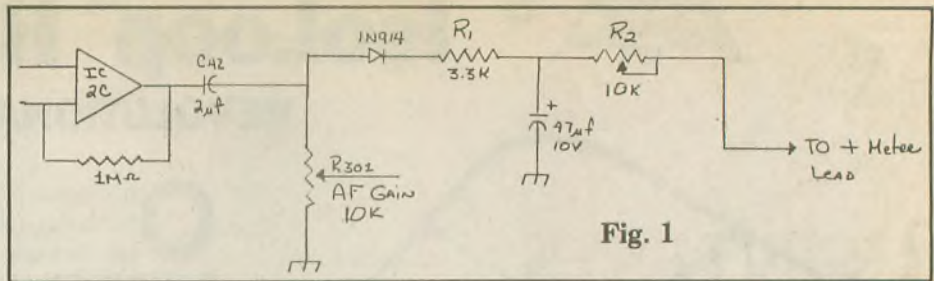


Fig. 1

dition and modifications previously performed. I would hesitate to buy a modified HW-8 unless I knew the owner who had done the modifications. Look at ham flea markets and in trade papers and the "Yellow Sheets" for a used HW-8.

Obviously, in order to modify this radio, it should be in working condition prior to beginning the modification process. The Heath manual for the HW-8 is an absolute *must* to have, not only to get the rig working, but to perform the modifications. Once you have the working rig, the fun begins.

One of the most productive mods centers around improving the sensitivity on the 15M band. Ade Weiss, WØRSP, authored a series of articles for *CQ* (reprints available for \$7 from Milliwatt Books, 833 Duke St., Vermillion, SD 57069) on turning the HW-8 into a real contest machine. The standard 15M sensitivity fix centers around removing the existing 15M RF coil, removing the existing turns on the secondary and adding a 4-turn secondary using #28 wire. This added coupling on 15M will greatly improve the overall performance on that band. Ade's articles detail this procedure (along with an RIT control, speaker, etc.) in step-by-step format.

My second favorite mod for the HW-8 is the replacement of the existing Q1 (MPF-105) FET with a 2N4416 FET. This is a 4-pin device but will work very well when placed in the original circuit. The fourth pin is actually a case ground for the 2N4416 and can be grounded by drilling a very small hole in the ground trace of the PC board next to the original Q1 holes. Or it can be left floating with no dis-

astrous results. Once this device is in place, you will notice a tremendous improvement in receiver sensitivity. This one mod makes the HW-8 play like a real radio! It is advisable to retune the RF front end section of the rig after performing this mod, to ensure that the rig is running at peak efficiency. Follow the steps outlined in the HW-8 manual.

For some reason, ham rigs without an S-meter don't look quite right. Since the HW-8 has this great meter on the front panel, why not make it function as an S-meter while in the receive mode?

What's that you say? This is a direct conversion (DC) receiver with no IF strip, hence no AGC loop, so how can we get any S-meter function? Simple . . . since the audio output is relative to the RF signal input on the receiver, it's quite acceptable to connect the circuit in Fig. 1 to the top of the AF volume control. The diode rectifies the receive audio and applies the DC signal across the existing RF output meter. R1 and C1 set the audio derived "AGC" time constant. You can play with these values and find the kind of meter action that you like. R2 is a 10K pot which is used to set full scale sensitivity on strong signals. This circuit will fit nicely on a small terminal strip and does not affect the operation of the RF power indicator during transmit. Mount the terminal strip on the sub-panel near the meter. Not bad for a handful of components, huh?

Much has been written about RIT for the HW-8. Having built the WØRSP version twice, I can tell you that the results are well worth the effort. A much simpler RIT is diagrammed in the *HW Handbook* by K3TS, and either RIT circuit will work well in the HW-8.

Addition of a second or third stage of AF filtering is always desirable in the HW-8. Merely copy the existing AF filter design using parts available at your local Radio Shack. Build this up on a piece of perf board and mount it on the back panel of the radio. Disconnect the 3-wire cable between SW-302 (the wide/narrow switch) and the main PC board. Take the AF filtered output from point HH and run it over to a (please turn to page 63)

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1990 North Carolina QSO Party

Sponsored by the Alamance Amateur Radio Club, this event will take place from 0000Z Nov. 10 to 2400Z Nov. 11. The object is to work as many NC stations as possible. Stations may be worked once per each band/mode combination for QSO points. Work mobiles again as they change counties.

Exchange: RST and QTH (NC county, state or country).

Suggested frequencies: CW — 3.540, 3.740, 7.040, 14.040, 21.040, 21.140, 28.040 and 28.140; SSB — 3.860, 7.260, 14.260, 21.360 and 28.360.

Scoring: Score one point for each SSB QSO, two points for CW and five points for each QSO with a Novice or Tech (Novices and Techs should sign /N or /T after their calls). NC stations multiply points by total number of NC counties, states, VE provinces and DXCC countries. Others multiply by total number of NC counties worked (max 100).

Logging: Logs must be kept in chronological order showing time, band, mode, call and exchange. Number each new multiplier as worked and include a separate multiplier checklist. Blank forms available from K4EG for an SASE.

Mail logs by Dec. 15 to NC QSO PARTY c/o K4EG, Box 3064, Burlington, NC 27215. Include SASE for results and certificate. □

ALARA Contest

The Australian Ladies' ARA Contest will be held Saturday, November 11, from 0001 to 2359 UTC. All licensed operators throughout the world are invited to participate. Also open to SWLs.

Object: Participation — YLs work everyone, OM's work YLs only. One contest (combined phone and CW) run over 24 hours.

Suggested frequencies: Bands to be used are 3.5, 7, 14, 21 and 28 MHz only. The following are suggested frequencies for easier location of contacts: 28.380-28.410, 21.190-21.200, 21.380-21.410, 14.250-14.280, 7.070-7.100 and 3.560-3.590.

Operation: Phone and CW. Each station may be counted twice for credit — once on phone and once on CW. All contacts must be made in accordance with operator and station license regulations. No net or list operation, no crossmode.

Procedure: Phone — Call "CQ ALARA CONTEST." CW — YLs call "CQ TEST ALARA." OM's call "CQ YL."

Exchanges: ALARA Member — RS or RST, serial number starting at 001, ALARA member, name. YL non-member or OM — RS or RST, serial number starting at 001, name.

Scoring: Phone — 5 pts. for ALARA member contacted, 4 pts. for YL non-member contacted and 3 pts. for OM contacted. CW — count double points for contacts where at least one operator is Novice. SWL — 5 pts. for ALARA member logged, 4 pts. for YL non-member logged.

Logs: Single log entry (but Australian YL Novices entering for the Mrs. Florence McKenzie CW trophy should indicate their CW score separately also). Logs must show date/time UTC, band, mode, call sign worked, report and serial number sent, report and serial number received, name of operator of station worked and points claimed.

Logs must be signed. Logs are also to show full name, call sign and address of operator and show final score (points claimed). Logs must be legible. No carbon copies. No logs will be returned. Decision of the Contest Manager will be final. Logs must be received by the Contest Manager by Dec. 31. Contest Manager: Mrs. Marilyn Syme, VK3DMS, P.O. Box 91, Irymple, 3490, Vic. Australia.

Awards: Mrs. Florence McKenzie CW Trophy — This will be awarded to the Australian YL Novice operator with the highest CW score (not necessarily an ALARA member). Minimum score 50 pts. The actual trophy, because of the size and weight, will not be forwarded to the winner, but a certificate bearing a photo depicting the trophy will be sent to the winner each year.

Certificates will be awarded for the following: Top score overall, top score phone only, top score Australian YL Novice CW (Mrs. F. McKenzie certificate), top score ALARA member in each country and VK call area, top score YL non-member in each continent, top score OM in each continent, top score SWL in each continent, top score VK Novice and top score overseas YL Novice CW. □

Telephone Pioneer QSO Party

The George S. Ladd and John I. Sabin Chapters invite all Telephone Pioneer Radio Amateurs to participate in the 26th Annual Telephone Pioneer QSO Party. The contest will take place from Sat., Dec. 1 at 1900 UTC until Mon., Dec. 2, 0500 UTC.

Rules: Fifteen bands are defined for use in the QSO party. They are:

1.8: 1.800-2.000	14.0: 14.000-14.150	28.3: 28.3-29.7
3.5: 3.500-3.750	14.2: 14.150-14.350	50.0: 50.0-54.0
3.9: 3.750-4.000	21.0: 21.000-21.200	144.0: 144.0-148.0
7.0: 7.000-7.150	21.2: 21.200-21.350	220.0: 220.0-225.0
7.2: 7.150-7.300	28.0: 28.000-28.300	UHF above 420 MHz

Any station representing a different chapter from the contestant may be contacted on any or all of the 15 bands for a maximum of 15 QSOs per station, with no more than one QSO per band. Any station in the same chapter may be counted once, for a maximum of one QSO per station. This contact can be on any band. Only one transmitter can be on the air at a

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time. Club stations may have multiple operators.

Procedure: phone user call "CQ Telephone Pioneers." CW and RTTY user call "CQ TP." Please observe good sportsmanship; share frequencies with low power stations and give way to established nets. Contacts via simplex or repeater are valid.

Frequencies: phone (MHz) — 1.855-1.930; 3.905-3.950; 7.260-7.290; 14.260-14.305; 21.360-21.405; 28.560-28.600; 50.1-50.5; 144.1-148.0; 222.1-225.0; CW (MHz) — 1.800-1.825; 3.555-3.595; 7.055-7.070; 14.055-14.075; 21.055-21.075; 28.055-28.075; 50.0-50.1; 144.0-144.1; 222.-225.0; novice/technician CW — 3.725; 7.125; 21.125; 28.125; RTTY — 3.630; 7.095; 14.095; 21.095.

Scoring: Each phone QSO is worth one contact point. Each CW QSO is worth two contact points. Total score equals contact points times chapters worked. Only one multiplier may be taken for each chapter worked. The maximum multiplier is 120 (all TPA chapters plus a maximum of 15 USTPA groups).

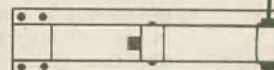
Exchange: Signal report and chapter number. (USTPA: club or chapter name and number.)

Reporting: If possible, return log sheets via your Pioneer Amateur Radio Coordinator. Please use the summary sheet. Send logs showing date, time station worked, band, mode, signal reports, chapter number, and summary sheet, postmarked no later than Jan. 15 to George S. Besley c/o John I. Sabin, Rm 3151, 2700 Watt Ave., P.O. Box 15038, Sacramento, CA 95851. □

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Alabama

The MONTGOMERY AMATEUR RADIO CLUB will host the 13th annual Montgomery Hamfest in Garrett Coliseum at the South Alabama State Fair grounds. Admission and parking are free. It will be all indoors, including the flea market.

Flea Market set up begins at 6 a.m.; doors open to the public from 8 a.m. to 3 p.m. FCC exams on site; code testing begins at 8 a.m. with all parts of written exams beginning at 9 a.m. For exam, bring a copy of your current license, picture I.D. and \$2.00.

Talk-in on 146.24/84, W4AP; ragchew 146.32/92 (with phone patch up or down); 147.78/18; 449.50/444.50.

Special Hamfest rates are available at Villagers Inn or Coliseum Motel.

For more information write to Hamfest Committee, 2141 Edinburgh Dr., Montgomery AL 36116, or call Phil at 205/272-7980 after 5:00 p.m. □

Connecticut

The SOUTH CENTRAL CONNECTICUT AMATEUR RADIO ASSOCIATION indoor ham radio and computer flea market will be

held at North Haven Park and Recreation Center from 9 a.m. to 3 p.m. Sellers will be admitted at 7 a.m.

Tables will be \$15 in advance or \$20 at the door. Reservations for tables must be received with check by Nov. 1. General admission is \$3. Talk-in on 146.01/61.

For information or reservations send SASE to: SCARA Flea Market, P.O. Box 81, North Haven, CT, 06473 or call Brad between 7 p.m. and 9 p.m. at 203/265-6478. □

Massachusetts

The BULL HN 1200 RADIO CLUB, sponsor of 147.72/12 repeater and the WALTHAM AMATEUR RADIO ASSOCIATION, sponsor of 146.04/64 repeater will hold their annual Amateur Radio and electronics auction on Sat. Nov. 17 at the Bull HN plant in Billerica.

Features will include a snack bar and bargain parts store. Admission and parking are free.

Doors will open at 10 a.m.

Talk-in on both repeaters.

For more information contact Mike Rioux, NW1J, 132 Killam Hill Road, Boxford, MA 01921. □

Michigan

The HAZEL PARK AMATEUR RADIO CLUB will hold its 25th Annual Swap and Shop on Dec. 2 from 8 a.m. to 2 p.m.

Admission is \$2 in advance or \$3 at the door.

Ticket and table reservations are available through HPARC, P.O. Box 368, Hazel Park, MI 48030.

The OAK PARK AMATEUR RADIO CLUB will hold its annual Swap and Shop hamfest on Nov. 4 at the Southfield Pavilion Center.

Doors open at 8 a.m. and admission is \$4 at the door; kids under 12 enter free with an adult. Plenty of free parking will be available.

Tables (8 ft.) can be reserved in advance for \$12 each. VE exams will be given.

Talk-in on 146.64/146.04-R; 224.36/222.76-R.

For reservation and ticket information, contact the Oak Park Amateur Radio Club, P.O. Box 1422, Royal Oak, MI 48068.

Minnesota

The annual Courage Center Winter Hamfest will be held on Saturday, Dec. 1 at the Eagles Club in Faribault.

Registration is at 9 a.m.

There will be a Handi-ham equipment auction and dinner at noon.

Talk-in on 19/79.

For more information contact Don Franz, W0FIT, 1114 Frank Ave., Albert Lea, MI 56007. □

New Jersey

The SHORE AREA HAM RADIO & COMPUTER CLUBS will sponsor a hamfest on Nov. 11 from 8 a.m. to 3 p.m. at the Allaire Expo Center.

Vendors will be admitted at 6 a.m.

The event will feature prizes, VE exams, tailgating and ham radio and computer demonstrations.

Fly-in Freq: 123.0 unicom; Talk-in on 145.110 -600, KC2Q/R; 146.520 simplex.

Admission will be \$4 in advance or \$5 at the door; children under 12 and accompanying spouses enter free. Tables will be \$20 and tailgate is \$8.

For further information contact Al Jackson, NK2O, P.O. Box 635, Eatontown, NJ 07724; 201/922-8121. □

North Carolina

The CABARRUS AMATEUR RADIO SOCIETY will sponsor its annual hamfest on Sunday, Nov. 11 beginning at 9 a.m. at the New National Guard Armory on NC highway 49 S.

VE exams, new equipment dealers and flea market will be featured.

Admission will be \$4 at the door.

For further information write: CARS Hamfest, P.O. Box 1290, Concord, NC 28025. □

Wisconsin

The FOX CITIES AMATEUR RADIO CLUB will hold their hamfest on Nov. 4 at the Starlite Club.

Testing check-in is at 8:15 a.m. and testing at 9 a.m.

To reserve a table please contact Don Baker at 621 W. 7th St., Kaukauna, WI 54130; 414/766-3886. □

The MILWAUKEE REPEATER CLUB is proud to sponsor the 6th annual "6.91 Friendly Fest" on Saturday Nov. 10 from 8 a.m. to 1 p.m. at Serb Hall, 51st & Oklahoma Ave. Sellers will be admitted at 7 a.m.

The selling halls are located entirely on the ground floor with easy access so, rain or shine, gather up your swafest bargains and come share our famous Milwaukee hospitality. Amateur Exams will be given.

Tickets are just \$4; 4 ft. tables are available for \$5.

To save \$1 per ticket or table — send SASE with payment to The Milwaukee Repeater Club, P.O. Box 2123, Milwaukee, WI 53201 before Nov. 3.

Talk-in on 146.91 and on 146.52. □

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Information in "New Products" is supplied by the manufacturers to acquaint Worldradio readers with new products on the market.

World Time Clock

H&M Jewelry announces the availability of an excellent station clock, the World Time Clock, which features the QTR Ring, allowing users to read not only their own local time, but also the time anywhere in the world, at a glance without any conversions.

The names of 65 cities and countries are displayed around the periphery of the World Time Clock. The local hour at those cities is read by the number on the QTR Ring adjacent to the city or country name; the minutes after the hour are read from the minute hand. GMT is read directly from the 12 o'clock position. A polar projection map of the world is also on the face of the clock, showing the world's time zones.



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*ICOM reg. ICOM U.S.A. not M. Bohnhoff



The magic ingredient to this station clock is the rotating QTR Ring. The ring is half black and half white, with numbers zero to 23. The black numbers on the white background indicate daytime (0600 to 1800), and the white numbers on the black background indicate night (1800 to 0600).

The World Time Clock comes in a brushed goldtone metal case with a bright polished faceted bezel, and runs approximately one year on a single "C" cell alkaline battery (not included). Overall height is nine inches, clock diameter is 7¾ inches, and depth is three inches. Price is \$79.95, plus \$5 for insured shipping and handling; please allow 4-6 weeks for delivery. Readers of Worldradio may take a five dollar discount if they mention Worldradio with their order. The World Time Clock makes a great holiday gift to yourself or a special friend.

For more information contact H&M Jewelry Company, 26 Edgecomb Road, Binghamton, NY 13905 or call 607/797-5458. □

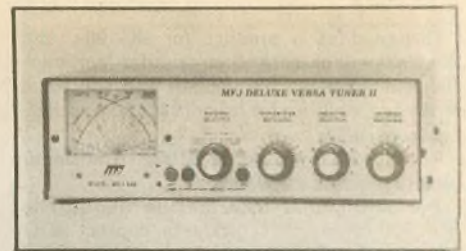
Antenna tuner

MFJ Enterprises, Inc. announces the release of the new MFJ-948 300W Deluxe Antenna Tuner for only \$129.95.

MFJ-948 is a 300W tuner that tunes out SWR for maximum power transfer to verticals, dipoles, inverted vees, beams, quads, mobile whips fed by coax, balanced lines or single wire — virtually any HF antenna. It covers 1.8 to 30 MHz and is made in the US.

It features MFJ's lighted peak reading Cross-needle SWR/Wattmeter with an on/off switch for the meter lamp. It also reads average power. This large meter shows you SWR, forward and reflected power at a single glance. It reads power on two scales — 30- or 300W. Three front panel meter switches let you select peak or average power, hi or low power scales, and meter lamp on or off. Lamp uses 12 VDC or 110 VAC with MFJ-1312; \$12.95.

A six position antenna switch lets you select two coax lines (direct or through tuner), random wire, balanced line and external dummy load. A 4:1 balun makes it easy to hook up balanced line antennas.



You also get MFJ's unmatched one full year No Matter What™ guarantee. That means MFJ will repair or replace (at our option) your MFJ tuner no matter what happens to it for a full year.


For more information or to order contact any MFJ dealer or MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762, or call 601/323-5869; FAX: 601/323-6551; Telex: 601/323-6551 or order toll free at 800/647-1800. □

HF SSB transceiver

SGC Inc., a well-known communications design and manufacturing company, has available the Model SG-2000 high frequency single sideband radiotelephone. This full coverage SSB radio provides global HF communications on voice and data transmission.

The SG-2000 features several sophisticated scanning modes, a large LCD frequency display and is remote and ARQ/FEC ready. It features a splash-proof front panel and includes an internal clock with turn on/off programming and 616 ITU voice and data channels, plus 100 user programmable memory channels.

The Model SG-2000 is a commercial HF SSB transceiver and incorporates unique features which appeal to the commercial, industrial and pleasure markets. The SG-2000 produces 150W and operates on the 1.8 to 30 MHz frequency bands. The unit has all functions built-in for HF SSB operation, including remote capability (up to six remote stations) or remote controlled through telephone lines. The SG-2000 can be controlled by an IBM or compatible computer without its removable front panel.



1991 Ham Photo Calendar

A contest and DX-oriented calendar, combining color photos, radio event dates, and operator reference.

- Over 140 operating events and radio history dates
- CQ & ITU world zone maps and countries lists
- ARRL & CRRL sections & VHF grid squares map
- Russian prefixes/Oblast list & map, ed. by K1KI
- Historical tribute to David Samoff, by Tom Lewis
- 1991 propagation forecast and tutorial by VP2ML
- U.S. Amateur Bands, license, mode, power limits
- Photos of famous DX and contest personalities

Calendar meas. 11" x 18" (opened)
Large 7 x 9" photo each month.
Spiral bound to hang/lie flat. 44 pp.

For U. S., VE, XE, send \$11.95 for one, \$10.90 ea. for two or more, plus \$2.00 for shipping and handling, regardless of the number ordered. For DX, send \$16.00 for one, \$15.00 ea. for two or more, air shipping included, to:

KB1T Radio Specialties, Box 1015-W, Amherst, NH 03031

Designed as a product for the 90s, the SG-2000 will operate on any marine, commercial and Amateur frequencies and will have receive capabilities for broadcast and weather-fax frequencies.

The SG-2000 retails for \$1995. Additional remote heads are \$595 each.

For additional information about the SG-2000 or any SGC products, contact SCG Inc. Sales and Marketing Department, SGC Building, 13737 S.E. 26th St., Bellevue, WA. 98005; 206/746-6310. □

EQ 300

For years, radio Amateurs have tried many types of audio devices, all dealing in only one parameter, that of level. Most signals contain

excessive low frequencies, causing them to be muddy sounding, hard to copy, lacking good articulation and presence of "sibilance" ("s" and "t" sounds). These annoying conditions are not solved by audio processing.

The answer is equalization. The EQ300 allows you to equalize your Amateur station just like most broadcasting transmitters and recording studios, reducing distortion, adding clarity, presence and sibilance.

The front panel "output" control provides a variable level up to + 2.0 volts out, sufficient to drive any microphone input including the ICOM series. Simply adjust to 1.0 volt out (11 o'clock) for Kenwood, Yaesu, etc. and 1.5 volts (3 o'clock) for ICOM. The only difference in the two models is the connectors. Order either 4- or 8-pin to match your rig. The EQ 300 has a power adapter circuit built in so it can be operated from a 9-volt battery or from a good 12-volt D.C. supply. Excellent RFI suppression has been installed for use in heavy RF environments.

The connectors are wired for the most popular 8-pin radios - Kenwood, Icom and Yaesu. Be sure to specify. It is also available for a 4-pin Kenwood configuration.

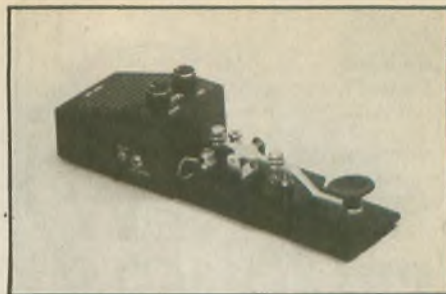
The EQ300 is available for \$69.95 plus \$5 shipping and handling. For further information write to No. 2 Heil Dr., Marissa, IL 62257 or call 618/295-3000. □

Code practice oscillator

MFJ Enterprises, Inc. announces the release of its new MFJ-557 Deluxe Code Practice Oscillator for \$24.95. It features a straight Morse key and a code oscillator with a built-in speaker mounted together on a non-skid heavy steel base that stays put on your table.

It lets you practice sending code at home, work, riding in your car - practically anywhere - because it's so easy to take it along wherever you go.

A volume control lets you adjust it from



barely audible to blaring full sound. You can practice your code without bothering anyone. A tone control gives you a wide tone adjustment from high "squeaky" to low "booming" tones. You even get an earphone jack for private listening.

It runs on a 9-volt battery (not included) or 110VAC with an optional power supply (\$9.95) which plugs into a jack on the side.

The straight key features screw-adjustable contacts and can be hooked up to your transmitter and used for sending code over the air.

This attractive unit is black and measures 8½ x 2¼ x 3¾ inches. It comes with MFJ's one year unconditional guarantee.

For more information see any MFJ dealer or contact MFJ Enterprises, Inc. P.O. Box 494, Mississippi State, MS 39762; 601/323-5869; FAX: (601) 323-6551; Telex: 53 4590 MFJ STKV, or order toll free at 800/746-1800. □

Storage boxes

Aluma Tower Company Inc. has introduced an optional storage box to be used in conjunction with trailer/tower units.

This new item, Model #615, can be used on all Trailer Models (TM-11, TM-51-20 and TM51-35). The box provides excellent storage for coaxial cable used with the Model # T-1100 100 ft. crankup tower, plus guy wire, ground anchors and other accessories.

Special boxes can be manufactured to suit your every need, in either stainless steel or aluminum.

Contact Aluma Tower Company Inc., P.O. Box 2806, 1639 Old Dixie Highway, Vero Beach, FL 32961-2806; 407/567-3423; FAX: 407/567-3432. □

AMSAT info

For membership or general information on AMSAT, you may write to the Radio Amateur Satellite Corporation, P.O. Box 27, Washington, DC 20044; or call 301/589-6062 or 313/584-2842. □



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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 two months in advance. For example, if your VE group is scheduling an exam for September, please have the information to us by mid July.

Worldradio, 2120 28th St., Sacramento, CA 95818.

Please mark the envelope "VE Exams."

List the location, and 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
Alabama				Maryland			
Nov 24	Montgomery	Leroy Bell Jr. (205) 269-4201	w/i	Nov 24	Laurel	(301) 572-5124	ltd w/i; p/r pref
Arizona				Massachusetts			
Nov 3	Tucson	K7OPX (602) 886-7217	w/i	Nov 7	Acton	K1DYG (508) 263-7435'	no w/i
Arkansas				Nov 17	Melrose	WB1F (617) 322-7654	w/i
Nov 10	Russellville	Ben Hillis (501) 964-6885	w/i	Michigan			
California				Dec 6	Trenton	(313) 676-6248	no w/i
Nov 3	Burbank	KE6AR (818) 349-0927	w/i OK	Minnesota			
	Nevada City	KD6SG (916) 273-2326	p/r pref; w/i OK	Nov 10	Bloomington	KD0CL (612) 881-7181	p/r pref
Nov 10	San Dimas	K6THQ (714) 596-9383	w/i OK	Mississippi			
	Apple Valley	NF6I (619) 241-4732; K6BET (619) 244-6080	w/i OK	Nov 8	Ocean Springs	AA5QJ (601) 875-9516 or AA5TX (601) 875-2142	
	San Marcos	KB6WB		Missouri			
	San Pedro	N6DYZ (213) 325-2965	ltd w/i	Nov 3	Independence	K0IXC (816) 781-7313; 7-9 p.m. only	
	Santa Barbara	KB5AH (805) 682-2665	w/i OK	Nevada			
	Seal Beach	NN6Q (213) 420-9480		Nov 10	Minden	W7QO (702) 265-3430	w/i
Nov 15	Fountain Valley	KI6WK (714) 846-6984		New Jersey			
	Long Beach	KA6HOQ (714) 897-6331; NF6X (213) 434-8278	w/i	Nov 10	Cranford	N2XJ (201) 635-7686	
Nov 17	Hawthorne	NO6I (714) 823-7158; WS6T (213) 600-4160	w/i OK	Nov 10	Pennington	AA2F (609) 737-1723	w/i OK; pref p/r
	Porterville	Pat (209) 539-2429	w/i only	Nov 14	Fort Monmouth	KZ2P (201) 905-3146 or (201) 370-8055	w/i
	Redding	NT6E (916) 243-REVA	w/i OK	Nov 15	Bellmawr	WA2VQG (609) 546-7710	no p/r
Nov 21	San Dimas	K6THQ (714) 596-9383	p/r	Nov 17	Bayonne	WA2QYX (201) 451-9471	w/i OK
	Eureka	KB6FIW (707) 442-9245	p/r pref by 11/19/90	New York			
Nov 24	Eagle Rock	KB6RXE (818) 791-1779; AA6HI (213) 256-2904		Nov 25	North Babylon	KA2RGI (516) 957-0218	w/i OK
Dec 1	Riverside	(714) 780-2680	p/r 7 days prior; w/i if space	North Carolina			
	Stockton	AA6NO (916) 662-0810	w/i	Nov 10	Yadkinville	N4UAN (919) 679-8954	p/r; w/i
Dec 1	Burbank	KE6AR (818) 349-0927	w/i OK			N4XRY (919) 699-8469	w/i
	San Dimas	K6THQ (714) 596-9383	p/r 1 week prior	Nov 11	Salisbury	AB4UX (704) 284-2414	p/r; w/i OK
Dec 2	Chico	W6YKU (916) 342-1180	p/r pref			N4UXO (704) 636-2853	w/i OK
Dec 6	Modesto	W6XK (209) 883-2968	w/i OK	Ohio			
Dec 8	San Marcos	(619) 465-EXAM	p/r 11/28	Nov 11	Independence	WT8A (216) 526-3807	w/i
Colorado				Dec 1	Mentor	KO8O (216) 256-0320	w/i OK
Nov 10	Denver	W0IJR (303) 366-9689	w/i OK	Pennsylvania			
Nov 17	Westminster	N0CFM (303) 451-1231; N0HNR (303) 278-4280	p/r or w/i	Nov 3	Erie	W3CG (814) 665-9124	w/i OK
Connecticut				Nov 5	Pennsburg	K3ZXQ (215) 679-5764	
Nov 10	Gales Ferry	KY1F (203) 536-0187	w/i	Nov 15	Center City	ND3Q (215) 482-0386	
Nov 25	Milford	NB1M (203) 933-5125; WA1YQE (203) 874-1014	w/i	Nov 19	Perkasie	Warren Erdman (215) 679-5764	p/r; w/i
Florida				South Carolina			
Nov 17	Melbourne	WB9IVR (407) 724-6183	w/i OK	Nov 17	North Charleston	AA4IX (803) 873-9465	w/i
	W. Palm Beach	W4SS (407) 967-1477; KG4U (407) 582-7617	w/i	South Dakota			
Idaho				Dec 8	Rapid City	KA0SEZ (605) 394-1298; NU0F (605) 348-6564	p/r 30 days prior; w/i OK
Nov 10	Boise	W7JMH (208) 343-9153	w/i	Tennessee			
Illinois				Nov 9	Memphis	WA4KRP (901) 795-3712	w/i OK
Nov 10	Oak Forest	KA9HDN (312) 247-0650	w/i	Dec 1	Memphis	W4MI (901) 357-8148	p/r Nov 29
Nov 11	Danville	KC9V (317) 793-3573; WA9Z (217) 442-8949	w/i	Texas			
Nov 17	Bloomington	KM9L (309) 662-1230; NO9W (309) 378-4032	w/i OK, with ID	Nov 10	Eddy	N5KZD (817) 859-5374	w/i
	Bolingbrook	NW9K (815) 886-5135	w/i		Midland	KT5G (915) 694-9450	
	Galesburg	KA9PCU (309) 342-5977			San Antonio	AA5HG (512) 680-2371	w/i
	Loves Park	W9SS (815) 877-6768	p/r; w/i	Nov 17	DFW Airport	KF5BL (214) 252-8015	
Indiana				Nov 20	Sherman	AA5PP (214) 786-2644	w/i
Nov 3	South Bend	NI9Y (219) 255-4455	w/i OK	Virginia			
Nov 17	Rushville	N6RS (317) 763-6090	w/i	Nov 3	Middletown	NC4B (703) 869-5241	p/r & ltd. w/i
Iowa				Washington			
Nov 18	Des Moines	NA0R (515) 964-0900; (515) 967-3890	w/i	Nov 1	Spokane	WA7IIR (509) 467-1208 or KM7U (509) 326-4833	p/r pref; Ltd. w/i

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AUTO-CALL MAGAZINE, official journal of the Foundation For Amateur Radio, a federation of over 50 clubs in the greater Washington, D.C. area. Great coverage of FCC, ARRL, VEC, Public Service and club activities in the area. A must for those even passing through the area. For sample copy write FOUNDATION FOR AMATEUR RADIO, P.O. Box 7612, Falls Church, VA 22046-1452.

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HAMMARLUND SP-600 \$150; R-390A \$150; Nordmende Galaxy 10-band \$60; Magnavox 10-band \$60; 2-page list, SASE please. WO9C, 114 Lakeview, Milwaukee, WI 53217.

FREE Ham Gospel Tracts, SASE, N3FTT, 5133 Gramercy, Clifton Heights, PA 19018.

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QRP

(continued from page 54)

3-pole rotary switch (non-shorting type). The wiper of this new switch is connected to pin 8 of IC-2. The two additional pins on the rotary switch are used to select the two new AF filter sections and a bypass mode. Now you have enough AF filtering for even the worst band conditions.

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Refer to Fig. 2. Replace R52 with a 1.5K resistor. Remove the yellow jumper wire from point T on the main PC board to pin 6 on the 15M band-switch. A 10K pot is mounted (either

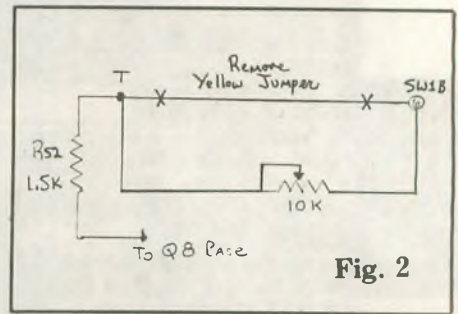


Fig. 2

on the front or rear panel) and wired in place of this jumper. By varying the resistance of the new 10K pot, the RF output can be changed. John recommends that these values be played with a bit as the bias requirements on Q8 may be different on various HW-8s.

Well, that's about it from here for now. 73s es gud DX. □

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