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Maj. Beau Rogers displays an American flag from his Dutch F-16 while refueling over Afghanistan. This month's *Utility Communications Digest* by Steve Douglass features more than 60 reader-submitted loggings, including several interplane frequencies to help you hear our Nation's military and our allies fight the war on terror. (U.S. Air Force photo by Capt. Allen Heritage)

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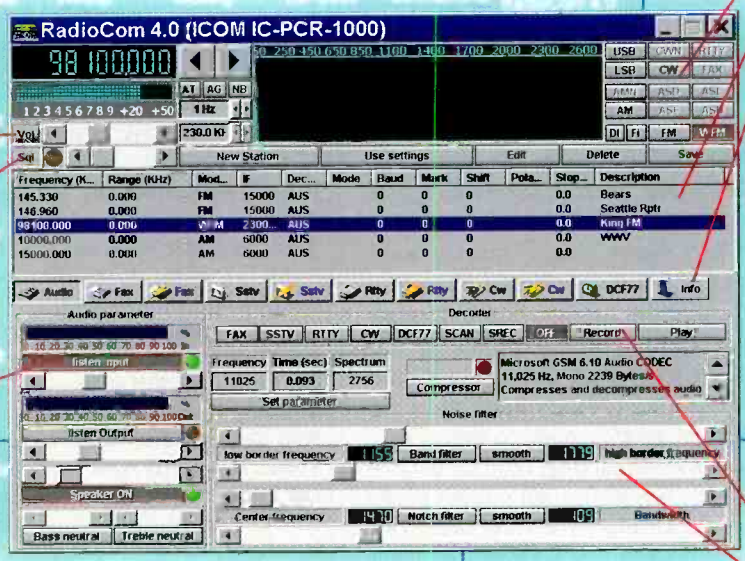

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by Harold Ort, N2RLL, SSB-596, WPUD-220

tuning in

an editorial

Track This

In these days of high-tech gizmos that aren't always as "high-tech" as the industry would have us believe – as evidenced by the sheer volume of tech support calls – some days are better than others. Maybe I'm crazy, but it seems like all the quality time we're supposed to be having because of our electronic tools is actually less than we had 30 years ago.

Like politicians, the cell industry hates it when people remember. Some days I might not remember where I put my Superman slippers, but I do remember the days of being able to reach a live operator by dialing "0" – and even being able to get a cop on my doorstep by dialing "0." Of course it was an old rotary-dial phone, and heavier than our kitchen sink. You could always tell if a person was a right or left-handed phone user by the size of their biceps. Growing up I remember always having a phone in the house - one – and it always worked. OK, every once in a while some doofus on wheels would take out a telephone pole and we'd lose service for a couple of hours, but most any day or night we could make or receive a call - *and* be heard.

I never paid much attention to the phone bill, but almost instinctively knew it was a good idea to make long distance calls *after* 5 p.m. because it was a lot cheaper. I suspect the bills were also pretty easy to read because I would have heard Dad asking the phone company a few questions. Interestingly, today's phone bills are – we're told - a lot easier to decipher, although my gut tells me it's not so much the bill itself, but the actual bottom line that gets folks honked off.

Bills are the very reason I don't have a cell phone bill. I know I pay more for the pay-as-you-go Nationwide TracFone Wireless service, but I like it that way; no surprises and no bills to decipher which would take me away from the time I spend on the phone with AOL's tech support.

But through it all, wouldn't you know that even my simple no-frills TracFone isn't without problems. It's not the actual phone that's giving me fits, it's the carrier – Cingular. Well, today it's Cingular, according to TracFone Tech Support; last week they weren't sure, and the week before that it was supposedly Verizon.

It's about the size of a handheld scanner; not one of those tiny flip-phones that look more like pagers than a phone. I like it that way. It fits in my hand and I can find it in my briefcase and on the car seat. It also has a normal ring. I can set the volume on the ringer, but that's about it; and no, it doesn't play My Way when Don Rumsfeld is on TV or Sixteen Tons when Dick Cheney comes out of the bunker for some fries. But right now I can only make calls; seems the receive portion of Cingular's service is out to lunch.

Over the past two weeks I've had more time on the office phone with TracFone than I've had listening to my radios; certainly not a good thing! Each time I'm promised the problem will be corrected within 48 hours, but 48 hours comes and goes and all I can do is make calls. One TracFone tech support fellow even told me I should toss the phone and get a new one; they'd roll over my units onto the new phone. Like my old pair of sneakers and this three-year-old computer I'm using, I don't want a new one. This one works quite well – when all the high-tech gurus push the right buttons.

Now, I realize many folks would think I should just bite the bullet and get a new digital phone with more bells and whistles than a Chinese drill sergeant, and a little camera so I can take a capture an image of the cat on the window. I've got plenty of radios with bells and whistles and a digital camera for the other. Besides, to me there's just something unnatural and weird about hearing a phone playing a cute little song in public. But still – after three weeks and getting six TracFone case numbers – I still can't receive calls.

(Continued on page 67)

POPULAR COMMUNICATIONS

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washington beat

Capitol Hill and FCC actions affecting communications

by Laura Quarantiello, lauraq@cts.com

Families Sue Over 9/11 Radios

The families of 12 firefighters killed in the collapse of the World Trade Center on September 11, 2001, have sued Motorola and the City of New York, saying the deaths could have been prevented if the firefighters' handheld radios had been working properly. The $5 billion dollar suit, filed in the U.S. District Court in Manhattan, claims that the company failed to warn the New York City Fire Department that its handheld radios could not transmit or receive in a high-rise building and, therefore, firefighters could not hear the evacuate order. The suit also slams Motorola, claiming that it misrepresented its digital radios when it sold them to the Fire Department in 1999, contributing to the events that left firefighters without adequate communications.

The FCC And Alleged 10-Meter Scofflaws

The American Radio Relay League (ARRL) says in a release to their members,

The FCC is working on at least two fronts to eliminate unlicensed operation from the 10-meter band. In January, FCC Special Counsel Riley Hollingsworth sent warning notices to two shipping companies regarding reports to the Commission that some of the companies' vehicles may be the source of illegal radio transmissions on the amateur band. One of the companies, UPS, has offered its full cooperation.

"Many truckers use CB radio, which does not require a license," Hollingsworth pointed out in letters to UPS offices in Ohio and Indiana and to R&L Transfer Inc. of Ohio. "However, any person using a radio transmitter on the Amateur Radio bands must possess a station and operator license." Hollingsworth asked the over-the-road shippers to advise their drivers that such radio operation could subject them to heavy fines and seizure of their radio equipment.

UPS Attorney Daniel N. Tenfelde responded to assure Hollingsworth that his company was taking its Warning Notice seriously and has launched a full investigation. "We discovered that some employees had obtained CB radios that contained a mechanism allowing them to switch frequencies into the 10-meter Amateur Radio band," he told Hollingsworth in a January 28 letter. "It is not UPS policy to allow equipment such as this to be used in our vehicles." He said UPS's contract with the Teamsters Union allows only for CB radios.

Tenfelde said UPS is working with its transportation and labor groups to let drivers know that such unlicensed operation violates both UPS policy and FCC regulations.

D.C. Cell Phone Ban

Lawmakers in Washington, D.C., have approved a measure that prohibits drivers from using their wireless phones without a hands-free device. Exemptions to the new law would be made for emergency situations. The law is expected to go into effect in July, and those caught in violation could be fined $100.

E-911 Charges

Is this the face of things to come? The state of Pennsylvania is requiring cell phone companies to charge their subscribers a new monthly surcharge that will be used to buy equipment to enable E-911 services. The new $1 charge, which goes into effect in March, will help put in place the necessary equipment and technology to allow 911 call centers to pinpoint the location of a cell phone caller within 100 feet.

New York Public Safety Plan Amended

The Wireless Telecommunications Bureau has announced approval for an amendment to the New York Metropolitan area Public Safety Regional Plan. The amendment will revise the current channel allotments for radio frequencies in the 821–824/866–869 MHz bands within the New York Metropolitan area, specifically providing new assignments for Westport Police Department, Connecticut; the Port Authority of New York and New Jersey; New Jersey Highway Authority, New Jersey; and Statewide Wireless Network, New York.

Cell Phones Are Safe

A group of scientists at the British National Radiological Protection Board has concluded that cell phones do not cause cancer. The independent board reviewed research on the health effects of exposure to radio frequency waves and concluded that mobile phones appear to be safe. While the group called for more research into the long-term potential health risks of exposure to radio frequency waves, it said in the report that "The...evidence does not suggest cancer causation, in particular from mobile phone use..."

Filing Comments With The FCC

Want your voice to be heard on communications issues? It's easy to file a comment with the FCC on any of a number of pending topics. Simply visit the FCC's homepage at www.fcc.gov and choose "Filing Public Comments" on the left side of the screen. Or, you can go directly to the page at http://gullfoss2.fcc.gov/ecfs/Upload/. Select one of the topics and you'll be taken to a page where you can enter personal information and your comment. At this time, the only comments accepted are those pertaining to the topics listed on the comment page. ■

A Radio Messenger: Radio Mosoj Chaski

Station Targets Descendants Of The Incas

by Walt Fair, JL., W5ALT

Although the main language in Bolivia is Spanish, it's not the only language spoken there. In the valleys of Bolivia, Ecuador, and Peru, an estimated 10,000,000 people speak Quechua (pronounced Keh-chew-ah). Although the current official language of those countries is Spanish, Quechua was the official language of the Inca Empire before its conquest by Spain. Consequently, hundreds of mediumwave, FM, and tropical band radio stations broadcast in Quechua in order to reach a significant portion of the population. One of these stations is Radio Mosoj Chaski, with studios in the city of Cochabamba, Bolivia.

Cochabamba is a city of nearly 500,000 sprawling in a valley on the edge of the Andes mountains. Originally founded in 1542 by a group of Spanish colonists, the original name was Kjocha-Pampa. During the mining boom in the Potosi region of Bolivia, the fertile valley became the most important source of grain for the country. Still known as the nation's granary, Cochabamba is a progressive and economically active city.

At an altitude of about 2,550 meters (roughly 1-1/2 times as high as Denver) it has an agreeable climate—never quite too hot or too cold. The average temperature varies between about 61° and 78° F, making for almost an eternal springtime. As the third largest city in Bolivia, it is a busy place with a small, but modern airport and excellent infrastructure. It is well known in Bolivia for the statue of Christ overlooking the city, which is similar to the famous statue in Rio de Janeiro, Brazil, but higher, as the Cochabambinos are quick to point out.

A look at the production control center of Radio Mosoj Chaski.

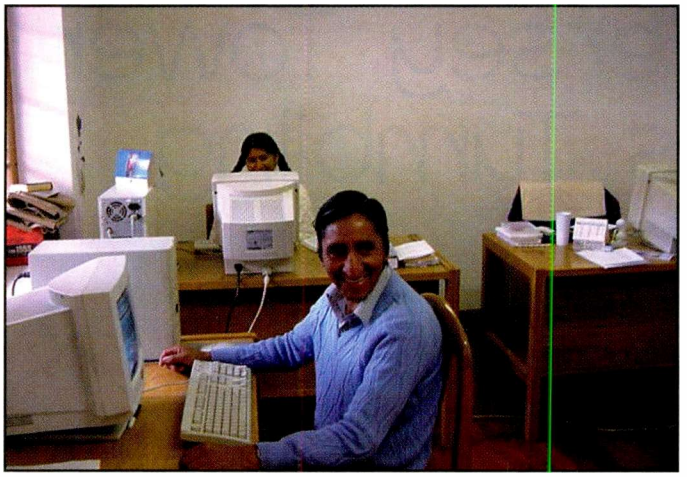
The studios of Radio Mosoj Chaski in Cochabamba.

Surrounding the city in the mountains and nearby valleys are numerous smaller towns. In many of these, the main spoken language is not Spanish, but Quechua. Descendants of the Incas, technically speaking the people are Quechua, while their rulers in the past were the Incas (rulers or kings). These people are the main target of Radio Mosoj Chaski.

The "New Messenger"

Radio Mosoj Chaski traces its history to a missionary effort in 1968 in Sucre, Bolivia, with the goal of teaching and educating the Quechua people. The organization, Sumaj Chaski (which means "Good Messenger"), distributed cassette tapes of mainly religious material in Quechua and occasionally sponsored radio broadcasts on some of the shortwave stations in the area, including the well-known HCJB. Although Radio Mosoj Chaski has no direct, official links with that project, their emphasis is the same and they take inspiration from the work of the Sumaj Chaski group. The name of the station reflects their admiration for the now-defunct Sumaj Chaski: Mosoj Chaski means "New Messenger."

Radio Mosoj Chaski is the result of the efforts of the Misión Andina Evangélica, in conjunction with several other Bolivian



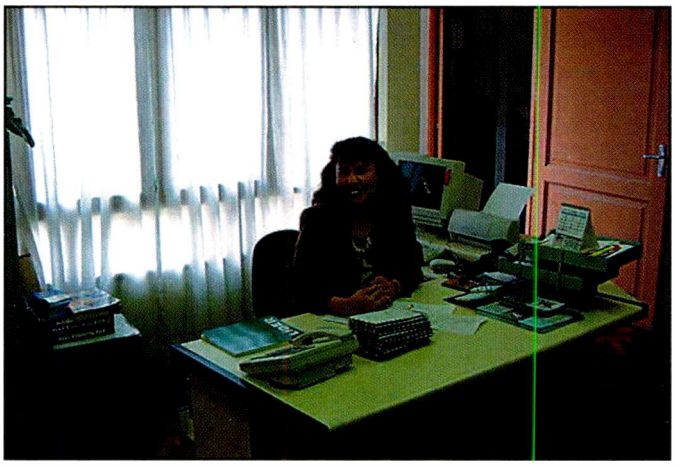
Radio Mosoj Chaski writers.

Recording the program "Wawaswan Parlarikuna" (Speaking with the Children).

Evangelical missions. The idea for the station came about when, in talking with the Quechua people who remembered the Sumaj Chaski tapes and broadcasts, several Evangelical missionaries were impressed by the impact made by the shortwave radio broadcasts in 1968. After studying the feasibility of using shortwave radio, programs were planned, a station was designed, funding obtained, and a broadcast license was applied for in 1990. According to station director Benedicto Ibarra M., that's when the problems started.

First, it took over seven years to obtain a broadcast license from the Bolivian government, mainly because the Mosoj Chaski organization chose not to participate in the normal corruption in Bolivia. Sr. Ibarra indicated that they had decided to "leave things in the Lord's hands" and had almost given up when the license was finally issued in 1997. After the license was obtained, it took about two years to build the transmitting facility in Cotapache, about 20 kilometers outside of Cochabamba. During that time, the studio in Cochabamba was obtained, a microwave link to the transmitter site was installed, and program material was gathered.

Finally, on April 12, 1999, the first official broadcast was made. The station currently broadcasts daily on **3310** kHz from 0900 to 1200 and 2200 to 0100 UCT using 8 kW. (The transmitter is rated for 10 kW, but they never run it at full power.)



Radio Mosoj Chaski's secretary with a stack of QSLs ready to mail.

The antenna is apparently a folded dipole with the feed point at about seven meters. According to Sr. Ibarra, the station still considers itself "new," and they are still learning about running a shortwave broadcast station. Most of the station's personnel have no prior broadcast experience and are continually studying and learning how to do things better.

Programming includes personal and community messages, as well as information on human values, local law, health, agriculture, veterinary medicine, cultural information, music, and stories of the Quechua heritage. But the mission of Radio Mosoj Chaski covers more than just radio transmissions. According to the station director, the four main areas of emphasis are ministry, radio, literacy, and music, all in the Quechua language. Thus the station employs a staff of writers and translators, and also works quite closely with the Quechua religious leaders in the rural areas. Besides the radio broadcasts, written material is distributed to teach the Quechua-speaking people to read and write. Since most do not speak Spanish, the first step is to teach them to read and write Quechua. Once that is accomplished, they can be taught Spanish. The goal is to incorporate the Quechua people more closely into the Bolivian society.

Saving Their Heritage

At the same time, Radio Mosoj Chaski makes a concerted effort to save the Quechua heritage by producing literature and music in the Quechua language. The writers and translators are busy translating and developing programs in Quechua for radio broadcast and written distribution. Some of the regular programs on Radio Mosoj Chaski include,

Musical programs
Rijch'ariy (Waking Up)
Sonqota Tiyaykuchisun (To Rest the Heart)
Bible studies
Qallariymanta Tukukuykama (From Beginning to End)
Janaj Pacha T'anta (Bread from Heaven)
Diosmanta Qhelqasata Ñawirisum (Daily Bible Reading)
Mosoj Runa (The New Man)
Special Programs
Wawaswan Parlarikuna (Speaking with the Children)

(Continued on page 73)

New Jersey Tower Comes Tumbling Down!

Jersey Shore Landmark Dates To 1943

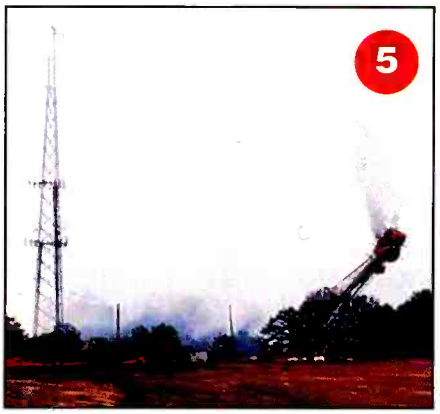
By Douglas Haviland

Commonly known as the Oakhurst Tower, a Jersey Shore Landmark came crashing down—deliberately—shortly after sunrise, much to the surprise of even local residents. In this series of photos, the huge tower stands moments before demolition crews strategically strapped explosives to the structure.

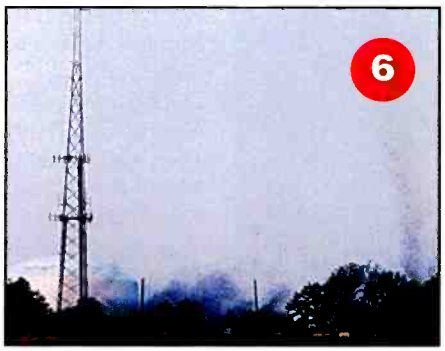
The tower was sold by the federal government to the Township of Ocean several years ago and was home to several public safety radio repeaters.

The 400-foot tower was originally built by the U.S. Army in 1943. Over the years the Communications Electronics Command based at Fort Monmouth has erected towers and installed communications equipment throughout Monmouth County.

The township investigated renovating the nearly 60-year-old tower visible from heavily traveled County Route 35, but it was decided it wouldn't be cost effective.



In the early morning hours of November 1 the landmark tower came crashing to the ground shortly after sunrise in a cloud of dust that lingered only for a short time—a brief reminder of a radio milestone.



A replacement tower has been constructed nearby to handle the town's communications needs, but it hardly pierces the sky the way the original one did for so many years.

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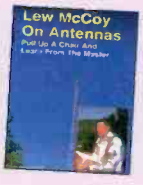

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by Gordon West, WB6NOA

Overboard With A Lifesaving Submersible Marine VHF Radio

Everyone out on the water is listening to marine VHF Channel 16. VHF Channel 16 is the international distress and calling channel that almost all marine VHF radios default to on power up. Hundreds of shoreside coast stations also guard marine VHF Channel 16. For yacht clubs, towing companies, the United States Coast Guard Auxiliary, even bait barges, Channel 16 is the most important channel to monitor for call-ups and emergencies.

As the United States Coast Guard transitions from multiple shoreside Channel 16 facilities to their new modern Rescue 21 Channel 16 watch, they continue to offer 20-mile-to-sea surveyed radio coverage to a 1-watt handheld with the little rubber antenna.

How about some Channel 16 life insurance that you can slip into your pocket or clip on your belt? What if it took the form of a submersible marine VHF radio that could withstand going underwater in an accidental overboard situation and become a lifesaving radio when you holler "MAN OVERBOARD, MAYDAY" on Channel 16. If the boat you were on somehow didn't hear your call for help, chances are there would be many other boats within five miles that could easily pick up your Channel 16 waterproof handheld distress call inches above the cold ocean or lake water.

This "radio life insurance" plan is so sound that the National Global Marine Distress Safety System Implementation Task Force, along with the United States Coast Guard Telecommunications Branch, is studying the feasibility of a special digital selective call (DSC) code that might be transmitted from a waterproof handheld radio with DSC capabilities. Additionally, Joe Hersey, Jr., Chief, Spectrum Management Division of the United States Coast Guard in Washington, D.C., agrees that anyone overboard with a submersible VHF radio would place their first call for help on VHF Channel 16 if they accidentally went in, but with the radio in their pocket.

Each radio was turned on and held under water for two minutes.

The Cost

Here's what your "radio life insurance" equipment, rated for an accidental man-overboard emergency, might cost:

West Marine VHF 100 submersible handheld, $180
West Marine VHF 200 submersible handheld, $220
Uniden Voyager submersible handheld, $199
Uniden Mystic submersible DSC handheld with GPS, $500
ICOM M88 submersible handheld, $300
ICOM M2A submersible handheld, $175
ICOM M1V submersible handheld, $199
Standard Horizon HX260 submersible VHF handheld, $165
Standard Horizon HX350 submersible VHF handheld, $199
Standard Horizon HX460 submersible mini-VHF handheld, $249
Standard Horizon HX470/471 multi-band DSC submersible VHF handheld, $350

Waterproof pouches would be another way to go if you are out on a PWC, kayak, or river raft, where the chances of getting swamped are pretty high and you don't want to risk having the submersible handheld fly off when you hit the water. But what you want is a submersible VHF handheld—nothing else.

"I have my cell phone in a waterproof pouch, and I take it everywhere with me in case of an emergency. I suppose I could use it if I went overboard, too," commented a mariner at the local boat show.

Bad idea. Cell phone coverage to sea is intentionally minimized in less popular cruising areas. If you placed a call for help, it would probably take several minutes to describe your predicament to an operator more trained to handle land emergencies. Until more cell phones are equipped with enhanced 911 GPS position finders, the only way they might locate you would be through time-consuming, land-based tower, time-delay measurements.

On the other hand, a call on VHF Channel 16 with a radio just inches above the water would certainly alert any vessel within a five-mile radius of you that an emergency exists.

Other Important Considerations

But there are still more considerations. First, make sure that the submersible VHF radio has fresh batteries. If they are rechargeable, they should have been fully charged before your trip out on the water. Double check to ensure that the battery compartment neoprene seals are perfectly aligned before you tighten the battery holder onto the unit. During long periods of immersion, water sometimes will seep into an improperly closed battery compartment.

Double check that your antenna is screwed on tight. Loose antennas might allow seawater to get into the antenna connector, cutting down range. Also make absolutely sure that the little rubber stoppers for the speaker microphone and external battery charging are in place to seal out water.

Turn the radio on without looking. You might go overboard at night. Double check that it comes up on VHF Channel 16. This is the first place you want to holler "MAN OVERBOARD, MAYDAY" in an emergency. Keep in mind that operating the radio while treading water is tough when you need to keep the radio antenna and the radio itself above the waves. And if you do go overboard, IMMEDIATELY get the radio out of the water to minimize the chance of water immersion. Even submersible radios will begin to leak moisture on the insides after a few minutes in the drink.

Also make sure your radio has some sort of lanyard that tethers it to your wrist or belt. Submersible marine VHF radios don't float. Not even for a second—they sink like a rock, so don't lose your "radio life insurance" into the deep because you lost your grip in the cold water.

Some Options

A couple of marine VHF handhelds have additional ways you can place a distress call. Equipment like the Uniden Mystic submersible handheld and Standard Horizon Model HX470 have a

This handheld Uniden VHF marine radio is also a GPS unit!

A DSC "panic button" can also broadcast a "mayday" call.

All five handheld marine VHF radios survived an hour in the water with no leaks.

red plastic cover protecting a red push-button for a DSC digital Mayday call on Channel 70. But this button won't work unless you've previously entered your nine-digit MMSI number. This is obtained, free of charge, at the Boat U.S. (www.boatus.com) or Sea Tow (www.seatow.com) website. Make absolutely sure your DSC-capable VHF has that number programmed into its self-identification memory, or else your red distress button won't do a thing. This includes putting the number in that fixed-mount, 25-watt, marine VHF at the helm, too. No number, no distress call.

The DSC distress call is an automatic way to switch area marine VHF transceivers automatically to Channel 16. You would then describe your plight and hope for a quick rescue.

The new Uniden Mystic marine VHF handheld with submersible rating and DSC capabilities also contains a built-in GPS receiver. This means that your outgoing data distress call will be accompanied by your precise position via GPS! The Uniden Mystic is the only marine VHF submersible handheld that this, plus DSC and a magnificent on-screen Magellan charting program.

The Proof Is In The Drink

Finally, you want to make sure that submersible marine VHF radios indeed could take the plunge. The test would be falling overboard with turned-off marine VHF submersible radios, and one by one, turning them on as I treaded water, and making a brief call on a working frequency. I wanted to see how well each radio sealed out seawater, and how easy it was to turn them on and holler for help in an emergency. I added one additional step: switching to a working channel so as not to interfere with Channel 16, which would be the intended man-overboard distress call frequency.

The test also checked the range of a marine VHF call at water level to nearby ships. Most everyone could hear me up to three miles away, and at five miles, my signal began to drop in and out as I bobbed in the water. I also tested the Uniden Mystic DSC call capabilities to another DSC station, and the DSC call went through loud and clear. At the conclusion of these in-water tests, all the radios pictured that were rated as submersible were retested and found to be transmitting and receiving well. Some of the equipment had slight water ingress to the battery compartment, but this would not have interrupted the initial distress call for at least an hour.

Several of my Coast Guard Auxiliary members suggested pre-planning how you would bring nearby boats to your specific position. You would probably see them long before they could see you bobbing in the water. If you're in the water looking at a nearby motor boat, you could ask the captain to execute a 360-degree turn to confirm that it's the boat replying to your overboard call. Then, when their bow is headed toward you, instruct them to steer straight ahead. This would work for any nearby sailboat as well, although it might be more difficult for them, under sail, to go through a full turn. Nonetheless, you must have visual contact with any boat you're going to hail to begin giving directions to your position in the water.

If you're using the Uniden Mystic, simply read out the large-screen GPS position. Mariners with good GPS skills could then enter that into THEIR GPS and head immediately to where you indicated. You could do this automatically on the Uniden equipment by pressing the DSC button.

Money Very Well Spent

So you see a couple hundred bucks is not much money to spend to ensure that everyone onboard has their own submersible marine VHF handheld. When the kids go sailing in the dingy, make sure they know how to call for help. Double check that they always know how to turn on the equipment in case they should slip unnoticed overboard.

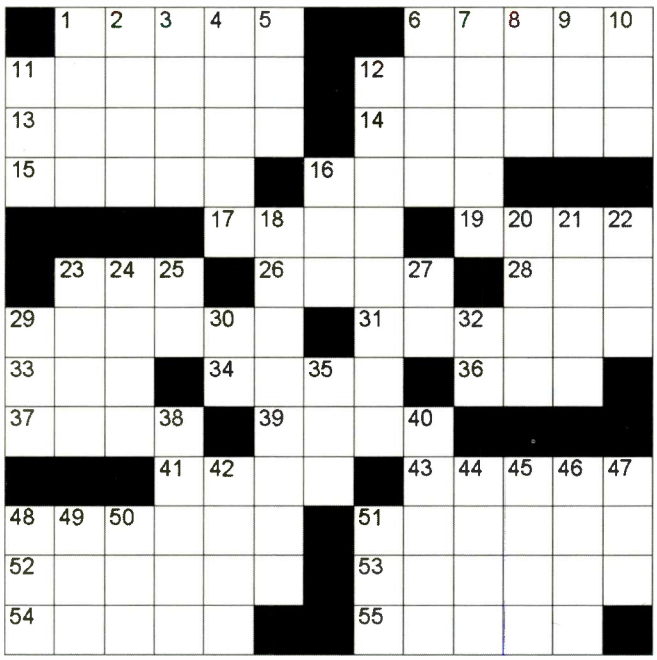
Make absolutely sure that *your* marine VHF is constantly tuned to Channel 16 when you're out on the water. Radio life insurance in the form of a submersible marine VHF handheld radio for every passenger onboard is a good lifesaving idea!

the Pop'Comm puzzle corner

test your radio knowledge

by Eric Force, eric@dobe.com

(RevSp = Reverse Spelling – e.g. "SPELLING" = "GNILLEPS" in puzzle)



ACROSS

1 Microwave frequencies above UHF
6 Deluge
11 "Dissipation _____ with frequency and temperature" (RevSp)
12 Pop' Comm's Ad Mgr: _____ Sposato (RevSp)
13 Brand of diazepam
14 Make rare
15 Channel type on 540 KHz
16 StarTrek android
17 Unidentified (abvr)
19 Digital circuit logic gate
23 1101 as Roman Numeral
26 Nevada Airport RNO
28 Constellation : The lion
29 CB 10-200, "_____ needed at ..."
31 Unit of power in the CGS system
33 Airport, Nashville, TN
34 AM 880, EDMONTON
36 Wire service
37 Conclusion
39 Terminal Radar Service Area (abvr)
41 Iceberg (slang)
43 Impedance matching device
48 FCC Country Code: TD (Trinidad and _____)
51 Salt of iodic acid
52 ITC Prefix A5A-A5Z (Country)
53 Fifth month of the Jewish calendar
54 Well-known
55 High altitude electro-magnetic pulse (MIL) (RevSp)

DOWN

1 Capacitor case style (Hermatic _____)
2 Liquid secreted by the liver
3 Melody
4 ITC Prefix C2A-C2Z (Country)
5 Type of voltmeter (abvr)
6 Ribbon cable characteristic
7 Long Range Navigation aid (abvr)
8 Roman numeral "I"
9 Airport, Norfolk, VA
10 Airport, Dayton OH
11 CW abvr, Service; Prefix to service message
12 The "S" in ASCII (RevSp)
16 Thread cutting tool
18 Positive Latitude hemi sphere (RevSp)
20 Pop' Comm's ____ Dixon
21 Devices for fishing
22 Gov. Transportation agency (abvr)
23 Non-stereo (abvr)
24 Copper ____ (type of circuit board)
25 CW abvr, I Repeat
27 River in Central Russia
29 Pakistan Broadcasting Corporation (abvr)
30 204 (decimal) in Hex notation.
32 Area Code 414 here
35 Int'l Q-Signal: What's my exact frequency?
38 Diminish
40 CGS system resistance unit
42 Mild oath
44 CW abvr, Addressee
45 Molten rock
46 "Area 51" here
47 CB 10-64, "_____ clear"
48 Dah, Dah Dit Dit Dit, Dah Dit
49 Expression of surprise
50 Nevertheless
51 Airport, Islip, NY

(Solution on page 35)

THIS MONTH IN RADIO HISTORY - Word Find

(Unused letters spell a similiar station's name launched May 17, 1960)

On May 20, 1985 ...

THE UNITED STATES BEGAN BROADCASTS TO CUBA ON RADIO MARTI

U N I T E D B R A D
I T R A M I E H T C
O I D A R O G S W U
S T S A C D A O R B
S E T A T S N A N A

Hidden Station Name: _____ _____

Solution: Radio Swan

Pop'Comm Trivia...(Thanks to Bob Sturtevant, KD7KTS, for this month's Trivia)

What was the telegrapher's malady known as "Glass Arm" and how was it dealt with? How did he do it?

More info at:
http://www.geocities.com/gm0rse/n0hff/c10.htm

Answer: Glass arm or telegrapher's wrist is what we now call Carpal Tunnel Syndrome and has been a problem since telegraphers started using keys. In 1888 Brunnell patented their Model W as "The Double Speed Key." It was what is commonly called a side-swiper. It relieved glass arm because of the directional change in wrist motion (side to side instead of up and down). It also usually increased the telegrapher's speed. Brunnell sold their Model W until 1920.

homeland security

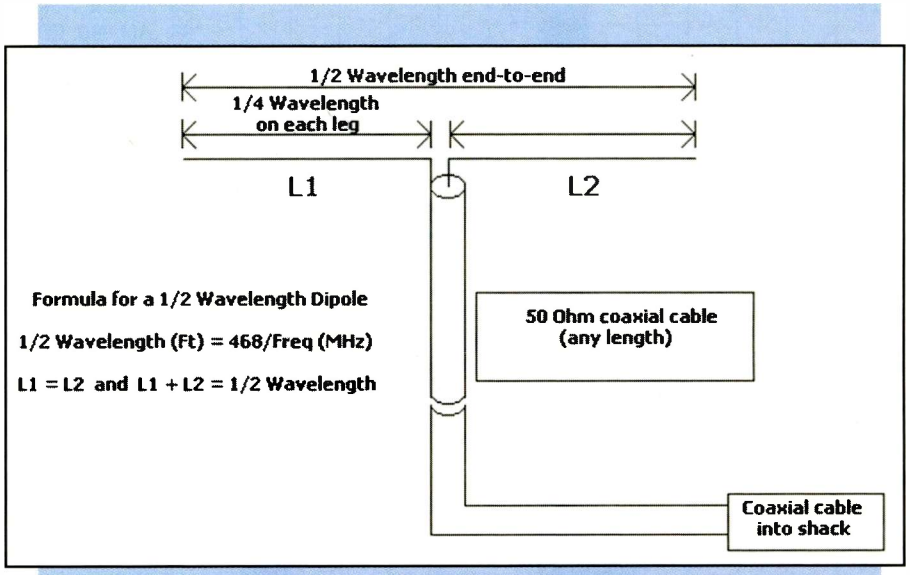
power, and products

by Rich Arland, K7SZ

Shortwave Antennas

It's Spring—man, it's about time! Our winter weather in northeastern Pennsylvania was brutally cold this year. The amount of snow and ice we received didn't do anyone's antennas any favors, either. It seems that the older I get the less I can stand the snow and bitter cold of winter.

With the arrival of Spring comes the inevitable chore of assessing the damage Old Man Winter did to my antenna farm. Fortunately over the years I have sustained minimal weather damage to my many antennas, thanks to my insistence on over-engineering each installation. Thorough planning and attention to detail are the keys to putting up big antennas and keeping them in the air, year after year.



A half-wave dipole fed with 50 Ohm coaxial cable.

Shortwave: The Forgotten Radio Band

Shortwave is often overlooked as a source of information for the concerned citizen. The major SW broadcasters and their megawatt outlets aside, HF radio can provide a unique window to the world that is unequaled in this age of satellite communications. Granted, there has been a tremendous downturn in the number of international SW broadcasters now on the air. Many stalwart shortwave broadcast outlets, like the BBC, RCI, HCJB, Radio Nederland, and Deutsche Welle, have drastically curtailed, or entirely stopped, their English language broadcasts to North America and Canada. This is primarily due to the huge amounts of funding required to staff, equip, and maintain an SW broadcasting facility. This, coupled with the ability of an SW broadcaster to "rent time" on another country's SW transmitter and beam their programming via satellite, means that the "Old Guard" SW broadcasters of the previous decades are either no longer on the air or have greatly truncated their shortwave broadcasting efforts.

This is very sad because Americans, in particular, are the victims of various "spin machines" associated with the regional and national news. Anytime you can tune in and receive an alternative view that possibly might challenge your ideology, it's a good thing. Most Americans would be surprised to find out that we are not looked upon as "heroes" in this war against terror by much of the rest of the world. Imagine that.

At the opposite end of the spectrum, emerging countries like China have *increased* the number of SW broadcast transmitters/facilities and are offering more diverse programming in various languages beamed around the world via HF. Go figure.

In developing areas of the world, official government HF broadcasting outlets are the only means of keeping the citizens of their countries informed as to what is going on within their boundaries. Religious fundamentalists are also huge users of the HF spectrum, beaming their messages of salvation and eternal damnation to the third world nations. Let's not forget the pirate/alternative SW stations that show up from time to time, or stations offering programming from governments in exile.

The military, too, is a huge user of the HF spectrum. Flight following, communications support for Special Air Missions (SAM flights), along with specialized communications in support of national security, DEA/DoD counter-drug operations, and the Hurricane Hunters out of Keesler AFB, MS, all make for some fascinating listening.

To cash in on this information bonanza, you'll need two things: a good HF receiver (an in-depth look at the ICOM R-75 will be featured next month) and a good HF antenna system. If you can't hear 'em you can't log 'em. A well-designed, over-engineered antenna system for HF is essential. We can carry this mantra over into scanning and other aspects of the radio hobby. Basically, if it's worth spending the time and effort of doing, it's best to do it right—the first time.

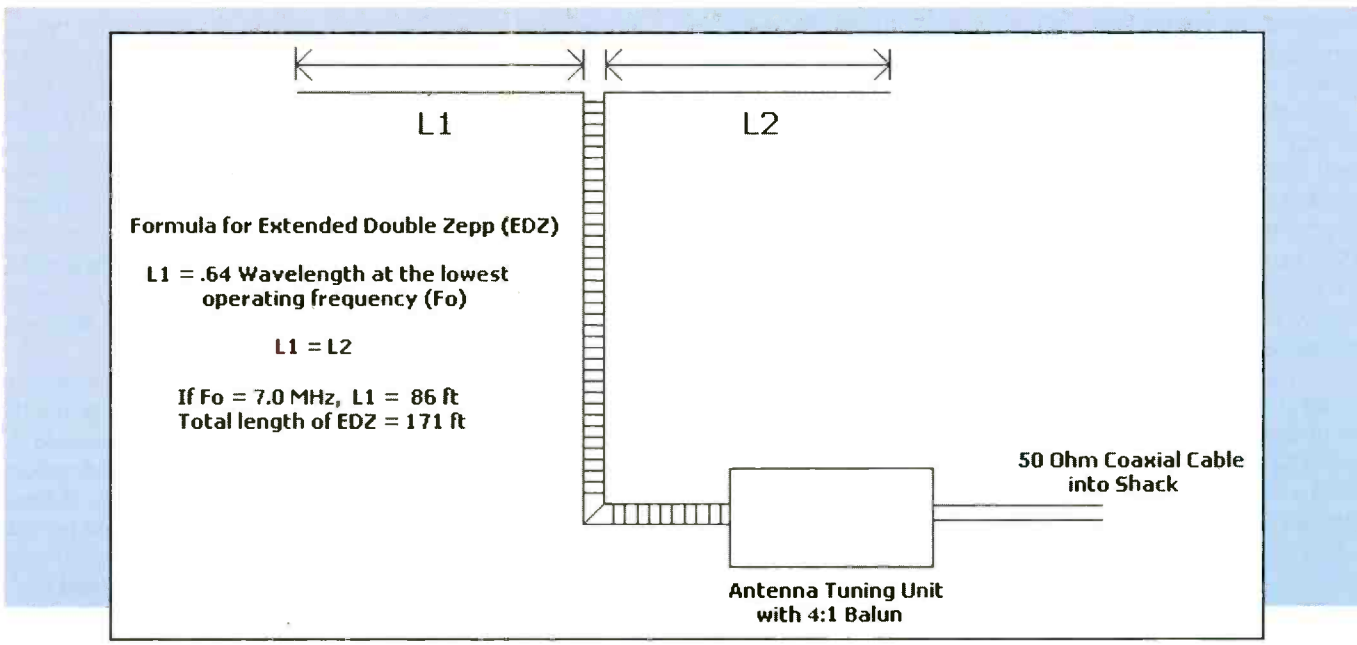
An Overview Of Shortwave Antennas

Okay, let's take a hard look at what's entailed in erecting a quality antenna system for HF (we'll cover VHF/UHF antennas in a subsequent column). For simplicity, we'll stay with the listening portion of the hobby, since there are prob-

ably many more of you who read this column who are SW listeners and scanner monitors than are ham radio operators.

Obtaining a good quality SW receiver is only the first step, and the simplest one at that. Most of the HF receivers made in the last 20 years can easily perform well with a short (less than 5-meter) length of wire antenna thrown out the window or extended around the walls of the radio room. However, there is more to life than short antennas!

If you want to hear the weak ones, that is DX the "Indos" on 90 meters at daybreak, log low-power SW outlets in Central and South America, monitor FEMA HF frequencies, track the Hurricane Hunters as they fly into the eye of the storm, catch



Extended Double Zepp Dipole fed with 300-450 Ohm Ladder Line or transmission quality twinlead.

the action as the DEA and U.S. Coast Guard interdict drug runners, or follow the battle on military HF frequencies, you're going to need a quality HF antenna installation that's up to the task of snagging all those elusive transmissions.

K.I.S.S.

The simplest HF antenna that is practical for most radio monitors is the lowly halfwave dipole antenna (**Figure 1**). Each "leg" of the dipole is cut to one-quarter wavelength of the desired operating frequency using the following formula:

Length (per leg) = 234/f (MHz).

The legs are fed at the center with 50 Ω coaxial cable (RG-58, RG-8X, RG-213, or Belden 9913F), which is in turn routed into the shack to the back of the HF receiver. This type of installation is fine, *if* you are interested in only one frequency or a group of frequencies close to the center of the band that the antenna is cut for. The ends of the legs opposite the feedpoint are deployed outward as far as possible to form either a standard dipole (flat-top configuration) or Inverted Vee configuration (**Figure 2**). The flat-top version is bi-directional broadside to the plane of the wire in a figure-eight pattern (**Figure 3**). The Inverted Vee is omnidirectional. In either of these configurations the antenna is "cut" for only one frequency, but is useable (depending upon the frequency of operation) over several kilohertz either side of the operating frequency.

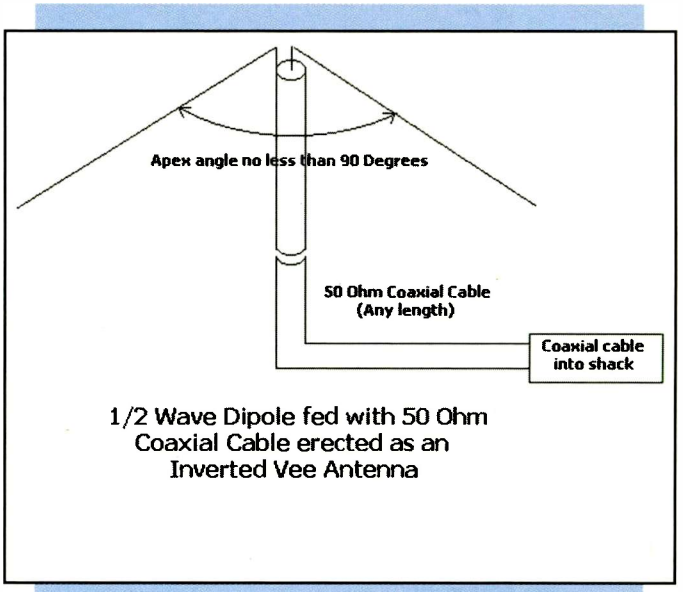
A more practical approach to the dipole antenna is to substitute open wire or twin lead feedline (300-450 Ω) in place of the 50 Ω coaxial cable (**Figure 4**). In effect, the entire feedline becomes part of the antenna system at various frequencies. In this configuration, the dipole becomes a doublet. If the dipole legs are cut sufficiently longer (.64 wavelength/leg) at the lowest frequency of operation, the antenna becomes an EDZ, short for Extended Double Zepp (a term held over from the old Zeppelin antennas used on early airships). This antenna is tunable through a wide range of frequencies using a balanced-line tuner or a conventional coaxial tuner coupled to a 4:1 balun transformer. The EDZ is a favorite of mine because it offers such frequency agility and gain over a wide range of frequencies.

The only real drawback to the EDZ is its total length. A 40-meter (7 MHz) EDZ is about 90 feet per leg or 180 feet end-to-end! In short, you need some real estate to erect one of these Big Boys. If you have the space, however, the EDZ is one very dynamic performer on the HF bands. I erected my 40-meter EDZ in 1998 and have used it continuously for contesting, DXing, and SWLing on 160 through 19 meters with excellent results. In addition to outstanding performance, the EDZ costs very little to assemble and can be scaled to virtually any frequency band.

But just because you're a little short on real estate, that doesn't mean you can't erect a good wire antenna. Excellent results can be obtained using a dipole cut for 50 feet per leg and fed with 300-450 Ω open wire or ladder line. As with the EDZ, you'll need a balanced line tuner or a coaxial tuner with a 4:1 balun transformer to match the impedance of the antenna to the rig.

Impedance Matching: Why?

The term "impedance matching" is often used, and newcomers to the hobby may have a question or two as to why we want to "match" impedances. Simply put, when you have input



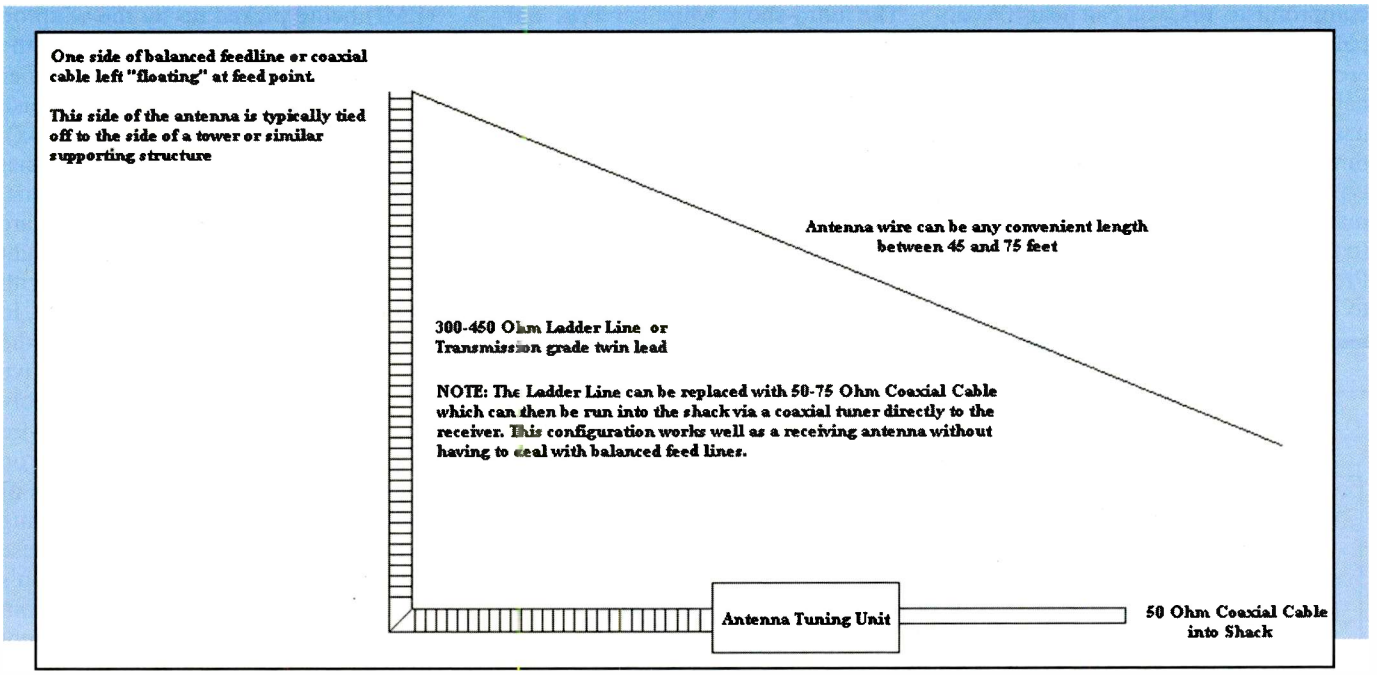
A half-wave dipole fed with 50 Ohm coaxial cable erected as an Inverted Vee Antenna.

and output impedances that are properly matched, you get maximum transfer of energy (power or voltage) between stages. This is a good thing. Basically this means that the extremely weak signal voltages received by your antenna are transferred to the input port on the communications receiver with little or no loss. The result is an increase in the signal-to-noise ratio, and the better the received signals will sound in relationship to the background (band) noise.

In the case of an antenna fed with 50 Ω-ohm coaxial cable and terminated in a 50 Ω-antenna port on the receiver, you *should* have the proper impedance match to transfer the maximum signal from the antenna to the receiver. (Note: this is predicated on the assumption that the antenna in question is "cut" for the operating frequency involved.)

In the case of twin lead or ladder line, you need to "transform" the impedance of the line (in this case 300-450 Ω) down to the 50 Ω input to the receiver. Normally, this requires using an impedance matching transformer, commonly called a balun (for **bal**anced to **un**balanced), which takes the balanced antenna feedline and transforms the output to an unbalanced output, along with providing an impedance conversion from 300/450 Ω down to 50 Ω. (Note: twin lead and ladder line are referred to as "balanced feedlines" since both conductors of the feedline are above ground, whereas coaxial cable is thought of as "unbalanced feedline" since one side of the coaxial cable is grounded to the receiver chassis.)

There are all sorts of antenna tuning units (a misnomer, by the way—you *don't* tune the antenna, you actually tune out the inductive, or capacitive, reactance of the feedline to provide the proper "match"). They are available from MFJ Enterprises (www.mfjenterprises.com) and other sources. Many of these units contain a 4:1 balun to handle balanced lines and provide the proper unbalanced output for the coaxial input to your receiver. You can tune these units the expensive way and buy a noise bridge or antenna analyzer (several hundred dollars) and tune the ATU using the bridge or analyzer to obtain the proper L/C match; *or* you can simply tune for the highest noise in the receiver (very inexpensive) and be reasonably assured that your



End-fed Zepp Antenna erected as a "Sloper".

tuner is properly adjusted to provide a nominal match between the antenna and the radio.

Beating The Balanced Line Problem

If you don't like the idea of running twin lead or ladder line into your shack, there's always the option of terminating the balance feedline into a current balun that offers a 4:1 impedance transformation. This is done outside of your shack. The 50 Ω coaxial cable is then run from the output of the balun into the shack, thus eliminating the hassle of dealing with balance feedlines. Jim Thompson, W4THU, at the Radio Works in Portsmouth, Virginia, offers a great selection of baluns for all occasions, as well as coaxial cable, connectors, and complete antennas. Additionally, Jim has a great book, titled *Frequently Asked Questions about Antenna Systems and Baluns*. It's chock full of valuable antenna information and should be in your radio library. Check out Jim's website at www.radioworks.com.

Still not enough room for a 100-foot dipole? Have no fear; there is another option or two left in the old bag of tricks. **Figure 5** depicts a Zepp antenna only 50 feet long and fed with 300-ohm twinlead or ladder line. Notice that this antenna is just one-half of the previously described double Zepp dipole. You can erect this as an inverted "L" or as a sloper off of the side of the house or tower. The "hot" side of the twinlead connects to the 50-foot leg, and the other end of the twin lead just "floats." The hot side of the feedline is then connected to the receiver antenna port or through a tuner to the receiver's antenna. While not quite as good as a full-size dipole, this short Zepp is capable of better-than-average performance over a wide range of HF frequencies. You also have the option to extend the 50-foot leg to whatever will fit into your lot size. Don't forget, you can also bend the leg(s) of any wire antenna to accommodate the available space with little impact on overall performance.

Alpha Delta Communications (www.alphadeltacom.com) offers a selection of sloper antennas, including one exclusively geared for the SW listener called the DX-SWL Sloper. Likewise, Par Electronics (www.rffilters.com/index.htm) manufactures and sells a broadband SW sloper antenna that has an adjustable balun at the feedpoint to help reduce noise and improve the matching of the antenna. Both of these antennas are priced well under $100 and are worth investigating if you don't have the physical space to erect a larger antenna. Both are also proven performers, so you can buy with confidence.

And For The Condo Challenged

Okay, so you live in a condo or housing development and can't erect any form of outside antenna thanks to Draconian covenants or rental restrictions. What now? Try a random length of wire around the ceiling of a room (hung on plastic hooks stuck to the ceiling with double-sided foam tape) to form either a loop antenna or an end-fed wire.

If there is just too much steel and concrete to contend with, then you have one option left: the "active" antenna. Active antennas have been around for many years in some form. As you might assume, the term "active" implies an RF preamplifier or an amplified circuit of some kind to increase the signal voltage going into the antenna port on the receiver. However, a *true* active antenna has very little amplification. Instead, the active devices enclosed in the antenna box match impedances between an extremely short whip antenna and the 50 Ω antenna input at the receiver. The overall result looks like an amplifier circuit, but, in truth, is a variable impedance matching device.

Alright, so what's wrong with a preamplified antenna? Simply put, it destroys the noise floor at the RF front end (RF amplifier) of the receiver, adding to the overall system noise. Sure, you might see your S-meter swing upward when you turn on the preamp, but all you're really seeing is noise, not useable signal strength. If you induce additional noise into the receiver, you won't have a chance of hearing the really weak stations you're hunting.

I've tried several commercial active antennas for SW listening and all are a

compromise. Yes, you can hear SW signals using an "active" antenna but they are not a realistic substitute for an external wire antenna. Basically, active antennas consist of a short whip (between three and six feet in length) and some type of preamplifier or impedance matching circuitry and a power source (commonly called a "wall-wart"). Problems arise with these antennas due to the lack of capture area of the whip. The ultra-short whip captures only a small fraction of the incoming signal voltage compared to an EDZ, dipole, Zepp, or random length end-fed wire antenna. Most of the whips are vertically polarized, which at HF doesn't normally pose a problem because of the way the ionosphere tends to scramble the polarization of a refracted radio wave.

There is the additional problem of local electromagnetic interference (EMI) being picked up by the whip on the active antenna, especially when the whip is mounted indoors. Noisy dimmer switches, computer generated noise (from oscillators inside the CPU box), and a poorly filtered power supply that induces AC hum into the active antenna, and cantankerous fish tank heaters are only a few of the problems that you might encounter using an active antenna with an indoor whip element. Realize that, in addition to the potential EMI, the received signal strength with an active antenna is going to be considerably lower than when using an external wire antenna. This becomes a critical issue on houses or structures that feature a lot of concrete, steel, and/or aluminum siding in their construction. Effectively, these structures start acting like a poor man's Faraday cage (a copper screened room used to electrically isolate equipment from the outside environment, cutting off any RF (radio frequency) or EM (electromotive) radiation into or out of the enclosure) by blocking incoming RF energy..

There are a lot of active antennas currently on the market. Realize that you get what you pay for. Really good active antennas, like the Dressler ARA 100 HDX and the RF Systems DX-ONE Professional Mark-II, cost well over $500 apiece! However, these two antennas perform admirably for short whips. At the other end of the spectrum are a number of less-than-stellar performers in the $100 price range. But if an active antenna is all you can erect due to covenants and/or housing/zoning/physical space restrictions, it's better than nothing.

Get Building

That's a wrap for this month's column. There's a lot of information relative to the current world situation waiting to be heard on the shortwave bands. I hope you've gained enough knowledge regarding HF antennas to venture forth and erect a suitable antenna with which to prowl the HF bands. If you'd like more information, go to the following websites and check things out for yourself:

www.radioworks.com
www.mfjenterprises.com
www.alphadeltacom.com
www.rf-filters.com/index.htm.

Until next time, remember: Preparedness is ***NOT*** an option. ■

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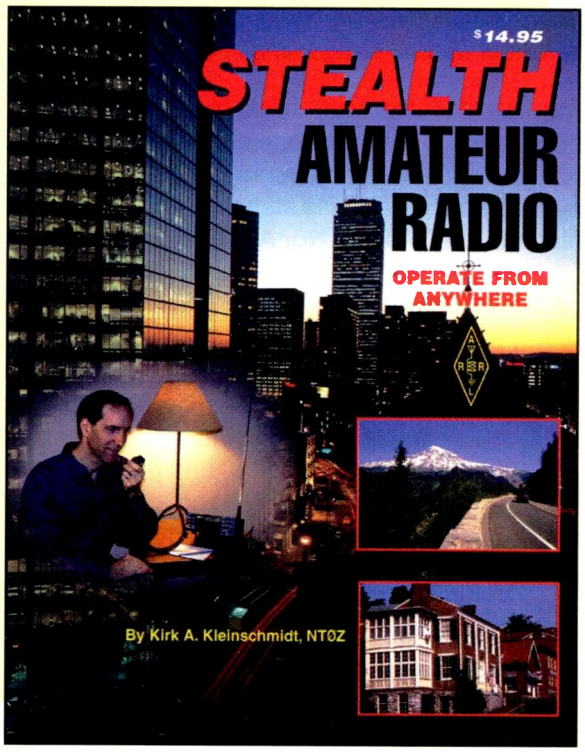
by Kirk Kleinschmidt, NTØZ

Ham Radio On The Sly

Pop'Comm reader Darrell Shandrow, NU7I, dropped me an e-mail the other day that described his desire to get on the air from his apartment. He's interested in operating on the HF bands and in putting out an okay signal without alerting his neighbors to the fact that he's radio active.

Depending on exact circumstances, that's not always an easy project. In fact, you could fill a book with the ins and outs of apartment operating—sneaky antennas, preventing and handling interference, proper RF and safety grounding, etc. Ooops. I *did* write a book about it! And Darrell's e-mail is the perfect excuse for me to shamelessly plug it, not to mention whip up a few pointers for this month's column!

All kidding aside, if you find yourself living in an apartment complex or a home with deed restrictions, etc, the book has a lot of detailed information to help you get on the air and enjoy ham radio regardless of your living situation. See the sidebar for more info. Now, for Darrell and anyone else in his situation, here are some ideas to get you started in stealth radio.



Shameless Plug: For a more in-depth discussion of stealth radio techniques and antennas, check my book, Stealth Amateur Radio, available from the library, the ARRL at www.arrl.org, or from your favorite ham radio bookseller.

On The Inside

When operating indoors, running low power is strongly encouraged. Potential interference is minimized, as is your exposure to nearby RF energy fields. I (and many other stealth-mode ops) have had success running only 5 watts to various indoor antennas. Besides, if you run more than about 50 watts output, you're asking for trouble. Thanks to the physics of RF propagation, cutting your output power from 100 watts to 25 watts is hardly noticeable at the other end.

Because apartments or condos are often several stories up in the air, away from dependable RF grounds, an alternative grounding technique is often needed for HF operation. An effective substitute "RF ground" can be obtained by using a counterpoise. Simply connect a quarter-wavelength piece of insulated wire to the ground terminal of your transceiver—one for each band of operation—and run the counterpoise wire(s) along the floor moldings, out of the way. Make sure the far end of each counterpoise wire is insulated (wrapped with electrical tape).

Don't ground your gear to water pipes, telephone lines, or telephone company grounds. They may be at DC ground potential, but will probably not provide a good RF ground and may cause interference. Nowadays, most residential plumbing contains at least one run of nonconductive PVC tubing, effectively insulating the upper-level plumbing from a direct connection with the earth below.

Operating HF

Even in a small apartment, it's usually possible to find the space to put up a dipole for 10 and/or 15 meters (a dipole for 10 meters is only a little more than 16 feet long). You've probably tried this arrangement for SWL antennas a time or two. If space (and family cooperation) permits, a dipole may be the easiest way to get on the air. After all, it's pretty much a given that you won't be installing a full-size beam inside your apartment. (If you have access to a large, airy attic, however, a wire beam or other conventional antenna may work fine.) To keep household harmony, perhaps the best way to install an indoor dipole is to run the wire elements along the wall/ceiling juncture and run the coax up the wall in a corner.

Horizontal loops are also possible. As with the dipole, run the coax up the wall in a corner. Instead of feeding the dipole, however, run a full-wavelength loop around the perimeter of the ceiling. An antenna tuner will probably be required for both antennas. With indoor installations, having a naturally resonant antenna isn't necessary (sometimes it's not even possible). Use an antenna tuner to "work" the antenna against a counterpoise or other ground connection. Whatever the configuration, give it a try. You may have to experiment a bit.

Ready-made indoor antennas are available from several sources. MFJ makes several mini loops and vertical antennas designed for space-restricted and indoor operation. The units

generally cover 40 through 10 (or 6) meters and have been used effectively by many stealth-mode hams. MFJ also makes an "artificial ground" that can make indoor hamming a lot easier, depending on your specific situation.

Some ops have taken to mounting mobile whip antennas—large and small—to their balcony railings, working them against a set of counterpoise wires instead of a car body (the counterpoise wires probably work better anyway!).

Other stealthy antenna solutions are limited only by your ingenuity and your situation. Over the years I've loaded up my apartment building's downspout with a 1-watt QRP signal; worked the steel fire escape on my dormitory building against a counterpoise; tuned up an aluminum window screen with a low-power signal; put up an outdoor "invisible" end-fed wire made from 30-gauge steel wire, shirt-button insulators and monofilament line; and I've even laced full-size wire Yagis and a full-size 40-meter horizontal loop in a fourth-floor walk-up attic. Where there's a will, there's a way.

My experience with indoor antennas is certainly not unique. Other success stories come to mind. I know of a Midwestern ham who ran a successful 40-meter DX net with a kW to an attic dipole (definitely not recommended under today's RF exposure limits!); and a Georgia ham who has worked DXCC with 5 watts using only attic-mounted wire antennas. These "hidden HFers" are out there, but they're hard to spot because they don't have any outdoor aluminum.

And speaking of outdoor aluminum, if there's *any way* to run a wire or two outside, even if it's only a thin steel wire running from a window sill or a balcony railing, it will usually outperform indoor antennas that are more compromising in nature. Perhaps the ultimate apartment solution is to run the steel wire out to a tree or some other handy structure. You should use heavy-duty monofilament fishing line to make an end insulator and support "rope," run the counterpoise wires around the baseboards of the apartment, and feed the thing with an autotuner/autocoupler at the point where the steel wire exits the building.

I used this arrangement (with a manual tuner) when I first moved to Connecticut and had to live in a hotel room for three or four months. It worked great and was never detected by anyone who might have been bothered by it. I was running 1.5 watts, so I'm confident that I wasn't causing RFI.

VHF/UHF

VHF/UHF bands are prime turf for space-restricted amateurs. At these high frequencies, antennas are physically small. Putting up a small Yagi antenna isn't out of the question. When I was getting acquainted with 440-MHz FM, I simply aimed a small beam out my third-floor window. I hit several area repeaters with no trouble and had many simplex QSOs, too. In many metro areas, the rubber-ducky antenna that comes with VHF/UHF handhelds will be more than enough to access several local machines. Here, indoor antennas may be no sacrifice at all!

Good Things From Small Packages

Don't give up on ham radio just because you lack the real estate for conventional antennas. There's a lot of fun to be had with indoor alternatives. Remember, practice and experimentation make perfect.

Send your QSL cards, questions and letters to me at *Popular Communications*, "Ham Discoveries," 25 Newbridge Rd., Hicksville, NY 11801. ■

by Shannon Huniwell

Shannon's Broadcast Classics

a look back at radio & TV's golden years

New England's Disappearing Stations

When the leaves were off the trees, I could get a glimpse of it up there on Connecticut's Talcott Mountain. A boy at school told me the strange building was designed to be the exact shape of an *A-1 Steak Sauce* bottle. What really made me curious about the unusual tall structure atop the peak, though, was the kid's insistence that the place housed a secret and powerful radio station. This claim got my Dad interested enough in the Heubline Tower to promise me an excursion up the mountain so we could investigate what—if anything—it was broadcasting.

What About The Steak Sauce?

When we made the short drive from our Simsbury home to the hiking trail, and then trekked up to the front door of that 165-foot tower building, my father, still mostly out of breath, verified, "It'd be a great place for FM transmission, alright!" A Connecticut State Parks guide added that from the structure's observation windows, about a 1,000 feet above the Farmington River Valley, one could make out the Long Island sound, Massachusetts's Berkshires Mountains, and Mount Monadnock, New Hampshire, some 80 miles away. She knew the building had once been owned by the *Hartford Times* newspaper, but couldn't recall anything about radio in her historical vignette. "Well, that's the only reason my daughter and I are here," Dad indicated to the nonplused official, and pledged to get to the bottom of the tower's broadcast connection enigma. "The darn thing doesn't even really look like a bottle of *A-1* anyway!" he added for my amusement, as the guide shook her head and walked briskly to a newly arrived bunch of hikers.

While my father sat on a nearby rock to survey the situation, I zeroed in on the interesting account of Gilbert Heubline, a successful Hartford hotel owner who made another fortune as America's first bottler of cocktails. From my Dad the teetotaler's grimace during the tale, I could tell he thought this was a terrible way to have cashed in. And, Heubline's other revelation, the decision to import Smirnoff Vodka, equally annoyed Pop.

Fortunately, for Dad's peace of mind on Talcott Mountain, Heubline's company had also thought to distribute *A-1 Steak Sauce*. Some say Gilbert Heubline was so happy that this non-booze acquisition kept his organization going during Prohibition, that he appreciatively constructed the tower in the likeness of an *A-1* bottle. The math is a little hazy on that story, though, as Heubline's tower was built in 1914, several years prior to America's attempt to go "dry." A bit fuzzy, too, is its resemblance to the steak sauce container. Both are tall, predominantly square, and narrow near the top, but that's where the similarities ceased.

Mr. Heubline died in 1937. Around the end of World War II, his tower and related summer residence passed into the hands of *The Hartford Times*, a Gannett-owned media company (*USA Today* is now their most famous property) that quickly renamed their tall acquisition, the "Times Tower."

Little WTHT...

It's likely that engineers from that afternoon paper's AM radio station, WTHT, were among the first *Times* employees treated to a view from the mountaintop retreat. Equally plausible is their possible reaction to the view. Probably, as my father had declared, the WTHT men exclaimed, "Hey, this would be a *fantastic* spot for one of those new FMs!"

Actually, the Hartford region was somewhat of an early FM hotbed, with WDRC and WTIC each pioneering frequency modulation outlets prior to World War II. So, the paper might have been well aware of FM's promise, especially as owners of 250-watt WTHT-AM and always mindful of getting more coverage.

Broadcast Pro-File chronicles the FCC granting a construction permit (CP) for what would become WTHT, which stood for *The Hartford Times*, around Christmas 1935. Originally a 100-watt daytimer at 1200 kc, the local station hit the air on August 12, 1936. The modest signal flowed from a roof-mounted 204-foot Blaw-Knox self-supporting tower on top of a 285-foot building at 983 Main Street in Hartford. Its days-only classification resulted from a requirement to protect WNRI, still unbuilt but CP authorized for fulltime operation at Newport, Rhode Island, on WTHT's 1200-kc co-channel. Reportedly, *Times* officials offered WNRI's people a pretty penny for the CP, asked the FCC to delete it, and, by late summer 1937, pocketed the night authorization for WTHT. Within a couple of years, day power jumped to 250 watts (with 100 after sunset), and then the Commission allowed WTHT 250 watts around the clock sometime in 1940. The following year, a North American frequency shift nudged the station to 1230 kc.

Right after the war, WTHT studios were moved to a "4 story brick office building located at 555 Asylum Street in the southern part of downtown Hartford." Two years after this change, the Lingo Tower Company was commissioned to install a tubu-

This late 1970s business card from WINF Manchester, Connecticut, is the only memorabilia in my files even remotely related to the long-defunct WTHT-AM 1230 in Hartford. By then, WINF had dropped CBS in favor of network news and features like Paul Harvey' commentary from ABC. The card came from the small station's Jeff Jacobs, a popular personality there due in part to his pleasant English accent. He sent me the card in place of a QSL. "(Turn)" refers to the other side's message that exclaims, "Yes, you heard us! Thanks."

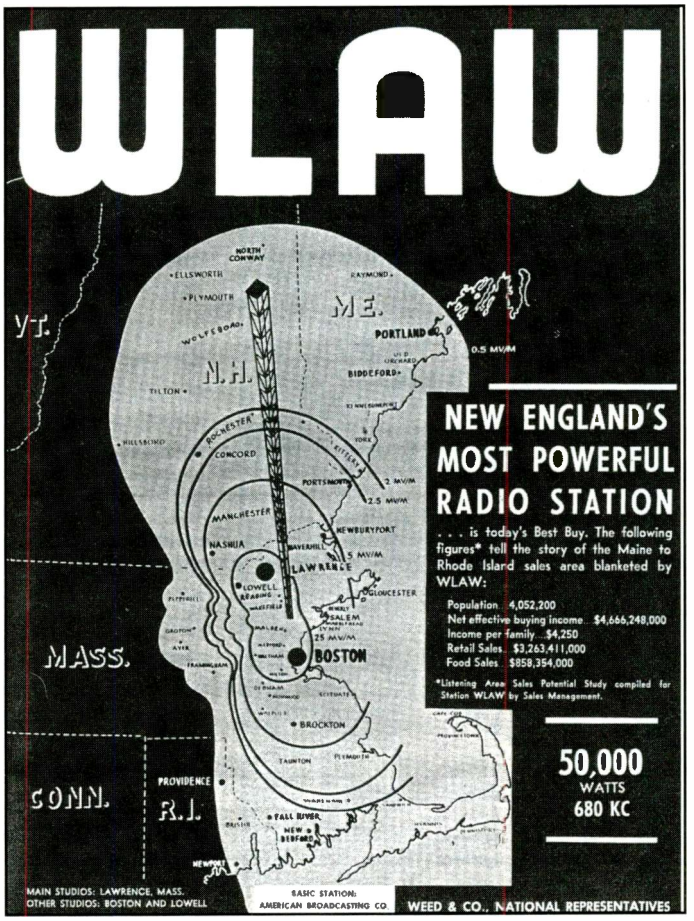
lar, vertical radiator at the same address. The 1947 engineering upgrade was part of an improvement plan that included transmitting *Hartford Times* sanctioned (and ABC Network) programming on a whole new band.

...And *BIG* WTHT-FM

Truth be told, the *Times* fiscal people were not likely to be in much of a hurry to spend money on FM radio in 1946. At that point, it's fair to say that no marketable FM audience existed. Even so, a nominal amount was allocated that year to secure a "conditional" FM CP grant. The FCC was still in the throes of making FM broadcasters (and FM applicants) move their operations from the genre's original 45-mc band (42 to 50 mc) to the 88- to 108-mc range. The "conditional" language reminded FMers that things were still in a state of flux. By mid-1947, though, *The Hartford Times'* static-free authorization crystallized as WTHT-FM at 106.1 mc with 5.6 kW at 800 feet above average terrain. That decent height, as you can figure by the opening of this story, resulted from WTHT-FM's "pylon" antenna being affixed to the tip of our "steak sauce" building.

On the afternoon of its March 29, 1948, debut, WTHT-FM rated an entire section in the paper. There, FM was extolled as "the very future of radio." In between the FM-related editorials were ads from Hartford-area stores that sold FM tuners, FM, and/or FM/AM sets. Pictures of WTHT-FM's gear included the antenna mast and transmitter setup in the svelte building's observation room. Engineering staff monitored the meters there whenever WTHT-FM (which duplicated the AM sister's programming) was on the air. You can check out the website of the Worldwide TV/FM DX Association for a glimpse.

WTHT-FM's inaugural hoopla and anticipated momentum didn't generate the response that *Times* officials had hoped. Though the station's coverage was exponentially superior to that of its AM companion, listener feedback was tiny. Not too long past Christmas 1950, a power failure in the vicinity of the *Times* Tower knocked WTHT-FM off the New England air. But concern on the part of the FM's management had only a single counterpart out there in "radioland," as just one letter wondering when WTHT-FM would reappear trickled into 555 Asylum Street. As *Broadcast Pro-File's* Jan Lowry reports it, "a decision was then made to withdraw from active FM broad-



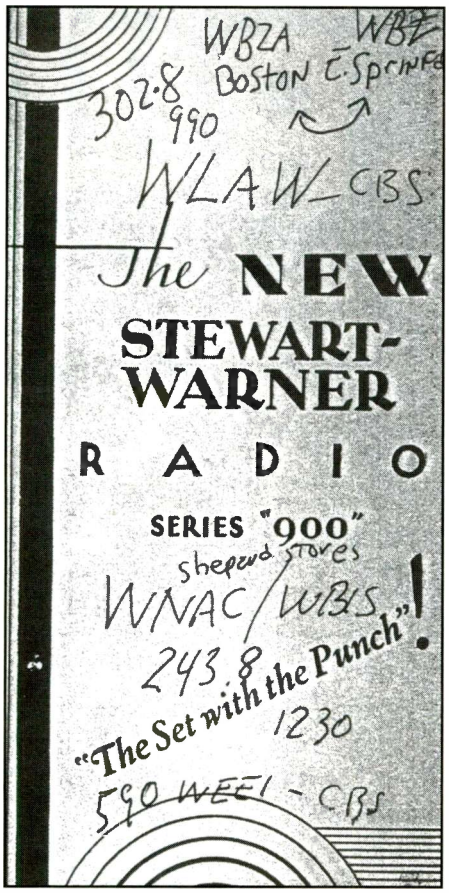
"New England's Most Powerful Radio Station" seems an obvious misstatement when one compares WLAW's 50 kW with the 50,000 watts offered by the likes of WBZ Boston on 1030 kc or WTIC 1080 kc in Hartford. That boast gains technical qualification, though, when the conventional wisdom is the lower the frequency, the greater one's wattage goes. 680 being lower than either 1030 or 1080, the claim had arguable merit. Of course, DXers know that the 680 Boston signal doesn't match the consistently distant zing of its two aforementioned New England rivals. Notice how the WLAW directional pattern—which turned a theoretical circle into an oval—was designed to blast into Lawrence and Boston from a site about midway between. Amusingly, the artist's rendition accomplishes this directionalization with one tower, instead of the actual and necessary three.

casting. WTHT-FM was shut down and its license returned to the FCC for cancellation in late January 1950. 'Economic reasons' were cited as the cause of its demise."

I'm not sure how long after that FM's closure that its pylon antenna and other transmitting equipment came out of the "steak sauce" building. A Connecticut state park's Internet site mentions that a replica of the Heubline Tower's original 25-foot-high cupola and spire were fitted to the building's top in 1998 "after an absence of more than 50 years." Figuring that the first cupola and spire were removed around 1946 to make way for the WTHT-FM installation, the math adds up. The state bought the real estate from the *Times* in 1965. It'd be nice to meet someone familiar with that transaction who could say whether the transmitter was still up there at the time.

Even The AM Evaporated

WTHT played on with a business-as-usual attitude for the



The cover of that smoky Stewart-Warner radio catalog shows my maiden great aunt's notes mentioning the original WBZ East Springfield/WBZA Boston arrangement and, by the arrows, their eventual call letter swap. Also indicated are WEEI, the first WNAC (owned by a department store my relative must have patronized), WBIS (which was a truly obscure shopping news station, featuring phonograph records between this shopping info, that broadcast with a limited hours schedule in Boston), and WLAW with a nod to its short-lived CBS affiliation.

next four years, but behind the scenes top management grew increasingly dissatisfied with their facility. More than ever since the FM foray flopped they coveted the kind of signal that reached Hartford's growing suburbs, an area covered adequately by the area's big radio guns like WTIC (1080, 50 kW) and WDRC (1360, 5000 W). Even a 1000-watt New Britain daytimer on 840 kc that went on air a decade after WTHT's debut transmitted a much wider footprint than the *Times'* modest AM facility.

Again, *Broadcast Pro-File* provides details of what this dissatisfaction caused the *Hartford Times* radio division to do:

> In early 1954, plans were undertaken to acquire an interest in the more powerful (5,000-watt) WONS [today known as WPOP 1410] in Hartford, which was operated by General Teleradio, Inc. The *Hartford Times* acquired a 45% interest in WONS, requiring the newspaper to submit the license for 250-watt WTHT to the FCC for cancellation pursuant to the agency's duopoly rules. On February 13, 1954 WTHT left the air for good. [The very next morning] WTHT's ABC radio network affiliation [perhaps its most valuable asset] was moved to WONS.

Also modified were these call letters WONS, which had stood for The O'Neil Station, Thomas O'Neil being an official with General (Tire & Rubber) Teleradio. WONS instantly became WGTH to denote the General-Times (Hartford) Television Corp. Another "deal sweetener" that motivated the *Times* to deep-six WTHT in favor of a minority interest in WGTH was a new UHF-TV station (WGTH-TV, Channel 18) included in the transaction. In fact, the old WTHT 555 Asylum Street quarters "were converted to television studios for the video operation" which hit the air in 1954 as Connecticut's CBS-TV affiliate. Channel 18's heyday as a major network station was short-lived, but it has a fascinating history that we'll look into sometime.

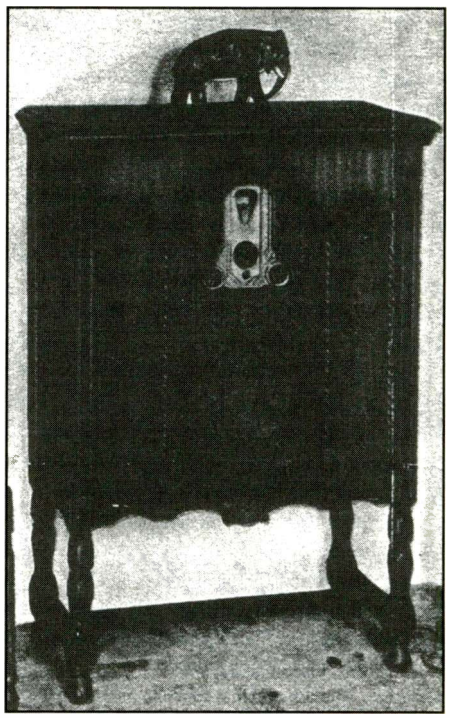
When word of the aforementioned WTHT folding reached the Nutmeg State's broadcast community, some of that small legion considered how and where they might reactivate the *Times'* erstwhile 1230-kc dial position. On May 18, 1958, John Deme's Manchester Broadcasting Company did so when its WINF debuted in Manchester, a community east of Hartford. For years, this little suburban facility served as the Hartford-area CBS radio affiliate, but—understandably with its "local" (1230-kc) channel frequency assignment—had a tough time hitting the burgeoning bedroom towns northwest of Hartford.

Interestingly, the 1963 *Broadcasting Yearbook* shows WINF as having a sizeable FM sister. I'm not sure if this one was an accurate listing (as a large Westport, Connecticut, FM was already in operation on the same frequency) or if it ever got beyond the CP stage. But it was said to have been a 7.6-kW Class "B" at 107.9-mc facility with an antenna height of 600 feet above average terrain. It's another *whatever happened to...*in our WTHT-related *here today, gone tomorrow* radio saga.

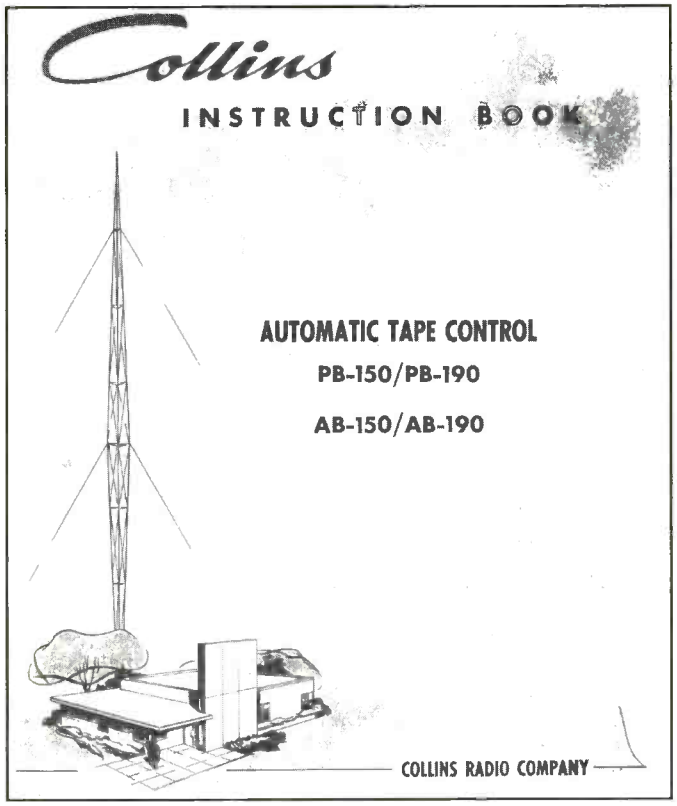
By the way, even WTHT's companion newspaper went the way of the wind. Like many late afternoon-published papers, it lost readership to the evening TV news audience, tried unsuccessfully to be bought by the morning *Hartford Courant* (America's oldest continuously published newspaper), and shut down in October 1976.

From Hartford to Boston

Two other city newspapers—*The Lawrence Daily Eagle* and *The Evening Tribune*—enter this edition's story. They were the major media arms of Lawrence, Massachusetts-based Hildreth & Rogers Company. Some 25 miles northwest of Boston, Lawrence (and its sister cities of Lowell and Haverhill) was just far enough from "Bean Town" for the Hildreth & Rogers firm to wield significant influence over a healthy share of local advertisers not particularly prone to spend ad dollars in Boston papers or on "Hub City" radio. This got the Lawrence paper publishers thinking about firing up a broadcast station of their own. So, six days ahead of Christmas 1937, the Hildreth & Rogers Company enlivened a CP it had secured from the FCC authorizing 1000-watts of daytime operation on 680 kc.



A catalog rendering of the radio like the one in my great aunt's bungalow. The Stewart-Warner Jacobean Period Console cost $142.50 with a built-in "reproducer" or speaker. That was lots of money in the late 1920s... especially considering the fine print that noted, "All priced less tubes." It probably didn't come with that old elephant figurine either!



Some of the late 1950s/early '60s Collins broadcast equipment instruction booklets wore a cover drawing of a generic "modern" radio transmitter site. One can imagine the architect's rendering of the proposed 50-kW facility, WLAW, looking a bit like this—minus a couple of sticks.

Thought I'd throw in a shot of two of the four tubular towers of KMBY 1540 kHz in Capitola, California. Jan Lowry snapped the picture and reports the "pole" towers were painted white and were fed by a transmitter in a small metal building located off State Route 1, between Aptos and Capitola. Apparently KMBY has been silent since October 1995. Jan couldn't detect any local signal when he tuned his vehicle's radio to 1540.

"Lawrence's Own Station," as the four-times hourly identification went, was appropriately called WLAW, borrowing its city of license's first three letters.

Allow me to relay a semi-related story here. It wasn't until I bought an old *Broadcast Yearbook* on eBay that my longtime curiosity about WLAW was finally quenched. Without meaning to get us horribly sidetracked, let me tell of the weekend around 1980 when my mother's great aunt, Ethel, passed away. I remember Dad being none too happy when (as he indelicately put it) "the old spinster croaked just so she could get revenge" by making him move all of her junk! Though she never liked my father for some reason, the 90-something senior adored my Mom, and left her a tiny house near the Boston suburb of Stoneham, Massachusetts, as well as everything in the stuffy four-room domain. My folks sold Aunt Ethel's home to a couple next door who had been bugging them since the second her obit hit the paper.

Anyway, while going through Aunt Ethel's stuff, Dad and I plugged in the dormant 1920s Stewart-Warner console radio that, probably since Truman was president, had primarily served as a stand for my fussy relative's parakeet cage.

"Something smells like it's on fire!" my mother exclaimed as the dust smoked off of the tubes. We hurriedly grabbed the radio's spindly legs and spun the ancient receiver 180-degrees. This revealed a small, smoldering catalog that, decades earlier, likely had enticed Aunt Ethel to purchase that set. On its cover were penciled the call letters of various stations, including WLAW. Scribbled in the largest letters, this must have been her favorite. "Better go get the *White's Radio Log*, Missy," Dad excitedly directed, noting that those WLAW calls were a complete mystery to him. Back from rummaging through our station wagon's glove compartment, I watched his puzzled expres-

sion while he flipped through the pages and found no reference to any WLAW in the Boston region.

50,000 Ways To Leave Your Lawrence

The enigma vanished when we later discovered that WLAW had operated on 680 kc, the modern home of Boston's WRKO. But how and when did a kilowatt daytimer from Lawrence become a Beantown "flamethrower" touted as "New England's Most Powerful Radio Station?" Answers began unfolding for us when we consulted some other vintage radio directories and saw that WLAW got permission to up its power to 5 kW and run day and night via a new directional array. These three sticks replaced WLAW's original 300-foot Lehigh steel tower off River Road in West Andover. And this 1940 change prompted CBS to make WLAW a "supplementary" affiliate that would carry Columbia shows even though CBS' WEEI Boston aired much of the same programming.

During World War II, Hildreth & Rogers Company management really got the taste of potential full-market broadcast coverage, so it filed an FCC application to boost WLAW output tenfold. By late summer 1947, a resulting CP for that power increase and a transmitter site change was activated. A 50,000-watt WLAW sprang into the Boston media market from a trio of 440-foot Lehigh towers anchored in the Beantown suburb of Burlington. It was a shrewd move because the new transmitter's influence netted the Lawrence-licensed station a "city-grade" signal throughout downtown Boston and beyond.

Meanwhile, WLAW's old site in West Andover became the headquarters of a local amateur radio club. It must have been lots of fun for those ham operators to be able to brag that their "shack" had been an authentic broadcast facility. I assume that the towers were far enough apart to be rigged with long wire antennas appropriate for the short waves.

With at least half of WLAW blasting into Boston and its nicely populated southern suburbs, station officials couldn't resist opening a secondary studio above a Boston savings bank in 1948. (Some sources list an auxiliary studio in Lowell, Massachusetts, too.) Three years later, WLAW's Boston home shifted to former WBZ quarters in the Hotel Tremont. Though the FCC still considered WLAW a Lawrence outlet, the morphing station quietly de-emphasized its focus on its city of license in favor of a more Bostonian flare.

This move-in caught the envy of General Tire & Rubber Company (the same outfit with WONS Hartford) officials at 5000-watt WNAC Boston. During 1953, they went ahead and paid $475,000 for WLAW and WLAW-FM. This co-located frequency modulation station took to the air through a Raytheon transmitter and side-mounted (on one of the three Burlington sticks) antenna on November 10, 1947. By late 1948, it was delivering a 20,000-watt WLAW simulcast to the Boston vicinity, from 3 to 9 p.m.

Lost In A Call Swap And Divestiture

Admittedly, huge WLAW had more kilowatt clout than the smaller WNAC, but the latter possessed a longer Boston history. Consequently, as the ink dried on the WLAW purchase, WNAC's 1260 spot was sold (for $120,000) to Pennsylvania station owner, Vic Diem and Associates, instantly becoming WVDA and eventually WEZE. Next, WLAW-FM's license for 93.7 mc was surrendered. On the official transition day, July 1, 1953, WLAW took the call WNAC. The tire firm's WNAC-FM (98.5 mc) was kept as a frequency modulation partner. Program phone lines from WNAC's existing Brookline Avenue Boston studios were simply rerouted from the 1260 site to the Burlington 680 towers to consummate the changeover. That done, General Tire's broadcast attorneys got the okay to drop mention of Lawrence and use the "This is WNAC Boston, 680 on your dial" station identification.

It'd be interesting to know what happened to the equipment at the former WLAW's Lawrence and Lowell quarters. Suffice it to say, WNAC staffers were not encouraged to remind folks that theirs had recently been a Lawrence station. That's one reason why the WLAW heritage was so quickly forgotten.

We'll have to include in a future column WNAC's second big transformation. The station secured an FCC CP to improve coverage by running separate antenna patterns day and night, as opposed to the single directional signal that came with the WLAW deal. Briefly, though, I wanted to remind you that WNAC-FM was quietly switched to WRKO-FM in order to obtain and hold that authoritative and significant callsign. The RKO connection surrounded General Tire's broadcast interests having merged with Howard Hughes' RKO Pictures and becoming RKO Teleradio Pictures, Inc., or RKO-General.

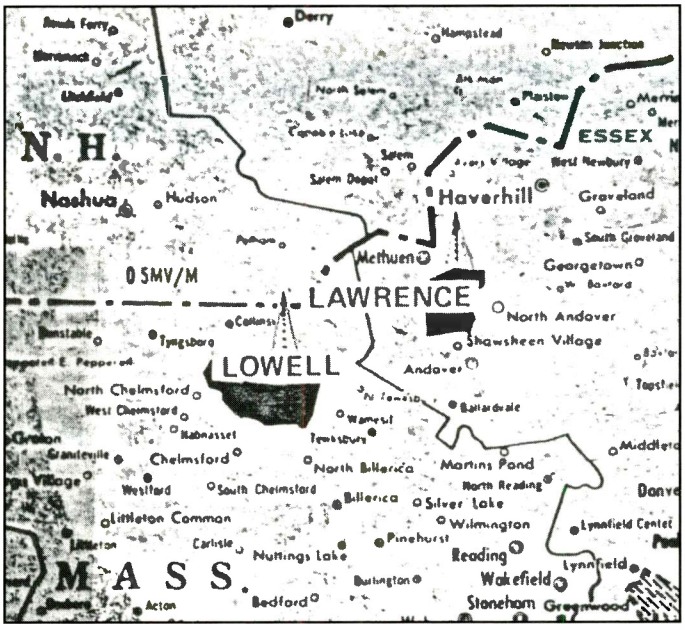
After experimenting with automated Top-40 programming on WRKO-FM, and netting stunning ratings successes with the Bill Drake-inspired "much more music" format on their previously moribund Los Angeles station, RKO-General officials decided to play contemporary records and use the authoritative sounding letters on the Boston AM side, so they converted WNAC to WRKO on March 3, 1967. Few members of the "Big 68" WRKO audience ever suspected that their wildly popular Top-40 outlet WRKO had been a 1000-watt daytimer up in Lawrence. Incidentally, even WRKO's legendary hit music run came to an end in late 1981 when it adopted the all-talk format still emanating from those three once-WLAW towers today.

The Other Lawrence Station With A Second Life In Another City

Besides Messers Hildreth and Rogers, nobody was happier about WLAW's power increases than were the owners of nearby Lowell's oldest station, WLLH, and "synchronous amplifier" WLLH-S ("S" for synchronous) transmitting from neighboring Lawrence. That's because each WLAW improvement promised WLLH officials that they'd eventually be the only local radio game in town. And, WLLH possessed a distinction among American radio stations as it was officially allowed it to operate transmitters in both Lowell and Lawrence.

In a conventional fashion, WLLH went on the air in 1934. The station's claim to fame arrived two years later, as *Broadcast Pro-File* explains:

On April 24, 1936, WLLH was granted special temporary authority (S.T.A.) to install a new synchronized booster [or repeater] station at Lawrence, MA, nine miles distant, with a power variable from 10 watts to 100 watts on 1370 kilocycles at a site to be determined. The authority was to expire July 1, 1936, but was later extended. On March 1937, WLLH's authorization for a booster station at Lawrence was reaffirmed; the new station was to be synchronized with WLLH on (then) 1370 kilocycles with a power of from 10 to 100 watts. On August 10, 1937, WLLH was granted special experimental authority for a satellite station at Lawrence, which was installed in the Cregg Building, utilizing a 100 foot Lingo vertical radiating tower. (It still stands at the Cregg Building in downtown Lawrence. Antenna is top loaded i.e.:



The WLLH Lowell/WLLH-S Lawrence "salesperson's coverage map" (meaning it's a bit optimistic) is somewhat hazy because of age and old Scotch Tape marks. Hopefully, you can get the gist of the document, even though it looks like how those stations might have sounded when they drifted off frequency.

guys at the top appear to be bonded to the flagpole antenna.) WLLH's booster went on the air December 1, 1937 with a power of 100 watts, duplicating the WLLH program schedule.

In 1938, the power of the station and its booster in Lawrence was increased to 150 watts full time in January 1940. Antenna tower in use at Lowell by 1940 was one 150-foot Lehigh vertical radiator. On March 4, 1941, WLLH was granted on a regular basis a license to cover operation of a synchronous station at Lawrence (replacing its former S.T.A.). This license specified a power from 10 to 100 watts, although at this time WLLH at Lowell was using 250 watts. In the NARBA frequency reallocations on Saturday, March 29, 1941, WLLH and its repeater) was assigned to operate on 1400 kilocycles in lieu of the previously authorized 1370 kilocycles. By 1943, an auxiliary studio was maintained by WLLH in the Cregg Building, Lawrence. After the war 500 watts of day power(s) was OK'd. That continued until late 1963 when the station was authorized to raise day power(s) from 500 watts to 1,000 watts, nights remaining 250 watts. Power was increased to this level in early 1964 [today, the authorization calls for a kilowatt day and night].

My files contain an undated copy (possibly late December 1978) of a WLLH/WLLH-S article from the music industry newspaper, *Radio & Records*. Columnist John Leader interviewed the then hit-music outlets' program director, Jack Diamond who "tried to explain some of the special challenges dual transmission causes." According to the article,

"The main problem occurs," Diamond said, "halfway between the two towers. Either tower [and related transmitter] is strong enough to take care of most [of the other's] interference, except for a one mile stretch exactly between the two. Driving through this area [listeners notice that the stations] sound like a tape cartridge that's out of phase and was not properly bulk erased. It sounds like some of the previous audio is still on the tape and the two things are fighting for control of your radio. You are actually listening to the two stations at the same time until you pass through the area and the [nearest] transmitter takes over. When one of the transmitters drifts off 1400 kc, you can hear it immediately. [Modern synthesized crystal-controlled transmitters don't prove too troublesome in the critical synchronization area.] But there was a time when WLLH/WLLH-S frequency adjustment between the two transmitters was handled by a huge mechanical system of pulleys and chains! The Lowell transmitter was the main and the Lawrence the slave. So if the Lowell transmitter drifted a bit off 1400, this mechanical system would go into gear and fine tune the Lawrence transmitter to match. Unfortunately, it didn't move very fast, so by the time the Lowell transmitter went off frequency and the Lawrence one corrected for it, the Lowell unit could have moved back in the other direction."

Diamond discovered some musty 1930s engineering documents in WLLH's deep storage that reported to WLLH ownership that the FCC would have happily entertained a modification of facilities application to move one of the transmitters to a compatibly different frequency, or maybe exchange WLLH and WLLH-S licenses for the then-vacant 680-kc spot later snagged by WLAW. Reportedly, however, the WLLH brass were too pleased with their unique station(s) to see the need for such change. They did ask the Commission for a third authorization, this one to build another synchronous amp (or repeater transmitter) in Haverhill, Massachusetts (hence the "H" in WLLH) with towers in Lowell, Lawrence, and Haverhill. "Thankfully," Diamond noted, "the FCC [quit issuing] multiple construction permits after 1936."

Till Next Time

Speaking of stopping, I can picture editor, Harold Ort, as a long-ago WLLH engineer looking at the studio clock and giving this correspondent the "cut" sign. Looks like I've already used up my scheduled "air time" in this issue. So, just like one of those trees near the Heubline Tower up on Talcott Mountain...I'll *leave!*

...And so ends another day of broadcast history from Pop' Comm. ■

the wireless connection

a look behind the dials

by Peter J. Bertini, radioconnection@juno.com

The KNX Drama Hour, And A Nifty Chassis Holder

From the looks of our mailbag, KNX's decision to drop their popular Old Time Radio "Drama Hour" has upset many loyal, albeit former, listeners! Here are a couple of letters typical of what you've been telling us:

Steve Dichter of Los Angeles, California, writes,

Peter, I just read your article "KNX 1070 Ends Drama Hour" in the February 2004 issue of *Pop'Comm*. The "Drama Hour" was picked up in the Los Angeles area by station KSUR AM 1260 and continues the same "Drama Hour" programming (which is aired at 8 p.m. and 1 a.m. weekday evenings). My favorite, "Jack Benny," is heard Saturday nights at 9 p.m., but KSUR's signal is not nearly as powerful as KNX's, so some creative tuning is needed in some locations. The KNX website extended the courtesy of listing the station change. My other local radio gripe was KFI's 640 moving the very popular show "Coast-to-Coast AM" from its live airing at 10 p.m. to a delayed broadcast at 1 a.m. This has upset many listeners! Thanks.

And Clark Rennie writes in,

I live in Los Angeles and KNX was my favorite AM station. They changed management several months ago and (in my opinion) it has steadily gone downhill. Yes, the "Drama Hour" is gone and the excuse is "All News, All The Time" format. Baloney! Later.

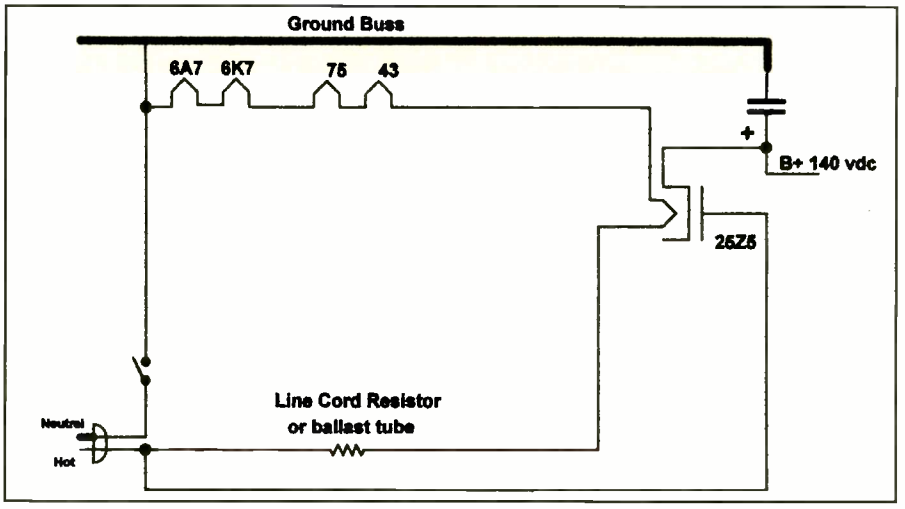


Figure 1. This is a simplified schematic of the filament wiring for an AC/DC radio using series filament tubes and a ballast tube or resistive line cord to drop the line voltage.

Poor Man's Chassis Holder

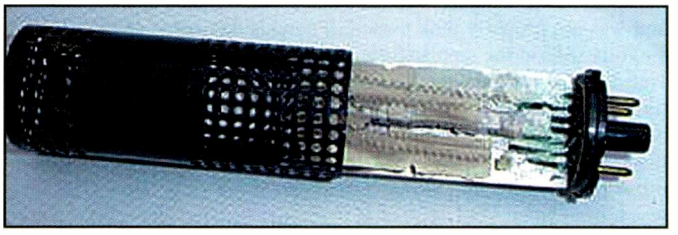
Reader Phil Nelson shares with us a nifty idea: a shop aid that's so obvious you'll want to slap your forehead and exclaim, "Why didn't I think of that!" Phil came up with a quick and inexpensive way to support a radio chassis undergoing restoration. As he puts it,

This is almost too dumb to mention, but after years of struggling to prop up heavy chassis on my workbench, it finally occurred to me to screw some heavy corner braces into the chassis mounting holes. Doh! This is especially handy with this particular radio chassis, which is narrow and heavy. If you put braces on all four corners, you can even turn the chassis upside down without crunching original components.

Phil's technique is shown in action in **Photo A**. The metal corner braces are available at your local home center or hardware store. We're indebted to Phil for his permission to reprint this material.

Photo A. Some things are so obvious you have to wonder why you didn't think of them! So it is with Phil Nelson's simple and quick way to support a large chassis on the bench. The chassis undergoing restoration is a large Midwest console, a very desirable deco-looking set. (Photo courtesy www.antiqueradio.org)

Photo B. Here's the inside scoop on an octal-based ballast resistor assembly. It's similar to what was originally used in the author's Simplex-D table set. Note the nichrome resistance wires wound on mica insulators and the perforated metal cover to permit air circulation and cooling.



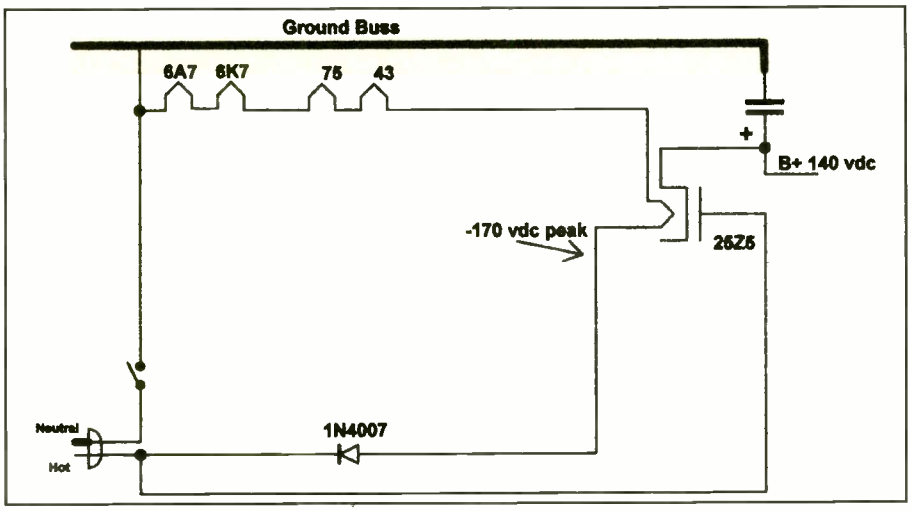


Figure 2. A silicon power diode will approximate 80 volts RMS for the series tube filaments, but the voltage is now a complex waveform with a DC component. The heating power of the complex waveform is the same as if the filaments were powered from an 80-volt RMS sinewave source, however. This configuration unnecessarily stresses the cathode-to-filament insulation on the rectifier tube.

Readers might enjoy visiting Phil's antique radio website at www.antiqueradios.org. There are many good antique radio websites, but Phil's is the gold standard that other's are judged by.

Simplex Revisited

Back in March 2004 I offered some suggestions for dealing with resistance line cords or missing ballast tubes in AC/DC tabletop sets. Our example was a small Simplex radio using a series filament string (totaling 80 volts) with a 38-volt ballast tube to drop the line voltage. A typical plug-in octal-based ballast, partially slid open to show the internal resistance wire assembly, is shown in **Photo B**.

Since I showed how a series diode could be used in lieu of ballasts or resistance line cords for dropping filament voltage in sets with series filaments totaling 80-volts, I've been made aware of a few not-so-obvious pitfalls that can occur.

Figure 1 is a simplified schematic for a set using a resistance line-cord or ballast tube to drop the AC line voltage for a series 80-volt filament string. In operation, the cathode of the 25Z5 rectifier is held at about 140 volts DC due to the first filter capacitor. A common failure mode for these tubes is a breakdown in the filament-to-cathode insulation. The 25Z5 *peak* filament voltage will go from plus-to-minus 113 volts (80 x 1.414) for each crest of the AC sinewave; that equates to

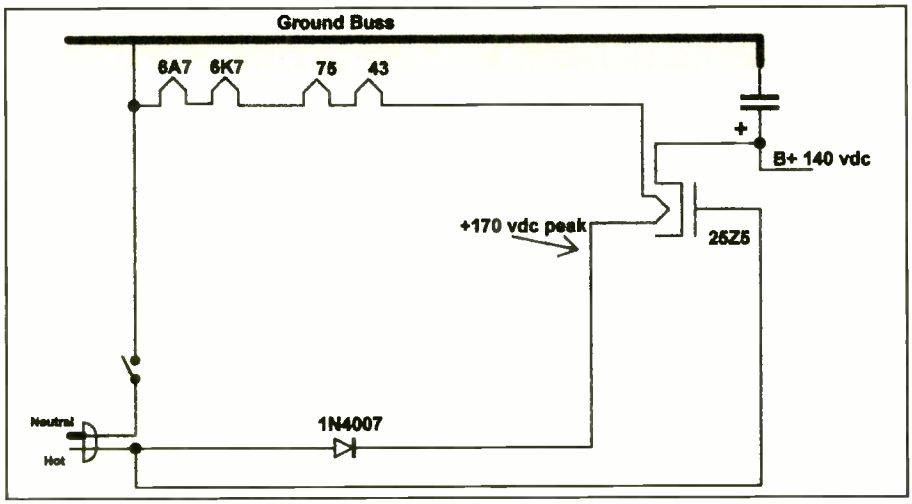


Figure 3. Reversing the diode polarity alleviates the peak voltage differential between the rectifier tube cathode and filament, reducing the likelihood of breakdown of the rectifier tube's cathode-to-filament insulation less likely. Subtle, but important! Remember to always fuse these sets; a cathode-to-filament short can result in some spectacular pyrotechnics!

a worst-case filament-to-cathode peak voltage differential of 253 volts. Over time the insulation can breakdown and fail, often with some spectacular pyrotechnics involved.

In **Figure 2**, the ballast (or line cord resistor) has been replaced with a silicon power diode (1N4007 diode with a 1-amp @ 1000 piv rating). As I mentioned before, the average voltage is now .707 times the AC line voltage since the diode halves the power, not the voltage.

I also mentioned that a true-reading (RMS) AC meter, such as the Fluke 8060, would show the correct RMS voltage. That was not correct. Since the voltage is now a complex waveform with a DC component the measurement becomes much more complicated, and a special thermocouple-based meter might be needed!

More important, notice that the diode orientation provides voltage on the negative portions of the AC line waveform; the filament voltage is varying from 0 to –170 volts peak over one half cycle during the AC sinewave. That results in a *maximum peak* differential of 310 volts between the cathode and filament. This is not the best situation to have.

Figure 3 shows what happens when the diode is reversed, in this case the voltage on the filament is "going positive" to a peak of +170 volts, resulting in a maximum peak filament-to-cathode differentials of *only* –140 to +30 volts! Much better. This is an improvement over the original circuit shown in **Figure 1**, and certainly better than what results from the diode orientation shown in **Figure 2**. Again, this is a subtle, but important, change that could yield big results for set reliability and safety.

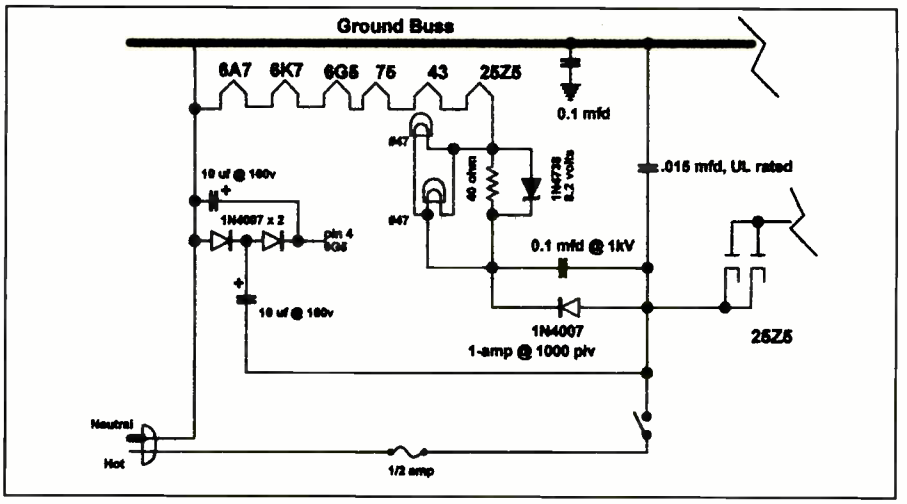


Figure 4. Here's the amended circuitry for my Simplex-D reflecting the changes needed to reduce the maximum voltages between the 25Z5 filament and cathode. Note that the polarity of the pilot lamps' surge-limiting Zener diode is also reversed.

Figure 4 shows the amended modifications made to my Simplex radio featured in the March column. The *dropping* diode polarity has been reversed as suggested above, and the Zener diode (used to clamp the pilot lamp surge voltage) as also been reversed. Since the AC waveform is now a complex voltage with a DC component, the Zener diode's voltage rating is chosen for best lamp brilliance, while weighing the surge voltage limits to prevent burnout. In some cases, the value of the parallel dropping resistor across the lamps might also have to be adjusted.

I hope I haven't belabored a simple point and that this explanation clarifies more than confuses the issue! In a future column, I'll cover how to use reactance to drop filament voltages; an inexpensive AC-rated capacitor can be used in lieu of ballast tubes or resistance line cords, *without* wasting energy as unwanted heat. This involves a little math (I'll make it painless with practical examples to work by) since we will be dealing with impedances and vector voltage addition.

Request For Assistance

Tom Beverly needs help with his Stenite model AC-7 TRF tabletop set. The radio is in extremely good condition, and Tom is eager to restore it, but alas he can't locate a schematic! If anyone can help, drop me a letter or e-mail and I'll put you in contact with each other. Thanks!

Next Month

Next month I'm planning a simple VHF crystal set project that will let you listen to aircraft communications, as well as nearby FM and VHF television stations! Remember, we welcome photos of your projects and collections as well as suggestions or contributions for future columns.

Until then, 73 from the "Wireless Connection" workshop. ■

broadcast technology

terrestrial AM, FM, and satellite radio news

by Bruce Conti, baconti@aol.com

NAB Signals FCC To Approve Nighttime AM IBOC

The National Association of Broadcasters (NAB) has endorsed nighttime operation of AM in-band on-channel (IBOC) digital broadcasting, also known as HD Radio. The endorsement comes as a result of the improved DRM-like codec released last autumn, which replaced the original PAC codec due to issues with audio quality and robustness, in particular with the limited bandwidth and slow data rate of AM digital. The NAB believes that any compromises in AM coverage area due to nighttime skywave interference are far outweighed by the benefits of improved audio quality and services. However, the question of final approval from the FCC remains open for discussion.

The results of nighttime AM IBOC testing last year using the old codec are yet to be promulgated, while the current codec is still untested at night between competing adjacent skywave signals. While some AM broadcasters have voiced opposition to IBOC digital because of potential interference issues, AM broadcast DXers are especially concerned with the increased noise levels that will be caused by the spill-over of IBOC digital on adjacent frequencies. Under the present AM and FM IBOC digital plan, interference issues would be addressed on a case by case basis, in which individual radio stations might be required to reduce the digital signal level on the upper and/or lower sideband by 6 dB to minimize interference.

QSL Information

963 4WK Warwick, Australia, QSL letter with bumper stickers and info on station, along with a cassette of a segment of their morning show mentioning my letter, received in 40 days, signed Ted Rogers-GM. Address: 4WK, Corner of James and Hume Streets, PO Box 403, Toowoomba QLD 4350, Australia. Queensland QSL #63, Australian QSL #222, MW QSL #2877! (Martin, OR)

1570 WBGX Harvey, Illinois, a nice friendly handwritten letter on station letterhead in 10 days for a taped report, signed Michael Gallagher-President. He mentioned my distance broke the record. Station has moved from Harvey to Chicago now, new address: 5956 S. Michigan Ave, Chicago IL 60637. (Martin, OR)

Broadcast Loggings

Although transoceanic mediumwave DXing has suffered this year under the influence of unusually intense solar activity, Mark Connelly, WA1ION, in Massachusetts, caught a rare transatlantic opening. "Stations from Spain were blasting in on the high end of the MW band, 1359 kHz especially strong, with respectable signals up on quite a few other frequencies as well, including 1179, 1224, 1296, 1503, 1575, and 1584 kHz," reported Mark. He continued, "1251 Libya was also huge, as was 1557 France, smokin' 1560 WQEW Radio Disney. 1332 Italy noted with local 1330 WRCA phased. Not much from the UK, however, no doubt as the effects of the Sun have continued to impact reception of signals from northern latitudes."

Lawrence Ressler in Ohio says the solar activity is having an effect on domestic reception. He writes, "The recent solar storms wreaked havoc with long distance listening on my car radio. I couldn't even pick up stations across the Pennsylvania border in Sharon, New Castle, or Pittsburgh, or 1100 WTAM Cleveland, the big flame-thrower here in northern Ohio. Strangely, I could receive 840 WHAS Louisville, Kentucky."

Often while solar activity will knock out AM signals to the north, reception from the south is enhanced as signals slip underneath the edge of the auroral dome.

Meanwhile, Patrick Griffith, NØNNK in Colorado had an interesting morning of transcontinental DX, logging five stations on 740 kHz in an hour, quite an accomplishment as the frequency is relatively uncrowded. Ira Elbert New, III, of Watkinsville, Georgia, has been busy at the dials too and kicks off this month's selected logs, all times are UTC.

610 WTVN Columbus, Ohio, at 1940 caught talk show and ID buried in the slop, "Newstalk 610 WTVN." (New, GA)

630 WMAL Washington, D.C., at 1935 a good signal with weather and "Todd Parrish, 630 WMAL News." (New, GA)

680 WPTF Raleigh, North Carolina, at 1930 a strong signal with newscast and winter storm warning, "Your official weather station, Newstalk 680, WPTF." (New, GA)

730 KKDA Grand Prairie, Texas, at 0725 "That's What The Blues Is All About" and ID as "AM Seven Thirty is Soul 73, KKDA." (Griffith, CO)

740 CHWO Toronto, Ontario, heard at 0609 with a wide variety of nostalgia; "The only station with Dean Martin, the Beatles, Barbara Streisand, and your all time favorites, AM 740." (Griffith, CO)

740 KCBS San Francisco, California, at 0650, "When the weather gets nasty depend on traffic and weather every 10 minutes on KCBS." (Griffith, CO)

740 KRMG Tulsa, Oklahoma, at 0600, "News Talk 740, KRMG," by a female announcer pronouncing the call letters very slow and deliberate. (Griffith, CO)

740 KTRH Houston, Texas, at 0603, only a "News Radio 740, KTRH" ID heard. (Griffith, CO)

740 An unidentified signal, at 0208 with a female in an oriental language heard for several minutes. Looped NE-SW from Denver. (Griffith, CO)

790 WAAY Eau Claire, Wisconsin, at 0025 a promo for Paul Harvey three times a day on WAAY, then an ad for Chippewavalley helpwanted.com into WeatherEye forecast and promo for WAAY790.com. Then back to ESPN. (Griffith, CO)

850 WDJC Birmingham, Alabama, at 2250 a good signal with gospel music, AM 850 The Truth." The station powered down around 2258. (New, GA)

870 WWL New Orleans, Louisiana, at 0459 a very listenable signal with ID as "Newsradio 870 WWL New Orleans, an Intercom Communications Group station," into CBS news. (Ressler, OH)

920 WBAA West Lafayette, Indiana, at 0138 fair with jazz music and National Public Radio. (Ressler, OH)

990 WDYZ Orlando, Florida, at 2255 heard Radio Disney buried in the slop, "Radio your way...Radio Disney WDYZ Orlando." (New, GA)

1060 WCGB Juana Diaz, Puerto Rico, heard at 0133 a fair to weak signal with a religious discussion in Spanish, acoustic guitar and harmonica music. (Ressler, OH)

1160 WAMB Donelson, Tennessee, at 1800 a good signal with standards, show tunes and big band numbers, "Serving Nashville and middle Tennessee with your kind of music 24 hours a day, this is WAMB 1160 Donelson." (New, GA)

1170 WLBH Mattoon, Illinois, at 1950 Stevie Wonder "Sunshine of My Life" buried in the slop, sign off at 2000, "Unforgettable 1170." (New, GA)

1180 WHAM Rochester, New York, heard at 0006 CBS News on a good signal with slight fading. "When the weather turns bad, turn to Rochester's premier weather station, Newsradio 1180 WHAM." (New, GA)

1520 KOMA Oklahoma City, Oklahoma, at 0328 a strong signal with fading, AP network news and ID, "News when you want it, the news station, News/Talk 1520 KOMA," interference from co-channel WWKB Buffalo, New York. (Ressler, OH)

1520 WQMA Marks, Mississippi, at 0701 DX test heard with Morse code during KOMA news, heard several times during the period. I was surprised this made it through! (Martin, OR)

Thanks to Mark Connelly, WA1ION, Patrick Griffith, NØNNK, Patrick Martin, Ira Elbert New, III, and Lawrence Ressler. 73 and Good DX! ■

PENDING

New Call	Location	Freq.	Old Call
WLJW	Cadillac, MI	1370	WKJF
KTFM	Universal City, TX	720	KSAH
KOND	Clovis, CA	92.1	KZFO
WYPF	Frederick, MD	88.1	WJTM

CHANGES

New Call	Location	Freq.	Old Call
KWFM	Tucson, AZ	1450	KTZR
KMXE	Orange, CA	830	KPLS
KZER	Santa Barbara, CA	1250	KEYT
KKOM	Ventura, CA	1590	KUNX
WVOJ	Fernandina Beach, FL	1570	WNNR
WNNR	Jacksonville, FL	970	WVOJ
WYMM	Jacksonville, FL	1530	WOBS
WVCC	Hogansville, GA	720	WGSE
KJPN	Honolulu, HI	1170	KENT
KENT	Pearl City, HI	1370	KJPN
KSNB	St. Louis Park, MN	950	KCCO
WFNA	Charlotte, NC	1660	WBHE
WCHO	Washington Ct House, OH	1250	WKSI
WKFB	Jeannette, PA	1530	WKTW
WVCD	Bamberg-Denmark, SC	790	WRIT
WCMS	Norfolk, VA	1050	WXMM
KEYF	Dishman, WA	1050	KDRK
CFAV	Laval, QC	1570	New
WCKS-FM	Fruithurst, AL	102.7	CKS
KTZR-FM	Green Valley, AZ	97.1	WFM-FM
KWMT-FM	Tucson, AZ	92.9	OYT
KPYG	Cambria, CA	94.9	OTR
KUSS	Carlsbad, CA	95.7	KOCL
KOTR	Hollister, CA	93.5	KBTU
KLRY	Gypsum, CO	91.3	New
WNCL	Milford, DE	101.3	WXPZ
WBTP	Clearwater, FL	95.7	WSSR
WYCT	Pensacola, FL	98.7	WBGP
WXGL	St. Petersburg, FL	107.3	WBBY
WFJO	Folkston, GA	92.5	WOKF
WOAH	Glennville, GA	106.3	WCGN
WTUN	Ringgold, GA	101.9	WSGC-FM
KLRI	Rigby, ID	89.5	KKLU
WCSJ-FM	Morris, IL	103.1	WYXX
WEGK	Charlestown, IN	104.3	WBLO
KISN	Belgrade, MT	96.7	KSCY
WAQQ	Rogers Heights, MI	88.1	New
WHLH	Jackson, MS	95.5	WDBT
WOAD-FM	Pickens, MS	105.9	WYJS
KKLU	Grand Island, NE	88.3	KXLJ
KURK	Reno, NV	92.9	KNHK
KBAC	Las Vegas, NM	98.1	KLSK
KABQ-FM	Santa Fe, NM	104.1	KBAC
WDRE	Calverton-Roanoke, NY	105.3	WXXP
WZAA	Garden City, NY	92.7	WLIR-FM
WLIR-FM	Hampton Bays, NY	107.1	WBON
WEGQ	Scotia, NY	93.7	WKRD
WRCI	Webster, NY	102.7	WDCZ-FM
WBON-FM	Westhampton, NY	98.5	WDRE
WKQC	Charlotte, NC	104.7	WSSS
WWGL	Farmville, NC	94.3	WGPM
WQNC	Harrisburg, NC	92.7	WCHH
WWNF	Kinston, NC	97.7	WZBR
WWEA	Oriental, NC	94.1	WNBR
WPWZ	Pinetops, NC	95.5	WKTC
WDWG	Rocky Mount, NC	98.5	WSAY-FM
WMUM	Washington, NC	98.3	WCZI
WRHD	Williamston, NC	103.7	WCBZ
WLZT	Chillicothe, OH	93.3	WFCB
KQOB	Enid, OK	96.9	KQBL
KMPQ	Roseburg, OR	88.1	KRBG
WRKY-FM	Hollidayburg, PA	104.9	WMAJ-FM
WZXM	Middletown, PA	88.7	New
WPGB	Pittsburgh, PA	104.7	WJJJ
WTZR	Elizabethton, TN	99.3	WPJO
KTCY	Azle, TX	101.7	KZMP-FM
KNAF-FM	Mason, TX	105.7	New
KZMP-FM	Pilot Point, TX	104.9	KTCY
KSRX	San Antonio, TX	102.7	KTFM
KLGD	Stamford, TX	106.9	KOES
KNJQ	Manti, UT	105.1	KMXU
KUDE	Nephi, UT	103.9	KMDG
KHTB	Provo, UT	94.9	KMXU
KDUT	Randolph, UT	102.3	KWKD
KZHT	Salt Lake City, UT	97.1	KISN-FM
WKCK-FM	Chesapeake, VA	93.7	WKOC
WKOC	Exmore, VA	106.1	WEXM
WSIG	Mount Jackson, VA	96.9	WSIG-FM
WXMM	Norfolk, VA	100.5	WCMS-FM
WFOG	Suffolk, VA	92.9	WWSO-FM
KHTO	Othello, WA	97.5	KZLN-FM
KRQI-FM	Seattle, WA	96.5	KYPT
KBKS-FM	Tacoma, WA	106.1	KBKS
WKSI-FM	Charles Town, WV	98.3	WXVA-FM
WMAD	Sauk City, WI	96.3	WCJZ
WXXM	Sun Prairie, WI	92.1	WMAD-FM
CFRM	Little Current, ON	101.1	New

our readers speak out

letters to the editor

Each month, we select representative reader letters for our "Our Readers Speak Out" column. We reserve the right to condense lengthy letters for space reasons and to edit to conform to style. All letters submitted must be signed and show a return mailing address or valid e-mail address. Upon request, we will withhold a sender's name if the letter is used in "Our Readers Speak Out." Address letters to: Harold Ort, N2RLL, SSB-596, Editor, Popular Communications, 25 Newbridge Road, Hicksville, NY 11801-2909, or send e-mail via the Internet to popularcom @aol.com.

Surging Forward

Dear Editor:

The December 2003 *Pop'Comm* really opened my eyes! The picture of the flamed power strip in particular—that's the same one I use on this computer equipment, although I do have a "master switch" ahead of the strip.

You can bet I'm gonna look for a higher-quality surge suppressor ASAP! BTW, I use a Tripp-Lite Isobar IBR-12 rack-mountable unit for my radio gear.

Thanks for some excellent information!

(Editor's Note: This letter was typical of the many we received on the topic of surge suppression after our December article. Although when we cut/pasted this fellow's letter his name didn't make it, we appreciate his comments and the many others who weighed in on this topic!)

A Handshake From Harry

Dear Editor:

I want to thank you and the staff of *Popular Communications* magazine. You may not get many letters of thanks for producing a quality product month after month. So here goes, "Thanks a lot." I enjoy your feature articles, "The Loose Connection," and "Utility Radio Review." These columns are quite good. I also enjoy the many fine advertisers who let us know what is new in the marketplace. With that said, please consider this a testimonial letter of thanks from your readers.

Ever since I was 12 years old and started welding with a screwdriver in my quest to learn about electronics, I have looked for general assistance to fill the gaps of my knowledge of radio communications and electronics, and *Pop'Comm* fits the bill nicely. My first project was a Knight Kit that Allied Radio sold via their catalogue. Additionally, I assembled Lafayette Radio products with my nifty 20-watt soldering pencil and volt-ohm meter. Do these name brands sound familiar? All of this gave me hands-on training and a heads-up experience for later when I trained in communications in the armed forces.

Over the years I have pursued shortwave listening, antenna construction and tree branch destruction, public service monitoring, severe wire entanglement, CB, project building, and amateur radio.

I have seen your fine magazine in a secure vault at NSA where a SIGINT technician informed me unofficially that it was both a reference and a good read. Imagine that—the unintended consequence of your efforts is that *Pop'Comm* can serve to aid National Security!

But there's more: Your serious monthly "Homeland Security" column is quite timely and provides excellent practical knowledge on how to be responsible for one's own safety, security, and emergency preparedness. Keep up the good journalism; we can all learn from each other on how to beat terrorism!

In closing, please keep the fresh material coming. Travel safe, do good, avoid twisted pairs and loose connections.

Harry T. Rensel, KF4CFZ

Solution to Puzzle Corner on page 13

POPULAR COMMUNICATIONS
May 2004 Survey Questions

I'm a shortwave radio enthusiast and am interested in monitoring digital communications:

Yes 1
No 2
Sometimes 3
Besides my communications receiver, I don't know what I'd need to receive these transmissions 4

My favorite digital mode is:

PSK31 5
RTTY 6
FAX 7
GTOR 8
ALE 9
CW 10

I'm also a ham and regularly use digital modes:

Yes 11
No 12
Sometimes 13
I might if I knew more about them 14
Not interested at all; voice QSOs work for me 15
I don't have a computer in my shack 16

I'm interested in using digital communications with my radio, but need to see better instructional material:

Yes 17
No 18
Some articles help, but only scratch the surface of digital comms 19
I need more hands-on material 20

by Harold Ort, N2RLL, Editor

SteppIR BigIR Vertical Antenna

Last year I had the pleasure of putting together and using the SteppIR Two-Element *Yagi* antenna; the review of this outstanding antenna was in our February *Pop'Comm*. Nevertheless, it's *still* a Yagi and requires a considerable amount of real estate if you're going to use it as it's intended—fully rotatable and up high (at least 25 feet, which isn't always easy for everyone, myself included). In my particular situation, I couldn't rotate the antenna, so I kept it in a fixed North/South orientation.

Enter the SteppIR BigIR Vertical antenna. It's 32 feet tall, weighs 15 pounds, and can be ground mounted using a series of—you guessed it—radials, or mounted in an elevated location using a couple of quarter-wave radials for *each* band of operation. The antenna operates from 6.9 to 54 MHz, so doing the math, well, that's a whole lot of radials, although the SteppIR instruction manual also says it can be mounted "just a few feet from the ground (four feet for 20-meters; 8 feet for 40-meters) and get fairly good performance with just two radials." Of course then there's the problem of achieving a good match, so drooping the radials to about 50 degrees, if possible, certainly helps.

But I just wasn't in the frame of mind to deal with the additional mounting work and the highly visible radials. After all, many of us can have a stick in the air, but go adding a handful of radials has to pass muster with your family, neighbors, and in many cases, a landlord or tenant association. I opted for ground mounting and a few buried radials.

Before assembly familiarize yourself with all the parts and method of construction.

A Day Project

As with any antenna installation, planning is the most important part. Another half hour of thinking, writing down thoughts, and taking measurements is well worth the time and effort. Just ask the folks who didn't.

Frankly, I've found the SteppIR antennas as close to "perfect" as most amateur antennas can get. That's based on assembly time, ease of operation, efficiency, and quality of materials. That's the good news. The other side of the coin is that there is no perfect antenna and, moreover, no perfect location—at least for most of us!

The principle of operation is the same as for their two-element Yagi: A stepper motor moves a beryllium copper strip through the antenna element that you control with the easy-to-use small box in your shack. You hardly need the instructions to use the controller—just some common sense, 110 VAC, and a few seconds for band changes.

Putting the vertical together takes no more than an hour or so. Unpack the box, inventory the parts, read the manual, and think! The antenna includes a two-foot, three-quarter inch mounting tube. I fit the tube into a short flagpole-mount. I then dug an 18-inch square hole into which I poured some inexpensive cement. I used four, four-inch stainless steel bolts inserted into the wet cement to hold the mount securely to the ground, then placed the mount onto the bolts and let the cement completely set. If you choose this, or a similar mounting method, don't rely on your eyes to tell you if the ground mount is level—use a level. (Come on, if you don't have one, it's time to buy one, anyway!) If you simply "eyeball" it, guaranteed the antenna will tilt a little bit, perhaps too much!

Slip the guy ring over the tube prior to mounting the antenna.

While the cement is drying (I let it completely set for an extra day), you simply pull out the elements on the fiberglass pole.

The mounting pole inserted in the small flagpole base. Cement was also placed around the mounting pole.

All fiberglass pole joints are securely taped with the provided electrical tape, then covered with a special self-sealing tape. This photo shows the tip of the antenna being prepared for the vent cap.

Three sections of heavy-duty guy wire were used to keep the SteppIR BigIR antenna secure in high winds.

tape and seal the joints, cap and seal the tip of the pole, slide the guy ring onto an extension tube that fits snugly into the motor housing unit (guying even the ground-mounted antenna gives 80-mph wind survivability—more on that later), insert the 25-foot fiberglass pole into the extension tube, and you're ready to make the connections and the ground radials. Following the well-written instructions and planning your installation makes the SteppIR antenna installation a breeze.

I used three heavy-duty guy wires and turnbuckles to give the antenna the best possible wind survivability. Even though the stepper motor housing is only about a foot off the ground, it's still a 32-foot fiberglass pole piercing the sky. Remember Murphy's Law: The right wind gust at just the right angle at just the right moment and your antenna is history. So it's always best to do the most you can to ensure it'll be there for many years. This is also where you can use a helper.

I usually tape the loose ends of the guy wire to the lower portion of the antenna pole or mount so they're not flying around as I position the antenna. It's also a good idea to wear goggles. (You might look strange, but you'll look really bad with the end of the guy wire sticking into your eye!) Some folks use good quality outdoor rope, which is also invisible to your signal. Whatever you prefer will work—just be sure to guy the antenna. As an extra measure of stability I decided to fashion one of my old RadioShack antenna brackets to the side of the house using stainless steel nuts and bolts.

Just as easy is connecting your coax (not included) to the housing and routing it to your transceiver. As with the SteppIR Yagi, you'll also need to connect and route the gray control cable at the same time. Be sure to adequately tape and then weatherproof each connection. Water seeping into the box and your coax can wreak havoc if you're not careful! I used clear silicone goop, available at any hardware store.

Oh, Those Radials!

Ask 20 radio enthusiasts about ground radials and you'll get 20 different opinions. Fact is—and the SteppIR manual points this out—all vertical antennas need a counterpoise for the antenna to perform efficiently. I'm not interested in making a big project (or perhaps I should say an *unnecessarily* big project) when a modest radial system will do. Let's face it: most folks can't put down 50 ground radials or even bury 20 ground radials, so we compromise and do the best we can, given our particular situation. That's what I did.

The SteppIR antenna has a very convenient lug for attaching your ground radials. I connected one 10-gauge wire and a lug to the terminal and ran the short wire underground to a stainless steel plate into which I had drilled about 25 holes, thinking I'd probably be able to bury 25 wires. Yeah, right. I ended up with *10* radials buried about six to eight inches deep, each one connected to the buried plate. For me, fiddling around with the ground radials, digging the trenches, and all the rest took longer than putting the antenna together. Sure, I could have gone out and rented one of those yard gizmos and cut my digging time in half, but I needed to keep busy that weekend. I sure did!

The SteppIR manual is very candid about the pros and cons of ground mounting versus elevated mounting and the number and length of radials should you decide to ground-mount the antenna. Ground mounting was my choice because the radials can be "any length and they work on all frequencies," the anten-

A simple balun-type loop wound near the antenna's base might improve antenna efficiency. The small white garden fence serves no real purpose—unless it's there to make the area look more attractive to my wife, which is entirely possible. It also warns me when I get too close with the lawn mower and weed whacker.

na then has a lower profile, and "eight to 12 one-tenth wavelength radials give 60 to 65 percent efficiency." Again, that's the good news. The other side of the story is that it would take 120 radials to equal an elevated vertical with two resonant radials at 90 percent efficiency. The SteppIR folks also correctly tell us that "more radials equals higher efficiency," but "more short radials are generally better than a few long ones."

The bottom line in my installation is that those 10 radials are of varying length; the longest is about 18 feet long and the shortest about four feet. How does it work? Not bad, and again, all without the need for an antenna tuner.

Just like the SteppIR Yagi, the vertical can be used for general shortwave listening and DXing. The results were impressive! Using the controller you simply enter the general frequency mode and use the up/down arrows to tune in 100-kHz increments (it's 50 kHz in the amateur mode). You can also save up to six frequencies into memory. The frequency is clearly displayed on the controller's easy-to-read display window. Pushing the buttons simply tells the stepper motor to extend or retract the copper element into the fiberglass pole for optimum efficiency. It doesn't get any easier than that! Listening to aircraft on shortwave was a breeze, with signals coming in loud and clear. I experienced very little noise (something pretty common with verticals)—at least the signals I wanted to hear were well above the noise level.

The completed SteppIR BigIR Vertical is mounted and ready for action. The slightly modified RadioShack antenna bracket, visible at the bottom of the photo, gives the antenna additional stability.

On the amateur bands the results are different, and they're going to be different for each operator based on numerous factors from location, coax, radials, soil, nearby objects, and so on. My first contact on the vertical was with W8DBF on 20 meters who said my signal was very good and 5/7. His was equally readable. I also talked with Ben, YN4SU, in Nicaragua and Steve, KE9DA, in Illinois on 17 meters with no trouble. Phil, KB1IIT, on 40 meters was also an easy copy and we had a good QSO with no problems.

My best results with the SteppIR vertical were on 10, 12, 17, and 20 meters where my SWR averages about 1.5:1. It's 1.7:1 on 40 meters. I haven't used the antenna on 6-meters. Of course using the controller you can work with the antenna element to achieve better results. And I'm sure that if I didn't have guy wires, my SWR would be a little better.

The Bottom Line

I'm impressed with the SteppIR vertical, as I was with their two-element Yagi. It doesn't require a degree in antenna construction to build, everything you need is included (except, of course, guy wires and guying hardware, and the silicone goop to weatherproof the connections), and the materials are solid and easy to work with. I've had this antenna up since October and it's seen all kinds of weather. Just the other day the temperatures dropped to six degrees and the antenna's copper element had no problem zipping out and into the fiberglass pole. We also had winds in excess of 65 mph last fall and, while it swayed back and forth, it's still standing—and operating like the day it was installed!

If you'd like more information on this outstanding antenna, contact the SteppIR folks directly at SteppIR Antennas, Inc. 23831 SE Tiger Mt. Road, Issaquah, WA 98027 or call 425-391-1999. The SteppIR BigIR 32-foot vertical antenna is $529; a shorter vertical, the SmallIR is 18-feet tall and 13.8 to 54 MHz and costs $489. You can also visit SteppIR on the Web at www.steppir.com. Please tell them you read about it in *Popular Communications*. ■

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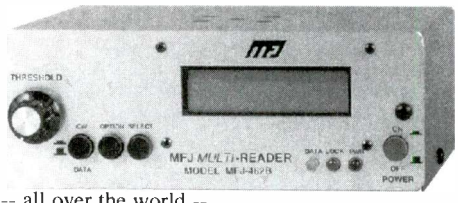

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"World Radio TV Handbook" says MFJ-1024 is a *"first-rate easy-to-operate active antenna ...quiet... excellent dynamic range... good gain... low noise... broad frequency coverage."*

Mount it outdoors away from electrical noise for maximum signal, minimum noise. Covers 50 KHz-30 MHz.

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Receives strong, clear signals from all over the world. 20 dB attenuator, gain control, ON LED. Switch two receivers and auxilary or active antenna. 6x3x5 inches. Remote has 54 inch whip, 50 feet coax. 3x2x4 inches. 12 VDC or 110 VAC with MFJ-1312, $14.95.

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Rival outside long wires with this *tuned* indoor active antenna. *"World Radio TV Handbook"* says MFJ-1020B is a *"fine value... fair price... best offering to date... performs very well indeed."*

Tuned circuitry minimizes intermod, improves selectivity, reduces noise outside tuned band. Use as a preselector with external antenna. Covers 0.3-30 MHz. Tune, Band, Gain, On/Off/Bypass Controls. Detachable telescoping whip. 5x2x6 in. Use 9 volt battery, 9-18 VDC or 110 VAC with MFJ-1312, $14.95.

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MFJ-1022 **$49.95**

Plug this *compact* MFJ all band active antenna into your receiver and you'll hear strong, clear signals from all over the world, 300 KHz-200 MHz including low, medium, shortwave and VHF bands.

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Eliminate power line noise!

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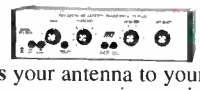
New! ***Completely*** eliminate power line noise, lightning crashes and interference *before they get into your receiver!* Works on all modes -- SSB, AM, CW, FM, data -- and on all shortwave bands. Plugs between main external antenna and receiver. Built-in active antenna picks up power line noise and cancels undesirable noise from main antenna. Also makes excellent active antenna.

MFJ Antenna Matcher

MFJ-959B **$99.95**

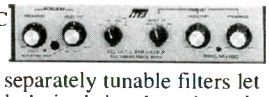


Matches your antenna to your receiver so you get maximum signal and minimum loss.

Preamp with gain control boosts weak stations 10 times. 20 dB attenuator prevents overload. Select 2 antennas and 2 receivers. 1.6-30 MHz. 9x2x6 in. Use 9-18 VDC or 110 VAC with MFJ-1312, $14.95.

Dual Tunable Audio Filter

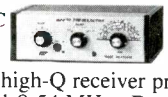
MFJ-752C **$99.95**



Two separately tunable filters let you peak desired signals and notch out interference at the same time. You can peak, notch, low or high pass signals to eliminate heterodynes and interference. Plugs between radio and speaker or phones. 10x2x6 in.

High-Gain Preselector

MFJ-1045C **$99.95**



High-gain, high-Q receiver preseletor covers 1.8-54 MHz. Boost weak signals 10 times with low noise dual gate MOSFET. Reject out-of-band signals and images with high-Q tuned circuits. Push buttons let you select 2 antennas and 2 receivers. Dual coax and phono connectors. Use 9-18 VDC or 110 VAC with MFJ-1312, $14.95.

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Use your computer and radio to receive and display brilliant full color FAX news photos and incredible WeFAX weather maps. Also RTTY, ASCII and Morse code. Frequency manager lists over 900 FAX stations. Auto picture saver.

Includes interface, easy-to-use menu driven software, cables, power supply, manual and *JumpStart*™ guide. Requires 286 or better computer with VGA monitor.

High-Q Passive Preselector

MFJ-956 **$49.95**

High-Q passive LC preselector boosts your favorite stations while rejecting images, intermod and phantom signals. 1.5-30 MHz. Preselector bypass and receiver grounded positions. Tiny 2x3x4 inches.

Super Passive Preselector

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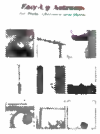
New! **Improves** any receiver! Suppresses strong out-of-band signals that cause intermod, blocking, cross modulation and phantom signals. Unique Hi-Q series tuned circuit adds super sharp front-end selectivity with excellent stopband attenuation and very low passband attenuation and very low passband loss. Air variable capacitor with vernier. 1.6-33 MHz.

Easy-Up Antennas



MFJ-38 **$16.95**

How to build and put up inexpensive, fully tested wire antennas using readily available parts that'll bring signals in like you've never heard before. Antennas from 100 KHz to 1000 MHz.

MFJ Antenna Switches

MFJ-1704 **$64.95**

MFJ-1702C **$24.95**

MFJ-1704 heavy duty antenna switch lets you select 4 antennas or ground them for static and lightning protection. Unused antennas automatically grounded. Replaceable lightning surge protection. Good to 500 MHz. 60 dB isolation at 30 MHz. **MFJ-1702C** for 2 antennas.

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world band tuning tips

your monthly international radio map

This listing is designed to help you hear more shortwave broadcasting stations. The list includes a variety of stations, including international broadcasters beaming programs to North America, others to other parts of the world, as well as local and regional shortwave stations. Many of the transmissions listed here are not in English. Your ability to receive these stations will depend on time of day, time of year, your geographic location, highly variable propagation conditions, and the receiving equipment used.

AA, FF, SS, GG, etc. are abbreviations for languages (Arabic, French, Spanish, German). Times given are in UTC, which is five hours ahead of EST, i.e. 0000 UTC equals 7 p.m. EST, 6 p.m. CST, 4 p.m. PST.

UTC	Freq.	Station/Country	Notes
0030	5019	Radio Horizonte, Peru	SS
0030	7325	Radio Vilnius, Lithuania	
0100	4052.5	Radio Verdad, Guatemala	SS
0100	6185	Radio Educacion, Mexico	SS
0100	7345	Radio Prague, Czech Rep.	
0100	11825	CPBS, China	CC
0100	9870	Radio Austria Int.	
0130	4965	Christian Voice, Zambia	
0130	11765	RAI Int., Italy, via Ascension Is.	II
0130	11745	Voz Cristiana, Chile	SS
0200	17875	Radio Japan/NHK	JJ
0200	17675	Radio New Zealand Int.	
0200	9765	Voice of Russia, via Vatican	
0200	9680	Radio Taiwan Int., via Florida	
0200	6180	Radio Nacional Amazonia, Brazil	PP
0200	11710	RAE, Argentina	
0200	4800	Radio Buenas Nuevas, Guatemala	SS
0230	11655	RDP Int., Portugal	PP
0230	3250	Radio Luz y Vida, Honduras	SS
0230	4991	Radio Apinte, Surinam	DD
0230	3255	BBC via South Africa	
0230	9570	Radio Budapest, Hungary	
0230	9635	Radio Nacional, Colombia	SS
0300	3325	Radio Maya, Guatemala	SS
0300	4845	Radio K'ekchi, Guatemala	SS
0300	11780	Egyptian Radio/Radio Cairo	
0300	4910	ZNBC/Radio Zambia	
0300	4810	XERTA, Mexico	SS
0300	11800	RAI Int., Italy	SS
0300	7285	Voice of Croatia	
0300	15375	Voz Cristiana, Chile	SS
0300	9400	Radio Bulgaria	
0300	7415	VOA Relay, Botswana	
0330	6175	Voice of Vietnam, via Canada	
0330	9705	Radio Mexico Int.	SS
0330	5026	Radio Uganda	vern
0330	9495	Radio Sweden, via Canada	
0330	9770	Channel Africa, South Africa	
0330	5055	Faro del Caribe, Costa Rica	SS
0400	3240	Radio Misiones Internacionales	SS
0400	4845	Radio Mauritanie, Mauritania	AA
0400	5905	Radio Ukraine Int.	
0400	9560	China Radio Int., via Canada	

UTC	Freq.	Station/Country	Notes
0400	5500	Voice of the Tigray Revolution	vern
0400	7100	Voice of the Broad Masses of Eritrea	vern
0400	4960	Radio Cima Cien, Dominican Republic	SS
0400	9820	Radio Havana Cuba	
0400	6985	Voice of New Sudan	unid
0430	6165	Radio Netherlands relay, Bonaire, NWI	
0430	6105	Radio Universidad, Costa Rica	SS
0500	4770	Radio Nigeria	
0500	5445	AFN/AFRTS, Florida	USB
0500	7210	Rdf. du Benin	FF
0500	9600	Magadan Radio, Russia	RR
0600	7125	RT Guineenne, Guinea	FF
0600	4915	GBC/Radio Ghana	
0600	4835	RTV Malienne, Mali	FF
0600	5985	RTV Congolaise, Congo Rep.	FF
0600	6235	Trans World Radio, via Albania	unid
0730	9975	Voice of Korea, North Korea	RR
0800	9820	Voice of Democratic Eritrea, via England	AA
0800	6160	CKZN, Newfoundland, Canada	
0830	9595	Radio Nekki (Tampa), Japan	JJ
0830	11565	Radio Rossii, Russia	RR
0900	7265	FEBC via Russia	unid
0900	9565	Radio Marti, USA	SS
0930	3290	GBC/Voice of Guyana	
0930	4825	Radio Educadora Braganca, Brazil	PP
1000	4875	La Cruz del Sur, Bolivia	SS
1000	4765	Radio Rural, Santarem, Brazil	PP
1030	4991	Radio Ancash, Peru	SS
1030	4955	Radio Cultural Amauta, Peru	SS
1030	4940	Radio Amazonas, Venezuela	Ss
1030	3280	La Voz del Napo, Ecuador	SS
1030	4919	Radio Quito, Ecuador	SS
1100	7305	Voice of Russia	CC
1100	5678	Radio Ilucan, Peru	SS
1100	7295	Radio Malaysia/Radio 4	
1100	12095	BBC, England	
1100	12020	Voice of Vietnam	VV
1100	9880	Radio Prague, Czech Rep.	GG
1100	4960	Radio Federacion, Ecuador	QQ
1100	4010	Radio Pueblo, Dominican Republic	SS
1100	9680	Radio Republik Indonesia	II

UTC	Freq.	Station/Country	Notes
1115	4774	Radio Centinela del Sur, Ecuador	SS
1130	9650	Radio Korea Int., South Korea, via Canada	
1130	9600	Radio Rebelde, Cuba	SS
1130	9810	CPBS, China	CC
1130	2310	ABC NT Service, Australia	
1200	4790	Radio Republik Indonesia, Fak Fak	II
1200	6130	Lao National Radio, Laos	Laotian
1200	9690	Voice of Greece	Greek
1200	4890	NBC, Papua New Guinea	
1200	11805	Radio Thailand	Thai
1200	5020	SIBC, Solomon Islands	BBC pgms
1200	5040	Radio Myanmar (Burma)	Burmese
1200	4925	RRI, Indonesia	II
1200	11820	Radio Polonia, Poland	
1230	6250	Radio Pyongyang, North Korea	KK
1230	11510	Radio Free Asia via Kazakhstan	unid
1230	7235	VOA Relay, Tinian, No. Marianas	KK
1300	11905	SLBC, Sri Lanka	unid
1300	9870	Radio New Zealand Int.	
1300	7160	Radio Thailand	JJ
1300	7210	Voice of Vietnam	VV
1330	11950	VOIRI, Iran	Farsi
1330	11530	Denge Mesopotamia	
1330	11570	Radio Pakistan	unid
1330	11890	Radio Japan/NHK, via Sri Lanka	
1400	15275	Adventist World Radio, Guam	unid
1400	9405	FEBC Int., Philippines	CC
1400	9335	Voice of Korea, North Korea	FF
1400	9965	KHBN, Palau	CC
1400	15385	Adventist World Radio via Abu Dhabi, UAE	unid
1400	9715	Radio Tashkent, Uzbekistan	Urdu
1400	12070	Radio Netherlands via Uzbekistan	
1400	15205	VOA Relay, Greece	
1400	10330	All India Radio	Hindi
1400	9740	BBC Relay, Singapore	
1400	15555	BBC Relay, Cyprus	AA
1400	15700	Radio Bulgaria	unid
1400	9515	Radio Canada Int.	
1400	11650	Radio Australia	
1400	7355	KNLS, Alaska	CC
1430	17505	Radio Sweden	
1430	21610	Radio Exterior de Espana	SS
1430	12080	Adventist World Radio, via South Africa	
1500	5764	AFN/AFRTS, Guam	USB
1500	12080	Radio Netherlands Relay, Madagascar	
1500	15530	Sudan Radio Service, via England	
1530	21810	RDP Int., Portugal	PP
1530	17870	Radio Rhino Int. Africa, via Germany	
1530	9820	Voice of Oromo Liberation, via Germany	unid
1530	9435	Radio Farda, via Greece	Farsi
1600	9720	RT Tunisienne, Tunisia	AA
1600	15220	Radio Jamahiriya, Libya, via France	AA
1600	17850	Radio France Int.	
1600	17865	Radio Austria Int., via Canada	
1630	15555	Swiss Radio Int.	II
1700	15395	UAE Radio, Dubai	AA
1700	15315	BSKSA, Saudi Arabia	AA
1700	11655	Radio Netherlands	DD
1700	15475	Africa No. One, Gabon	FF
1800	11734	Radio Tanzania-Zanzibar	Swahili
1800	17870	Channel Africa, South Africa	
1800	11825	Radio Sawa, via Sri Lanka	AA
1830	15355	Radio Oman	AA
1900	9780	Republic of Yemen Radio	AA
1900	12005	RT Tunisienne, Tunisia	AA
1900	12015	VOA Relay, Thailand	
1900	15345	RTV Marocaine, Morocco	AA/SS
1930	9960	Voice of Armenia	unid
2000	9830	Radio Jordan	AA
2000	17800	Voice of Nigeria	
2000	17735	Deutsche Welle relay, Rwanda	PP
2000	17705	Voice of Greece, via California	Greek
2000	12085	Radio Damascus, Syria	
2030	12005	UAE Radio, Dubai	AA
2030	11630	Voice of Russia	PP
2030	11605	Kol Israel	FF
2030	15295	Adventist World Radio, via South Africa	
2030	15240	VOA Relay, Morocco	
2030	11760	Radio Havana Cuba	
2100	15110	Radio Exterior de Espana, Spain	SS
2100	9880	Radio Kuwait	AA
2130	11945	Deutsche Welle Relay, Rwanda	GG
2130	11855	Radio Japan/NHK, via Ascension Is.	JJ
2130	12065	VOA via Russia	
2130	17825	Radio Japan/NHK	
2130	11975	VOA Relay, Sao Time	
2130	9530	Radio Sawa, via England	AA
2130	9990	Egyptian Radio/Radio Cairo	
2200	11730	Radio Vlaanderen Int., Belgium, via Bonaire	
2200	9600	Vatican Radio	CC
2200	9445	All India Radio	
2200	12130	Trans World Radio, Guam	CC
2200	9560	Voice of Turkey	TT
2200	15140	HCJB, Ecuador	SS
2200	9615	Radio Cultura Sao Paulo, Brazil	PP
2200	15345	RAE, Argentina	SS
2215	9760	Cyprus Broadcasting Corp.	Greek
2230	7250	Radio Romania Int.	
2230	9885	Swiss Radio Int.	GG
2230	9935	Radio Makedonia, Greece	Greek
2230	9825	Radio Budapest, Hungary	HH
2230	6085	Bayerischer Rundfunk, Germany	GG
2230	9580	Africa No. One, Gabon	FF
2230	9875	Radio Vilnius, Lithuania	Lithuanian
2230	21740	Radio Australia	
2230	11690	Scandinavian Weekend Radio, Finland	irr
0600	4835	RTV Malienne, Mali	FF
2300	17835	Radio Imperial, El Salvador	SS
2300	11725	Radio Cairo, Egypt	
2300	15240	Radio Australia, via Taiwan	
2330	9655	Voice of Turkey	
2330	11660	Swiss Radio Int., via French Guiana	
2330	15575	Radio Korea Int., South Korea	unid
2330	9575	Radio Medi Un, Morocco	FF/AA
2330	15820	La Red, Argentina	USB; irr.

power up: radios & high-tech gear

by Harold Ort, N2RLL

review of new, interesting, and useful communications products

B+K Precision's New Dual Display Auto Ranging LCR Meter

B+K's new Model 879 auto ranging LCR meter is a lightweight, battery powered, handheld unit that can be used to measure capacitance, resistance (of non-inductive components) and inductance in four test frequency ranges. Priced at $295 it includes the following features: simultaneous display of measured value and Q or dissipation factor, min/max average, relative mode, tolerance test, four selectable test frequency ranges (100Hz, 120Hz, 1kHz, and 10kHz), backlit LCD and RS-232 interface.

B+K Precision's new auto ranging LCR Meter (Model 879) is loaded with features and costs $295.

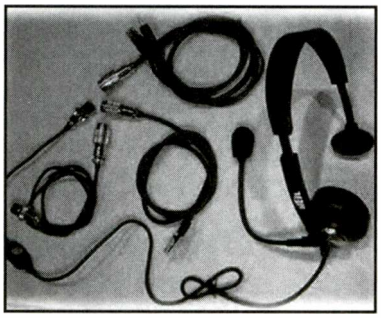
The Model 879 is a microprocessor-controlled unit and is easy to operate. It takes makes measurements in parallel mode, but is also capable of series mode measurements. The full convenient front panel pushbuttons and controls include selections such as Data Hold, Maximum, Minimum, and Average Record Mode, Relative Mode, Tolerance Sorting mode, Frequency, and L/C/R selection. The instrument also prompts the user when calibration is needed. Test data can be transferred to a PC through an optional fully isolated optical RS-232C interface.

A tilt stand provides position flexibility for viewing and operating the meter. The over-molding rubber case provides protection for both the user and the meter. A standard 9 Vdc battery provides power for the meter.

The new B+K Precision Model 879 Dual Display LCR Meter comes complete with instruction manual, 9 Vdc battery, test alligator clips (pair) and is available for immediate delivery. For more information and the name of an authorized distributor near you contact B+K Precision Corporation, 22820 Savi Ranch Parkway, Yorba Linda, CA 92887 or phone 714-921-9095 or visit them on the Web at www.bkprecision.com.

Heil Sound Ltd.'s Traveler Headset System

Heil Sound Ltd., with 20 years of service to the amateur radio community, makers of the famous Goldline microphones, has a product that's just right for Pop'Comm readers; the Traveler. It's a new and unique single headset system that features up/down and PTT in-line switches, a high-performance Heil "iC" electret element, various three-foot interface cables allow use on virtually any transceiver – and some HTs.

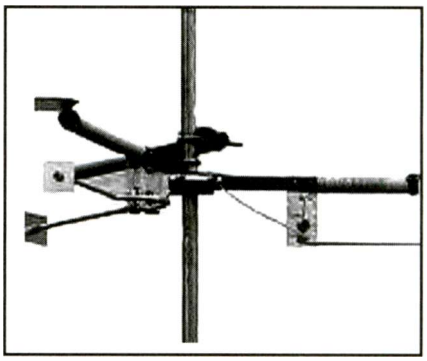


Heil Sound Ltd.'s Traveler single headset boom system is perfect for mobile or portable operation.

This sturdy, yet lightweight mobile use headset can use either the left or right boom position! Priced at $xxx, the Traveler by Heil Sound Ltd. is available by calling the company at 618-257-3000 or visiting them on the Web at www.heilsound.com. Be sure to tell them you read about the Traveler in Pop'Comm.

Isotron's New Triband HF Antenna

It's only 32 inches across and covers 20, 15 and 10 meters! This interesting combination HF antenna is fed with a single feedline and mounts on a single pole. You'll typically achieve an SWR of 2:1 or less on 20 and 15 meters and on any 1 MHz portion of 10 meters.



The new Isotron Triband HF antenna is $198.95 (plus shipping). Could it be the solution for your antenna requirements?

You don't need a motor to change frequencies, and there are no radials. More information on the new Isotron Triband HF antenna that sells for $198.95 (plus shipping) can be found at www.isotronantennas.com, or contact the Bilal Company at 137 Manchester Drive, Florissant, CO 80816, or phone 719-687-0650. As we always ask – please tell them you read about it in *Popular Communications!*

New Cobra microTALK® GMRS/FRS Radios

The 2004 microTALK® line from Cobra Electronics is the industry's first complete line of extended communication range radios. The radios provide the longest range in the GMRS/FRS category with the features and high-tech, contemporary design consumers demand.

Cobra says, It's the "first complete line of GMRS/FRS two-way radios in the industry, giving consumers the most choices with ranges up to 3, 6, 8 and 10 miles." Features include:

- VOX hands-free operation enables the radio to recognize when a person is speaking and automatically begin transmitting, freeing hands for other tasks.

- Patented VibrAlert® provides a silent alert for incoming calls.

- 10-Channel Memory allows users to program up to 10 channel or channel/privacy code combinations for instant retrieval.

- NOAA All Hazards Alert Radio warns of weather, chemical and other civilian emergencies.

Cobra's new PR 4250-WX (value pack MSRP $59.95) two-way radio provides up to three watts and features 22 channels with 38 privacy codes. The news release says, it's "Packed with unique features for the serious radio user, including integrated 8-point digital compass, clock/alarm/stopwatch and NOAA All Hazards Alert Radio. Other premium features include VOX for hands-free operation, VibrAlert silent paging along with a 10 channel memory and switchable power output to preserve battery life.

The new Cobra 3100-2 DX heldheld features switchable power output to conserve battery life.

The new 3100-2 DX (two-pack MSRP $69.95, value pack MSRP $79.95) features eight-mile range radio features 22 channels with 38 privacy codes for uninterrupted communication. The PR 3100-2 DX includes VOX for hands-free operation, VibrAlert silent paging along with a 10 channel memory and switchable power output to conserve battery life.

Cobra's new PR 245-2 (two-pack MSRP $49.95, value pack MSRP $59.95) six-mile range radio features 22 channels with 38 privacy codes with scan feature to quickly locate conversations and five selectable call alerts. Proprietary battery saving circuitry automatically switches to battery saver mode if no transmissions are made within 10 seconds.

The PR 145-2 (two-pack MSRP $29.95, value pack MSRP $49.95) offers three-mile range radio and features 22 channels for uninterrupted communication. The ultra compact design makes this entry-level unit perfect for small hands and quick storage, while not sacrificing performance.

Cobra Electronics Corporation is a leading global manufacturer of innovative mobile communication, marine and GPS products for consumers, having attained a leadership position in the GMRS/FRS, citizens band radio and radar detector markets. Recognizing new opportunities for growth, Cobra has introduced a new line of handheld GPS units, mobile navigation systems, as well as a marine product line. Cobra, twice ranked by *Forbes Magazine* as one of the 200 Best Small Companies, has a track record of designing innovative and award-winning products. To learn more about Cobra Electronics, please visit www.cobra.com. And for more information about these and other Cobra Electronics products, you can also call the company at 773-889-3087. ■

Editor's Note: *It's important to remember that unlike using FRS radios, you need a license to operate GMRS transceivers. Manufacturers note this fact on the packaging and instructions packed with each radio, but all too often it's not very prominent on the package itself. General consumers are likely to forego the simple $75 fee to the FCC (for a five year family license), but what they might not realize is that operating a radio transmitter without proper authorization carries large monetary penalties. Do the right thing and get licensed by visiting www.fcc.gov/formpage.html or call 1-888-CALL-FCC. For excellent easily understood information about GMRS and other personal radio services including MURS (Multi-Use Radio Service) visit the Personal Radio Steering Group at http://www.provide.net/~prsg/.*

computer-assisted radio monitoring

by Joe Cooper, joe@provcomm.net

Digital Control—Part III

Over the past two columns I've been taking an in-depth look at Ten-Tec's RX-320/D HF communications radio. The reason for doing this is that it is a true "Black Box" radio, having no external controls other than an on-off switch.

To operate the radio you need to hook it up to a personal computer via a serial cable and then run a software program designed to control it. As a result many of the characteristics of the RX-320/D come to be defined by the software you use. So while certain performance functions, such as sensitivity, selectivity, and frequency coverage, remain constant for all software, the final design of the software can make a big difference in how effectively the functions and features of the radio can be used.

I've talked about this in the past, when I've looked at different software control packages for the RX-320/D and other computer-controlled radios. Ten-Tec's corporate philosophy of providing as much technical information as possible to the public about the RX-320/D has encouraged a significant amount of third party (both amateur and commercial) development of control software.

It's interesting to see how an individual programmer, faced with the task of controlling the RX-320/D, comes up with an entirely unique approach. Yet within this diversity there are still some common design philosophies. For instance, one school of software design tries to emulate the look and feel of a conventional radio. When you run their programs you see a graphic representation of a radio with a conventional knob and dial layout that is not that much different from a radio from the 1980s or 90s. The reasoning behind this approach is that by providing knobs and dials under glass, so to speak, the average person will feel more at home using the software. The argument goes that by providing users with a "virtual radio," they can leverage their conventional knowledge of radio operation to run the computer software.

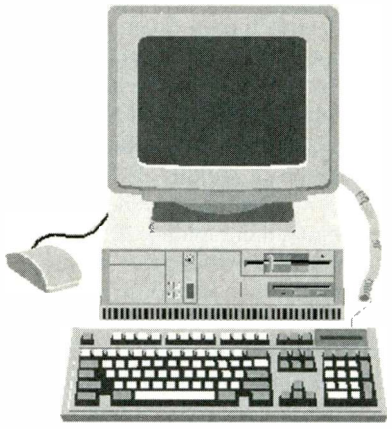
This approach has some merit, as today's computer operating systems support high-speed graphics that allow the virtual replication of a "radio under glass." However, other than the novelty of representing a radio as a computer graphic in a software program, why try to emulate old radio technology in a new computer technology environment? This has led some software developers to reject the "radio under glass" approach and undertake some new design goals. So what you'll see in some of the newer control software are features like displaying functions in different windows, gathering information from the Internet (such as real-time propagation reports), and unique ways of displaying information in way that don't look anything like a conventional radio.

If the person using a control software package developed by either school of thought is able to use their monitoring radio successfully, then that software package was successfully designed, in my opinion. However, what does concern me is that users have grown dependent on professional and advanced amateur software programmers to provide the programs in the first place.

Now I'm not expecting everyone to run out and take programming courses just so that they can write their own software control programs for their monitoring radios. However, what I do think is important is that people develop a better understanding of what actually happens when you click on a button icon or use a feature in a software program and something takes place in your radio.

RX320/D Programming Overview

As I outlined last month, the RX320/D is made up of two circuit boards (RF and DSP) and a surprisingly small number of IC chips. The primary IC chip is Analog Devices' ADSP-2101, which is essentially a small computer as it comes with its own CPU and is controlled by a semi-permanent software program stored on a memory chip called an EPROM (Erasable Programmable Read Only Memory).

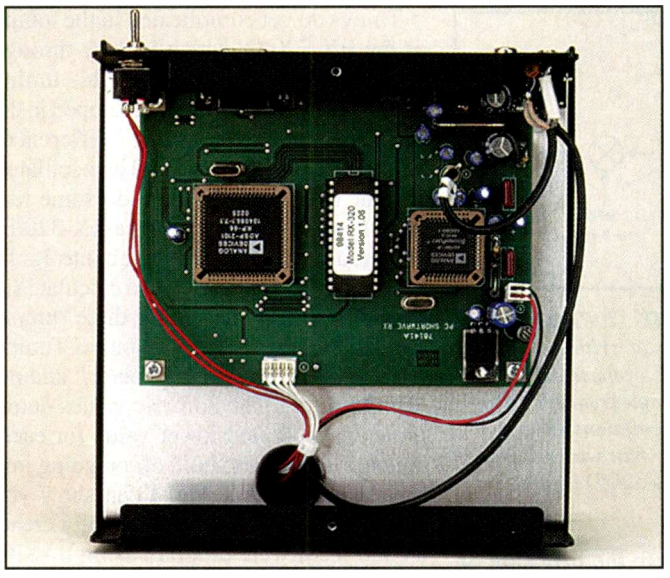


When you turn on the RX320/D, it "boots up" just like your personal computer, performing a number of programmed tasks. It's these programmed tasks that make today's computer-based monitoring radios "dynamic" devices.

The original analog radio, available up to the 1970s, was simply a passive device that tuned and amplified a radio signal picked up on its antenna. If the sound coming out of the speaker was too low, you had to turn a knob to change it. If it was too harsh, you had to "tweak" several knobs and dials for better listening.

However, today's DSP-based radio constantly processes the RF, AF, and digital information that flow through them. By this I mean that the radio's internal CPUs are constantly running a semi-permanent software program that's separate from the control software in your CPU that's tasked with monitoring the radio's RF and audio signals. As it monitors, it performs its own form of "tweaking" on those signals to ensure that you hear them at their best quality. Still, while today's radio does an amazing amount of work for you, you still need to "tell" the radio how to perform certain functions.

That's where the control software in your PC comes into play. Once the radio's computer is processing signals, it needs the control program to "tell" it what additional tasks must be performed. Those tasks generally involve the operation of practical functions, such as setting the sound volume, tuning a frequency, and selecting the mode of the signal (AM,



Here's what this month's column is all about—that big IC chip on the far left. That's an ADSP -2101, which is a computer on a chip. The rectangular chip to the right of it is an EPROM, which contains the firmware used to operate the computer in the ADSP-2101. In the column I outline how the firmware works with the CPU in the IC to define radio functions using computer algorithms, rather than discrete parts. (Photo Courtesy of Ten-Tec)

SSB, or CW, for example). Without such commands the radio just sits there and process the signal it has defaulted to.

This month we're going to look at the commands used to control the RX320/D and how the control software in your PC generates them. I'll then look at how they get from your PC to the radio and how the ADSP-2101 computer chip uses them. This may sound complicated, but it's actually rather easy—so easy, in fact, that in next month's column I'll show you how to create a simple program in the BASIC programming language to control the RX320/D. More important, I'll introduce you to an easy-to-use BASIC compiler you can download for free from the Internet. This will allow you to create your own software programs for Microsoft Windows that will operate the RX320/D.

But first, let's take a more detailed look at exactly what takes place within the RX320/D so you can understand why it needs a PC attached to it.

The RX320/D—A Computer Or A Radio?

As mentioned before, the heart of the RX320/D is the ADSP-2101 integrated chip, which is essentially a small computer. The chip by itself has nothing to do with being a radio—that is until it's programmed to be one.

Stored on an EPROM chip that sits beside the ADSP-2101 IC is the actual software program that defines how the IC will process the digital information that passes through it. Essentially, the software instructs the IC to process the incoming signal it received from the RX320/D's RF board.

Because that software program cannot be changed easily, it's called "firmware." The only way to change the RX320/D's firmware is to physically remove the EPROM and replace it with another one with a new or updated version of the original programming code. Thanks to new technology, however, this is beginning to change. If you purchase the next version up from the RX320/D (the RX-350) you'll be able to download new versions of the firmware from the Internet and then transfer that new programming code directly from your computer over to the radio via its serial cable connection. In this way you can continuously update the operation of your radio without having to buy a new one. Likewise, those who manufacture programmable radios can continue to offer their customer's improvements and enhancements as an on-going service.

Again, the most important concept to understand when working with the new generation of radios is that their coils, capacitors, and other hardware parts no longer define what that they are, as was the case with analog radios. Rather, it is the skill of the software engineer who creates the firmware stored in the EPROM that defines today's radios.

The first thing that happens when you turn on the power to start the RX320/D is that the CPU on the ADSP-2101 IC checks a built-in EPROM to tell it what to do. The firmware on that EPROM tells the chip to first check to make sure it is working properly, and then check the main EPROM for any instructions. It then starts to run the instructions placed there by the Ten-Tec software engineer. These instructions basically say to process the signal passing through the IC in a particular way.

Specifically, the firmware programming defines the following:

Mode (AM, SSB, CW)
Frequency
BFO
Audio Filter
AGC Control
Line-in Level
Speaker Output level
Signal Strength

There are additional features, such as being able to turn the radio on and off (from an operation standpoint, rather than controlling its power) and being able to display what version the firmware is on the computer attached to the radio.

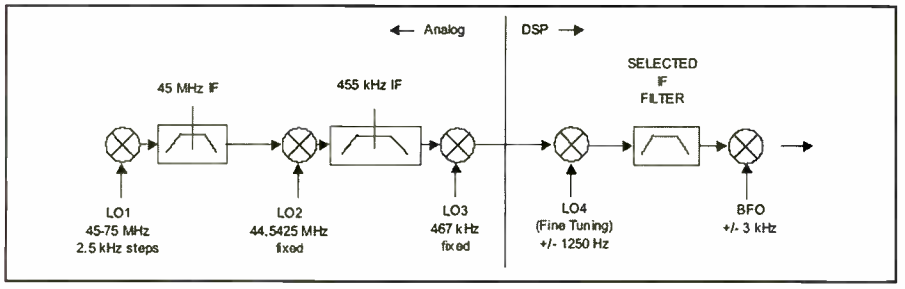
It's important to remember that what's passing through the ADSP-2101 is not an analog signal, such as you would find in a conventional analog radio. Rather, it is a digital sample of the signal that the IC has received from the RX320/D's RF circuit board.

Mechanical devices no longer perform all of the functions described above. These have been turned into mathematical equivalents that are performed in the ADSP-2101 CPU. For example, the audio filtering is no longer accomplished through coils, capacitors, or crystals. Instead, the original digital signal is sampled according to a mathematical algorithm that results in an output that's the equivalent of a mechanical filter, only better because the algorithm provides precise control over the process. As a result the cut-off range of frequencies is sharper and the dynamic range is higher than is generally possible with a mechanical filter, unless it is made to extremely high tolerances.

So that leads us to the next point, which is what role do *you* play in using this type of radio? It's sitting there running its firmware program and merrily processing the signal without your assistance. Or is that actually the case? Yes, the ADSP-2101, using its firmware program, is providing you with the best possible processing of the signal. However, you're still needed to define for the IC what parameters it will use to do that processing. That information is not stored in the radio in any way, which is why it needs to be connected to a PC to receive it.

RX-320/D Command Set

So, the RX-320/D has its job defined for it by the firmware attached to the ADSP-2101. The CPU in the IC reads the



This is a schematic of the PLL (Phased Locked Loop) tuning used in the RX-320/D. We'll look at this in more detail next month when I introduce you to the ins and outs of writing a control program in BASIC. The important point to understand here is that each of these oscillators needs to be supplied with a specific tuning factor in order to process a single frequency properly. Next month I'll introduce you to the formulas used to make those calculations, along with some history and background on PLL tuning, a technique, by the way, that was originally developed and used in 1933. So don't think that everything about the RX-320/D is futuristic.

instructions and then processes the signal it receives from the RF board. However, to do that properly, it needs a set of instructions "telling" the CPU at what level or in which way the processing is to take place. This is accomplished through what's known as a "Command Set" of instructions.

These commands are created by the control software you run in your personal computer and are sent to the RX-320/D via the serial cable you connect between the PC and the radio. One of the main features of the ADSP-2101 is that has a built-in modem capable of receiving and sending serial data back and forth between itself and the PC it's connected to.

As there are only seven functions (Mode, Frequency, BFO, Audio Filter, AGC Control, Line-in Level, and Speaker Output level) there are only seven commands. The commands themselves are very simple, being the combination of an alphabetic letter and a number. What gets a little bit trickier is that the letter of the alphabet is represented in what is known as ASCII code, and the number is represented in Hexadecimal code. I'm not going to get into that right now (I'll cover it in full next month), but trust me, it's not that difficult.

To give you an example of one of the command set, let's look at setting of the "Mode" of the radio. The format looks like this:

"M" mc <cr>

The "M" stands for Mode, mc is one possible detection mode, and the <cr> stands for carriage return, which is the equivalent of pressing the Enter button on your keyboard.

To actually set the mode, you have to look at your options. There are four modes programmed into the firmware of the ADSP-2101: AM, USB, LSB, and CW, simply defined as 0, 1, 2, and 3. To set the radio into USB mode, the control software in your PC sends the command "M" 1 <cr>. This information is given to the CPU, which then starts to process the signal in that mode. If you then send the command "M" 3 <cr> the CPU switches to the CW mode. It's as simple as that.

The remaining commands are much the same—the only difference being the amount of numbers are used to set a value. For example, there are 34 bandwidths available in the filter mode, which uses the numbers 0 to 33 to set each one. Likewise there are 64 levels of volume for either the line-in or the speaker output, represented by the numbers 0 to 63.

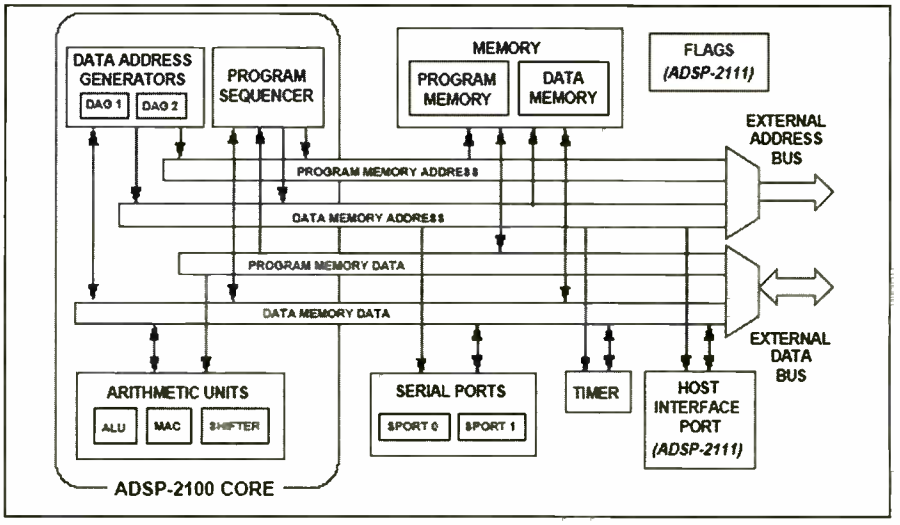
Things do get complicated in the tuning of the RX-320/D, which is done through Phase Locked Loop (PLL). This tuning technique, which was first developed in the early 1930s, uses phase differences between the input signal and an oscillator.

Your PC actually gets to do some real work here when it is tuning the RX-320/D. To tune a single frequency, the control software in your computer has to calculate six numeric values to determine three "tuning factors." These are the "Coarse Tuning Factor," the "Fine Tuning Factor," and the "BFO Factor." The numeric values determine an upper and lower value for each. Again, I'm going to hold off on going into great detail on this until I can show you how it's applied when you actually create a control software program using BASIC.

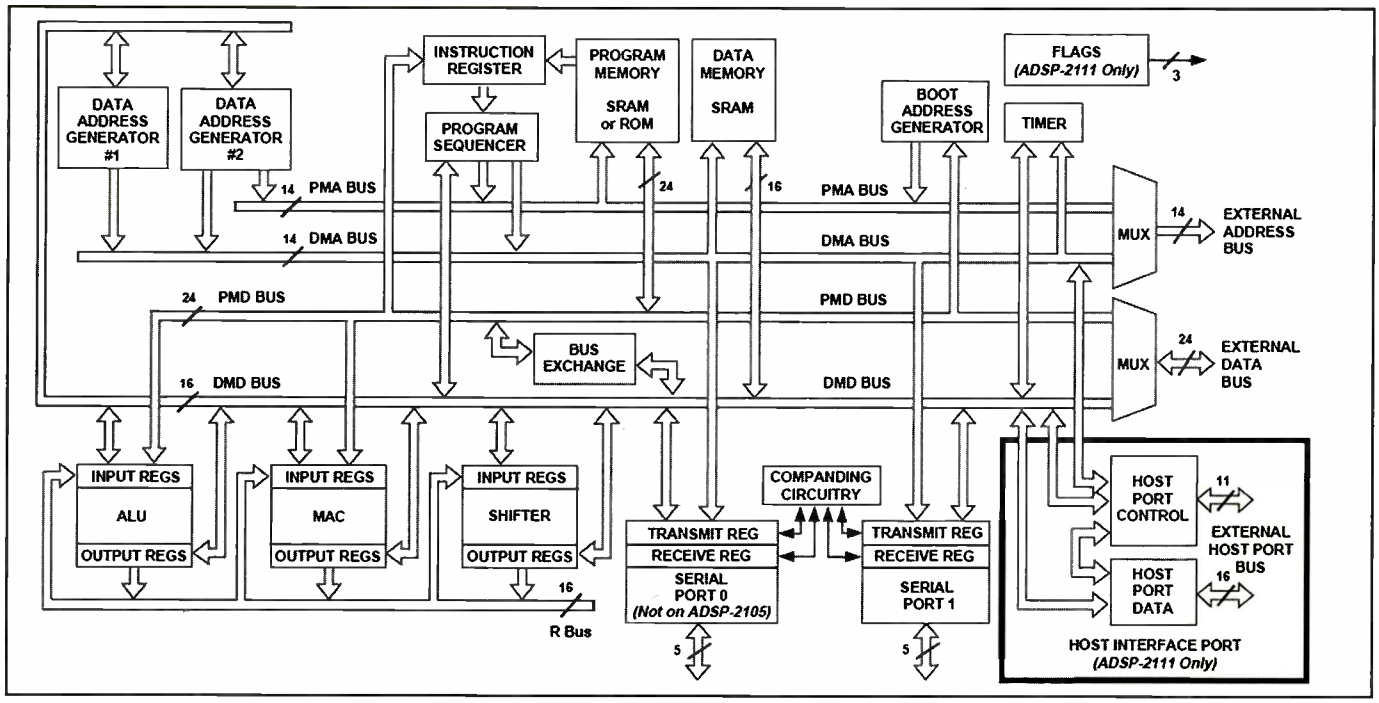
A Recap

At this point you should now understand that RX-320D is essentially a dedicated computer attached to an RF board for tuning HF radio frequencies and a serial port modem that can receive command codes from your computer.

When you flip the power switch to "on" it turns on the computer contained on the ADSP-2101 IC chip, which then runs a built-in program called firmware. That program tells the CPU on the chip to run another firmware program written by a software engineer at Ten-Tec, which in turn tells the ADSP-2101 chip to start processing signals it gets from the RF board.



This is a very basic diagram of the internal structure of the ADSP-2101. The block on the left that is defined as "Core" is the CPU. The Memory shows the program memory, which is built into the IC, and the Data Memory, which is the EPROM containing the firmware. The IC supports two serial ports, but only one is used with the RX-320/D, which is where the command codes are delivered from the control software running on your personal computer. (Diagram courtesy of Analog Devices)



Now, this is starting to get a bit scary looking. The three boxes on the bottom labeled ALU, MAC, and Shifter are the key components of the CPU, which is the area where the firmware instructions are processed. The Data Address generators in the upper left are used to move data in and out of the CPU. Don't worry too much about this right now if it does not make much sense. (Courtesy of Analog Devices)

The control software program running on your personal computer then tells the CPU exactly how to process the signal through the use of a set of command codes, which are sent to the RX-320/D via a serial cable hooked between the PC and the radio. The ADSP-2101 is able to use this information because it contains a small modem that can control the flow of serial information back and forth.

Once the ADSP-2101 has finished processing the digital information, it is converted back to an analog audio signal that is then sent off to the loud speaker or headphones attached to the RX-320/D. As you change the setting on the control software in your computer, new numeric values representing those changes are sent over the serial cable to the ADSP-2101, which then adjusts the signal processing to the new values you want.

If you don't change the settings on the control software, the ADSP-2101's CPU continues to monitor the signal passing through it to process it in the best possible way. So, while the RX-320/D may appear to be sitting there doing nothing, there's actually a significant amount of activity going on within its chips and circuits.

It is a shame that with IC chip technology we've lost some of the drama and mystery of the analog radio, where tubes glowed and mechanical devices turned and moved. However, now that I have explained in part what actually takes place in a modern radio I hope that you can better appreciate exactly what's taking place once you turn it on.

Frankly, I think once you understand the new technology that you can still participate in creating new devices to control your radio, you will re-discover the same drama and excitement that motivated people to pick up a soldering iron and wire together an analog set. Again, trust me, it's really not that difficult if you just take a moment to plan and work out what you want to accomplish.

Next Month

As we'll see next month, there's also significant activity taking place in your PC to ensure that the ADSP-2101's CPU gets the correct command codes and tuning factors to run your RX-320/D properly. I'll show you how a software program written in BASIC gets those codes from your computer into the RX-320/D. We'll look at an easy-to-use (and better yet, free) BASIC compiler you can download from the Internet.

Again, I can't guarantee that you'll become a computer programmer overnight simply by reading the column, but I will provide you with an understanding and appreciation of what takes place when you use a control software program written by either a professional or amateur software developer.

More important, by understanding what takes place within the RX-320/D at this level of programming, you'll be better prepared when I begin to look at how you can communicate with the radio over the Internet. There really isn't that much difference between understanding communications using a serial cable and a network card.

If you wish to e-mail me with any questions, please use carm_popcomm@hotmail.com. As mentioned before, I cannot answer general questions on computers, but will be more than happy to help you with any issues raised in the columns. Likewise, you can write to me at "Computer Assisted Radio Monitoring," PMB 121, 1623 Military Rd., Niagara Falls NY 14304-1745.

I'm interested in receiving any pictures you may have of your own computer-assisted monitoring station or stories about how you have built and run it. Don't worry about your writing, as I'm more than happy to help you.

And again, please take time to write a letter to one of our service people in Iraq offering them your thanks and support. Remember that you can send letters of general thanks and support by simply marking the envelope "Any Service Person—Iraq." It may take several months to get to someone, but I'm certain that it would make the day of whoever receives it. ■

ScanTech

by Ken Reiss, radioken@earthlink.net

strategies and techniques to keep YOU informed

Tones—Passwords For Radios

We get a lot of questions here at "ScanTech," and it always amazes me how they seem to come in waves. The most recent identifiable trend has been related to tones and tone squelch. It's been some time since we discussed this, so I thought the column might be the best place to address all of the questions in a group. My apologies if you didn't get a direct response to your letter or e-mail.

Tone squelch is used in commercial two-way radio systems to help control interference in congested areas. Essentially, the tone acts like a password for the receiver. In a traditional system, the receiver simply waits until it senses a radio signal and then opens the squelch and amplifies the signal, regardless of what that signal is. It might be a signal you're interested in, like your dispatcher or one of the cars calling back, but it could just as easily be noise produced from some outside source, or it could be a transmitter that's close to your frequency, but not quite on channel. If it's strong enough, or close enough to your receiver, you're going to hear it. Of course, you can turn the squelch level up, to a point. Eventually you'll squelch out the things you *want* to hear, too.

CTCSS, or Continuous Tone Coded Squelch System, is sometimes known by the trade names of Private Line (Motorola) and Channel Guard (GE). Other important acronyms are DCS (Digital Code Squelch) and DPL (Digital Private Line). Many public safety systems use these, and they are becoming much more common for hams and other two-way radio systems. If you've looked at FRS radios or MURS radios, some of them come with a "Privacy Code." That's probably a CTCSS subaudible tone.

With CTCSS, the receiver doesn't use the carrier level at all. It's looking for the correct tone—a low-level (below the level of our hearing, for most of us) signal that acts like a "password" and says to the receiver "this signal is for you." Any interfering signal or even other users on the same frequency who don't have the password won't get through. The tone is filtered from the audio that comes out of the speaker, so there's not much chance of hearing anything.

The interference of a signal a few kHz away won't have the right tone. Or even if it has the tone, it will be distorted enough that it won't be recognized. So the receiver stays squelched even in the presence of very strong signals without the correct tone. Pretty cool.

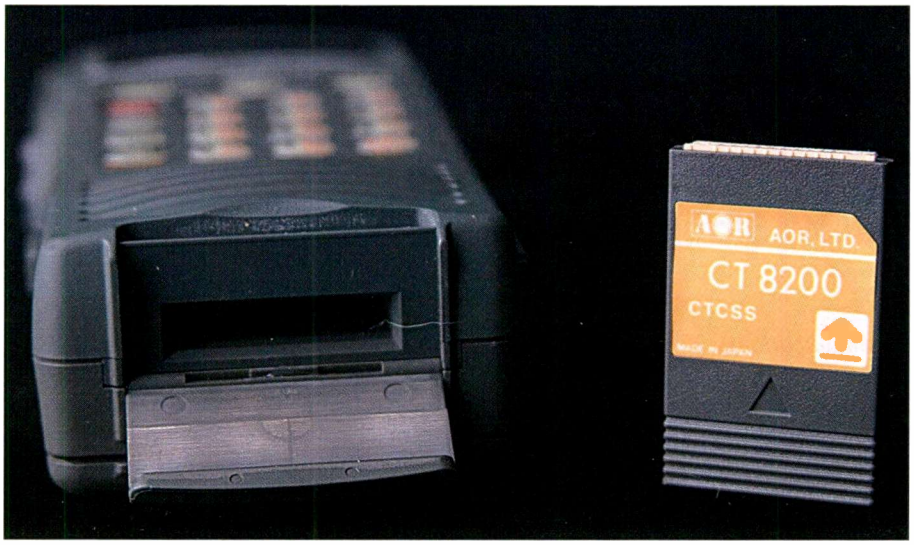
Most, but not all, two-way systems in the VHF range use one of the two systems, and many on UHF do as well. Trunked systems have a control channel and another type of password system used to help them control interference.

How It Works For You

So what do we care as scanner listeners? Well, there are two things we can do with CTCSS or DCS information. One is that we can use it just like the two-way folks: to stop interference from getting through our receiver. If you've got a situation where two stations share a frequency, or you're getting interference from an adjoining or nearby transmitter, a CTCSS or DCS-equipped scanner can really be a treat! Of course, for this to work the agency you're trying to listen to has to be transmitting a CTCSS or DCS signal, or there won't be anything for your scanner to use as the password. The other use for subaudible tones is to help in identifying the station talking. If you can read the tone information from a transmitting station, it can be helpful in knowing who's transmitting, or sometimes even in identifying other users on a frequency. At a minimum, if the station you normally listen to uses a tone of 103.5 and you suddenly start seeing 123.0 tones show up, you know that you're receiving something out of the ordinary.

Some of the newer receivers with built in CTCSS can display the tone right on the main display. This can be very useful for identification of the transmitting station.

Other receivers just let you know that the tone squelch is engaged Check the top center of this IC-R2 display.



Some receivers require an additional module or board to work with tone information like this CT-8200 which plugs into the AOR AR-8200 receiver.

On the business bands, CTCSS or DCS of some kind is almost required. Business users have long been pioneers (or guinea pigs, depending on your point of view) for new communications systems, and one of the early uses of CTCSS was to allow multiple users to actually share the same frequency in the same community. It is fairly common for businesses that need to use radio communications to be able to—or be forced to—share a frequency with several other companies. The reasoning is that there just aren't that many frequencies to go around, and many smaller companies (some of the companies who can benefit most from two-way communications) don't have enough units or traffic to justify a full-time exclusive frequency. In a large metropolitan area, the cost of putting up repeaters and systems all over town to get coverage can be prohibitive, but by sharing a system small business can get a much better communications system than they could afford by themselves.

So why not have Joe's Pizza Parlor share with Ralph's Plumbing? Great idea. Except that now all of Joe's people have to listen to all those plumbing calls all day, and vice versa. CTCSS can take care of that problem. If Joe has one tone, and Ralph has another, then as long as they both don't talk at once, they probably won't know the other is there. In fact, it may be possible, depending on how many units Joe and Ralph have on the street during the day, to have several other companies share that frequency, too.

Another major advantage of tone squelch systems is frequency re-use, or "how close geographically can I assign two users to the same frequency without causing interference?" Public safety agencies are a great example of this problem. If my local police are on 154.845, how far away does another city have to be in order to use 154.845 for their city's police? The answer to that depends on the local geography and the use of the frequency by the agencies.

If the frequency is used for dispatch operations with a big powerful base transmitter, then another base transmitter will have to be quite a distance away so they don't interfere. About 150 miles is the ideal distance, although on some frequencies that probably doesn't quite happen. Of course, if there's a mountain range between the two cities, then the rule can change a bit. One problem that we scanner listeners can run into is being between these two users. The base stations transmitting might be 75 or 100 miles apart, but if you're right in the middle, your scanner is quite likely to hear both signals. That's fine, if you're interested in both, but tone squelch can help if you're not.

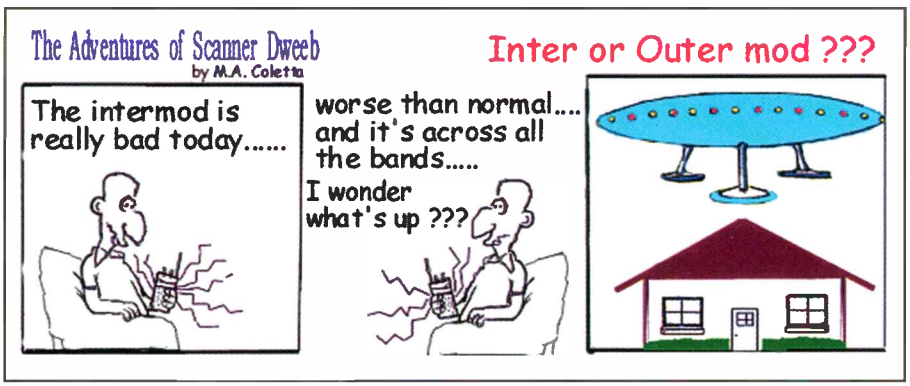
If both users are using the channel for public safety car-to-car or low-power operations then the frequency can be recycled a lot closer to home. The lower-power transmitters won't carry as far, and with CTCSS they can almost share a frequency like the business band folks, if there isn't too much traffic.

Tone Readers

In order for your scanner to take advantage of CTCSS, either for squelch purposes or just for information, you'll need one of two things: either a CTCSS-capable scanner, which will allow you to use the CTCSS as a squelch system, or a conventional scanner with a tone reader. Tone readers come in two varieties: units that are simply intended to read the tone and provide that information on a display of some sort, and units that can interface with both the scanner and computer software so that the audio can be controlled just like a CTCSS scanner. Obviously, if you want true tone squelch, the CTCSS scanner is the more convenient way to go, but there are just some radios, particularly at the high end (go figure), that don't offer CTCSS as an option without an external reader. If you want to use one of those radios, an external reader is the way to go.

There is also a software tone reader available. It takes audio from the recorder output or speaker output of your scanner and into the line input of your sound card. Depending on the scanner, you can usually get a good read of the sub-audible tone. The program is called WinTone and is available at http://www.steaksandwich.com.

If you're interested in more audible tones, there are all sorts of readers, mostly external, to decode ACARS, POCSAG, and GOLAY (pager modes, although there is a question about the legality of this) and DTMF. Lots of readers for the shortwave bands include these modes as well.



v.i.p. spotlight

Congratulations To Paul W. Blankenship Of Texas!

Popular Communications invites you to submit, in about 300 words, how you got started in the communications hobby. Entries should be typewritten, or otherwise easily readable. If possible, your photo should be included.

Each month, we'll select one entry and publish it here. All submissions become the property of *Popular Communications,* and none will be acknowledged or returned. Entries will be selected taking into consideration the story they relate, and if it is especially interesting, unusual or even humorous. We reserve the right to edit all submitted material for length, grammar, and style.

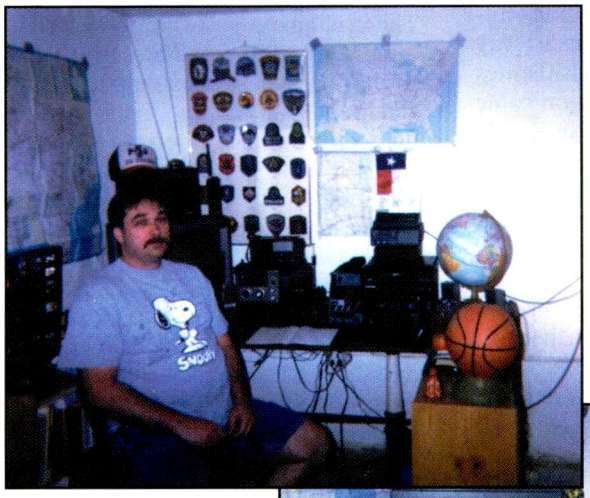
The person whose entry is selected will receive a one-year gift subscription (or one-year subscription extension) to *Popular Communications*. Address all entries to: "V.I.P. Spotlight," *Popular Communications*, 25 Newbridge Road, Hicksville, NY 11801 or e-mail your entry to popularcom@aol.com.

Our May Winner: Paul Blankenship

Paul tells *Pop'Comm*, "Radios have always fascinated me. At the age of seven I remember my Dad bringing home a large 1940's era radio from an auction – it was bigger than me! After playing with it a while I found there were stations playing music and speaking in languages I had never heard. Shortwave had found another victim. I have been listening ever since.

I went through the CB and the scanner years, adding them to my radio pleasures. Although I am unable to afford ham radio equipment, I still can enjoy listening to the world with my shortwaves (aided by my World Band Tuning Tips in *Pop'Comm).*

I have my communications area set up in the basement – my wife suggested it. I have three shortwaves, six scanners and three CBs. Depending on my mood I can tune in South America, the long-haul truckers or the area law enforcement and REACT teams." ■



Here's Paul Blankenship in his basement radio room, complete with globe and wall maps.

A closer look at Paul's equipment. ⟶

Locating Tone Information

Once you have a tone reader, or CTCSS-capable scanner, you have to find the tone information for the channels you're interested in monitoring. There are a number of public safety agencies that still do not use CTCSS or DCS, but most do, especially in larger metropolitan areas, and particularly agencies that still use the VHF and UHF bands. Conventional 800-MHz systems are likely to use tone, but trunked systems do not, as they rely on the central controller for receiver control.

You may get lucky and be able to find the tone information published, or you may have to do some detective work to find them. If you have a reader, you can just sit back and wait, because the reader will report them to you. Of course, once you find them, you should send them into *Popular Communications* so we can publish them and save everyone else the work.

And there you have it! Tone squelch can really be a help to your regular scanning, particularly if you're experiencing interference problems. It can also help you with identifying unknown agencies. It's another piece of information you can put into the puzzle that'll help you hear more on that scanner!

Frequency Of The Month

Our frequency this month will be **155.250**. I don't believe this one has been done before, but unfortunately my laptop (where the master list is kept) is in the shop. My apologies if you've seen this one before. Send in your entries to the address below and don't forget to mark the frequency in the subject line or on the envelope.

Our *Coptalk* winner this month is **Mike Wilkinson** of Mineral Ridge, Ohio. *Coptalk* is generously donated by Tiare Publications. You can find out about it by checking out Tiare's website at www.tiare.com/coptalk.htm.

What's On Your Mind?

We're always glad to hear from you about scanner-related questions or topics. You can write me at Ken Reiss, 9051 Watson Rd. #309, St. Louis, MO 63126 or via e-mail at radioken@earthlink.net. Until next month, good listening! ■

by Alan Dixon, N3HOE / WPUC720 / KST8678

Could There Be An Aircraft-Style "Black Box" Crash Recorder In YOUR Automobile? And A Real Telematics Vehicle Data Installation For Your Car!

The telematics revolution moves forward! For those not already familiar, and who have not followed these developments right here in *Pop'Comm*, "telematics" is a term that has evolved in recent years to describe communications, navigational, and computing functions in land motor vehicles. In a broader sense, it also includes entertainment systems such as stereo equipment, satellite broadcast receivers, and DVD video players. Simply put, "telematics" is to cars, trucks, and SUVs what "avionics" is to aircraft. And although this term is fairly new, telematics devices have been in our automobiles for decades.

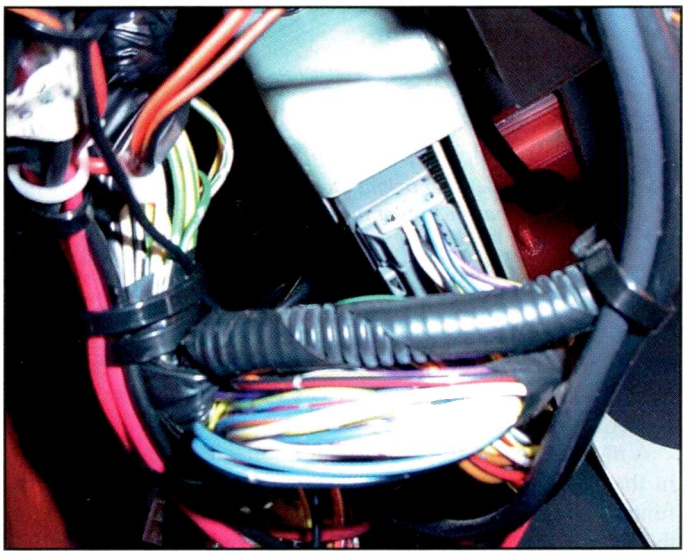
I'm certain that the ultra high-tech newbies in the nascent telematics industry would cringe at the realization that CB radio and pre-cellular IMTS mobile phones operating on VHF and UHF channels were true early examples of telematics. Automotive AM or FM radio, stereo, kickin' amplifiers, and audio graphic or parametric equalizers have for decades also been among telematics devices, long before the term was coined.

In *Pop'Comm* issues over the past three years or so, we've examined several communications and navigation-related telematics devices and services. For *communications*, these have included CB, GMRS, and even MURS two-way radio, with Midland, Maxon, and RadioShack products, respectively. And we have considered amateur service mobile installations with two Vertex Standard VHF/UHF and VHF transceivers and an Alinco DX-70 series transceiver, as well as touching generally upon the subject of mobile cell phones. One telematics *service* we talked about here is General Motors' On-Star communications and navigation fee-based services. On the *navigation* side, we looked in some detail at the functionality of one excellent and affordable mobile GPS unit, the Garmin GPS III Plus. We also took a look at a Uniden Safety Warning System (SWS)/radar receiver and electronic compass.

The mail we've received from you overwhelmingly supports our continued reporting of telematics developments, from time to time. And since we've already reported on two of telematics' three basic functionalities, the other being computing, it's about time we looked at that.

Now is a particularly opportune time to consider this aspect, since until just about this point in the evolution of telematics there have been very few *aftermarket* automotive computing products available. And now there are two promising new aftermarket products in this category for us to examine this month!

The aftermarket consideration is important to us. I've said in previous columns that telematics should not be merely available to those purchasing expensive new cars, trucks, and SUVs, That's because, in addition to state-of-the-art telematics being part and parcel of new, high-end vehicles, this technology should be available to all, as a *retrofit* or add-on upgrade to any and all existing vehicles.

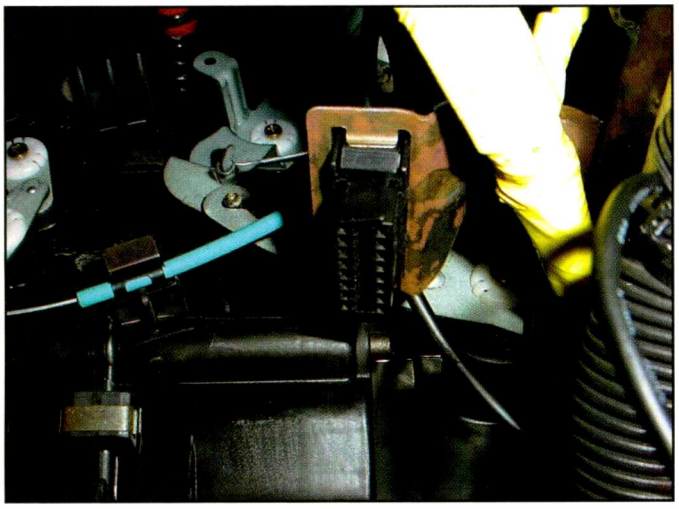


The mysterious vehicle Powertrain Control Module, running SAE J-1978 protocol, is a flat aluminum box, seen here with its data connector on its bottom side. In our project vehicle, this module is located behind the dashboard and above the driver's kick panel. (All photos by N3HOE)

Some here may legitimately raise the question that computing devices aren't *communications* at all. I mean, this is a communications magazine, not covering electronics in general. Even the navigation devices I've presented, the GPS and the SWS/radar/compass units, are digital data receivers; one presenting graphics, the other presenting lines of text. Automotive computing is sometimes linked to wireless data transmission. This may not be the case in many vehicle computing applications right now, but in the very near future these systems will become inexorably tied to wireless data communications systems. So, it is expedient for us to learn just a few things about at least one especially basic type of automotive computing.

Three Basic Automotive Computer And Processor Concepts And "Black-Box" Crash Data Recorders

Basic types of automotive data crunching? Sure. By way of my own observations, I'd say there are three fundamentally different kinds of mobile computing *functionalities*. One obvious category is *mobile PC use*. This is simply the installation of a laptop or palmtop operating system (Windows, DOS, LINUX, etc.) in a car or truck using one of the several hardware docking device kits on the market. These are typically used with a



Here's the standard SAE J-1962 OBD-II Data Link Connector. This port is located under and behind the dashboard, on the driver's side, near the top of the center console.

GPS receiver driving graphic geo-mapping software. Alternately, or in addition to, some are fitted with a WiFi (EIA 811.x protocol) transceiver card, although WiFi is rather "iffy" for use while in motion. Note that almost without exception the only connection with these devices to the vehicle itself is the power supply.

A more fundamental type of automotive computing is found in the *embedded engine and vehicle monitoring and control* functionalities found in all cars, SUVs, and light trucks sold in the United States over the last 20 years, or so. If any operating system is used at all in these vehicle systems, it is either manufacturer-proprietary or a standard open only to vehicle system component designers. The software for these systems resides in and is defined by *firmware* (application-specific IC chips).

The processing hardware comprising this other category of mobile computing is completely hardwired to the vehicle at many points. Its inputs are numerous sensors throughout the automobile. Input data is used to control vehicle fuel, ignition, automatic transmission power transfer, cruise control (if applicable), and emission control systems. On some vehicles, there may be even more systems monitored by these on-board processors.

Additionally, these embedded processors calculate *trouble codes* when any of a long list of engine (or other) malfunctions occur. This function illuminates one or more instrument "idiot lights," in particular, the dreaded Check Engine warning. When the car or truck is subsequently brought in for service, a service technician can plug a device into the vehicle that reads the applicable trouble codes. This functionality came to be known in the automotive industry as *On-Board Diagnostics (OBD)*.

Many vehicles have two main processor modules and several smaller, dedicated single-task or single-system processors scattered throughout. These processors are often single-card (board) units. The automotive industry hasn't exactly bought into the home computer concept of having all processing boards contained within a single CPU housing box. The two main modules in most cars and trucks typically have functionally descriptive names, such as the Powertrain Control Module (PCM) and the Sensing and Diagnostic Module (SDM). A maze-like wiring harness connects these processor modules and their sensors using multi-pin plug-in connectors. None of these connectors I have ever seen are any of the common data connectors associated with home PCs, such as the DB-9, DB-15, the 24-pin RS-232-style, or any of the telephone-style "RJ" series connectors.

So, when a service technician needs to read stored trouble codes in the OBD system, he has to make sure that he has the right cable and the correct code-reading device or PC software for the particular make of vehicle on which he is working, right? Well, it *had been* like this since the inception of OBD in the early 1980s. However beginning in 1996, all cars, light trucks, and SUVs sold in the United States were required by federal regulation to have one standard diagnostic protocol (SAE J1978) and, equally important, one standard data port connector (SAE J1962) that was developed by the automotive industry.

This *second* generation of On-Board Diagnostics became known as *OBD-II*. Despite this single industry standard for automotive PCM modules, individual manufacturers do have wide latitude to add additional functions, sensors, and measurements to the data collected and stored in these units. In any number of cases, these include things like speed, acceleration, deceleration, airbag deployment, seatbelt use, and braking. Hmmm...are you seeing the same scenario that I see? Imagine how this information could be used in motor vehicle crash investigation.

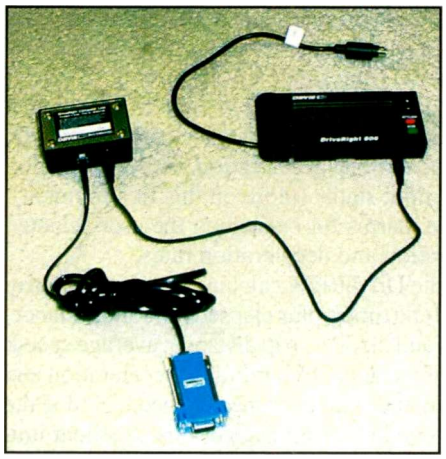
We have, therefore, to one degree or another, an aircraft-like "black box" in each and every car, light truck, and SUV built since model-year 1996. This is known in the industry as *CDR* (Crash Data Retrieval).

I can hear the gasps now coming from every direction! Really, how many of us were aware of this? If you are a professional ASE-certified automotive service technician, or an avid shade-tree mechanic, then you already know quite a bit about OBD-II. But the rest of the populace has been kept almost entirely in the dark about it. Oh sure, you may have been aware that there was a plug somewhere in the vehicle into which your service shop could connect their diagnostic computer. But not many of us were aware of the *full* capabilities of the OBD-II system, particularly CDR.

General Motors, along with a third-party contractor, Vetronix Corporation, developed the first-generation CDR system, circa early 2000, according to an earlier press release from *Telematics Update* (www.telematicsupdate.com). This early CDR functionality was designed only for GM vehicles, not surprisingly. Ford Motor Company, along with this same third-party contractor, developed a later version, circa 2001. This later CDR system was operational in certain select Ford Motor Company vehicles, with the expressed intent of expanding this functionality to more Ford models in subsequent years. Vetronix is a manufacturer of both OEM (Original Equipment Manufacturer) and aftermarket automotive diagnostic products and systems, headquartered in Santa Barbara, California.

It will certainly bother a substantial number of individuals to know that our bad driving habits leading to a collision, or even a "near miss," are being measured and recorded. These particular types of data are stored in the SDM, also known as the *airbag module* or the Restraint Control Module (RCM). The data can be retrieved directly from the SDM if necessary, but is typically downloaded at the OBD-II port, which is sometimes referred to as the vehicle Data Link Connector (DLC).

Crashes and near misses are recorded as "events." A crash is defined by an airbag deployment. A near miss is properly called a "non-deployment event," and is marked by relevant vehicle sensor signals being critical enough to alert the *sensing algorithm*, but not quite critical enough to trigger the airbags. Regardless, both types of events' data are stored. How long is



The DriveRight 600 console is shown here with its optional PC interface hardware. This hardware is included with the optional Fleet Management Software.

this stored data retained? Possibly forever, but not actually likely.

A vehicle's SDM can retain data for one *non-deployment* event, which can be overwritten by a subsequent, more severe non-deployment event. The SDM can also retain data for two airbag *deployment events*, if the second deployment event occurs within five seconds of the first. The first deployment event will be stored in the *deployment file*, and any second deployment described here will be stored in the *near-deployment file*. All data is written to non-volatile memory, specifically an EEPROM (E^2PROM). Incidentally, an airbag "second deployment" is essentially academic here, since an airbag can be inflated only once. A second deployment evidently refers to a secondary impact (or other trigger) severe enough to once again inflate the airbags, as if that were a possibility.

All of this begs the question, how can this data be deleted or erased? It's like this: Deployment event files, including the near-deployment file, by design cannot be deleted or overwritten. After an airbag deployment event the SDM must be replaced, as must the airbags themselves. In this instance, any privacy advocates involved would not likely have been in any condition or position to do much of anything, anyway. And, a major collision is certainly not going to go unnoticed. That's just the way it is. Your only alternative may be to obliterate the module with a large hammer!

But how about those "near misses" we all have from time to time in our everyday driving? Does anybody want their latest or most severe near miss recorded in their car's SDM for all time? Clearly, *no*! Mercifully, these manufacturers built in a sort of "back door." You'll be happy to know that you can delete any near-miss *non-deployment event* stored in your vehicle's SDM yourself, without any tools or plug-in devices, according to Vetronix. This SDM event can be cleared by cycling your ignition key switch on and off 250 times. That's no misprint—it must be done 250 times! They didn't want to make it *too* easy for us, did they? It's estimated though that this will occur in about 60 days of normal driving, anyway.

Surprisingly, however, press reports from around the country indicate that law enforcement officers and agencies are largely unaware of the existence of CDR "black-box" technology. Outside of the National Highway Transportation Safety Agency (NHTSA), the Michigan State Police, the Ontario Provincial Police, and a handful of other agencies, police traffic accident investigators have, in many cases, been unaware of this investigative tool. Anecdotal evidence indicates that in a number of recent traffic accident investigations that happened to be particularly difficult to reconstruct, officers involved have been somewhat dumbfounded upon learning that automotive "black-boxes" even exist! That is, for the few who ever did discover CDR in the course of their investigations. You can expect, however, that it won't be too much further into the future that police everywhere will become aware of this technology.

OBD-II trouble codes are typically read by automotive service technicians using handheld digital display devices plugged directly into the OBD-II port. Sometimes service shops have analyzer consoles that perform this function, along with any number of separate engine diagnostic procedures. Downloading crash data from the OBD-II port (or directly from the airbag SDM), however, can be done only with a dedicated *crash data retrieval module kit* with proprietary software, interfaced with a personal computer. And since automotive crash data retrieval technology is entirely proprietary to the third-party contractor, the necessary CDR retrieval hardware and software is available only from that contractor, Vetronix.

The complete CDR retrieval kit is priced at a whopping $2,495, putting it out of the reach of average consumers and everyday automotive enthusiasts. There is however, an on-line CDR users' group for those of us who still have nagging questions on this topic. Set your browser to www.CDRtoolsubscribe@yahoogroups.com.

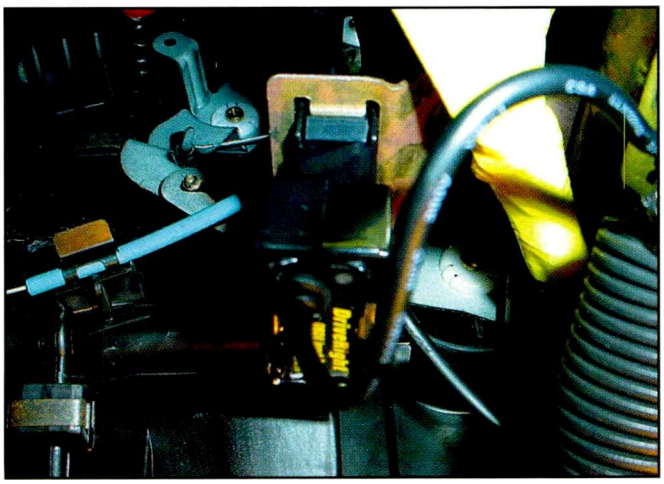
All of this brings us now to the third basic type of mobile computing: the dashboard vehicle function processor, data memory, and display unit. We're talking *aftermarket* here. Why? Because to our knowledge here at "On-The-Go," there aren't any OEM ("factory equipment")—optional or standard—dashboard *dedicated* processor, memory, and display units with a substantial range of functionality, such as in the aftermarket product group we will describe here.

Over the last three or four decades, there have been several interesting aftermarket attempts at automotive vehicle monitoring dashboard "computers." The ones I read about years ago were simply collections of analog devices, some of which weren't even electrical. Some real-time fuel-mileage calculators were vacuum operated. That sort of device was connected to the engine intake manifold by a thin rubber hose. Other devices were assemblies of things like electronic digital clocks, digital flux-gate compasses, driveshaft-mounted magnetic speed sensors, and fuel flow sensors, with displays backlighted by ordinary 12-volt incandescent light bulbs. These devices did not store data, except perhaps for the most recent readings, and had no interface to connect to a personal computer. These were the sort of products available from vendors like JC Whitney and Pep Boys auto supply stores.

Some of these products offered in later years are true digital processors, but rely primarily on internal G-force accelerometers (speed sensors) and clocking devices to calculate values like acceleration, speed, quarter-mile time, 0–60 MPH time, and so forth. Prices for these units run into the hundreds of dollars, and none of those I am aware of connect to a vehicle's OBD-II computer processor system.

Davis Instruments' DriveRight OBD-II Vehicle Data Display Monitor

Finally, though, one manufacturer has a true dashboard OBD-II data display, memory, and processing unit, and related accessory products available. Many radio hobbyists are already familiar with Davis Instruments' weather station products. Now, Davis Instruments, of Hayward, California, manufactures and markets the



Here we can see the DriveRight 600 data connector and cable plugged into our project vehicle's OBD-II port. All vehicle installation cable, connectors, and related hardware is included with the DriveRight 600.

This is one beautiful installation of the DriveRight 600 display console! We installed it in our project vehicle's center console, fitted among the various other telematics devices on board, just below our GPS mapping display. Having the two data displays together makes for easier viewing of both, at a glance.

DriveRight 600 vehicle safety and use monitor; the CarChip data logger; and Vehicle/Fleet Management Software (FMS) with interface hardware. An optional GPS latitude/longitude data receiver module is also available for the DriveRight 600.

The main product among these, the DriveRight 600 itself, was just introduced within the last 12 months. The compact dashboard display and control console comes with a variety of mounting options, including hard-mount snap-release brackets, Velcro, double-sided adhesive tape, and even a visor clip mount! All cables, wiring, electrical connectors, hardware, and backup battery are also included.

The DriveRight dashboard console has a large-enough and definitely easy-to-read backlighted LCD display. The unit is powered entirely from the vehicle's 12-volt power supply, and it relies on its backup battery only when the unit is removed from the vehicle and connected to a personal computer for data downloads or for PC-based user setup and configuration. (Nearly all user-selectable configuration parameters are programmable by means of the unit's front panel buttons, as well.) The console unit measures about 2-1/4 x 5-1/4 x 0.86 inches (HWD), with its display screen occupying most of the front panel. It is controlled by four pushbuttons located on the front side.

This unit stores and displays a number of vehicle data inputs. These include current road speed; trip distance (trip odometer); month, date, and time; current acceleration and deceleration rates; optional digital input status (more on this in a moment); and audible and visible alarms for exceeding the user-selected top speed, and acceleration and deceleration rates.

Using these inputs, the DriveRight calculates and stores a trip log displaying start and end times, plus elapsed time and distance. The trip log also stores and displays trip distance; average speed; counts of the number of instances of hard/rapid acceleration and deceleration; top speed; and time over the set speed. And if the optional GPS receiver module is connected, this excellent unit will display current numerical latitude and longitude readings, and log vehicle position at regular intervals. (There is no provision for graphic mapping on the display screen, but the trip GPS log may be downloaded later to a PC, using the optional FMS software, for geo-location using one of several commonly available mapping software products (not included).

User-selectable parameters include alarm thresholds for excessive speed, acceleration too rapid, deceleration too rapid, units of measure (miles or kilometers), defining "trips," audible alarm on/off, optional driver ID entry, and PIN code to keep these parameters from unauthorized change.

The most basic type of installation involves nothing more than plugging the DriveRight's OBD-II plug into the OBD-II data port on the car, truck, or SUV into which the unit is being installed. That's it—just mount the console, then plug it in and drive! Nothing could be simpler! As we have already noted, the DriveRight 600 has two optional binary (high-state/low-state) digital data inputs. These are default-set to trigger by a high-state signal: +12 volts.

Digital input 1 is typically connected to the vehicle's brake light circuit. You see, the DriveRight 600 builds its own accident log (which is readable only with the optional FMS software). It stores the last 40 seconds of data prior to any very sudden stop. Having the brake light circuit as input documents whether or not the driver was attempting to brake. The second digital input is usually connected to either the vehicle lights switch, or to the seatbelt indicator light. Having data as to whether a vehicle's lights were on or whether the driver was wearing the seatbelt would also be valuable information in an accident investigation, of course! When I installed my DriveRight 600 evaluation unit in the *Pop'Comm* "On-The-Go Radio" project vehicle, I decided that since this GM vehicle's running lights are always on, I would connect the digital input 2 to the seatbelt indicator.

I had a ball test-driving the DriveRight 600 installation in the project vehicle! The installation instructions for the product stated that the DriveRight unit may need to be speed calibrated, and it outlines the procedure. But in my test drives, the DriveRight, right out of the box, compared exactly with both the vehicle speedometer, and my GPS speed readings when holding a steady speed, at all of my different test speeds. On rapid acceleration there *may* have been a few milliseconds of latency in the displayed speed, but this was, obviously, barely perceptible, if in fact there was any latency at all. Regardless, speed readings consistently read correctly at any given steady cruising speed.

At first, the DriveRight audible alarms were just a bit annoying. Of course, I can simply program them to stay off and rely

on the visual display warnings. But, I quickly realized that the acceleration and deceleration alarms could be an early warning if one's driving starts to become too "squirrelly" to be safe. Feedback is a fast teacher, and I found myself subconsciously (read that as, "effortlessly") avoiding the audible alarms by adjusting my driving habits accordingly! *Never let this or any telematics device distract you from driving safely and keeping focused on the road ahead.*

There are two ancillary malfunction diagnostic-related functions that the DriveRight 600 does *not* offer. One is reading the OBD-II DTC, as your service technician would in the course of making certain repairs. The other is resetting the Check Engine Malfunction Indicator Light (MIL). These functions are offered with a related Davis product, the CarChip. This is a small plug-in device that plugs directly into a vehicle's OBD-II port. It is about the size of two 9-volt batteries stacked together, which is not much bigger than the OBD-II connector itself on the DriveRight 600.

As its name implies, the CarChip, in addition to its obvious vehicle plug, contains a non-volatile EEPROM data memory chip, and a tiny plug for FMS software-to-PC interface connection. The *basic* CarChip comes complete with its own software and PC interface cable. Since this product has no data display, collected data must be downloaded to a computer for viewing and analysis.

The CarChip collects much of the same data that the DriveRight 600 does, so it can be used in lieu of the DriveRight, if viewing data at a later time (as opposed to real-time while driving) suits the needs of the operator. *Apparently*, both the DriveRight 600 and the CarChip may be used alternately (but not simultaneously) on the same vehicle. The DriveRight would be used for day-to-day driving, and the CarChip would be swapped into play anytime a diagnostic trouble code DTC reading and a Check Engine MIL warning light reset are needed.

Davis markets the DriveRight family of products as management tools for fleet operators to improve efficiency and safety. The speed recording functionality reminds me of my early days in EMS and fire fighting in the early 1970s. Many of our ambulances and some fire apparatus were equipped with the old Tachograph (I'm not certain of the spelling, anymore—I must be getting old!) speed recorders. These were mechanical, clockwork devices that were "T"-coupled to the speedometer cables in equipped vehicles, and usually mounted astride the transmission hump, facing the driver.

Their flat, cylindrical bodies were solid cast metal, each with a speedometer dial that at first glance looked more like a clock face. A tiny odd key was used to open the face, revealing a circular graph inside, calibrated concentrically in MPH and radially in hours. In the hub of the paper graph was a tiny 24-hour clock dial. Each day at midnight we had to change the graph paper, bringing in the expended graphs to be filed. In addition to recording speed, there were indicators for emergency signal use and siren use. Hmmm—we sure could have used the DriveRight product back then! The DriveRight 600 can store up to 435 hours of speed recording, not just 24. And, it's paperless.

Point is, the DriveRight 600 is the only product in its class that I have found to date, aftermarket or OEM. Functionally speaking, then, the bottom line is that if you want a next-generation telematics dashboard console data display of your vehicle's OBD-II data (relative to *driveability*, rather than malfunction diagnostics), this exciting product is your choice! And the frosting on the cake is its affordability. Service shop and laboratory equipment *not* suitable for mobile use that I've seen can run into thousands of dollars, but the DriveRight 600 complete with all installation hardware lists at $425. And this alone is all that most motorists and automotive enthusiasts need! Then, if you want it, the Fleet Management Software (FMS) for the DriveRight 600 lists at $395. And the basic CarChip device sells for $139, complete with its own software and computer (PC) interface cables.

You just can't beat the quality and the utility of these Davis Instruments. Check out and purchase these outstanding products on-line at www.davisnet.com. The Davis website has all of the several DriveRight product user, database, and installation manuals available for download in Adobe PDF format, too! You may also telephone for information or purchases at 510-732-9229. Their technical support line is 510-732-7814.

Next Month: The New "Class L" Telematics CB Radio Service!

There is *so* much more to learn about the telematics technologies currently being developed. Next month we'll get straight back to *communications* matters, as we take a brief look at the newly FCC-codified 5.9-GHz Citizens Band radio service. This is the Dedicated Short-Range Communications Service (DSRCS) which is for digital data and voice low-power telematics-only use. It was authorized in Report And Order WT Docket 01-90 (FCC 03-324), just released at press time, in February 2004. I say we'll take a "brief" look since little is yet known as to how this new "Class L" CB Radio Service (Part 95, Subpart L) will evolve. So stay tuned, and we'll see you as summer begins, right here at "O-T-G Radio"! ■

plane sense

your link to global aviation communications monitoring

By Bill Hoefer, flacap388@hotmail.com

A Frequency And Information Source YOU Need!

Normally I'd try to do an April Fool's joke in the magazine, but not this year. I apologize to those who were expecting it. Wait till next year, though. In the last few issues I'd been getting a little off the beaten track as to sources of frequencies and explanations of ATC procedures. I hope to remedy this starting with this month's column.

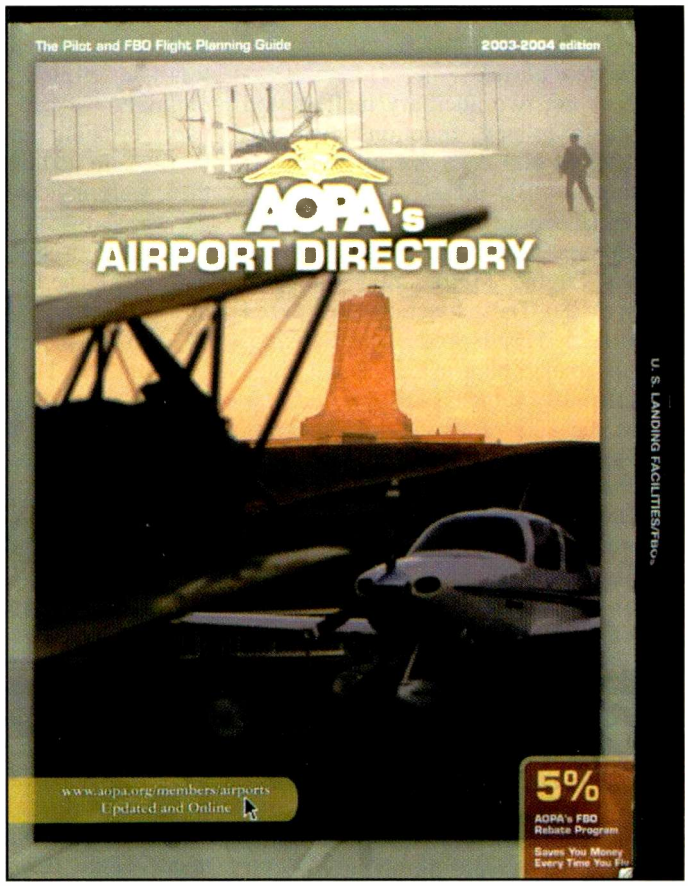
I've given sources of aviation frequencies many times, and I even list changes every month. This month I'm reviewing a source every one of you can get: the annual *Aircraft Owner's and Pilot's Association's (AOPA) Airport Directory*. This hefty book has 680 pages of information primarily written for pilots, but it also has more than enough information on airports throughout the U.S. for use by the scanner enthusiast. If I had to recommend only one universal book for you, it would be the *AOPA Airport Directory*. It's divided into three general sections: 1) General Services; 2) International Operations; and 3) U.S. Landing Facilities and FBOs (Fixed Base Operators). This third section is also divided into one major and two minor subsections and is of primary interest to you.

This section covers all 50 states and the District of Columbia. Find the state you're looking for, then dive in. Virtually all public and private airports are listed. Unfortunately military airports aren't, for obvious reasons. Airports are listed by the city they are in or associated with, so you must know the city name. Specifically, you don't look under "J" in the New York section to look for John F. Kennedy International Airport; you must look under "N" for New York City. And even then it can be confusing, but not because of the book, but because of the name of the airport.

Two prime examples are airports listed in the Orlando, Florida section. The first is Sanford (SFB). For years the Sanford Airport has been listed as just that—Sanford Airport. It's located 16 miles northeast of Orlando in a different county. But in recent years it was renamed Orlando Sanford. The second is Kissimmee (ISM). It's located 16 miles southwest of Orlando, also in a different county, but is officially called Orlando Kissimmee Gateway. But this soapbox is for a different day.

Roughly half the airports also have a mini-diagram of the field, showing runway configuration, runway numbers, lengths, and widths, and on some, if you really look close, even the approach light systems. This way you can look at the layout and see what runways are in use.

The listing in the illustration is for Orlando Sanford Airport (SFB). The exact location of the airport is given in latitude/longitude, not just as a general location near the city of reference. In this case it's 28° 46.66' north, 81° 14.25' west. Notice the use of minutes and decimals of minutes, not the use of seconds. These coordinates are for the geographical center of the airport. (People who use computer programs to aim their antennas may find this of great value.) Magnetic variance is then found. Sanford is showing 5W, or 5 degrees west of true north. In other words, a magnetic compass points 5 degrees west of true north. And since the magnetic north pole is constantly moving, every so often an airport's runway numbers may change to reflect the new magnetic variance. The closest navigational aids (NAVAIDS) are then found. In the case of Sanford, the Orlando VOR is shown. The frequency is 112.2 MHz and the airport is located 20 nautical (not statute) miles on a heading of 15° from the VOR. The NDB is located on the field with a frequency of 408 kHz.



Here's a look at the cover of the 2003/2004 AOPA Airport Directory.

The Frequencies

About one-third of the way down in each text illustration, you see most of what you're looking for: the aviation frequencies. The Flight Service Station (FSS) for the airport is listed here. In this case, it's my FSS—St. Petersburg. We use 123.6 and 122.45 MHz at Sanford, with 123.6 being the primary and 122.45 the secondary. Communications frequencies are listed for the tower (120.3), ground and clearance delivery (121.35), GCO (123.975), Orlando Approach (121.1), UNICOM (122.95), and Common Traffic Advisory Frequency, or CTAF (120.3). Notice that after the tower frequency is listed

ORLANDO— Orlando Sanford (SFB). **Location:** 18 mi NE of city. **Coordinates:** N28-46.66; W081-14.25. **Mag var:** 5W. **Navaids:** ORL 112.2 020 15; SFB 408 on field. **Telephone:** 407/323-8313, 407/322-7771, 407/585-4100, 407/585-4000. **Fax:** 407/324-0305, 407/322-0186. **Hours:** 6:30 am to 11 pm daily. **Elevation:** 55. **Pattern altitudes:** 1000 MSL all aircraft. **Runways:** 18-36 6,002 × 150, asphalt grooved, asphalt rlsc; right tfc ry 36, trees ry 36, lights PCL/ 9L-27R 9,600 × 150, asphalt grooved; right tfc ry 27R, trees ea end, lights PCL/ 9R-27L 3,500 × 75, asphalt; right tfc ry 9R, pole ry 9R; trees ry 27L, lights PCL/ 9C-27C 3,578 × 75, asphalt; right tfc ry 9C, pole ry 9C; trees ry 9C. **Lights:** SS to SR. 120.3 (3 clicks in 5 sec, low intensity; 5 clicks in 5 sec, med intensity; 7 clicks in 5 sec, high intensity); beacon. **Fees:** hangar, tiedown. **Approaches:** GPS RNAV, ILS, ILS/DME, NDB, VOR/DME, VOR/DME RNAV. **FSS:** Saint Petersburg 123.6, 122.45. **Com freq:** TWR 120.3 (6:30 am to 11 pm); GND 121.35; CLNC DEL 121.35; GCO 123.975; APP Orlando/121.1; UNICOM 122.95; CTAF 120.3. **Weather contacts:** ATIS 125.975; ASOS 407/321-9364. **Charts:** Jacksonville; L19. **Noise abatement:** Noise sensitive area under ILS apch fm SEMCO on to ry 9L & fm 4 mi out straight in to ry 27R; preferred ry landing 27R, departure 9L. **Transportation:** courtesy car; limousine; shuttle bus. **Taxis:** A-1 407/328-4555; Yellow 407/920-6326. **Rental cars:** Alamo 407/328-4315, Dollar 407/324-1314. **Restaurants:** nmrs; nmrs within 3 mi; Sonny's Bar-B-Que 3 mi 407/321-9295. **Restaurants on field:** Jerry's Jetway Cafe 407/323-0345. **Lodging:** Budget Inn 3 mi 407/321-0690; Days Inn 6 mi 407/323-6500; Knights Inn 4 mi 407/323-0445; Marina Inn 3 mi 407/323-1910. **Local attractions:** Central Florida Zoo 7 mi. **U.S. Customs:** Y. **Notes:** airline svc. Intensive flight training, aerobatics, helicopter ops.

Avion Jet Center, L.L.C.: 407/328-9997, 866/328-9997. **Fax:** 407/328-8442. **Location:** SW. **Fees:** overnight. **Hours:** 8 am to midnight. **Computerized weather svc:** Y. **Frequency:** 122.825. **Fuel:** Avfuel 100LL, Jet-prmix.

CE Avionics, Inc.: 407/323-0230. **Fax:** 407/321-3804. **Location:** CTR. **Hours:** 8 am to 5 pm wkdys; 24 hr on req. **Repair services:** radio, instrument. **Credit cards accepted:** MasterCard, Visa.

Comair Aviation Academy: 407/300-7020, 800/822-6359. **Fax:** 407/323-3817. **Location:** N. **Hours:** 9 am to 5:30 pm. **Computerized weather svc:** Y. **Frequency:** 123.5. **Fuel:** Chevron Texaco 100LL.

South Seminole Flying Club: 407/333-9523. **Fax:** 407/327-7107. **Hours:** not rptd.

Southern Jet Center, LLC: 407/323-7288. **Fax:** 407/323-6133. **Location:** W. **Hours:** 8 am to 5 pm wkdys.

StarPort: 407/321-8880, 866/321-8880. **Fax:** 407/321-3070. **Location:** N. **Fees:** overnight. **Hours:** 6:30 am to 9:30 pm daily; 24 on req. **Frequency:** 122.95, ARINC130.5. **Fuel:** Phillips 100LL, Jet, Jet-prmix.

Part of the AOPA Airport Directory *covering Sanford, Florida.*

so are the hours the tower is in operation. Also notice that the CTAF is the same as the tower. No need to change to a different frequency just because the tower is closed. Automated Terminal Information Service (ATIS) frequency(ies) then follow; in this case, 125.975. Some larger airports may use two or more ATIS frequencies.

The last part of this listing includes the FBOs for the airfield. Some have frequencies, some do not. If an ARINC (Aeronautical Radio Inc.) facility is located there, such as StarPort at Sanford, the ARINC frequency is shown here. ARINC will be discussed in a future column.

The AOPA graphic for Plymouth, Florida, is an example of a listing of an uncontrolled airport. The airport is officially Plymouth-Orlando County (X04). This small airport, located just 16.3 nautical miles northwest of Orlando and paralleling U.S. Highway 441, is where I got my first taste of flying while growing up, watching small airplanes take off and land during the mid 1960s and observing a parajumping competition there. In spite of the amount of traffic, this is an uncontrolled field and everyone must be on the assigned UNICOM/CTAF frequency of 123.05. This helps ensure that someone is not landing on runway 15 while someone is departing from runway 33. Of course, St Petersburg FSS has frequencies assigned to the general area here, too. In this case, it is 122.2 and 123.6. This field also has an ATIS of 127.25.

As a little side note, you'll notice that many of the airports also list restaurants both off and on the fields. Some lazy day you may want to take your scanner and listen as you have a burger or other fare there. I've been told that the Outer Marker Café

PLYMOUTH— Orlando Country (X04). **Location:** 2 mi NW of city. **Coordinates:** N28-42.43; W081-34.90. **Mag var:** 3W. **Navaids:** ORL 112.2 307 16.3. **Telephone:** 407/886-7663. **Fax:** 407/886-7842. **Hours:** 8 am to SS. **Elevation:** 143. **Pattern altitudes:** 943 MSL light aircraft; 1143 MSL heavy aircraft; 1143 MSL multiengine aircraft; 1143 MSL turbine aircraft; 500 MSL rotorcraft; 500 MSL ultralights. **Runways:** 15-33 3,185 × 100, asphalt, turf; right tfc ry 15, trees ea end, lights LIRL. **Lights:** beacon. **Obstructions:** fire twr NE side of ry. **Fees:** hangar, tiedown. **FSS:** Saint Petersburg 122.2, 123.6. **Com freq:** UNICOM/CTAF 123.05. **Weather contacts:** ATIS 127.25. **Charts:** Jacksonville; L19. **Noise abatement:** Dusk to dawn; all acft; trailer park SE; dep end ry 33; rmn clr of trailer prak at all times do not turn out blo 600'. **Transportation:** courtesy car; public; shuttle bus. **Taxis:** 886-0377. **Rental cars:** Budget; Enterprise 884-6313/ 24 hr notice; Forsythe Auto Group 407/814-7501, 814-7663/trans provided. **Restaurants:** nmrs within 10 mi; Plymouth Woodshed 2 mi 886-4141; Zellies 2 1/2 mi 889-7595. **Lodging:** Crosby Motor Inn 2 mi 886-3220; Emerald Hill Inn 6 mi; Hamnpton Inn 5 mi; Lakeside Inn 7 mi. **Local attractions:** MGM Studios 20 mi; Universal Studios 20 mi; Walt Disney World 20 mi. **Notes:** Lnd long ry 33 w/t or E wind; steep dropoff 63' SE & 55' W edge of ry, intensive flight training, helicopter ops, ultralights.

Brinkman Aviation: 407/889-8995. **Fax:** 407/889-4596. **Hours:** by appt.

JMM Aviation, Inc.: 407/886-7663. **Location:** SE. **Fees:** overnight. **Hours:** 8 am to 4 pm. **Computerized weather svc:** Y. **Frequency:** 123.05. **Fuel:** Chevron Texaco 100LL.

The AOPA Airport Directory *for Plymouth, Florida.*

at the Titusville Space Coast Regional Airport (TIX) near the Kennedy Space Center has some good eats. I haven't been there, but one day I'll try it.

One word, however, for the east coast of Florida: When the Space Shuttle starts operations again (last I heard was sometime in 2005), scanning within a 30-mile radius of the launch site will be curtailed from a couple hours before launch until a short time afterwards. You may want to take your scanner and go to U.S.1/FL A1A and listen to the NASA Operations there as you sure won't hear anything else atSanford/Kissimmee/ Orlando Exec or Orlando International airports.

Question Of The Month

Before I go to the question of the month, you'll no doubt want to know where I got this book and how much I paid for it. There are a variety of sources, but the primary, other than joining the AOPA directly, is from the largest pilot supply company, Sporty's. Go to http://sportys.com/takeoff/ for their aviation catalog. (They have four others under http://sportys.com/.) You can also call them at 1-800-SPORTYS. The cost is $29.95 plus s/h. Other aviation charts, books, and maps are also offered. And look at the airplane they're giving away this summer while you're there.

Now, our question of the month comes from Kyle in Vero Beach. Kyle asks,

> I hear pilots filing flight plans with St. Petersburg Flight Service Station. Some will give the identifier of Vero Beach as "VRB" and others as "KVRB." Are there two airports or what?"

Thanks, Kyle. Officially the airports in the U.S., at least in the lower 48, do indeed start with the letter "K" (just like all AM/FM radio stations start with a K or W, and ham stations in the U.S. start with K, N, W, or AA-AL). We normally just drop the K, or Kilo, because except for international flight plans, we know it starts with a K. It's only required on an international flight plan. The Bahamas start with MY (Nassau is MYNN, Freeport is MYGF, etc.); Canada starts with C.

Oh, this leaves out Alaska and Hawaii. Sure we can use three-letter identifiers such as FAI for Fairbanks, Alaska, or HNL for Honolulu, Hawaii, but because of their proximity to the Pacific Rim, they start with PA and PH, respectively. Fairbanks is officially PAFA and Honolulu is PHNL. Northway, Alaska, where I spent half of 2001 is either ORT or PAOR. Go figure.

Thanks for the question, Kyle. Please, if you have any questions concerning flight ops and frequencies mail them directly to me at *Pop'Comm* or e-mail them to me at flacap388@hotmail.com. See y'all next month. ■

NEW/CHANGED/DELETED FREQUENCIES

NEW

AL
Talladega Municipal (ASN)
ASOS 119.625

AK
Deadhorse, Inigok Airport (4AK1)
CTAF 122.9

AR
Jacksonville, Little Rock AFB
MLS Rwy 07 (M-SQN) 114.05

CA
Marysville, Beale AFB
ILS Rwy 33 (I-MIZ) 109.5
Mountain View, Moffett Federal Airport
ILS Rwy 32R (I-NUQ) 110.35
ILS Rwy 14L (I-MNQ) 110.35
San Diego, Miramar MCAS
ILS Rwy 24R (I-NKX) 111.15

CO
Denver ARTCC (ZDV)
Denver Low Sector 118.47/225.4
Scottsbluff NE Low Sector 127.95

FL
Milton, Whiting Field NAS (South)
ILS Rwy 32 (I-NDZ) 110.55

GA
Marietta, Dobbins AFB/Atlanta NAS
ILS Rwy 11 (I-DJR) 109.7

KS
Wichita, McConnell AFB (IAB)
Boeing GC 123.125

LA
New Orleans NAS JRB/Alvin Callender
ILS Rwy 04 (I-NBG) 109.5

MS
Meridian NAS/McCain Field
ILS Rwy 19L (I-NMM) 109.7

NJ
Millville, Holly City Heliport (2P5)
Unicom 123.0

NY
Akron (9G3)
Unicom 122.725
Canandaigua (D38)
AWOS-3 118.675
Hornell Municipal (4G6)
AWOS-3 118.475
Lancaster, Buffalo-Lancaster Airport (D77)
Unicom 122.8

NC
Fayetteville, Pope AFB
MLS Rwy 23 (M-PPN) 113.45
Goldsboro, Seymour Johnson AFB
ILS Rwy 26 (I-DDX) 109.9
Kinston Regional Jetport at Stallings Field (ISO)
ASOS 132.75

OH
Cleveland-Hopkins International Airport (CLE)
Ground Metering 127.275
Delaware Municipal (DLZ)
AWOS-3 119.025
Van Wert County (VWT)
AWOS-3 115.175

OK
Altus AFB
ILS Rwy 17L (I-RUK) 110.55
ILS Rwy 35R (I-FNM) 110.55
Oklahoma City, Tinker AFB
ILS Rwy 12 (I-EVG) 111.7
ILS Rwy 30 (I-PLH) 111.7

PA
Bedford County (HMZ)
ASOS 118.35

SC
Sumter, Shaw AFB (SSC)
PTD 372.2

TX
Fort Worth NAS JRB/Carswell AFB (NFW)
Base Ops 291.775
Kingsville NASS
ILS Rwy 13R (I-NQI) 110.9

VA
Stafford Regional (RMN)
AWOS-3 126.325

VT
Highgate, Franklin County State (FSO)
AWOS-3 119.025
Lyndonville, Caledonia County (6B8)
AWOS-3 119.275

WA
Milwaukee, General Mitchell International (MKE)
UPSET Ctrl 6761.0kHz
Winthrop, Methow Valley State (S52)
ASOS/AWOS-3 118.425

WI
Janesville, Southern Wisconsin Regional
ILS Rwy 32 111.35

WY
Pine Bluffs Municipal (82V)
ASOS/AWOS-3 132.425

CHANGED

AK
Anchorage, Ted Stevens Anchorage International (ANC)
MLS Rwy 06L (M-TGN) was 111.9, now 111.3

CO
Denver ARTCC (ZDV)
Tuba City AZ Low Sector was 343.95, now 256.87

GA
Sandersville, Kaolin NDB (HIT) was 212 kHz, now 360 kHz

KS
Great Bend, Hilyn NDB (HIL) was 308 kHz, now 338 kHz

MN
Minneapolis ARTCC (ZMP)
Hayward WI Low Sector — was 278.5, now 276.4

NM
Albuquerque ARTCC (ZAB)
Fort Stockton TX Hi Sector — was 134.925, now 120.925

NY
Niagara Falls International (IAG)
AFR Op — was 340.8, now 340.24

ND
Bismarck Municipal (BIS)
Mandan Municipal (Y19)
apch — was 346.4, now 298.9
Grand Forks (RDR)
PMSV — was 344.6, now 343.5

OH
Cleveland Hopkins International (CLE)
Elyria Municipal (1G1)
Lorain County Regional (LPR)
apch — was 125.85, now 133.875

TX
Fort Hood/Killeen, Robert Gray AAF (GRK)
Flt Flwng — was 32.1, now 38.75
Fort Worth NAS JRB/Carswell AFB (NFW)
GC — was 264.5, now254.325/279.575
GCA — was 380.8, now371.875
LC — was 237.9/249.8, now 269.375/284.725
PMSV — was 380.8, now 371.875
Houston ARTCC (ZHU)
Kerrville TX Low Sector — was 124.2, now 134.95/269.4

VA
Norfolk NS/Chambers Field (NGU)
Navy Norfolk Helicopter GC — was 312.4, now 298.95

DELETED

CO
Denver ARTCC (ZDV)
Grand Mesa Low Sector — 334.05
Rock Springs WY Low Sector — 128.5/327.8
Sterling CO Low Sector — 135.925

MI
Detroit
BERZ NDB (UIZ) — 215kHz

TX
Fort Worth NAS JRB/Carswell AFB (NFW)
SFA PTD — 256.2

AIRPORT IDs, NEW/CHANGED/DELETED

NEW

AL
Samson, Logan Field — 1A4

AK
Deadhorse, Inigok Airport — 4AK1

GA
Rocky Fort, Pegasus Ranch — 0GE9
Woodland, Rainbow Field Airport — 6GE2

TN
Dowelltown, Soggy Bottom — 2TN8
Moscow, Hawks Nest Airport — 4TN3

UT
Salt Lake City, Redwood Health Center Heliport — UT98

VA
Bedford, Hawk Ridge Airport — 20VG
Bristol, Northstar Aviation Heliport — 02VG
Fisherville, Augusta Medical Center Heliport — 09VG

WA
Addy, Blue Creek Airport — WA57
Deer Park, Deer Flat Airport — WA52
Elk Heights — WA21

WV
Morgantown/University Hospital/Gnd Pad #2 Heliport — 04WV

WI
Brussels, Crispy Cedars Airport — 7WI8

CHANGED

AR
Conway, Dennis F Cantrell — Was M03, now CWS

CA
Burbank (BUR) — was Burbank/Glendale/Pasadena, now Bob Hope Airport

MN
Elbow Lake (Y63) — was Elbow Lake Municipal, now Elbow Lake Municipal, Pride of the Prairie

NM
Apache Creek, Jewett Mesa Airport — was Q13, now 13Q
Aztec Municipal — was Q19, now N19
Carrizozo Municipal — was Q37, now F37
Espanola, San Juan Puebel — was Q14, now E14
Mountainair Municipal — was Q04, now M10
Reserve Airport — was Q16, now T16
Santa Rosa Route 66 Airport — was Q58, to I58
Springer Municipal — was Q42, now S42

OK
Beaver Municipal — was Q44, now K44

TN
Fall Branch (65TN) — was Roach Ranch, now Roach Farm

TX
Brownfield, Terry County — was Q26, now BFE
Dimmit Municipal — was Q55, now T55
Floydada Municipal — was Q41, now 41F
Friona, Benger Air Park Airport — was Q54, now X54
Levelland Municipal — was Q24, now LLN
Littlefield Municipal — was Q00, now LIU
Stratford Field — was Q70, now H70
Sunray Airport — was Q43, now X43

DELETED/ABANDONED

AK
Eagle River, Hardee Field Airport — 1AK7

IL
Forrest, Fosdick Airport — 4IL9
Quincy, Blessing Hospital at 14th St Heliport — 0IS7

WI
Lakewood Country Club — 6M5

Info Central

news, trends, short takes, and other things radio

by Harold Ort, N2RLL, Editor and D. Prabakaran

Amateur Radio Newsline Announces Roy Neal, K6DUE, Amateur Radio Mentoring Project

The Amateur Radio Newsline Inc., a federally chartered not-for-profit corporation, has announced the creation of the "Roy Neal, K6DUE, Amateur Radio Mentoring Project." This is a program designed to take newly licensed radio amateurs and place them one-on-one with veteran hams so that they may learn the traditions and operating skills that no classroom or home-study environment can teach.

Roy Neal, K6DUE, was a driving force within the structure of Amateur Radio Newsline. He passed away on Friday, August 15, 2003, from complications arising from heart valve replacement surgery a few days earlier.

Amateur Radio Newsline had this to say about the project,

In addition to serving as Amateur Radio Newsline's Vice President, (Neal) was also our teacher, advisor and friend. Those of us who had the honor of knowing Roy were keenly aware of his willingness to help anyone better themselves. He was always willing to share his lifetime of knowledge in many areas including science, space exploration and Amateur Radio. With this in mind the Amateur Radio Newsline Board of Directors at its annual meeting on December 13, 2003 voted unanimously to honor Roy's memory by creating a program to carry on his vision.

What we have named "The Roy Neal, K6DUE, Amateur Radio Mentoring Project" is loosely based on a similar program created by Broadway performer Ann Reinking. Reinking was a student of and performer with the legendary choreographer/director Bob Fosse. She is now carrying on the "mentoring" tradition in the art of dance through her own educational foundation, the Broadway Theater Project. This is a Florida based training program connecting students with seasoned theater professionals. If we may quote Ms. Reinking: "It's sort of an un-written law or rule in the world of dance that you pass on what you know. This particular craft is at its best when it's passed from one person's hands to the next." Now, if you think about it, what Ann Reinking says about "dance" applies equally to our world of Amateur Radio—maybe more so, because, for decades the knowledge and tradition of our hobby/service was passed down from seasoned operators to newcomers, one to one. Unfortunately, in the ham radio of today, this art of mentoring that we call "Elmering" seems to be disappearing. It is being replaced by "weekend cram class training" and/or the more tedious world of "home study." Both provide lots of technologically trained hams, but they do not turn out skilled operators or hams who really appreciate the art of amateur radio. Only one-on-one "mentoring" or "Elmering" can do that.

The "Roy Neal, K6DUE, Amateur Radio Mentoring Project" is to be a similarly structured program that fosters those one-on-one relationships that go well beyond the knowledge necessary to pass a ham radio exam. It will put an emphasis on our traditional ham radio values by placing new hams into contact with skilled operators who are willing to teach them such radio art-forms as how to work DX, or run a contest, build and operate a repeater, talk by bouncing signals off the moon, kit construction and anything else that makes a ham a ham. In essence, to pass along the living traditions that make ham radio what it is to all of us old timers. To make this work, two groups of hams are needed. First we need skilled operators who are willing to donate time to assist those in need of training. We also need new hams to come forward and say: "I want to learn more." We will do our part by matching the mentors to those in need of Elmering.

To get the project underway we have asked Joe Eisenberg, KØNEB, to create the necessary databases and begin the process of matching volunteer mentors to those wishing instruction. We are also asking both groups to send us an e-mail at mentor@arnewsline.org. In your note please state if you are offering to be a mentor or are in need of training. Please include your name, call, address, e-mail address with zip code, phone number, best time of day to call and any other pertinent information.

It is our hope that the nation's Amateur Radio community will join with us to make "The Roy Neal, K6DUE, Amateur Radio Mentoring Project" a part of the traditions of the hobby, and that it will become a lasting memorial to the radio amateur who gave so much of his life to making Amateur Radio the best hobby and service in the universe.

Cracked Cracker Barrel And Wal-Mart Frequency Mystery

We received several responses to our recent question about the frequencies used by the Cracker Barrel restaurant crews. One sleuth simply invited his MFJ frequency counter to breakfast one day and bingo! Turns out they use standard Family Radio Service frequencies.

Another *Pop'Comm* reader in New Jersey actually got a first-hand look at their RadioShack units (catalog Number 21-1813). They're reportedly operating on FRS Channel 1, 462.5625 MHz.

We've also learned that Wal-Mart communicates using Motorola XV1100 1-watt business band transceivers. These single-channel radios easily cover even the largest retail areas, well out into the parking lot. Look for many of them on 154.600 and 154.700. It's interesting listening after you've shopped till you've dropped and you're waiting for your family to find you in the parking lot.

RFE/RL May Leave Current HQ

Since 1995, Radio Free Europe/Radio Liberty (RFE/RL) has been broadcasting from the building of the former Federal Assembly in Prague's center. Its removal for security reasons was considered after the 2001 terrorist attacks on the United States. The contract for its current headquarters expires at the end of the year. Radio Free Europe, founded in 1949 by the American government, started its first broadcasts from Munich to the Soviet bloc in 1950 with a broadcast to Czechoslovakia.

Meanwhile, Radio Free Europe/Radio Liberty (RFE/RL) is preparing to cease broadcasting in seven languages to countries in Central and Southeastern Europe. Language services broadcasting to Estonia, Latvia, Lithuania, Slovakia, Romania, Bulgaria, and Croatia closed in December under a directive from the White House and the Broadcasting Board of Governors.

Services to Eastern Europe are being cut back because the emphasis of broadcasting funded by the American federal government is being shifted to Arab countries. RFE will continue broadcasting to other countries of the former Yugoslavia, Serbia, including in Albanian for Kosovar-Bosnia, Macedonia, and also to Moldova, Belarus, Ukraine, and Russia.

The $8.8 million budget cut will affect 46 staff positions at

RFE and 36 positions at the Voice of America, which is to cease its broadcasts in Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Slovene, Slovak, and Romanian.

Voice Of The Mediterranean Falls Silent

The Maltese-based international broadcaster Voice of the Mediterranean (VOM) closed down its shortwave broadcast in January. The station was supposedly jointly financed by the Maltese and Libyan governments, but according to Maltese government sources the Libyans have not made any payments since 1998. This meant that the radio station could no longer be viable and there was nothing to do but to close it down. Despite that, the station launched its fourth website in a relatively short time. The contract to run the website was awarded to a Maltese Internet company that employs the son of VOM station manager Richard Muscat. According to the Maltese government, Libya has now informed it that it no longer wishes to finance the station, so the government decided to close it down.

The station's mission was to promote Mediterranean culture, primarily the Maltese culture and identity, and to encourage people from different cultures to identify what can unite them in order to promote peace in the region.

Mugabe Plans "Propaganda Radio Station"

According to reports from Zimbabwe quoted by South Africa's *Sunday Independent*, President Robert Mugabe is planning a series of measures to counter negative reporting of his regime. Sources close to the Mugabe government say that the Department of Information is preparing to spend billions of Zimbabwe dollars on technology to monitor, and potentially censor, Internet activity. Among other measures mentioned by the South African report are "a propaganda radio station" which "would be broadcasting 24 hours a day to worldwide audiences." Mugabe recently addressed the World Summit on the Information Society and accused Britain of using the Internet as a tool in trying to re-colonize the Third World.

SGC Mourns Loss

SGC, Inc., recently announced the passing of its founder and president, Pierre Goral on February 12, 2004. Pierre was an internationally recognized designer, entrepreneur, and leader in the field of RF engineering.

The announcement stated,

In his personal life, Pierre was a caring and devoted husband, father, friend, model citizen, and community leader. In his leisure time, he was an artist, photographer, skier, and snowboarder, and demonstrated an appreciation of life in everything he did. He led an adventurous life, working in the jungles of Brazil as a young engineer, and traveling the world to represent his company, SGC, Inc., established in 1971. RF engineering was his passion and he devoted himself and his company to producing only the very finest, professional HF SSB products. His emphasis on quality set the standard for the industry.

While the company mourns the loss of such a valuable friend and leader, SGC will continue to move forward and produce products to the standards the industry has come to rely on after more than 30 years of successful business.

Condolences for the family may be sent care of SGC, Inc., 13737 SE 26th Street, Bellevue, WA 98005 or by e-mail to sgc@sgcworld.com.

the propagation corner

by Tomas Hood, NW7US,
pc-prop-man@hfradio.org

up-to-the-minute forecasts helping you get the most from the radio spectrum

Understanding Sporadic-E

While the month of May might be a little early for the sporadic-*E* (*Es*) season, there have already been reports in February for VHF *Es* activity. *Es* is mostly a summer-time phenomenon, though there is normally some *Es* activity during late December and early January. It is well documented that *Es* occurs most often in the summer, with a secondary peak in the winter. These peaks are centered very close to the solstices. The winter peak can be characterized as being five to eight times less that the summer *Es* peak. Can we expect exceptional *Es* propagation during the *Es* season of 2004?

We do not yet fully understand the causes of *Es*. Scientists are still pursuing the cause, or more likely multiple causes, of *Es*. As far back as 1959, 10 distinct types of *Es* and at least nine different theories of causation were offered. The classification of distinct types has been retained, but since the 1960s, the wind shear theory has become one of the most accepted ones.

Wind sheer occurs when the wind blows at different directions and speeds as you increase in height. Simply, the wind shear theory holds that gaseous ions in the *E* layer are accumulated and concentrated into small, thin, patchy sheets by the combined actions of high-altitude winds and the earth's magnetic field. The resulting clouds may attain the required ion density to serve as a reflecting medium for VHF radio waves. Although most research has confirmed a close association between wind shear and *Es*, not all aspects of the *Es* phenomenon can be explained, including its diurnal and seasonal variations.

If wind shear is one of the most pronounced causes of *Es*, what is the trend of our global weather patterns for the winter and spring of 2004 in the Northern Hemisphere? Since warmer ocean waters cause less wind sheer, we would have to watch the Pacific and Atlantic Ocean temperature trends from December 2003 through the summer.

The Ap Index And Understanding Propagation Terminology

The Ap index, or Planetary A index, is a 24-hour averaging of the Planetary K index. The Planetary K index is an averaging of worldwide readings of earth's geomagnetic field. High indices (Kp > 5 or Ap > 20) means stormy conditions with an active geomagnetic field. The more active, the more unstable propagation is, with possible periods of total propagation fade-out. Especially around the higher latitudes and especially at the Polar Regions, where the geomagnetic field is weak, propagation may disappear completely. Extreme high indices may result in aurora propagation, with strongly degraded long distance propagation at all latitudes. Low indices result in relatively good propagation, especially noticeable around the higher latitudes, when transpolar paths may open up. Maximum K-index is 9, and the A-index can exceed well over 100 during very severe storm conditions, with no maximum.

Classification of A-indices is as follows:

A0–A7 = quiet	A30–A49 = minor storm
A8–A15 = unsettled	A50–A99 = major storm
A16–A29 = active	A100–A400 = severe storm

Solar Flux (SFI): This flux number is obtained from the amount of radiation on the 10.7-cm band (2800 MHz). It is closely related to the amount of ultraviolet radiation, which is needed to create the ionosphere. Solar Flux readings are more descriptive of daily conditions than the Sunspot Number. The higher the Solar Flux (and, therefore, the higher the Sunspot Number), the stronger the ionosphere becomes, supporting refraction of higher frequencies.

Ionosphere: A collection of ionized particles and electrons in the uppermost portion of the earth's atmosphere, which is formed by the interaction of the solar wind with the very thin air particles that have escaped earth's gravity. These ions are responsible for the reflection or bending of radio waves occurring between certain critical frequencies with these critical frequencies varying with the degree of ionization. As a result, radio waves having frequencies higher than the Lowest Usable Frequency (LUF) but lower than the Maximum Usable Frequency (MUF) are propagated over large distances.

Sunspot Number (SSN): Sunspots are magnetic regions on the Sun with magnetic field strengths thousands of times stronger than the earth's magnetic field. Sunspots appear as dark spots on the surface of the Sun. Temperatures in the dark centers of sunspots drop to about 3700° K (compared to 5700° K for the surrounding photosphere). This difference in temperatures makes the spots appear darker than elsewhere. Sunspots typically last for several days, although very large ones may last for several weeks. They are seen to rotate around the sun, since they are on the surface, and the sun rotates fully every 27.5 days.

Sunspots usually occur in a group, with two sets of spots. One set will have positive or north magnetic field while the other set will have negative or south magnetic field. The field is strongest in the darker parts of the sunspots (called the "umbra"). The field is weaker and more horizontal in the lighter part (the "penumbra").

Galileo made the first European observations of sunspots in 1610. The Chinese and many other early civilizations have records of sunspots. Daily observations were started at the Zurich Observatory in 1749; continuous observations were begun in 1849.

The sunspot number is calculated by first counting the number of sunspot groups and then the number of individual sunspots. The "sunspot number" is then given by the sum of the number of individual sunspots and 10 times the number of groups. Since most sunspot groups have, on average, about 10 spots, this formula for counting sunspots gives reliable numbers even when the observing conditions are less than ideal and small spots are hard to see. Monthly averages (updated monthly) of the sunspot numbers show that the number of sunspots visible on the sun waxes and wanes with an approximate 11-year cycle.

For more information, see http://prop.hfradio.org.

Optimum Working Frequencies (MHz) - For May 2004 - Flux = 94, SSN = 38 - Created by NW7US

UTC TO/FROM US WEST COAST	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CARIBBEAN	23	23	23	22	20	18	17	16	14	13	13	12	13	15	17	18	19	20	21	22	22	23	23	23
NORTHERN SOUTH AMERICA	30	30	29	27	25	23	21	19	18	17	16	15	15	18	20	23	25	26	27	28	29	30	30	30
CENTRAL SOUTH AMERICA	29	26	24	22	20	19	18	17	16	15	14	17	17	19	22	24	26	28	29	30	31	31	32	31
SOUTHERN SOUTH AMERICA	25	19	17	16	16	15	14	14	13	13	13	13	12	16	19	22	24	25	27	28	29	30	30	28
WESTERN EUROPE	12	12	11	10	10	12	14	13	12	11	11	15	17	18	19	20	21	21	21	21	20	19	18	16
EASTERN EUROPE	10	10	9	9	13	16	14	12	11	11	10	10	15	17	19	20	20	20	19	18	17	15	11	10
EASTERN NORTH AMERICA	27	27	26	26	25	23	21	19	18	16	15	15	17	19	21	23	24	25	26	26	27	27	27	27
CENTRAL NORTH AMERICA	15	15	15	15	14	14	13	12	11	10	9	8	8	10	11	12	13	14	14	14	15	15	15	15
WESTERN NORTH AMERICA	8	8	8	8	8	7	7	6	6	5	5	4	4	4	5	6	6	7	7	7	8	8	8	8
SOUTHERN NORTH AMERICA	25	24	24	24	23	22	20	19	17	16	15	14	13	14	16	18	20	21	22	23	23	24	24	24
NORTHERN AFRICA	17	15	14	13	12	12	14	13	12	12	13	16	18	19	20	20	21	21	22	22	21	21	20	18
CENTRAL AFRICA	18	17	16	15	14	15	14	13	12	11	11	15	17	19	20	20	21	21	22	22	22	22	22	20
SOUTH AFRICA	17	16	15	14	14	13	16	18	17	15	15	17	19	21	22	24	24	25	26	24	22	21	19	18
MIDDLE EAST	14	13	13	14	16	16	13	12	11	11	10	12	16	18	19	20	21	21	21	20	19	18	16	15
JAPAN	21	22	22	21	21	21	20	19	19	17	16	14	13	13	15	14	13	12	13	15	17	18	19	20
CENTRAL ASIA	22	21	21	21	21	20	20	19	18	17	16	14	14	14	16	17	18	17	16	15	14	16	18	20
INDIA	19	19	19	19	19	18	16	13	12	11	10	10	10	10	10	9	9	9	9	12	15	16	17	18
THAILAND	18	20	21	21	21	20	20	19	18	16	14	13	12	13	16	17	19	18	17	16	15	14	14	16
AUSTRALIA	30	32	32	32	32	31	31	30	27	25	23	21	19	18	17	16	15	15	14	14	17	23	26	29
CHINA	20	21	21	21	21	20	19	18	17	15	13	12	12	12	15	17	15	14	13	13	15	17	18	19
SOUTH PACIFIC	31	31	31	31	30	28	25	19	17	16	15	15	14	14	13	13	13	13	12	23	26	29	30	30

UTC TO/FROM US MIDWEST	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CARIBBEAN	26	26	26	25	23	21	19	17	16	15	14	14	15	17	19	21	22	23	24	25	26	26	26	26
NORTHERN SOUTH AMERICA	28	27	27	24	22	20	19	17	16	15	14	14	14	17	19	21	23	24	25	26	27	27	27	28
CENTRAL SOUTH AMERICA	29	26	24	22	20	19	18	17	16	15	14	16	18	21	23	25	26	28	29	30	30	31	31	31
SOUTHERN SOUTH AMERICA	24	19	18	17	16	15	14	14	13	13	13	13	16	18	21	23	25	26	28	29	30	30	29	27
WESTERN EUROPE	16	13	12	12	11	11	14	13	13	15	17	18	19	19	20	20	21	21	21	21	20	20	19	17
EASTERN EUROPE	10	10	10	9	9	14	13	12	11	12	15	17	19	20	20	21	21	20	20	19	18	17	14	11
EASTERN NORTH AMERICA	19	19	19	18	17	16	14	13	12	11	11	11	12	14	15	16	17	18	19	19	19	20	20	20
CENTRAL NORTH AMERICA	9	9	9	9	8	8	7	6	6	5	5	5	5	6	7	7	8	8	8	9	9	9	9	9
WESTERN NORTH AMERICA	15	15	15	15	14	14	13	12	11	10	9	8	8	10	11	12	13	14	14	15	15	15	15	15
SOUTHERN NORTH AMERICA	17	17	17	17	16	15	13	12	11	11	10	9	9	11	12	13	14	15	16	16	17	17	17	17
NORTHERN AFRICA	21	19	18	16	15	15	15	14	13	13	16	17	19	20	20	21	22	22	22	22	22	22	22	22
CENTRAL AFRICA	18	17	16	15	14	14	15	14	13	14	16	18	19	20	20	21	22	22	22	22	22	22	22	20
SOUTH AFRICA	16	15	15	14	14	13	14	20	19	17	17	19	22	24	26	28	29	30	27	24	21	20	18	17
MIDDLE EAST	15	13	12	12	15	15	14	13	13	15	17	18	19	20	20	21	21	22	22	21	20	19	17	16
JAPAN	21	21	21	20	20	19	19	18	16	15	14	14	16	17	16	14	13	13	13	16	17	19	20	20
CENTRAL ASIA	22	21	21	21	20	19	18	17	15	14	13	13	15	17	18	19	19	17	16	15	14	16	18	20
INDIA	13	15	16	17	17	15	13	12	11	11	11	15	17	18	17	16	15	12	10	10	9	9	9	9
THAILAND	18	20	21	20	19	18	17	14	13	12	12	12	15	17	19	20	20	19	17	16	15	14	14	15
AUSTRALIA	31	32	32	32	31	30	29	26	24	22	20	19	18	17	17	16	15	14	14	13	18	24	27	29
CHINA	20	21	21	20	19	18	17	14	13	12	12	12	16	17	18	17	16	14	13	13	15	17	18	19
SOUTH PACIFIC	31	31	31	30	29	27	23	17	16	15	14	14	13	13	13	13	13	12	14	24	27	29	30	31

UTC TO/FROM US EAST COAST	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CARIBBEAN	21	21	20	19	17	16	14	13	12	12	11	11	13	15	16	17	18	19	20	20	21	21	21	21
NORTHERN SOUTH AMERICA	24	24	23	21	19	17	16	15	14	13	12	12	14	16	18	20	21	22	23	23	24	24	24	24
CENTRAL SOUTH AMERICA	28	26	24	22	20	19	17	16	15	15	14	17	20	22	24	25	27	28	29	29	30	30	30	30
SOUTHERN SOUTH AMERICA	23	19	18	17	16	15	14	14	13	13	13	13	18	21	23	25	26	27	28	29	30	30	29	27
WESTERN EUROPE	17	16	14	13	13	14	13	12	12	14	16	17	18	19	20	20	20	20	20	20	20	19	19	18
EASTERN EUROPE	12	11	10	10	10	14	13	13	14	16	17	19	20	20	21	21	21	21	20	20	19	18	16	13
EASTERN NORTH AMERICA	9	9	9	8	8	7	6	6	5	5	5	5	6	7	7	8	8	9	9	9	9	9	9	9
CENTRAL NORTH AMERICA	21	20	20	19	18	17	15	14	13	12	11	11	13	15	16	17	18	19	20	20	20	21	21	21
WESTERN NORTH AMERICA	27	27	27	26	25	23	21	19	18	16	15	15	16	19	21	23	24	25	26	26	27	27	27	27
SOUTHERN NORTH AMERICA	21	21	21	20	19	17	15	14	13	12	11	11	12	14	16	17	18	19	20	20	21	21	21	21
NORTHERN AFRICA	21	19	18	16	15	14	14	15	15	16	19	21	22	24	25	26	26	27	27	27	27	26	25	23
CENTRAL AFRICA	18	17	16	15	14	14	15	15	15	16	19	21	22	24	25	26	26	26	26	26	26	24	22	20
SOUTH AFRICA	16	15	15	14	14	13	14	18	17	16	18	20	23	25	26	28	29	30	27	24	21	20	18	17
MIDDLE EAST	18	17	16	15	15	15	14	13	12	15	17	18	19	20	21	21	22	22	22	23	22	22	22	20
JAPAN	21	21	20	20	19	17	16	15	13	13	15	17	18	17	16	15	13	13	14	16	18	19	20	21
CENTRAL ASIA	20	20	20	19	18	17	16	14	14	15	16	18	18	19	20	20	19	18	17	15	15	15	18	20
INDIA	10	9	9	9	14	15	14	13	14	16	18	19	19	20	20	20	19	19	18	17	15	11	10	10
THAILAND	17	19	19	18	17	15	14	13	13	15	17	18	19	20	21	21	21	20	18	17	16	15	14	14
AUSTRALIA	31	32	31	31	30	27	25	23	21	19	18	17	17	17	16	15	15	14	14	13	20	25	28	30
CHINA	19	20	19	19	18	16	14	13	13	15	17	18	19	19	19	18	17	15	14	14	15	17	18	19
SOUTH PACIFIC	31	31	30	29	28	25	21	16	15	15	14	14	13	13	13	13	12	12	18	24	27	29	30	31

The period from 1995 to 2003 has been the most active for Atlantic hurricanes in the historical record. Since 1995 seven of nine seasons have been above normal (the exceptions being the El Niño years of 1997 and 2002). At the same time, the eastern Pacific Ocean region is expected to have a normal to possibly a lower-than-normal amount of heavy storm activity. Scientists base this prediction on the confluence in time of La Niña, with a multidecadal pattern of tropical rainfall that supports hurricane activity. In the years when El Niño dominated (1997 and 2002), the presence of El Niño suppressed hurricane activity in the Atlantic. The *Es* summer season of 2002 was intense. There seems to be a clear correlation between the increased wind sheer (resulting in less hurricane and severe storm activity) and *Es* activity.

In 2003, the prediction was that El Niño would again dominate. But as El Niño petered out in March and April, signs of cooling in the Pacific Ocean in May indicated that La Niña was close on its heels. The stepping in of La Niña at the beginning of the hurricane season is a situation that has only arisen twice in the last eight hurricane seasons. Both 1998 and 1999 had moderate-to-strong La Niña episodes during the months between July and December, according to NOAA. Hurricane Mitch, for example, was one of the strongest storms ever recorded in the Atlantic and first began as a tropical depression on October 22, 1998, according to the National Climatic Data Center.

La Niña's typically cooler-than-normal temperatures in the Pacific Ocean influence the global atmospheric conditions and make for an active Atlantic hurricane season. In El Niño or neutral years, wind directions and speeds create a high vertical wind shear between the lower and upper atmospheres, such that the weaker westerly jet stream winds cut off the tops of storms that develop in the strong easterly trade winds. When La Niña enters the scene, it tends to strengthen the upper-level winds and cause the lower trades to lose their gusto. "La Niña tends to make winds more uniform as you go up through the atmosphere," says senior research scientist Gerry Bell of NOAA's Climate Prediction Center. "La Niña contributes to more hurricane activity primarily by acting to decrease the vertical wind shear in the heart of the main development region."

Looking at the data for the summer of 2003, La Niña did not play a significant role. Yet, neither did El Niño. The Climate Prediction Center reports that sea-surface temperature anomalies in the Niño regions increased during early June through early July, but then decreased during the last half of July and remained fairly steady during August 2003.

2004: Elevated Hurricane Activity?

Weather experts predict that 2004 will be a year of elevated hurricane and storm activity in the Atlantic region. Based on the outlook for the Pacific region with a normal season expected in the Pacific and with an elevated activity level predicted for the Atlantic region, we can expect moderate to strong *Es* activity this summer (2004). According to the Climate Prediction Center, the possibility of a development of either El Niño or La Niña is low during 2004. You can view up-to-date climate information at http://www.cpc.ncep.noaa.gov/products/predictions/.

How can we know when a *Es* opening is occurring? Several e-mail reflectors have been created to provide an alerting service using e-mail. One is found at http://www.gooddx.net/ and another at http://www.vhfdx.net/sendspots/. These *Es* alerting services rely on live reports of current activity on VHF. When you begin hearing an opening, you send out details so that everyone on the distribution will be alerted that something is happening. They, in turn, join in on the opening, making for a high level of participation. Of course, the greater number of operators on the air, the more we learn about the extent and intensity of the opening. The bottom line is that you cannot work *Es* if you are not on the air when it occurs.

In addition to live reporting, there is a very powerful resource available on the Internet. Check out http://superdarn.jhuapl.edu/. SuperDARN (Super Dual Auroral Radar Network) is an international radar network for studying the earth's upper atmosphere and ionosphere. Using the SuperDARN real-time data 24-hour overview, you can view the day's ionization activity at the northern polar region. You may also view live radar displays of the same area. These graphs help identify *Es* clouds existing in the higher latitudes. One use for this would be the detection of a variation of *Es*, known as auroral *E*.

Michael Hawk has written an informative overview of *Es*. You may read it online at http://www.amfmdx.net/propagation/Es.html. In next month's column, we'll look closer at working *Es* on VHF, UHF, and the upper HF spectrum.

Current Solar Cycle 23 Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for January 2004 is 37, down from December's 47. The 12-month running smoothed sunspot number centered on July 2003 is 62, down from June's 65. The lowest daily sunspot value during January 2003 was recorded on January 27, with a count of zero. The highest daily sunspot count for January was 61 on both January 20 and 21. I expect to see an increase of days with zero sunspots, now that we are well into the decline of the current solar cycle. A smoothed sunspot count of 35 is expected for May 2004.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-centimeter observed monthly mean solar flux of 114 for January 2004, down only one point from December 2003. The 12-month smoothed 10.7-centimeter flux centered on July 2003 is 130, slightly down from June's 133. The predicted smoothed 10.7-centimeter solar flux for May 2004 is about 94, give or take about 20 points.

The observed monthly mean planetary A-Index (Ap) for January 2004 is 20. The December 2003 figure has been adjusted from 17 to 18. The 12-month smoothed Ap index centered on July 2003 is 22, just about the same as for June 2003. Expect the overall geomagnetic activity to be active during May.

HF Propagation

On the higher HF frequencies (16 through 11 meters), fairly good daytime openings should be possible on north/south paths, but in shorter windows. As we move closer to summer, daytime DX signals on 16 through 11 meters will become weaker and openings more sparse than during the fall and winter seasons. As the days grow longer in the Northern Hemisphere, the sun heats up and thins the ionosphere. With less ionization, the maximum frequency refracted is lower than during colder months. By June, this thinning causes a real reduction in the MUF. Sixteen meters will be the best bet out of the higher bands, not only because of propagation, but also because more international broadcasters will still use this band around the clock.

Most DX signals, and the strongest signals, will be found on lower bands. Look for peaks in signals around the hours of sunrise, and again just before sunset, and into the late evening. Daytime paths are best when they terminate in areas where it is night. This enhances propagation to remote parts of the world and lengthens the DX window. Twenty-five and 22 meters will have more stable signals than will 19 meters, especially on north/south paths, again around the hours of sunrise and sunset. Thirty-one meters again becomes one of the strongest and most reliable bands, although you will find it congested. Look for Europe and Africa early in the morning through late morning, then north/south openings during the day if the solar activity is low (otherwise the *D* layer absorption will wipe out the band). As sunset approaches, look for South Pacific, then Asia as the sun sets.

During the night, 41 through 60 meters should provide good openings from Europe, Africa, and the east. Some DX should be possible on 75 through 120 meters, but signals are expected to be mainly weak and covered by seasonal noise. Static levels also increase noticeably during May, and signals may sound weaker on DX openings during the daylight hours.

VHF Conditions

Possible *Es*, transequatorial propagation (TEP), and an occasional auroral event will keep the VHF enthusiast happy. Solar activity will not likely be high enough for *F*-layer DX opening, though we might be surprised. The best time to look for these openings is during the afternoon hours on those days with high flux readings.

Es ionization is expected to increase considerably during May, and fairly frequent VHF meteor-scatter (Ms) short-skip openings should be possible. These are likely to occur over distances of approximately 1,000 to 1,400 miles. Although *Es* openings can take place at just about any time, the best time to check is between 10 a.m. and 2 p.m. and again between 6 and 10 p.m. local daylight time.

A seasonal decline in transequatorial (TE) propagation is expected during May. An occasional opening may still be possible on VHF. The best time to check for VHF TE openings is between 9 and 11 p.m. local daylight time. These TE openings will be north-south paths that cross the geomagnetic equator at an approximate right angle.

Auroral activity is generally lower in March and April, due to the change in the orientation and position of the earth and magnetosphere in relation to the solar wind. Watch for Kp values above 6, which occur on days of disturbed HF conditions.

Major Meteor Shower

One major meteor shower, the Eta Aquarids, will occur in May. The Eta Aquarids peak in the morning of May 5, but start around May 1, 2004. This shower has a peak rate of up to 20 to 50 per hour. Most meteor showers are at their best after midnight. After midnight, you're on the leading edge of the earth and you're meeting the meteors head-on. Before midnight, you're on the trailing edge of the earth and the meteors have to catch up to you. As a result not only are more meteors seen in the pre-dawn hours, but their impact speeds as they encounter the earth's atmosphere are much higher and the meteors are generally faster and brighter. This causes greater ionization, which is what you use to refract a radio signal. Look for TV and FM broadcasts during these events. If you are an amateur radio operator, look for 6- and 2-meter openings off of the ionized meteor trails.

I'd Like To Hear From You

Be sure to check out the latest conditions, as well as the educational resources about propagation, which I have put together for you at http://prop.hfradio.org/. I also provide a WAP/WML resource for wireless devices. If you want the latest propagation information, like the solar flux, Ap reading, and so forth, check out http://wap.hfradio.org/, the wireless version of my propagation site. Finally, you can join in with others in discussing space weather, propagation, and shortwave or VHF listening, at http://hfradio.org/forums/.

Write me! Is there something you'd like to learn more about? Let me know. ■

Tuning In *(from page 4)*

This isn't the first time a high-tech wonder has made me crazy, and it probably won't be the last. But isn't it strange that with all the radios – handheld mega-channel scanners, state-of-the-art ham gear, automatic-band-adjusting antennas and monitoring gizmos with push-buttons for every conceivable function, that a simple telephone goes whacky? I think it's what we've been covering here in Pop'Comm for years: when push comes to shove, grab a basic radio with some alkaline batteries. No airtime charges, no credit checks, no hassles, just good old-fashioned communications as it should be.

As for TracFone Wireless – well, they've got problems – customer service problems. I made six calls to them, got only one part of my problem resolved, and so ended up e-mailing the corporate offices a short explanation with my home phone number.

At that point wouldn't you think they'd call me offering apologies and assistance? Nope, not a chance. The e-mail response from the Executive Resolution Department said, "In order for me to further assist you, I will need to verbally speak to you. Please contact me at the number listed below to have this issue resolved."

What's wrong with this picture? My Dad was a welder and lawn mower repairman. (Those were the days when we actually fixed things and didn't throw them out). Imagine someone calling him six or more times, sending a letter, and he *still* asks the customer to call him? Not in a million years! Problem today is most large companies don't really care if a few hundred folks go away – they figure there are another thousand out there to take their place.

So, I dutifully called TracFone as requested. Now, please sit down for this one. Five – yes, five – calls to them in three-days finally got a callback. In order for them to resolve the roaming issue I had to return the phone which I did that day. It was another eight days before I received a replacement reconditioned digital phone after they received mine in two days.

It's one of those smaller phones, but that's OK. After all my hassles you'd think they would have included an owner's manual. ■

global information guide

listening to what your world says every day

by Gerry L. Dexter

All India Radio Considers Ending SW Broadcasting, And "Global" Now Includes Pirate/Clandestine Stations

Editor's Note: You'll spot some changes in the column starting this month. Pop'Comm *"Pirate" guy Ed Teach reportedly found a treasure map so he has retired to a small house on a hidden cove on an unspecified island in the Caribbean. So, beginning with this issue your pirate logs will be included in this column, and in the future you can submit them directly, as you do your regular SWBC loggings. The same now holds true for clandestine logs as well. Logs can me mailed to* Pop'Comm *headquarters in Hicksville, e-mailed to me at Popularcom@aol.com, or mailed direct, as you prefer. Please list your clandestine logs under "Clandestine" and include the target country if possible. Needless to say, regular shortwave broadcast logs will continue to be the column's mainstay and, as always, we encourage you to participate as fully and frequently as you can.*

The latest "Bummer of the Month Club" offering is the very disturbing news that the bosses at **All India Radio** (AIR) are considering ending shortwave broadcasting, despite having put a few gazillion rupees into facilities in recent years. (Send your response card back and check the "no" box.) There's been no definite decision as of this writing, so letters to the Director General at AIR in New Delhi wouldn't be a bad idea.

China National Radio—those are the mainland guys—has made some changes in the so-called "Taiwan" service. It's been split into two distinct sections: "Zhonghua Zhisheng" (the" Voice of China" to you) will emphasize mostly news, commentary, and so on, and Shenzhou Zhisheng (Voice of the Devine Land) emphasizing music, culture, and other arts, with a lot of the programs in the Amoy and Hakka dialects.

Speaking of Taiwan, "Truth for the World" is a fairly new religious broadcast carried on China Broadcasting System facilities. It's airing on **7220** from1400 to 1430. Another new broadcast is the **Voice of China**, using **7270** from 1430 to1530. This is the creation of a group called the Foundation for China in the 21st Century, operating out of Concord, California. The program is designed for mainland listeners.

Why are things so confusing when it comes to the question of who is broadcasting from where? A recent Deutsche Telekom (DTK) schedule is a case in point. Here's a list of what that organization is carrying via their transmitters at Julich and/or Wertachtal:

Voice of Croatia
Gospel for Asia
Voice of Russia
Radio Africa International
IBRA Radio
Swiss Radio International
Deutsche Welle (imagine that!)
TDK Systems
Radio Free Europe/Radio Liberty
WYFR
Voice of America
HCJB
Radio Taiwan International
Democratic Voice of Burma
Bible Voice Broadcasting Network
Pan American Broadcasting
Universal Life (Universelles Leben)
Overcomer Ministry (Brother Stair)
RTBF (Belgium)
Trans World Radio
Adventist World Radio
Radio Vlaanderen International
Voice of Democratic Path of Ethiopian Unity
Christian Science Monitor/WSHB
Radio Rainbow
Evangelumsradio Hamburg
Evangelische Missions
Radio Rhino International Africa
Voice of Democratic Eritrea
Voice of Ethiopian Salvation
Radio Huriyo (to Somalia)
Voice of Oromo Liberation
Radio Reveil Paroles de Vie

And that's just one example. Never mind the many outlets operated by VT Merlin (all of the former BBC-run home and relay sites), Sentech's Meyerton site in South Africa, or the numerous other broadcasters renting time to other program producers here and there.

Most of these outfits are radio stations in every aspect but one: they neither own nor operate a transmitting facility. They are simply programmers who hire someone else to see to the technical side of things and handle the actual signal transmission. Now, there's nothing really wrong with this, but logging these broadcasters has a sort of kissing your sister aspect to it!

We had half expected the Korean language SSB broadcasts of the **Full Gospel Church** in the Canary Islands wouldn't last more than a few months, but here we are some two years later and they're still going on **6715** (varying lately to 6719). The majority of DXers in North America haven't heard this one, though, due to the time/frequency pairing (we're working with daylight hours on a band that doesn't "play" during those times). The winter months are the best for pursuing this one.

The **Burmese (Myanmar) Defense Forces Station**, formerly heard on 6570 occasionally in the mornings, has dropped down to **5770**. Check for it around 1330 sign on.

WJIE notes that its **Voice of Liberty** station in Liberia is now up to half power, although by the time you read this it may be at its full 5 kW on **11515**. The station notes that the transmitter is that of the former High Adventure outlet, which operated from Lebanon.

Our book winner this month is **David Jeffery** of New York who receives a copy of the 2004 edition of *Passport to World Band Radio*, courtesy of Universal Radio. If you don't have a

From this isolated cabin somewhere in the woods of Pennsylvania, astounding DX feats are accomplished by these and other guys who now and then hide out there for a weekend at the dials.

copy of their giant catalog yet, why not? It's full of radio goodies of every description. Drop them a note at 6830 Americana Parkway, Reynoldsburg, OH 43068, send an e-mail to dx@universal-radio.com, or call them at 614-866-4267.

Now here's the usual plea for informational support in the form of your loggings (by country, double spaced. your name and state after each) photos of you in your shack (please?), station schedules and information, spare QSLs you don't need returned, station pictures—we welcome whatever you think might be of interest!

Here are the latest loggings. All times are in Coordinated Universal Time (UTC). AA, FF, SS, etc. are language abbreviations (Arabic, French, Spanish, etc.). If no language abbreviation is indicated, the broadcast is assumed to have been in English.

ALASKA—KNLS, **7355** in CC at 1451. (Foss, Philippines) **11870** at 1347. (Brossell, WI)

ALBANIA—Trans World Radio relay, **6235v** at 0600 sign on with religious programming in unid. language. Off at 0615 with IS. (Alexander, PA)

ANTIGUA—BBC relay, **5975** at 0000. (Sanchez, NM) 0300. (Paradis, ME)

ARGENTINA—Radio Nacional/RAE, **11710** with SS news at 2253. (Miller, WA) **15345** in SS at 2208. (Brossell, WI) La Red, **15820 USB** relay at 2352 with talks in SS, 3 + 1 time pips at 0000, ID, news by man. (D'Angelo, PA)

ARMENIA—Voice of Armenia, **9960** in unid. language at 1940. (Paradis, ME)

ASCENSION ISLAND—BBC relay, **12095** at 1430. (Northrup, MO) 1925 to West Africa heard on **15400**. (DeGennaro, NY)

AUSTRALIA—ABC Northern Territories Service, Alice Springs, **2310** at 1503 with news. Also Katherine, **5025** at 1548. (Miller, WA) 1924 with rock vocals. (Foss, Philippines) Radio Australia, **5994** at 1400, **9580** at 1300. (Newbury, NE) **6020** at 1330. (Barton, AZ) 1040. (Miller, WA) 9580 at 1300. (Northrup, MO) **11550** via Taiwan at 2133 in Asian language. Also **11650**, **//11660** at 1402 (Brossell, WI) 2244 in Malay. (DeGennaro, NY) **15240** via Taiwan at 2321. (Jeffery, NY) **21740** at 2130. (Paradis, ME) 2230. (Sanchez, NM)

AUSTRIA—Radio Austria Int., **7325** at 0120, **//9870**. (Newbury, NE) **17855** at 1320. (Foss, Philippines) **17865** via Canada at 1613. (DeGennaro, NY)

BELGIUM—Radio Vlaanderen, **11730** via Bonaire, with news items at 2210. (Newbury, NE)

BENIN—Rdfn do Benin, **7210.2** at 2255 with FF talk & African music. Off with national anthem heard at 2302. (Alexander, PA)

BOLIVIA—La Cruz del Sur, **4876** in SS at 0954. (DeGennaro, NY)

BOTSWANA—VOA relay, **7415** at 0315. (Paradis, ME) **12080** at 1909. (Brossell, WI) **13710** at 2058. (MacKenzie, CA) **17895** at 1948. (Jeffery, NY)

BRAZIL—Radio Clube do Para, Belem, **4855** in PP at 0958 with QRM from co-channel Radio Difusora Acreana. (DeGennaro, NY) Radio Verde Florestes, Cruzeiro do Sul, **4865** with sign on at 1030. (DeGennaro, NY) Radio Bare, Ondas Tropicais, **4895** at 1011 in PP. (DeGennaro, NY) Radio Aparecida, Aparecida, **9630** in PP at 2115. (DeGennaro, NY) Radio Educacao Rural, Tefe, **4925** with ID in PP at 1030. (DeGennaro, NY) 1031. (Jeffery, NY) Radio Senado, Brasilia (t), **5993.2** at 1035 with Brazilian pops ballads, PP political talk. (Alexander, PA) Radio Brazil Central, Goiania, **4895** in PP at 0827. (Jeffery, NY) 11815 at 0115 with PP and US pops, **//4985**. (Alexander, PA) Radio Missoes da Amazonia, Obidos, **4865** in PP at 0948. (DeGennaro, NY) Radio Educadora, Braganca, **4825**, with PP ID at 0945. (DeGennaro, NY) Radio Cultura, Sao Paulo, **9615** in PP with ID at 2211. (DeGennaro, NY) Radio Difusora do Amazonas, Manaus, **4805** in PP with commercials, ID at 1000. (DeGennaro, NY) Radio Rural, Santarem, **4765** in PP with music at 0956. (DeGennaro, NY) Radio Difusora Acreana, Rio Branca, **4885** at 1022 with local talks in PP. (DeGennaro, NY) Radio Nacional do Amazonaia, Brasilia, **6180** in PP at 2329 and 11780 at 0044. (Miller, WA) **11780** in PP at 2140. (Brossell, WI) 0220. (Sanchez, NM)

BULGARIA—Radio Bulgaria, **5800** with ID at 2230. (DeGennaro, NY) **7400** with news at 0000. (Paradis, ME) 7400/9400 with EE open at 0300. (Burrow, WA) 9400 at 0010. (Newbury, NE) **15700** in unid. Slavic language at 1400. (Brossell, WI)

CANADA—CKZN, St. John's, **6160** with regional news at 1031. (DeGennaro, NY) Radio Canada Int'l, **6160** carrying Radio Netherlands program at 0940. (Barton, AZ) **9515** at 1400. (Newbury, NE) **9590** at 2300. (Sanchez, NM) **17860** via Xi'an, China, at 0222 with weather at 0230. (Foss, Philippines)

CHILE—Voz Cristiana, **11745** in SS to Brazil at 0141. (DeGennaro, NY) **15375** in SS at 0310. (Sanchez, NM)

CHINA—China Radio Intl., **5960** via Canada at 1117, IDing as "Radio China International." Also **9640** in SS to Europe at 2119. Also **9755** via French Guiana at 1430 and **9810** from Xi'an at 1128. (DeGennaro, NY) **9560** and 9755 via Canada at 0400. (Sanchez, NM) 9755 at 1400. (Newbury, NE) **9790** via Canada at 0103. (Newbury, NE) **11900** at 1350. (Brossell, WI) **13630** at 2055 with QRM from Cuba jamming Radio Marti. (MacKenzie, CA) **13670** at 1558 via Canada mixing CC and EE. (Barton, AZ) CPBS, **7290** (Beijing) in CC with radio drama at 1551. Also **9810** (Xi'an) at 1546. (Foss, Philippines) **11825** (Shijiazhuang) in CC at 0100. (Sanchez, NM) China Music Jammer, **9875** covering RFA-Palau at 1929. (Brossell, WI)

CONGO (Rep)—Radio Congo, **5985** at 0430 sign on with opening anmt and into African music. Covered by WYFR sign on at 0455. (Alexander, PA) 0622 with FF news. (Miller, WA)

COSTA RICA—Faro del Caribe, **5054.6** at 0337 with inspirational music, man in SS. 0358 with sign off anmts. (D'Angelo, PA) Radio Universidad (t) **6105** at 0445 with segments of non-stop Latin music and some male SS anmts. (D'Angelo, PA)

CLANDESTINE—Voice of the New Sudan (p), **6985** at 0400 with

Abbreviations Used In This Month's Column

//	—	Parallel frequency
ABC	—	Australian Broadcasting Corporation
AFRTS	—	Armed Forces Radio Television Service
AFN	—	Armed Forces Network
AIR	—	All India Radio
anncr	—	announcer
anmt(s)	—	announcement(s)
BSKSA	—	Broadcasting Service of the Kingdom of Saudi Arabia
CNR	—	China National Radio
GOS	—	General Overseas Service
ID	—	identification
Int'l	—	international
IS	—	interval signal
Lang	—	language
LSB	—	lower sideband mode
NBC	—	National Broadcasting Corporation
OA	—	Peru, Peruvian
PBS	—	People's Broadcasting Station
Pgm	—	program
RRI	—	Radio Republick Indonesia
sked	—	schedule
SIBC	—	Solomon Islands Broadcasting Corporation
TOH	—	Top of the Hour
unid.	—	unidentified
USB	—	upper sideband mode
vern	—	vernacular (any local dialect or language)
VOA	—	Voice of America
VOIRI	—	Voice of the Islamic Republic of Iran

local vocals, Big Ben-like chimes at 0406, and talk in language. (Alexander, PA) Voice of the People (to South Korea) **3912** with woman in KK at 1617. Jammed. (Foss, Philippines) Voice of Democratic Eritrea, **9820** via Germany with AA talks at 1624. (Miller, WA) Voice of Oromo Liberation, **9820** via Germany in unid. language at 1554. (Miller, WA) Radio Free Asia, **9905** via Palau in CC at 1633. Extremely strong here. (Foss, Philippines) **11510** via Kazakstan in Asian language at 1240 and **11900** via Tinian in CC at 2150. (Brossell, WI) 13745 via Tinian in CC at 2105. (MacKenzie, CA) 13745 via Tinian in CC at 1530. (Barton, AZ) Radio Farda, (to Iran) **9435** via Greece at 1530 in Farsi. (Barton, AZ) Radio Sawa (to Iraq) **9530** via UK in AA at 2148. (DeGennaro, NY) **11825** at 1858. (Brossell, WI) Echo of Hope (to N. Korea), **3985** in KK at 1856. (Foss, Philippines) Voice of the Tigray Revolution (to Ethiopia) **5500** at 0355 sign on with IS, man anncr in Tigrinya, music segment, opening anmts and news. Talk and flute music from 0410. **//6350**. (D'Angelo, PA; Alexander, PA) Radio Rhino Int. Africa via Germany, **17870** with EE talks, IDs, closing at 1600. (D'Angelo, PA) Voice of Mesopotamia, **11530** at 1344 with music, talk and ID of "Denge Mesopotamia" at 1400. (Brossell, WI)

CROATIA—Voice of Croatia, **7285** heard at 0311 with "Croatia Today." (Burrow, WA)

CUBA—Radio Havana Cuba, **6000** in SS at 1345. (Barton, AZ) **9550** at 0500. (Newbury, NE) **9600** in SS at 1149 and **15120** with sign on in AA at 2030. (DeGennaro, NY) **9820** at 0400. (Sanchez, NM) **11760** at 2050. (MacKenzie, CA)

CYPRUS—BBC Relay, **9410** at 2114. Also **21490** in unid. language at 1438. (Jeffery, NY) **15555** in AA heard at 1426. (Brossell, WI) Cyprus Broadcasting Corp via BBC relay, **9760** in Greek at 2223. (DeGennaro, NY)

CZECH REPUBLIC—Radio Prague Intl., **6200//7345** at 0420 to sign off at 0427. (Burrow, WA) **5930** in Czech at 2224, 7345 at 2251 and **9880** in GG at 1104. (DeGennaro, NY) **21745** in unid. language at 1032. (Foss, Philippines)

DOMINICAN REPUBLIC—Radio Cima Cien, **4959.6** at 2213 with merengue and salsa music and SS talks. (DeGennaro, NY) Radio Pueblo, **5009.9** in SS at 1101 sign on with military march. (DeGennaro, NY)

ECUADOR—Centinela del Sur, Loja, **4773.6** with SS talks and brief music bits at 1115. (Alexander, PA) La Voz del Napo, Tena, **3280** in SS/QQ at 1046. (DeGennaro, NY) Radio Federacion Sucua, **4960** in QQ at 1121. (DeGennaro, NY) Radio El Buen Pastor, Saraguro, **4814** with religious talks in QQ at 1045. (DeGennaro, NY) Radio Quito, **4919** with SS discussion at 1057, ID at 1100. (DeGennaro, NY) HCJB, **3220** in SS/QQ at 1048. (DeGennaro, NY) **11980** in GG at 2309. (Foss, Philippines) **15140** in SS heard at 2200. (Sanchez, NM) 2309. (Barton, AZ)

EGYPT—Egyptian Radio/Radio Cairo, **9990** with EE news at 2152. (DeGennaro, NY) **11725** (t) at 2301 with time pips (late), poor modulation and decreasing strength. (Burrow, WA) **11780** in AA at 0243. (Miller, WA) to close at 0329. (Barton, AZ)

ERITREA—Voice of the Broad Masses, **7100** at 0355 sign on with IS, talk in vernacular at 0400, Horn of Africa music. (Alexander, PA)

EL SALVADOR—Radio Imperial, **17834.9** heard at 2304 with variety of SS pops and ballads, SS rap and talk, ID at 2314 and sign off around 2350. (Alexander, PA)

ENGLAND—BBC, **6110** via Greenville, in SS to South America at 1125. Also **6195** via Antigua at 1025 and **12095** at 1522. (DeGennaro, NY) Sudan Radio Service via UK, **15530** at 1500 ending VOA programming, then detailed EE sign on for Sudan Radio Service, address in Kenya. Monday-Friday only. Into unid. language at 1505. (Alexander, PA) 1615 with music and AA talk. (Miller, WA)

FRANCE—Radio France Int., **6175** in SS at 1028, off at 1030. Also **17850** in EE to Central and Southern Africa at 1617. (DeGennaro, NY) **11615** with world news at 1700. (Miller, WA)

FRENCH GUIANA—Radio France Int., **23185** in FF at 1512. (Jeffery, NY)

GABON—Africa Number One, **9580** with world news in FF at 2100. (Miller, WA) 2229 in FF with songs. (DeGennaro, NY) **15475** in FF at 1710. (Brossell, WI)

GERMANY—Deutsche Welle, **6100** in GG at 0430. (Sanchez, NM) **11690** via Canada in GG at 2300. (Newbury, NE) **21780** in AA at 1522. (Jeffery, NY) **21840** in Swahili at 1553. (DeGennaro, NY) Deutschland Radio, Berlin, **6005** in GG at 2251. (DeGennaro, NY) Bayerischer Rundfunk, **6085** with discussion in GG at 2239. (DeGennaro, NY)

GHANA—Ghana Broadcasting Corp., **4915** with EE talk, news at 2207. (DeGennaro, NY)

GREECE—Voice of Greece, **9690** with talk show in Greek at 1212. (Miller, WA) **9420** in Greek at 2107, **17565** via Greenville in Greek at 2012 and **17705** via Delano in Greek at 2015. (DeGennaro, NY) RS Makedonias, (t) **9420** in Greek at 2239. (DeGennaro, NY) **9935** in Greek at 2250. (Brossell, WI) VOA Relay, 11715 at 1358 with website address, ID and into unid language. **15205** with jazz at 1410. (Brossell, WI)

GUATEMALA—Radio Verdad, **4052.7** at 0320 with long marimba pieces and woman with SS anmts. (Strawman, IA) Radio Buenas Nuevas, San Sebastian, **4800** at 1042 with songs and SS religious messages. (DeGennaro, NY) 1204 with children singing, man in SS. (D'Angelo, PA) Radio Maya, Barillas, **3224.8** at 0320 with local programming, SS talk. Off abruptly at 0330. Also noted 0923 to past 1000. (Alexander, PA) 1052 in SS and unid language. (DeGennaro, NY) Radio K'ekchi, **4845** at 0255 with ballads, ID, talk. Off at 0330. (Alexander, PA) 1215 in SS. (Brossell, WI)

GUAM—AFN/AFRTS, **5764 USB** with sports heard 1552. (Miller, WA) Adventist World Radio/KSDA, **15275** in unid Asian language at 1420. (Brossell, WI) Trans World Radio/KTWR, **12130** with ID heard at 2200 and into CC. (Brossell, WI)

GUINEA—RTVG Guinnenne, **7125** with FF talks and highlife music at 2213. (Brossell, WI) 2300 with FF talks and Afro-pops to 0001 off. (Alexander, PA)

GUYANA—Voice of Guyana, **3291.1** at 0250 with pop tunes, ID at 0327. (D'Angelo, PA) 0930 with birthday greetings. (Wilkner, FL)

HONDURAS—Radio Luz y Vida, San Luis, **3250** at 0355 with SS talk, closing ID and anmts, national anthem and off a t 0404.

(Alexander, PA) Radio Misiones Internacionales/HRMI, **3340** at 0400 with SS religious programming, SS ballads. Off at 0502. (Alexander, PA)

HUNGARY—Radio Budapest, **9825** with songs of the '30s and '40s at 2235. (DeGennaro, NY)

INDONESIA—RRI-Pontinak, **3980** in II heard at 1540. (Miller, WA) RRI Fak Fak, **4790** in II at 1248. (Strawman, IA) RRI-Jambi, **4925** with call, INS and domestic music in II heard at 1415. (Foss, Philippines) RRI-Cimamggis, **9680** in unid. language at 1124. (DeGennaro, NY)

INDIA—All India Radio, **4790** (Chennai) 0100 with Subcontinental music, talk in unid. language. Off at 0115. (Alexander, PA) **4860**, Delhi at 1230 with EE ID and news. (D'Angelo, PA) 1250 with Hindi music. Also **5010,** Thiruvananthapuram at 1258 in unid language. (Miller, WA) **9445**—Bangalore in EE at 2216 and **13710** Bangalore in Hindi at 1125. (DeGennaro, NY) **10330** in presumed Hindi at 1407. (Brossell, WI)

IRAN—VOIRI, **11950** in presumed Farsi at 1357. (Brossell, WI)

ISRAEL—Kol Israel, **9390** in HH at 2210, **9435** in FF at 2041. (DeGennaro, NY) **11605** in HH at 1945. (Miller, WA) 2027 with IS, ID "Ici Israel" and into FF at 2030. (Brossell, WI)

ITALY—RAI Intl, **9515** in EE at 2035, **9675** with discussion in II at 2351 and **11765** via Ascension in II at 0145. (DeGennaro, NY) **11800** in SS at 0300. (Sanchez, NM)

JAPAN—Radio Japan/NHK, **3530** in EE at 1105 (*no listing for this—gld*). **6110** via Canada in JJ at 2249, **6120** via Canada at 1034, **11710** via UK at 1111, **11855** via Ascension at 2100 sign on and **21630** via Ascension in JJ at 1604. (DeGennaro, NY) **6145** via Canada at 0013, **9845** in JJ at 1455 and **11705** in JJ at 1457. (Newbury, NY) **7200** at 1520. (Foss, Philippines) 11855 (Ascension) at 2148 and **11890** via Sri Lanka at 1358 with ID and address before 1400 close. (Brossell, WI) 11855 to Central Africa at 2100. (Paradis, ME) **17825** in EE at 2145. (MacKenzie, CA) 0200 with time pips and ID in JJ. (Sanchez, NM) Radio Nekkei (Tampa) **3925** in JJ at 1024. (Miller, WA) **6055** in JJ at 1225. (Brossell, WI) **9595** in JJ heard at 0830. (Barton, AZ)

JORDAN—Radio Jordan, **9830** in AA a t 1923. (Brossell, WI) 2014 in AA. (DeGennaro, NY)

KUWAIT—Radio Kuwait, **9880** with AA talks at 2100. (Brossell, WI)

LAOS—Lao National Radio, **6130** at 1157 with vocal, seven gongs, instrumentals and man with news in Laotian. (D'Angelo, PA)

LIBYA—Radio Jamahiriya, **15220** (*via France—gld*) with news in AA at 1610. (Miller, WA)

LITHUANIA—Radio Vilnius, **7325** with news at 0030. (Paradis, ME) Discussion at 0034. (Newbury, NE) **9875** with IS and into Lithuanian at 2300. (Miller, WA)

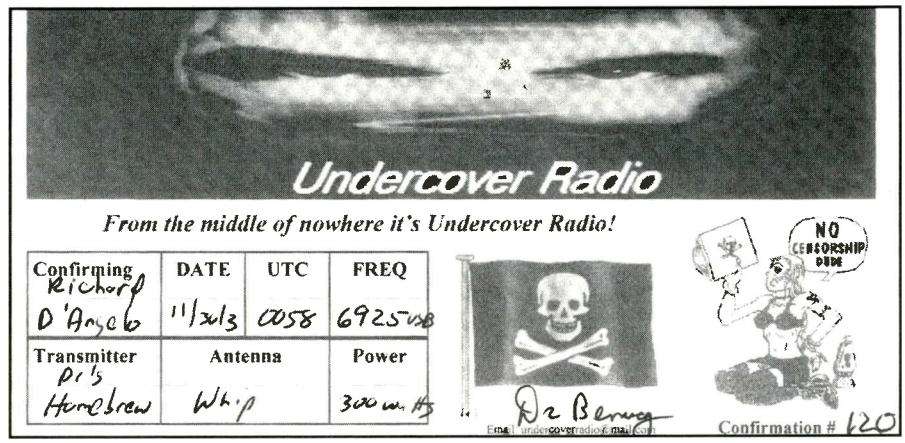
MADAGASCAR—Radio Netherlands relay, **11655** opening at 1800, co-channel QRM from station in SS. (Barton, AZ) 2035 in EE. (MacKenzie, CA) **12080** with news at 1400. (Brossell, WI) 1512. (Foss, Philippines)

MALAYSIA—Radio Malaysia, Kajang, **4845** at 2007. Also **5030**, Kuching, with nice instrumentals at 1317. (Foss, Philippines) Radio Four, **7295** with newsat 1100 with ham QRM. (Alexander, PA)

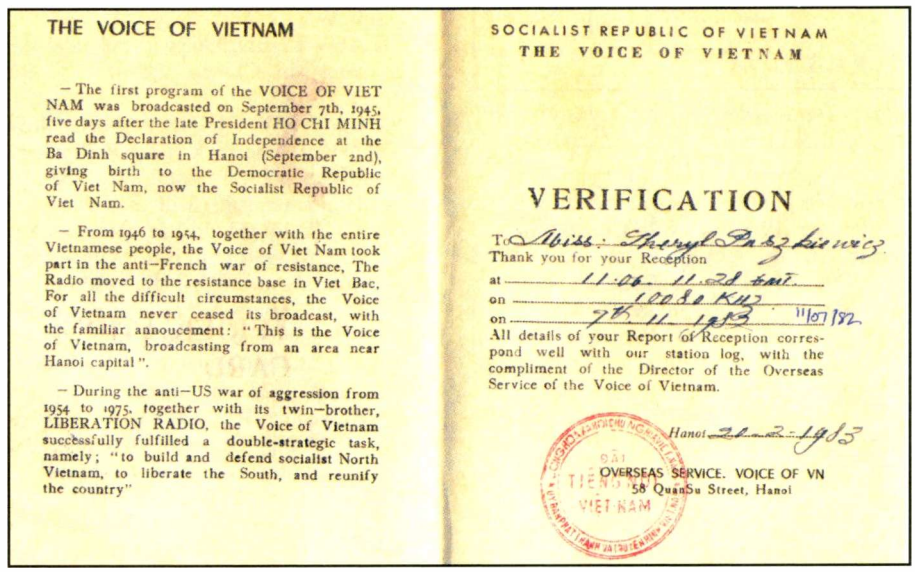
MAURITANIA—Radio Mauritanie, **4845** in AA at 2204. (DeGennaro, NY) 0303. (Miller, WA) 0350 in AA and FF. (Sanchez, NM) **7245** with IS at 0758 sign on and into Koran. (Alexander, PA)

MALI—RTV Malienne, **4835** with FF ID at 2200 and into Koran recitations. Also **5995** at 2230. (DeGennaro, NY) **9635** with news in FF at 1631. (Miller, WA)

MEXICO—XERMX, **4810** at 1125 with religious music, short SS ID at 1130, 1143. Use LSB to avoid "noise blob" always present on the high side. (Alexander, PA) 1322 with clean signal. Carrier off for 30 seconds at 1325. (Strawman, IA) 0315 with non-stop mix of eclectic music, SS ID and frequency anmt at 0335. Again at 1030 with same programming. (D'Angelo, PA) Radio Mexico Int., **9705** at 0155 with SS talk, light instrumental



Undercover Radio sent this QSL "from the middle of nowhere" (Tnx Rich D'Angelo, PA)


THE VOICE OF VIETNAM

– The first program of the VOICE OF VIET NAM was broadcasted on September 7th, 1945, five days after the late President HO CHI MINH read the Declaration of Independence at the Ba Dinh square in Hanoi (September 2nd), giving birth to the Democratic Republic of Viet Nam, now the Socialist Republic of Viet Nam.

– From 1946 to 1954, together with the entire Vietnamese people, the Voice of Viet Nam took part in the anti–French war of resistance. The Radio moved to the resistance base in Viet Bac. For all the difficult circumstances, the Voice of Vietnam never ceased its broadcast, with the familiar annoucement: "This is the Voice of Vietnam, broadcasting from an area near Hanoi capital".

– During the anti–US war of aggression from 1954 to 1975, together with its twin–brother, LIBERATION RADIO, the Voice of Vietnam successfully fulfilled a double-strategic task, namely; "to build and defend socialist North Vietnam, to liberate the South, and reunify the country"

SOCIALIST REPUBLIC OF VIETNAM
THE VOICE OF VIETNAM

VERIFICATION

To Miss: Theryl Przybiewicz
Thank you for your Reception
at 11:06 - 11:28 GMT.
on 11038 KHz.
on 7th. 11. 1983 11/07/82
All details of your Report of Reception correspond well with our station log, with the compliment of the Director of the Overseas Service of the Voice of Vietnam.

Hanoi 20-2-1983
OVERSEAS SERVICE. VOICE OF VN
58 QuanSu Street, Hanoi

The Voice of Vietnam has been issuing this folder QSL for about a hundred years.

Radio Taiwan International is always coming up with attractive new QSL designs.

music, IDs. Only an open carrier after 0230. (Alexander, PA) 0345 with Cuban big band music. (Barton, AZ) Radio Educacion, **6185** with ID heard at 1141. (DeGennaro, NY) 0558 with Mexican music and SS. (Newbury, NE)

MOROCCO—RTV Marocaine, **15345** in AA at 1531. (Foss, Philippines) 1550 in AA. (Barton, AZ) 1920 in AA and SS. (DeGennaro, NY) VOA Relay, **15240** with FF songs and African news in EE at 2038. (Brossell, WI) Radio Medi-un, **9575** in FF and AA at 2332. (DeGennaro, NY)

MYANMAR—Radio Myanmar, **5040.6** at 1205 with nice local vocals and flute music hosted by woman with some Burmese talk, ID, and news at 1230. (D'Angelo, PA) **5985.8** heard at 1255 with bright sounding woman vocal. At 1300 VOA-Thailand signed on and knocked Myanmar far into the background. (Foss, Philippines)

NETHERLANDS—Radio Netherlands, **11655** with news in DD at 1702. (Miller, WA)

NETHERLANDS ANTILLES—Radio Netherlands Bonaire Relay, **6165** with news at 0430. (Sanchez, NM) 9785 to Australasia to 1058 close. Also 17725 at 2019. (DeGennaro, NY) **9845** at 0007. (Newbury, NE)

NEW ZEALAND—Radio New Zealand Int., **9870** heard at 1310 with music, news, coastal weather. (Brossell, WI) 1605 with news, long regional weather forecast. (Barton, AZ) 1651 with bird IS, music and news. (Miller, WA) **9885** at 0839 with classical music. (Jeffery, NY) 1055 with sports interview. (Newbury, NE) **17675** heard at 2302 with news, sports. (Burrow, WA) 0205 with history of '40s-'50s blues recordings on Atlantic. (Foss, Philippines)

NIGERIA—Radio Nigeria, Kaduna, **4770** with ID at 0530. (Paradis, ME) Voice of Nigeria, **15120** at 1945 with Nigerian pops. Off at 1958 to move to 17800 just after Cuba opened on 15120. **17800** heard from 1959 sign on with EE news at 2000. Very strong, distorted, over-modulated here but had been very good on 15120. (Alexander, PA)

NORTH KOREA—Voice of Korea, **9335** with talks in FF at 1412. (Brossell, WI) **9975** in RR at 0745. (Barton, AZ) **11735** at 0110, North Korea being persecuted by U.S. imperialists. (Newbury, NE) Radio Pyongyang, **6250** at 1233 with apparent troop exhortations and martial music. (Brossell, WI) Pyongyang Broadcasting Station, **3250** at 1925 with female vocal. (Foss, Philippines)

NORTHERN MARIANAS—VOA Relay, Tinian, **7235** with Korean at 1250. (Strawman, IA)

OMAN—Radio Oman, **15355** at 1839 with stringed music and talk in AA. (Brossell, WI)

PAKISTAN—Radio Pakistan, **11570** with Koran and unid. language heard at 1333. (Brossell, WI)

PALAU—KHBN, **9965** with talks and religious songs in Chinese heard at 1406. (Brossell, WI)

PAPUA NEW GUINEA—NBC, **4890** 2021 with local time, rock. (Foss, Philippines) 1217 with U.S. pops. (Brossell, WI) 1253 with classical church music. (Miller, WA)

PERU—Radio Madre de Dios, Puerto Maldanodo (p) **4950.1** at 1100. (Wilkner, FL) Radio Cultural Amauta, Huanta, **4955** in QQ at 1038. (DeGennaro, NY) Radio Virgen del Carmen, Huancavelica, **4886.8**, with religious program at 1044. (DeGennaro, NY) Radio Bambamarca, **4428** with SS talk, huaynos at 1035. (Alexander, PA) La Voz de la Selva, Iquitos, **4824.4** at 1015 with OA music, ID, ads, jingles. (Alexander, PA) 1040 with EE pops, SS anmts. (Wilkner, FL) 1050 with music. (DeGennaro, NY) Radio Imperio, **4386.6** with SS church service at 0315. (Alexander, PA) Radio Horizonte, Chachapoyas, **5020**, 1134 with OA music, man in SS, ID, time check. (D'Angelo, PA) 0030 with SS talks, OA music, ID. Off at 0133. (Alexander, PA) Radio Huamarca (t) **5384.3** at 1120 with music and SS anncr. (Wilkner, FL) Radio San Nicolas, Mendoza, (t), **5472** at 1030 with music and man in SS. (Wilkner, FL) Radio Santa Monica, Cusco, **4965v** at 1010 with SS talks, canned IDs, OA music. (Alexander, PA) Radio La Hora, Cusco, **4855.6** with SS ID at 1053. (DeGennaro, NY) **4856.2** at 1005 with OA music, SS talk, ID. (Alexander, PA) Radio Ilucan, Cutervo, **5678** at 1120 with "...hermanos Peruanos...Radio Ilucan..." (Wilkner, FL) 0225 with SS talk, SS pops. Off at 0241. (Alexander, PA) Radio Ancash, Huaraz, **4991** at 1030 with mostly SS talk, short bits of OA music. (Alexander, PA)

PHILIPPINES—FEBC, **9405** at 1400 with ID and talk in CC. (Brossell, WI) **9500** with news at 1713. (Miller, WA) VOA Relay, **7215** at 1229 with ID and transmitter off for 20 seconds, then back with a much weaker signal. Changed from Indonesia to Laotian service involving a change in direction from 200 to 255 degrees. (Strawman, IA) **9760** at 1407. (Newbury, NE) **9790** in CC at 1407. (Brossell, WI)

PIRATES—Cupid Radio, **21895** at 1430 but never more than snippets of pop. (Strawman, IA) Grasscutter Radio, **6925** at 2156 with rock, IDs. (D'Angelo, PA) KIPM, **6950 USB** at 0207 with "Nine Audio Signals From Space" program. (D'Angelo, PA) Radio Tre (Italy) **6310** at 0200 with ops, multi-lingual ID. (Alexander, PA) Radio Free Speech, **6950** at 2336 with ID and special holiday program. (Balint, OH) 2321 with parody ads and music, ID, and Blue Ridge Summit address. (Wood, TN) WMPR, **6955** at 0110 with digitized male voice giving call letters and female voice, also digitized, giving frequency. ID as "Micro Power Radio." (Hertel, KS) 2221 with rock songs, ID "W-M-P-R 6955." (Duddy, NY) Undercover Radio, **6925 USB** at 0812 with techno and "demonic" rock interspersed with rambling philosophy. E-mail as: undercoverradio@mail.com and Merlin, ON postal address. (Bellar, WA) **6950** at 0149 with heavy metal, ID and contact info. (Duddy, NY) James Bond Radio, **6925** at 2218 with various rock and Bond-related tunes. (Duddy, NY) Radio Bingo, **6925 USB** 0010 with ID hosted by Dr. Tornado. Website and phone number given but not fully copied. (Duddy, NY)

PORTUGAL—DRP Int., **11655** in PP at 0230. (Sanchez, NM) **9815** with music and PP talk at 1138. Also **11740** in PP with ID at 1153 and **21810** with music and PP at 1551. (DeGennaro, NY) **15540** in PP at 2045. (Brossell, WI)

SRI LANKA—SLBC, **11905** at 1305 with songs and woman anncr in unid language. (Brossell, WI) In Singhalese with Hindi-style vocals at 1515. (DeGennaro, NY) Deutsche Welle Relay, **12035** at 2157 with IS, ID and into unid language. (Brossell, WI)

SURINAM—**4990** at 0316 with music, including hip-hop. (D'Angelo, PA) Tentative on **4991** at 1034 with talk by man in presumed DD. (DeGennaro, NY)

SWAZILAND—Trans World Radio, **9500** in EE with African music at 1841. (Miller, WA)

SWEDEN—Radio Sweden, **9495** (via Canada, gld) heard at 0355. (Newbury, NE) **17705** with "60 Degrees North" at 1440. (Foss, Philippines)

SWITZERLAND—SRI, **9885** in GG with an interview at 2239. Also **15555** in II heard at 1634 to the Mideast and Africa. (DeGennaro, NY) **11660** via French Guiana at 2330 with item about trafficking in human beings. (Sanchez, NM)

TAIWAN—Radio Taiwan Int., **5950// 9680** via Florida at 0308 with news, program preview, "Formosa Outlook." (Burrow, WA) 5950//9680 at 0200 with news. (Sanchez, NM) 9680 at 0210. (Newbury, NE) **15465** in CC at 1005. (Foss, Philippines) CBC (t) **6140** in CC with presumed news at 1130. (DeGennaro, NY)

THAILAND—Radio Thailand, **7160** in JJ at 1304. (Strawman, IA) **7285** in TT at 1047. (Miller, WA) **9680** with features and news at 0011. (Burrow, WA) **11805** in TT at 1200. (DeGennaro, NY) **13695** at 0030. (Newbury, NE) BBC Relay, **6195** at 2122. (Jeffery, NY)

This Adventist World Radio QSL celebrated the golden days of Ekko QSL stamps.

9510 at 1715. (Miller, WA) **12015** heard at 1905. (Brossell, WI)

TUNISIA—RT Tunisienne, **9720** in AA at 1638. (Miller, WA) **12005** in AA a t 1905. (DeGennaro, NY) **15450** with live sports event at 1425. (Brossell, WI)

TURKEY—Voice of Turkey, **6185** in Romanian at 2103, **9560** Asia/Australia at 2156, **9460** in TT at 2220, **9655** in EE at 2340. (DeGennaro, NY) 9655 with press review at 2300. (Paradis, ME)

UGANDA—Radio Uganda, **5026** at 0347 with talk in local language by various men, local vocals. (D'Angelo, PA)

UKRAINE—Radio Ukraine Int., **5905** with features, ID heard at 0420. (Burrow, WA)

UNITED ARAB EMIRATES—UAE Radio, Dubai, **12005** in AA at 2044. (DeGennaro, NY) 15395 in AA at 1705. (Brossell, WI)

UNITED STATES—AFN/AFRTS, Key West, **5445 USB** with stock market at 0521. (Miller, WA) **5446** at 0700. (Newbury, NE)

UZBEKISTAN—Radio Tashkent, **6025//9715** opening EE at 1330. **9715** was the better of the two. (Barton, AZ) 9715 at 1400 with IS, ID and into Urdu. (Strawman, IA) Radio Netherland via Uzbekistan, **12070** heard at 1400. (Brossell, WI)

VATICAN—Vatican Radio, **5890** in Italian at 2220, 9600 in CC at 2205, 11740 in II at 1119. (DeGennaro, NY) **11625** with IS at 1656. (Miller, WA)

VENEZUELA—Radio Amazonas, Puerto Ayacucho, **4939.7** in SS at 1035. (DeGennaro, NY)

VIETNAM—Voice of Vietnam, **6175** via Canada at 0330. (Sanchez, NM) **7210** in presumed VV at 1333. Also **12020** in VV at 1016. (Foss, Philippines)

YEMEN—Republic of Yemen Radio, **9780** with woman in AA at 1920. (Brossell, WI)

ZAMBIA—Radio Zambia/ZNBC, **4910** in FF at 0307. (Miller, WA) **6165** with African music at 1939. (Foss, Philippines) Christian Voice, **4965** at 0134 with woman talking, rock, ID and two different mailing addresses. (D'Angelo, PA)

ZANZIBAR (Tanzania)—Radio Tanzania Zanzibar, **11734** in presumed Swahili with talks and music at 1818. (Brossell, WI)

And so, order is again restored! A thundering roar of thanks to the following who listened and lettered this time: Ed Newbury, Kimball, NE; Dave Jeffery, Niagara Falls, NY; Ciro DeGennaro, Feura Bush, NY; Kirk Bellar, N7UK; Wayne Hertel, Wichita, KS; Dave Balint, N8IW; Brian Duddy, Nyak, NY; Joe Wood, Gray, TN; Marty Sanchez, NM; Stewart MacKenzie, Huntington Beach, CA; Bruce R. Burrow, Snoqualmie, WA; Marty Foss, Guinayangan, Philippines; Rick Barton, Phoenix, AZ; Robert Brossell, Pewaukee, WI; Mike Miller, Issaquah, WA; Robert Wilkner, Pompano Beach, FL; Jerry Strawman, Des Moines, IA; Richard D'Angelo, Wyomissing, PA; Mark Northrup, Gladstone, MO; Ray Paradis, Pittsfield, ME and Brian Alexander, Mechanicsburg, PA. Thanks to each one of you. ■

A Radio Messenger: Radio Mosoj Chaski

(from page 7)

Kawsaypa T'ikariynin (The Flower of Life, for teenagers)
Yanapajkunapaj (For Those Who Help)
Educational Programs
Pakitu (A radio novel about the necessity of learning to read and write)
Warmispa Parlaynin (Speaking with Women)

Besides the daily radio broadcasts, Radio Mosoj Chaski offers music recording services, Quechua programs for distribution to other stations, and preparation of advertising in the Quechua language. The station also sells written and recorded Bible study programs, Quechua literature, and educational materials to help teach literacy to the Quechua people. The sales of these materials and services, along with donations, support the operation of the radio station and the educational efforts of the staff.

Take A Listen

With 8 kW from the mountains of Bolivia, the station is widely heard, quite possibly the easiest Bolivian catch on the air. They have received reception reports from around the world. The station welcomes reports and makes a concerted attempt to respond to every one. Reception reports in Spanish are preferred, but Sr. Ibarra said that when they receive something in English, one of the technicians working there translates it in his spare time. Of course, a report in Quechua will assuredly get their attention! You can write to them at Radio Mosoj Chaski, Casilla 4493, Calle Avaroa No. 254, Cochabamba, Bolivia. Their e-mail address is chaski@bo.net. ■

by Steve Douglass, webbfeat@1s.net

utility communications digest

news, information, and events in the utility radio service from 30 kHz and beyond

We Came This Close, Hot Military Interplane Frequencies, And Showing Radio To Our Kids

The other day I made a trip out to the Kritser Aviation & Space Museum, located on the north side of the local airport. There's not much to see yet at this struggling, funds-impaired museum, but they do have some interesting displays of old helicopters, MiGs, and the like.

However, in an old hangar across the compound I was surprised to find a room filled with what looked like vintage nuclear bombs! They turned out to be "dummy shapes" used for training, but they still evoke powerful feelings in everyone who sees them.

Being one who came of age during the height of the Cold War, it was incredible for me to see these symbols of the nuclear age silently gathering dust in a corner of an old aircraft hangar. Today, as we all struggle to live under the threat of terrorism, it's hard to remember what it was like to live on the brink of nuclear war. Some veterans even wax-nostalgic for the days when you could tell the bad guys from the good guys by what hat they wore. The waters of war are muddier now and it is hard to tell friend from foe.

However, before we *long* for those good old days of "MAD" doctrine, keep in mind that only nine years ago the world came within a hairs-breadth of nuclear war, and this was *after* the Cold War had ended!

What? You don't recall the incident? Few do, except for some sharp-eared HF radio monitors who at the time didn't realize how close we had come to going up in a blinding nuclear flash.

It was early morning on Wednesday, January 25, 1995, when the finger of Russian President Boris Yeltsin was poised on the nuclear button. Early warning radars indicated that Russia was under missile attack, and strategic Russian military forces were on maximum alert. Reacting to the crisis, Yeltsin reached into a black suitcase, picked up his portable hotline, and began conferring with his generals. Was it a real attack? Was the unthinkable happening? If Yeltsin gave the *go-code* most of Europe would have disappeared under a nuclear holocaust, and in response, America would be forced to retaliate.

Remote listening posts and U.S. spy satellites eavesdropping on Russian military communications picked up the telltale signs of increased Russian military activity. Although it wasn't quite clear what was going on, sources inside the military say that as a precaution the U.S. strategic forces were placed on high alert. Fortunately the alert didn't last long. By 5:30 a.m. (EST) the crisis was over. The button didn't get pressed and the world went on without being any the wiser.

So what was the cause of this Cold War style East-West missile crisis? Why had we come so close to the brink? Was it a misunderstanding or a simple mistake in military judgment? Or, as others have suggested, a political scenario dreamed up by (then) President Yeltsin to prove to the West that he still had a firm grasp on the military reigns in his country? Some even suggest that it was a covert plot hatched by the U.S. intelligence community to test Russian military readiness.

Now a museum piece, this practice training nuclear bomb symbolized a time when we all lived under the threat of nuclear destruction. The author found this dummy nuke in an unused hangar at his local airport. (Photo by Steve Douglass)

Inching Toward Disaster

To find out, we need to take a look at the events as they unfolded on January 25, 1995. At 2 a.m. (EST) on Andoya Island (a Norwegian Arctic outpost) a space research missile was launched. Officially, this NASA-sanctioned mission was to gather data on the Aurora Borealis. Because of the close proximity—620 miles from the Russian mainland—the launch was announced months in advance. Moscow was well aware of the planned launch and the information had been passed on to the relevant Russian military authorities.

Over 600 missiles had been fired from Andoya since 1962, so the launch should not have come as a surprise to anyone. Something was different about this launch, however, and it sent the Russian strategic forces into a state of panic.

On the Koala Peninsula (possibly at the ABM/BMEW site at Murmansk) Russian Air Force early-warning-radar technicians tracked the missile. Their radarscopes displayed something curious. Instead of behaving like a typical scientific research vehicle, the missile roared hundreds of miles higher than any ever launched from Andoya. The radar telemetry changed as the missile shed its stages, indicating it was a four-stage rocket. Finally it reached an altitude of 900 miles and slowly began to arc over. The technicians recognized the trajectory of the missile as that typical of a nuclear-tipped ICBM. As a result,

Russian strategic forces went on full military alert and President Boris Yeltsin was notified. From a command center in Moscow's version of the White House, Yeltsin picked up his hot lines and began conferring with his military generals.

Meanwhile back in the United States, military radio hobbyists were routinely monitoring communications on the (then) Global High Frequency System (GHFS). The GHFS was used by the U.S. military for long-distance communications with far-flung military units, bases, aircraft, and ships at sea, including strategic nuclear forces. Although most secure military communications take place via military satellite and hardened telephone links, GHFS worked as a reliable backup system. MILCOM hobbyists knew this and listened in 24 hours a day, especially for broadcast EAMs (Emergency Action Messages), coded transmissions possibly containing military marching orders or the tell-tale signs of imminent military action. Usually these coded messages consist of numbers and letters read phonetically over GHFS channels. Although never confirmed by the military, some of these messages are practice "EAMs" containing the "go-codes" directing the military to go to war.

Test EAMs could be heard several times an hour on GHFS frequencies. Typical test EAMs consist of 12 to 30 characters, but on rare occasions they can exceed 100 characters. An EAM is usually followed by an "authentication code," so strategic forces can verify that the message is authentic.

In the case of war or military alert, USSTRATCOM forces receiving an EAM compare it with sealed orders located in a safe or vault on the aircraft, ship, or missile site. If the orders are confirmed as authentic the "Strategic Integrated Operations Plan" (SIOP) is consulted to see what the plan of attack is.

Fortunately, the majority of EAMs are test messages and no one outside of the military really knows their content. Occasionally (during times of international crisis) a drastic increase in EAM traffic may indicate strategic forces being placed on alert, ready for military action.

MILCOM monitors noted long EAMs whenever the terrorist alert level was elevated and on the eve of the recent war in Iraq. On the night of January 25, 1995, many military monitors noted a lengthy EAM. The message consisted of 154 phonetic parts, followed by an authentication code. After the message was initially sent, it could be heard being echoed by remote transmitters on almost all GHFS, USSTRATCOM, and CANFORCE channels. Although the contents of the message were coded and known only to those who had top-secret access, it was apparent to anyone listening in that something was going on.

The EAM was repeated almost nonstop for over 20 minutes, an unheard of event, especially during peaceful times. Was it possible that the alert level of STRATCOM forces was bumped up a notch? Many hobbyist monitors couldn't help but wonder.

Somehow the press caught wind of the alert and connected it to the Norwegian missile launch. Calls by the press to Cheyenne Mountain, NORAD, and the Pentagon only yielded the answer, "We were aware of the Norwegian launch and we are tracking it."

In Moscow, Russian President Boris Yeltsin was busy deciding how to handle the situation. From the Russian military's point of view the parabolic trajectory of the missile indicated that it was absolutely not a scientific research vehicle. Of the hundreds of missiles launched from Andoya, none had reached such altitude and displayed the unmistakable trajectory of a ballistic missile, instead of following the usual pattern of flying straight up to an altitude of 100 miles and then tumbling downward into the sea. Yeltsin was advised that this missile followed the parabolic, four-stage-to-high trajectory profile of a middle-range, ground-to-ground tactical missile. The radar signature of the rocket was also twice as big as anything ever launched from Andoya, indicating to the Russians that it was large enough to carry a tactical nuclear payload.

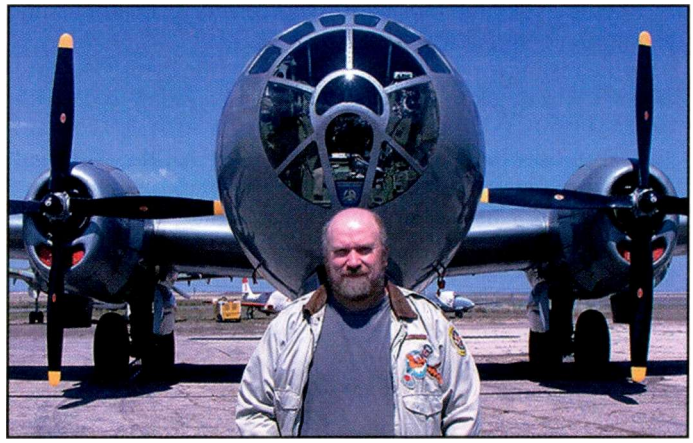


Photo of the author in front of the Commemorative Air Force B-29 "FiFi"—the only one of its type still flying. The first nuclear bomber, the B-29, was used to drop the atomic bombs on Hiroshima and Nakasaki, heralding the post-WWII nuclear age. It was during a recent visit by this vintage bomber to the Kritser Aviation & Space museum that the author found a storage room filled with practice dummy atomic bombs. (Photo By Mike Dunlap)

Russian President Yeltsin made his decision. At approximately 1:48 a.m. (EST) the missile was destroyed. and it fell in the region of the Spitzbergen archipelago.

The Spin Zone

Conflicting reports say that the Russians shot it down with an antiballistic missile. Norwegian Lt. Col. Espen of the Norway Defense Command at Bodoe told the international press that the missile went down as planned and landed in the Spitzbergen region.

Military monitors noted that communications on GHFS channels returned to normal levels around 3:00 a.m. (EST). A Russian Interfax News Agency story released a few hours later created an international scare, triggered alarm bells in the West, and rocked currency markets. The initial report (quoting government sources) said that the Russian air defenses had shot down a "combat missile" fired at them from a country in northern Europe.

Interfax quoted the source as saying, "The missile violated Russian air space and was destroyed."

The Russian military was quick to react to the Interfax report, realizing that the West would regard the shooting down of the missile as a violation of the SALT II treaty, which stipulates that anti-ballistic missile systems are only allowed to be deployed around Moscow.

Very quickly, Russian Air Defense released the terse statement, "Moscow region air defenses did not bring down any missile today."

Later, Interfax released another story quoting an official of the Russian Air Defense Command saying, "Three Russian early warning systems had picked up a launch of a combat missile in Norway. This source stated that it soon became clear that

the missile would fall outside Russian territory," contradicting the initial report that it was shot down.

It's interesting to note that at the same time the British Defense Ministry was quick to state that they "had nothing to do with the NATO missile alert." U.S. administration officials were also quick to follow up with a statement saying that they doubted that any such incident had actually taken place.

Meanwhile, Norwegian officials scrambled to clarify that the alert was not their fault, according to a Reuter's report, Andoya spokesman Kolbjoren Adolfsen said, "We told (the Russians) what type of rocket was going to be fired, (the center used a refurbished NATO missile) where it was going to land and we indicated a time period from January 15 to February 5, with a daily window from 5 a.m. to 12 p.m..." Adolfsen went on to say "For 32 years we have done this. We study the Northern lights over Spitzbergen in daytime. It is pitch dark up there at this time of year. We have fired 607 rockets since the project started."

Adlofsen suggested that the Russians might have over-reacted because of the high-ballistic trajectory of the four-stage rocket. Norwegian Ambassador Per Tresselt suggested that official measures should be taken to avoid a recurrence for the incident, which, in Norway's opinion, was an over-reaction by Russian strategic forces and not the fault of the Norwegian government.

The Russians were not so conciliatory. An unnamed general told Izvestsia "What kind of meteorological rocket is multi-staged, flies further than 600 miles along a ballistic (parabolic) trajectory rather than 185 miles straight up?"

Izvestsia also quoted the head of the Central Aerological Observatory, Professor A. Chernikov, as saying, "The rocket fit the profile of a mid-range ground-to-ground military missile."

Only adding to the controversy was Yeltsin himself who, in comments to the Interfax news agency, said: "The launch was NATO-member Norway and their Western defense partners way of testing Russian military readiness."

A Most Dangerous Game

Although it may seem alarming, the thought of testing Russian defenses in this way is really not an unlikely scenario. Throughout the Cold War years, the U.S. intelligence community had engaged in a technique to test Soviet military readiness by provoking their military to respond to aircraft flying close to their sovereign air space. In intelligence community circles this was known *as* "tickling the bear's tail."

In the months leading up to the incident, Russia became embroiled in a nasty military campaigning in Chechnya. Reports coming out of Chechnya painted a picture of a Russian Army out of control. Some Russian troops deserted their posts, stating that their commanding officers were not being controlled by Moscow. Doubts about Russian command began to appear in the West. Many defense analysts rightly began to wonder: If President Yelstin wasn't in control of his military, who was?

Is it possible that deep inside the NRO or CIA a scenario was devised to answer these questions? By "tickling the bear's tail" and provoking a response could the nuclear command and control structure of the Russian military be ascertained?

Another scenario suggests that it was Yeltsin himself who took advantage of the Norwegian launch to prove to the world that he was solidly in charge. According to a Reuter's report, diplomats in Moscow suggested Yeltsin, under fire for the military mess in Chechnya, had set out to show his own military (and the Western powers) that the Russian military was still an effective nuclear power. In Oslo, Norway, newspapers suggested that it was Yeltsin's way of showing he was still the top dog in the Kremlin.

An Enduring Mystery

In any event, on January 25, 1995, the game was played with repercussions that are still echoing through the halls of the Pentagon. Only military insiders know just how close we came to nuclear war that day. Was the incident simply the result of miscommunications between countries? Or was it the result of military intelligence agencies playing potentially deadly games? Or was it a political scenario carefully plotted, planned, and played out to show the world who was in charge of Russia's nuclear arsenal? Only military insiders know, and they aren't saying!

So remember to keep your ears peeled. You never know what you'll monitor.

More Thinking Outside The Box

Last month's column got a lot of you thinking "outside the box," and you sent in interesting low-tech solutions for high-tech problems.

For instance, Ken Hansen wrote:

If you want better audio out of your HF set, but don't want to shell out big bucks for a high-fidelity stereo amplifier, try using a set of amplified computer speakers. Some have tone controls that can help you eliminate some noise. I use a RadioShack DSP filtered amplified speaker that, unfortunately, they don't sell anymore but you can find on eBay from time to time. It was originally intended as a noise reduction speaker for CB radios. Works great on HF.

Chris Pavek wrote:

A cheap and cool way to transmit scanner audio to another room is to use an old baby monitor/transmitter. Although you could just place the baby monitor next to the scanner and transmit audio that way, you will also be transmitting any conversations in the room to anyone listening. So, I opened the transmitter, removed the microphone by desoldering the two wires it was attached to, and instead soldered to those wires a cord that plugs directly into the (line-level) output on my scanner. This way I transmit scanner audio only. Using the baby monitor receiver, I can then monitor what my scanner is doing from any room in the house. I'm thinking of experimenting with building an outside antenna for the transmitter so I can listen outside as well.

An anonymous person wrote:

I use a pair of wireless 900-MHz speakers that I bought at a factory outlet for $30. Normally these speakers are quite pricey, but when I saw them for sale at such a great price (even though I really didn't have a use for them at the time) I had to buy them. Then your column got me thinking that I could use them as remote monitors! Connecting the transmitter to my scanner output was easy and the 900-MHz transmitters have no problem penetrating the thick walls throughout my brick home.

That letter reminded me that once, when setting up a bank of scanners for a local television station in my city, the chief meteorologist asked me if I could pipe the audio into the weather office, which was located on the other side of the building. This proved tough because between the newsroom and the weather office were several thick concrete walls that prohibited drilling into and running wires through. Setting up a scanner in the weather office was also out of the question, because electronic noise from the computers and radars and other equipment trans-

mitted birdies on many of the very frequencies the weather department wished to monitor.

My solution was to also use 900-MHz wireless speakers, which worked like a charm. Now when severe weather threatens, all the weather department has to do is turn up the speaker and listen in as the civil-defense weather spotters and law enforcement agencies report on what the skies are doing.

There are other wireless ways to transmit receiver audio that you might consider. How about using a VOX-activated FRS walkie-talkie pair? Although the FCC might frown on this method, it does work well and can transmit audio potentially much further than wireless speakers or baby monitors.

Wireless or wired intercoms could work, too. Or how about using infrared wireless headphones or speakers that are virtually immune to interception? I have a buddy who uses one of those VCR rabbits (transmitters used to send video from any video source throughout the house) to transmit his audio to a television in his bathroom!

Dispatches From The Front

The airport in my hometown is used frequently by the Air Force for training. Formerly Amarillo Air Force Base, the long runways and little commercial traffic make it an ideal place for military pilots to make practice approaches. On any given day, it's not uncommon to see many military types doing practice landings and takeoffs. Most common are the KR-135s from Altus Air Force Base, Oklahoma, and sometimes you can see three or four of them in a pattern.

Sometimes these tankers land to refuel or eat their lunch at the local airport diner. Sometimes they sit on the old SAC alert pad, killing time, and waiting for someone they are slated to refuel who is late for some unknown reason. When they do, I sometimes hear them on my UHF military band scanner saying, "go to chat."

I have searched and searched for this chat channel with no luck. I asked for help on the MILCOM list and received this neat collection of frequencies (see "Inter-plane Frequencies") that I now pass on to you. I haven't found the chat channel yet, but this is a good place to start. Note the cute designations for these channels, so when you hear, "Go to Winchester!" you'll know what they're taking about.

Finally, Richard Arland, K7SZ, sent me this nice missive and a few loggings:

Hi Steve:

You are an evil man. You got me to spend money. Serious money. I just bought an ICOM R-75 from Universal on sale. MAN! What a receiver!

Anyway, I started prowling the HF MILCOM bands and have a couple of loggings I hope you can use in your column.

Date	Time	Freq	Remarks
1-26-04	2130Z	11175	SAM 2860 request p/patch with Andrews
1-26-04	2131Z	11175	Offut w/Skyking broadcast
1-26-04	2135Z	11175	Navy Flying Tiger-21 p/patch w/Golden Hawk via Puerto Rico (most likely Ramey AFB)

I have an Alinco DR-70T in my truck and use a Tarheel Model 200 screwdriver antenna for HF ham work, and it also doubles as a MILCOM SW antenna. These loggings were taken during my drive home after work. You got me into some really interesting stuff. I photocopied your three columns and the e-mail messages you sent me and have passed this info around to several of the people I work with who also like to follow the black projects stuff. A couple of them even have SW radios, and I am trying to get them interested in prowling the MILCOM frequencies.

Thanks Rich! As I've always said, if I get even one more person interested in this great hobby, I've done my job!

Reader's Logs

Before we get on with our HF logs I want to remind you that you can send in your MILCOM loggings above 30 MHz, including UHF aero band catches. Just do so in the format below. Many thanks to our ever-faithful UTE monitors who dutifully submit their logs every month. Maybe you'd like to be one of them?

0000 (Frequency MHz): STATION, Anytown, USA, summary of traffic heard in MODE at 0000Z. (monitor/sometimes location)

2598.0: O/M (EE): 0615 USB "Testing on 2598...1-5, 5-1. Out." (RP)

2598.0: VCS (Canadian CG-Halifax), VON (Canadian CG-St Johns), VCO (Canadian CG-Sydney): 0635 USB w/FF & EE broadcasts of gale warnings for Eastern Canada coastal areas and adjacent waters. (RP)

2598.0: VCG (Canadian CG-Rivieres-au-Renard): 0440 USB w/MIB in FF. (RP)

2598.0: VCP (Canadian CG-Placentia NFL): 0051 USB w/MIB in EE for Grand Banks & Maritimes area. (RP)

2598.0: VCM (Canadian CG-St Anthony, NFL): 0108 USB w/MIB & WX for Grand Banks area. (RP)

2598.0: VCS (Canadian CG-Halifax), VON (Canadian CG-St Johns), VCO (Canadian CG-Sydney): 0635 USB w/FF & EE broadcasts of gale warnings for Eastern Canada coastal areas and adjacent waters. (RP)

2670.0: Y/L (EE): 0415 USB w/sign off—identifier missed. Probably CG Group Wood Hole Mass. (RP)

2749.0: VCO (Canadian CG-Sydney): 0049 USB w/MIB in EE/FF. (RP)

2899.0: Gander Radio (MWARA NAT-B): 0320 USB w/Delta 22 (not heard) asking him to relay clearance on VHF guard freq to Air India 112. Shanwick & Santa Maria also on this freq. (RP)

2970.5: O/M (SS): 0253 USB w/O/M (SS). (RP)

4016.0: Counting Station (V5--Y/L SS): 0318 USB w/5-figure groups. (RP)

4026.0: M8 (Cuban Illicit): 0304 CW w/cut numbers. (RP)

4270.0: CFH (Canforces Meteo-Halifax): 0309 Fax. WX for Maritimes. (RP)

5696: CAMSPAC Pt. Reyes wrking CG Rescue 1713 w/safety of flight info. 1530Z (DS2 WI)

4316.0: NMN (CG Portsmouth VA): 0339 USB w/"Perfect Paul" WX. (RP)

4344.0: Unid: 0317 Fax. Weak signal-picture poor. Appears to be WX chart. Possibly NMC, CG Point Reyes CA. (RP)

4346.0: NMC (CG Point Reyes CA): 0344 Fax. Weak signal with WX chart. (RP)

5696: CG 1712 departing McChord AFB, rqsting COMSTA Kodiak to assume their guard. 1430Z (DS2 WI)

6235: Coordination net with stns Hotel, Lima, Foxtrot, Papa, and other players. 0300Z (DS2 WI)

6314.0: NMN (CG Portsmouth VA): 0324 CW/FSK markers. (RP)

6761: GASSER 65 coordinating aerial refueling w/UNID stn ending in 03. 1654Z (DS2 WI)

6800.0: CAP (probably Civil Air Patrol): 0839 USB/ALE sounding. (RP)

6985.0: TEST3 (unidentified): 2203 USB/ALE TO TEST2 (unidentified). (RP)

7602.0: 033NHQCAP (unidentified, CAP HQs, Maxwell AFB AL): 0940 USB/ALE sounding. (RP)

7602.0: 043NHQCAP (unidentified, CAP HQs, Maxwell AFB AL). 2251 USB/ALE sounding. (RP)

7635.0: Head Cap 45 (Chaplain, Civil Air Patrol--ID as in North Carolina--acting as NCS): 2205 USB w/Hill Cap 49 (West Virginia CAP) who relays check in for Red Fox 105 (CAP Illinois) for National Chaplain's Net w/scripture reading and homily. Patriot 465 (CAP Massachusetts) also checks in. (RP)

8001.9: NMC (CG Point Reyes CA): 0117 CW/FSK markers. (RP)

8097.0: Y/L (SS): 0531 USB w/5-figure groups. (RP)

8670.0: IAR (Rome Radio): 0110 CW w/announcements. (RP)

8133.0: M8 (Cuban Illicit): 2314 CW w/cut numbers. (RP)

8550.0: CTP (Portuguese Navy): 0016 RTTY 75/bd/850Hz w/NAWS. (RP)

8566.3: FUV (FR Navy Djibouti): 0021 RTTY 75bd/850Hz testing. (RP)

8433.2: TAJ (unidentified, possibly Turkish): 0010 CW/FEC markers. (RP)

8790.5: ULO (unidentified, possibly Russian): 0027 CW/FEC markers. (RP)

8980: CAMSLANT Chesapeake trying pp between CG Rescue 1720 and D7 ops no joy. QSY to 8983. 1630Z (DS2 WI)

8983.0: CAMSLANT Chesapeake: 1935 USB w/CG 2141 (HU-25, CGAS Cape Cod) who reports airborne from Cape Cod enroute to Norfolk VA. (RP)

8983.0: CAMSLANT Chesapeake wrking CG Rescue 1720 w/safety of flight and tfc frm D7 ops. Later on 1720 RTB as they complete search and no ELT heard. 1530Z and 1635Z. (DS2 WI)

8992.0: KKG34 (I think) NCS ops coordinating freqs with unreadable stn. 1930Z. (DS2 WI)

9007.0: Trenton Military: 2255 USB w/Chalice Xray (E-3B AWACS, Tinker AFB) in pp w/Radar Maintenance trouble-shooting onboard radar problems. (RP)

9047.0: 043NHQCAP (possibly Deputy Director of Comms, CAP HQs Maxwell AFB AL): 1209 USB/ALE sounding. (RP)

9047.0: 0004SCCAP (Chief of Staff, South Carolina CAP): 2017 USB/ALE sounding. (RP)

9067.0: O/M (South Korean): 0249 USB w/O/M (South Korean). (RP)

10046.0 4XZ (Israeli Navy Haifa): 2302 CW. (RP)

11018.0: SITIO12E (Colombian Army): 0154 USB/ALE TO SITIO18E (Colombian Army). Also noted on 08560.0. (RP)

11175: Reach 7X3 wrking McGuire Metro via pp OFFUTT. 1630Z (DS2 WI)

11175: Reach 378 wrking Rhody OPS via pp ANDREWS. 1628Z. (DS2 WI)

11229: BANK WITCH calling NECESSARY w/no joy. 2000Z. (DS2 WI)

11232: CANFORCE 2405 w/flt ops and pos rpt to TRENTON Military. Later pp to EAGLES NEST with arrival data. 1555Z. (DS2 WI)

Inter-plane Frequencies

Frequency	Description	Designation
299.5000	USAF interplane common, general use discrete	"CHEAP SUIT"
300.6000	USAF interplane common, general use discrete	"30-AUGHT-6" *
303.0000	DoD general use discrete	WINCHESTER OR "THIRTY-THIRTY" 333.0000
	DoD general use discrete	"TRIPLE-3"
333.3000	DoD general use discrete	"QUAD-3"
333.3500	DoD general use discrete	"QUAD 3-5"
333.5500	DoD general use discrete	"FULL HOUSE"
335.5500	DoD general use discrete	"FULL HOUSE 2"
345.6000	DoD general use discrete	"STRAIGHT"
345.6500	DoD general use discrete	" STRAIGHT 2"
351.0000	DoD general use discrete	"HAIRCUT "
357.0000	DoD general use discrete	"MAGNUM"
384.5000	DoD general use discrete	"PISTOL" (38-45)
384.5500	DoD general use discrete	"PISTOL-5" (38-45

11232: SENTRY 332 asking for pp but not pp quality for TRENTON Military. 1535Z. (DS2 WI)

11232: RAZOR 66 snding tfc to PEACHTREE via pp TRENTON Military. 1555Z. (DS2 WI)

11232: SHADOW 91 w/radio chk to TRENTON Military. 2230Z. (DS2 WI)

11342.0: ARINC New York: 1657 USB w/N555NY in radio checks. Also on 06640.0 & 08933.0. (RP)

13966.0: O/M (Portuguese): 1954 USB w/unheard station. Caught at end of exchange. Mention in chat of Mexico and an unidentified "link." Probable Brazilian net. (RP)

11402.0: 022NHQCAP (CAP National Operations Center, Maxwell AFB AL): 1306 USB/ALE sounding. (RP)

12581.5: WLO: 2123 SITOR w/financial news items in EE. (RP)

12788.0: Possibly CG Boston: 0339 USB w/"Perfect Paul" WX forecasts for Georges Banks, Hudson and Baltimore Canyons. (RP)

12788.0: NMG (CG New Orleans LA): 2241 USB w/automated "Perfect Paul" WX bdcast. (RP)

12824.0: CTP (Portuguese Navy): 2104 RTTY 75bd/859hz w/NAWS. (RP)

13200: OFFUTT heard w/EAM 1620Z. (DS2 WI)

13257: DRAGNET WHISKEY w/tfc to DRAGNET COMMS via pp TRENTON Military. 1540Z. (DS2 WI)

13339.0: Aero Mexico Operations (O/M SS): 2056 USB w/Aero Mexico flight (callsign missed) w/WX for Miami. (RP)

15016: OFFUTT heard w/EAM 1620Z. (DS2 WI)

15034: TRENTON Military w/WX at various Canadian sites. 1630Z. (DS2 WI)

17982.0: Aircraft 0074 (O/M Portuguese): 2122 USB w/unidentified controller (O/M Portuguese) reporting departure from Belem. Brazilian Air Force. (RP)

18003: HILDA EAST wrkin unid arcft ending in 51 w/WX for Bangor via pp PUERTO RICO. 1708Z. (DS2 WI)

19103.5: 001 (possibly Det 1. 1/228th Avn Bn, Soto Cano AB, Honduras): 1538 USB/ALE sounding. (RP)

19709.0: ERMNAT (Brazilian Navy Radio Station, Natal): 1231 USB/ALE sounding. (RP)

22376.0: NMC (CG Point Reyes CA): 2115 SITOR w/NIMA NAVSAFETY bulletins for Pacific area. (RP)

This month's UTE log contributors are Ron Perron (RP), Dwight Simpson (DS2).

Thanks to all for your submissions. Each and every one of your contributions is appreciated.

Final Thoughts— On Passing The Torch

As I have said before in this column, I am one of those too-proud grandfathers who thinks his granddaughter Caysi is "just the berries!" I'm the kind of granddad that most people just hate, gushing and whipping out the family photos at the drop of a hat. Slowly but surely I am introducing her to the wonderful hobby of radio monitoring. Although she is only four years old, I am surprised at how quickly she's learning. She now loves to tune the dials through the FM broadcast band looking for music. In fact, she now runs for my

radio room every time she visits and makes a beeline for my vintage Panasonic RF-4900. My guess is that in time she'll be just as hooked on scanning the bands as I am.

However, just when I thought being a grandfather couldn't be any better, my daughter tells me that we'll soon have another bambino to bounce on our knees. We also learned that this time it's going to be a baby boy—now I'll have a grandson to roughhouse with!

I've already been warned that Caysi may get a bit jealous if her "granda-da" shows any partiality to the new lad in the family. Sure, monitoring is considered a guy's hobby, but as the e-mails I receive attest, there are many female monitors out there who know just as much, if not more, than most hairy-legged variety monitors do!

It's already clear that Caysi will be the kind of girl that gives any boy a run for his money. She's smart, athletic, not at all shy, and a bit of tomboy, much like her mom. It's also clear that she'll be a lady and not at all afraid to express love and tenderness. If her dad is any example, I'm sure her brother will be a rough and tumble kid and smart as a whip, as well. But no matter how they turn out I'll love and treat my grandkids equally and try to instill in them both the excitement I feel for radio-monitoring.

A new generation of radio hobbyists is just what we need to breathe new life into this pastime we share. Are you doing your part?

If you feel the same way I do may I make a few suggestions?

First, don't force your interests on them. Let their natural curiosity about the world lead them. If at first they bore easily, that's okay. Kids have short attention spans for pretty much everything, not just what you're interested in. Give them time and repeated exposure and their interests will be piqued naturally.

Above all be patient. Don't get your feelings hurt if a teenager thinks your hobby is a bit nerdy or not cool. With repeated exposure they'll naturally be drawn to these shiny black boxes with bright frequency read-outs, silver knobs, and switches. Let them observe your excitement and they, too, will be infected with the monitoring bug.

Then, when they are old enough, buy them their own radio, something simple and inexpensive at first. Then *help* them set it up. Don't do all the work yourself. A sense of accomplishment on their part will cement them to the hobby.

Working together to build and design a homebrew antenna system, or letting them design their own monitoring post will ensure that it is *their* hobby, too, and not just something you are forcing on them. That will drive them away faster than asking them to take out the garbage. In return you should also show interest and participate in one of their favorite non-radio hobbies. If you dismiss their hobbies, they'll dismiss yours as well.

I'm not a child-psychologist, but I'm sure Dr. Phil would agree that it's not enough to love your kids and grandkids. You have to show them you do. Talk with them. One of the best ways is to be their mentor. Radio monitoring just may be the hobby that brings you closer together. When times get tough you'll find getting your kids to open up can be tougher than pulling teeth, but talking about a shared interest may be just enough to re-establish the lines of communications!

And isn't that what this hobby is all about anyway? ■

ADVERTISERS' INDEX

loose connection

radio communications humor

by Bill Price, N3AVY, chrodoc@earthlink.net

Bill Cleans Up

Even though the column has a long "lead time" between when I write it and when it hits the newsstands and mailboxes, it is safe to tell you that as I write these words, and as you read them, I am cleaning my "office." For as long as I have had a room of my own, it has been called an office. It has been many things during those 20-odd years, including a ham-shack, hobby shop (now *there's* a catch-all phrase if ever I heard one) music room, woodcarving shop (yes, in the house), computer room, and the place where I fix things which might or might not need fixing. If Mr. Porsche himself brought me his finest car to use on vacation, I'd want to tweak it *just a tad* to see if I couldn't get it to run a little smoother. No, I don't learn very quickly.

So Bill's cleaning his office. Big deal. Well, it is a big deal. It took my able-bodied son and me a whole day to empty the room so that it could be dusted, wiped, swept, etc. During that time we found an amazing assortment of things that I thought were gone forever. Tools which I was sure had been lost (so I bought others to replace them), in particular. To that end, I have either three or four of those huge staple guns; however, every time I need one, I must buy another because it's faster and easier to drive 20 miles and spend $20 than to spend three hours looking and *then* drive 20 miles to spend $20.

I found my old scanner—the good one, and a great general coverage receiver that I thought I had lost or lent to someone. I found my RadioShack digital signal processor—one of their better products that didn't sell well enough for them to keep in the catalog. And little amplifiers. And speakers. And more receivers. No transmitters, though, except for my old Kraco 23-channel CB, which I just might install in my car (if I get the car running).

Just how messy *was* the office? I found a Sawzall and a circular saw which I hadn't seen in years (remember, this room is *in* the house, just across from the living room). And one of Norm's really big receivers, a case and a half of his books, and his cuckoo clock which I promised to fix for him.

So all of my "things," these great important possessions of mine, are now in the living room, stacked and piled carefully, but in no special order, so that I may take them one by one back into the office and put each one in its place. I've spent two full weekends on this part of the project so far and have at least two more to go.

I'm a little uneasy about showing friends my office, even when it's neat, since it contains a belt sander and a drill press (both bench-top tools, not floor models) and a bench grinder. I get a lot of strange looks even from people who I consider are a lot like me, and that makes me seriously question my sanity (or my choice of friends).

But I fix things. Just last weekend, I used my anvil. Did I mention that I have an anvil in my office? Not quite as big as the one the coyote drops several times each Saturday morning (it does say "ACME" on the side), but it takes two hands to lift it, and even then it's a challenge. Of course, I have sheet-metal work to do, just like everyone else does. I had to make a replacement pan for the plastic one in the bottom of the upstairs rat's cage (we have upstairs and downstairs rats, the way other people might have maids or bathrooms).

What else might you find in Bill's tool room? How about a torque-indicating screwdriver? A person doesn't want to overtighten the reedplate on a good harmonica, y'know. About five inch-pounds ought to do it.

Of course, no home, den, or office would be without a Dremel tool. So I thought that three would be better than one; of course, only one is the real thing—the other two are cheap knockoffs in case someone wants to borrow one. And drills. Two cordless and three with cords (four if you count the drill press).

Y'know those ratchet screwdrivers with the interchangeable bits? The same bits you can use in a drill or screw gun? Y'know I don't own a single one of them. They're all gone. But I have 3,728 #2 Phillips bits alone, along with Torx, hex, square-drive and plain old flat screwdriver bits. Someday I know I'm going to find that my downstairs rats have been stashing the ratchet handles (Hey! RATchet! I should have thought of that sooner. Now I know where to look!)

Now, can we have a show of hands, please? How many of you are hoarders? I don't mean ration coupons from WWII, but certain items that you're always worried you'll run out of at some critical juncture in your life. With me, right after the #2 Phillips bits, it's X-ACTO blades. I've got at least two dozen of every possible shape and size they've ever made, and some which have been discontinued for years. (See? It's a good thing I got some while I could!)

Duct tape (some of which is actually labeled "Not for use on heating ducts) is perhaps the one tool which disappears most frequently in the Price household. And how many of you have bought label makers only to find that the label-tape for that make and model has just been discontinued?

Dental picks, feeler gauges, points-files ("what are points, dad?"), diamond hones, chisels, gouges, every shape and type of sharpening stone imaginable, tin snips (small, medium, and large, left- and right-handed cuts), a pack of 100 hacksaw blades (wouldn't want to run out in a snowstorm), hammers (six ball-peen, three claw, a three- and a five-pound sledge, and a splitting maul—we have no fireplace), drill bits, every fraction size, every number and letter size, and even some Roman numeral sizes. Twist bits, spade bits, forstner bits.

And pliers. Oh, be still my heart! How I love good pliers! I'm probably the only non-electrician with three pair of Kleins. My plier collection gets all the way down to the funky 10-inch alligator forceps which can sneak in to the back panel of a computer and grab a loose screw that's all the way at the front of the case!

Now, if you'll excuse me for a moment I've gotta go to the kitchen and get a knife to tighten this annoying loose screw on the keyboard. See you later. ■

Editor's Note: We're glad Bill's finally getting organized. Rumor has it that he has lost his computer, but if he finds it, you can write to him at chrodoc@earthlink.net.

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