Radio–Homeland Security–Computers & Radio–Family & Hobby Comms

45635

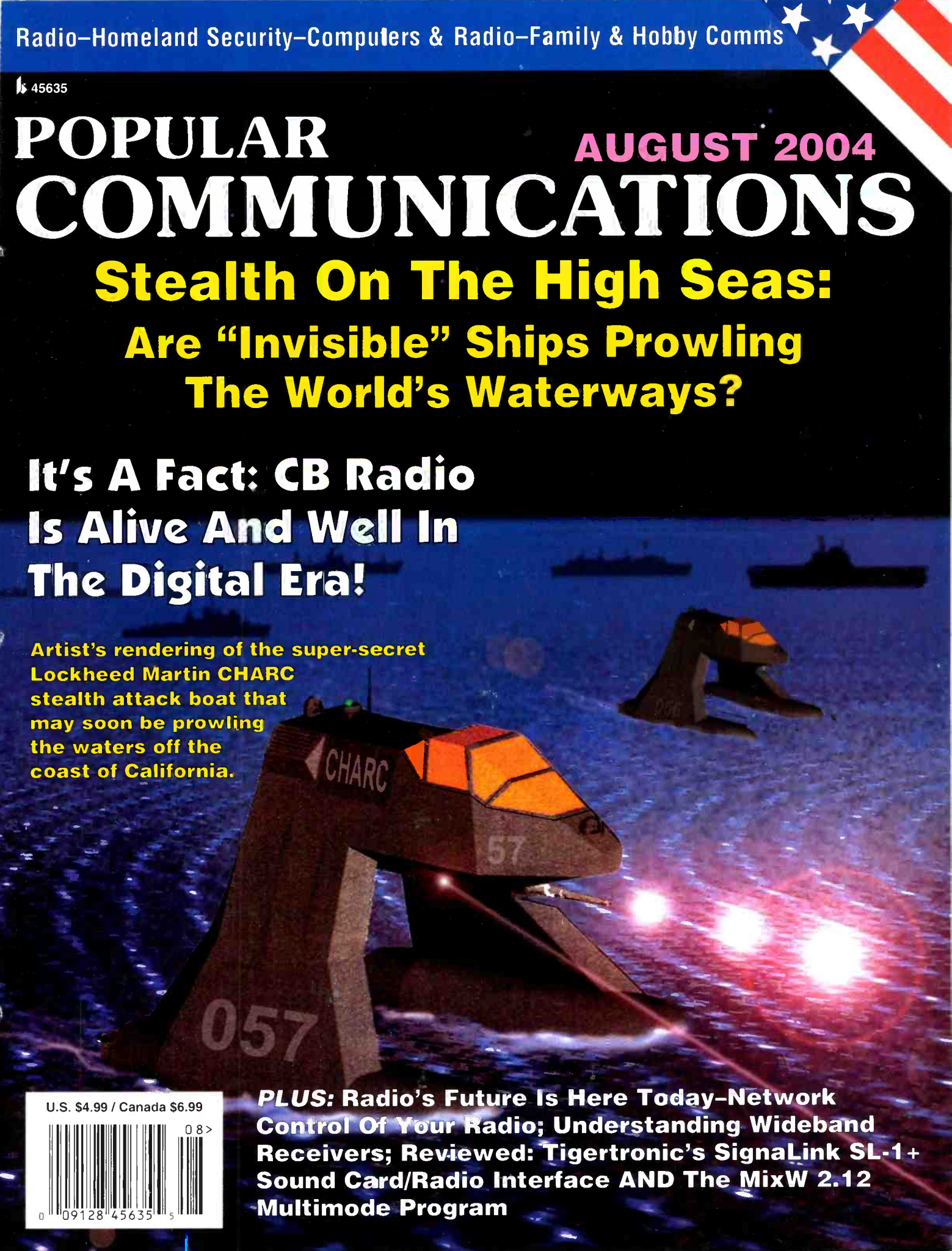
POPULAR COMMUNICATIONS

AUGUST 2004

Stealth On The High Seas:

Are "Invisible" Ships Prowling The World's Waterways?

It's A Fact: CB Radio Is Alive And Well In The Digital Era!



Artist's rendering of the super-secret Lockheed Martin CHARC stealth attack boat that may soon be prowling the waters off the coast of California.

U.S. $4.99 / Canada $6.99

08>

0 09128 45635 5

PLUS: **Radio's Future Is Here Today–Network Control Of Your Radio; Understanding Wideband Receivers; Reviewed: Tigertronic's SignaLink SL-1+ Sound Card/Radio Interface AND The MixW 2.12 Multimode Program**

SIXTY METERS AND MORE!

New Upgrades to Our Most Popular Models

TCXO 0.5 ppm Included

ALL MODE
PORTABLE/BASE TRANSCEIVER

FT-897D

60 m Band

HF/50 MHz 100 W/144 MHz 50 W/430 MHz 20 W
20 W (Optional FNB-78 Battery Required)

TCXO DSP

DSP
DIGITAL SIGNAL PROCESSING
Included

ULTRA COMPACT
ALL MODE MOBILE TRANSCEIVER

FT-857D

60 m Band

HF/50 MHz 100 W/144 MHz 50 W/430 MHz 20 W

DSP

FNB-85 1400 mAh Long-Life Ni-MH Battery and NC-72B Charger Included

ULTRA COMPACT
ALL MODE PORTABLE TRANSCEIVER

FT-817ND

60 m Band

HF/50/144/430 MHz 5 W

ATAS-25 Manually-Tuned Portable Antenna

The ATAS-25 is a manually-adjusted portable antenna ideal for field use with the FT-817. Designed for mounting on a standard camera tripod (1/4" stud), the ATAS-25 is tuned by sliding the shorting ring of the loading coil up or down and selecting the appropriate number of top sections. Counterpoise wires are supplied.

The ATAS-25 is constructed of high-grade materials for maximum efficiency, and it's the perfect traveling companion for your FT-817!

Freq. Range: Amateur Bands 7-450 MHz.
Max. Power: HF/50 MHz: 100 W SSB/CW
(50% Duty, 1 min. TX/RX)
AM/FM: 50 W
144/430 MHz: 50 W
Size: Max. Length 7'3" (2.2 m)
Min. Length for Carrying: 2' (0.6 m)
Weight: 2.1 lb. (930 g)

ATAS MICRO

YAESU
Choice of the World's top DX'ers

Vertex Standard
US Headquarters
10900 Walker Street
Cypress, CA 90630 (714)827-7600

For the latest Yaesu news, visit us on the Internet:
http://www.vxstdusa.com

Universal Radio — Quality equipment since 1942.

ICOM®

R10 The **R10** is a wideband communications receiver you can hold in your hand. It covers .5 to 1300 MHz (less cellular) with 1000 alpha memories, bandscope and SSB/CW. It comes with four AA NiCad cells, charger, belt clip, strap and flex antenna. (This, and other prices shown, are after mfg. coupons). $299.95

R5 The **R5** covers 150 kHz to 1309.995 MHz (less cellular gaps) in: AM, FM Narrow and FM wide. 1200 memories store: frequency, mode, step size, duplex direction and offset, CTCSS tone, tone squelch and skip settings. Other features include: attenuator, LCD lamp, AM ferrite bar antenna, auto power off, CTCSS decode, weather radio function and battery save. $199.95

R3 The **R3** tunes 500 kHz to 2450 MHz (less cellular) in AM, FM-W, FM-N and TV via a 2 inch **TFT color TV screen**. You can receive regular TV [NTSC], and you may be able to see certain video feeds and ham radio Fast Scan TV. A second mono LCD display that can be used to conserve battery life. You get: 450 alpha memories, 4-step attenuator, bandscope, video and audio outputs and auto power-off. Comes with Li-Ion battery, charger, belt clip and BNC antenna. $369.95

R20 The new R20 covers an incredible 150 kHz to 3304.999 MHz (less cellular) with 1250 alphanumeric memories, bandscope and SSB/CW. It has: two VFOs, dual watch, voice scan control, NB, large two line LCD and CTCSS/DTCS/DTMF. A built-in IC **audio recorder** can record 1, 2 or 4 hours of reception! This radio comes with charger, Li-ion battery, belt clip and wrist strap. More info on website. $499.95

R75 ✔**FREE from ICOM: UT-106 DSP Notch/NR Option**
Normally $139.95, **free** with R75 purchase. Limited time offer.

✔**FREE from Universal Radio with your R75:**
"Shortwave Listening Guidebook" ($19.95 value)

The ICOM **R75** receiver continues the proud tradition of the earlier R70 and R71A models. With full coverage from 30 kHz to 60 MHz; all longwave, medium wave and shortwave frequencies are supported plus extended coverage to include the 6 meter amateur band. Some of innovative features of the R75 include: Synchronous AM Detection, FM Mode Detection (but not the FM broadcast band), Twin Passband Tuning, Two Level Preamp, 99 Alphanumeric Memories, four Scan Modes, Noise Blanker, Selectable AGC (FAST/SLOW/OFF), Clock-Timer, Squelch, Attenuator and backlit LCD display. Tuning my be selected at 1 Hz or 10 Hz steps plus there is a 1 MHz quick tuning step plus tuning Lock. The front-firing speaker provides solid, clear audio. The back panel has a Record Output jack and Tape Recorder Activation jack. The R75 includes the Icom AD55A external 120 VAC 60 Hz to 16 VDC 1.5 Amp power supply adapter. The R75 is an excellent single sideband receiver (SSB). The supplied 2.1 kHz SSB filter is suitable for utility, amateur, or broadcast SSB. However, two optional CW/SSB filter positions are available (one per I.F.). The IC-R75 is a great value. Ask about our new infra-red **remote control** option. **Call for price.**

PCR1000-02BON
✔**FREE with your ICOM PCR1000**
"Shortwave Listening Guidebook"

Hear it all with the **PCR1000-02BON** Windows receiver covering 10 kHz to 1300 MHz (less cellular) in AM/FM-N/FM-W/SSB/CW. With IF Shift, NB, CTCSS Decode, 6 Scan Modes, 3 Screens. The **new** included ***Bonito Software*** CD adds exciting new capabilities. $369.95

R8500 ✔**FREE with your ICOM R8500**
"Shortwave Listening Guidebook" & Icom Cap

The professional-grade ICOM R8500 covers 100 kHz to 1999.99 MHz (less cellular). Please see our catalog or website for the full story on this extremely versatile multimode wideband receiver under $1500.

www.universal-radio.com

◆ **Visit our website or request our free 104 page catalog for other ICOM products.**

Universal Radio is also pleased to carry the complete ICOM **amateur radio** equipment line. **IC-7800** shown.

universal radio inc.

Universal Radio, Inc.
6830 Americana Pkwy.
Reynoldsburg, Ohio
43068-4113 U.S.A.

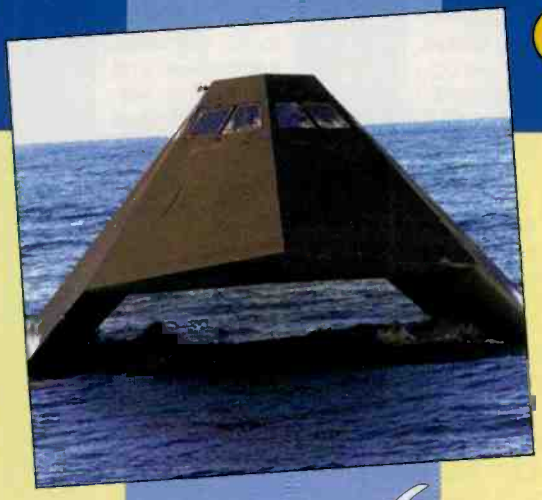
☎ 800 431-3939 Orders & Prices
☎ 614 866-4267 Information
614 866-2339 FAX Line
dx@universal-radio.com

- Visa
- MasterCard
- Discover
- JCB

- Prices and specs. are subject to change.
- Special offers are subject to change.
- Returns subject to a 15% restocking fee.
- Prices shown are after mfg. coupons.

Contents

POPULAR COMMUNICATIONS
Volume 22, Number 12 August 2004



6

25

74

Departments

On The Cover

Artist's rendering of the super-secret Lockheed Martin CHARC stealth attack boat that may soon be prowling the nighttime waters off the coast of California. For more details and how you might relate comms, them be sure to check out tips on Steve Douglass' article "Stealth On The High Seas" on page 6. (Illustration by Steve Douglass)

tuning in

by Harold Ort, N2RLL, SSB-596

an editorial

The Forgotten Comment: Who Really Speaks For CB?

Over the past few months I've read hundreds of official comments to the FCC regarding BPL (Broadband over Power Line). Most of you already know what BPL is—and isn't—from these pages and elsewhere in the hobby media. Simply put, it's the latest not-so-high-tech power line industry effort (with nauseating intimacy between the BPL industry and the highest levels of the FCC, and even the President) to bring high-speed Internet services to homes and businesses using overhead power lines as radio frequency (RF) carriers.

Trouble is it's a system rife with technical problems, including very obvious and pronounced interference to licensed radio services wherever the BPL systems are being tested. Overhead power lines aren't designed to carry RF energy any more than your garden hose is designed to carry natural gas. The BPL interference issue is a well-documented *fact* and not the product of over-zealous radio operators hell-bent on protecting their turf at any cost.

The ARRL, CQ Communications, Inc., various editors (myself included), and a myriad of radio enthusiasts, government agencies, private citizens not connected with radio, and many others have all filed comments with the Commission. These comments are basically saying that BPL in its present form is a really bad idea, and that using overhead power lines to carry radio signals—*however low the power*—is dumber than operating a pirate radio station in front of the FCC headquarters. It seems to me that from a common-sense perspective (oops, there I go again, asking the industry and FCC to exhibit what most thinking Americans have!) if you have to divert the public's attention away from the obvious interference and even talk about *notching* power line RF from the get-go, that's really an admission of severe technical problems.

In an effort to reach out to the current administration, League President Jim Haynie went to Washington recently and met with Richard Russell, the White House associate director of technology in the Office of Science and Technology Policy. (Of course, the politicians—which are the *real* problems here—are clouding the facts. They're trying to fine-tune public opinion much like we would a radio, or maybe null out adjacent channel interference until the offending station is barely audible. That, and the fact that My Prezadant is saying about BPL what he's saying about most everything else that he doesn't know about ("BPL is good for America"), got me wondering just what *is* good for America when it comes to radio.

So, this weekend I made a few phone calls and went back through some old files trying to find out just what it is that the rest of America—beyond the ARRL, the Internet yap rooms, "lists," and hard-core radio hobbyists—thinks about radio. I'm talking about *real* radio here, not the latest battle between Howard Stern, the network bigs and the FCC, or the latest chart-busting hit by *Whoz Dat Yellin Obscenities In My Ear.*

The old expression "where the rubber meets the road" came to mind (no, not as a title for a new song!), and my mind being what it is, I thought about CB radio. Apparently so do most ordinary Americans. Now, whatever *you* think about CB radio, and whatever position you hold—or *think* you hold—in the ham radio community or elsewhere, please know that when I began asking "regular folks" about radio, eight out of 10 said something like, "you mean CB?"

On most of the nearly 100 radio talkshows I've been on in the past few years talking up our radio hobby to the general consumer, inevitably the on-air conversation turns to CB radio and how it can be a lifesaver. Oh sure, there's usually a chuckle between the broadcaster and me about the less-than-admirable side of CB, but for an unlicensed service that's been around nearly 45 years and that's pretty much ready to go out-of-the-box, folks should really *expect* a cross-section of America. (Heck, I hear worse tuning across the FM broadcast band during morning drive-time!) Give a clown a mic and he's suddenly a changed person and ready for Prime Time CB.

Fact is, CB's popularity isn't declining. Matter of fact, if you read Alan Dixon's superb article elsewhere in this issue you'll learn that just the opposite is true. And just as true as BPL is a *very* large crock-pot, it's also true that the premier CB radio organization in the United States is REACT International, Inc., and their motto is, "In emergencies, reliable communications are the lifeline for survival." REACT's many capable volunteer communicators are always there when it comes to helping out. It doesn't matter if it's a neighborhood disaster or widespread natural or manmade catastrophe; REACT's operators (CB, ham, FRS, and GMRS) are always at the ready.

These excellent operators know that it's not just *talking* on the radio in emergencies that counts, it's mostly *listening* that matters. After all, if you can't *hear* the fellow calling for help with his battered CB walkie-talkie from under the pile rubble, then where does that leave rescuers?

Sadly, though, when I inquired of REACT about their FCC comments regarding the greatest threat to hearing a weak 11-meter signal, officials couldn't *remember* if they had filed comment with the Commission. (I might not remember what I had for breakfast last Tuesday, but I, and the folks who work with me, certainly remember the comments we filed on BPL.

Turns out, after a few e-mails from key REACT honchos I learned they did indeed file a comment—all 200 words or so—last summer, but it took plenty of head-scratching in Suitland, Maryland, to remember and even find the comments filed by REACT's FCC Liaison, William Riley. They basically mirrored what the ARRL had said earlier without much original thought, and they certainly didn't address the fact that CB and even amateur mobile operators will face unprecedented interference problems from BPL simply because one can't predict where disaster will strike and low-power comms beg to be heard, but are beneath the BPL racket. It didn't mention that BPL's deployment is not usually in urban but rural areas that often see large-scale evacuations coordinated by CB radio, as in the case of Hurricane Andrew.

Remember, REACTers are folks using *legal* CB radios at home and in their vehicles; depriving them of the ability to communicate is tantamount to cutting the coax at the local Sheriff's office. That's what needed to be said in REACT's comments. It wasn't.

Frankly, were it not for the foresight, hard work, and dedication of Alan Dixon and Ron McCracker and other REACTers *acting on their own*, REACT's voice would seldom, if ever, be heard. So, while the League's Jim Haynie had the smarts to travel from Newington, Connecticut, to Washington, in nearby Suitland, Maryland, the folks at REACT stayed home planning yet another REACT Conference.

It's a good bet that BPL won't be on REACT's agenda. That's why we continue to urge individual operators to contact the FCC, their legislators, and the media about issues that go well beyond hobby radio, such as BPL. What about you? Have you commented? ■

our readers speak out

Each month, we select representative reader letters for "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.

An Underestimated Threat?

Dear Editor:

I read with interest your recent comments on "Antenna Restrictions Got You Down?" I think most amateurs do not realize the importance of this issue. I believe that *nothing poses as big a threat to ham radio as Home Owner's Associations (HOAs). Not spectrum grabs, not No-Code licenses, not even the Internet or Broadband over Power Lines.* I believe the average amateur and the ARRL badly underestimate the threat. This issue has proliferated into each new housing development (even some of the older ones) as CC&Rs (covenants, conditions, and restrictions).

Antenna restrictions pertaining to CC&Rs and imposed by builders, developers, and HOAs in residential neighborhoods impose unfair restrictions with respect to antennas and towers. Many single out "radio antennas: not permitted." These restrictions effectively remove the heart of amateur and communications radio and make the hobby inactive.

We have not taken corrective action soon enough. To this extent we are handicapped and it will be very difficult to undo, or reverse the trend.

For about a year, my wife and I have been trying to relocate to a new home. We have spent many hours reading the CC&Rs of the desired developments. The experience has been very discouraging. The trade-off comes down to choosing between amateur radio and our appropriate housing requirements. The look on the real-estate agent's face when you discuss your requirements says it all: "You are not welcome." Perhaps we haven't done a very good job of promoting amateur radio or the radio hobby in general. Perhaps too many bad experiences have gone unaddressed.

Yes, I have tried inside antennas, so called "compromised" antennas, and "stealth" antennas and they "work" after a fashion. But it is not the same as a good outside beam or wire. Besides, many of the CC&Rs do not permit any "transmitting, ham radio or outside antennas." Period.

Radio is important because it can influence young would-be scientists. I was introduced to amateur radio at an early age and it created a life-long passion for science, learning, and school. I made science my life's career. It is difficult to influence and mentor youth with radio without demonstrating its capability to generate excitement. Youth in our neighborhood will not easily be exposed to radio because of these restrictions.

The FCC has not demonstrated the courage to set minimum standards for amateur radio operators' antennas and override the CC&Rs copied by most new land developments. The FCC has deferred this issue to Congress. I doubt we will get any action there. Some state legislatures have taken up the issue, but it is not a priority.

I will encourage all my radio friends to get involved, promote the positive, and write letters. I also encourage our leadership and editors of our respected publications to bring up this issue and keep it in the forefront. It deserves our immediate attention. The survival of our hobby is at stake.

Mike Grimes, K5MLG
Plano, TX

Good News For Outbanders?

Dear Editor:

The FCC gives a damn NOT about any of your "illegal" activities! I come to this conclusion following a nearly six-year process, attempting to generate action against the clown across the alley from my house. This guy has a full-beam, 60-foot tower in his backyard, sporting a 10-meter element.

Shortly after moving in, I was scanning the dial on my ICOM R-7100, in the neighborhood of 27.7 MHz. I inadvertently tuned right in to his signal, which immediately pegged the S-meter to the wall. Just as quickly, I hit the power switch...but not before the overload had burned out a pri-

(Continued on page 78)

POPULAR COMMUNICATIONS

EDITORIAL STAFF

Harold Ort, N2RLL, SSB-596, Editor
(E-mail: Popularcom@aol.com)
Tom Kneitel, K2AES/SSB-13, Senior Editor
Edith Lennon, Managing Editor
Richard S. Moseson, W2VU, Online Coordinator
(E-mail: w2vu@popular-communications.com)

CONTRIBUTING EDITORS

Rich Arland, K7SZ, Homeland Security
Peter J. Bertini, K1ZJH, Restoration/Electronics
Bruce Conti, AM/FM Broadcasts
Joseph Cooper, Computer Assisted Radio
Gerry L. Dexter, Shortwave Broadcast
Alan Dixon, N3HOE/WPUC720 Personal Radio
Steve Douglass, Utility Communications
Bill Hoefer, KBØULJ, Aviation Communications
Shannon Huniwell, Classic Radio
Kirk Kleinschmidt, NTØZ, Amateur Radio
Tomas Hood, NW7US, Propagation
Bill Price, N3AVY, Humor/Communications
Laura Quarantiello, Legislative Affairs
Ken Reiss, Technical/Scanning
Bob Sturtevant, Puzzles and Trivia
Gordon West, WB6NOA, Radio Resources

BUSINESS STAFF

Richard A. Ross, K2MGA, Publisher
Arnold Sposato,N2IQO, Advertising Manager
Emily Leary, Sales Assistant
Sal Del Grosso, Accounting Manager
Ann Marie DeMeo, Accounting Department
Catherine Ross, Circulation Manager
Melissa Gilligan, Operations Manager
Cheryl DiLorenzo, Customer Service Manager
Bonnie Perez, Customer Service

PRODUCTION STAFF

Elizabeth Ryan, Art Director
Barbara McGowan, Associate Art Director
Dorothy Kehrwieder, Production Manager
Emily Leary, Assistant Production Manager
Hal Keith, Technical Illustrator
Larry Mulvehill, WB2ZPI, Photographer

A publication of

CQ Communications, Inc.
25 Newbridge Road
Hicksville, NY 11801-2953 USA

Offices: 25 Newbridge Road, Hicksville, NY 11801. Telephone (516) 681-2922. FAX (516) 681-2926. Web Site:<http://www.popular-communications.com/> Popular Communications (ISSN-0733-3315) is published monthly by CQ Communications, Inc. Periodical class postage paid at Hicksville, NY and additional offices. Subscription prices (payable in U.S. dollars): Domestic—one year $28.95, two years $51.95, three years $74.95. Canada/Mexico—one year $38.95, two years $71.95, three years $104.95. Foreign Air Post—one year $48.95, two years $91.95, three years $134.95.

U.S. Government Agencies: Subscriptions to Popular Communications are available to agencies of the United States government, including military services, only on a cash with order basis. Requests for quotations, bids, contracts, etc. will be refused and will not be returned or processed.

Printed in the United States of America.

Postmaster: Please send change of address to Popular Communications, 25 Newbridge Road, Hicksville, NY 11801.

Info Central

news, trends, short takes, and other things radio

by Harold Ort, N2RLL, Editor, and D. Prabakaran

Uniden Releases PC Scanner Control Protocol

Paul Opitz, Product Manager for Uniden Corporation of America, tells us that in response to requests from the scanning community, Uniden has released the PC scanner control protocol for the free use of hobbyists and third-party software developers. This information should help to spur continuing innovation and growth in the scanner market, by expanding the integration of Uniden's scanner models into hobbies, public safety, media, and other specialty markets. This protocol is being released on an as-is basis, with no technical support provided. Users needing more information about using the protocol are encouraged to participate in any of several hobbies on-line forums available for the discussion of scanner technology.

The protocol is available immediately from the download section of Uniden's website at http://www.uniden.com for the following models: BC245XLT, BCT8, BC780XLT, BC895XLT, BC250D, BC785D, BC296D, and BC796D.

Some PA Call Boxes Are History

Chalk it up to a sign of the times. Pennsylvania Department of Transportation officials have begun phasing out roadside call boxes that were originally installed in 1999 on Interstate 81 in Luzerne and Schuylkill Counties. The reason for removing the 102 call boxes: cell phone popularity.

Only 130 calls were logged last year on the 51-mile stretch of I-81 and maintaining the call box system requires $119,000 annually, which works out to about $1,000 for each call! Officials say the money could be used in other areas, including road improvement and maintenance.

Will The EU Go To Court Over U.S. Anti-Terror Agreement?

The European Parliament has threatened a court challenge over a planned EU-U.S. anti-terror agreement to secure the personal data of airline passengers. In early spring the EU's parliament condemned the plan fearing a weakening of civil liberties. Meanwhile, Washington continues to say it needs the personal data to prevent terrorism.

EU lawmakers say that unlike passport information, the personal data collected by airlines are not checked for accuracy; in the event of problems, travelers can be subject to lengthy questioning or even arrest. Liberal Democrat Graham Watson said, "We share the commitment of the United States to fighting terrorism, but we will not ride roughshod over the privacy rights of Europeans in this fight."

APCO Applauds The FCC

The Association of Public-Safety Communications Officials (APCO) International has applauded the FCC for its leadership with wireless Enhanced 911 (E911) regarding the third meeting of the Wireless E911 Coordination Initiative held recently at FCC Headquarters.

The first and second meetings, held in April and October 2003, respectively, brought together key wireless industry experts, national, state, and local government officials, and the public safety community to discuss the findings of the Hatfield Report and the new issues that have arisen since. (The Hatfield Report was initiated by the FCC in an effort to bring all wireless carriers and manufacturers into the E911 loop. Dale Hatfield, a former FCC bureau chief, conducted an inquiry into the technical and deployment problems associated with E911. His report was released on October 15.) This current meeting reconvenes the previous participants to update the stakeholders and identify the issues that still need to be addressed.

APCO International staff and members participated in the Wireless E911 Coordination Initiative. APCO International Director of 911 Services and Communications Center Operations William C. Cade participated on the "Status of E911 Initiatives" panel discussing the activities of Project LOCATE (Locating Our Citizens At Times Of Emergency). Cade also participated on the "Public/Private Partnerships in the E911 Setting: Achieving Results in the Absence of Regulation" panel, updating attendees on the progress of the Public Safety Foundation of America with APCO International Telematics Task Force Chair Chris Fischer. In addition, Col. Walter Way, Johnson County (KS) Sheriff's Department, participated on the "Coordination Issues Among Stakeholders: Meeting Regulatory Obligations" panel, and Jim Beutelspacher, Minnesota State 911 Program Manager, participated in the "Next Steps for Multi-Line Telephone Systems" panel.

"We are thankful that the FCC has created this forum for us to discuss the issues our members face on a daily basis," APCO International President Vincent Stile said. "We applaud the FCC for their continuing efforts to help make wireless E911 a certainty for this nation."

North Korean Defectors In South Korea Plan Internet Radio

North Korean defectors in South Korea will establish an Internet radio station focusing on Pyongyang's infringement of human rights, a step aimed at raising awareness of their fellow North Koreans on the issue. Service was scheduled to begin by early May. It will be operated out of an office in Seoul, which was set up with 30 million Won ($25,500) donated by defectors. The station may also sell its contents to the Voice of America and Radio Free Asia, and will pursue shortwave broadcasting for people in North Korea as well.

Listeners will be able to access the station through its website at http://www.freenk.com/.

Burmese Opposition Radio To Change Morning Broadcast Frequency

The Democratic Voice of Burma (DVB) morning programs, usually broadcast in the shortwave 49-meter band, have switched to the 31-meter band on 9435 MHz. Don't forget to report your reception of the station to Gerry Dexter's "Global Information Guide." See his column for details. ■

Stealth On The High Seas

Are "Invisible" Ships Prowling The World's Waterways— And Can You Monitor Them?

By Steve Douglass

From time to time I have written about covert military aircraft projects, such as the *Black Manta* or the *Pulser*. Since then I have received many letters from readers telling me of their own close-encounters with aircraft the government would rather you not know about. Most of these letters also ask for more information on secret stealth aircraft to appear in my "Utility Communications Digest" column. However not all UTE monitors are as enamored with aircraft as I am and have a more nautical bent. They're in love with the ocean, ships, and marine monitoring, and as a rule couldn't care less about what's flying through the midnight skies.

But that doesn't mean there isn't black project intrigue on the high seas. In fact, the sea-borne U.S. military is now embracing stealth technology—and not in the form of carrier-based aircraft. Silent, practically invisible stealth ships are now prowling the world's waterways.

Seafaring Origins

Back in the 1970s when the geniuses at the Lockheed Skunk Works, a "secret" aircraft development group operated by Lockheed, created the formula for building a low-radar-observable aircraft, they realized that the special shaping required could be applied to anything they didn't want to show up on radar. They began envisioning a whole slew of stealth projects, including everything that flew, rolled, and yes, sailed the seven seas.

Lockheed Martin's design for a stealthy attack boat is based on its success with its other stealthy projects, such as the revolutionary F-117 stealth fighter and the Sea Shadow stealth ship. (Photo courtesy Lockheed Martin)

Imagine a fleet of Navy ships that could sneak up on a target unnoticed, sitting quietly off an enemy coast ready to launch aircraft, missiles, or UCAVs (see "Glossary") at a moment's notice. Terrorist camps could be taken out without any warning, plus once the word was out that America could strike anywhere at anytime, the decision to direct war against the U.S. would not be something an enemy would take lightly.

Another very attractive mission envisioned for stealth ships would be the ability to insert clandestine operatives into a country via an ocean inlet where they could spy or conduct paramilitary operations. One unexpected stealth byproduct was the special faceting shape that also seriously reduced a submarine's sonar signature, which will make future submarines impossible to track.

The Navy also envisioned building spy ships that could loiter off a coast gathering SIGINT and COMINT without an enemy being any wiser. Possibly, many Navy old-salts couldn't help but wonder if the infamous "Pueblo Incident," where North Korea captured a U.S. eavesdropping ship, could have been avoided if stealth had been invented decades earlier.

With these requirements in mind, Lockheed futurists began exploring the possibilities of building stealthy ships. They began by building models and testing them in a huge man-made lake and radar range in the middle of the California desert, near Death Valley. The Skunk Works miniature ocean came complete with wave-making machines and a movable pylon on which to mount test shapes that could be irradiated with many wavelengths of radar, including those of orbiting Russian ocean surveillance satellite radars.

An unforeseen, and comical, problem occurred when the test ocean attracted vast herds of wild horses. Smelling the fresh water, they came by the hundreds to drink from Lockheed's stealth pond. This problem was solved when salt was added to the water, not only driving away the horses but also closely duplicating the salinity and density factors of the world's oceans.

Out of these tests the first stealth ocean-going navy ship was born. Known as the *Sea Shadow*, this super-secret ship was built and tested in complete secrecy off the coast of Catalina

The first stealth ship, the Sea Shadow *was so cutting edge that at first the U.S. Navy rejected it. Now the Navy is rethinking its ideas on stealth and is applying stealth technologies to designs for future warships and aircraft. (Photo courtesy Lockheed Martin)*

Island. Constructed and hidden away inside a floating dry-dock, the *Sea Shadow* only set sail on moonless nights and in carefully guarded sea-lanes where the Navy could run its series of tests, which included over-flying the ship with every type of sea searching radar they could muster.

During one series of tests, the stealth ship was only spotted twice, but that was only when a Navy P-3 Orion came within a couple of miles of the *Sea Shadow*, far inside the anti-aircraft missile range of any defensive system the ship could defend itself with.

As impressive as the *Sea Shadow* was, acceptance within the Navy was not assured. Keep in mind that the U.S. Navy is a branch of the military mired in tradition and bureaucracy, so much so that when one Navy admiral saw the blueprints for the *Sea Shadow* he demanded to know where the paint locker was. Every ship that had ever sailed in the U.S. Navy since John Paul Jones had a paint locker onboard and he'd be damned if the *Sea Shadow* wasn't going to have one also!

So the *Sea Shadow* became just an experiment in high technology that the Navy wasn't interested in at all... until now.

Despite its unsuccessful attempt to bring the Navy into the stealth age, Lockheed persisted and has announced that it hopes to build an even more advanced Navy fast attack boat, called a CHARC for Covert High-Speed Attack & Reconnaissance Craft.

Looking like a cross between a stealth fighter, Comanche helicopter, and a Star Trek spaceship design, the CHARC is designed to protect carrier groups by fighting off attacking suicide boats (like the type that attacked the *USS Cole*), sink diesel submarines (now being sold to third world countries by North Korea and Russia), and also work as a clandestine spying platform capable of reconnaissance deep within hostile waters. The CHARC could also be used as a minesweeper and an anti-aircraft SAM platform as well.

Designed to be stealthy in all aspects with very low radar, sonar, acoustic, and infrared signatures, the CHARC should be very hard to detect, indeed. It will be fast, too, propelled by two folding engine pylons up to 50 kilotons by two 2,600- to 3,000-hp diesel engines.

In most operating modes the engine pods work submerged, as in the *Sea Shadow*'s SWATH design, but could be pumped with air and swiveled up like wings so that the entire ship can lay flat on the water like a catamaran, enabling it to work in shallow water or to reduce its visible signature greatly. When the engine pods are configured below the craft their buoyancy can be configured so that the entire ship, except for the engine pods, can rise 14 feet above the water for use as a surveillance platform and to

The Sea Shadow *inside its secret floating dock where it was built and tested in complete secrecy.*

THE VERY BEST IN S

YB 400PE AM/FM/ Shortwave Radio

This high-performance PLL synthesized, dual-conversion YB 400PE receiver pulls in AM, FM-Stereo, Shortwave, and Longwave, including continuous coverage from 520-30,000 KHz. Even Ham radio two-way communications can be heard using the SSB circuitry. Its highly sensitive auto-tuning system stops even on weak stations within the international Shortwave broadcast bands. Its 40 programmable memory presets allow quick, easy access to your favorite stations.

Key features include:

- Easy tuning with direct frequency entry, up/down buttons, and auto-scan
- Multifunction LCD displays time, frequency, band, alarm wake time, and sleep timer
- Sleep timer, dual clocks, and dual alarm modes wake you with beeper or radio play
- Built-in antennas for complete portability and socket for supplementary Shortwave antennas
- Includes AC adaptor, earphones, carrying pouch, supplementary Shortwave wire antenna, and batteries

$149.95

YB 550PE AM/FM/ Shortwave Radio

Unique features define the model YB 550PE, such as 200 randomly programmable memory presets with user-defined memory page customizing, digital fine-tuning control, and favorite station wake-up memory. Through its PLL synthesized digital tuner, receive AM, FM-Stereo, and Shortwave with excellent sensitivity and selectivity. Enjoy the entire Shortwave spectrum that includes all 14 international broadcast bands and continuous Shortwave coverage of 520-29,999 KHz. Its auto-tuning system stops even on weak stations within the international Shortwave spectrum, or with the direct frequency entry system, go instantly to any frequency in its tuning range.

Key features include:

- Signal strength and battery power level indicators
- Digital clock with selectable 12/24 hour clock display format
- LCD with display light that shows simultaneous display of frequency and clock
- Alarm with snooze feature and 10-90 minute sleep timer
- Includes built-in antennas, sockets for supplementary Shortwave and FM antennas, earphones, and optional AC adaptor

$99.95

The Most Powerful Compact Shortwave Radios

1015 Corporation Way, Palo Alto, CA 94303 | Tel: (650)903-3866 | Fax: (650) 903-3867 | **www.etoncorp.com**

HORTWAVE RADIOS

S350 AM/FM/ Shortwave Radio

Incorporating a sensitive, high-performance analog tuner with digital frequency readout, the S350 receives AM, FM-Stereo, and continuous Shortwave coverage of 3,000 to 28,000 KHz, including all 14 international broadcast bands. Its classic analog tuning knob with superimposed fine-tuning control makes it a pleasure to operate, and the variable RF gain control, wide/narrow bandwidth selector and low pass filter give you complete control over incoming signals. Operates on 4 'D' batteries for long battery life.

Key features include:

- Multifunction LCD shows digital frequency, clock, and more
- Alarm and 1-90 minute sleep timer
- Variable, independent bass and treble controls
- Left/right line-level outputs (stereo in FM)
- Includes built-in antennas, sockets for supplementary Shortwave and FM antennas, convertible nylon handle/carrying strap, earphones, and optional AC adaptor

$99.95

FR200 AM/FM/ Shortwave Emergency Radio

Requiring no external power source, the FR200 is a versatile multi-purpose tool for keeping informed, entertained, and safe. Combining AM/FM/Shortwave radio and flashlight in one, the FR200 operates without batteries – powered by its built-in hand-crank generator – allowing you to listen to news, music, and international programming from anywhere, including places where power is a problem.

Key features include:

- AM/FM/Shortwave Tuning (SW1, 3.2-7.6MHz; SW2, 9.2-22MHz)
- Hand-crank power generator recharges internal Ni-MH battery
- Built-in flashlight perfect for emergencies or camping
- Splash-proof ABS cabinet withstands your adventures and abuse
- Can also operate on 3 AA batteries or optional AC adaptor

$39.95

in The World.

etón®
GRUNDIG North America

Glossary Of Terms

COMINT: Communications Intelligence
Faceting: Cutting flat planes on a gemstone
P-3 Orion Aircraft: A Navy four-engine turboprop antisubmarine and maritime surveillance aircraft.
SAM: Surface-to-Air Missile
SIGINT: Signal Intelligence And Information
SWATH: Small Waterplane Area Twin Hull design wastes less energy climbing wave peaks and accelerating down troughs.
UCAV: Unmanned Combat Air Vehicle

expose the 20-mm cannon and Hellfire missile pods.

The four-man cockpit design is borrowed from the MH-60R/S STRIKEHAWK helicopter, with its faceted stealth shape a direct descendant of the F-117 and RAH-66 Comanche scout helicopter designs.

If the CHARC is built, one or more of these unique craft will operate from a much larger craft, such as a carrier or assault ship. Fast, nimble, and stealthy, the CHARC can only add to the lethality and flexibility of any carrier group.

"So how can monitors hope to catch a CHARC on their radios? Try monitoring marine VHF channels near Navy yards on the west coast."

Listening For The CHARC

So how can monitors hope to catch a CHARC on their radios? Try monitoring marine VHF channels near Navy yards on the west coast. I don't think you'll have any chance of monitoring a CHARC on HF, but associated Navy communications might indicate when the CHARC is on sea trials. Good areas to monitor should be the waters around the Channel Islands off of Santa Barbara (where the *Sea Shadow* was tested) as well as off the waters near the Navy's secret test facilities located on San Nicolas Island.

During *Sea Shadow* trials the Coast Guard let it leak that they were escalating stop and search procedures in the test areas, which worked well at keeping pleasure craft far away, so keep an ear to CG channels as well.

Most of the *Sea Shadow* trials took place on moonless nights with the craft tucked away before dawn back in its floating hide-and-shelter on Long Beach. Look for unusual floating barges and enclosures guarded closely by Navy police and Navy support ships.

You might want to monitor Navy UHF aviation band frequencies as well for increased P-3 Orion traffic, because that will undoubtedly be used to see if they can track the CHARC on their radars. Lockheed Martin hopes to field CHARCs by 2008.

As we continue the War on Terrorism into the 21st Century, keep an ear to the airwaves. You never know what you might hear! And of course don't forget to report any unusual communications to me here at *Pop'Comm*. ■

washington beat

Capitol Hill and FCC actions affecting communications

by Laura Quarantiello, lauraq@cts.com

Changing The Wiretap Law

New York State Attorney General Eliot Spitzer has filed comments with the FCC urging it to change the wiretapping law to force communications companies to build surveillance capabilities into mobile devices and Internet-based telephone services. Spitzer's views are similar to those held by the Justice Department, which has called for the FCC to revise the current law to cover information services as well as telecom services. The communications industry made it clear that it already cooperates on surveillance with law enforcement agencies. But, the industry noted that Congress explicitly exempted information services from the wiretapping law and that any change in the law should come in the form of new legislation from Congress, not a rule change by the FCC.

Rural Providers Miss E911 Deadline

Approximately 90 rural mobile service providers have missed the deadline to deploy Enhanced 911 (E911) services and comply with an FCC mandate, which states that mobile operators must pinpoint the location of emergency callers using wireless phones within 50 yards 95 percent of the time. The Rural Cellular Association said it had no plans to take immediate action on behalf of its members. The FCC said it also would not take immediate enforcement action, but instead will bring up the issue at the Commission's E911 meeting at the end of the month.

NextWave Spectrum Licenses

The FCC and NextWave Telecom have finally ended an eight-year legal dispute over 63 spectrum licenses auctioned in 1996. The agreement, approved by the Justice Department, will have NextWave return most of the licenses to the FCC, retaining a 10-percent slice of the spectrum that includes licenses for spectrum stretching from Washington to Boston. NextWave will pay the government $1.1 billion and could in the future pay the government part of the proceeds if it decides to sell its remaining spectrum licenses. The FCC plans to auction NextWave's returned spectrum within months, providing U.S. wireless carriers with the opportunity to increase capacity.

Medical Devices Waiver

Biotronik, Inc., has been given a waiver for its Philos DR-T medical implant device to operate in the Medical Implant Communications Service (MICS) band, located at 402 to 405 MHz. The device is a low-power implanted transmitter that operates in conjunction with a cardiac pacemaker to facilitate data communication from the device to a doctor. The data is transmitted from the implanted device to a radio receiver that is contained inside a specialized cellular telephone located in close proximity to the patient. The data is then relayed via the cellular telephone to a data collection point for later review by a doctor.

Biotronik also holds a certification for implantable cardiac defibrillators and for implantable cardioverter defibrillators with the same monitoring/communications function, and additional cardiac implant devices await certification. The devices are designed to communicate data in the event of certain changes in the patient's condition or through manual activation, and also at regular intervals for periodic monitoring of the patient's condition.

TV Channel 16 Changes To Public Safety In NYC

The FCC has reallocated television Channel 16 (482 to 488 MHz) in the New York City metropolitan area to the land mobile service for public safety communications. In 1995, the Commission conditionally waived Parts 2 and 90 of its rules to allow the temporary assignment of frequencies in the 482- to 488-MHz band to public safety agencies in New York City. As a result of this action, public safety use of the frequencies was permitted for a period of at least five years or until a television broadcast station initiated use of Channel 16 for advanced television broadcast operations, whichever was longer. In that order, the Commission found that the public safety agencies in New York had "an urgent and immediate need for additional spectrum capacity for public safety communications." The Commission believed that the use of TV Channel 16 would provide necessary relief and would allow for the development of interoperability of communications among the affected public safety agencies. Finally, the Commission concluded that the spectrum relief could be achieved without affecting then-existing television operations or plans for the implementation of advanced television.

Tagged! Commercial Shipping Containers Get Improved Radio Frequency Identification Devices

In an effort to increase homeland security and improve the efficiency of commercial shipping operations, the FCC has adopted a Third Report and Order that allows for the operation of improved radio frequency identification (RFID) systems for use in conjunction with commercial shipping containers. This action is expected to result in lower shipping costs and improved security at ports, rail yards, and warehouses in commercial and industrial settings by enabling the contents of containers to be rapidly inventoried. These improvements will also help system users determine whether tampering with their contents has occurred during shipping.

An RFID system consists of a tag mounted on the item to be identified and a device that receives information transmitted from the tag. The Commission's rules permit RFID systems to be operated on a number of frequency bands, subject to limitations on their maximum signal level and transmission duration. These limitations constrain the range and information transfer rates of RFIDs. The Order increases the maximum signal level permitted for RFID systems operating in the 433.5- to 434.5-MHz band to facilitate more reliable transmissions with greater range than the rules previously allowed.

The 433-MHz band is available for unlicensed operation in many countries around the world, thus enabling manufacturers to produce a single model of a device for use in both the United States and other countries. The Order also increases the maximum permitted transmission duration for these RFID systems from one second to 60 seconds, resulting in a 60-fold increase in the amount of data that can be transmitted, thus facilitating the scanning of the contents of an entire shipping container. To minimize the risk of interference to authorized communication services, operation of RFID systems with higher power and longer transmission duration is limited to commercial shipping containers in commercial and industrial areas. ■

CB Radio Triumphs In The Digital Era!

Our "Mature" Radio Friend Is Alive And Well Just When We Need It Most

By Alan Dixon

It's time to clear the air on a few radio issues. A number of our regular readers have insisted on more 11-meter CB radio news in *Pop'Comm's* "On-The-Go Radio" column. Although CB radio interest remains at a high level, CB *news* items have become somewhat scarce. Please note that this is not a sign of a dwindling population of CB enthusiasts. It's quite the *opposite*. A leveling-off of "new" developments in that medium marks a sustained maturity in the world of 27-MHz CB radio. And that's not a bad thing at all.

"Just home high a level of interest does the CB Radio Service enjoy? A university study is bound to surprise more than just a few folks."

Okay, I just said that interest in CB radio remains high. But all too often, I hear the comment made by various people in radio communications that CB radio is on the way out. Almost invariably, these individuals assert that the channels have gone silent. Then, when quizzed as to when the last time any of these folks got on the CB channels, either to operate or to monitor, the answer always leads in the same direction: "Oh, I gave up CB radio years ago," or "I got rid of my old CB set back in the 1980s." Really! Just how then do such "geniuses" have any idea what is happening on the 11-meter band? They don't.

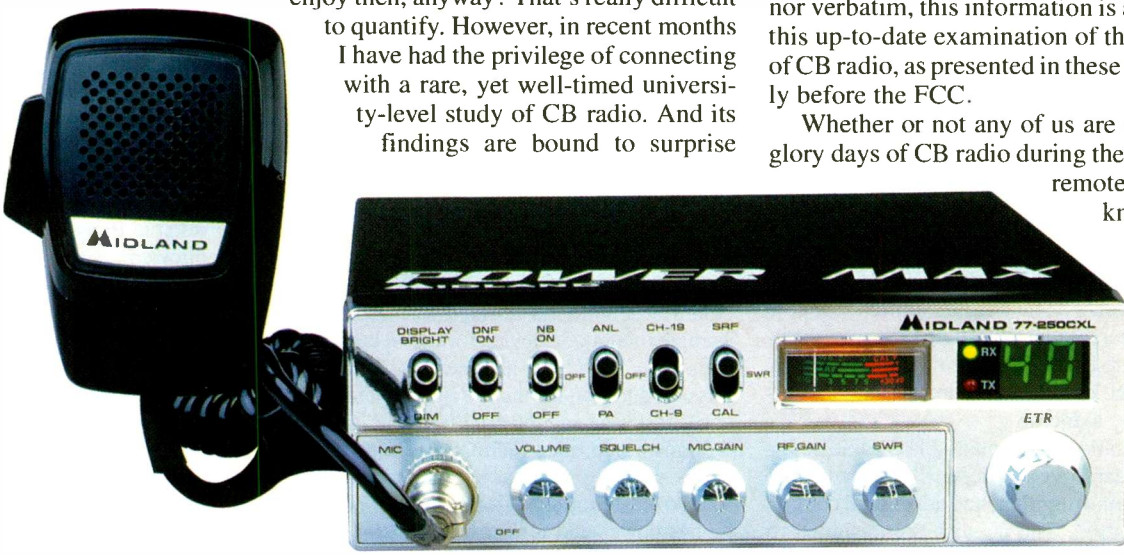
Just how high a level of interest does the CB Radio Service enjoy then, anyway? That's really difficult to quantify. However, in recent months I have had the privilege of connecting with a rare, yet well-timed university-level study of CB radio. And its findings are bound to surprise more than just a few folks who think they know what's happening in CB radio.

Protect Your Slice

First though, we need to be aware that there is an ominous new force poised to crush 27-MHz CB radio. This force is political rather than technology or market-based. Yet, it has nothing to do with any rules violations or abuses in the 11-meter band. The threat is the FCC's advancement of Broadband over Power Lines (BPL) technology. There are numerous organizations and individuals standing up to have HF bands in the Amateur Radio Service protected from the interference that will be caused by this defective technology. But who is standing up for CB radio, which is also in the HF spectrum bands? Not many, it appears initially. Nevertheless, I have filed lengthy formal comments stressing the importance of protecting the 11-meter band from BPL interference. This was done in the interest of all who use and rely upon CB radio communications *(Pop'Comm publisher CQ Communications also addressed the threat to CB in its FCC comments. -ed)*

This article contains much of the information I presented in this effort to protect CB radio. I had filed comments originally in the Notice of Inquiry (ET 03-104) period of the BPL proceedings last year, and again in the Notice of Proposed Rule Making (ET 04-37) phase this spring. While neither complete nor verbatim, this information is an accurate representation of this up-to-date examination of the popularity and importance of CB radio, as presented in these docketed comments presently before the FCC.

Whether or not any of us are old enough to remember the glory days of CB radio during the 1970s, nearly everyone even remotely familiar with CB has some knowledge of that decade's greatest fad. But fads, by definition, come and go.



CB radio continues to dominate the highways of North America in even greater numbers than in the mid-1980s. This is the Midland 77-250CXL classic chrome-face CB mobile. (Photo courtesy of Midland Radio)

When the CB craze of the '70s faded as rapidly as it arrived many people both within and without the CB world naturally concluded that CB radio was either dead or dying. Aside from the fad though, how has CB radio popularity fared over the last two-plus decades? Even disregarding the entire CB craze phenomenon of the mid-1970s, a large number of communications volunteers and hobbyists, as well as occupational users and professionals, seem to feel that interest in CB radio has been on a steady decline over the past 20 years. But is this assumption valid?

The Rest Of The CB Story—Without Jumping To Conclusions

For the many of us who lived during the CB fad in the mid-1970s, it's all too easy, though not necessarily accurate, to conclude a declining interest. In 1976, all 23 CB channels were loaded with traffic, in nearly every part of the country. The three main trucking channels then (10, 15, and 21) were busy around the clock, in even the sparsest areas within range of any major highway. Today, truckers nearly everywhere in the United States are on one channel: Channel 19. The remainder of the 40 channels we have today are largely quiet, except for the daytime DXers on channels 35 through 40 on sideband, and one or two lower channels with AM DXers. So concluding that CB radio popularity is on the decline is simple, right?

Maybe not. Jumping to such a conclusion robs us of some highly relevant realities. How can we see what's really going on? In the course of my own research over the years, I've noticed an unfortunate dearth of statistics on CB radio use, sales, manufacturing and imports, or anything else telling. Finally, in early 2003, I was contacted by a group of researchers at Michigan State University. There, the National Science Foundation (NSF) was launching a major multi-year research project on CB radio popularity in the United States, and researchers were then in an early round of source material gathering. I remained in the loop with this ongoing research, and what they have found may surprise you. We are privileged here at *Pop'Comm* that research associate Carol Ting has provided us with rudimentary statistics for use in compiling facts for this report.

Conventional Wisdom

Just how big was the CB radio fad of the 1970s? Staggeringly so! CB radio sales soared from just under two million units in 1974 to over 11 million in 1976. Sales volume began plummeting just a year later, however. By 1979, annual sales volume had dipped to just under two million; about the same sales level seen just before the fad.

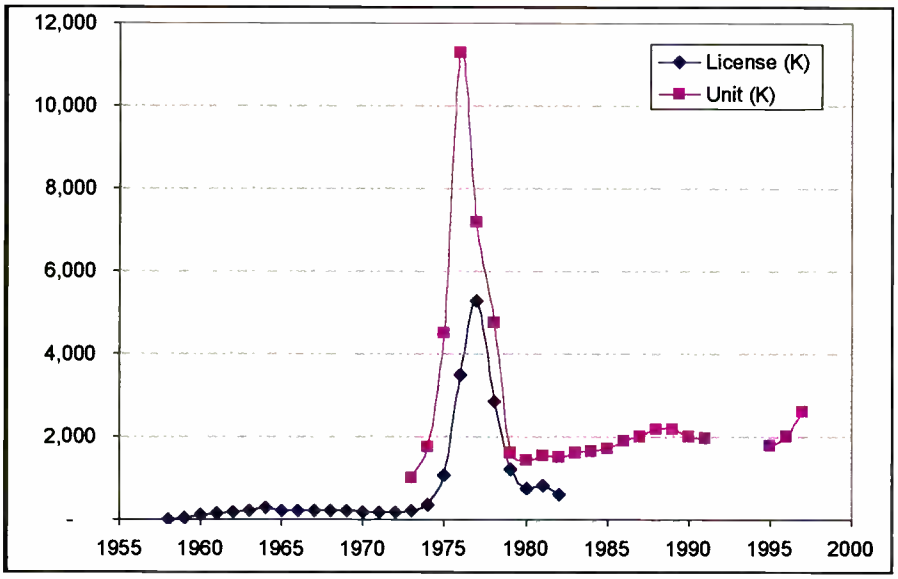
Research shows two main factors that spurred the beginning of the CB fad. One was the Arab oil embargo and its effects on motorists. These included the difficulty in finding available fuel while on the highway, the reduction of the nationwide speed limit to 55 MPH, and motorists' keen interest in the related law-enforcement activity. The second factor was massive media attention in newspapers and magazines. Additionally, several country-western genre songs about truckers' exploits with CB radio became crossover hits, assuring airplay on nearly every radio station featuring any form of contemporary music. Television shows and movies rapidly followed.

Far more difficult to track, though, are the circumstances that brought the fad to an abrupt *demise*. Several interrelated factors came into play. The first was a direct effect of the fad's rapid onset: Demand began to outstrip supply. In 1975 alone, some 12 million units were ordered for retail sale, but only five million were delivered. Distributors routinely submitted duplicate orders in the hopes of receiving adequate quantities.

New manufacturers entered the business, and related stock market performance would come to bear a strange resemblance to the Internet dot-com business boom of two decades later. This market would prove to be sorely optimistic, and caused distributors to amass excessive stockpiles of CB radio units. The marketing momentum at work in this case spiraled into what economists describe as a "hog-cycle" supply-demand imbalance which, as researcher Ting succinctly notes, typically leads to a dramatic market correction.

Another factor resulted from industry lobbying the FCC to authorize more CB channels. In the summer of 1976, the Commission responded by increasing the number of channels from 23 to 40, to be effective January 1, 1977. Sales of 23-channel CB radios were ordered to cease after that date, but sales of 40-channel units were not permitted at all *prior* to that same date. This shortsighted transition policy gave vendors only five months to clear out their collective massive overstock of 23-channel sets. An industry panic ensued, causing retailers to dump their standing inventories into the market at "fire-sale" pricing levels. Still-new 23-channel radio closeout units were often sold at a mere

Will high-power GMRS mobile transceivers be permitted in Canada in the near future? The Maxon SM-4000 pictured here has been a popular mobile GMRS radio. (Photo courtesy of Maxon)



The rise and fall and rise of Citizen's Band Radio in the U.S.

20 percent of cost, just in time for a heavy Christmas shopping season!

Then, as the year 1977 dawned, new CB radios with all 40 required channels typically sold at ***10 times*** the most recent pricing of the otherwise comparable new CB radios, sold only a month before. And, the new 40-channel radios were in *relatively* short supply. The hog-cycle effect of overstocking, coupled with a disastrous FCC transition policy, drove up CB radio prices (again, *relatively*) while choking the supply. The result was a steep plummet in CB radio sales, with a supply-and-demand dynamic that fueled an uncontrolled downward spiral from which the industry never *totally* recovered.

The *Real* Deal

When we step back and look at the bigger picture, however, we can see that, except for the "spike" caused by the rise and fall of the CB fad, CB radio popularity had only *increased* over the 45 years that 27-MHz CB radio has existed. That's right—consumer enthusiasm has steadily *increased*, even since 1980, contrary to the uninformed opinions often given as "fact" by those who no longer personally support CB radio.

In the statistical science of mathematics, there is a process known as *normalization*. This process legitimately discounts aberrations that are in fact statistically insignificant when considering a larger range of data. (Several times *larger*, that is, than the aberration in question.) Therefore, when we look at the approximately 45-year span of CB radio history, even just roughly normalizing the approximately four-year spread during which the CB fad occurred, we can clearly see that *CB radio sales have increased nearly steadily over the entire span.*

The Nineties And Beyond

The number of new CB radio units sold topped one million annually, circa 1973. This was up from about 100,000 new units licensed in 1960. *Overall*, sales had stepped up to roughly 1.8 million annually by 1980. Since 1980, new unit sales steadily increased to just over two million during 1989. After that time, sales dipped slightly to just under two million annually until 1995.

After 1995, CB radio annual sales have increased sharply through 1997, *at a rate closely approximating that of the rise of the CB fad*, circa 1973 to 1975! It is interesting to note that during these same years of the late 1990s, FRS radio was introduced. It appears at this point that FRS radio popularity has complemented, not competed with, 27-MHz CB radio popularity.

To date, there is no real accounting for the tens of millions of CB radios already in existence. The Michigan State University group is still in the process of investigating the status and use, as well as the disposal, of previously sold units. Nevertheless sales of new CB radio sets is an unimpeachable measure of public interest in 11-meter radio. With facts in hand, rather than personally biased and narrow opinion, we can assert with confidence that those who claim that CB radio popularity is dead or dying simply do not know whereof they speak. CB radio is unquestionably alive and, moreover, *growing*.

There are more *new* CB radio sets on the road now than since 1980, *by far*. Some *20 times* the number of new 27-MHz CB radios are being put into use *every year* than in 1973, and the number of new radios going on the air is rapidly approaching the figures of 1975! The fact is, the number of new 11-meter CB radios being put on the air is not only *increasing*, but it's increasing at an increasing *rate* (indicating an upward spiral), as well.

If that's not enough, the American Trucking Association, Inc., reports 1.68 million Class 8 (semi-trailer) commercial trucks on the road nationwide in recent years. It is a well-known and undisputed fact that nearly all of them rely on CB radio 24/7/365 for tactical (operational) communications, *professionally*.

Why Would The NSF Care?

Now, ask yourself this: What interest does the NSF have in CB radio? The NSF is an entity created by the federal government to contract with university graduate schools to conduct research of potential interest to the government, particularly the Department of Defense (DOD).

Hmmm...interesting...the military concerned with CB radio? While we're not as yet privy to the greater purpose of the study, you can draw your own conclusions. Could this have something to do with citizen preparedness during a protracted War on Terrorism? If so, why CB radio? Why not be more concerned with cellular telephones and wireless Internet connectivity?

Cell phones frequently fail during widespread emergencies and at mass casualty incidents. Repeaters, trunked or conventional, can certainly fail, and high-power commercial and amateur radio equipment drains batteries far more quickly than does a simple 4-watt transmitter. This much we know.

CB, The Next Generation?

Got CB? If not get it, and get on the air. Get back into operating CB, and show the uninformed how courteously and professionally radio communications are conducted. We remain in the midst of an ongoing War on Terrorism, where preparedness is never optional. If you're not already on 11 meters, it's high time to catch up with so many consumers and add 11-meter radio to your "commo" arsenal! ■

books calendars • videos

The Short Vertical Antenna and Ground Radial

by Jerry Sevick, W2FMI

This small but solid guide walks you through the design and installation of inexpensive, yet effective short HF vertical antennas. With antenna restrictions becoming a real problem, this book could keep you on the air!

Order No. SVERT **$10.00**

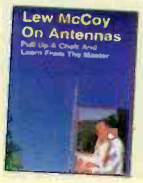
Keys, Keys, Keys

by Dave Ingram, K4TWJ

You'll enjoy nostalgia with this visual celebration of amateur radio's favorite accessory. This book is full of pictures and historical insight.

Order No. KEYS **$9.95**

McCoy on Antennas



by Lew McCoy, W1ICP

Unlike many technical publications, Lew presents his invaluable antenna information in a casual, non-intimidating way for anyone!

Order No.MCCOY **$15.95**

Understanding, Building & Using Baluns & Ununs

by Jerry Sevick, W2FMI

The successor to the popular and authoritative *Baluns and Ununs*. Great deal of new tutorial material, also includes new designs, and crystal clear explanations of howand why they work.

Order No. 2BU **$19.95**

The NEW Shortwave Propagation Handbook

by W3ASK, N4XX & K6GKU

A comprehensive source of HF propagation principles,sunspots, ionospheric predictions, with photography, charts and tables galore!

Order No. SWP **$19.95**

W6SAI HF Antenna Handbook

by Bill Orr, W6SAI

Inexpensive, practical antenna projects that work! Guides you through the building of wire, loop, Yagi and vertical antennas.

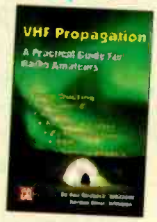
Order No. HFANT **$19.95**

VHF Propagation

A Guide For Radio Amateurs

NEW BOOK!

by Ken Neubeck, WB2AMU & Gordon West, WB6NOA



Finally, a comprehensive source-book on VHF propagation by two of the industry's finest authors!

Here's a sampling of what you'll find inside:

- Tropo Ducting
- Aurora
- Meteor Scatter
- TEP
- Sporadic-E
- Combo Modes
- F_2 Propagation

Order No.VHFProp **$15.95**

Heathkit - A Guide to the Amateur Radio Products

by Chuck Penson, WA7ZZE

This greatly expanded Second Edition is a must for collectors and Ham history buffs, but is a terrific trip down memory lane for any Ham who was there or wishes he had been. Pick up this 328-page volume and you won't be able to put it down!

Order No. HEATHKIT **$29.95**

videos

~~$19.95~~ NOW ONLY **$12.95 ea.**

Buy all 7 for your Club for only **$69.95**

Ham Radio Horizons: The Video.....*Order No. VHOR*
Getting Started in Packet Radio.....*Order No. VPAC*
Getting Started in Ham Radio.....*Order No. VHR*
Getting Started in Contesting.....*Order No. VCON*
Getting Started in DXing.....*Order No. VDX*
Getting Started in VHF.....*Order No. VVHF*
Getting Started in Amateur Satellites.....*Order No. VSAT*

Ham Radio Magazine on CD

Hot Item!

Brought to you by CQ & ARRL

Here's what you've been waiting for! Enjoy quick and easy access to every issue of this popular magazine, broken down by years!

Three sets, each containing 4 CDs -

1968-1976	Order No. HRCD1	$59.95
1977-1983	Order No. HRCD2	$59.95
1984-1990	Order No. HRCD3	$59.95

Buy All 3 Sets and Save $29.90!
Order No. HRCD Set **$149.95**

2004/05 calendar

January 2004 through March 2005

Spend $100 and get this calendar FREE!

Amateur Radio Calendar brings you 15 spectacular images of some of the biggest, most photogenic shacks, antennas, scenics and personalities.

Order No. ARCAL

~~$10.95~~ NOW ONLY **$8.95**

FREE 2004/05 Calendar with every $100 purchase!

Name _____ Callsign _____

Street Address _____

City _____ State _____ Zip _____

Qty	Item #	Description	Price	Total Price

Shipping & Handling: U.S. & Possessions - add $5 for the first item, $2.50 for the second and $1 for each additional item.* **FREE shipping on orders over $75.00** (merchandise only). Foreign-Calculated by order weight and destination and added to your credit card charge.

Total

Method of payment ☐ Check ☐ Money Order ☐ Visa ☐ MasterCard ☐ Discover ☐ American Express

Credit Card No. _____ Expiration date _____

CQ Communications Inc., 25 Newbridge Rd., Hicksville, NY 11801/516-681-2922; Fax 516-681-2926
Order Toll-Free 800-853-9797

ScanTech

by Ken Reiss, radioken@earthlink.net

strategies and techniques to keep YOU informed

Wideband Receivers—Understanding Them Will Help You Love Them

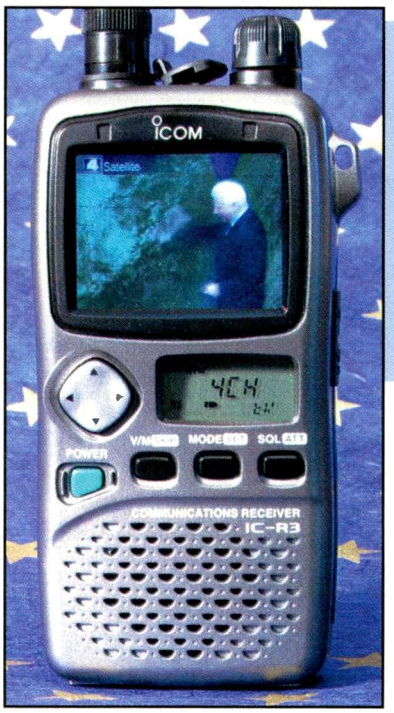
Wideband receivers, which include coverage of both traditional scanner frequencies *and* the shortwave range, have become very popular over the last few years. Ranging from the pocket-sized Alinco DJ-X2 through ICOM's PCR-1000 and AOR's 5000 receivers, these sophisticated radios offer a wide range of radio listening activity. Yet many scanner enthusiasts find them difficult to use, complain of poor performance, or are surprised they can use these "scanning receivers" on shortwave frequencies. I've had several letters lately that can be put into this category, so I thought it was time to have a chat about these neat radios again. Of course, you know what happens when they let the scanner guy think...

First Fix: The Antenna

So what's up with these radios and why do we tend to have a love/hate relationship with them? On the surface, it should be the coolest thing since the control grid: one radio that covers virtually from DC to daylight! So why is it that many of us, particularly those who buy one of these radios as a first receiver, are disappointed?

The first problem that arises immediately is your antenna. Remember that all antennas are frequency sensitive. Yes, some perform better than others over a wider range of frequencies, but all represent some sort of compromise to get there. You can have maximum performance on one frequency or narrow band, or moderate performance across a wide range of frequencies, but not both.

Also remember that the frequency an antenna operates best at is essentially a function of its length. I realize there are some exceptions to this rule achieved with active antennas and electrical characteristics, but for the most part, longer antennas means lower in frequency according to a formula: Overall Length in feet = 468/Frequency in MHz. Multiply the answer by 12 to get inches if you're dealing with higher frequencies. You might prefer the quarter-wave formula, substituting 234 instead of 468. That will give you the length of a quarter-wave segment (each element) of the half-wave dipole (or you can use that amount for a quarter-wave antenna).



And for the truly "all-in-one" solution, pocket-sized receivers like the ICOM R3 provide wide band coverage and a TV receiver. Of course, there are always compromises in design, so don't expect the R3 to perform like an R9000, but it sure is handy!

At 155 MHz, the antenna comes out to 3.019 feet total. That's 36.2 inches for a half-wave dipole, or 18.1 inches for a quarter-wave whip using an external ground. The metal body of a car or a filing cabinet works very well for this purpose. You can build one of these out of coat hangars if you're interested, or desperate. Wrap that length of wire around a plastic or air core of some sort and put a rubber jacket on it and you have a rubber duck-type antenna that can be put on a handheld conveniently. Even telescoping antennas 18 inches long aren't too unwieldy. Handheld receivers use the body of the radio as best they can to make up for the missing part of the dipole.

You don't have to be tied to the house for this kind of coverage. The AOR 8000 series (8200 shown) has a lot of the same features of its bigger cousins in a much smaller package.

The Shortwaves—Longer Antennas!

However, when we transition to shortwave, things get totally out of hand. At 9 MHz, which is about the center of the common utility bands and many of the broadcast bands, that half-wave dipole is going to be 52 feet long. Even a quarter-wave will be 26 feet. Put that on your Alinco DJ-X2 or ICOM R2!

The radio manufacturers, of course, realize this and try to compensate on many of the handhelds by adding amplification. The idea is to make the most of any signal that *does* reach the tiny antenna so that you might hear it. And it works to a certain extent. The AR-8200 from AOR is a fairly decent performer on HF with not much more than a telescoping antenna. Shortwave portables use this same technique to achieve better performance with the smaller antenna, and many of them will actually overload with a larger antenna; they simply can't handle the increased signal.

For many years the standard of excellence for hobby radio was the semiprofessional R9000 from ICOM. Unfortunately, the need to delete cellular frequencies killed this receiver in the North American market. The newer R-8500 is actually a better scanner, but doesn't quite have all the bells and whistles of the 9000, which has been left to the commercial/government market.

The advantage of shortwave portables is that they are designed for, in the grand scheme of things, a fairly narrow band (1.7 to 30 MHz), and so can be optimized for that area. Even performance across this frequency range can vary on some portables. Your wideband receiver has to perform not only on the shortwave bands, but equally well on the VHF/UHF, where additional amplification can easily cause interference or overload as it does on some of the portables. In North America, we're not bothered with particularly high-powered signals on HF, and so an over-amplified receiver, wideband or dedicated shortwave portable will work reasonably well. In Europe and other parts of the world where signals are stronger, overload can become a significant problem. It's really a delicate cat and mouse game, and the receiver that works best in your area might not work best for someone only a few miles away with different reception conditions.

What About Scanning?

So what's all this got to do with scanning, I hear you cry. Well, the next thing people want to do is make one of those receivers scan. Many readers have written to ask "Why can't I get my receiver to scan the HF Coast Guard frequencies like I can the VHF ones?"

Well, assuming you have an HF receiver that scans, the answer is you can, but at reduced performance. First of all, as you well know if you're familiar with the HF bands at all (and if you're not, you owe it to yourself to spend some time down there—it's a fascinating world), you'll be aware that the noise level can vary significantly in just a few kHz. Yet the whole idea of scanning the HF range is to keep an ear on the activity that could be taking place at any point in the band.

The Coast Guard is a good example of this. On HF, the Coast Guard has three primary frequencies: 2.182, 5.696, and 8.983. Why? Because at any time, the propagation conditions, and therefore the distance that communications on each of those frequencies will travel, is different. Depending on where in the water the ship or aircraft is that they want to communicate with, and what the conditions are for the evening, you'll find them switching back and forth between frequencies regularly. All of the services operate this way, so to track their activity, you'll either need multiple receivers or a way to scan.

But scanning presents some major problems of its own. What antenna do you use? At 2 MHz, you'll need 234 feet for a dipole! At 8.9 MHz, it's down to a mere 52 feet for optimum performance. The answer here is that you make a compromise. Pick something in the middle, or possibly use an antenna with slightly wider band performance on HF and live with what you can get. It won't be ideal for DX, but we shouldn't be scanning for DX anyway.

Some of the higher-end units feature two antenna inputs, one for the higher frequencies and one for lower. The AOR AR-5000 offers an optional multi-antenna

Frequency Of The Month

Each month we ask our readers to let us know what they're hearing on our "Frequency Of The Month." Give it a listen and report your findings to me here at "ScanTech." We'll pick a name at random from the entries we receive and give the lucky winner a free one-year gift subscription, or extension, to *Popular Communications*.

Our frequency this month is **155.730**. If you're so equipped, try **5.696** as well and see what happens there. Check it out and see what's on it in your area! Then let me know via e-mail or snail mail.

Our Frequency of the Month winner this time is **Gregory S. Hatzis** for his entry on 153.860. Gregory writes,

I just picked up my copy of the April 2004 issue and had to chuckle when I read your frequency of the month where you said "...unless you recognize it right away..."

I did indeed recognize it right away. The frequency 153.860 is used, with a CTCSS tone of 77.0, by the Orange County (New York) Department of Emergency Services as a repeater output frequency (158.865 being the input) under callsign WAU-718. In fact, that is the "name" of the channel and the dispatcher on it is called "718" for short. The County maintains five towers for "WAU-718" (Arden, Graham, Mount Beacon, Mount Peter, and West Point) in and around Orange to cover the county's 835 square miles.

The channel is used for countywide emergency medical service operations (alerting/paging, unit-to-unit, and H.E.A.R. (Hospital Emergency Alert Radio) traffic takes place on other frequencies) for 15 of the county's 25 EMS agencies (seven of the others have their own dispatch and operations arrangements made with their local police departments and the three remaining self-dispatch). Access to the repeaters is also allowed to various first responder agencies, such as fire and police departments, so they can directly relay situation reports to incoming BLS (Basic Life Support) and/or ALS (Advanced Cardiac Life Support) units.

Up until an announcement on March 10, 2003, by the County Executive, the channel was also shared with the Orange County OEM (Office of Emergency Management), which caused a lot of friction when they took over the channel during their operations. OEM now has a separate network to meet its needs.

switch so that antennas can be selected based on frequency ranges. This is a nice feature and will help enhance performance when trying to scan a wide range of frequencies, but it doesn't completely address the mode/squelch problems. This option does solve the multi-antenna problem, but if you're trying to use a handheld or other receiver with only one antenna input, it's almost impossible to get good performance everywhere. Of course, if signals are strong enough, you can get acceptable performance from many compromise antenna designs. Wideband discones and active antennas are commonplace.

Setting the receiver's squelch so you can scan also presents major problems. With that noise level changing as you hop from frequency to frequency, setting the squelch at a high enough level to stop the noise on the noisiest frequency means you'll be missing weak signals on other channels. And weak signals may be all that's there!

If you're only interested in the stronger signals, scanning with a high squelch setting might be okay. As a case in point, I sometimes like to scan the air frequencies for New York radio. They are either there at about S9, or not. There's not much middle ground. Once I find active frequencies for the evening, I can stop scanning and turn the squelch down or off to hear some of the aircraft talking back.

Better receivers have several methods of scanning to help compensate for this. Many include a "time scan" mode that simply steps the receiver through each of the memory channels being scanned for a specific time interval—activity or not. While not the ideal situation for what we normally think of as scanning, this method can help identify active frequencies, and it can be done with the squelch off so that the weak signals are not lost. It's probably not something you'd want to do for long, though, as the background noise is constantly changing and conversations cut off in the middle because it's time to move on. It can drive you bonkers! Hmmm...I wonder if Harold scans HF?

Of course, the situation is made worse if you're trying to add VHF/UHF activity into the scanning mix. Here, in the FM mode, squelch behaves a bit differently and must be set accordingly. Switching back and forth with such a wide frequency and mode setting may simply not be workable on your receiver. Many receivers also have internal relays that must switch as the receiver crosses certain frequencies. This clickity-clack can sometimes annoy users while the receiver looks for activity.

Table: Frequencies You Can Try

Here's a VERY short list of HF utility frequencies to get you started. There are many excellent references, among them Steve Douglass' "Utility Communications Digest" right here in *Pop'Comm*!

Military
11.175 Global HF system (mostly Air Force) primary day frequency
8.992 Global HF system primary night frequency

Coast Guard
5.696 Coast Guard rescue frequency
8.983 Coast Guard rescue frequency

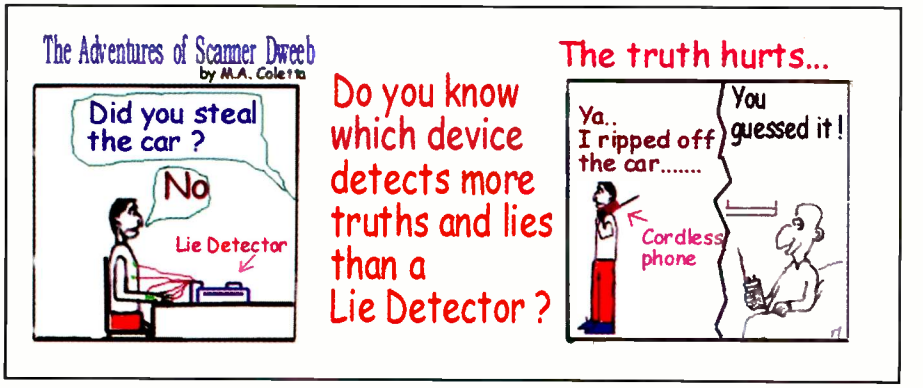
Aviation
5.520 NY Radio, overseas flights
5.598 NY Radio, overseas flights
6.586 NY Radio, overseas flights
6.628 NY Radio, overseas flights
8.906 NY Radio, overseas flights

Weather
4.426 Automated weather reporting
6.501 Automated weather reporting
8.764 Automated weather reporting

Try It, But Remember: Patience Is A Virtue!

If you have a receiver that will scan HF, give it a chance to work for you. Find a few frequencies that you're interested in and see what you can hear. See the **Table** for a list of a few, but by no means all, utility frequencies from a couple of categories. Also, don't forget to check Steve Douglass' "Utility Communications Digest" right here in *Pop'Comm*! Pick a few frequencies that sound interesting and see what happens. If you've never spent much time on HF, you'll need to be a bit patient. You might even want to park on a frequency for a half hour or an hour at a time to see if there's any traffic you can hear before deciding to include the frequency in your scan.

Now that you're more informed about those wideband receivers, try your hand at it and let me know how it worked for you. In addition to your frequency entries, I'm always looking for questions and suggestions. If you have one, send it along. We'll pick the best and run them here in the column so everyone can benefit! Send your input to Ken Reiss, 9051 Watson Rd. #309, St. Louis, MO 63126 or via e-mail to radioken@earthlink.net. Remember to mark frequency entries with the frequency on the envelope or in subject line of the e-mail so they'll be entered correctly. Until next month, Good Listening! ■

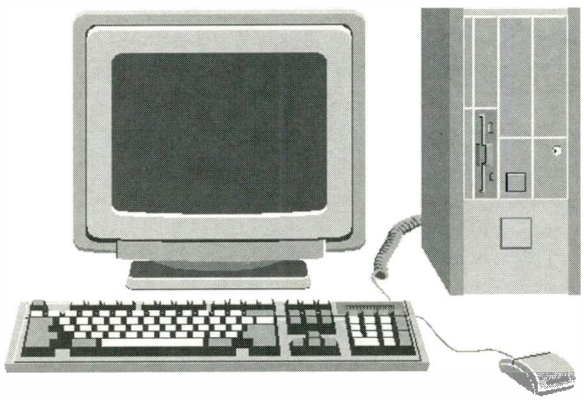


computer-assisted radio monitoring

by Joe Cooper, joe@provcomm.net
carm_popcomm@hotmail.com

Using the computer to enhance your radio monitoring experience

Network Control Of Your Radio—Part I
The Future Of Radio Monitoring Is Here Today!



Over the past series of columns I have given you a very detailed look at what goes on inside a modern computer-controlled digital signal processing (DSP) monitoring radio. As I explained, a DSP radio contains a small computer that has its own semi-permanent software that defines virtual components and circuits. So rather than having all the coils, capacitors, and resistors of an analog radio, the DSP radio defines an electronic circuit using mathematical formulas created when its built-in computer processes the software information.

However, a DSP radio still needs *you* to provide it with information on how to set up its various functions, such as frequency, audio level, and bandwidth. This information is created in the control software installed on your PC. That information, in the form of a command code, is then transferred to the DSP radio via the serial cable that connects the PC to that radio.

These command codes are actually very simple. They are, in fact, a combination of a single letter, a number, and a carriage return. Each function available in the DSP radio has its own letter to represent it (for example, the letter "M" for Mode) and a number to represent either a fixed function (M0 = AM mode, M1 = USB mode, etc.), or a range of numbers (1 to 63 for volumne level).

Again, the actual transference of the command code is relatively simple, being one of the functions of the PC control software. After you select a function you want to change, the control software generates the proper command code and then opens up the serial port on the PC to send the code over to the radio via the serial cable.

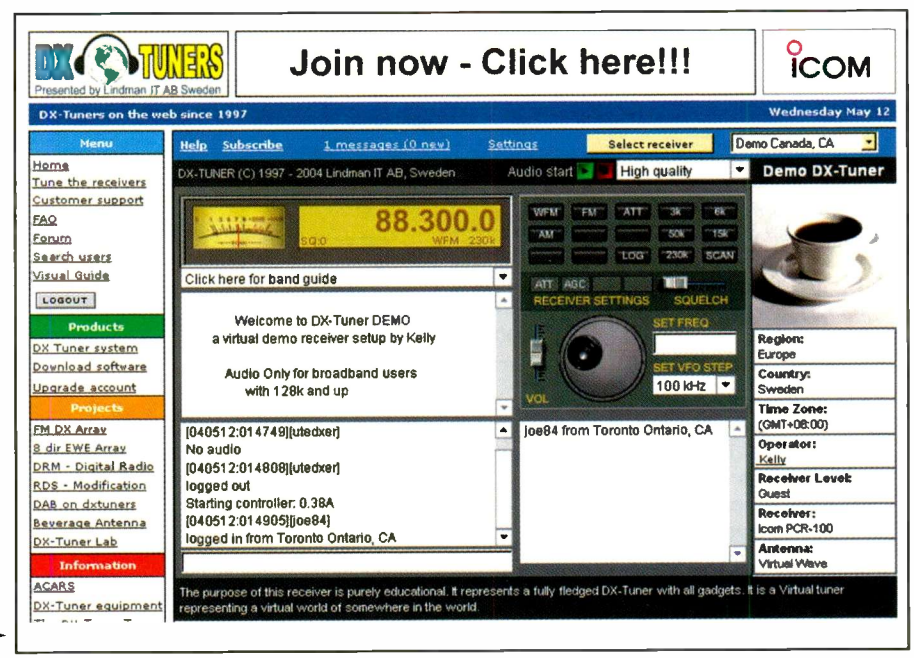
Once the command code arrives at the DSP radio it's passed through a built-in modem, which then routes the information to the radio's own computer, which then processes it according to the requirements of the firmware program.

When that happens the frequency is changed, the audio volume is altered, or the bandwidth is increased or decreased, depending upon what you've asked it to do. The feedback you get so you know this command has been acted upon is the change you hear in either your speaker or headphones, or an alteration of the values displayed in the user interface of the control software you're using when you look at your computer's video screen.

This is all fine and good if you have your DSP radio directly hooked up to your PC via the aforementioned serial cable, as you normally would since you probably have the radio and the computer almost side by side. However, what if you would like to control the radio at a greater distance from the computer?

Remote Control Of Your Radio

Generally speaking, the maximum practical length you can make a serial cable is about 50 feet, with 10 feet being considered optimum for normal use. If you really want to try to reach



After having logged into the DX Tuners server, you can select a radio to listen to. You will then see a user interface screen, such as this one (which is one of four demo radios that work). Note that you have all the features that you would normally expect of a monitoring radio, such as volume control, digital tuning, modes, and bandwidth. Since Java has been used to program the interface, the dials and buttons are three dimensional and move when used. The signal strength level constantly changes as with a real radio. →

START STREAMING AUDIO FEED - Requires the RealPlayer software from Real Networks.

Note: Some single click tuning suggestions are located a bit further down the page.

This radio DOES NOT RECEIVE frequencies above 60 Mhz (60000 Khz). It does not pick up local FM broadcast stations, TV stations or police, fire or ham radio transmissions above that frequency.

The radio is currently tuned to 2500 kHz. Mode is AM.
Filter width is Normal. AGC mode is Medium.
The Preamp mode is Off. The noise blanker is currently Off.
The DSP noise reduction is Off. The DSP Notch Filter is Off.
You're listening to:WWV-Time_Signal.
Last changed on - 5/11/2004 9:12:17 PM from address 68.102.135.192.

The time is now - 5/11/2004 10:04:59 PM (EST/EDT)

Enter the Frequency (in Kilohertz) : 14040 Mode:
Select filter width : Normal Select AGC : Medium
Select PREAMP mode: Off Select Noise Blanker mode: Off
Select DSP Noise Reduction mode: Off Select DSP Notch Filter mode: Off
Description of frequency 20 Meter CW
Click To send Send Frequency Change

Enter the frequency in Kilohertz. For example:
570 for WSYR in Syracuse, NY 620 for WHEN in Syracuse, NY
1600 for WNCR in Oneida, NY 9755 for Radio Canada International - various times

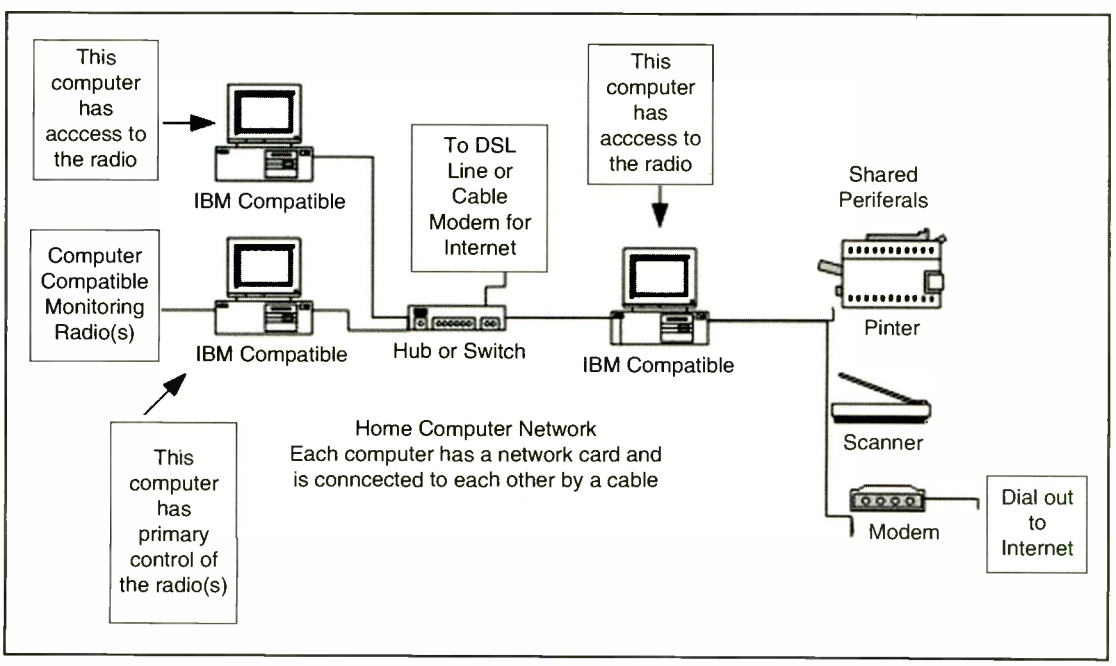
NOTE: You can enter fine tuning information for USB, LSB and CW by adding a decimal point and up to 3 additional digits like this: 3825.125
The effective frequency range is 500 Khz to 59999.999 Khz.

This is the control Interface for the ICOM IC-R75 monitoring radio on Bob Arnold's, N2JEU, webpage. This has been written in Visual Basic, so it does not have the three dimensional graphics that Java programming provides. However, it gets the job done and provides many of the same features as the control interface found at DX Tuners.

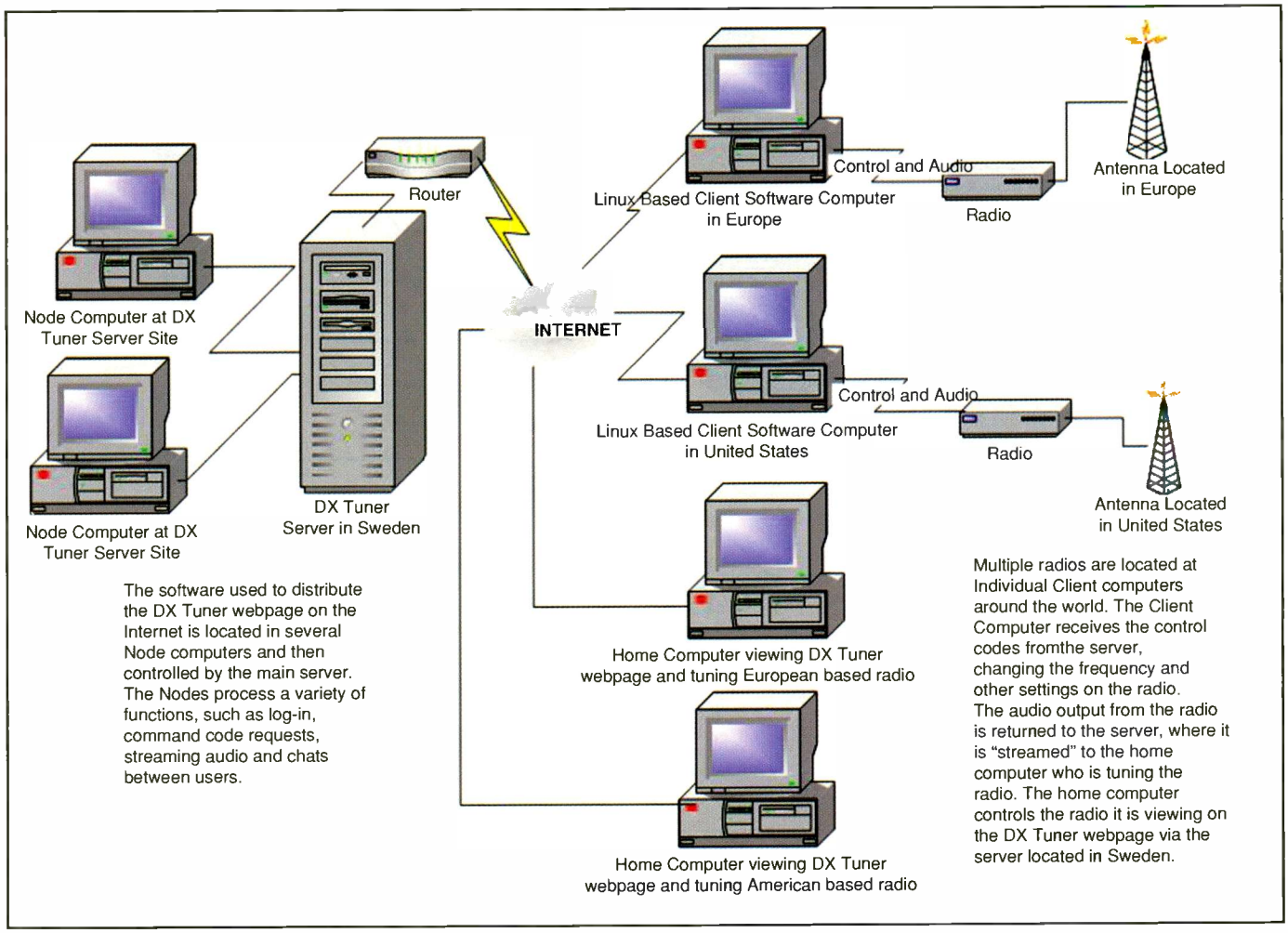
the absolute maximum length for a serial cable you must first use the best possible material and manufacturing techniques, and then set the data transfer for the lowest possible rate. If everything works perfectly you can reach an absolute maximum length for a serial cable, which is about 150 feet.

Some people have experimented with using wireless control devices to operate their computer-assisted radios and have achieved distances of several hundred feet. However, that raises the problem of getting the audio from the radio back to either a computer's sound card (for audio recording or additional DSP processing) or a speaker/headphones.

One solution is to use additional wireless devices, such as wireless microphones or baby monitors. However, you again run into the problem of coverage limits due to the low wattage output of such devices, interference from other devices (or to others using these devices) and the quality of the audio once it is received.



This is a diagram of a basic home network, or LAN. Note that there is one radio attached to one computer via a serial and audio cable. When the other computers are properly configured with the correct software, they will also be able to control and listen to the radio. Likewise, if there is an Internet and streaming audio server on the control computer, people on the Internet would have access to the radio as well. We'll cover setting up such a service for either a LAN or the Internet in this series of columns.



This shows how a Client/Server setup can be configured. It's based on the server used at DX Tuners. Note that the radios are connected to computers off site and are controlled by other computer users who are logged into the main server.

So really, if you want to increase the distance between the PC with the control software and the computer-compatible radio you wish to control, you need to make certain that the connection you establish is going to actually work. More important, you also need to make certain that the audio you finally hear is as close to what you would actually hear if you were listening directly to the radio's audio output.

The only way to overcome the limitations of long serial and audio cables and wireless devices is to use computer networking for transferring both the command code and audio signal. It's the only way in which you can be certain that the data you start out with at one computer is the same when it arrives at the other. Obviously there may be some additional costs involved, but you'll find that if you plan things out these costs can be surprisingly low. As you've seen in past columns, I've always tried to present software that is either inexpensive or free, and I'll be giving you further examples in this series of columns.

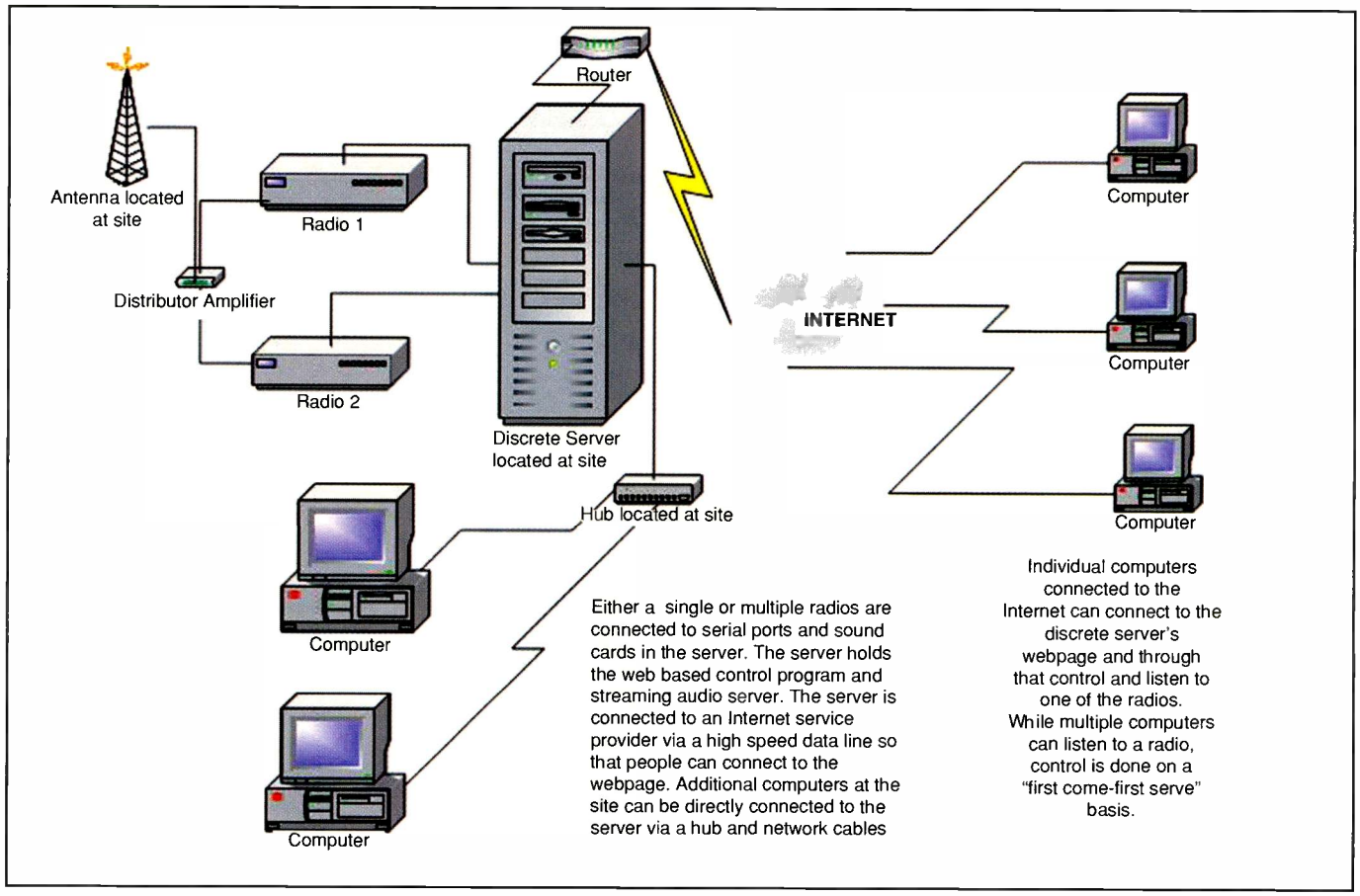
Using A Computer Network

In this series of columns I'm going to be looking at using a home-based Local Area Network (or LAN) to control a computer-compatible radio at a distance that a serial cable could not support. I'm also going to be looking at how to use this same LAN to send the radio's audio output to one or more PCs over that same extended distance.

I've written before about setting up a home-based LAN and how to listen to a radio's audio output over that LAN (*Popular Communications* July and August 2003; see the end of this column for information on purchasing back issues). If you refer back to those two columns you'll see that I outlined in great detail the exact steps required to do that successfully.

Setting up a LAN is extremely simple thanks to the low cost of networking parts and cables, the "plug-and-play" capability of those parts, and the use of "wizards" to walk you through the set up of the software connection of a computer to a network. Even purchasing a second computer for a home LAN is very inexpensive today if you buy a good used one. Even if that used computer can only support an early version of Microsoft Windows (such as 3.0 or Windows 98) you can still put together a home network with relative ease, though not with the same plug-and-play/wizard support you get in later versions of the operating system.

What I did not cover in those two columns was how to control a compatible radio over such a network. The reason was simple; there was still a fair amount of



This shows how a Discrete Server is configured, as Bob Arnold, N2JEU, has set up his server. This allows anyone on the Internet to view his webpage and then control and listen to one of his two radios.

information needed to be covered in further columns before I felt that the subject could be outlined properly.

My intention over the next series of columns is to explain exactly how to set up and control a computer-compatible radio over a home LAN. We'll look at some software programming examples of a network-based radio control program that you can try yourself using the JAVA programming language.

To do this task successfully there are two key points you will need to understand. First is that there is virtually no difference between using a serial cable and network cable when it comes to moving command codes between computers. In both cases, it's still simply a matter of sending a combination of a letter, a number, and a carriage return to the compatible monitoring radio. The only difference is that with a LAN the command code also contains additional information (addressing) on how to find the proper computer on the network which has the radio hooked up to it. Second, you will come to understand that the more difficult task in setting up your LAN is sending the radio's audio output over the network. This is because you must first sample the audio output of the radio and then "stream" the resulting sampled digital information to the receiving computer.

If you have read the two columns on using sound cards (July and August 2002) and the three columns on digital audio recording (October to December 2003), you'll have no problems understanding the techniques involved. And once you understand what's involved in moving digital commands and sampled audio across a home-based LAN it's not really that difficult to apply the same techniques to the Internet. So this series of columns will conclude with a look at how you can control and listen to a compatible radio from any place in the world that has access to the Internet.

The "New School" Of Radio Monitoring

I believe that the techniques I'm going to be describing are going to become the core technology of radio monitoring over the next decade. More importantly, because radios are increasingly being made up of "virtual components" that are impossible to modify, the next frontier of "hands-on" experimentation for many people will be in software programming and the integration of compatible radios into networked computer systems.

I also believe that necessity is going to motivate many people to undertake such experimentation because of the increasing difficulty people are having when they attempt conventional radio monitoring. Many people are finding it harder to set up proper antennas, particularly if they live in areas with restrictions and covenants that prohibit putting them up. Secondly, not everyone can afford a high-end monitoring radio or multiple radios spanning a wide range of frequencies.

There are also other issues, such as the fact that fewer shortwave broadcast signals are being beamed to North America and that a lot of the "the action" is taking place on VHF/UHF frequencies that are simply not within the listening range of many people.

So the future of "hobby" radio monitoring will likely follow the same path PCs did over the last 10 years. The real potential of the PC was only recognized once people began to network them in large numbers via LANs and the Internet, allowing multiple people to share them. So will it be with monitoring radios. Once a large number of monitoring radios covering a wide range of frequencies in different locations around the world are networked together and made available for public use, we will see a significant change in the way people monitor radio signals. Consider how nice it would be to be able to monitor stations and services that are either difficult or next to impossible to hear with your existing equipment. Rather than being left out of hearing important events due to poor location or propagation, you'd have the option of selecting a more favorable monitoring location somewhere else in the world.

Yes, for many decades part of the enjoyment of radio monitoring has been to set up an antenna and build a station, then see what you could pick up. However, that technique is now officially "old school" in this age of the Internet. Today's "new school" of radio monitoring that is quickly developing will be to connect your radio to the Internet and share it with others, while you share different radios located around the world. This will actually improve the radio-monitoring hobby, rather than diminish it. The whole point of this new information age is to get accurate information quickly, not to struggle listening to a faint signal made more difficult with noise and static.

That old model of radio monitoring, where you tried to pick out "DX" through headphones while twiddling an analog dial or were stuck scanning your local fire department because that's all there was, is now becoming as much part of history as vacuum tubes and crystal sets. The new model is one of "convergence," where multiple technologies, including radio, DSP, computer networking and the Internet, are coming together to create a global network of monitoring stations. My prediction is that in the next five years, if you can't hear it, then the station is either not on the air or it's being deliberately blocked (and that's another story I'll be looking at in a future column).

As far as I'm concerned you can subtitle this next series of columns "The Future of Radio Monitoring, 101." If you get in on this action *now* you can really count yourself as being part of the next true pioneering stage of radio monitoring.

Examples Of Networked Radios

Before getting to the theory and technical side of listening to and controlling a monitoring radio over a LAN and the Internet, I want to first introduce you to two examples of successful networking of radios. Both use the World Wide Web to allow individuals from around the world to share their radios with other people.

The first is "DX Tuners" (www.dxtuners.com), started by Kelly Lindman, which is a subscription-based service for the amateur radio monitoring community. Located in Sweden, this English language service has 39 networked receivers covering LW, BCB, HF, VHF, and UHF frequencies in North America and Europe. The second is an individual effort undertaken by Bob Arnold, N2JEU, and made available on his personal webpage (www.ralabs.com/webradio). Rather than a large-scale project like DX Tuners, Bob's supports two dedicated radios that you can tune from the LF bands up to 60 MHz.

While the two sites represent different scales of operation, they're both interesting in their willingness to encourage others to try their hand at setting up a similar project. In the case of DX Tuners, they are looking for new radios to connect to their network and Bob is willing to answer questions and provide information on how to set up your own Web-based system.

It's also interesting that both Kelly and Bob started working with networked-based radios back in 1997, though with two different approaches. Kelly's system is based upon the Java programming language, while Bob used Visual BASIC (both of which I will talk about in more detail in future columns).

A Large-Scale Radio Server

The foundation for Kelly's system came about through a contract with a global aviation body to create the world's largest commercial web-based radio network. Kelly felt that the serious amateur radio monitor deserved a similar service and so set up the current service during 2001/2002. Bob first put his network together in 1997 and has been refining his web-based radio system ever since. One of the nice things about his webpage is that he has documented his efforts in great detail, which allows someone with a good background in computers to be able to set up his own system.

Kelly's network is part of his commercial services and is a very sophisticated Linux (an alternative Windows-based operating system) "Client/Server network." This means that the computers that operate the radios in the service are part of the network located in Sweden, rather than being independent sites on the Internet. To better understand this setup, log into the DX Tuners site (you can do this for free as a guest with limited privileges) and choose one of the radios that are available by clicking on a list of locations. You will then see an image of a virtual radio control panel, which you can use to tune and control the radio at the remote location.

When you change the frequency or mode, or make a request to start listening to the radio's audio, the server in Sweden sends a request to the client computer connected to the radio to perform those tasks. The client computer then places the appropriate control code into the radio to make those changes happen. Likewise, the radio will provide feedback to the client with such things as the Signal Unit

level. This information is passed back to the server in Sweden, which then displays the results in your computer via the webpage you're viewing. The audio from the remote radio is fed into a sound card on the client computer, which then samples the sound and sends it off to the server in Sweden. That digital sample is then re-routed to your computer when requested, where your sound card turns the digital information into analog sound, which is then heard via your computer's speakers.

As you're listening to an individual radio you can also "text chat" with others who are listening at the same time. Since more than one person can listen or use one of the networked radios at one time, this method of communication allows a group of people to negotiate which frequency will be listened to. To be able to do this on such a large scale (there are currently 14,000 people registered to use the service) the server comprises one main computer and a number of smaller "nodes" connected to it. The main computer oversees the operation of the nodes using Java2 Enterprise Edition server software, which provides centralized control of all the different operations taking place in the nodes. The nodes run a custom software program that controls all aspects of the DX Tuners site, everything from controlling the radio, logging the chat requests, alerting the portal with current IP info, and audio encoding and streaming.

This is a big operation, requiring a small staff of volunteers who keep the server running, answer technical questions, and help people connect their radios to the server. I'll be talking about that in more detail in the next column. The reason for treating it separately is that to make such a connection a person must first set up a computer using the Linux operating system (which is essentially free because it is an open system; more on that point later). He or she then must connect the radio to the computer and then properly configure a Client software program supplied by DX Tuners. It is a bit challenging, but if you undertake the task you contribute to the advancement of the radio-monitoring hobby in a significant way. You also receive a small stipend from the subscription money paid by the system users, which is to help offset the investment of time and money you have made to make the radio available on the system.

A Small-Scale Radio Server

Bob's system of networked radios works on a slightly different principal than Kelly's and is known as a "discrete server." This means that only one computer containing the server software is used (Kelly's could contain multiple servers working in parallel to provide more connections) and is open to the entire Internet, whereas Kelly's requires you to register and log in. The result is that Bob's system is more of a "first come, first serve"-type, where anyone viewing the webpage can change the frequency or mode at any time.

The advantage of this type of system is that it's easier to set up and maintain, as there is only a server and no client computers to contend with. The radios are simply hooked up to the server and the radio control software resides there, with the operation of that software being open to anyone who connects to Bob's website. The only real problem can occur is when too many people are viewing the webpage at one time, with each person making a request for a frequency or mode change. The server can only provide so many connections to the webpage by individual computers on the Internet, so at a certain point any further connections are cut off and those trying to use the radio will find the operation of the webpage very slow. Currently the maximum number of people who can listen to or operate the radio at one time is seven. This is because Bob is using a free software product called the RealNetwork basic server. This was a free software package for streaming the audio, which was produced by the same people who make the RealAudio audio player.

Today you can download an *improved* free version of that product, now called the Helix Server-Basic, which allows up to five audio streams at one time. In the next column, I'll be discussing how to use that software and how to set up your own system following Bob's model.

Wrapping Up

Now that you've been introduced to the working systems that Kelly and Bob have put together, next month I'll show you how to start out by setting up a home LAN. This will allow you to control your radio remotely and stream the audio to one or more computers on that network.

In the column after that I'll show you how to take your system to the next level, where you can either connect up to the DX Tuners server or set up your own connection to the Internet with a discrete server. The key point is that you'll learn how to set up your LAN, and eventually the Internet connection, in the simplest and most straightforward way, using free software where available.

As always, if you break down the task into simple steps, write out a checklist of tasks to perform, and track where you are by keeping a record, you should be able to set up a usable system. Results do vary, and remember that we are still in a pioneering stage of developing this technology, where experimentation and possible failure still happen.

However, the reward for undertaking the challenge I am presenting is helping to move the practice of radio monitoring into the 21st Century and to be able to say honestly that you are one of the first members of the "new school" that is beginning to emerge from the convergence of radios, personal computers, and the Internet.

If you wish to e-mail me with any questions, please use carm_popcomm@hotmail.com. As I've 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. You can also write to me at "Computer-Assisted Radio Monitoring," PMB 121-1623 Military Rd., Niagara Falls, NY 14304-1745.

I've placed a list of the columns I've written over the past two years, along with a summary of the content, on my personal webpage at www.provcomm.net/pages/joe. I've also included instructions on how to purchase back issues of *Popular Communications*. Remember that I cannot release previously published material as *Pop'Comm* owns the copyright for all of the material.

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

Again, please take some time to write a letter to one of our service people in Iraq offering them your thanks and support. 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. ■

technology showcase

new product performance analysis

by Harold Ort, N2RLL, Editor

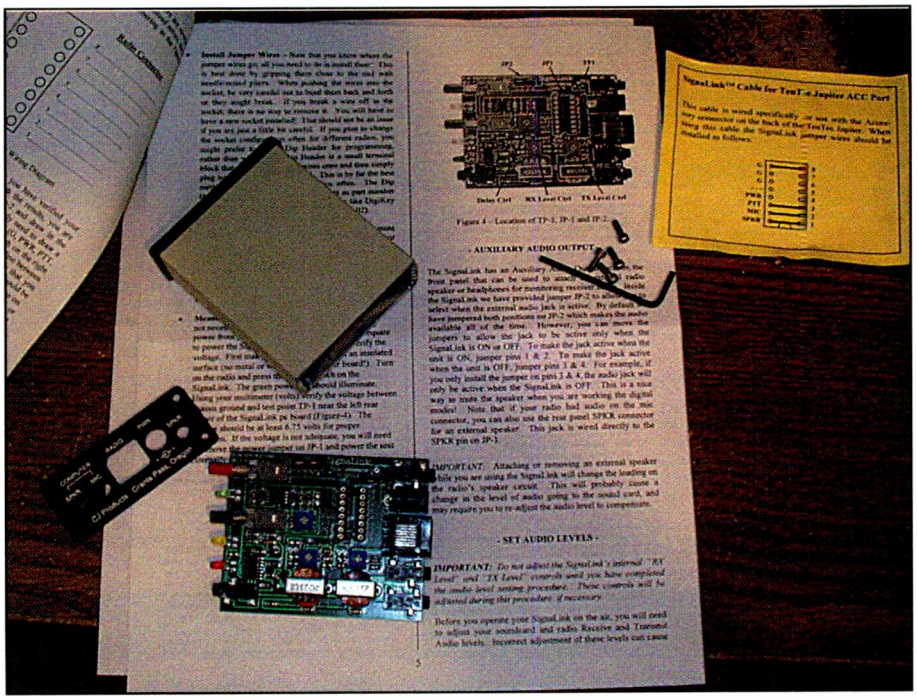
Tigertronic's SignaLink SL-1+ Sound Card/Radio Interface And The MixW 2.12 Multimode Program

The one aspect of our radio hobby that always fascinates me is that it's so varied. One look at the radio spectrum makes that point, but *beyond* a quick look at the sheer vastness of the spectrum, there are also the services you can hear, from broadcast to military and aircraft communications. And if you're a licensed ham you've got a multitude of frequencies and modes at your disposal. Get tired of the 2-meter repeater action and you can experiment on other bands—day or night, you can literally pick your radio pleasure.

This month I'd like to take you on a brief journey into the world of *digital* signal monitoring *and* transmitting using the Tigertronics SignaLink SL-1+ sound card/radio interface, in conjunction with the MixW Multimode program. No, this won't be a lengthy, technical dissertation. Remember, we're radio enthusiasts, too, and getting a piece of equipment working properly and reporting our findings to you is our "Showcase" mission. Please read on!

Before we go further, though, it's important to get a *basic* understanding of digital modes and how you use them. If you're wondering (as I was, until I did some research) how and what the digital modes are and how you would use them, put your mind to rest—it's really not very complicated. It's *only* as complicated as folks *want* it to be; that includes the people who are sometimes not the so-called "Elmers" or radio helpers they could be. If you're a ham you can use PSK31, RTTY, and other modes to have keyboard-to-keyboard chats with other hams. It's all done at your computer's keyboard. You see what you're transmitting, you see the other person's incoming message, and a whole lot more, depending on the software.

If you're not a ham and want to chase digital signals, you can do that, too. Over the course of just a couple of days, I received, saved, and printed weather charts, Fax transmissions, and decoded military comms.



Getting ready to install the jumpers inside the SignaLink SL-1+ interface so it works with my Ten-Tec Jupiter transceiver.

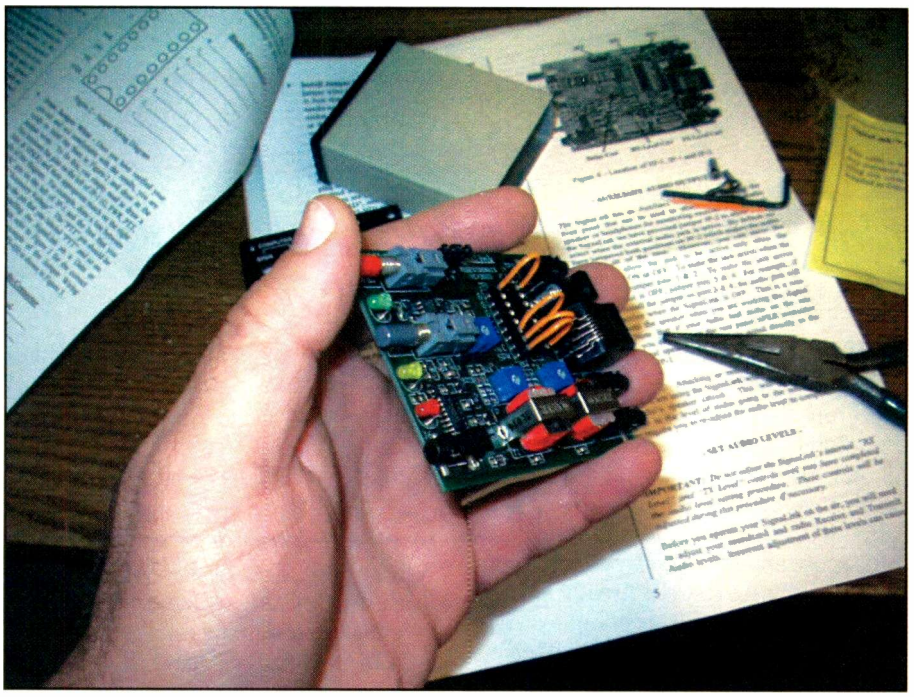
What You Get—And What You'll Need

Let's look first at the digital basics. You probably already have most of what you need, including a reliable computer system with CD-ROM and sufficient memory to run a graphics-intensive program, a very good receiver or transceiver connected to a good antenna, and some patience. So let's go straight to the SignaLink interface.

If your radio desk is like mine there's hardly room for a notepad. Well, you're in luck if that's the case, because the SignaLink interface box is really tiny; it's small enough to fit in the palm of your hand. The SignaLink comes completely assembled from Tigertronics (www.tigertronics.com) for $69.95 plus shipping. You get a well-written instruction manual, DC power plug (the unit requires 6.75 to 15 VDC at only 10 mA (I use a small regulated power supply for both my radio and the SignaLink interface, but you can also power the unit *directly* from your radio or a simple wall adapter power supply, not included), a CD with sample software selections, a cable for your specific radio, and the expert help of the Tigertronics folks.

You'll also need two shielded audio cables with 3.5-mm stereo plugs on each end. You'll be connecting them from the SignaLink to your computer's sound card Mic and Speaker jacks. You can purchase the optional SignaLink Cable Accessory Kit, which I'd recommend—it's got everything you'll need to start operating right away.

It helps if you've got a working knowledge of your computer's sound card and if you're able to maneuver to the Windows Control Panel and adjust the various volume controls. Chances are you're already familiar with these settings, but if not, you will be!



Here's an inside look at the SignaLink SL-1+ unit. The jumper wires have been carefully inserted with small needle-nose pliers.

The SignaLink comes with a small package of press-in jumper wires; you don't need a soldering gun, just a pair of needle-nose pliers. Using a 3/32-inch Allen wrench you remove the unit's cover and very carefully insert the provided jumper wires into the sockets that match the simple diagram SignaLink provided for your radio. (If you don't have a small yellow sheet with your radio's wiring diagram, their CD also has information on many radios). This process took me five minutes from start to finish. But, please, *thoroughly* read the instruction manual, because the wrong jumper settings could damage the SignaLink or your radio.

Your Computer's Sound Card— And Making It All Work

To properly interface the SignaLink with your computer and radio, simply connect it to both and follow the instructions. Trust me: the Tigertronics folks have made this process easy. I did it, and if you know me...well, the manual has to be pretty flawless, because I'll inevitably have more questions than some companies' tech support has answers. Such wasn't the case with Tigertronics, though. As a matter of fact I only called them once, and, wouldn't you know it, the problem was a setting on my Ten-Tec Jupiter transceiver that needed changing.

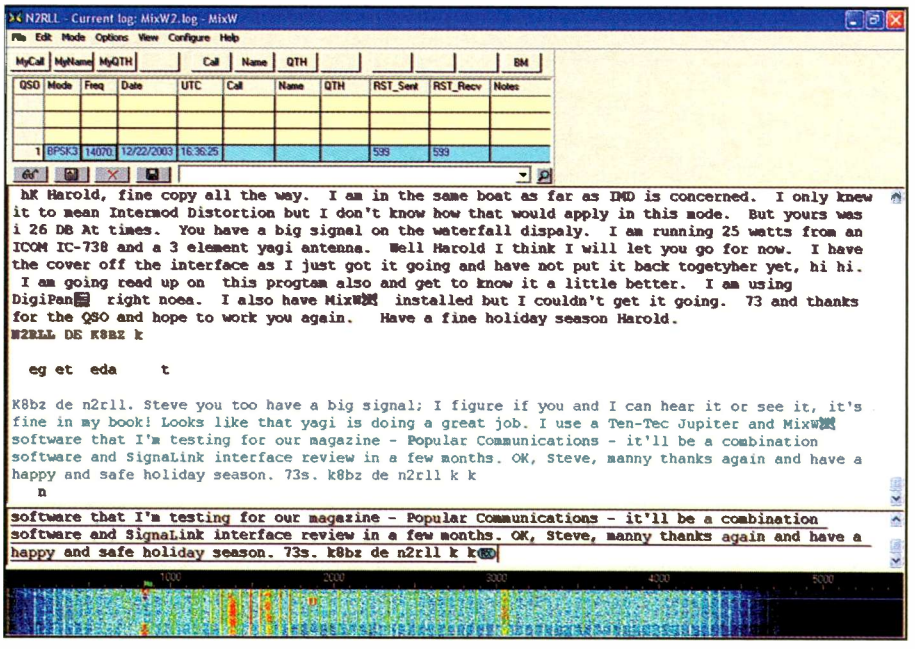
I won't bog this review down with every single adjustment and tweaking you have to do, but will tell you this: From the time I opened the box to the time I was decoding a PSK31 transmission, it was about an hour—and that's only because I had to take a couple of minutes to find my glasses, make some simple changes on my Jupiter transceiver, and clear a spot on my desk for the SignaLink. I feel that radio interfaces should just do their thing and not give me a headache. On that score SignaLink fits the bill.

Looking at these digital modes on my monitor and decoding Fax and RTTY transmissions is a major kick! If you agree, you'll love the SignaLink as much as I do. Once it's plugged into the Mic and Speaker jacks of your computer and connected to your radio, you'll discover a world of signals you'll find very addictive. I haven't *talked* on the Jupiter in weeks—and I love to talk! Folks have told me it's a similar feeling using CW.

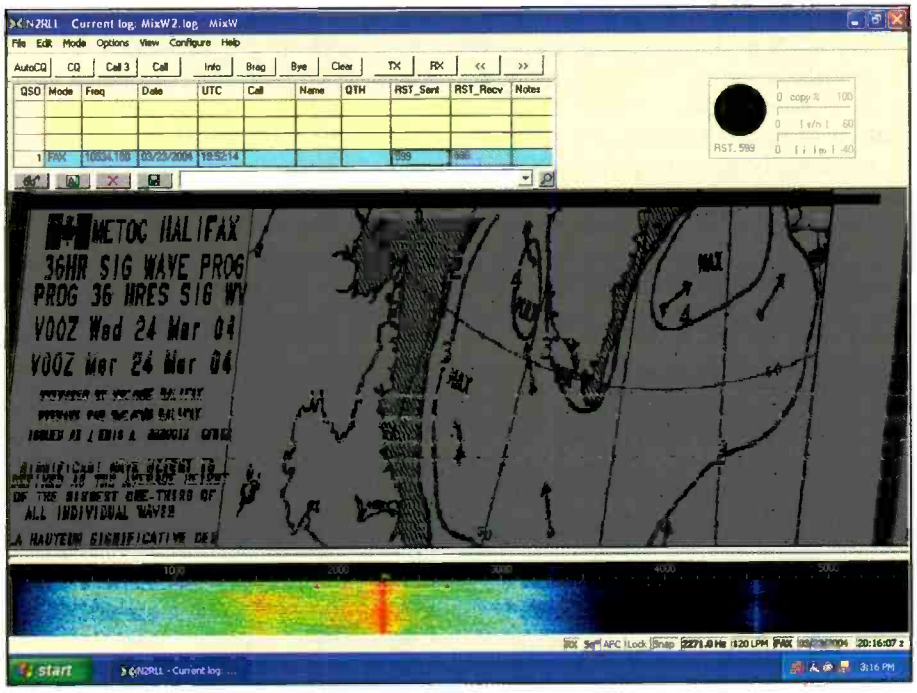
I found the computer's sound card adjustments to be the most critical aspects of operating keyboard digital modes. And after many weeks of using various digital keyboard modes, I still find that to be the case. The volume controls on your computer might need to be adjusted each time you use different software, if you decide to use several of the many programs out there. I've had tremendous success with the MixW Version 2.12 Multimode Program.

MixW Multimode Program

MixW is a multimode program for hams, but it's also ideal for SWLs and DXers because you're able to receive and print FAX transmissions and much more. The MixW program has many features



Steve, K8BZ, and I chatted on 14.070 using MixW. He was using DigiPan software at the time. Coincidentally, he was having some problems getting MixW running on his computer—just the opposite of my initial attempts with DigiPan!



Canadian station CFH, Halifax, Nova Scotia, can be found on 4271, 10536, and 13510 transmitting weather faxes. This reception was on 10536.

that give you almost automatic processing of a QSO. MixW does not require a TNC; the only requirement is that you must have a computer running Windows 9x, ME, NT4, 2000, or XP operating system and a compatible soundcard, or you can use the SignaLink interface. MixW also offers its *own* interface, the MixW RigExpert, which simply plugs into your computer's USB port and has no controls except an on/off button.

MixW (as well as DigiPan) was the brainchild of computer guru, Nick Fedoseev, UT2UZ. Nick is a software systems engineer in the Ukraine and has been a licensed ham since 1978. His partner, Denis Nechitailov, UU9JRD, also from the Ukraine, has extensive computer software and firmware experience. The MixW beta testing team involved 16 hams from around the world, including several from the U.S.

There have been several upgrades and improvements to the original MixW. The latest version of MixW (Version 2.12) supports SSB, AM, FM, CW, BPSK31, QPSK31, FSK31, RTTY, Packet (HF/VHF), Pactor (RX only), AMTOR (FEC), MFSK, Hellschreiber, Throb, Fax (RX only), SSTV, and MT63.

No two computers are alike and, therefore, no two users of the same Windows operating system will experience identical results with the same software and identical radios. I say this because my personal experience with their very popular DigiPan program was pretty disappointing. I've since read that my operating system, Windows XP—for whatever reason—and DigiPan don't always see eye to eye. And that's fine. Frustrating at first, yes, but when you've connected all the cables, set the volume controls properly, and done everything you're supposed to do, sometimes you've just got to give in to technology and move on. But because there are so many programs out there in radioland you'll have no trouble finding one or two that work for you and your system. For me, one of the better ones is indeed MixW.

Working With SignaLink And MixW

It's easy to connect MixW to your computer. One 3.5-mm cable goes from the SignaLink's "Computer/SPKR" jack to the speaker output of your sound card, the other 3.5-mm cable from SignaLink's "Computer/MIC" jack to your computer's microphone input jack. Plug in SignaLink's specially made cable to your radio and make sure you've got the jumpers installed correctly (and carefully!). Then just power up the SignaLink to get started with MixW.

MixW is easily downloaded (I've got a dial-up modem on AOL and the entire

process took under five minutes). If you're satisfied with the 15-day trial version, it's simply a matter of remitting $50 on their secure site for the registration. But go ahead and try it for a couple of weeks. I'll bet you my sound card that you'll like it!

I believe one of the most important aspects of any computer program is the after-the-download/sale tech support. Here's where MixW really shines. I've always got questions and the MixW team was there to help. E-mail a question and in most instances you get a reply within 24 hours. And not an automated reply or a "see the instructions/FAQs for that answer" reply, either.

Scott Thile, K4SET and Scott Hill, K6IX, put the "help" files together for MixW and I'd say they did a superb job! You really *need* to fully read the well-done instructions and help files before operating in the digital keyboard modes. There's no real "quick start" simply because there's more to using these modes than turning on your radio and calling CQ as you would using CW or voice. Please don't interpret this to mean it's complicated and cumbersome, though, because it's *NOT*!

Using MixW is as simple as having your sound card settings properly configured, your SignaLink working properly, and being able to set up the MixW program to make your digital radio experience a true pleasure. It took me about half an hour to initially set up the "macros." You simply type in your call letters, the name of your radio, location, and other data, so when you hit the "CQ" button using your mouse the program automatically transmits your CQ call with your callsign.

Most of my operating so far has been with the PSK31 (actually the BPSK mode) on 20 meters near 14.070. PSK31 is ideal for low-power operation; as a matter of fact the worst thing you can do is to crank up your power to more than 25 or 30 watts—it's just not necessary. I leave my power set at about 15 watts. There have been many times where I couldn't hear the signal on the Jupiter's speaker, but the MixW program was able to detect the calling station and display the text on the screen!

Great For Shortwave Listening And DXing!

We've all heard the repetitious rolling sound of a fax transmission, but now *you* can decode it. For example, to hear and decode station CFH in Halifax, Nova Scotia, tune the carrier frequency 1.9 kHz below 10536, or at 10534.1. (You can turn off the SignaLink interface when receiving, but you really don't need to.) Change the mode to "Fax" and make a couple of other minor MixW tweaks and you'll capture their transmissions 1-2-3. Then if you want, it's a simple matter of hitting the "Print Screen" key on your keyboard. That saves it into your computer's memory. Then it's a matter of going into "Paint" and then under the pull-down menu "Edit," clicking on "Paste." That will save the screen to your Windows "Paint" program work area.

But where else do you tune for signals? If you're a ham—and remember, you don't need a license to *listen*—the MixW folks have thoughtfully provided links and frequency information in the "Help" menu. But, for starters, check out 14.070.15 and 7070.15 for PSK31 transmissions. Don't forget that each month *Pop'Comm* columnist Steve Douglass' "Utility Communications Digest" features the latest information on monitoring the utility frequencies, and your loggings are a major part of his presentation. Check it out!

One More Thing...

You will certainly need more information on digital comms than I've presented in this review. An excellent source is the superb book from the ARRL, titled, *HF Digital Handbook* (3rd edition). Written by well-known ham Steve Ford, WB8IMY, it's a must-read and a great digital communications resource. The book is available from the ARRL at www.arrl.org for $19.95 or by calling them at 860-594-0200. Make it part of your radio library. The book, the MixW program, and SignaLink make a great combination that's hard to beat!

"Regular-Radio Guy"-Approved

I found the MixW program and the SignaLink SL-1+ to work flawlessly together. That's saying a lot, especially because I'm not a software guru or computer dude—I'm just a radio guy who wants to broaden his hobby horizons. Mission accomplished!

For more information on the SignaLink interface, contact Tigertronics at 198 West Woodside Street, Unit B Grants Pass, OR 97527; Phone: 541-474-6700; Web: www.tigertronics.com.

MixW's homepage is at www.mixw.net, or you can e-mail Nick directly at ut2uz@qsl.net for more information. Please tell them you read about it in *Popular Communications*—and start enjoying the digital modes! ■

the Pop'Comm puzzle corner

test your radio knowledge

By R.B. Sturtevant, KD7KTS

Editor's Note: "Puzzle Corner" columnist Eric Force has decided to put the keyboard aside so he may better attend to a family emergency. We wish him the best. He will be missed.

Our new columnist, Bob Sturtevant, KD7KTS's radio fascination goes back to the early 1950s when he "started fooling around with the knobs on Dad's Zenith Trans-Oceanic." When he was only seven years old he was thrilled to hear a major league baseball game from New York City—he was living in England at the time! Bob enjoyed listening to pirate station Radio Caroline while he was in the Air Force. He has written on the "reporting styles" of several world broadcasters (VOA, BBC, and Radio Habana) and held a Third Class FCC license when he did reporting for a college radio station. We're very pleased to welcome Bob to the Pop'Comm *family, and we know you'll enjoy his radio trivia and sense of humor.*

Q. When U.S. Special Forces radio operators went into the jungles of Viet Nam they never wanted to put up an antenna because enemy mortars and artillery could use it as an aiming point. How did these ingenious troops "get the message out"?

A. They would find a relatively soft plant like a bamboo or banana and drive a spike into it, then connect their antenna output to the spike. There was usually enough moisture in the tree to act as a conductor, thereby it a passable antenna. It wasn't a perfect solution, but it worked and didn't draw enemy fire.

Q. During World War II, when British and American bombers went to raid Germany, how did the radio operators in the various planes "chat" with each other without breaking radio silence?

A. When the planes were not under attack and the radio operators were just killing time they would signal each other using flashlights and send Morse code messages. They would also signal the signal ..._ (V) to troops on the ground.

Q. Who was the first woman to become a telegrapher and why did she get the job?

A. Francis "Fog" Smith was a young man with some rather radical views on the labor situation in Massachusetts. Smith's job was to set up a telegraph line for the Morse Company between New York and Boston. In 1846 he met the woman editor, Sarah Bagley, of a crusading labor paper in Lowell, Massachusetts. She had been fired from a job she had held for 11 years for writing and speaking out against the working conditions in the Lowell spinning mills. After a few weeks' training Bagley became the world's first woman telegrapher, with a salary of $400 per year. It allowed her to keep up her work as a labor crusader.

Q. You tune across the radio band and hear a station that doesn't identify itself with a callsign and merely sends numbers in either voice or Morse code. What have you found?

A. Congratulations, you've found a spy station sending instructions or information to monitoring stations in another country. Called "Number Stations," they are run by governments or spy rings that can't get in direct touch with their agents in the target country or can't contact their employers directly. The numbers are a prearranged code that transmits information without needing a reply. While they're all over the place, they're sometimes hard to find.

Q. When was the first time an astronaut used amateur radio in space?

A. Astronaut Bill McArthur, KC5ACR, used 2-meter VHF from the STS-58 Space Shuttle flight in October 1993. Using the frequency 145.5 MHz at 30 to 40 watts, he made over 100 voice contacts, mostly with schools. His typical altitude of 150 miles gave him a "footprint" of about three million square miles, or about the size of the continental United States, at any one time.

Q. During the Korean War, did the United Nations forces have any secret monitoring bases to intercept enemy radio traffic?

A. Yes, lots of them and all classified. One was on the island of Miyang-do, approximately 40 miles east-northeast of the Port of Hungnam in North Korea. Republic of Korea Marines and Intelligence forces were there along with an American Army Security Agency radio intercept detachment and a Combined Command Reconnaissance Activities, Korea unit. The total American strength on the island was hardly ever more than five or six individuals at a time, but they monitored enemy frequencies and prepared agents for insertion behind enemy lines. Since the U.S. Navy controlled the sea and could bring considerable firepower on any invader, the North Koreans never bothered these island bases.

Looking Back . . .

Five years ago in *Pop'Comm*:

• ScanTech columnist Ken Reiss took a trip down scanning's memory lane; and now we take yet another: there it was - a photo of the brand new AOR AR-7000 1,500-channel wideband receiver. And ICOM had just released their IC-706MKIIG mobile ham rig. This new transceiver added more power on 2-meters and 440 MHz capability. Y2K was on the horizon, and our "CB Scene" columnist Jock Elliott was already talking about making CB part of your communications arsenal – just in case!

Ten years ago in *Pop'Comm*:

• Back in 1994 Optoelectronics of Fort Lauderdale, Florida was advertising their "new" OptoScan 456 computer interface for the PRO-2005/6 scanners with high-speed scanning: 25 channels per second! We reviewed the new R.L. Drake SW8 World Band receiver, and Gerry Dexter reported in "The Listening Post" that Swiss Radio International was using a new relay facility in French Guiana to improve reception in Central America as well as the western part of North America. Times sure change: seven years later in 2001 SRI began to drop from shortwave.

Twenty years ago in *Pop'Comm*:

• We reported that the Middle East was "volatile" back in 1984; the article, "Monitoring The Endangered Ships" included frequencies and tips on monitoring oil tankers that were coming under attack in the Persian Gulf. A "custom 5 _ inch program diskette came with the new Bearcat CP 2100 computer-control radio billed as "the first scanner radio designed as a peripheral for today's popular personal computers." It had a whopping 200-channel capacity and sold for $499.95. On shortwave, WMLK the Voice of "assemblies of Yahweh" was America's newest broadcaster, and the late Senator Barry Goldwater introduced a bill in the Senate (S 2437) that "makes it perfectly clear that the Communications Act of 1934. . .in no way prevent a man or family from having a space antenna on their property that will bring in satellite signals and, through proper receivers and so forth, show them on your screen." Congressman Al Gore (R-TN) introduced a similar bill in the House of Representatives.

global information guide

listening to what your world says every day

by Gerry L. Dexter

New Shortwave Broadcasts For Iraqi Coalition Maritime Forces

A rather unusual new transmission has appeared on shortwave recently, designed for Iraqi Coalition Maritime Forces to "provide listeners methods to continue assisting coalition maritime forces in identifying and reporting terrorist activity conducted at sea," according to information published on the Web.

These broadcasts are being aired under the name "Radio For Peace" and are scheduled as follows: 0200 to 0400 on **6125** via Dhabbaya, UAE; 0100 to 020 on **9575** via Rampisham, UK; 1700 to 1830 on **9815** via Dhabbaya; 0030 to 0200 on **9845** via Rampisham; 0800 to 1100 on **15170** via Dhabbaya; 1100 to 1200 on **15360** via Rampisham; 1400 to 1700 on **15500** via Rampisham; 1400 to 1500 on **17720** via Rampisham; 0600 to 0800 on **17780** via Rampisham; 1600 to 1700 on **17855** via Rampisham; and 1500 to 1600 on **17895** via Rampisham. At this writing it's still unclear just what organization or group is doing the programming, which is in Arabic, Farsi, Hindi, Pashtu, Urdu, and English.

Another local commercial broadcaster has been testing the shortwave waters. **Maeva Radio**, an FM station in Antwerp, Belgium, is running occasional tests (including Digital Radio Mondiale) via the Julich, Germany, site. Initial broadcasts were on **5975** but by now that may have been changed to **6015**. Both frequencies will apparently be employed at one time or another. Unfortunately, the first test aired from 1300 to 1500, making the broadcast out of reach for most North American listeners.

Brazilian station **Radio IBP** in Campo Grande (**4895**) is now known as Radio IBP Novo Tempo.

QSLs from the U.S. government's **Radio Free Asia** have been generally slow and spotty for quite awhile. Now there's a new guy in charge who's said to be a lot more enthusiastic about things. Reports for Radio Free Asia transmissions can now be sent to A.J. Janitschek, Radio Free Asia, 2025 M Street NW, Washington, D.C. 20036.

On the other side of the coin are those stations that continue to expand and increase their coverage area. One of these is HCJB-Australia, which is asking the government there for approval to increase the size of its antenna farm. The station plans to erect as many as 31 new antenna masts, which would provide a 60-percent increase in coverage for their Asian target areas.

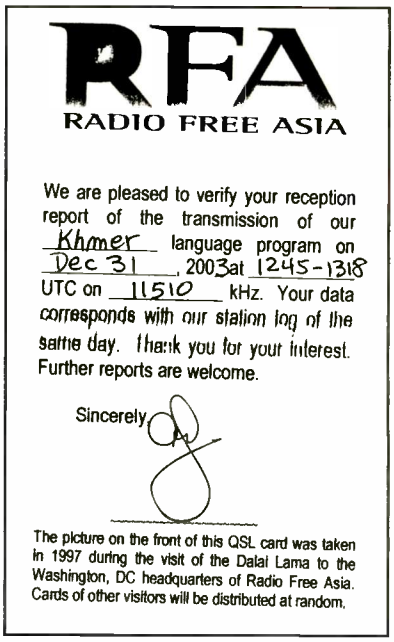
It may not matter to anyone, but in case you care, we've lost English from the **Voice of the Islamic Republic of Iran**. The station hinted this was coming some months back, reportedly due to a budget cutback.

Herald Broadcasting (Christian Science) is reported to have signed a letter of intent to sell **WSHB**, Cypress Creek, South Carolina, which they put up for sale a few months ago. The name of the buyer hasn't been released yet (there are a few potential buyers we strongly hope are not involved!).

That new **Catholic Radio Network** station planned for Papua New Guinea appears to be active now, using **4960** from Vanimo. The station uses 1000 watts with a straight up and down radiation pattern, which means its signal probably won't get out very far.

Radio Nacional de Venezuela, inactive for some time, is back on the air. Radio Havana Cuba is relaying RNV programming at various hours on **17705, 15320, 13740, 11875, 9550,** and **6000**. These are beamed, variously, at the United States and Caribbean/South American targets. And, by the way, you can expect stronger signals, and probably more frequencies in use, from RHC soon. They've been able to add some new transmitters and are refurbishing their facilities.

Robert Brossell of Wisconsin was unhappy with his RFA QSL since they failed to show reception of Almaty, Kazakhstan. From the card text it looks like they're not into confirming sites!



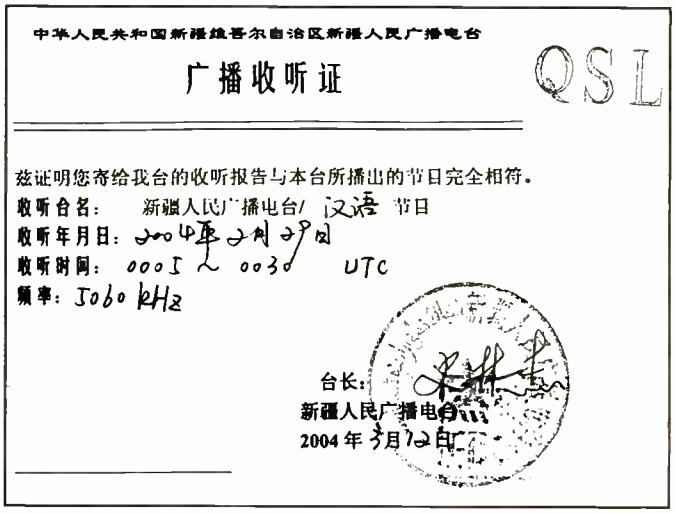
RFA
RADIO FREE ASIA

We are pleased to verify your reception report of the transmission of our Khmer language program on Dec 31, 2003 at 1245-1318 UTC on 11510 kHz. Your data corresponds with our station log of the same day. Thank you for your interest. Further reports are welcome.

Sincerely

The picture on the front of this QSL card was taken in 1997 during the visit of the Dalai Lama to the Washington, DC headquarters of Radio Free Asia. Cards of other visitors will be distributed at random.

"It's Greek—no, Chinese—to me! Sheryl Paszkiewicz got this card confirming reception of Xinjiang PBS from Urumqi, China.



中华人民共和国新疆维吾尔自治区新疆人民广播电台

广播收听证

QSL

兹证明您寄给我台的收听报告与本台所播出的节目完全相符。

收听台名： 新疆人民广播电台/ 汉语 节目

收听年月日：2003年12月31日

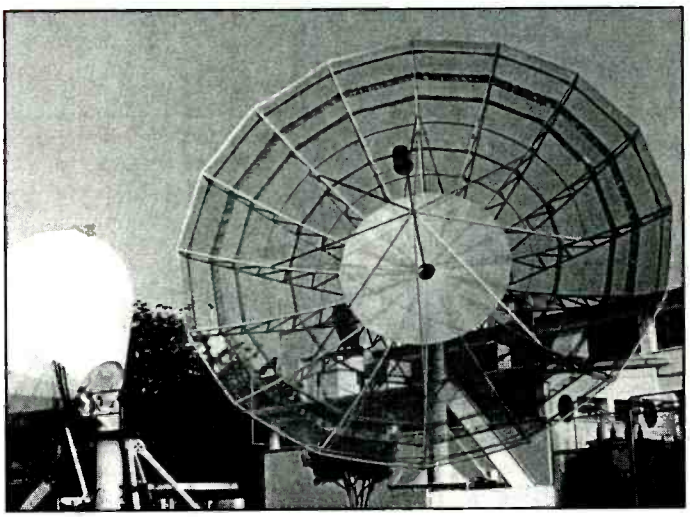
收听时间： 0001 ~ 0030 UTC

频率： 1080 kHz

台长：

新疆人民广播电台

2004年3月12日



Wonder what you could pick up with this thing? It's on the cover of a QSL Rich D'Angelo got, confirming reception of VOA via Ascension Island on 7265.

Remember, your shortwave broadcast station logs are always welcome. But please be sure to double or triple-space them, list them by country, and add your last name and state abbreviation after each log. Also needed are spare QSLs you don't need returned, station schedules, brochures, pennants, photos, and anything else you think would be of interest to our readers. And we continue to wonder if there are any souls brave

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
annor	—	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

It's a bit hard to hear, but look at the snazzy QSL that XERTA on 4810 sends. This one went to Rich D'Angelo.

enough to send in a shack photo—an activity that seems to have all but disappeared in recent years!

Here are this month's logs. All times are in UTC. Double capital letters are language abbreviations (SS = Spanish, RR = Russian, AA = Arabic, etc.) If no language is specified the broadcast language is assumed to be in English (EE).

ALBANIA—Radio Tirana, **6115** with news at 0152. (Charlton, ON) **7130** at 2130 with news and "Albania in a Week." (Paradis, ME) **7270** in Albanian at 0148. (DeGennaro, NY) **9510** (t) at 1955 with narrative and mentions of Albania. Off at 1958. (Burrow, WA) Trans World Radio via Albania, **12070** with Billy Graham at 0813. (Gardner, MS)

ALGERIA—Radio Saharawi, Western Sahara via Algeria, **7460** at 1830 in AA and possible Berber. Music, news, and comment. Into SS at 2300 and ID as Radio Nacional de Sawee. (Ziegner, MA)

ANGOLA—Radio Nacional, **4950** in PP at 0528. (DeGennaro, NY)

ANGUILLA—Caribbean Beacon, **6090** with Gene Scott at 0048. (Gardner, MS)

ARGENTINA—RAE, **11710** with EE news at 0210. Also 2336 at **15345** in SS. (Charlton, ON) 11710 at 0220 with DX program. EE ended at 0257. (Alexander, PA)

ARMENIA—Voice of Armenia, **9960//9965** in GG at 2021, into EE at 2042. (Ziegner, MA) **9960** at 2040 with IS, anthem, ID, and schedule. (Burrow, WA)

ASCENSION ISLAND—BBC Relay, **7160** to Africa at 0330. (Brossell, WI) **12095** at 2100. (Paradis, ME) 2348. (Miller, WA) **15400** at 2106. (Chandler, ON)

AUSTRALIA—Radio Australia, **6020** at 1225, **9580** at 1235, **9590** at 1200. (Northrup, MO) 6020 at 1031, **9475** at 1100 and 9590 at 1047. (DeGennaro, NY) 6080 at 1604. (Burrow, WA) **9560** at 1210. (Miller, WA) 9580 at 0939. (Gardner, MS) 9580//9590 at 0945. (Barton, AZ) Same at 1130. (Rossetti, MA) 9580 at 1159 and **21740** at 2308. (Charlton, ON) 12080 at 2144. (Montgomery, PA) **15160//15240/15515** at 0550. (Moser, IL) 21740 at 2200. (Paradis, ME) Voice International, **7245** in presumed Indonesian at 1655, ID at 1700 with e-mail address. (Burrow, WA) **13685** at 1148 with positive ID at 1155. (Montgomery, PA) HCJB-Australia, **11750** in CC/EE at 1157; off at 1159. (DeGennaro, NY)

AUSTRIA—Adventist World Radio via Austria, **9660** at 2114. (Charlton, ON) Radio Austria Int., **7325** in EE at 0128. **17865** in EE at 1613. (Charlton, ON)

BELGIUM—Radio Vlaanderen Int., **11635** at 1214. (Miller, WA) **11730** via Bonaire in unid language at 2234. (Charlton, ON)

BENIN—ORTB, **7210** in FF and local dialect at 2245 with news, drama, rap. (Ziegner, MA)

BOLIVIA—Radio Mallku, Uyuni, **4796.7** in unid language with string of numbers at 0955. (Wilkner, FL) Radio Santa Cruz, **6134.8** at 0920 in SS with pops and anmts to past 1030. (Alexander, PA) Radio Perla del Acre, Cobija (p) **4600.2** at 1020 in SS with ID "Esta es Radio Perla del Acre, transmitiendo todavia..." (Wilkner, PA) Radio Santa Ana, Santa Ana del Yacuma, **4650.3** in SS at 1020. (Wilkner, PA)

BOTSWANA—VOA Relay, **7340** at 0300. (Paradis, ME) **9885** at 0259 with IS, time, and ID. (Brossell, WI) **12080** in FF at 2102. (Charlton, ON)

BRAZIL—(all in PP) Radio Nacional Amazonas, **6180** at 0037 with sports **11780** at 2218. (Miller, WA) at 2344 and **11780** at 0838. (DeGennaro, NY) 0204. (Charlton, ON) Radio Nacional do Brasil, **9665** at 0458 with instrumentals, IDs, ballads. (Alexander, PA) Radio Difusora Roraima, Boa Vista, **4875** at 0345 with EE pops, ID. Off at 0403. (D'Angelo, PA) 0907. (DeGennaro, NY) Radio Clube do Para, Belem, **4885** at 0200. (Linonis, PA) 1030 with ID. (DeGennaro, NY) Radio Brazil, Campinas, **4785** with religious talk at 0956. (DeGennaro, NY) Radio Educacao Rural, Tefe, **4925** with news at 1012. (DeGennaro, NY) Radio Difusora Acreana, Rio Branco, **4885** with call-in program at 1007. (DeGennaro, NY) Radio Brazil Central, Goiania, **4985** at 0917 and 2332. **11815** at 0843. (DeGennaro, NY) **4985** at 0141. (Jeffery, NY) **11815** at 2317. (Charlton, ON) 2340. (Miller, WA) Radio Difusora Amazonas, Manaus, **4805** at 0958 with ID, commercials, and news. (DeGennaro, NY) Radio Anhanguera, **4915** at 0000 with ID, talk. (DeGennaro, NY) 0025 with sports. (Miller, WA) 0210 with Brazilian music. (Linonis, PA) Radio Gaucha, Puerto Alegre, **6020** at 0835 with religious messages. (DeGennaro, NY) Radio Rural, Santerem, **4765** with commercials and songs at 0840. (DeGennaro, NY) Radio Congohas, **4775** with music and songs at 0857. (DeGennaro, NY) 0057 with talk, vocals, ID, more talk. Poor, with CODAR QRM. (Paszkiewicz, WI) Radio Educadora, Braganca, **4825** with ID at 0902 and music. (DeGennaro, NY) Radio Bandeirantes, Sao Paulo, **9645** with talk and commercials at 0817. (DeGennaro, NY) **11930** at 2050. (Paradis, ME) Radio Difusora, Londrina, **4815** at 2350 with religious talk, ID at top of the hour, and more religion. (D'Angelo, PA) Radio Bare, Ondas Tropicais, **4895**, 0407 with talks. IDs at 0407 and 0424. (D'Angelo, PA) ID at 0515. (DeGennaro, NY) Radio Cultura, Ondas Tropicais, **4845.2** at 0127 with romantic vocals, ID, and then news at 0130. (D'Angelo, PA) Radio Aparecida, Aparecida, **9630** with religious talk at 0054. (DeGennaro, NY) **11855** with music at 2345. (Miller, WA) Emisora Rural Petrolina, Petrolina, **4944.9**, 0016 with church service and mentions of Brazil, Petrolina. (Paszkiewicz, WI)

BULGARIA—Radio Bulgaria, **5800** in BB at 0555, **9700** in BB at 0048 and **11700** in EE at 1151. (DeGennaro, NY) **7400** at 0007 and **7500** at 2346. (Charlton, ON) **7400//9400** at 0017. (Burrow, WA) **11700** at 0000. (Miller, WA)

This Month's Book Winner

To show our appreciation for your loggings and support of this column, each month we select one "Global Information Guide" contributor to receive a free book. Readers are invited to send in loggings, photos, copies of QSL cards, and monitoring room photos to me at *Popular Communications*, "Global Information Guide," 25 Newbridge Road, Hicksville, NY 11801, or by e-mail to popularcom @aol.com. The e-mail's subject line should indicate that it's for the "Global Information Guide" column. So come on, send your contribution in today!

Our book winner this month is **Robert Montgomery** who receives a repro copy of *The Official Shortwave Log and Call Book*, originally published in 1933, courtesy of Tiare Publications Group. You can check out their offerings at www.tiare.com.

BURKINO FASO—Radio Burkina, **5030** heard at 2241 with call-in show in FF. (Ziegner, MA) 2255 to 0001 sign off. (Alexander, PA)

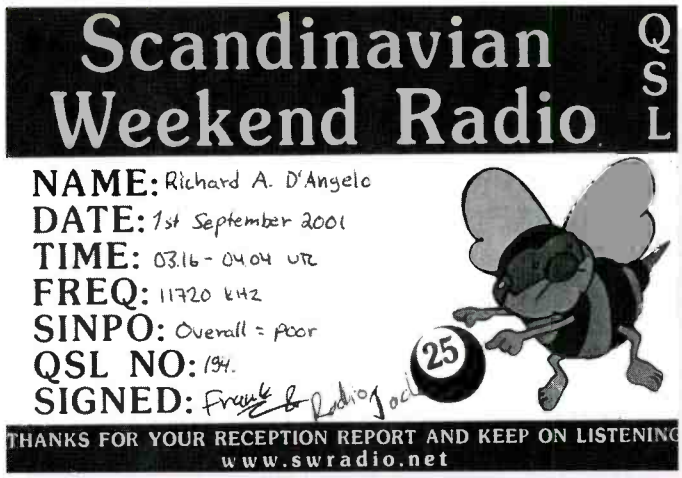
CANADA—Radio Canada Int., **9660** via Japan with news at 1230. (Northrup, MO) **11965** via Germany in FF at 2006. (DeGennaro, NY) **13710** at 0100. (Barton, AZ) CFRX, Toronto, **6070** with an infomercial at 0905. (Gardner, MS) CKZN, St. John's, **6160** with weather at 1036. (DeGennaro, NY) CBC Northern Quebec Service, **9625** in FF at 1235. (Northrup, MO) CHU time station, **3330//7335** at 1940. (Charlton, ON)

CHILE—Voz Cristiana, **15375** in SS at 0200. (Barton, AZ) 0505. (Gardner, MS) **17680** in SS at 1849. (Charlton, ON)

CHINA—China Radio Int., **6040** via Canada at 1025 with EE talk, CC folk music. Also **6145** via France with environmental talk at 2344 and **9580** via Cuba at 0108. (DeGennaro, NY) **9580** (*via Cuba—gld*) at 0134. **13630** via Mali at 2107 and **13685** via French Guiana in SS at 0229. (Charlton, ON) **7755** at 1330 with EE ID. **9670** in CC at 1230. (Northrup, MO) **9560** via Canada at 0440. (MacKenzie, CA) **9570** (*via Cuba—gld*) with news at 1733. (Burrow, WA) **9600** at 1959—very strong. (*via Cuba?—gld*) **9665** in SS at 0305. Also **11640** at 2045 (Brossell, WI) (*via Brazil—gld*) **9755** at 1400 in EE rather than listed CC. Also **13685** opening in SS at 0200 (*via Mali—gld*) (Barton, AZ) CPBS, **7110** in CC at 1337, //**9810**. (Brossell, WI) **15380** in CC at 0023. (Jeffery, NY) Voice of the Strait, Fuzhou, **11590** in CC at 1109. (DeGennaro, NY) China Music Jammer, **9680** at 1421 covering VOA-Philippines in CC. (Brossell, WI) **11990** at 1420. (Paszkiewicz, WI)

CLANDESTINE—Voice of Peace and Democracy in Eritrea, **5500**, 0340 with talk in Tigrinya, apparent ID, and close at 0349/ //**6350**. (D'Angelo, PA) Voice of the Tigray Revolution, **5500** at 0355 sign on with repetitive flute (?) IS to 0400 and man opening program, into news, //**6350**. (D'Angelo, PA) Radio Free Asia, **9365** via Armenia, 0217 in Tibetan with mostly talk, EE ID at 0230, and into more Tibetan. //**11695** via Dhabayya, UAE, and **11975**, Wertachtal, Germany, and **15695**, Dushanbe, Tajikistan. **9825** in CC at 1406. Also **11510** in Khmer at 1327. (Brossell, WI) Radio Sawa, **9645** via Morocco in AA at 0050. (DeGennaro, NY) **9745** via Greece in AA at 2139. (Charlton, ON) **9805** in AA at 0303. (Brossell, WI) Voice of Biafra Int., **7380** via South Africa from 2100 sign on with EE anmt and ID and programming targeted at Biafra. ID "You are tuned to the Voice of Biafra International broadcast coming to you from Washington, D.C., transmitting on 7380 kHz frequency equivalent to 41-meter band. There is more to come so please stay tuned for the entire hour of broadcast. Thank you." (D'Angelo, PA) Radio Free Europe, **7105** in AA at 0317. (Brossell, WI) Radio Farda, **9435** with U.S. pops at 1425. (Brossell, WI) Voice of the People, **3910** in KK at 1238. (Miller, WA)

Scandinavian Weekend Radio QSL



Scandinavian Weekend Radio is on the air the first weekend of each month and is a fairly easy pick up if you live in EST-land. (Thanks Rich D'Angelo)

Popular Communications August 2004 Survey Questions

My preferred mobile transceiver is:

CB 1
Ham VHF/UHF 2
FRS 3
GMRS 4
Ham HF 5

I primarily use FRS:

At home 6
Shopping at the mall 7
On family outings - park, etc. 8
Never 9

For highway and travel information I regularly depend on

Ham VHF/UHF 10
CB 11
GMRS 12
AM/FM broadcast radio 13
Electric highway alert signs 14

I rate the mobile usefulness of CB as:

Very useful for travel directions 15
Very useful to help me stay awake on long trips 16
Very useful to keep track of radar traps 17
Not very useful 18

I keep my mobile CB in the vehicle all the time:

Yes 19
No 20
Don't use CB 21

The main reason I don't use CB on the road is:

The offensive language 22
The limited range 23
The high noise level 24

The main reason I use CB on the road is:

Reliable highway information 25
Low current drain on battery 26
No license needed 27

COLOMBIA—La Voz Guaviare, San Jose de Guaviare, **6035** at 0945 with local music, ID, anmts, slight drifting and splatter from Radio Marti-6030. Alexander, PA) La Voz de tu Conciencia, Bogota, **6010.2** at 0310 with music, ID, anmts. (Paszkiewicz, WI)

CONGO—Radio Okapi, **9550** with woman in FF at 0112. (DeGennaro, NY) (*Rare!—gld*)

CROATIA—Voice of Croatia, **7285** via Germany in Croatian at 0142. (DeGennaro, NY) 0300. (Burrow, WA; Charlton, ON)

CUBA—Radio Havana Cuba, **11760** in EE at 2102. (Charlton, ON) **12000** in SS at 1216. (DeGennaro, NY) 1400. (Brossell, WI) Radio Rebelde, **5025** in SS at 0142. (Charlton, ON) 0311. (Brossell, WI) 1013. (DeGennaro, NY)

CYPRUS—Cyprus Broadcasting Corp., **6180** at 2215 opening and talks in Greek, Greek music. Off at 2245 and parallel to **7210** and **9760**. (D'Angelo, PA) BBC Relay, **9410** at 0408. (MacKenzie, CA) **11820** in AA at 1353. (Brossell, WI)

CZECH REPUBLIC—Radio Prague, **6200** in EE at 0211, **7345** at 0102 and **17485** at 1701. (Charlton, ON) **6200//7345** at 0407, ID at 0412. 17485 at 1701. (Burrow, WA)

DOMINICAN REPUBLIC—Radio Cristal Int., **5009.8** at 2336 with SS ID and music. (DeGennaro, NY)

ECUADOR—Radio Federacion Sucua, **4960** in SS and QQ at 1044. (DeGennaro, NY) La Voz del Napo, (p) **3279.5** in SS at 0909. (Alexander, PA) La Voz del Upano, Macas, **4870** in SS at 0312. (Brossell, WI) Radio Quito, **4919** in SS with music at 0511. (Miller, WA) 0520. (DeGennaro, NY)

EGYPT—Radio Cairo/Egyptian Radio, **9990** at 2130 with EE news, music, interview, time pips, ID. (Burrow, WA) 2300 with music and "Holy Koran and its Meaning." (Paradis, ME) 9990 with Koran at 2217 and **11725** in EE at 2335. (Charlton, ON) **12050** in AA at 2023. (DeGennaro, NY)

EL SALVADOR—Radio Imperial, **17835.8** (p) at 2150 with SS talk and religious music. Gone at 2355 recheck. (Alexander, PA)

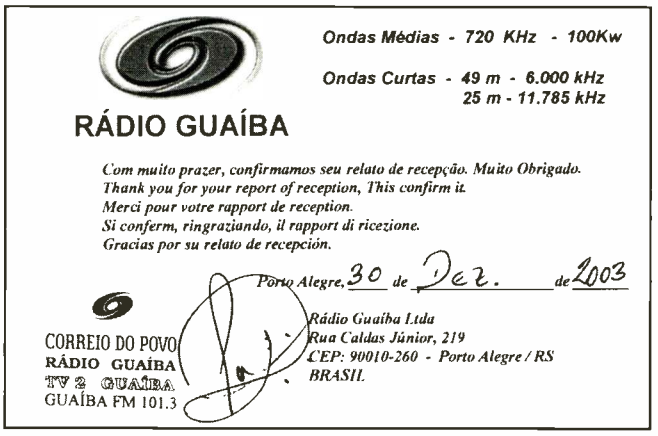
ENGLAND—BBC, **6195** at 0600. (Jeffery, NY) **15190** heard at 1400. (Ziegner, MA) **17820** with soccer match at 1656. (Charlton, ON)

ETHIOPIA—Radio Ethiopia, **7110** in presumed Amharic at 0320. (Brossell, WI) **9560** at 1605 with interview, music, ID at 1617. Drifts slightly. (Burrow, WA) Radio Fana, **6940** in unid language at 0414 under heavy RTTY QRM. (Brossell, WI)

FINLAND—YLE/Radio Finland, **15400** in Finnish at 1310. (Brossell, WI) 1608 in Finnish. (Paszkiewicz WI)

FRANCE—Radio France Int., **4890** via Gabon in FF at 0404. (Brossell, WI) **11615** with current events at 1600. (Barton, AZ) **11725** via Ascension in FF at 0621. (Jeffery, NY) **11955** via Gabon in FF at 2003. **15215** via Japan in FF to West Asia at 1748. (DeGennaro, NY) **15605** on women's rights at 1647. Also **17605** in EE at 1640. (Charlton, ON) **17850** in EE at 1630. (Moser, IL)

One of the old Brazilian standbys is Radio Guiaba, in Porto Alegre, Brazil, which operates on both 6000 and 11785. (Thanks Rich D'Angelo)



FRENCH GUIANA—Radio France Int., **17630** in SS at 2121. (Chandler, ON)

GABON—Africa No. One, **9580** at 1241 in local language. (DeGennaro, NY) 2139 in FF. (Charlton, ON) **15475** in FF at 1754 with DJ, time signals, ID, and presumed news at 1800. (Burrow, WA)

GERMANY—Deutsche Welle, **6075** in EE at 2059, **6100** via Canada in GG at 0234, 9545 in GG a t 0029, **13590** at 1928, **15205** at 2059 and **15410** in EE at 2124. (Charlton, ON) **9990** via Russia in GG at 1105. (DeGennaro, NY) **15145** via Portugal in AA at 1305. (Brossell, WI) 15205 via Rwanda with African news at 2127. (Miller, WA) 2020. (Moser, IL) Bayerischer Rundfunk, **6085** in GG at 2124. (DeGennaro, NY) Radio Africa Int., **11735** with African news at 1833. (Chandler, ON) **17550** with music program and IDs at 1730. (Barton, AZ) Adventist World Radio via Germany, **15175** in FF at 2012. (Jeffery, NY) Radio Rhino Int., via Germany, **17870** with ID and news at 1500. (Paradis, ME) Bible Voice Broadcasting, via Germany, **6010** via Wertachtal text transmission at 0035 to 0058 close. Also **9690** test at 0048 to 0059 close. (D'Angelo, PA)

GREECE—Voice of Greece, **7475** in Greek at 0141 and **15630** in Greek at 1942. (Charlton, ON) **9375** with Greek music at 0130. Also **9420** to Australia at 2209 and **12105** to West Africa and South America at 2035. (DeGennaro, NY) **9420** in Greek at 0415. (MacKenzie, CA) **9690** (*via Delano—gld*) in Greek at 1330. (Northrup, MO) Radio Makedonias, **7450** (p) with opera in progress at 2120, anmts in Greek and variety of nice music. (Montgomery, PA)

GUAM—Adventist World Radio/KSDA, **12010** at 2130 with "Network Seven" news. (Gardner, MS) Trans World Radio via Guam, **9975** in unid language at 1339. (Brossell, WI) AFN/AFRTS, **5765** with news at 1159. (Miller, WA)

GUATEMALA—Radio Cultural, **3300** at 1050, very strong with numerous IDs. (Wilkner, FL) 1051 with flute and guitar. (Strawman, IA) Radio Buenas Nuevas, San Sebastian, **4799.6** with SS children singing at 1051. (DeGennaro, NY) 1227 with SS religious messages. (Miller, WA) 0200 with partial ID. Lots of CODAR QRM. (Linonis, PA) Radio Verdad, Chiquimula, **4052.5**, at 1110 with sign on/national anthem. (Wilkner, FL) 1228 with SS music. (Miller, WA) 0410. (Brossell, WI)

GUYANA—Voice of Guyana, **3291** with EE talks at 0313. (Brossell, WI)

HAWAII—KWHR, **9930** with "Called to Worship" at 0831. (Gardner, MS) AFN/AFRTS, **6349 USB** with news monitored at 1313. (Miller, WA)

HONDURAS—Radio Luz y Vida, **3250** with EE sermon heard at 0333. (Brossell, WI)

HUNGARY—Radio Budapest, **9590** at 0116, new frequency, but poor with lots of noise problems and deep fades. Mixture of birdcalls and local music. (Montgomery, PA) **9835** with European news at 0204. Also **11965** in HH at 2232. (Chandler, ON)

INDIA—AIR, Panaji (Goa), AIR-Delhi, **4860** in Hindi at 1255. (Brossell, WI) Chennai, **5010** at 0043 with music, annct, brief music, man and woman in Hindi. (Montgomery, PA) **5990** at 0128 in non-Hindi with vocals, talks, flutes, mention of "Akashvani." (Paszkiewicz, WI) **9445**-Bangalore, to Europe in EE at 2205. Also **9470**-Aligarh in Hindi at 1219 and **11620**-Delhi in EE at 1140 with regional news. (DeGennaro, NY) **9445** in EE at 2135 and **9945** in EE at 2119. (Charlton, ON) 9445 with news at 2100. (Paradis, ME) **11585** in presumed Hindi at 1323, similar programming on **9820** and 10330. (Brossell, WI) 1425. (Miller, WA) **11620** at 2318. (Charlton, ON) **11735** in presumed Hindi at 0230. (Linonis, PA)

INDONESIA—RRI Palangkaraya, **3325** (t) at 1240 in II with vocals, anmts. (Paszkiewicz, WI) 1253 with II news. (Miller, WA) RRI-Ternate, **3345** in II at 1258. (Miller, WA) RRI-Pontianak, **3976** with news at 0423. (Miller, WA) RRI-Makassar, **4749.2** with news in II at 1517. (Miller, WA) RRI-FakFak, **4789** music and II talks at 1143. (Miller, WA) Voice of Indonesia, **9525** in II at 1203. (Charlton, ON) **15150** at 1959 with FF, ID, and into EE. (Burrow, WA)

IRAN—VOIRI, **6010** at 0215 in Farsi with talk on Islam. (Linonis, PA) **7190//9610** in EE

at 1605. (Burrow, WA) (*EE has since been dropped—gld*) **11695** in presumed Farsi at 1340. (Brossell, WI) 11750 at 1930. (Paradis, ME) **15410** with pop vocals at 1615 and **15415** at 1610. (Barton, AZ)

ISRAEL—Kol Israel, **6280** in EE at 0500, //**7545** and **17600**. (Alexander, PA) 7545 in HH at 0135. (DeGennaro, NY) 0349. (Brossell, WI) **11585** in EE at 2001 and **17535** in EE at 1806. (Charlton, ON) **11605** with news at 2000. (Paradis, ME) **17535** in unid language heard at 1735. (Miller, WA)

ITALY—RAI Int., **7225** with bird IS at 0340 and **9840** in II at 0305. (Brossell, WI) **9755** at 1933 with IS, broadcast starts at 1935 but too weak. (Burrow, WA) 11800 at 2035. (Charlton, ON)

JAPAN—Radio Japan/NHK, **5975** via UK with news at 0504. (DeGennaro, NY) **6145** via Canada in EE at 0050. (Charlton, ON) **11690** at 0610 and **11915** via Gabon in GG at 0620. (Barton, AZ) **11855** at 2120. (Charlton, ON) **17825** at 2104. (Moser, IL)

JORDAN—Radio Jordan, **11690** with western pops at 1500. (Paradis, ME) 1613 with pops, Ids for "Radio Jordan, 96.3 FM." (Burrow, WA) 1649 with heavy RTTY QRM. (Charlton, ON) **11810** in AA at 1351. (Brossell, WI)

KUWAIT—Radio Kuwait, **11675** with AA pops at 0230. (Linonis, PA) **15110** with weekly Urdu broadcast at 1610. (Ziegner, MA) **15495** in AA at 2340. (Jeffery, NY)

LAOS—Lao National Radio, **6130** at 1200 with gongs, ID, and usual instrumental opening. (Strawman, IA)

LIBYA—Radio Jamahiriya, **17880** via France in AA at 1708. (Charlton, ON) Voice of Africa service, **11635** via France at 1918-1921 with EE news, French at 1921. Better on //**11715**. (Alexander, PA)

LITHUANIA—Radio Vilnius, **9875** in EE at 2350. (Charlton, ON)

MADAGASCAR—Radio Netherlands Relay, **9895** in SS. ID at 0259. (Brossell, WI) **11655** at 1900. (Paradis, ME)

MALAYSIA—Radio Malaysia, Sarawak, **4895** with Iban music at 1313. (Miller, WA) **7295** with music and "Radio Four" ID at 1618. (Burrow, WA)

MALI—RTV Malienne, **4835** in FF at 2319, //**4782**. (DeGennaro, NY)

MAURITANIA—Radio Mauritania, **4845** with music and talk in unid language at 2326. (DeGennaro, NY) 0702 with presumed news. (Gardner, MS)

MEXICO—Radio Educacion, **6185** in SS at 0155. (Charlton, ON) 0753. (DeGennaro, NY) Radio Mil, **6010** with songs and music in SS at 0508. (DeGennaro, NY) XERTA, **4810** at 0055 with SS pops, ballads, anmts. Short "This is XERTA" ID at 0224. Occasional dead air and intermittent hum. (Alexander, PA) 1110 with ballads and slightly over modulated audio. (Strawman, IA) Radio Mexico Int., **9705** at 0408 with ID at 0415 and 0438 with continuous vocals in between. (D'Angelo, PA) Radio Universidad, Potosi, **6045** at 1210 but very poor signal. (Wilkner, FL)

MOLDOVA—Voice of Russia, **7125** in RR at 0150. (Linonis, PA) 0325 in RR. (Brossell, WI) **7180** in SS at 0153. Also **9665** in SS at 0045. (DeGennaro, NY) 7180 at 0330. (Gardner, MS)

MOROCCO—RTV Marocaine, **5980** in AA at 0411. (Brossell, WI) **15345** in AA and some FF at 1754. (DeGennaro, NY) 1830 in AA, call to prayer, news at 1900. (Burrow, WA) VOA Relay, **9810** in CC or JJ at 1320. (Northrup, MO) Radio Medi-Un, **9575**, at 2114 with Mid-East music, AA talks but later in FF with EE pops, ID 2200, and news. (D'Angelo, PA) 0245 in FF/AA. (Linonis, PA)

MYANMAR—Radio Myanmar, **5985** with music in EE at 1511. (Miller, WA) (t) at 1551 with "beautiful music" format, weak talk at 1559, anthem, and off at 1600. (Burrow, WA)

NETHERLANDS—Radio Netherlands, **11655** in EE at 2050. (Charlton, ON) **11675** at 1117. (DeGennaro, NY)

NETHERLANDS ANTILLES—Radio Netherlands Relay, Bonaire, **9845** at 0024 on spies in the Netherlands. (DeGennaro, NY) **17810** at 2042. (Charlton, ON)

NEW ZEALAND—Radio New Zealand Int., **6090** at 1422, **9870** at 1357 and **17675** at 0009. (Miller, WA) **9870** with Charlie Byrd music at 1336. (Brossell, WI) 1608 with "Met Service Report" at 1608. (Burrow, WA) **9885** ending "Dateline" program at 0829. (Gardner, MS) 0900 with news. (Paradis, ME) 1058 with bird IS and sign on. Also **11675** at 1144 on hospital operations in New Zealand. (DeGennaro, NY) **11980** in EE at 1923. (Charlton, ON) **15720** at 2140. (Miller, WA)

NIGERIA—Radio Nigeria, Kaduna, **4770** with talk and hymns at 0438. (DeGennaro, NY) **15120** at 1932 and **17800** at 2115, both in EE. (Charlton, ON) **15120** with religious program at 1510, ID at 1529. Also **17800** at 2240 with ID at 2256. (Montgomery, PA) 17800 at 2048 with program on democracy. (Jeffery, NY) 2144 with schedule, ID, and feature. (Burrow, WA)

NORTH KOREA—Voice of Korea, **7140** in EE at 0115. (Charlton, ON) **9975** with the wonders of Kim Jung Il monitored at 1604. (Burrow, WA)

NORTHERN MARIANAS—KFBS, Saipan, **11580** with religious songs in CC at 1340. (Brossell, WI)

PAKISTAN—Radio Pakistan, **9395**// **11570** with IS, time pips at 1600. Off at 1615. (Burrow, WA) **15065** in Urdu at 1400. (Ziegner, PA)

PAPUA NEW GUINEA—NBC, **4890** with interview in Pidgin at 1052. (DeGennaro, NY) 1146 with EE news. (Miller, WA)

PARAGUAY—Radio Nacional, **9737** at 0153 with LA vocals, ID 0158 and SS news at 0200. Off without anthem at 0215. (D'Angelo, PA) 0730 with SS talk, ID, mostly continuous local music. (Alexander, PA) 0826. (DeGennaro, NY)

PERU—(all broadcasts in SS and/or QQ) La Voz de la Selva, Iquitos, **4825** at 1002. (DeGennaro, NY) Radio Santa Rosa, Lima, **6045** with religious music at 0949. (DeGennaro, NY) Radio La Hora, Cusco, **4855** with ID at 1003. (DeGennaro, NY) Radio Melodia, Arequipa, **5996.6** at 0746 with canned ID, anmts, time checks. Wiped out by adjacent channel splatter at 0802. (Alexander, PA) 1052. (DeGennaro, NY) Radio Santa Monica, Cusco, **4965** at 0950 with OA folk music, SS anmts, canned ID at 1015. (Alexander, PA) 1022. (DeGennaro, NY) Radio Oriente, Yurimaguas, **6188** at 1035 with talk, music, ID 1038. (Alexander, PA) Radio La Poderosa, **6536** at 0110 with OA music, SS talk, ID at 0130, and abrupt sign off at 0136. (Alexander, PA) Radio Victoria, Lima, **9720** (p) at 0700 with SS ads, "La Voz de Liberacion" program with religious sermon. Better on //**6020.2**. (Alexander, PA) 0822 with evangelical program. (DeGennaro, NY) Radio Tarma, Tarma, **4775** with Sunday church service at 1022. (DeGennaro, NY) Radio Huanta 2000, Huanta, **4746.8** with SS discussion at 1046. (Strawman, IA) Radio Cora, Lima, **4914** with news at 0440. (Miller, WA) Radio Madre de Dios (t) **4950** at 0210 with possible ID, Christian music. (Linonis, PA)

PHILIPPINES—FEBC, **9500** in CC to East Asia at 1049. (DeGennaro, NY) 1423 in CC. (Brossell, WI) Radio Pilipinas, **11730//11890** in Tagalog at 1736 with newscast. (Burrow, WA) **15190** at 1923 with woman talking, music, man with ID, and closedown anmts in EE. Off at 1930. (D'Angelo, PA) 1929 with very poor audio, caught mention of frequency and "Radio Pilipinas." (Charlton, ON) VOA Relay, **9760** at 1325. (Northrup, MO) **9790** in Asian language at 1320. (Northrup, MO)

PIRATES—KRMI, Radio Michigan Int., **6925 USB** at 0146 sign on after a bunch of pirate ops finished a QSO. Reports to: krmi6955@yahoo.com. (D'Angelo, PA) Captain Morgan (t) **6950** at 0126 with lots of music but no ID. Think it is Morgan due to the *Twilight Zone* music. (Balint, --) Take It Easy Radio, **6925** at 0405 with Eagles and urging people to take Fridays off. Reports to: takeiteasyradio@yahoo.com (Gardner, MS) **6950** at 0210 with lots of Bob Seeger and talk about his (operators) presidential platform. (Johnson, IL) Big Thunder Radio, **6925 USB** relaying Iron Man radio at 0052. Address: bigthunderradio@yahoo.com. (Gardner, MS) WMPR, **6925 USB** at 0032 with dance music and IDs. (Gardner, MS) KRLR, **6925 USB** at 0100 with classic rock. (Linonis, PA)

PORTUGAL—RDP Int., **11655** with news in PP at 0000. Also **17615** with news in PP at 1740 (Miller, WA) **15540** with soccer match in PP at 2115. (Charlton, ON) **15575** with news items in PP at 1405. (Ziegner, MA).

PUERTO RICO—AFN/AFRTS, **7507** at 0346 with sports update. (Brossell, WI) 1043 with computer show. (DeGennaro, NY)

ROMANIA—Radio Romania Int., **7250** with sports scores at 2254. Also **9550** in Romanian at 2308. (Charlton, ON) 9510 with talk on Moldova at 0119. (DeGennaro, NY)

RUSSIA—Voice of Russia, **9450** to East Asia in possible Korean at 1215. **12070** with

chamber music at 2032. Also **15455** in GG at 1758. (DeGennaro, NY) **9765** at 0223 and **15595** at 0232. (Chandler, ON) **9900** with presumed news in RR at 1330. Website: www.vor.ru. (Brossell, WI) **15445** with Moscow Mailbag at 0510. (Barton, AZ) FEBA via Russia, **11695** at 1344 with "What a Friend" IS and off at 1347. (Brossell, WI)

RWANDA—Deutsche Welle Relay, **9565** in unid language at 0259. (Gardner, MS) **9630** in EE at 0450. (MacKenzie, CA) **9870** at 0253 with music, ID. (Brossell, WI) **11865** with "News Link Africa" at 2100. (Paradis, ME) **11945** in GG at 2111. (Charlton, ON)

SAO TOME—VOA Relay, **4960** in FF at 0532. Also **11975** to Africa at 2015. (DeGennaro, NY)

SAUDI ARABIA—BSKSA, **9870** in AA at 2134. (Charlton, ON) **11820** in AA at 1950 and **15205** in AA at 1742. (DeGennaro, NY) **21600** in FF at 1430. (Paradis, ME)

SERBIA—Int. Radio of Serbia and Montenegro, **7130** in EE at 0206. (Charlton, ON) **9580** in language at 2340. (Paszkiewicz, WI)

SINGAPORE—Radio Singapore, **6150** at 1556 with schedule, ID, and close. (Burrow, WA) BBC Relay, **9740** with news feature at 1225. (Northrup, MO) 1418 on Muslim attire. (Brossell, WI)

SOUTH AFRICA—Channel Africa, **3345** at 0348 with ID "This is Channel Africa broadcasting to Southern Africa" at 0400. (Brossell, WI) **9525** at 1201. (Charlton, ON) **11710** with news at 0501. (Burrow, WA) Trans World Radio via Meyerton, **9660** in unid African language at 1658. (Miller, WA) BBC via Meyerton, **11765** at 0611. (Jeffery, NY) Radio Sondergrense, **3320** in presumed Afrikaans at 0310. (Brossell, WI)

SOUTH KOREA—Radio Korea Int., **5975//7255** at 1605 with news, ID. (Burrow, WA) **9560** via Canada at 0218. (Charlton, ON) **9650** via Canada with EE/KK lesson at 1245. (Northrup, MO) 1130 discussing RF identification of merchandise in stores and jewelry marketing on the Internet. (Rossetti, MA) **15575** with news in JJ at 2300. (Miller, WA)

SPAIN—Radio Exterior de Espana, **5970** via Costa Rica in SS at 1058 and **9620** in SS at 0100. (DeGennaro, NY) **6055** in SS at 0120, **9595** in EE at 2053 and **17850** via Costa Rica at 1905 in SS. (Charlton, ON) **6055** with 60s rock at 0030. (Burrow, WA) **9535** in SS at **0428, //9620**. (MacKenzie, CA) **9710** in SS at 1325. (Northrup, MO) **15195** in RR at 1707. (Ziegner, MA) **15385** at 0050 and **17850** at 1835. (Barton, AZ)

SRI LANKA—SLBC, **4940** at 1500 with time pips, news in CC. Also **6150** at 1508. (Miller, WA) **9770** with nice variety of music at 0044. (Montgomery, PA) 0032 "You are tuned to the English service of the SLBC." (Charlton, ON) Radio Japan via Sri Lanka, **11890** in JJ at 1357. (Brossell, WI)

SUDAN—Radio Peace, **4750** at 0230 sign on with light instrumental music and ID followed by EE religious programming, talk in vernacular, local music. (Alexander, PA) Republic of Sudan Radio, **7200** in AA with soft instrumental music at 0334. (Brossell, WI) Sudan Radio Service, via UK, **11665** at 0259 sign on with guitar IS, multi-lingual IDs with address and fax number, music, vernacular talk. (Alexander, PA) **15530** in AA at 1555. (Charlton, ON) **17630** in possible AA with ID, music at 1630. (Paradis, ME)

SURINAM—Radio Apinte, **4990** at 0350 with U.S. pops, EE ID at 0404 as "Radio Apinte—Number One" and into DD anmts. (Alexander, PA) **4991** at 0538 with DD ID at 0540 and music, DD anmts. (DeGennaro, NY)

SWAZILAND—Trans World Radio, **3240** with EE ID at 0330 and into unid African language. (Brossell, WI)

SWEDEN—Radio Sweden, **6065** in Swedish at 2120. (DeGennaro, NY) **9495** at 0230. (Charlton, ON) 0236. (Gardner, MS) **15735** at 1330. (Paradis, ME)

SWITZERLAND—Swiss Radio Int., **13645** via Julich, Germany in GG at 2040. (DeGennaro NY) **17660** via French Guiana at 1945. (Charlton, ON)

SYRIA—Radio Damascus, **13610** at 1936 in FF. EE news began around 2005. (D'Angelo, PA) 2008 with EE opening. Varying between news and AA music to close at 2211. (Alexander, PA) 2018 with news. Strong carrier but weak modulation. (Burrow, WA)

TAIWAN—Radio Taiwan Int., **5950** via WYFR, with news in SS at 0603. (DeGennaro, NY) **7130** at 1200 with anthem, ID, news. (Brossell, WKI) **9680** via WYFR with news at 0233. (Chandler, ON) **11550** with Taiwan news at 1609. (Burrow, WA) **11605** in CC at 1230 (Barton, AZ)

TAJIKISTAN—Voice of Russia **11500** in Hindi at 1340. (Brossell, WI)

THAILAND—Radio Thailand, **9535** at 1923 with tax info, ID at 1926. (Burrow, WA) **9680** with news at 2030. (Paradis, ME) **9790** in CC, "Thailand National Radio" ID at 1329. (Brossell, WI) **11870** at 1202 with opening and into EE news. (Montgomery, PA) **15395** at 0027 sign on and into man with EE newscast. (D'Angelo, PA) VOA Relay, **7255** with jazz at 1205. (Brossell, WI)

TURKEY—Voice of Turkey, **6020//7240** with schedule, IDs, news at 0400. (Burrow, WA) **6050** to West Africa in AA at 2115, **9460** in TT at 2156 and **11850** with FF commentary at 1953. (DeGennaro, NY) **9460** in AA at 0317. (Gardner, MS) 0422. (MacKenzie, CA) **9655** in TT at 2306. (Chandler, ON)

TUNISIA—RTV Tunisienne, **7160** in AA at 2025. Also **9720** in AA at 2047. (Charlton, ON) **12005** in AA at 0245. (Linonis, PA) 2019. (DeGennaro, NY) **15450** in AA at 1007. (Miller, WA)

UKRAINE—Radio Ukraine Int., **15520** in FF with Middle East news at 1212. (Charlton, ON) Voice of Russia relay, **7240** in RR at 0337. (Brossell, WI)

UNITED ARAB EMIRATES—UAE Radio, Dubai, **12005** in AA at 0312. (Charlton, ON) 0329 to 0345 close with EE "Images of Arabia" feature. **15395** at 1335 with "Images of Arabia." **//13675**. Also **21605** at 1555 in AA and into EE at 1628 to 1645 abrupt off. (Alexander, PA)

UNITED STATES—AFN/AFRTS, Key West, **5446 USB** at 1017 with computer show. (DeGennaro, NY) **12133** with sports at 2109. (Gardner, MS) 2352 with news. (Miller, WA)

UZBEKISTAN—Radio Tashkent, **9715** in Uzbek at 0130. (Charlton, ON) **11905** with EE at 2030. (Strawman, IA) **17775** with news, features at 1330. (Paradis, ME)

VANUATU—Radio Vanuatu, **7260** heard at 0915 with EE news. Best in LSB. (Montgomery, PA)

VATICAN—Vatican Radio, **6020** in CC at 1245. (Miller, WA) **7250** at 0610. (Moser, IL) **7305** in SS at 0340. (Brossell, WI) 0241 in FF. Also **9605** at 0255 and **9865** with IS and ID at 0159. (Charlton, ON) 9605 in SS at 0105. Also **13765** in FF at 2045. (DeGennaro, NY)

VENEZUELA—YVTO-Observatorio Cagical, **5000** with SS time anmts. Mixed with WWV/WWVH at 0545. (DeGennaro, NY) Radio Amazonas, Puerto Ayacucho, **4940** in SS with talk on area politics at 1046. (DeGennaro, NY)

VIETNAM—Voice of Vietnam, **6175** via Canada at 0236. (Charlton, ON) **7280/9730** in EE at 1601 with Vietnam news, ID, and mailbag program. (Burrow, WA) **12020** with EE ID at 1000, **//9840**. (Alexander, PA)

ZAMBIA—Christian Voice, **4965** at 0309 with man/woman anncr team, religious vocals, ID at 0329. (D'Angelo, PA) ZBC, **4910** in unid African language at 0405. (Brossell, WI) 0426. (Miller, WA)

ZIMBABWE—Zimbabwe Broadcasting Corp., **3306** at 0340 with talks in unid language and group chorals. (Brossell, WI)

And that empties the box for this time. Time to sound the trumpets and launch the fireworks in salute to the following folks who did the good deed this month (unfortunately our list of addresses was lost in an operating system upgrade so it will be names only this time): Sheryl Paszkiewicz, Robert Wilkner, Jason Gardener, Robert Charlton, Tricia Ziegner, Howard Moser, Lou Rossetti, Bruce Burrow, Mike Miller, Paul Johnson, Bruce Burrow, Stewart MacKenzie, Dave Jeffery, Robert Brossell, Dave Balint, Ray Paradis, Rich D'Angelo, Mark Northrup, Robert Montgomery, Brian Alexander, and Jack Linonis.

Thanks to each one of you—and sorry we won't be able to send out the usual acknowledgment cards this month. Be sure that we have your full address for next time! ■

Tap into *secret* Shortwave Signals

Turn mysterious signals into exciting text messages with the MFJ MultiReader™!

Plug this self-contained MFJ *MultiReader*™ into your shortwave receiver's earphone jack.

Then *watch* mysterious chirps, whistles and buzzing sounds of RTTY, ASCII, CW and AMTOR (FEC) turn into exciting text messages as they scroll across an easy-to-read LCD display.

You'll *read* interesting commercial, military, diplomatic, weather, aeronautical, maritime and amateur traffic . . .

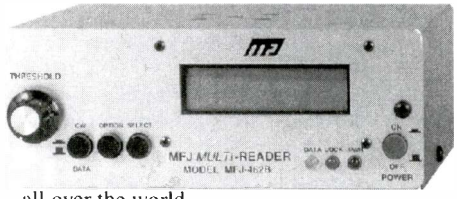
Eavesdrop on the World

Eavesdrop on the world's press agencies transmitting *unedited* late breaking news in English -- China News in Taiwan, Tanjug Press in Serbia, Iraqui News in Iraq -- all on RTTY.

Copy RTTY weather stations from Antarctica, Mali, Congo and many others. Listen to military RTTY passing traffic from Panama, Cyprus, Peru, Capetown, London and others. Listen to hams, diplomatic, research, commercial and maritime RTTY.

Listen to maritime users, diplomats and amateurs send and receive *error-free* messages using various forms of TOR (Telex-Over-Radio).

Monitor Morse code from hams, military, commercial, aeronautical, diplomatic, maritime



-- all over the world -- Australia, Russia, Japan, etc.

MFJ-462B **$179.95**

Printer Monitors 24 Hours a Day

MFJ's exclusive *TelePrinterPort*™ lets you monitor any station 24 hours a day by printing transmissions on an Epson compatible printer.

Printer cable, **MFJ-5412**, $9.95.

MFJ *MessageSaver*™

You can save several pages of text in an 8K of memory for re-reading or later review.

High Performance Modem

MFJ's high performance *PhaseLockLoop*™ modem consistently gives you solid copy -- even with weak signals buried in noise. New threshold control minimizes noise interference -- greatly improves copy on CW and other modes.

Easy to use, tune and read

It's easy to use -- just push a button to select modes and features from a menu.

It's easy to tune -- a precision tuning indicator makes tuning your receiver easy for best copy.

It's easy to read -- the 2 line 16 character LCD display with contrast adjustment is mounted on a brushed aluminum front panel for easy reading.

Copies most standard shifts and speeds. Has MFJ *AutoTrak*™ Morse code speed tracking.

Use 12 VDC or use 110 VAC with MFJ-1312B AC adapter, $14.95. 5¼Wx2½Hx5¼D inches.

No Matter What™ One Year Warranty

You get MFJ's famous one year *No Matter What*™ limited warranty. That means we will repair or replace your MFJ *MultiReader*™ (at our option) *no matter what* for one full year.

Try it for 30 Days

If you're not completely satisfied, simply return it within 30 days for a prompt and courteous refund (less shipping). Customer must retain dated proof-of-purchase direct from MFJ.

Super Active Antenna

"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.

MFJ-1024 **$139.95**

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.

Indoor Active Antenna

MFJ-1020B **$79.95**

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.

Compact Active Antenna

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.

Detachable 20 inch telescoping antenna. 9 volt battery or 110 VAC MFJ-1312B, $14.95. 3⅛x1¼x4 in.

Eliminate power line noise!

MFJ-1026 **$179.95**

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.

CW, RTTY, ASCII Interface

MFJ-1214PC **$149.95**

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**

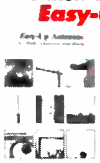
High-Q passive LC preselector boosts your favorite stations while rejecting images, intermod and phantom signals. 1.5-30 MHz. Preselector bypass and receiver grounded positions. Tiny 2x3x4 inches.

Super Passive Preselector

MFJ-1046 **$99.95**

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**

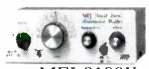
How to build and put up inexpensive, fully tested wire antennas using readily available parts that'll bring signals in like you've never heard before. Antennas from 100 KHz to 1000 MHz.

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.

World Band Radio Kit

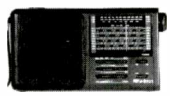


MFJ-8100K ***kit*** **$69.95**
MFJ-8100W ***wired*** **$89.95**

Build this regenerative shortwave receiver kit and listen to signals from all over the world with just a 10 foot wire antenna. Has RF stage, vernier reduction drive, smooth regeneration, five bands.

21 Band World Receiver

MFJ-8121 **$39.95**



MFJ's new 21 Band World Receiver lets you travel the world from your armchair! Listen to BBC news from London, live music from Paris, soccer matches from Germany and more! Covers 21 bands including FM, Medium Wave, Long Wave and Shortwave. *Sony*® integrated circuit from Japan, multicolored tuning dial, built-in telescopic antenna, permanent silkscreened world time zone, frequency charts on back panel. Carrying handle. Operates on four "AA"s. Super compact size!

Free MFJ Catalog
and Nearest Dealer . . . 800-647-1800

http://www.mfjenterprises.com

• 1 Year *No Matter What*™ warranty • 30 day money back guarantee (less s/h) on orders from MFJ

MFJ ENTERPRISES, INC.
Box 494, Miss. State, MS 39762
(662) 323-5869; 8-4:30 CST, Mon.-Fri.
FAX: (662) 323-6551; **Add s/h**
Tech Help: (662) 323-0549

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
0000	9845	Radio Netherlands Relay, Bonaire, NWI	
0000	11655	RDP International, Portugal	PP
0000	11765	Radio New Zealand Int.	
0000	5010	Radio Cristal Int., Dominican Republic	SS
0000	15380	Central People's Broadcasting Station, China	CC
0000	11700	Radio Bulgaria	RR
0030	15395	Radio Thailand	
0030	9770	Sri Lanka Broadcasting Corp.	
0030	9645	Radio Sawa, USA, via Morocco	AA
0030	6010	Bible Voice Broadcasting, USA, via Germany	
0030	6090	Caribbean Beacon, Anguilla	
0100	9605	Vatican Radio	SS
0100	6536	Radio La Poderosa, Peru	SS
0100	9510	Radio Romania Int.	
0100	6185	Radio Educacion, Mexico	SS
0100	4052.5	Radio Verdad, Guatemala	SS
0100	7345	Radio Prague, Czech Republic	
0100	9590	Radio Budapest, Hungary	
0100	5025	Radio Rebelde, Cuba	SS
0130	9715	Radio Tashkent, Uzbekistan	Uzbek
0130	7545	Kol Israel	HH
0130	9375	Voice of Greece	Greek
0130	5990	All India Radio, Panaji (Goa) India	unid
0130	6115	Radio Tirana, Albania	
0130	7270	Radio Tirana, Albania	Albanian
0130	7325	Radio Austria Int.	
0200	9560	Radio Korea Int., South Korea, via Canada	
0200	7130	Int. Radio of Serbia and Montenegro	
0200	9737	Radio Nacional, Paraguay	SS
0200	6010	Voice of Islamic Republic of Iran	Farsi
0200	9835	Radio Budapest, Hungary	
0200	9365	Radio Free Asia, USA, via Armenia	Tibetan
0200	4800	Radio Buenas Nuevas, Guatemala	SS
0200	15375	Voz Cristiana, Chile	SS
0200	11710	RAE, Argentina	
0230	6175	Voice of Vietnam, via Canada	
0230	9689	Radio Taiwan Int., via WYFR	
0230	4750	Radio Peace, Sudan	
0230	11675	Radio Kuwait	AA
0300	9460	Voice of Turkey	TT
0300	3320	Radio Sondergrense, South Africa	Afrikaans
0300	4965	Christian Voice, Zambia	
0300	9665	Voice of Russia, via Moldova	
0300	4810	XERTA, Mexico	SS
0300	9575	Radio Medi-Un, Morocco	AA/FF
0300	4845	Radio Mauritanie, Mauritania	AA
0300	9840	RAI Int., Italy	II
0300	3291	Voice of Guyana	
0300	9665	China Radio Int., via Brazil	SS
0300	7285	Voice of Croatia	
0300	7110	Radio Ethiopia	Amharic
0300	4870	La Voz de Upano, Ecuador	SS
0300	9400	Radio Bulgaria	
0330	7240	Voice of Russia, via Ukraine	RR
0330	7200	Republic of Sudan Radio	AA
0330	3240	Trans World Radio, Swaziland	unid
0330	3306	Zimbabwe Broadcasting Corp.	unid
0330	7507	AFN/AFRTS, Puerto Rico	USB
0330	5500	Voice of Peace & Democracy in Eritrea (cland)	Tigrinya
0330	6010	La Voz de tu Conciencia, Colombia	SS
0330	3250	Radio Luz y Vida, Honduras	SS
0345	7225	Trans World Radio, Swaziland	
0400	9535	Radio Exterior de Espana, Spain	SS
0400	4910	Radio Zambia	unid
0400	9420	Voice of Greece	Greek
0400	6940	Radio Fana, Ethiopia	unid
0400	5500	Voice of the Tigray Revolution (cland)	Tigrinya
0400	9490	RTBF, Belgium	FF
0400	9515	Radio Sultanate of Oman	AA
0430	4910	Radio Cora, Peru	SS
0430	4770	Radio Nigeria	
0430	5985	RTV Congolaise, Congo Republic	FF
0500	6065	Radio Sweden	Swedish
0500	11710	Channel Africa, South Africa	
0500	4960	Voice of America Relay, Sao Tome	
0500	15445	Voice of Russia	
0500	6010	Radio Mil, Mexico	SS
0500	6085	Bayerischer Rundfunk, Germany	GG
0500	4919	Radio Quito, Ecuador	SS
0500	4895	Radio Bare, Manaus, Brazil	PP
0500	5030	Radio Burkina, Burkina Faso	FF
0530	4991	Radio Apinte, Surinam	DD
0530	4950	Radio Nacional, Angola	PP
0600	11765	BBC, England, via South Africa	
0700	9720	Radio Victoria, Peru	SS

UTC	Freq.	Station/Country	Notes
0800	9885	Radio New Zealand Int.	
0800	12070	Trans World Radio, via Albania	
0830	9930	KWHR, Hawaii	
0900	7260	Radio Vanuatu	
0900	3280	La Voz del Napo, Ecuador	SS
0900	6070	CFRX, Toronto, Canada	
0900	4825	Radio Educadora Braganca, Brazil	PP
0900	6135	Radio Santa Cruz, Bolivia	SS
0930	6035	La Voz de Guaviare, Colombia	SS
1000	4940	Radio Amazonas, Venezuela	SS
1000	4965	Radio Santa Monica, Peru	SS
1000	4650	Radio Santa Ana, Bolivia	SS
1000	4798	Radio Mallku, Bolivia	SS
1030	9500	Far East Broadcasting Co., Philippines	CC
1030	3300	Radio Cultural, Guatemala	SS
1030	4960	Radio Federacion, Ecuador	SS
1030	6160	CKZN, St. John's, Canada	
1030	4600	Radio Perla del Acre, Bolivia	SS
1100	12020	Voice of Vietnam	
1100	11590	Voice of the Strait, China	CC
1100	9580	Radio Australia	
1130	9650	Radio Korea Int., South Korea, via Canada	
1130	4890	National Broadcasting Corp, Papua New Guinea	
1130	3385	Radio East New Britain, Papua New Guinea	Pidgin
1130	11750	HCJB-Australia	CC/EE
1200	11870	Radio Thailand	
1200	7130	Radio Taiwan Int.	
1200	7255	Voice of America Relay, Thailand	
1200	9525	Channel Africa, South Africa	
1200	6045	Radio Universidad, Mexico	SS
1200	6130	Lao National Radio	Lao, etc.
1200	9525	Voice of Indonesia	II
1200	4748	Radio Republik Indonesia, Makassar	II
1200	13685	Voice International, Australia	
1200	9505	Radio Veritas Asia, Philippines	unid
1230	9525	Radio Polonia, Poland	unid
1300	9790	Voice of America Relay, Philippines	
1300	15400	YLE/Radio Finland	Finnish
1300	6349	AFN/AFRTS, Hawaii	USB
1330	15395	UAE Radio, Dubai	
1330	11510	Voice of Russia, via Tajikistan	Hindi
1330	11695	Far East Broadcasting Assn, via Russia	unid
1330	11580	KFBS, Saipan, No. Marianas	CC
1330	11510	Radio Free Asia, via Kazakhstan	Khmer
1330	11810	Radio Jordan	AA
1330	11890	Radio Japan/NHK, via Sri Lanka	JJ
1330	9975	Trans World Radio, Guam	unid
1330	11820	BBC Relay, Cyprus	AA
1330	9810	Central People's Broadcasting Station, China	CC
1400	12070	Radio Netherlands, via Uzbekistan	
1400	9740	BBC Relay, Singapore	
1400	15065	Radio Pakistan	Urdu
1400	9500	FEBC, Philippines	CC
1400	12000	Radio Havana Cuba	SS
1400	11585	All India Radio	Hindi
1430	21600	Broadcasting Service of Kingdom of Saudi Arabia	FF
1500	15120	Voice of Nigeria	
1500	17870	Radio Rhino Int., Germany	
1600	11570	Radio Pakistan	
1600	9975	Voice of Korea, North Korea	
1600	15410	Voice of Islamic Republic of Iran	
1600	15415	Voice of Islamic Rep. of Iran	unid
1630	17630	Sudan Radio Service, United Kingdom	AA
1630	9660	Trans World Radio, via South Africa	unid
1630	11690	Radio Jordan	
1630	15605	Radio France Int.	
1700	17880	Radio Jamahiriya, Libya, via France	AA
1730	17535	Kol Israel	HH
1800	17850	Radio Exterior de Espana, Spain	
1830	15345	RTV Marocaine, Morocco	AA
1830	11735	Radio Africa Int., USA, via Germany	
1830	17680	Voz Cristiana, Chile	SS
1900	15190	Radio Pilipinas, Philippines	
1900	11655	Radio Netherlands Relay, Madagascar	
1900	11635	Radio Jamahiriya, Libya, via France	AA, etc.
1900	15630	Voice of Greece	Greek
1930	17660	Swiss Radio Int., via French Guiana	
2000	12005	RTV Tunisienne, Tunisia	AA
2000	13610	Radio Damascus, Syria	
2000	9960	Radio Farda (USA to Iran)	Farsi
2000	11655	Radio Netherlands	
2000	11585	Kol Israel	
2000	15150	Voice of Indonesia	
2000	12105	Adventist World Radio, USA, via South Africa	multi
2000	15175	Adventist World Radio, via Germany	FF
2000	9960	Voice of Armenia	
2030	11905	Radio Tashkent, Uzbekistan	
2030	11640	Radio China Int., via Mali	
2100	11865	Deutsche Welle Relay, Rwanda	
2100	15540	RDP Int., Portugal	PP
2100	17800	Voice of Nigeria	
2100	17825	Radio Japan/NHK	
2100	15265	Channel Africa	
2100	9445	All India Radio	
2100	7450	Radio Makedonias, Greece	Greek
2100	12080	Voice of America Relay, Botswana	FF
2100	15400	BBC Relay, Ascension Island	
2130	9870	Broadcasting Service of Kingdom of Saudi Arabia	AA
2130	9580	Africa Number One, Gabon	FF
2130	12010	Adventist World Radio/KSDA, Guam	
2130	11730	Radio Vlaanderen Int., Belgium, via Bonaire	
2200	17834	Radio Imperial, El Salvador	SS
2230	6180	Cyprus Broadcasting Corp.	
2230	11930	Radio Bandeirantes, Brazil	PP
2300	9655	Voice of Turkey	TT
2300	7460	Radio National RASD, W. Sahara, via Algeria	SS
2300	21740	Radio Australia	
2330	12133	AFRTS, Florida	USB
2330	15495	Radio Kuwait	AA
2330	11800	RAI Int., Italy	II
2330	9875	Radio Vilnius, Lithuania	
2330	11725	Radio Cairo, Egypt	
2330	6145	China Radio Int., via France	
2330	11815	Radio Brazil Central, Goiania, brazil	PP

power up:
radios & high-tech gear

by Harold Ort, N2RLL

new, interesting, and useful communications products

Uniden Announces BC246T Handheld Compact Trunking Scanner

Uniden America Corporation just announced its latest trunking scanner, the BC246T. Representing the first in a new generation of compact handheld scanners, the BC246T introduces several innovative new features, including Uniden's exclusive Close Call RF Capture Technology. The BC246T will be available in the fall of 2004.

The BC246T uses a new dynamically allocated memory system, allowing the user to program its 3300-plus channels into any configuration desired. While traditional scanners have been limited to only 10 banks, the BC246T groups channels into systems, allowing for 50 or more systems to be programmed and scanned simultaneously. Systems can still be quickly enabled or disabled using the 0 to 9 keys, and each system can have up to 10 groups of channels that are also available for quick selection.

Uniden's exclusive Close Call RF Capture Technology zeroes in on nearby transmissions without the need for programming, even when the BC246T is in other modes, scanning, searching, or holding on a frequency. For example, if someone transmits within a few hundred feet (range depends on transmit power and other radio traffic in the area), the scanner immediately detects and tunes to the transmission; it's ideal for use at events when the frequency being used is unknown.

Uniden's new BC246T handheld trunking scanner is a state-of-the-art scanner in a compact package.

The BC246T comes complete with two NiMH AA batteries, internal recharging, PC programming and control. Key features include:

- Compact Size (4-1/2 x 2-3/4 x 1-1/4 inches HWD)
- TrunkTracker III Technology (Motorola, EDACS, and LTR Analog Trunking)
- Comprehensive Analog Trunking, including I-calls, Emergency Alert, Trunk Search, and ID Blockout
- Up to 3,300 Channels, dynamically allocated
- System, Channel Group, and Channel Alpha Tagging
- Coverage of 25–54, 108–174, 216–225, 400–512, 806–956, and 1240–1300 MHz
- Close Call RF Capture Technology
- SAME Weather Alert
- 10 Programmable Search Ranges
- 12 Preprogrammed Service Searches
- Backlit Display
- CTCSS/DCS Rapid Decode

Uniden America Corporation, the North American subsidiary of Japan-based Uniden Corporation, manufactures and markets wireless consumer electronic products, including cordless telephones, business telecommunications systems, scanners, FRS/GMRS radios, marine radios, and other wireless personal communications products. Based in Fort Worth, Texas, Uniden sells its products through dealers and distributors throughout North, Central and South America. For more information, contact Uniden America Corporation directly at 817-858-3300 or online at www.uniden.com. Uniden products are available online or at their numerous retailers listed on their website.

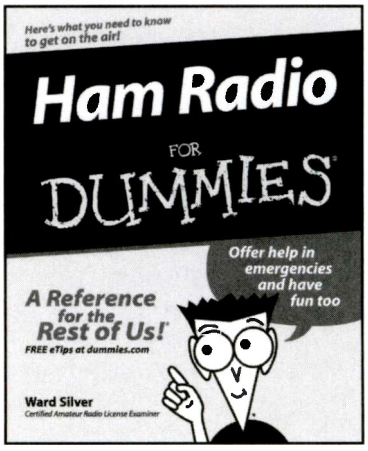
Ham Radio For Dummies

The familiar yellow-and-black covers of the popular "for Dummies" books are visible in every bookstore. Covering a variety of topics in a straightforward style, readers turn to them for introductions and as a users' guides to many topics. Now amateur radio, one of the oldest technical hobbies, has joined the list with Wiley Press' just-released *Ham Radio for Dummies* by Ward Silver, NØAX. The book provides an excellent introduction to ham radio for interested readers. Newly licensed hams will find the book to be a friendly desktop advisor, or "Elmer," as they learn the ropes of operating on the ham bands.

The book is organized in four parts: an introduction to ham radio, an overview of the licensing process, information about the various activities within ham radio, and the technical aspects of getting a station on the air. The book concludes with the "Dummies'" famous "Part of Tens" section (lists of useful things to know and remember) and two substantial appendices of reference information. A pull-out "cheat sheet" is provided to help the new ham get going. Weighing in at 360 pages, *Ham Radio for Dummies* covers a lot of the hobby! If you prefer, an e-book version is also available.

The book's author, Ward Silver, has held the amateur call sign NØAX since 1975. His professional experience includes broadcasting, electrical engineering, and teaching. He writes the popular "Hands-On Radio" column for *QST* magazine and is the author of numerous ham radio articles, quizzes, and crossword puzzles.

A PDF sample of the book's first chapter is available for download from the Wiley Press "Dummies" website (www.dummies.com, then search for "ham radio") along with a substantial Bonus Content



Ham Radio For Dummies *is now available at your favorite bookstore. Written by Ward Silver, NØAX, it's a must-have for new hams and all your friends who might be interested in amateur radio.*

chapter on the technical aspects of operating and antennas. *Ham Radio for Dummies* is priced at $21.99 and is shipping from many on-line and traditional booksellers.

CQ Introduces VHF Propagation, A Practical Guide For Radio Amateurs

CQ Communications announced the publication of a new resource for hams active on VHF and UHF bands who want to learn more about long-distance propagation possibilities available to them. *VHF Propagation, A Practical Guide for Radio Amateurs* was written by Ken Neubeck, WB2AMU, and Gordon West, WB6NOA.

Newcomers to VHF are often surprised by their ability to communicate over long distances due to the commonly held, but incorrect, belief that propagation above 30 MHz is limited to line of sight. In *VHF Propagation*, Neubeck and West examine each of the most common long-distance propagation modes found on the VHF and UHF bands, explain how they occur, and offer tips on making the most of these "band openings" when they do occur. Topics covered include tropospheric scatter and ducting, sporadic-*E*, aurora, 6-meter *F*-layer propagation, and transequatorial propagation.

Ken Neubeck is one of the leading amateur radio authorities on VHF propagation, particularly on his favorite band of 6 meters. Gordon West is one of the best-known authors in amateur radio today, whose favorite activities include VHF/UHF DXing and studying the "duct" that develops between California and Hawaii each summer, permitting hams with handhelds to make contacts over 2,000 miles away. Both Neubeck and West are Contributing Editors for *CQ* and *CQ VHF* magazines. West is also a Contributing Editor for *Popular Communications*, writing on a wide variety of topics.

VHF Propagation, A Practical Guide for Radio Amateurs is published by CQ Communications Inc., of Hicksville, New York. It is priced at $15.95 and is available from many ham radio dealers or direct from CQ at 1-800-853-9797 (9 to 5 EST, weekdays) or anytime through the CQ online bookstore by going to http://www.cq-amateur-radio.com and selecting "Click Here to Visit the CQ Store." All major credit cards accepted.

In addition, Gordon West is independently offering an audio CD (or cassette) companion to the book, providing samples of how each type of propagation sounds, along with narration by West. The disk/cassette is available directly from Gordon West Radio School, 2414 College Dr., Costa Mesa, CA 92626, for $9.95 plus $3 shipping, personal checks only.

AOR's ARD25 Digital-To-Analog Conversion Unit

If you've got one of the many receivers that were "left behind" when some public agencies began using APCO Project 25 digital modulation, and your receiver has a 10.7-MHz output port, the AOR ARD25 can translate those *unencrypted* digital signals to intelligible audio. (Some of those receivers include the AOR AR-ONE, the AR8600 series, and AR5000 series).

The new AOR ARD25 Digital-to-Analog Conversion Unit works with many receivers that have a 10.7-MHz output port. It can translate unencrypted digital signals to intelligible audio.

The new AOR ARD25 can also channel your receiver's analog output through the ARD25. It will automatically recognize analog signals and pass them to the ARD25's internal speaker or to an external station speaker. Best of all there's no receiver modification needed—the unit is easy to connect and operate.

Standard accessories included with the ARD25 include a 120-VAC adaptor, BNC patch cable, speaker cable, and instruction manual. For more information on AOR's new ARD25 Digital-to-Analog Conversion Unit, contact AOR, Ltd. at 20655 S. Western Avenue, Suite 112, Torrance, CA 90501; phone 310-787-8615 or visit them on the Web at www.aorusa.com. Please tell them you read about the ARD25 in *Pop'Comm*.

homeland security

emergency radio, alternative power, and civil defense

by Rich Arland, K7SZ

It's Not Just For Hams: Emergency Communicator Training For Anyone! And A Skill-Sharpening Foxhunt

Last month we spent the entire column discussing training needed to effectively function as an emergency communicator. While this information primarily focused on the ham radio side of the hobby, you should realize that as a GMRS, FRS, or CB radio operator you need the same type of training before offering your skills and equipment in support of disaster relief communications. To that end, this month we are going to cover the Amateur Radio Emergency Communications (AREC) course training offered by the American Radio Relay League (ARRL), which is open to anyone who wishes to improve their skills as an emergency communicator.

While I am a card-carrying member of the ARRL, I am not directly affiliated with the people who write and produce this series of courses. Having taken the Level I and Level II courses, I truly believe that I am much better prepared to offer my services as an emergency communicator than I was prior to my exposure to these two courses. I highly recommend them to anyone interested in this aspect of the radio hobby. The cost per course is minimal ($45 for ARRL members) which is *reimbursed* upon successful completion of each course. It's a great deal, and you will greatly improve your emergency communications skills and knowledge as a result.

The ARRL's AREC courses are a direct result of the terrorist activities of 9/11. It became obvious to the public service folks at the League that a series of courses had to be designed and offered as "distance learning" tools for radio hobby personnel desiring to become better skilled in emergency communications.

AREC Course Level I

The first course (001) is geared toward a beginner in emergency communications. Essentially this course is designed to take someone who is unfamiliar with the concepts involved in disaster relief communications and bring their knowledge and skills up to a point where they are an asset to their local ARES, REACT, ACS (Auxiliary Communications Service), SKYWARN, and SATERN (Salvation Army Team Emergency Radio Network) group. This course is not intended to promote any specific emergency communications group over another.

The ARES concept (sponsored by the ARRL), however, is the oldest and has the longest history of providing emergency communications in the public service. It is also the largest group of dedicated communicators and is found in almost every sector of America. Therefore, the majority of the course book is geared to the ARES organizational structure and the duties and responsibilities of its members. This is *not* to say that other emergency communications groups are inferior to ARES. They are not.

Obviously if you are not a licensed amateur radio operator, you cannot join an ARES group and participate as an active emergency communicator. However, groups like REACT (which is primarily geared for the CB radio operator and GMRS/FRS operator) are open to anyone who wants to become active in emergency communications.

Pennsylvania State Trooper Ron Zukosky is shown standing next to the buried fox transmitter. His right hand is resting on the antenna that is hidden in a tree. Note the coax snaking down the tree to the ground.

The ARRL's AREC courses are designed to provide the tools necessary to respond appropriately in any given area of emergency communications. For instance, what may work well fighting brush fires in California may not work when dealing with flooding in the Midwest. The course provides flexibility when dealing with disaster communications and is therefore suitable, with modification, to any emergency communications group anywhere in the United States, Canada, or elsewhere. Obviously local operating protocol and training always takes precedence. Therefore, it is imperative that if you become involved with a local emergency communications group, whether it's ARES, REACT, or another, your training will be geared toward their

specific areas of interest in support of the agency or agencies they serve.

The objective of the AREC Course Level I, Introduction to Amateur Radio Emergency Communications, is to provide a baseline level of knowledge and skill in Amateur Radio Emergency Communications for anyone wishing to assist their local emergency communications organizations. This is the first of the ARRL courses in Amateur Radio Emergency Communications. Regardless of prior experience and knowledge, this course is designed to prepare volunteers for participation with their local emergency communications organization.

All ARRL AREC courses are intended for use in conjunction with local protocol and training already available. These courses have been developed using material from all over our great country. These courses are a method for raising emergency communications awareness regardless of geographic location.

The course is aimed at volunteer amateur radio operators who wish to be more involved with emergency communications at an introductory level. (*NOTE: Although this wording is directed toward ham radio operators, remember if you are a REACT, GMRS, FRS, or CB radio operator, by taking this course you can gain a ton of useful knowledge which will greatly improve your skills. In other words, these courses are not for hams only.*) About the only prerequisite is a desire to raise personal skill levels and gain additional knowledge of amateur radio emergency communications, although an HF license and HF equipment are highly recommended.

AREC Level I consists of 20 learning units that start with an introduction to emergency communications and progress through amateurs as professional communicators, the served agency, basic communications skills and message handling, the incident command system emergency equipment selection, emergency activation and deployment, operations and logistics, personal safety/survival/health, and alternate communications systems and methods, ending with other learning opportunities. In short, it is a very basic introduction to emergency communications and how you, as the emergency communications volunteer, fit into the overall scheme of things. One thing that is stressed throughout the course is the professionalism that the volunteer communicator needs to put forth when working with other professionals within the disaster relief system. Teamwork, teamwork, teamwork—it's all about teamwork.

Each learning unit has an "activities" section where the student must submit specific written assignments to his/her mentor, who is assigned at the beginning of the course. Your mentor is your guide and is specially trained to provide help should you encounter difficulties. You must submit all your activities assignments to your mentor and take all the end-of-unit tests (normally about five questions per learning unit) in order to progress to the final examination.

The final exam tests your retention of the ideas you should have learned in the course and must be completed and passed in order to receive credit for taking the course. Upon successful completion (within the eight-week time limit) your initial $45 (if you're an ARRL member) course fee will be reimbursed.

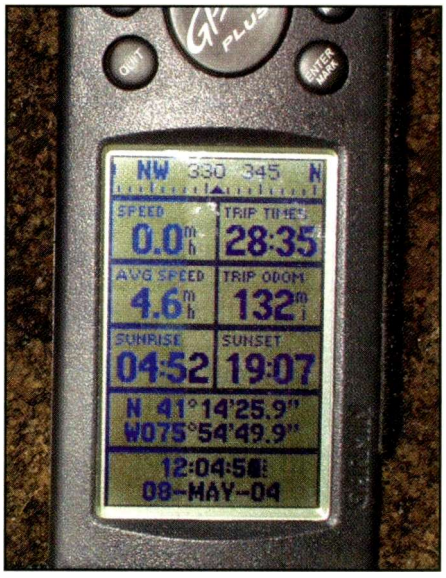
If you are new to emergency communications or just want to improve your operating skills and overall knowledge of emergency communications this is the course for you. Even if you're not a licensed ham operator, you can join the ARRL. In fact, becoming an ARRL member is a very good idea. These are the folks who protect our frequencies.

As an aside: the ARRL is the "lead dog" in the fight against Broadband over Power Line (BPL). BPL is an ogre that has the capability to totally disrupt our frequencies between 2 MHz and 80 MHz. (So far the ARRL is the *only* group that sees that "the king has no clothes," and it has been severely criticized by everyone from the engineers at the FCC to the *Wall Street Journal* for daring to stand up to the fallacies and distortions of the marketing geniuses promoting BPL as the next big leap in Internet access. For this and nothing else, you should join the League.

AREC Course Level II

The second emergency communications course offered by the ARRL starts off where Level I ends. It is specifically targeted for those emergency communicators who want to assume a more active role in disaster relief communications by becoming a net control station (NCS).

The Level II course consists of 19 learning units and is undertaken in the same manner, meaning you have unit activities that must be submitted to your mentor. In addition you must complete each five-question test at the end of each learning unit. All this must be done before taking the final exam for credit for the course. As with the Level I course, your $45 registration fee will be refunded upon successful completion of Level II.



This is a shot of the GPS unit that is sitting right next to the hidden fox transmitter. Note the coordinates.

The aim of the Level II course is to concentrate on the infrastructure of ARES and the duties of the NCS. This course covers working with volunteers, how to run a successful net, being a liaison with Public Safety Officials, the Official Emergency Station (an ARRL field appointment), training others, the annual Simulated Emergency Test (SET) along with the ARRL Field Day, addressing the needs of a served agency, SKYWARN, personal preparedness for emergency responders, handling hazardous materials, hospital emergency communications, etc.

This course is comprehensive and is designed to take the average emergency communicator (with Level I training) to the next level of participation. While not everyone needs to be trained as an NCS, this course ties together many areas of emergency communications so the student has a much broader knowledge base with which to function in times of disaster. Believe me, it's well worth the price of admission. You can't have enough training. Remember the quote from my Special Forces buddy from last month? "What you do in training you'll do in combat." Nuff said.

Now Onto The Foxhunt

Our sister publication, *CQ Amateur Radio,* sponsored a national foxhunt weekend on May 8/9, 2004. The object was to have hams throughout the coun-

try to engage in local foxhunts to improve their abilities in radio direction finding (RDF). A foxhunt involves hiding a low-power (normally) VHF transmitter in a remote location and having a group of hams try to find it in the fastest possible time.

Our local Murgas Amateur Radio Club (in Wilkes-Barre, Pennsylvania) got together recently for one such hunt. Pennsylvania State Trooper Ron Zukosky, N3VTH, and Joe Betz, KF3DI, were the coordinators. Promptly at 1300 EST the "fox" was turned on and the hunt was on!

On the surface it would seem rather academic that all a foxhunter would have to do is to take two or three RDF bearings from several disbersed distant locations, draw intersecting lines on a map of the area and drive (or run or walk) to the area where the lines intersect and locate the hidden transmitter. Good plan, unless you have "The Wife & Aunt Betty handicap." That would be me.

Bob Nygren, N3RN, is taking an RDF bearing about 50 feet from the fox transmitter/antenna. Bob was the first to find it. Congrats, N3RN!

About 1245 EST my wife, Tricia, who was driving our van, pulled into the parking lot near a crafts shop where she "needed to run in for a second." I assembled the three-element Yagi, and promptly at 1300 EST, took a cut on the fox transmitter. Ron used the 2-meter simplex frequency of 146.550 MHz on the fox transmitter. From my location in northeast Wilkes-Barre, it looked to be somewhere to the southwest. I figured Kirby Park, as it was big, open, and public. What better place to hide a transmitter? As it turned out I was not quite right, but I was in the general vicinity.

After 25 minutes I had to go into the store and "rescue" my wife. We headed out of the parking lot and then Aunt Betty had to go to the bathroom. One thing you definitely *do not* do is ignore Aunt Betty when she has to go. Nope...did it once and will never do that again! Trust me. When she has to go, she has to go. Post haste.

Pit stop taken care of, we headed back out. Then Tricia noticed that we were almost out of gas! Now the hunt was on to find a gas station, one that was charging under $2 per gallon. More time spent. Then Aunt Betty and Tricia *both* had to go to the bathroom! Sigh, this is what it's like to be me!

FINALLY we got back on the road and started some serious direction-finding. After several cuts on the fox near the Luzerne County Court House and Kirby Park it became apparent that the fox was located farther west than originally thought. We drove through my neighborhood and my S-meter on the 2-meter HT was bounding around from one-half to full scale! We were getting close! Tooling around Meyers High School, the S-meter went berserk! I exited the van near the baseball fields behind the school and proceeded on foot using my RadioShack HT-420 HT, a homemade attenuator, and a rubber duck antenna.

It wasn't long until I was very close to the fox. I could not dial in enough attenuation to bring the S-meter down from full scale. Then out came the Alan Broadband "Zap Checker," which is a fine little piece of gear used for locating hidden RF sources. In the linear mode it's very sensitive, much too sensitive to allow me to accurately pinpoint the fox. Switching to the logarithmic mode, I managed to get within a couple of feet of the fox and I still couldn't see it!

George Ganus, WB3FKQ, came to my rescue and handed me his ancient Yaesu dualband HT that he had tuned in the third harmonic of the fox frequency (146.55 X 3 = 439.650 MHz). The idea of using the third harmonic is that this offers about 90 to 100 dB of attenuation beyond whatever the external attenuator will yield. In other words, you can really reduce the input signal by tuning your receiver to the third harmonic.

I finally spotted the short rubber duck antenna taped to a tree limb not more than three feet from where I trudged up the hill to the railroad tracks above the ball fields. Even with "The Wife and Aunt Betty Handicap" I was not the *last* person to find the fox.

Foxhunting—The Serious Side

Okay, why write about a foxhunt in the "HOMSEC" column? Very simply, after the events of 9/11, we have given the terrorists a blueprint of how to disrupt our public service communications. These terrorist groups are *not* stupid. They listen, watch, and learn. They will not hesitate to use any means necessary to fulfill their goals of terrorism. In warfare—and this *is* a war—if the enemy can disrupt or interfere with vital communications links they have an edge. It's our job to ensure that we don't give them that edge.

It has been well documented that the cellular infrastructure in and around New York, Washington, D.C., and western Pennsylvania disintegrated in a matter of minutes on 9/11. It was also well documented that the trunked radio systems used by NYPD and FDNY and other EMS groups were not up to the task of providing needed communications in times of chaos. Also, if you were paying attention, you know about the interference to these systems in New York due to NEXTEL radio systems.

That leaves us, the volunteer communicators of ARES, REACT, etc. to pull yeoman duties and provide the necessary

Mike Naven, N3FJA, finds the prize. Note the homebrew loop RDF antenna made from 34.5 inches of RG-8 coax. This is a great antenna for RDFing and costs next to nothing to produce.

emergency back up communications that are needed in such times. If the terrorists can effectively disrupt our VHF/UHF voice and data communications, the disaster relief efforts will be severely hampered.

Being able to RDF and quickly locate and isolate an offending transmitter is a pretty handy skill. Foxhunts offer the emergency communicator the opportunity to hone these skills.

Foxhunting Gear

What does the average emergency communications volunteer need to participate in a foxhunt? A VHF/UHF receiver (or dual-band ham HT) with an S-meter is mandatory. The receiver (it can be nothing more than a handheld scanner) encased in a metal case is preferable. Simple RDF antennas can be quickly assembled from a 34.5-inch piece of RG-8 coax, a couple of connectors, and a non-metallic mast about three to four feet long. An attenuator, either homemade or commercially purchased, will drop the incoming signal from the antenna to allow the hunter to narrow the search perimeter and close in on the hidden transmitter. Using a rubber duck antenna attached to the attenuator and receiver will further facilitate a close approach to the fox. Let's not forget the trick of tuning to the third harmonic of the hidden transmitter. Notice that nothing listed so far is beyond the capabilities of the average ham or scannist.

While there are Doppler RDF units available, they cost upwards of $200 just for the antenna and electronics to detect the Doppler phase shift. These high-tech units are also troubled by multi-path signals, which will yield false headings on the RDF unit. Remember the KISS principle? Keep it simple and you'll do just fine in a foxhunt. As with anything else, practice makes perfect. There is a lot of information on the Internet about foxhunting, so get online and check things out for yourself.

If you have any experience in participating in foxhunts, don't hesitate to write or e-mail me (richard.arland@verizon.net) and I'll try to get your comments into this column. Remember, not only is foxhunting a fun aspect of the radio hobby, it also offers us a chance to hone needed RDF skills that might prove quite handy in the future.

News Flash! Pennsylvania's New 800-MHz Statewide Trunked Radio System

That's right, gang, I was privy to a letter sent by two state legislators in the Pennsylvania State House to the State Attorney General and the State Auditor General. It requested that a performance audit be conducted on the new trunked radio system, which has incurred gross cost overruns and is still not on line after three years of anticipation. I will present more information when available, but suffice it to say that the original figure I was quoted of $273 million spent is wrong. Cost figures provided by these two legislators show the cost to the taxpayers of Pennsylvania to be in excess of $400 million dollars and climbing!

A performance audit should shine some sunlight on exactly who is responsible for this great waste of taxpayer money. Additionally, the state of New York has contracted with M/A Com to install an OpenSky system for all of New York State! Doesn't anyone pay attention? More details as they become available. (For those of you not familiar with this, the OpenSky Wireless Private Network is the latest wireless technology application from M/A-COM, a division of Tyco Electronics. M/A-COM is a leading supplier of RF, microwave, and millimeter wave integrated circuits and IP Networks to the wireless telecommunications, and defense related industries.)

That's it for this month. Get out and play radio, find a fox and have some fun. In the mean time remember: Preparedness is ***NOT*** an optional. ■

on-the-go radio

around the block, around the world–personal radio keeps YOU in touch

by Alan Dixon, N3HOE / WPUC720 / KST8678

GMRS Expected To Be Authorized In Canada—By Next Month!

Unlike the FCC in the United States or OFCOM in the UK, Canada's Department of Industry, also known officially as Industry Canada (IC), has always been rather predictable. This is because, historically, IC has basically followed the policy actions of the U.S. FCC, typically lagging anywhere from a few weeks to a few years or so behind U.S. policy. While this practice makes for excellent harmonization of the RF bands between the two nations, I would hate to see IC mimic some of the more idiotic motions of the FCC, such as cutting the amateur radio allocations at 220 MHz and, of course, the BPL agenda.

Just a few years after the Family Radio Service (FRS) was opened in the United States during the mid-1990s, IC followed suit by authorizing the service in Canada in April of 2000 (*Canada Gazette* Notice DGTP-004-2000). Over the past several months now, IC has been considering authorizing the GMRS (General Mobile Radio Service) in Canada. What is unusual in this case is that in one form or another, GMRS has existed in the United States since the early 1950s. It has been known by its present name since the late 1970s, and substantial rules changes in both the late 1980s and the late 1990s served to expand interest in this excellent radio service.

But the real reason that Canada is deciding on GMRS so many years after its inception is likely not due to any U.S. regulatory changes or to any refinements in technology. IC concedes, in its "Spectrum Policy" document dealing with GMRS (SP-462/467MHz, March 2004; *Canada Gazette* Notice DGTP-001-04), that consumer-grade GMRS handheld radios are so readily available "elsewhere" in North America.

What IC proposes is a low-power, "license-exempt" GMRS service, utilizing the same discrete UHF frequencies as the United States does, though not necessarily the same duplex channelization plan. This is not to be confused with Canada's General Radio Service, which is IC's official name for 27-MHz CB radio. Canada is proposing to allow 5 watts maximum transmit power, with the intention of accommodating consumer hand-portable radio equipment.

Incumbent land-mobile licensees using the candidate GMRS frequencies are being given the option to be displaced to other frequencies, or to remain on their authorized frequencies on a secondary basis with no protection from interference. Critical operations licensees, including public safety users, are being advised to move off these frequencies. The GMRS Alliance, an industry consortium of GMRS distributors established by and operating under Electro-Federation Canada, is providing coordination for the displacement.

IC does seem to have some disturbingly strange concepts of how GMRS operates in the United States, though. They seem to believe that, except for repeater transmitters, it is a low-power service. And they seem to think that repeaters are used only on one frequency pair: the unofficial distress and traffic channel, the "675" pair at 462.675/467.675 MHz. Furthermore, they state their belief that the 16 repeater frequencies (8 paired channels) are relatively *new* to the United States! Also, IC *evidently* intends to permit both transmit and receive functions on the eight repeater input frequencies at 467 MHz in the United States. Bad idea!

Using repeater input frequencies for simplex is an especially bad idea considering that IC has stated that it will consider authorizing repeaters and higher-power GMRS transceivers sometime in the future. Only when incumbent land-mobile licensees have been "facilitated" in being displaced from the GMRS frequencies will this be considered, according to IC. It is entirely possible that, should the time comes, GMRS repeaters and possibly high-power GMRS transceivers may require licensing and frequency coordination.

"The big news at the moment however, is that Industry Canada is set to open up GMRS to 2-watt unlicensed handheld radio users* next month—*September, 2004."

Coming Soon...Real Soon

The big news at the moment however, is that Industry Canada is set to open up GMRS to 2-watt unlicensed handheld radio users *next month*—September, 2004. Final technical specifications are being written for certification and final rules are being considered as of this writing, but September remains the target date for the introduction of GMRS in Canada. Make sure not to operate at all on GMRS frequencies in Canada until it becomes certain that the service has been authorized. And see that your radios are IC-certified or otherwise appropriately grandfathered. Be sure to read this important IC document for yourself at http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/vwapj/sp462-467e.pdf/$FILE/sp462-467e.pdf. Then use related web links to keep up with GMRS scheduled implementation at http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/vwGeneratedInterE/sf08145e.html.

CB Club News!

The "Nashville Rebel," owner of the former Channel Masters CB Radio and Scanner Club, informs us that that group has mor-

phed into the White Squirrel CB Radio Club, headquartered in Olney, Illinois. Like the previous club, the White Squirrel Club exists as an Internet group forum, so its operations are not actually geographically restricted to any particular part of the continent. Our host, Nashville Rebel invites prospective members and former Channel Masters CB Club members to sign up for the club's e-mail membership message board, at YahooGroups. Set your browser to http://groups.yahoo.com/group/White_Squirrel6245o/ and sign up.

Nashville Rebel again validates the continued usefulness of CB radio, with operators linked to the Internet, as well as the commitment of the White Squirrel membership. As I had previously reported in the "On-The-Go" column, Nashville Rebel was once contacted by a woman who was seeking help in locating her husband, a truck driver out on the road. She was trying to get a message to him to let him know that his mother had suffered a severe heart attack, leaving the mother with only hours to live. The driver was expected to be somewhere in the Virginia area. Nashville Rebel then sent a message to all club members to attempt to locate the driver using his CB handle and name, along with the name of the trucking company. Many of the club members in and around that area of the country got on their CB radios and someone was able to contact the driver in Kentucky, only 13 minutes later! He made it home in time to kiss his dear mother goodbye, before God took her away.

Notice that this is a perfect example of using the Internet in conjunction with CB radio for both emergency and for professional business (trucking, in this case) messaging. Good show, Nashville Rebel! He asks us to please keep in mind this *touching* story of a highly successful example of CB service, and to please visit White Squirrel CB Radio Club website and join. As a CB Radio Service operator myself, I am proud to be among the many who assist this online club by broadcasting emergency requests, received by e-mail, on CB radio Channel 19.

See You Next Month

Let's meet right back here at "On-The-Go Radio" next month, when we will again take a close look at happenings in 11-meter CB radio, as well as the other Personal Radio Services. Write to me at wpuc720@juno.com. ■

by Steve Douglass, webbfeat@1s.net

utility communications digest

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

Mysterious Contrails At Area 51, And A Glowing Radio!

According to recent reports in the aviation press, new sightings of the mysterious "donuts on a rope" contrail have been coming in from Utah and Nevada. This time the craft, which has been dubbed the *Pulser*, was accompanied by a chase aircraft bearing a normal contrail.

As I've described in past issues of this column, the *Pulser* may be a high-speed military aircraft (manned or unmanned) employing a unique propulsion system known as a "pulse-detonation-wave-engine" that can propel an aircraft to very high speeds with a series of evenly timed bursts or mini-explosions.

At first thought to be flying out of the restricted White Sands Missile Range in New Mexico it now looks like operations have been moved to the secret test bases in Nevada, namely, Area 51—a.k.a. Groom Lake Test Flight Center.

Military monitors in the southwestern United States might be able to intercept communications involving the *Pulser* (although not the *Pulser* itself) by keeping an ear to VHF and UHF aviation communications. As usual, please report what you hear straight away to the e-mail address posted in the header of this column!

An Illuminating Idea!

Have you been to a garage sale or a swapmeet lately? Not only are they a great way to pick up some cool radio gear at bargain basement prices, you might even happen upon something quite innovative! Let me explain.

Recently I attended a small annual ham radio swapfest held in the city where I live. As I went from table to table, browsing the stacks of used equipment, radio accessories, and related gadgets, I came upon one of the coolest gizmos I had ever seen.

Mounted in a Plexiglas box so you could see the inner-workings, the receiver was aglow with all sorts of blinking lights, looking somewhat like a set piece from the movie *Tron*. Lit from inside, the salmon-colored circuit boards glowed orange. Mounted on the surface were many blinking super-bright LEDs, giving it the look of an electronic, working-thinking–functioning robotic brain, but in reality it was a very sophisticated HF receiver!

As I took a closer look at this fascinating receiver, which flies in the face of all corporate receiver designs (hide the innards inside a non-descript black box), the genius who designed and built and offers this amazing receiver made himself known. His name is David White, WN5Y, a teacher from Pampa, Texas, and his "Electroluminescent Receiver" is for sale in kit form via the Internet.

More than curious, I began quizzing David about his creation and especially about the look of the receiver. Were the lights just for show or did they serve a function?

"Indeed they do!" he answered, "Sure it looks cool, but the LEDs actually help diagnose problems with the receiver and give you clues about how the radio functions. If you've done something wrong during construction the LEDs simply won't work. In fact they function much like a built-in oscilloscope."

David White's "Electroluminescent Receiver" kit in all its glowing glory. This cool receiver may be the perfect project for getting your kids interested in radio technology, and it's also one of the best receivers you'll ever own. (Photo courtesy David White, WN5Y)

As David proceeded to tell me about the technical specifications of the receiver I must confess I became a bit lost. I know a thing or two about radio technology and have sometimes even been able to repair my own radios, but what this man knew about radio technology made me feel like a neophyte and was quite beyond me. It was clear to me that David had forgotten more about radio technology than I'll ever know, which is embarrassing because the radio kit is designed to teach radio theory to kids even though it is also a state-of-the-art DX machine.

Having said that, I'll try not to further display my lack of technical knowledge by attempting to explain just how the receiver works. But I will tell you that the receiver is a dual-dual conversion, dual-dual-image superhet device that covers the 40-, 30-, 20-, and 17-meter amateur radio bands and, with minor modifications, SWL bands can also be received.

For a detailed look at the receiver and information on how to order your own, check out David's website at http://www.pan-tex.net/usr/r/receivers/elrintroduction.htm.

What makes the receiver unique is its use of standard LEDs and infrared (IR) LEDs that not only give the receiver its unique look but also serve as essential components of construction and diagnostic indicators. More important, they also work like curiosity-inducing magnets that kids can't resist. On seeing this blinking, flashing, illuminated piece of radio hardware, kids are mysteriously drawn to it like moths to a flame.

Ham Radio Book & CD Special !

Ham Radio Magazine Anthologies

Introducing the first four of a new series of anthologies drawn from the pages of *Ham Radio* magazine. Now you can enjoy collections of the best material published in *Ham Radio* magazine, conveniently arranged by subject and by original publication date. Choose your interest, your time period, and choose your Anthology.

1

Homebrewing Techniques - This anthology brings together the most useful and practical advice and techniques for the person who wants to build anything from small solid state projects to beam antennas. **Order No. AHOME $19.95**

2

Test Equipment & Repair Techniques - From building test gear to trouble shooting the rig, this anthology of the best articles on the subject has been carefully selected to meet today's needs. Includes techniques and devices that work and are easily duplicated, and gives today's Hams a much-needed helping hand at solving equipment problems on their own. **Order No. ATEST $19.95**

Ham Radio Anthology: Antennas - 3

Carefully selected, these first two antenna anthologies cover all types of antenna designs and theory from 160 meters through microwaves. All articles have been selected to be as timely and valuable to today's Ham as they were to *Ham Radio* readers of the time. These first two volumes will be followed by two additional volumes.

Antennas - 1968-1972.....Order No. ANT1 $19.95

Antennas - 1973-1975.....Order No. ANT2 $19.95

Get all 4 Anthologies for only **$75.00**

Save $$ and get free shipping & handling!

That's right, only $75 for all 4 books and FREE shipping & handling!

All 4 Anthologies.....Order No. 4ANTS $75.00

Ham Radio Magazine on CDs

5

Enjoy quick and easy access to every issue of this popular magazine, broken down by years! Three sets, each containing 4 CDs.

1968-1976 Order No. HRCD1 **$59.95**
1977-1983 Order No. HRCD2 **$59.95**
1984-1990 Order No. HRCD3 **$59.95**

Buy All 3 Sets— you'll save $29.90 and get a FREE Calendar and shipping too!

Order No. HRCD Set **$149.95**

6

Get it all and Save over 20% All 4 Anthologies and all 3 Sets of HR CDs for only $175 - Save $49.95 Plus a FREE 2004/05 Calendar !

FREE Calendar
with every $100 purchase!

Amateur Radio Calendar - This 15 month calendar (January 2004 through March 2005) brings you 15 spectacular images of some of the biggest, most photogenic shacks, antennas, scenics and personalities in our hobby!

$8.95 value - FREE with $100 purchase!

Get all 6 for only **$175.00**

All 4 Anthologies	*$ 75.00*
All 3 sets of HR on CD	*~~149.95~~*
If purchased separately	*~~$224.95~~*

Plus a FREE 2004/05 Calendar and shipping!

Order No. HRSpecial $175.00

FREE 2004/05 Calendar with every $100 purchase!

Name _____ Callsign _____

Street Address _____

City _____ State _____ Zip _____

Qty	Item #	Description	Price	Total Price
			Shipping/Handling	
			Total	

Shipping and Handling: US and Possessions - Add $5.00 for the first book, $2.50 for the second, and $1 for each additional book. FREE SHIPPING ON ORDERS OVER $75.00 (merchandise only). Foreign - Calculated by order weight and destination and added to your credit card charge.

Method of payment ☐ Check ☐ Money Order ☐ Visa ☐ MasterCard ☐ Discover ☐ American Express

Credit Card No. _____ **Expiration date** _____

CQ Communications Inc., 25 Newbridge Rd., Hicksville, NY 11801/516-681-2922; Fax 516-681-2926
Order Toll-Free 800-853-9797

Inventor David White stands next to his "Electroluminescent Receiver Kit" at a recent Ham swapmeet.

I've stated many times in this column how important it is for the health of this hobby to find unique ways to pry kids away from their video games and MTV and get them interested in radio. David's kit may be the perfect tool for achieving this goal.

David told me that when the receiver was introduced at the Greenville, Texas, Hamfest a ham operator's son spotted the receiver and made a beeline for it. The boy couldn't help himself from turning all the knobs and flicking the switches. This pleased the father to no end because he had been looking for a project to help promote his son's interested in radio technology. Other examples David cited included teachers who have bought the kit to build as a class project that encourages creative thinking and knowledge in electronics and, in particular, elementary electronic theory, soldering skills, radio electronics, RF theory, working with LEDs, and applications of IR devices.

So how easy is the kit to build? We'll let you know. Ham radio operator and good friend Ken Hansen, WB5QLI, purchased a kit and we'll be putting it together, *together*! We'll document the construction and feature it in an upcoming issue.

More Thinking Outside The Black Box

Reader Mike Baldwin of Hayward, California, writes with this cool idea:

I quite enjoy your articles, and I've got a good "outside the box" idea of my own. I've found a very slick way of sending my scanner and shortwave audio from my radio room to other parts of the house. RadioShack sells a nifty expandable two-station intercom system (catalog #43-3102, usually on sale for $49) that transmits signals via 900 MHz. This is fairly standard for an intercom system, *but* they already have a mono RCA input on them for auxiliary input.

The units then broadcast whatever source you choose to input to all the intercoms on the system, in between intercom conversations. A simple patch cord from one intercom to my radio headphone jack does the trick!

What makes these intercoms even slicker is that they can be powered via four AA batteries, and are no bigger than a walkman-type radio! With 200 feet of range, these are the ultimate in household portability!

My well-worn ICOM R-3 plugged into a variable-voltage auto DC cigarette plug adaptor allows continuous viewing of the programming screen while charging. Note the LCD readout shows 5.5 volts.

ICOM R-3 Power Fix

Stanley Dudley from Houston Texas writes with an interesting question:

I noticed in your excellent article "Into the Storm" that you use an ICOM R-3 as both a scanning receiver and a television monitor in your storm chase vehicle. I was wondering how you power it. Do you keep the CRT on at all times? I own one and when the receiver is charging I can't use the CRT to view television or the programming screen without it going scrambled! The manual says if you turn on the CRT while charging you could ruin it. I'd like to have the cool and handy programming screen on at all times but it drains the battery in no time, really limiting its use. What's your fix?

You are absolutely right, Stanley. With the provided ICOM charger, the voltage is too high and will burn out the CRT if the screen is turned on while charging. My fix was to buy an inexpensive cigarette lighter adaptor power supply that can be switched to supply lower voltage (6-volts) DC to the R-3. It is then safe to turn on the CRT and run it continuously without worrying about it scrambling or burning out.

The one I use is an Archer (RadioShack) DC auto adaptor (catalog #270-1562) and can be switched from 6 to 12 VDC. The auto adaptor also comes with a series of interchangeable plugs that fit the receptacle on the R-3. Just be sure you pick the right polarity or you could ruin your radio!

Readers' Logs

There aren't many loggings this month. UTE monitors must be out enjoying the summer weather, but what you do report is choice!

As always many thanks to our ever-faithful UTE monitors who dutifully submit their logs every month. Maybe you'd like to be one of them? Send us your loggings to the e-mail address located above the column title.

0000 (Frequency MHz): STATION, Anytown, USA, summary of traffic heard in MODE at 0000Z. (monitor/sometimes location)

2749: Canadian CG-Halifax w/marine WX broadcast at 0240Z. (DS2 WI)

3485: GANDER Radio with aviation WX bdcst monitored at 0320Z. (DS2 WI)

4790.0: KYAASF (Kentucky Army Aviation Support Facility, Frankfort KY): 0313 USB/ALE sounding. (RP)

5550: NEW YORK Radio wrking American 55 monitored at 0310Z. (DS2 WI)

5598: REACH 189 wrking NEW YORK Radio monitored at 0305Z. (DS2 WI)

5598: REACH 659 wrking NEW YORK Radio monitored at 0307Z. (DS2 WI)

5696: CG 1706 TXing safety of flight info to CAMSLANT Chesapeake at 1350Z (DS2 WI)

5696: CG 1706 RXing UHF freq to use on scene from CAMSLANT at 1359Z. (DS2 WI)

5696: CG 1502 TXing safety of flight info to CAMSLANT at 1407Z. (DS2 WI)

5696: DUBLIN 88 RXing WX rpt from what sounded like 511. Then DUBLIN 88 sent position rpt to 511 to relay to PANTHER at 0230Z. (DS2 WI)

5875.0: EAATS (Eastern Army Aviation Training Center, Muir AAF Ft. Indiantown Gap PA): 1436 USB/ALE sounding. (RP)

6911.5: EAATS (Eastern Army Aviation Training Site, Muir AAF Ft. Indiantown Gap PA): 1456 USB/ALE sounding. (RP)

7527.0:CG 24C (HH-60 # 6024, CGAS Clearwater): 0625 USB w/Panther (OPBAT, Nassau Bahamas-not heard) securing radio guard. (RP)

7630.0: RAM (Israeli Air Force, probably Ramat David Airbase): 0203 USB/ALE sounding. (RP)

7650.0: T1Z137 (1/137th Avn Regt, OHNG, Canton OH): 1408 USB/ALE sounding. (RP)

7778.5: CL1 (FBI, Cleveland, OH): 1627 USB/ALE TO CO1 (FBI, Columbia, SC). Also noted on 09183.5. (RP)

7851.0: AAR3FQ (Army MARS, Virginia-acting as NCS): 2017 LSB w/AAR3FI (Virginia); AAR3SJ (Virginia); AAM3RA/A (Virginia); and AAR3ZC (Maryland) w/chat on Regional Net. (RP)

8037.0: CPSNY (Cooperstown, NY, EOC): 2108 USB/ALE sounding. (RP)

8047.0: MMANGB (Nat'l Guard Bureau, Montgomery, AL): 1833 USB/ALE TO GUSNGB (Nat'l Guard Bureau, Grissom ARB, IN). (RP)

8912.0: CS1: 0131 USB/ALE TO I34 (BICE CESSNA 550 #N2734K) followed by Hammer (BICE AICC, March AFB CA) calling 34K in clear voice then a short encrypted exchange. (RP)

8912.0: CamsPac: 0139 USB w/J18 (HH-60J # 6018, CGAS Clearwater) who provides position as 2754N/8240W. (RP)

9007.0: Shadow 38 (MC-130 Kirtland AFB): 0615 USB w/Trenton Military-not heard) in pp w/Kirtland Metro w/WX for Albuquerque, NM. (RP)

9145.0: ANG SPRINGFIELD (Nat'l Guard Bureau, Springfield, OH): 1748 USB/ALE sounding. (RP)

9145.0: 38C (unidentified, probable U.S. Army): 0042USB/ALE TO 38A 34A (unidentified, probable U.S. Army). (RP)

9145.0: BARRAZA (Peruvian hospital net): 0004 USB/ALE TO CHOCOPE (Peruvian hospital net). (RP)

9906.0: PCRC5 (Regional Communications Command Post, Military Region 5, Venezuelan Army): 1201 USB/ALE TO CLC52 (Communications Logistics Center, 52nd Jungle Inf Bde). (RP)

10151.5: V17 (unidentified, probable U.S. Army): 1210 USB/ALE TO V1A (unidentified, probable U.S. Army). (RP)

10151.5: V3A (unidentified, probable U.S. Army): 0751 USB/ALE sounding. (RP)

10242.0: CG J37 (HH-60J # 6037, CGAS Cape Cod-ID as flight of two): 0140 USB calling CamsPac w/no response. (RP)

10024.0: Continental 1108: 0706 USB calling CENAMER Radio w/no response. (RP)

10024.0: Aero Mexico 011 (O/M SS): 0629 USB calling CENAMER w/no response. (RP)

11175: REACH 7046 RXing WX rpt for Iceland from HILDA Metro via LAJES at 0345Z. (DS2 WI)

11282: Navy RG426 wrking San Francisco Radio. (DS2 WI)

11232.0: Trenton Military: 0337 USB w/Sentry 06 (E-3B AWACS Tinker AFB) in pp w/Tinker Metro. (RP)

15094.0: KNY90 (unidentified SHARES station): 1726 USB/ALE sounding. (RP)

16144.5: SKYWAT (Skywatch, Army Flight Watch center, Soto Cano AB Honduras): 1840 USB/ALE sounding. (RP)

16144.5 228: (2/228th Avn Regt, Soto Cano AB Honduras): 1805 USB/ALE TO RUH956 (UH-60L). (RP)

16144.5: 228FWD (deployed element of 2/228th Avn regt, Soto Cano AB Honduras): 1800 USB/ALE TO SKYWAT (Skywatch, Army Flight Watch center, Soto Cano AB Honduras). (RP)

18480.0: OLZ69 (Czech Embassy, Cairo?): 1955 USB/ALE sounding. (RP)

This month's HF logs were contributed by Ron Perron (RP) and Dwight Simpson (DS2).

Above 30 MHz, Too!

There are still many of you who haven't realized that this column encompasses utility services above 30 MHz. This means you can send in your VHF and UHF MILCOM loggings! Don't be shy. If you don't want your name published in a national magazine, a nickname or handle will do. In today's hectic world, utility communications are not restricted to the HF bands; on many occasions you can hear the same stations on LF, HF, VHF, and UHF!

I also want to see your shack pictures and your unique engineering solutions to radio monitoring problems, such as your homebrew antennas, add-ons, and the like. This is your chance to get your words and pictures in print for others to learn from and enjoy. ■

Shannon's Broadcast Classics

a look back at radio & TV's golden years

by Shannon Huniwell
melodyfm@dreamscape.com

Broadcasting's Lost Value Of Variety

Drift back with me about three decades to a time before most folks had cable TV or an FM car radio. Then, average Americans —broadcasters included—had never heard of the Internet, cell phones, satellite radio, or a station without anybody in the local studio. Even so, anyone possessing a $5 AM transistor pocket portable was likely exposed to more programming variety than typical media consumers hear and see today.

That's because prior to the 1980's deregulation, the FCC, while never authorized to regulate content, suggested its licensees' provide the broadcast audience with varied entertainment programming, some news, general interest features, a bit of religious content, agricultural info (where pertinent), and coverage of local issues. This meant that whether tuned to a big city 50-kW "flamethrower," or dialed into the only station in some sparsely populated western county, one couldn't help but come in contact with a robust menu of topics and ideas on subjects ranging from international events to what new books had been added to the hometown library.

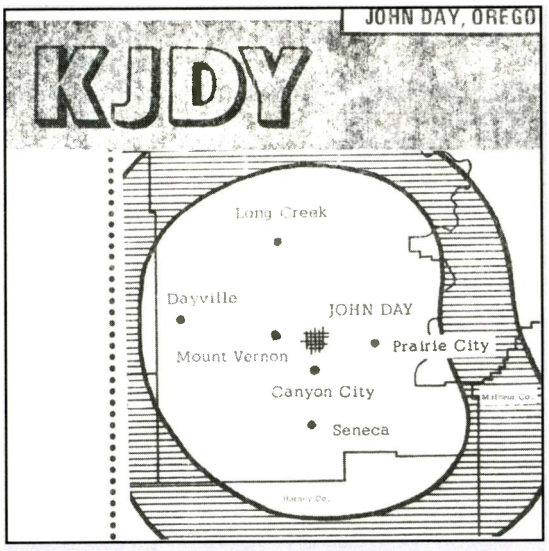
This month's column takes on that spirit of variety and dusts off a shelf of broadcasting's past. Admittedly we'll go a mile wide but only an inch deep. No matter, I'm hoping you agree that our brief look at nearly forgotten things like "fake first" FCC radio license schools and Idaho's "authentic" pioneer commercial TV station will provide us with a broader basic knowledge of our electronic communication heritage.

The Magic Filing Cabinet Says We'll Begin Our Adventure In John Day, Oregon

Have I ever mentioned my motivation behind a good number of "Shannon's Broadcast Classics"? It's a well-worn, four-drawer oak file cabinet rescued from the "no offer refused" pile of our county's Red Cross fundraising tag sale. After being refinished within an inch of its most attractive coffee ring stain, the heavy old piece became home to an informal collection of radio and television literature. Come to think of it, maybe "literature" is too fancy a word for the dog-eared group of station brochures, coverage maps, advertising matchbook covers, clippings, music surveys, transmitter site snapshots, and other sundry AM-FM-TV memorabilia.

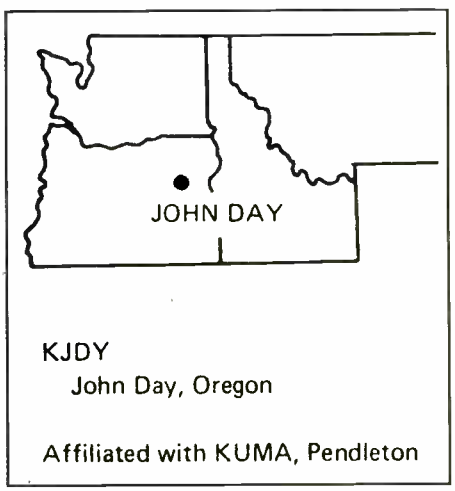
Anyway, my *Pop'Comm* contributions often get under way a few minutes following a reach into one of the cabinet's files. Truth be told, some of my favorite editions result from a "grab bag" of several documents, such as the most recent foray that included an obscure photocopied letter with no address on the envelope (I've got no idea where it came from!) offering John Day, Oregon's KJDY for sale.

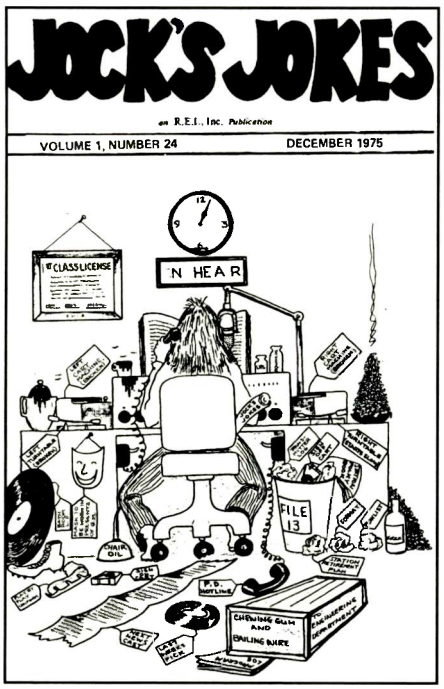
According to the circa-1983 correspondence, "KDJY was constructed in 1963 and been under the same ownership since that time. It was the only station in Grant County—located in the middle of east central Oregon. The county had a population of 8,000. John Day at that time had 2,000, and Canyon City



A good way to make a small market broadcast coverage contour seem big is to ignore everything outside of the little station's influence. Note that KDJY's city of license, John Day, is in all upper case lettering.

Here, John Day, Oregon, is the only place on a map depicting four Western states! Not even Pendleton, the home of KDJY's sister station, KUMA, earned a spot on this image.





REI not only infiltrated many a radio station with its joke booklet for DJs, but the broadcast school often offered posters of the cartoon comic-style Jock Joke's covers, just right for an on air studio wall.

which is contiguous had about 800 residents." A couple of other towns about 10 miles away added up to another 1,800 folks in the KDJY listening area. The letter proudly identified "John Day as the central banking and shopping center for the county," and noted that "KDJY covers the entire county in the daytime."

The 1000-watter on 1400 kHz signed on at six in the morning and, on an FCC-designated "specified hours" basis, went off at seven each evening, though sporting or other community events saw it staying awake a bit later. The station official indicated that KDJY studios/offices occupied 800 feet of "compact and clean" space from the Grant County Fair Association some four blocks from downtown. Monthly rental was a modest $25. Equipment included in the deal was as follows:

- Collins 20V-2 (1000-watt) AM transmitter
- Tower
- IGM 500 automation system
- Gates control board
- Gates turntables
- Several tape cartridge machines
- Several tape recorders
- Satellite dish and receivers to catch UPI News audio and UPI teletype
- 7.5-kVA emergency generator

Reportedly, that generator got many workouts when "street" power was disrupted. It enabled KDJY to be a true service to its coverage area which, according to the literature, was "isolated as far as outside radio penetration is concerned, with the closest stations being in Burns, Ontario, Bend, and Pendleton—all 80 miles or more away. Besides a weekly newspaper, KDJY in many ways served as the community's 'daily paper' with funeral notices, birth announcements, etc."

The little AM was being offered for sale because its husband-wife management team retired and the owners felt that a new couple was needed to re-cultivate a folksy "local owner-manager relationship to the community and that cost savings would result." Savings were anticipated by cutting expenditures for full health insurance benefits that had jumped significantly over previous years, and totaled over $7,000 for the facility's six employees. Even in 1983, health care costs were potential impediments to station profitability.

Anyway, during the previous 19 years, KDJY made money, in addition to serving its constituents with a mix of country and middle-of-the-road music, national news, and lots of local information. For example, the 1982 balance sheet showed revenues of $9,038 in national advertising, $109,892 from local ad sales, and $63 via miscellaneous means. Expenses, the largest being salaries/benefits, came to $109,442, allowing for a respectable little profit of $11,168.

Perhaps you'll agree that the most charming part of the KDJY prospectus was the owners' concern that their modest AM outlet not simply be sold to just anyone. A ready buyer with the requisite $150,000 first needed to pass muster. "Interested parties," KDJY founders stated, "should submit a complete biographical summary—including their experience in radio and any other information they desire." If money were not the only factor in station ownership transactions today, might we still have significant numbers of truly locally owned/operated and authentically community responsive broadcast outlets in the KDJY tradition?

He's Not A Real Engineer—His FCC License Is Just A "Fake First"!

Another radio reality that evaporated in the 1980s was the FCC's series of commercial operator licenses. Prior to the '80s, it was unlikely that an aspiring DJ would be hired without one, even at the tiniest broadcast property. Typically, a "Third Phone" or third-class ticket was all that managers of non-directional AM and/or smaller FM facilities required.

The second-class license was a more technical authorization, but the "First Class Radiotelephone Operator License" proved golden at any broadcast venue, and mandatory at higher power and/or directional stations. That is to say, at least one person with an appropriate FCC "ticket" had to be present whenever the transmitter was on. An announcer who could be on the mic plus legally serve as official technical person running the broadcast gear was worth two employees.

Word spread through the once-perennial wannabee announcer realm that even someone who sounded like carton character Elmer Fudd would get snapped up for on-air adventure if possessing the coveted "First." Such a piece of paper in the disc jockey world was said to be a "passport to success in many fields of electronics and communications." One source promised, "key personnel are required by law to hold a first-class license. Good paying jobs are open in airlines, railroads, television, telephone, and radio for licensed personnel. Most of these jobs are interesting and stable with plenty of opportunity for advancement." Whoever wrote that copy about radio and TV gigs being "stable" and brimming with "advancement opportunity" probably never worked overnights at a Top-40 AM that was about to be sold and switched to some automated easy-listening format, but the "interesting job" part was accurate enough to prompt thousands of fledgling air-personalities to aspire for a first-class ticket.

The problem with any of the authorizations, especially the most challenging "First Phone," was that the person who wanted one had to get to an FCC field office and take a written test. For some, that meant traveling hundreds of miles *AND* studying electronic theory until that information could be successfully converted into a sufficient number of correct multiple-

choice answers on the exam form. For most young radio hopefuls, that seemed too much like school!

Five Weeks And *Bingo!*

To capitalize on the Commission's licensing requirements, the growing need for people educated in electronics, and the sizeable pool of future FCC test takers who just wanted to pass the darn thing and get a great DJ position, various technical institutions opened their doors. Disc jockey types of the 1960s and 1970s are most likely to remember Radio Engineering Incorporated (REI) Schools of Sarasota, Florida, and Fredericksburg, Virginia. REI was best known for guaranteeing that it could teach *anybody* techniques needed to obtain a first-class license. In fact, REI promised to train a person until he or she "passed the FCC exams."

Pop'Comm reader Johnny Edwards (who asked that I only use his air-name from the Midwesterner's former radio days) recalls attending REI. He liked the instructors, though says, "they sure had their work cut out for them!" That's because Edwards admits being "completely a-technical and having no aptitude or memory for electrical or mathematical facts" Apparently, he wasn't alone. According to Edwards,

> There were about three or four of us in our class who couldn't get anything to stick. One guy gave up and went home, though the teacher encouraged him to stay and waived further tuition costs. Another fellow and I kept going to class until by osmosis or brainwashing we crammed enough possible multiple-choice answers in our noodles to take the exam in Washington, D.C. After we sweated it out, we sat in a waiting room while they marked the tests. I barely passed, but felt like a million bucks when the examiner mumbled my name and grade.
>
> The weird part was that the other guy somehow scored 100 percent and was asked to accompany the examiner in the back room. He later told me the FCC employee directed him to trace a circuit on a radio chassis they had there. My classmate gave the G-man a nervous, sickeningly frightened look and just stood there with knocking knees. 'That's what I thought,' the official sneered, warned him that he shouldn't put his hands on or in anything electrical, and curtly dismissed the poor slob. The guy called me about a week later with news he'd just started working for some horribly directional New Jersey daytimer at the upper end of the dial.

As for Edwards, just like he expected now that the "First Phone" was in hand, he was almost immediately hired in his home state as a night time announcer/engineer at an AM also emitting a tricky directional antenna array. "We gotta have a jock with a first-class ticket because the regular engineers go home at six," the program director admitted. Edwards told the programmer his bailiwick was music, not meters, and hoped he'd never need to do any actual tech stuff.

He told us,

> I couldn't even fix the cord on a hairdryer, let alone something that produces radio waves. Sure enough, though, the Chief Engineer pops by the station after supper to meet me and matter-of-factly asks me to change the 4-400 tubes in the auxiliary RCA transmitter. I looked through the rectangular window in the transmitter cabinet and asked, 'By any chance might you mean those little round glass things with the big wire on top?' The CE smirked and walked back to his office chanting, 'Won-der-ful...Another hippie DJ with a fake first... a completely fake-o first!'

Edwards ends the saga by reporting that the next day the program director called him at home to say that the engineer didn't want him touching the equipment unless it was *already* sparking, smoking, or on fire. This former radio guy says he wouldn't trade his years in broadcasting for anything, and credits REI with giving him the "ticket" to that Nixon/Ford-era adventure. But Edwards shrugs that he still can't troubleshoot a hairdryer or even a blinking VCR.

At the beginning of his career, one now-veteran radio personality remembers hearing his disc jockey colleagues referring to an FCC first-class radio telephone ticket as "a license to print money." They meant that whoever snagged an FCC "First Phone" probably could get a broadcast job without much effort. This REI ad hints at the same assumption.

In 1976, cost for the five weeks of instruction was $540. Additionally, a dormitory room could be rented for $35 weekly. Those wanting educational experience regarding how to be a DJ were also invited to the Florida "campus" for a $640, six-week announcing course during which one could practice in REI's closed circuit radio station studio. Its output reached a single-track recorder so that graduates could leave with an audition tape.

The school advertised in a clever fashion. It disguised the modest REI course catalog as a 14-page humor magazine that measured about the size of a *TV Guide*. Every station received a copy of *Jock's Jokes*. As REI shrewdly figured, the little green/white bimonthly publication usually ended up in the hands of each station's most eager personality. With the booklet, one could go beyond the time, temperature, or name of record and artist.

Jock's Jokes was packed with corny zingers the likes of, "Here's a sign of our times—seen on top of a chicken barn: CHEEPERS BY THE DOZEN!" Or, "It's been said that life is pretty glum when you pass 50—especially if there's a patrol car behind you." Other—alleged—chuckles were, "I'm not saying that (insert name of another DJ at station) is poor, but he's been broke more times than a New Year's Resolution!" and "Well it may be said that that's the way the cookie crumbles on Wall Street, but in Hong Kong it's the way the egg rolls."

If you're hearing in your head someone punctuating with "Batta Bing, Batta Bing!" at the tail of each of those rather tame quips, you've got a sense of what *Jock's Jokes* sounded like in the hands of novice broadcasters. If the exit timing—or next programming element—was off by a second on any such "funny," the whole thing came across to the listener worse than if the DJ hadn't said anything at all.

Somewhere I've got a cassette tape of an inexperienced air personality who is trying very hard to be hilarious with what is probably a copy of *Jock's Jokes* in hand. You can hear the pages hitting the microphone as he finishes stumbling through a

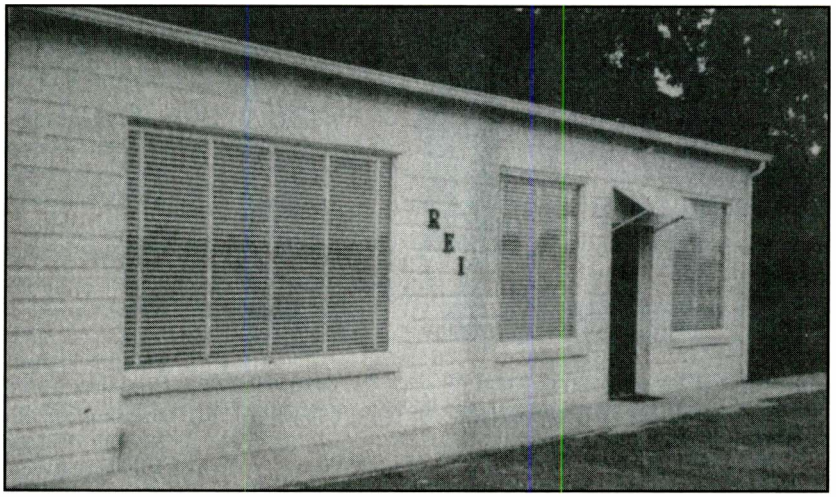
live commercial for some auto repair place, an out-of-nowhere mention of the "hot 89 degrees outside our studios right now," and then without any inflection or tone change reads, "They say bosses are odd. You oughta see the boss's house. He just added a wing to it. Now maybe he can fly south for the winter!"

Suddenly there's this pause and an awkward thinking-to-oneself whispery repeat of the last line. After several seconds of dead air, the cue-burned start of T-Rex's "Bang A Gong, Get It On" blasts away any doubt that the kid hadn't bothered to preview the material. At least he didn't get caught off guard and read over the air one of the many subliminal plugs ("Don't put off getting your First any longer. Why not enroll in the next REI class today?") placed strategically like hidden mines between the hundred or so actual jokes printed in each edition.

Something From *Broadcast Pro-File*

My Dad has been bugging me to fit in the history of a nice local Garden State AM that its faithful listeners reported suddenly vanished sometime during the last months of the 1980s. Unfortunately, the old file cabinet had nary a shred of documentation on WCRV 1580, but Jan Lowry's *Broadcast Pro-File* provides us with a glimpse of the life of this Washington, New Jersey, daytimer. The only WCRV anecdote I can offer came from a college classmate of my father's who went on to Princeton Seminary, became a Presbyterian minister, and nearly met his maker in a WCRV studio. More on that later.

Fans of small-scale radio should recognize the name Simon Geller. For years, he ran the one-man classical music FM operation (WVCA) at Gloucester, Massachusetts. Prior to that legendary venture, though, while living in Union City, New Jersey, in the early 1950s, Geller filed for an FCC construction permit (CP) to build a 250-watt daytime-only AM in Washington, New Jersey. In June 1955, he was granted the CP specifying non-directional operation on 1580 kHz. Geller liked the term "voice" in his call letters, so requested WCRV for his new Warren County's Radio Voice. From studios/offices in the First National Bank Building at 3 Belvidere Avenue and transmitter on Route 31 north of Washington, WCRV hit the air on the first day of July 1956. As he would



So maybe it didn't look like a campus at Harvard or Yale, but REI's educational facilities did the trick for many students hoping to learn how to pass the FCC's toughest exams.

throughout his storied New England FM career, Geller served as General Manager, Chief Engineer, Commercial Manager, and Program Director.

By the following September, however, he had enough of the routine and sold WCRV to the owners of WMTR about 30 miles east in Morristown. This group was granted a power increase so that WCRV could jump to 500 watts in the winter of 1958. Jan Lowry's research verifies "it operated daily from sunrise to sunset with a popular music format."

Sometime around the Geller/WMTR group transition, my dad's then-young pastor buddy was asked to broadcast a sermonette and prayer on WCRV. He was slated to do so once a month in rotation with three other local clergy. This broadcast tenure nearly ended before it began, though. An obviously on-edge announcer directed the minister to the guest mic, and instructed him to start the message as soon as the on-air light illuminated. Not more than five seconds into the scripture reading, the WCRV DJ jumped up and started using language not found in the Bible. Next, in a building crescendo of rage, the announcer ripped off his headphones, offered no blessing for WCRV's intermittent equipment, and then hurled the headset at the wall where it shattered and left a definite crater.

Luckily, the pastor was divinely led to duck just in time to escape the main projectile, but sustained a "rope burn" on the ear where the headphone cord had whipped by at an ungodly speed. A moment later, the on-air light miraculously clicked back on again, the meter on the transmitter remote control unit returned to attention, the DJ shrugged with embarrassment, and the forgiving minister, now rubbing his ear, calmly continued his reading from Proverbs 12:25: "*Anxiety in a man's heart weighs him down, but a good word makes him glad.*"

The story goes that the quick-tempered DJ was so impressed that the parson said absolutely nothing about the incident to WCRV management that he starting attending church!

Meanwhile, the station continued under the WMTR relationship until March 1966 when it was sold (for $105,800) to WCRV's news director and two business partners. Other changes occurred in 1969 with power doubling to 1 kW and in 1970 as the studios/offices were moved (presumably) to the transmitter site.

Rod Fritz's broadcast career included tenure at WCRV during this era. He has happy memories of the place beginning in 1971 when, he says,

> The studios were located in a converted house situated along Route 31 in Washington. Next door, was a mostly vacant lot where the tower stood. The general manager's office was on the second floor. The first floor had a reception area in what had probably been the former house's living room. The studios were on a lower level to the right of the reception area. The WCRV newsroom was originally the dining room, etc. There was a kitchen, which the staff used whenever they were kicked out of their own homes, or on very snowy nights.

Fritz laughs about one WCRV saga that is forever burned into his memory. It concerned the transmitter,

> ...which was located in the basement of the house. Right above the transmitter there was the bathroom. One day someone plugged up

the toilet. It overflowed, leaking water all over the floor and then through the floor into the basement and onto the transmitter, knocking the station off the air.

He speculates that the incident represents "the only time a station has been knocked off the air because of a toilet overflowing at one time or another."

Fritz proudly notes that "a great group of future broadcasters worked at WCRV. It gave lots of fledgling radio pros a chance to really learn their craft." And there was much opportunity to experience the broadcast industry's penchant for frequent change. The station's format shifted from pop to contemporary, and down tempo a bit to middle-of-the-road in 1974. Two years later, WCRV started airing modern country tunes. By the close of the 1970s, it signed up as an NBC affiliate.

A 1981 sale saw another programming change, this time to what was termed "Diversified/Top-40," which likely meant mostly current charting music, local information, and specialty shows. The new owners hired a consulting engineer to seek an FCC power increase. A grant to 2,500 watts daytime resulted, though this was conditioned on building a multi-tower directional array. No matter, the promise of higher wattage in its growing county sparked yet another ownership transfer, this time (1985) in a $650,000 deal to Star Broadcasting, Inc. The original WCRV calls were dumped in favor of WSRR (for StaRR) and the Adult Contemporary formatted "Star 158" slogan. NBC news was also dropped.

Interestingly, the station secured a CP for 500 watts nighttime operation, but activated neither the 2.5-kW day authorization nor the night power. Instead, WSRR remained with its old tower and 1-kW output. Apparently, the directional antenna system was either too costly to build or triggered fatal zoning issues. Perhaps it was the realization that attracting new AM daytime listeners in an increasingly FM environment presented a formidable challenge that caused Star Broadcasting to take WSRR "dark" in 1989. Then, the last of the outlet's long-faithful listeners and advertisers simply discovered the 1580 spot absent of anything listenable.

For eight years thereafter, Star kept the station license and unfulfilled CPs. In March 1997, however, the Commission asked Star to stop postponing the inevitable. At that point, remaining Star officials "returned the authorizations to the FCC for cancellation." At that point, it was a sad and probably completely unnoticed end to a once welcomed local radio voice.

Who Had Time To Notice KFXD-TV?

Finally in our broadcast history variety pack, here's the "don't blink or you'll miss it" account of Idaho's first commercial television station. Arguably, KFXD-TV takes prize for the shortest on-air tenure. It debuted and folded all in the span of a few weeks! Frank Aden, Jr., N7SOK, is this fascinating video outlet's "biographer," and he deserves to tell its story in his own words:

Even most broadcasters in Idaho have no knowledge of the state's pioneer, albeit very short-lived, TV station. Most believe KTVB (KIDO-TV) to have been the first Idaho television property. Each year on KTVB's anniversary they usually claim they are Idaho's oldest TV station and at times have incorrectly stated they were the first. Idaho's first TV station could be identified as an experimental video outlet that Idaho State University ran from September to December 1941 on 144 MHz with 15 to 20 watts. KIDO radio in Boise had considered starting a TV station in 1941 but the outbreak of World War II made it impossible to get parts or even enough technical people for the project.

In 1948 the FCC froze new TV station applications due to an obvious shortage of channels and a need for reallocation. The freeze was lifted in 1952 and the rush to be first in TV in Idaho immediately began. KIDO received the state's first commercial television CP on December 23, 1952, for Channel 7 at Boise. This was followed by KGEM with Channel 9, KDSH radio's KBOI-TV got Channel 2 at Meridian (transferred to Boise in January, 1955), and KFXD Nampa was granted a TV CP for Channel 6. The only other station to receive a CP in the state in 1953 was KID in Idaho Falls, which put Idaho's fourth station, KID-TV Channel 3 (now KIDK) on the air in December.

By spring 1953, KGEM announced they would not be able to get on the air until early 1954, but because of financial issues, the station never came on and was deleted in October 1954. Meanwhile, KDSH also reported they would not be on until fall (Thanksgiving 1953 was their first regular broadcast day). This left the race for premier Idaho commercial TV broadcaster between KIDO and KFXD.

According to newspapers reports of the time, KIDO appeared to be clearly ahead of KFXD's TV timetable as KIDO announced in spring they would be on the air in July. Local appliance stores that were trying to convince the public to buy the new TV sets ran ads stating "only x-number of weeks to TV!" Most knew that KFXD was also planning a 1953 debut, but were taken by surprise on June 14 or 15 when KFXD officials announced they would start telecasting on the June 18.

KFXD had obtained a prototype Gates transmitter during the spring of 1953 and was busy building homebrew equipment that it could not obtain commercially. When the KFXD-TV announcement came, KIDO officials stated they were still targeting a July launch and would not sign-on until they could provide a full service operation. The majority of KIDO-TV's equipment was commercially produced and they had network contracts with all four TV networks: NBC, CBS, ABC, and Dumont. KFXD-TV had not been able to secure any such network agreement.

The KFXD-TV transmitter site was near Deer Point where the Boise area's present TV/FM antenna farm is. The transmitter and related gear was taken up to the mountain in a trailer. Reportedly, electrical power was supplied by a generator. Connection to the studio site at KFXD radio (south of Meridian) was made by phone line. A short article from June 19, 1953, in the *Idaho Statesman*, indicates KFXD-TV's inaugural transmission (making it Idaho's first commercial TV broadcaster) began at 1:10 p.m. the day before and consisted of two different test patterns aired for about five hours.

Gilbert Rose, Jr., the son of KFXD-TV's chief engineer, remembers that the ephemeral television station had no tower. "Instead, right in front of the transmitter building, the owner built a redwood panel (or fence about six feet tall and 18 feet wide) on which was mounted a rather complex series of maybe four fairly thick copper tubes pointed at the Boise Valley." Despite this homebrew unconventional antenna system, reception was reported to be good in Boise and Nampa and even as far as away as Weiser some 55 miles distant.

This information is contrary to what was later recalled by KTVB and KBOI-TV officials, who said KFXD-TV was only using about 500 watts and barely showed up in its city of license. One would expect, however, that the newspaper, naturally considering advertiser-supported television as the enemy, would gladly say the reception was lousy if in fact it was. Instead, the press used its "spin power" to point

Very little graphic documentation about Idaho's first commercial television remains. Some of the only surviving pictures related to KFXD-TV are appliance store advertising found in library microfilms of period newspapers. Both of these June 1953 ads acknowledge KFXD-TV as a pioneer telecaster. Shoppers were invited to visit the stores for a peek at the short-lived station's test pattern.

out that the KFXD-TV test pattern presentation was pretty dull stuff.

FCC records show the pioneer TV operation was authorized for 12.95 kW effective radiated power (ERP), but nobody is now sure what the first day's ERP equaled. It's plausible that, much like some clever homemade ham gear, the scratch-built KFXD-TV antenna was designed for incredibly high gain that souped-up the output of that prototype Gates television transmitter. The newspaper article also reported that the transmitter was located at a 7,500-foot spot on Shafer Butte (north of the 7,100-foot Deer Point). This makes sense as telephone lines and power would have been more accessible there.

The Nampa paper, the *Idaho Press Tribune*, reported at the time that the transmitter was on Deer Point at the 6,500-foot level. This could not have been Deer Point, but what is known as Lower Deer Point, 500 feet below Deer Point. Power would have also been available as the power line to Bogus Basin passes through there. A few years ago, Bill Frahm, Chief Engineer for KBOI radio and Frank Aden checked this location out and found a concrete platform there. Lower Deer Point has been used as a transmitter site for several local utility services for many years.

The Statesman article mentioned reception reports by several viewers in the valley but, rather than detailing signal strength, simply stated the small audience's disappointment of only being presented with a test pattern as opposed to regular programming.

After 10 days of running test patterns, KFXD-TV finally began regular programming on June 29. The primitive program schedule was a mishmash of filmed fare barely able to compete with radio or a good novel. It's identified as follows: 1:00 p.m., test pattern, off at 5:00 p.m. and back on at 6:00 p.m., 6:01 p.m. "Skyway to Mexico," 6:20 p.m. "San Diego Zoo," 6:30 p.m. "Twelve Million Brothers," 6:50 p.m. "Operation Bootstrap," 7:00 p.m. "Williamsburg Restored," 7:30 p.m. "How to Drive in the City," 7:55 p.m. "The Christopher's series," 8:00 p.m. Test Pattern, and finally a 9:00 p.m. sign off.

Two weeks later, on July 13, KIDO-TV signed on the air with conventional programming cherry picked from the four national networks. Its transmitter was located on a rim just above town (but moved to Deer Point in 1956). Power was 53,000 watts. The *Idaho Statesman* ran a feature article on KIDO-TV, which was touted with several pages of pictures. From this burst of publicity and the positive buzz around Boise/Nampa area about KIDO-TV's decent reception and enjoyable shows, it was clear to KFXD-TV management that their video outlet needed significant improvements. Instead of investing in popular programming, on August 12 the station signed off the air—forever. KFXD-TV had not even lasted two months.

The *Idaho Statesman* quoted KFXD manager Edward Hurt as saying the station had left the air and that it probably would not return, at least for several months. No concrete explanation was given. Again, Gilbert Rose, Jr., provides us with the only remaining insight in the matter. He remembers that Hurt absolutely hated to "take on much in the way of debt," so had little desire to plow money into KFXD-TV, especially with no major television network association to provide a source of quality programming. Hurt was accustomed to the fiscal success of his KFXD radio, so the thought of a money pit television station quickly tested his patience. And word that even a dark KFXD-TV might be worth several hundred thousand dollars to the right party, likely played into his decision to pull the historic video facility's plug while he sought a buyer.

In early 1954, it was reported that KXFD-TV was sold to KGEM radio, which then dropped their CP for the yet unbuilt Channel 9. In television's early years, it was conventional wisdom that channels above six were inferior to those on the lower numbers. KGEM felt the Channel 6 frequency was a better bet for reaching the Boise market than was their original, Channel 9. On paper, the KGEM folks quickly changed KFXD-TV's callsign to KTVI-TV and claimed this new operation would take to the air with improved equipment. Oddly, nothing materialized in this incarnation of Channel 6, and the authorization was abandoned in October 1954.

It is unfortunate that there is so little known about KFXD-TV. Apparently the *Idaho Statesman* did not take any pictures of the station nor have any been found, except for two fuzzy shots by the *Idaho Press Tribune*. Again, the print medium felt a potential threat from video competition. As for what the KFXD-TV identification slides and test patterns looked like, we may never know. It's clearly a case of broadcast history being lost in thin air.

Do You Have A Story?

Many thanks to Frank Aden, N7SOK, for sharing the mysterious KFXD-TV's story. If you have any further details about this or any station we chronicle in "Shannon's Broadcast Classics," feel free to e-mail me at melodyfm@dreamscape.com. For now, let's hit the old sign-off announcement...*And so ends another day of broadcast history variety at* Pop'Comm. ■

plane sense

your link to global aviation communications monitoring

By Bill Hoefer, flacap388@hotmail.com

Flying: A Personal Observation, And A Trip To Germany!

Let's start with a profound statement: flying just hasn't been the same since September 11, 2001. The same is true with monitoring aviation. The military frequencies are far more active than before. AWACS aircraft are still patrolling our skies here in the good old U.S. of A. And pilots are more apt to get in trouble for thoughtless actions in the cockpit. Restrictions put on pilots have multiplied since the attacks.

Before 9/11 there were few "temporary flight restrictions," or TFRs. Most were common sense items, but now they abound. Every time I brief a VFR (visual flight rules) pilot in the Orlando area I am required to advise him or her of the TFR around Walt Disney World. Then there's the restriction of flying over the Kings Bay Nuclear Submarine Base north of Jacksonville. These are in *addition* to restrictions on flying over sports arenas, music concerts, space shuttle launches and recoveries (that is, when they resume), nuclear power plants, hydroelectric dams, political conventions, military bases, and, of course, any place the nation's President and Vice-President may be.

Frankfurt Airport is Germany's main airport hub.

I hadn't flown after the 2001 attacks since I returned from Alaska. All familiarization flights ("fam flights" as known by those in air traffic control) have been curtailed. One of the perks of being a controller was the privilege of riding in the cockpit in the "jump seat," usually in the far back of the cockpit. This allowed us to observe procedures and get a feel for how much pressure a cockpit crew was under while flying these multi-ton aluminum tubes. Many pilots encouraged us to fly with them, not just for familiarization, but also because an extra pair of eyes sometimes is crucial in spotting traffic that's been pointed out to the crew by controllers on the ground.

Those days are probably gone forever.

However, I just flew for the first time since returning from Alaska. And it wasn't a domestic flight. I flew internationally to Germany. The last time I was in der Fatherland was during my tenure in the U.S. Air Force there from 1977 to 1981. The Berlin Wall was still in existence the last time I was there. Few American restaurants existed. There was a Burger King and a McDonald's in Frankfurt and a Kentucky Fried Chicken in Kaiserslautern. And none in West Berlin.

Germany was still beautiful, but I didn't know about scanning and ham radio operations there. I know Germany is big in amateur radio, so I took my ICOM IC-V8 2-meter handheld along and found that not all the American ham radio 2-meter frequencies are available in Germany. While we use 144 to 148 MHz for our 2-meter ops, in Germany only 146 to 148 MHz is in use. The lower frequencies are used by the German Army, the Bundeswehr. But it was all rather moot; I heard nothing on 2 meters in the two weeks I was there.

So I tried using my RadioShack handheld scanner. I could hear only aircraft at high altitude talking to Frankfurt Center. I felt like I was experiencing Radio Free Europe—not the American-run radio station to the old East Bloc, but a Germany free of radio. Very bizarre.

I was savvy enough not to pack my two radios in my checked baggage, but placed them in my carry-on bag, hoping to use them at Frankfurt's Rhine-Main airport. I was questioned by the personnel at the US Airways desk, but when they saw my ham radio license and FAA ID, they left me alone. But I had to go through security (just like here) at the airport prior to going to my gate. I had figured that notifying US Airways personnel was all that was needed. I was wrong. Both radios were in my carry-on bag and went through the x-ray machine. Of course, in the modern post-9/11 mentality, the authorities choose to err, to use an overused word, on the side of safety.

I was pulled over by the German security personnel and asked to give them my radios for inspection. Not wanting to instigate an international incident I let them take the radios. But it was not to confiscate them, but to verify I had no explosive device in them. They placed both radios on a table in front of me and used something that looked like a small flashlight to inspect them. In the "head" of the light the agent slid a small gold-colored piece of screen. He waved this device over both

radios for a few seconds. Then he removed the gold-colored screen from this device and slid it in a large electronic box just a few feet away. After about four or five minutes the security agent turned to me, smiled and said to take my radios and enjoy my flight. I obeyed.

Another Toy, And Listening To Aviation Frequencies

After picking up just one more toy VW (I own close to 300 of them) at the airport I finally made it to the passenger waiting area for my flight. I was able to try just once more to see if I could hear something. Finally I hit the jackpot. I picked up nearly 35 aviation frequencies, which are listed to the right. Not bad for a handheld scanner with a rubber duckie antenna in a large metal encased building. After this I will be taking my scanner to any airport I go to. (I know, it's embarrassing to admit I hadn't in the past).

Before I list the frequencies from Rhine Main, however, let me first quote an audio taped incident from Munich, Germany:

A German pilot flying a Lufthansa Airbus requested push back from the ground controller, making the request in German.

The ground controller said, "Please make your request in English."

The indignant pilot stated, "I am a German, flying a German aircraft, in Germany. Why must I speak in English?"

Another controller picked up the ground mic and said in perfect Elizabethan English, "Because you lost the bloody war!"

I'll have listings from other airports in future issues. Enjoy! And thank you for flying with *Pop'Comm*!

RhineMain, Germany Air Frequencies

Computer Generated Weather	127.6/135.775
Approach ATIS	118.725
Local Control	119.9/124.85
Ground Control	121.7/121.85
Clearance Delivery	121.9
Approach/Departure	119.675/120.8/127.625/ 127.725/128.65/135.35/ 136.125
Frankfurt Center	120.925/124.475/124.725/ 125.05/125.675/127.05/ 127.5/132.075/132.775/ 133.275/133.65
Frankfurt FSS	124.425/126.625
Condor Operations (?)	131.475
Lufthansa Operations (?)	131.75
Miscellaneous Frequencies	127.975/131.45/ 132.15/136.7

NEW/CHANGED/DELETED FREQUENCIES

NEW

AK
Shishmaref Airport (SHH)
Nome FSS RCO 122.4

AR
Eureka Springs, Black Mountain Airport (18AR)
Unicom 122.8
Jacksonville, Little Rock AFB (LRF)
MLS Rwy 25 (M-JPK) 113.35
Sherrill, Smith's International (99A)
CTAF 122.9

CA
California City Municipal (L71)
AWOS-1 120.875
Edwards AF Aux North Base (9L2)
Joshua Apch 132.75/343.7
Northern California Tracon (NCT)
Cloverdale Municipal (O60)
Napa County Airport (APC)
Novato, Gnoss Field (DVO)
Petaluma Municipal (O69)
Sacramento (NCT)
Santa Rosa, Charles M. Schulz, Sonoma County Airport (STS)
Apch 124.325/288.3
Oakland ARTCC (ZOA)
Mount Tamalpais CA Low RCAG 124.325/288.3
Ramona Airport (RNM)
ATIS 132.025
San Francisco International Airport (SFO)
LDA 28R (I-FNP) 110.75

GA
Ashburn, Richter Airpark Airport (GD12)
CTAF 122.9
Sandersville, Kaolin Field (OKZ)
ASOS 120.575

IL
Taylorville Municipal (TAZ)
AWOS-3 Second Freq 123.875

IN
La Porte Municipal (PPO)
AWOS-3 110.825

KS
Fort Scott Municipal (FSK)
AWOS-3 124.425

ME
Naples, Brandy Pond Seaplane Base (5ME)
CTAF 122.9

MA
Boston, General Edward Lawrence Logan International Airport (BOS)
Apch 263.1
Boston Consolidated TRACON (A90)
Apch 382.0
Plymouth Municipal Airport (PYM)
Cape Apch 284.6

MI
Carsonville, Circle U Heliport (2F2)
CTAF 122.9

MN
Great Falls, Malmstrom AFHP (GFA)
Apch 128.6/259.1
Blade Ops 271.9
Comd Post 311.0/321.0
PMSV Metro 239.8
Red Wing (RGK)
Green Bay AFSS RCO 122.6

NE
Hebron Municipal (HJH)
AWOS-3 118.525

NJ
Millville (MIV)
Unicom 123.0/131.1

NY
Kingsbury, Mountain View Airport (14NK)
Unicom 122.725

NC
Kill Devil Hills, First Flight Airport (FFA)
AWOS-3 118.075

OH
Cleveland ARTCC, MI
Litchfield, MI (LFD)
High 277.4

PA
Harrisburg International Airport (MDT)
ANG Ops 395.1

PR
Cidra, Sabanera Heliport (PR53)
Unicom 122.975

RI
North Kingstown, Quonset State (OQU)
ANG Rhody Ops 383.3

SD
Martin Municipal Airport (9V6)
Unicom 123.0

TN
Memphis ARTCC (ZME)
McKellar TN Low RCAG 127.975
Pine Bluff AR High RCAG 125.475

Memphis International Apch (MEM)
Tunica Municipal MS (M97)
Apch 119.1/291.6

TX
Angleton, Bailes Airport (7R9)
Unicom 122.75
Chico, Spectre Airport (XA07)
Unicom 123.0
El Dorado Airport (27R)
Unicom 123.0
Giddings, Lee County (GYB)
AWOS-3 119.225
Hondo (HDO)
HDO VOR 109.4
New Gulf Airport (T17)
Unicom 122.8
Pecos Municipal (PEQ)
AWOS-3 118.175
Rock Springs, Edwards County (ECU)
AWOS-3 118.175
Seguin, Heber Airpark Civic Club LLC Airport (E70)
CTAF 122.9
Seminole, Gaines County (GNC)
AWOS-3 118.075

UT
Beaver Municipal (U52)
AWOS-3 119.925

VA
Staffor Regional Airport (RMN)
ILS/DME 33 (I-RMN) 108.75

WV
Buckhannon, Upshur County Regional Airport (W22)
Clarksburg Apch 121.15/269.375

WI
Ladysmith, Rusk County Airport
Green Bay AFSS GCO 121.725
Marshfield (MFI)
Green Bay AFSS GCO 121.725
New Richmond Municipal
Green Bay AFSS GCO 121.725
Osceola, L O Simenstad Municipal Airport
Green Bay AFSS GCO 121.725
Platteville (PVB)
Green Bay AFSS RCO 122.5

CHANGED

CA
El Centro NAF (NJK)
PMSV METRO was 344.6, now 348.3
San Nicolas Island NOLF (NSI)
LC was 374.8, now 379.3

CO
Aurora, Buckley AFB (BKF)
LC was 291.65, now 291.675
PMSV was 344.0, now 228.45

FL
Milton, Whiting Field NAS (NSE)
CD was 274.7, now 257.775

HI
Honolulu AFSS (HNL)
Hilo RCO was 272.7, now 233.7
Kaneohe Bay MCAF (NGF)
Apch was 263.6, now 263.15
LC was 349.9, now 379.25
PTD was 308.2, now 307.2

LA
Shreveport Downtown (DTN)
CD was 119.6, now 120.75

MA
Boston TRACON (A90)
Laconia Municipal NH (LCI) was 305.4, now 254.25
Springfield-Chicopee, Westover ARB (CEF)
LC was 348.4, now 348.75

MI
Detroit International Airport (DTW)
Howell, Livingston County (OZW)
Pontiac, Oakland County International (PTK)
Apch was 124.9, now 127.5

MO
Cameron Memorial Airport (EZZ)
CD was 121.8, now 121.6

NV
Fallon Municipal (FLX)
Fallon NAS, Van Voorhis Field (NFL)
Apch was 118.3, now 120.85
Indian Springs AF Aux (INS)
LC was 358.3, now 360.625

NJ
Caldwell, Essex County (CDW)
LC was 126.5, now 119.8

OH
Cleveland ARTCC (ZOB)
Findlay OH Low RCAG was 269.3, now 291.725
Flint MI Low RCAG was 307.8/335.6, now 290.425/348.75
Litchfield MI Low RCAG was 343.8, now 281.425/285.625
Mount Hope OH Low RCAG was 307.2, now 298.925

OK
Fort Sill, Henry Post AAF (FSI)
Basic Radar was 118.6/290.375, now 120.55/322.4

PA
Philadelphia, Northeast Philadelphia Airport (PNE)
LC was 349.0, now 278.8

SD
Rapid City, Ellsworth AFB (RCA)
PMSV was 375.2, now 375.775

TN
Memphis ARTCC (ZME)
Brinkley AR High RCAG was 120.85, now 124.025
Columbus MS High RCAG was 135.3, now 133.125
Greenwood MS High RCAG was 125.675, now 127.425
Meridian MS High RCAG was 134.925, now 128.275
Nashville TN High RCAG was 135.375, now 118.875
Pine Bluff AR High RCAG was 133.55, now 125.475/132.425
Walnut Ridge AR High RCAG was 133.0, now 132.375

TX
Fort Worth ARTCC (ZFW)
Dublin TX Low RCAG was 381.65/387.0, now 273.55/314.0

VA
Roanoke Regional, Woodrum Field (ROA)
ATIS was 118.65, now 134.95

WY
Jackson (JAC)
VOR was 108.5, now 115.4

DELETED

CA
Oakland ARTCC (ZOA)
Cloverdale Municipal (O60)
Napa County (APC)
Novato, Gnoss Field (DVO)
Petaluma Municipal (O69)
Santa Rosa, Charles M. Schulz, Sonoma County (STS)
Apch 127.8/353.5

FL
Miami, Opa Locka (OPF)
LC 125.6

GA
Sandersville, Kaolin Field (OKZ)
NDB 212

KS
Wichita AFSS (ICT)
Lawrence KS RCO (LWC) 122.55

KY
Paducah, West Kentucky Airpark Airport (5KY3)
CTAF 122.8

NC
Eden, Rockingham County Heliport (8N0)
UNICOM 123.05
Raeford, P K Airport (5W4)
UNICOM 123.0

OK
Fort Sill, Henry Post AAF (FSI)
CD 118.6/290.375

PA
Fort Indiantown Gap, Muir AAF (MUI)
GC 139.0

TN
Memphis ARTCC (ZME)
Greenville MS High RCAG 124.95
Memphis TN Low RCAG 119.3
Russellville AR High RCAG 118.775

TX
Greenville, Majors (GVT)
USAF Test 139.8

NEW/CHANGED IDs/CLOSED & ABANDONED AIRPORTS

NEW

AL
Chatom, Hawthorn Pines Airport 6AL6
Dothan, Blueberry Hill Airport 5AL4

Lillian Community Heliport	9AL6
Samson, Fairlane Airport	5AL8
AK	
Kivalina Airport	PAVL
AR	
Brickleys, Dawson's Airport	15AR
Eureka Springs, Black Mountain Airport	18AR
FL	
Belleview, The Villages Heliport	19FL
Bushnell, Connell's Wahoo Airport	25FL
Cypress, Folsom Airport	2FL3
Dunn, Charles Field Airport	3FL7
Frostproof, Ridge Heights Airport	4FL5
Niceville, Twin Cities Hospital Heliport	6FL5
Wimauma, Gyro Town USA Stolport	23FL
GA	
Ashburn, Richter Airpark Airport	GE12
Clayton, Heaven's Landing	GE99
Sandersville, Kaolin Field	OKZ
IL	
Ceneseo, Hamoond-Henry Hospital Heliport	3LL2
ID	
Challis, CAHC Emergency Heliport	99ID
Glenns Ferry, Health Center Heliport	3ID4
Priest River, Flying H Ranch Airport	96ID
LA	
Alexandria, Grass Roots Airport	05LS
St. Francisville, Tembec Heliport	06LS
MD	
Upper Marlboro, Duley Farm Airport	6MD0
MI	
Carleton, Four Star Heliport	0MI7
Carsonville, Circle U Heliport	2F2
Newport Woods Airport	9MI2
Webberville, Cloud Nine Field Airport	46MI
MN	
Barnsville, Coot Landing Airport	4MN2
Plymouth, Svard Heliport	64MN
NH	
Hampstead, Clark Heliport	10NH
Kensington, Propwash Airport	21NH
Lyndeborough, Sunny Hill Landing Heliport	29NH
New Boston, A and K Heliport	28NH
Washington, Diving Rock Seaplane Base	07NH
NJ	
Frenchtown, Mabel's Ballonport	JY42
Harvey Cedars, Soaring Sun Seaplane Base	21JY
Perth Amboy, Hess State Street Heliport	22JY
NY	
Kingsbury, Mountain View Airport	14NK
NC	
Kill Devil Hills, First Flight Airport	FFA
OH	
Findlay, Blanchard Valley Regional Health Center Heliport	89OH
PR	
Cidra, Sabanera Heliport	PR53
TX	
Bellevue, Menard Airport	XA09
Bertram, McFarlin Ranch Airport	XA12
Chico, Spectre Airport	XA07
Cotulla, Los Cuernos Ranch Airport	XA08
Glen Rose, Circle Eight Ranch Airport	XA04
Grand Saline, Cozby Germany Hospital Heliport	XA01
Houston, Landrey's Seafood House Heliport	XA13
Johnson City, Danz Ranch Airport	XA02
Lubbock, MDR 1 Heliport	XA06
New Gulf Airport	T17
Ponder, Ponderosa Field Ultralight	XA10
Rowlett, LPMC Heliport	XA11
Sanger, Edgington Ranch Airport	XA03
Sudan, Fairview Field Airport	XA05
VT	
Jericho, Meadow Stolport	07VT
WA	
Ellensburg, Flying Rock Airpark Airport	WA47
Gig Harbor, East Gig Harbor Heliport	6WA8
Lake Stevens, Reohl Heliport	WA31

CHANGED

AR	
Sherrill, was Tommy Anderson, now Smith's International	was AR99, now 99A
CO	
Creede, Mineral County Memorial Airport	was Q39, now C24
ID	
Athol, Silverwood Airport	was S62, now 2ID4
KY	
Paducah, West Kentucky Airpark Airport	was FIO, now 5KY3
MN	
McGregor, Isedor Iverson Airport	was 17Y, now HZX
MT	
Drummond Airport	was DRU, now M26
NE	
Thedford, Thomas County Airport	was 6N8, now TIF
NC	
Currituck County Airport	was 9W7, now ONX
Dunn, Charles Field Airport	was 3FL7, now NC22
Grantham, Cox-Grantham Airfield Airport	was 1NC8, now 6NC0

TX

Port Lavaca, Calhoun County Airport	was T97, now PKV
Seguin, Heber Airpark Civic Club LLC Airport	was TE70, now E70
Seminole, Gaines County Airport	was 31F, now GNC

WI

Menomonie Municipal, Score Field Airport	was W11, now LUM

CLOSED/ABANDONED

CA

City of Industry, Shepherd Field Airport	CA24

CO

Idalia, Bonny Airport	CO25

GA

Albany, Ayresport Airport	52GA

ID

Eagle, Floating Feather Airport	ID59

IL

Eldred, The Adwell Corporation Airport	13IS
Essex, Rash's Acres Airport	IS24
Mattoon, Rural King Airport	IS75
McClure, East Cape Girardeau	3LL6
Meyer, the Adwell Corporation Airport	4LL5
New Douglas, Layher Airport	IS36

IA

Stanton, Jacobs Airport	4IA6

LA

Bossier City Medical Center Heliport	LS41

MD

Baltimore, St Agnes Health Care Heliport	120

MO

Excelsior Springs, Pegasus Pad Heliport	MU43
Plevna, Palmer Airport	7MO9

NH

Manchester, Public Service Co. Manchester Heliport	NH23
Portsmouth, Newington Heliport	NH27

NJ

Cape May CGAS Heliport	NMK

OH

Stony Ridge, Ranchport Airport	68OH

OK

Enid State School Heliport	15OK

OR

Carber, Big Sky Ranch Airport	42OR

PA

Mechanicsburg, Eichelberger Heliport	PA57

SC

Saluda, Scurry Airport	SC39

WA

Graham, Moss Field Airport	2WA4
Harrah, Labbee Field Airport	2WA7
Lummi Island, Millers Field Airport	4WA5
Marshall, Magpie Flats Heliport	WN67
Sequim, Davis Field Airport	62WA
Stanwood, Livingston Bay Airport	14WA
White Swan, Hitchcock Airstrip Airport	WA04

WI

Bangor, Webster Field Airport	79WI

WY

Laramie, Ray's Airpark Airport	WY63

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

Solar Wind And Coronal Holes

Space is not a vacuum, at least in our solar system. The sun's atmosphere actually extends very far out from the sun. Space in our system is filled with plasma, a low-density gas in which the individual atoms are charged. The temperature of the sun's atmosphere is so high that its gravity cannot hold on to it. The plasma streams off the sun in all directions at speeds of about 400 kilometers per second (about 1 million miles per hour). This is known as the "solar wind."

The speed of the solar wind fluctuates, and it carries with it magnetic clouds. These magnetic clouds are interacting regions where high-speed wind catches up with slow-speed wind. The solar wind speed is high (800 km/s) over coronal holes, and low (300 km/s) over streamers. These high- and low-speed streams interact with each other and alternately pass by the Earth as the sun rotates. These wind speed variations buffet the Earth's magnetic field and can produce storms in the Earth's magnetosphere. Many Coronal Mass Ejections (CMEs) combine with the solar wind and cause shock waves which, if directed to the Earth, can ignite the aurora and major ionospheric and geomagnetic storms.

Coronal holes are an extended region of the corona, exceptionally low in density and having "open" magnetic field topology. Coronal holes are largest and most stable at or near the solar poles and are a source of high-speed solar wind. However, coronal holes situated at or near the solar equator tend to have the greatest impact on the Earth. Coronal holes follow the rotation of the sun, taking about 27 days for a full revolution around the sun. This means that if the coronal hole lasts long enough, we'll see its influence on space weather every 27 days. Coronal holes, then, are typically long-duration features, and since they spew out plasma at elevated speeds, degrade ionospheric propagation for days at a time.

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) mean 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.

The Earth has a magnetic field with a north and a south pole, which is enclosed within a region surrounding the Earth called the "magnetosphere." As the Earth rotates, its hot core generates strong electric currents that produce the magnetic field, which reaches 36,000 miles into space. The magnetosphere prevents most of the particles from the sun, carried in solar wind, from impacting the Earth. The solar wind distorts the shape of the magnetosphere by compressing it at the front and causing a long tail to form on the side away from the sun. This long tail is called the magnetotail.

The Magnetosphere And Radio

Let's look at the relationship between coronal material and magnetic fields. The corona is so hot that the gases in it lose some of their electrons in the powerful collisions between atoms. This plasma is a mixture of positively charged ions and negatively charged electrons. Take a look at a neon light. You are looking at plasma. Because plasmas are electrically conductive, they can steer magnetic fields. And they are steered *by* magnetic fields. ACME is one solar feature that drags a piece of the sun's magnetic field with it. These loops of magnetic force are stretched and dragged into interplanetary space by the inertia of the expanding plasma. When these magnetic forces impact the Earth they are either diverted by or combined with Earth's magnetic field.

The speed of a CME ranges from less than 50 to about 2,000 kilometers per second. As the CME moves outward from the sun, it generates a shock wave that can accelerate particles in interplanetary space to high energies. When a CME or its shock wave passes the Earth, geomagnetic storms are triggered. The majority of large and major geomagnetic storms are generated by the encounter with both the interplanetary shock and the CME that drives it. Their ability to disturb the Earth's magnetosphere is a function of their speed, the strength of their magnetic field, and the presence of a strong southward magnetic field component. During the declining years of a solar cycle, like where we are currently, we see far fewer CMEs, since flaring has declined, than we do during the peak years of the cycle. However, we do see frequent coronal holes. These are what contribute to days of poor propagation, since the elevated solar wind speed and increase in plasma may degrade the ionosphere.

The Earth's magnetosphere is formed from two essential ingredients: the Earth's magnetic field (which has much the same form as that of a bar magnet, and is from pole-to-pole) and the solar wind. When the solar wind and magnetic fields combine with the Earth's magnetic field, they alter the shape and intensity of this shield around the Earth. The ionosphere is affected by these changes, either by an increase of ionization, or a decrease or even a depletion of ionization. Depressions in ionospheric density cause major communications problems because radio frequencies that previously had been refracting off the ionosphere now punch through. The Maximum Usable Frequency (MUF) on a given radio signal path can be decreased by a factor of two during an ionospheric storm event. Storm effects are more pronounced at high latitudes.

During August, we'll see days when coronal holes dominate space weather. We'll only see occasional, if any, CME activity, however. Solar activity will be low to moderate, too, as we are far into the decline of Cycle 23. Major shortwave broadcasters have taken this into consideration and have chosen frequencies that, with the high power and gain of their transmitting facilities, will overcome tough propagation into their target areas. But, there may be days when it will be a challenge to hear the station you're hunting for.

Current Solar Cycle 23 Progress

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-centimeter observed monthly mean solar flux of 101 for April 2004, down from 112 for March. The 12-month smoothed 10.7-centimeter flux centered on October 2003 is 124, down from September's 126. The predicted smoothed 10.7-centimeter solar flux for August 2004 is about 88, give or take about 15 points.

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for April 2004 is 39, 10 points down from March's 49. The 12-month running smoothed sunspot number centered on October 2003 is 58, a couple of points less than September's 60. The lowest daily sunspot value during April 2004 was recorded on April 10 and 11, with a count of 13. The highest daily sunspot count for April was 63 on April 19. A smoothed sunspot count of 30 is expected for August 2004.

The observed monthly mean planetary A-Index (Ap) for April 2004 is 10, down from March's 12. The 12-month smoothed Ap index centered on October 2003 is 21, down a point from September. Expect the overall geomagnetic activity to be quiet to disturbed during most days in August.

August HF Propagation

Propagation on the higher frequencies will fluctuate less drastically during August, as the hours of sunlight are quite long and the ionosphere has very little time to recombine during the hours of darkness. Higher HF frequencies are going to be unusable over most paths, but when sporadic-*E* (*Es*) openings occur, expect good domestic signals. These *Es* openings will be strong at times and fairly common, but might be short-lived.

Nineteen and 22 meters will compete with 16 for the best daytime DX band during August. Broadcasters know that the summer daytime MUFs are higher than during the winter, so they move their scheduled broadcasts up in frequency. These bands will open for DX just before sunrise and should remain open from all directions throughout the day, with a peak in the afternoon. Nighttime conditions will favor openings from the south and tropical areas. Look for gray-line propagation from Asia, with long-path common from southern Asia, the Middle East, and northeastern Africa, as well as the Indian Ocean region via the North Pole.

The 25- and 31-meter bands have an incredible amount of activity, since many broadcasters target their audiences during prime times (morning and early evenings) in the target areas. Expect 11 MHz to be an excellent band for medium-distance (500 to 1,500 miles) reception during the daylight hours. Longer-distance reception (up to 2,000 to 3,000 miles) should be possible for an hour or two after local sunrise and again during the late afternoon and early evening. Heavy congestion will occur here, too, as many international and domestic broadcasters make use of 25 meters.

The backbone of worldwide shortwave broadcasting, 31 and 41 meters, will provide medium-distance daytime reception, ranging between 400 and 1,200 miles. During August, reception up to 2,500 miles is possible during the hours of darkness, and until two to three hours after local sunrise. Forty-one and

Optimum Working Frequencies (MHz) - For August 2004 - Flux = 88, SSN = 30 - 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	22	21	19	18	16	15	14	13	12	11	12	14	16	18	19	20	21	22	22	23	23	23
NORTHERN SOUTH AMERICA	29	29	29	26	24	22	20	19	17	16	15	15	14	16	20	22	23	25	26	27	28	29	29	29
CENTRAL SOUTH AMERICA	29	27	24	22	20	19	18	17	16	15	14	16	16	18	21	24	26	27	29	30	31	31	31	30
SOUTHERN SOUTH AMERICA	26	23	20	19	17	16	15	15	14	14	13	13	13	15	18	21	23	25	27	28	29	30	30	29
WESTERN EUROPE	13	10	10	9	9	13	15	12	11	10	14	16	17	18	19	19	20	20	20	20	19	18	17	16
EASTERN EUROPE	10	9	9	9	13	15	14	11	10	10	9	13	16	17	18	19	19	19	18	17	16	14	10	10
EASTERN NORTH AMERICA	26	26	25	24	22	20	19	17	16	15	14	13	15	18	21	22	24	25	26	26	27	27	27	27
CENTRAL NORTH AMERICA	15	15	14	14	13	12	11	10	9	9	8	8	7	9	11	12	13	13	14	14	15	15	15	15
WESTERN NORTH AMERICA	8	8	8	7	7	7	6	6	5	5	4	4	4	4	5	6	6	7	7	7	8	8	8	8
SOUTHERN NORTH AMERICA	24	24	24	23	22	21	19	17	16	15	14	13	12	13	16	18	19	21	22	23	23	24	24	24
NORTHERN AFRICA	15	14	13	12	11	11	13	12	11	10	14	16	17	18	19	20	20	20	21	21	20	19	18	16
CENTRAL AFRICA	17	16	15	14	13	14	15	13	11	13	15	16	17	18	18	19	19	20	20	20	20	20	20	19
SOUTH AFRICA	18	17	16	15	14	14	15	15	14	13	13	14	18	20	22	23	24	25	25	26	25	23	21	19
MIDDLE EAST	12	11	11	12	15	16	14	11	10	10	9	14	16	18	18	19	20	20	20	19	17	15	14	13
JAPAN	21	21	21	21	20	20	19	18	16	14	13	12	11	11	12	13	12	11	11	14	16	18	19	20
CENTRAL ASIA	21	21	21	21	20	20	19	18	16	14	13	12	11	11	13	16	17	16	15	14	13	14	17	20
INDIA	17	18	18	18	18	17	16	14	10	10	9	9	12	10	9	9	9	9	8	11	14	15	16	17
THAILAND	17	19	21	21	20	19	19	18	16	13	12	11	11	11	15	17	18	18	16	15	14	13	13	15
AUSTRALIA	29	30	31	32	31	30	29	28	25	23	21	20	18	17	16	16	16	15	14	14	16	21	24	27
CHINA	20	20	21	20	20	19	18	17	16	14	12	11	10	14	15	14	13	12	11	11	12	15	17	19
SOUTH PACIFIC	31	31	31	31	30	29	26	23	20	18	17	16	15	15	14	13	13	13	13	21	26	28	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	25	24	22	20	18	17	15	14	14	13	14	17	19	21	22	23	24	25	25	26	26	26
NORTHERN SOUTH AMERICA	27	27	26	24	22	20	18	17	16	15	14	13	13	16	18	20	22	23	24	25	26	26	27	27
CENTRAL SOUTH AMERICA	29	26	24	22	20	19	18	16	16	15	14	15	17	20	22	24	26	27	29	29	30	31	31	30
SOUTHERN SOUTH AMERICA	26	22	20	19	17	16	15	15	14	14	13	13	15	17	20	23	24	26	27	28	29	30	30	28
WESTERN EUROPE	16	15	12	10	13	13	12	11	10	12	15	17	18	19	20	20	20	20	19	19	19	18	18	17
EASTERN EUROPE	10	10	9	9	9	14	12	11	10	14	16	17	18	19	19	20	20	19	19	18	17	16	14	10
EASTERN NORTH AMERICA	19	19	18	17	16	14	13	12	11	11	10	10	12	14	15	16	17	18	19	19	19	19	19	19
CENTRAL NORTH AMERICA	9	9	8	8	8	7	6	6	5	5	5	4	5	6	7	7	8	8	8	9	9	9	9	9
WESTERN NORTH AMERICA	15	15	14	14	13	12	11	10	10	9	8	8	7	9	11	12	13	13	14	14	15	15	15	15
SOUTHERN NORTH AMERICA	17	17	16	16	15	14	13	12	11	10	9	9	8	10	12	13	14	15	16	16	17	17	17	17
NORTHERN AFRICA	19	18	16	15	14	13	12	12	11	10	14	16	18	19	20	21	21	22	22	22	22	22	21	21
CENTRAL AFRICA	18	16	15	14	13	13	12	12	11	10	14	17	18	19	20	21	21	22	22	22	22	22	21	19
SOUTH AFRICA	17	16	16	15	14	14	13	19	17	16	16	18	21	24	26	28	29	30	29	27	24	22	20	19
MIDDLE EAST	13	12	11	11	13	13	12	11	10	13	16	17	18	19	20	21	21	21	20	19	18	16	15	14
JAPAN	21	21	21	20	19	18	16	14	13	12	11	11	12	15	13	12	12	11	11	14	17	18	19	20
CENTRAL ASIA	21	21	20	20	19	18	16	14	12	12	11	10	14	16	18	19	18	16	15	14	13	14	17	20
INDIA	12	14	15	16	17	16	14	11	10	10	14	16	17	17	16	15	14	12	10	9	9	9	9	8
THAILAND	17	19	20	19	18	17	16	14	12	11	10	14	16	17	18	19	20	18	17	15	14	14	13	14
AUSTRALIA	29	30	31	31	30	29	27	24	22	21	19	18	17	16	17	17	16	15	14	14	17	22	25	27
CHINA	20	20	20	19	18	17	16	14	12	11	10	14	16	17	16	14	13	12	11	11	12	15	17	19
SOUTH PACIFIC	31	31	31	30	29	28	25	20	18	17	16	15	14	14	13	13	13	12	15	23	26	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	20	20	18	16	15	14	13	12	11	11	10	12	14	16	17	18	19	20	20	21	21	21	21
NORTHERN SOUTH AMERICA	24	23	22	20	18	17	16	15	14	13	12	12	13	15	17	19	20	21	22	23	23	24	24	24
CENTRAL SOUTH AMERICA	28	26	23	22	20	18	17	16	15	14	14	16	19	21	23	25	26	27	28	29	29	30	30	30
SOUTHERN SOUTH AMERICA	25	22	20	19	17	16	15	15	14	14	13	13	17	20	22	24	26	27	28	29	29	30	30	28
WESTERN EUROPE	14	13	12	11	10	10	11	10	10	13	15	17	18	19	20	20	20	20	20	19	19	18	17	16
EASTERN EUROPE	10	10	9	9	12	12	11	11	10	14	17	18	19	20	20	20	20	20	19	19	18	17	16	14
EASTERN NORTH AMERICA	9	9	8	8	7	6	6	5	5	5	4	5	6	7	7	8	8	9	9	9	9	9	9	9
CENTRAL NORTH AMERICA	20	19	19	18	16	15	14	13	12	11	10	10	12	15	16	17	18	19	20	20	20	20	20	20
WESTERN NORTH AMERICA	27	26	25	24	23	21	19	17	16	15	14	13	15	18	21	22	24	25	26	26	27	27	27	27
SOUTHERN NORTH AMERICA	21	21	20	19	18	16	15	14	13	12	11	10	11	14	15	17	18	19	20	20	21	21	21	21
NORTHERN AFRICA	20	18	17	15	14	14	13	14	13	14	18	20	22	24	25	26	26	27	27	26	26	25	24	22
CENTRAL AFRICA	18	16	15	14	13	13	14	14	13	14	18	20	22	24	25	26	26	26	26	26	25	23	21	19
SOUTH AFRICA	17	16	15	15	14	14	13	17	16	15	16	19	22	24	26	27	28	29	29	26	24	22	20	19
MIDDLE EAST	17	15	14	14	13	13	12	11	11	13	16	18	19	20	21	21	22	22	22	22	22	21	20	18
JAPAN	21	20	19	18	16	14	13	12	11	11	11	15	16	14	13	12	12	11	10	14	17	18	19	20
CENTRAL ASIA	20	20	19	17	15	13	12	12	11	10	14	16	18	19	20	19	18	17	15	14	13	13	17	19
INDIA	9	9	9	9	13	12	11	11	10	14	16	18	19	19	19	18	18	17	17	16	14	11	10	10
THAILAND	16	18	18	16	14	12	12	11	10	13	16	18	19	20	20	21	21	19	17	16	15	14	13	13
AUSTRALIA	30	31	30	30	28	25	23	21	20	18	17	16	15	18	17	16	15	15	14	13	18	23	26	28
CHINA	19	19	18	17	15	13	12	11	11	12	15	17	18	18	17	14	13	12	11	11	11	15	17	18
SOUTH PACIFIC	31	30	30	29	27	24	22	17	16	15	14	14	13	13	13	12	12	12	19	24	27	29	30	30

49 meters should be still best for worldwide DX from sunset to sunrise. Early evening and into darkness, increasingly longer paths develop, up to several thousand miles. As propagation conditions don't change much on the lower HF bands through the solar cycle, a high number of HF broadcasters rely on these bands. International and domestic broadcasts compete with amateurs on the 41-meter band and with each other on both. This makes for a lot of interference, especially during the late afternoon and evening hours, making reception of weak, exotic signals a bit more of a challenge.

Don't expect any improvement in nighttime DX conditions on 41 through 120 meters during August, since we are not yet close enough to the seasonal decrease in the static levels of winter. The 5-, 3-, and 2-MHz shortwave bands are used mostly in designated tropical areas for domestic broadcasting. The entire 4-MHz band is set aside for domestic broadcasting in Asia, and some of this band is used throughout Europe. On all of these bands, during daylight, reception should be possible from up to 500 miles away. After sunset until an hour or so after sunrise, reception of signals from 1,000 to a possible 2,000 miles away is possible. There will still be a high level of static during August, so these bands will be a challenge to those looking for long-distance DX of exotic tropical stations. The best time to search for these would be just before sunrise and an hour or so after daylight.

August VHF Conditions

Statistical studies show that a sharp increase in *Es* propagation takes place at mid-latitudes during the late spring and summer months. During August, short-skip propagation over distances as great as 1,400 miles should be possible for about 10 percent of the time on 6 meters. Higher VHF (2-meter) openings may also be possible during periods of intense *Es* ionization.

In addition, conditions for tropospheric ducting begin to form over wide areas of North America and over the Atlantic and Pacific Oceans. Watch for stalled high-pressure cells between your location and the DX. Each summer season in North America, weather systems develop which produce conditions favorable for VHF DX. Stalled high-pressure weather cells, with pressures reaching above 1025 millibars, are known to cause ducting of VHF radio signals. When ducts occur, VHF radio signals may propagate through these ducts far beyond the normal line-of-sight distances.

Tropospheric ducting forms each year between Hawaii and the U.S. West Coast, and from San Francisco to Los Angeles, Denver to Dallas, Texas to Florida, the Great Lakes to the eastern seaboard, the Great Lakes to Texas, Nova Scotia to Miami, and the Midwest to the Southeast.

Advanced visual and infrared weather maps can be a real aid in detecting the undisturbed low clouds between the West Coast and Hawaii or farther during periods of intense subsidence-inversion band openings. This condition occurs also over the Atlantic. There is a great resource on the Internet that provides a look into current conditions. Bill Hepburn has created forecast maps and presents them at http://www.iprimus.ca/~hepburnw/tropo_xxx.html, which includes maps for the Pacific, Atlantic, and other regions.

I'd Like To Hear From You

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

I hope to hear from you. Send a letter or an e-mail. ■

v.i.p. spotlight

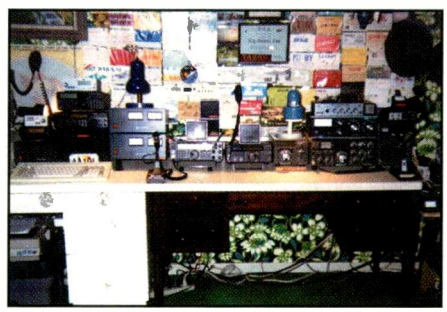
Congratulations To Robert J. Mitchinson, AA1GL, Of Connecticut

Pop'Comm reader R.J. Mitchinson tells us,

The radio bug bit me in late '67 when a friend showed me his Hallicrafters shortwave receivers. By 1968, I had an RCA portable SW radio with two bands of shortwave; later that year I graduated to a Hallicrafters S120 and continued to listen to shortwave and use CB throughout the '70s and early '80s.

I was KDU-6054 and later KFH-5197 on CB and WPE1HQM on SW. College interrupted my radio activities somewhat, but in 1985 I got my Novice ticket and from that I upgraded all the way to Extra in 1993 with the call AA1GL.

My SWL gear includes a RadioShack DX394 with an MFJ multireader and Bearcat 9000 XLT for scanning. I also have Kenwood and Yaesu ham transceivers for HF hamming. I would not have "thunk" back in '68 that I would have expanded my hobby and my shack to the extent they are today!



Here's an inside look at Robert Mitchinson's shack in Naugatuck, Connecticut.

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

ham discoveries

connecting as a radio amateur

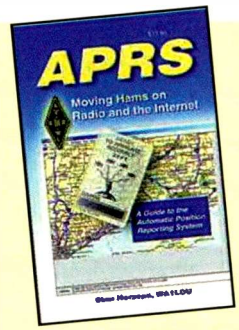
by Kirk Kleinschmidt, NTØZ

A Minimalist's Guide To Ham Radio Fun!

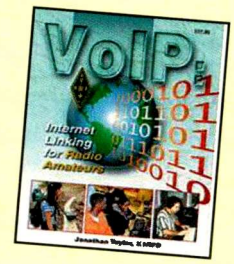
Now that we're well into the first decade of the 21st Century, our society and our ham radio hobby are operating in new and perhaps unexpected ways (pun intended). In years past, ham radio evoked images of mysterious-looking radio gear racked along the walls of some dim, dungeon-like shack. The radio rooms of yore weren't as dark and brooding as Dr. Frankenstein's laboratory, but the addition of a Jacob's Ladder or two may have made the two indistinguishable! As it was, the cheery glow of the vacuum tubes and the orange-colored light of the panel meters brightened the ambiance somewhat.

At any rate, ham radio was mostly associated with ham shacks. Hams had shacks and they operated from within them. Period. Well, mostly. Today, however, "shackless ham" isn't an oxymoron! Plenty among us have adapted to our modern, mobile society and have learned to enjoy and integrate our pursuit of ham radio in exciting and often unexpected ways.

So, if you can't have a shack in the conventional sense—because of deed restrictions, apartment or dormitory living, financial strain, unsupportive parents or spouses, or whatever—this month's column will hopefully inspire you to "do your own thing" as you explore your options. Ham radio has many traditions, but hams are not bound by them! The important thing is to keep an open mind as you explore new aspects of our hobby and new ways in which to enjoy them, regardless of your situation.



Speaking of Internet radio linking, the ARRL has released a new book, APRS–Moving Hams on Radio and the Internet; that covers the whole gamut of Internet systems and technologies available to hams (and even SWLs, who can "listen in" on many linked contacts).



VoIP: Internet Linking for Radio Amateurs, *written by Jonathan Taylor, K1RFD (VoIP guru and pioneer), will get you on the air (or on the net!). See your favorite amateur radio products dealer or visit www.arrl.org.*

Mobile Operating

With the teeny tiny size of modern mobile radios—most with similarly small price tags—chances are good that you can set up a shack in your car or camper if you can't set up a shack at home. Unlike the bad old days, when mobile rigs were the size of beer coolers and required power supplies that were even bigger, today's mobile radios are small, small, small! They're also full featured, high performance, and fairly inexpensive. Because they run on 12 VDC, you can also take them camping, use them for Field Day, or fly them to an exotic island.

Modern mobile rigs handle AM, FM, SSB, CW, and data modes from 160 through 6 meters (or more), receive from DC to daylight, and can be remotely mounted (the radio lives in the trunk or under the seat while the "control head" and the mic mount attached to the dashboard). These little rigs are as flexible as their whip antennas.

Club Stations

Unless you live in the outback there's probably at least one club station in your area. Amazingly, it's probably lightly attended and just waiting for you to twist the knobs. Although popular in Europe, where some countries still require a period of club station operation as a licensing requirement, club stations in the United States are often used primarily for license instruction and contesting.

One club station in central Minnesota has four transceivers, a large amplifier, a tall tower, several beams, and a bunch of wire antennas. Although nicely equipped, the station doesn't see much use. Whenever I've used it I've had the place all to myself!

Search for club stations at colleges, universities, tech schools, and even high schools. You might have to join a club to gain access, but that's probably a step in the right direction anyway. Club stations are great for contesting and a great way to get on the air with other hams.

Contests, Field Day, And Special Events

About 15 years ago I met a veteran ham who didn't own a station—not even a handheld transceiver for 2 meters—yet he operated almost every weekend. Week after week I'd even hear about his *contest* exploits. This crafty fellow worked the world from his friend's "contest superstation," which was lavishly equipped and advantageously located outside the city limits. When I asked him why he didn't have a station of his own, he thought I was crazy. This was *exactly* his kind of ham radio. He wasn't missing out on anything by not having his own shack.

This weekend warrior wasn't alone, either. I soon met others who took similar approaches. Some operated from friends' stations, some from university club stations, and one guy got on the air only when he was vacationing in the Caribbean (which was pretty often)!

If this style of ham radio appeals to you—and you have generous friends or an available club station—you'll have plenty of operating opportunities, including Field Day and Special Events stations. Amateur Radio's "Field Day" is always the fourth full weekend in June. For a solid 24 hours hams, using all modes and frequencies, make millions of radio contacts under simulated emergency conditions, living in tents and using emergency power. The November Sweepstakes is a ham radio contest where points are assessed for contacts and numerous awards are given to deserving operators. Field Day and the Sweepstakes both offer loads of fun and excitement for the shackless operator.

Foxhunting And Radiosporting

Foxhunting—finding hidden transmitters as part of a friendly competition—is a popular weekend activity in many parts of the

country (especially on both coasts and around larger metropolitan areas). Hams, usually radio club members and often grouped in age- or experience-related teams, gather to search for one or more hidden transmitters (foxes). The search area may be as small as a schoolyard or as big as a state!

On a typical foxhunt, competitors try to find all the foxes in the least amount of time. Common frequencies are on 2 and 80 meters. Competitors use handheld radios and compact directional antennas. Larger competitions may cover several square miles of forest or park land and may require maps and orienteering skills.

In the "motorsport" variant, the hunters drive cars or off-road vehicles, the foxes are typically hidden on mountaintops or wayside rest areas, and the field of competition may cover several hundred square miles. Mobile foxhunters often use GPS navigation systems and sophisticated receiving gear, including multi-antenna Doppler arrays with computerized graphical displays.

Whether the atmosphere is casual or highly competitive, foxhunting has something for everyone, no shack required!

Public Service Comms

Providing comms at public events, such as parades, festivals, and celebrations, is a long-standing amateur radio tradition. Although FCC rules prohibit amateurs from relaying certain specific details about race leaders and other information on the progress of an event, hams may assist safety officials at aid stations, operations centers, checkpoints, and emergency vehicles.

To get involved, all you need is a handheld transceiver. Most public service communications are handled on VHF and UHF frequencies because few activities spread out beyond repeater range. Two meters is most popular, but other bands are also used.

If you're a member of a ham radio club, you've probably already been asked to help out at public events. If you aren't in a club yet, or if your club hasn't engaged in such activities, ask around on the air and check the local nets to hook up with service-minded hams in your area.

In addition to local club-provided communications, hams may be prepared to handle larger regional or national emergencies, such as floods, fires, and earthquakes. Most of these emergencies are handled by members of the Amateur Radio Emergency Service (ARES) and the Radio Amateur Civil Emergency Service (RACES). Other popular public service outlets include SKYWARN. Its local chapters spot and track tornadoes and work with the community and disaster preparedness groups during severe weather.

If you want to serve your fellow citizens, public-service comms will provide the opportunity. And, again, no home station required!

Radio Expeditions

You can't be the first explorer to reach either of the poles, but you certainly can take your radio gear to an infinite number of enjoyable "expedition destinations" that will definitely be appreciated by your fellow hams.

Where might you go? Just about anywhere, really. How about camping, canoeing, or motorcycling? Or maybe fishing, hunting, or hiking. With a compact mobile rig or an even-smaller QRP transceiver, you can be on the air from just about anywhere. Stay in touch with your friends and family, make new friends, or both!

During Field Day or the November Sweepstakes, for example, instead of operating from your home state (which probably has scads of hams), why not drive to a secluded resort or nondescript roadside motel—with your radio gear, of course—in a neighboring state or province where hams are scarce and sought-after? By working the contest from a rare state you'll be "the DX station," the distant, sought-after one, and others will be appreciative! Every year at least a few Alaska hams trek across the border to work Sweepstakes from Canada's Yukon or Northwest Territories. Why? To *be* the DX, of course!

Your expedition activities don't have to be limited to contests, either. You could set up at a scenic overlook at an out-of-the-way mountain pass to help other ops collect a new grid squares. You could also operate from a nearby island (inland or coastal) to work ops looking for Islands On The Air (IOTA) QSOs. Your imagination is the only limitation.

Internet-Assisted Radio Fun

Shackless hams with decent Internet connections are pioneering a new and somewhat controversial approach to ham radio fun. By using a PC equipped with a sound card, the right software, and a headset, a radioless, shackles ham can activate a repeater in a remote location (across town, across the country, or even in some foreign countries) and have a PC-to-radio QSO that is indistinguishable from the "real thing." Ops of some systems even have ham-only PC-to-PC voice chats. All of this is made possible by the clever use of technology developed to facilitate digital telephone calls, Voice Over Internet Protocol, or VoIP, for short.

As I said, using the Internet this way is somewhat controversial, but these types of contacts are being made on a daily basis. I plan to report on these techniques in detail in a future column, but for now, point your web browsers to www.eqso.net (the eQSO system) or www.echolink.org (the Echolink system) to check things out.

Start "Thinking Outside The Shack"

If you use your imagination you'll find a host of ways to get on the air, regardless of your present situation. And in the process of trying out new things, you just might discover a facet of amateur radio you'd otherwise never have uncovered.

Don't forget to send your QSL cards, questions, and letters to "Ham Discoveries," c/o *Popular Communications*, 25 Newbridge Rd., Hicksville, NY 11801. ■

the wireless connection

a look behind the dials

by Peter J. Bertini, radioconnection@juno.com

A Signal Meter You Can Build For Your Vintage Communications Receiver

About a year ago we featured a simple tuning eye indicator add-on accessory for basic communications receivers lacking S-meters or other visual tuning aids. Eye tubes are fun, but they are also expensive, have a short life span, and are getting harder to find. I had promised a follow-up S-meter project for my Hallicrafters S-53 (the resident guinea pig we keep on hand for such experiments), and here it is! Depending on how good a scrounger you are and the current contents of your junkbox, this project's cost will be about the same, or less, than that of the eye-tube tuning indicator.

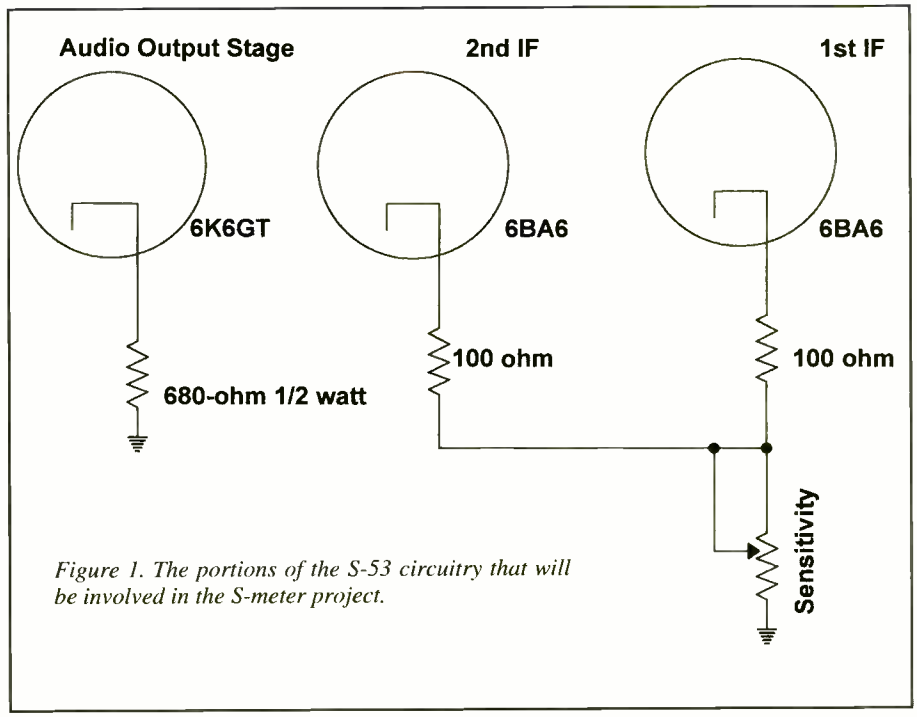


Figure 1. The portions of the S-53 circuitry that will be involved in the S-meter project.

A Word Of Caution

First, though, a few words on electrical safety. This project is intended as an adjunct for transformer receivers, those that provide isolation between the cabinet and chassis from the AC line and nearby grounds. The transformer-powered Hallicrafters S-53 is such a receiver. It was also a beginner's set, but it is one step above other entry-level receivers of the day, such as the Hallicrafters S-38 series. The S-38 sets were basic AC/DC receivers, and thus will require an isolation transformer or precautions to keep all electrical circuits and exposed metal on the external S-meter fully isolated and insulated from the radio operator! These AC/DC sets used a *hot chassis* (one side of the AC line is attached directly to the chassis) and, therefore, present a serious shock hazard. Thus, I do not recommend beginners undertake these projects, unless they're under the guidance of a more experienced individual.

One final caveat: As always, I advise restoring any receiver before using it. At least replace the AC line bypass capacitor in the Hallicrafters with a suitable UL rated component!

KISS

Keep It Simple, Stupid! My first inclination was to use a more elaborate S-meter scheme using a balanced-bridge circuit based on a dual-triode tube to drive the external S-meter. Yet, many communications receivers simply used a meter to monitor the plate current of the IF stage(s). As the received signal varied, so did the automatic gain control (AGC) voltage. As the signal grew stronger, the AGC voltage would rise, causing the IF stage to go further towards cut-off, with a corresponding decrease in current.

This scheme required some novel mechanical innovations, as a "normal" meter would indicate full-scale (FS) deflection when no signal was present! This left two choices: either use an expensive meter movement with a right side zero-resting position; or take a more novel approach where a conventional meter was instead mounted upside down with an inverted dial scale markings! I wasn't too keen on using high DC plate voltages to operate an external S-meter. Instead, I'll sample a few of the cathode voltages to achieve the same results. (The highest voltages at the meter will be under 30 volts; a much safer alternative.) I'll show my solution below.

I'll be finishing the vacuum tube (and truly universal) S-meter project in the near future; it's on the bench being fine-tuned. When done, I'll do a column on it as well. I also promised an FM Crystal Set project, that's in the works and being written up as work on it progresses.

A Solution

I can't claim originality for the circuit shown in **Figure 2**. I recall seeing the basic principle presented in an early edition of Bill Orr's *Radio Handbook*. As I indicated before, there's quite a few ways to skin this cat, and this is only one method of many. The audio stage (a 6K6 in the S-53) uses a cathode resistor to self-bias the stage for Class A operation. We'd expect to find between 15 and 20 volts when measuring across the original 680-ohm cathode resistor. Ditto for the IF stages; these also use cathode resistor biasing, so they remain linear (Class A) when a no-signal (or under weak-signal) condition isn't producing a negative DC grid bias. I measured about 1.6 volts on

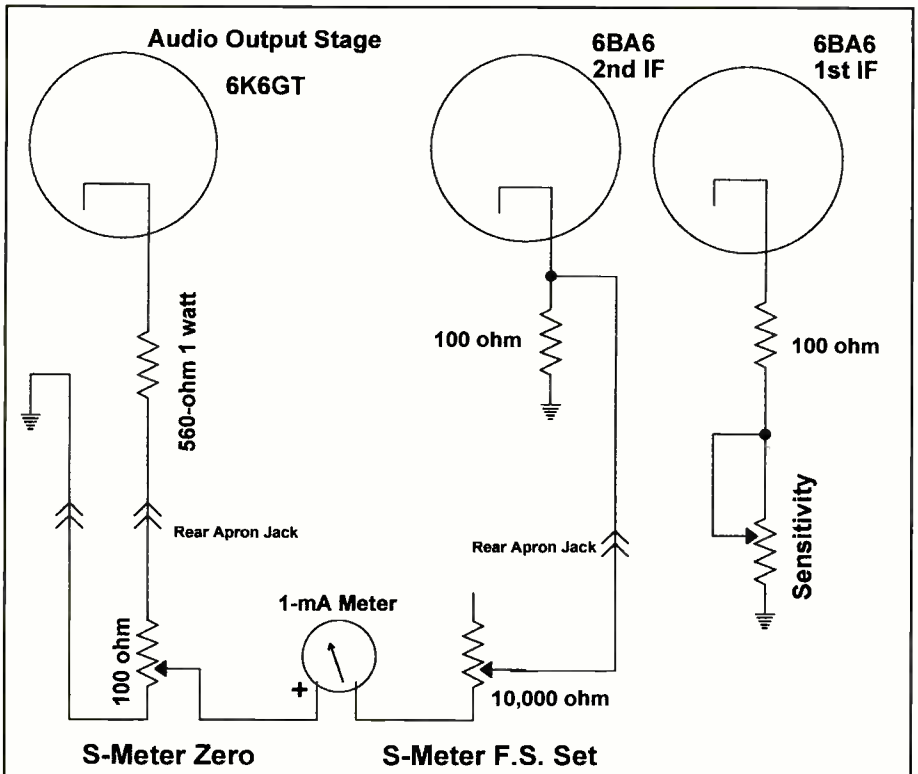


Figure 2. Suggested changes and modifications for the S-53 to permit using its companion S-meter accessory.

each of the S-53 6BA6 tube cathodes with no signal (no AGC action) being present.

Balancing Act

Stay with me, please. **Figure 1** shows the original S-53 schematic, and **Figure 2** shows the modifications added for the external S-meter. Note that these are partial schematics; they only illustrate the components affected by our modifications or where the connections for the external S-meter will come from.

The purpose of the variable (100-ohm) and fixed resistor (560-ohm) in series is to allow us to generate a reference voltage equal to the idling cathode voltage of the 6BA6 cathode. This potentiometer serves as the Zero Set control; when the voltages are equal, no current will flow and the meter will show no deflection.

As AGC is applied, the 6BA6 will pass less current through the cathode resistor, and thus the cathode voltage will reduce proportionally! A meter placed between the 6BA6 cathode and the reference voltage from the Zero Set potentiometer will indicate the relative signal strength!

The circuit will work with meters up to about 1 mA (for FS deflection), and going to a meter movement much under 500-µA for FS deflection will become trickier to keep zeroed. Less sensitive movements might work, but it might not be possible to develop enough current to fully deflect the meter. Or worse yet, you might risk back-feeding cathode current from the audio stage to adversely affect the IF stage biasing!

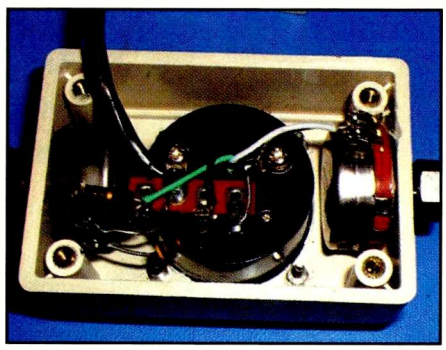


Photo A. Peeking inside the plastic project box shows there is little free room in this crowded enclosure.

The 10,000 ohm (10 k-ohm) potentiometer is used to set to the maximum S-meter deflection. This is set for FS meter deflection on a very strong signal. If incorrectly set, the meter might "peg" on very strong signals, or conversely fail to show the true strength of a very strong signal. I had tried using the pot wired as true potentiometer (think voltage divider)

Photo B. Here's a view of the completed S-meter package.

where the meter was shunted between the center arm of the pot and one end. The series rheostat wiring worked better, for an interesting reason! I noted that, when wired using the potentiometer as a voltage divider, the meter was heavily dampened due to the relatively low value external shunt resistances, making the meter action appear unnaturally stiff!

Fudging Values

The values shown are not cast in stone. Each radio will require some "tweaking" of component values so the controls work smoothly, allowing the operator to set the S-meter Zero and FS settings without much hassle. If the Zero Set point is overtly critical, banging the S-meter against the end stops will occur over a short portion of its rotation. If this happens, consider using a smaller value pot with series dropping resistors on either side of it to provide easier matching of the reference voltage to the IF stage cathode's idle voltage. The resistors should total within 20 percent of the original value, with erring on the high side preferred. That will increase the grid bias and the set will run a tad cooler. Don't be afraid to experi-

Radio Rescue

Photo 1. Folks are beginning to line up for a chance to learn more about their vintage radios.

A few years back, the Texas Antique Radio Club began a public service program called Radio Rescue. Patterned after TV's antique appraisal shows, Radio Rescue invites the general public to bring their old radios to be looked over by club members. Recently the club set up for a Radio Rescue in an antique store. The San Antonio event was the fourth for the club and was "wildly successful," according to one club member.

"We were so busy at the scheduled four-hour event, which ultimately evolved into over five hours, that no one could keep an entirely accurate count of the number of radios we saw," said Carter Cook of Austin, the club's current president. To help take care of the crowd, some club members went out to the parking lot or to nearby, on-street parking to appraise console radios hauled down for the event. For a while, one club member had to direct traffic in the antique shop's small parking area.

At a post-Rescue wrap up session, participants estimated that they saw 100 to 150 radios, or an average of one radio about every 2.5 minutes throughout the event. Available space dictated that the club had room for only two appraisal stations at the antique store, so lines formed. People chatted amiably with "Grandma's old radio" tucked under their arms or sitting beside them while they waited their turn. Each appraisal session began with a statement of the radio's history, as the owner knew it. Then, the appraiser provided,

- The make, model, and model year of the radio, and information about the manufacturer.
- Comments on cabinet condition, along with cleaning and maintenance tips.
- Referrals for radio repairs, if requested. One club member booked radio repair jobs through the next seven months!
- Estimated original retail cost of the radio.
- A current appraised value of the radio based on standard antique radio reference books.

Photo 2. These two fellows were seeking someone to restore their grandmother's vintage Philco console.

- Information about the Texas Antique Radio Club, as needed.
- A little social history about the use of the radio in the era when it was new.
- Technical information, such as using external wire antennas, antique radio electrical safety, and sources for parts.
- Explanation of the radio's features, like control knob functions and dial markings.

Photo 3. This rare Seferics radio made in Texas could detect approaching severe thunderstorms.

Photo C. At one time commonly available items, these vintage S-meters are hard to find these days.

Photo 4. This radio was a promotional item from the Lone Star Brewery of San Antonio.

Photo D. The S-53 receiver, and its companion S-meter, make a winning combination.

Cook said, "We saw some rare—I almost said unexpected—radios, but we've learned from past experience that the rare and unusual always show up at these events."

Photo 1 shows the setup for the event. The Philco console radio in **Photo 2** belongs to those two fellows; they were looking for someone to repair their grandmother's Philco. Several fellows in the club do repair work, and they now have enough repair jobs to keep them busy until next year! The set in **Photo 3** is a "Seferics," a radio made in San Antonio designed to function as an AM radio and to provide warning of approaching severe thunderstorms. For information on the Seferics, visit the TARC website at www.gvtc.com/~edengel/TARC.htm and click on "Texas Radios" for Carter Cook's article. The Seferics in the photo is a one-of-a-kind prototype in a crude fiberglass case. Very few of these radios were built as the company only lasted six months or so. The "Lone Star" beer bottle radio shown in **Photo 4** was a promotional item from the Lone Star Brewery of San Antonio. Ed Engelken provided the club photos.

The Texas Antique Radio Club meets monthly. Visitors and new members are welcome. Each meeting includes a radio flea market in advance of a program on some aspect of the old radio hobby. See the TARC website for meeting dates and sites. Your vintage radio clubs' activities, projects, and information can be spotlighted here! Contact radioconnection@juno.com for further details.

ment; each receiver design will differ and likely benefit from some tweaking of the meter's parts values.

Finding The Parts

The project box was a small Hammond plastic enclosure from the local electronics store. It is a tad small. I would have preferred to mount the potentiometers on the rear of the enclosure. **Photos A** and **B** show how I assembled my meter. The FS Set pot will require infrequent adjustment, while the Zero Set pot will be used more frequently to compensate for aging tubes or varying AC line voltages. Thus, I used a pot with a shaft and knob to facilitate zeroing the S-meter.

The biggest challenge is finding an S-meter! In the past you'd find nice S-meters offered on the parts racks at the local RadioShack (**Photo C**), but alas those days are long gone! Here is what I suggest. You can salvage a suitable S-meter from an old CB radio or parts radio. Also, many surplus houses offer meters at very attractive prices. Fortunately, new imported 1-mA meter movements are available, or you might consider making your own replacement meter scale using PhotoShop or another similar computer program.

What The Meter Tells Us

Conventional wisdom is that each S-meter division is equal to about 6 dB of signal change, and that an S-9 reading is equal

mary chip in the RF circuit. I shipped the receiver to ICOM in Bellevue, Washington, where they proceeded to repair the rig to full satisfaction, at a cost of around $200.

I have e-mailed at least two separate complaints about this guy to the FCC, each of which included his specific street address and full descriptions of transmission content, though neither included any mention of my direct financial loss due to the overloading signal. (Needless to say, I no longer tune the 27.5- to 28-MHz range, without attenuation in place!)

Now, for you Outbanders, here's the good stuff: the FCC will do NOTHING against you! A call to the "888-CALL-FCC" morons netted me a disinterested youngish female, who informed me the complaint had been forwarded to my local Field Office. She did have the address, but informed me that there was no way to contact them directly, other than via snail-mail, or by hanging around the front door of the office (40 miles from my home). According to my contact, there are *no* telephone numbers for Field Offices.

Call me a cynic, but I expect absolutely no response or action by the FCC against this almost-daily violator of the 10-meter band. (I will send another letter eating crow if I am wrong, but I'm not holding my breath!) But this doesn't involve Janet Jackson's breast, or the process of gathering Republican votes and campaign contributors, by way of In Band On Channel or Broadband over Power Line, so I'm sure it holds no interest to anyone other than myself. So, blast away, Outbanders, and relish the fact that the FCC has absolutely NO concerns about what you're doing!

Greg Hardison
Los Angeles, CA

World Opinion—And The Untidiness Of It All

Dear Editor:

I'm sure you probably got some guff from a few readers for your outspoken editorials, but I for one agree with your recent editorials, they tell it like it is. You're right: many countries have had it up to their ears, so to speak, with our cocky attitude. They also have a lot to say and we—even if Washington doesn't—should be listening to them. I think it's important for us radio listeners to focus not just on the hobby of monitoring, but as you've said, listen to what the world says about us on shortwave. Your words cut right to the heart of the matter and belong not just in *Pop'Comm*, but other radio publications as well. Thank you for caring about America!

Robert Steele
Dallas, Texas

Dear Robert:

Yes, a few folks stomped their feet and whined, but if they stop stomping long enough to turn on the radios and take part in their democracy, we'd all be able to breathe a lot easier. Our radios—and, yes, *Pop'Comm*—are a superb link to the world around us. We must continue to listen and comment on that world. When our soldiers—even just one—ask us for donated radios so they can stay in touch in Iraq and elsewhere, yet multibillion dollar contracts to insiders get approved without the customary bidding process simply because "it's wartime," something is terribly wrong. The D.C. power brokers catering to special interest groups that don't give a rat's tail about polluting OUR radio spectrum with Broadband over Power Line signals is also wrong.

Is this political? You bet it is, and these topics, like former (gee, I like saying that!) Congressman Billy Tauzin's Capitol Hill schemes to keep YOU from listening to the public airwaves will be pointed in these pages. Some things just need to be said. Thank you for your letter, Robert, (and also to the many others including Art Voss and Stephen Bellmore) for recognizing that there's more to radio and *Pop'Comm* than QSLs, antennas, and computers.

to a 50-µV signal. In reality, a meter that shows 6 dB per S-unit would be considered very stingy, giving the mistaken impression of a very insensitive receiver! Modern receivers typically show a 1 S-unit change for about 4 dB of signal variation. It's also very difficult to maintain the 50-µV calibration to match an S-9 reading across all bands: a typical consumer grade receiver's gain will vary widely across the ranges and over different bands. At best the S-meter is a relative indicator, useful for comparing signal strengths or aiming antennas.

Receiver Electrical Modifications

My S-53 receiver was previously equipped with a six-pin Jones accessory socket on the rear apron. It was added to accommodate the tuning-eye indicator project. I upset a few readers when I did these non-reversible modifications, and I heard about it. This radio was saved from a dumpster, and it needs major restoration until it comes close to being a *collector grade* set. There's a lot of rust and damage hidden from the photos. The radio will be fully restored for a future column, and I'll discuss the differences (there are some major ones) between the S-53 and S-53A receivers at that time. If any reader can help with a good set of knobs for my S-53, I'd appreciate hearing from you.

The six-pin accessory socket supplied filament, B-plus, AGC voltage, and ground for the tuning eye indicator. That left two free connections, which can be used for the external S-meter. The S-53 circuitry required a few easily reversible modifications (shown in **Figures 1** and **2**).

The first step was removing the internal cathode resistor for the 6K6 audio output stage, and then running the cathode directly to a free position on the 6-pin Jones socket. Originally, both cathode resistors for the 6BA6 tubes (the first and second IF stages) were connected to the front-panel gain control. The second IF stage cathode resistor is now directly tied to ground, and a lead from the cathode connection of the second IF cathode is brought out to the remaining free pin on the accessory socket on the rear of the receiver apron. When this mod is done, only the first IF stage's gain is varied by the Sensitivity control. The other connection required is the chassis ground; this was already present on one of the six pins.

Note that the modified receiver will not work when the S-meter is disconnected. You can make up a dummy plug with an internal 680-ohm cathode resistor so the receiver can be operated when the S-meter is removed.

Finished Project

Photo D shows my S-53 and S-meter combo in action! When I was a beginning ham and SWL, one of my first receivers was a Navy RBM-4 with an outboard ARC-5 receiver sampling the IF for greater selectivity. I built an S-meter accessory for that setup, using an older backlit S-meter salvaged from a National receiver. Some of my fondest recollections are of tuning across stations on that old Westinghouse, while watching the amber backlit S-meter respond to the signals from far distant stations.

Let Me Hear From You Soon

Adieu until next time; I have some fond memories to catch up on. Don't forget to send in your questions, stories and photos about classic radio restoration. I'll do my best to answer you in the column if the topic lends itself to a broad audience. See you right here next month! ■

ADVERTISERS' INDEX

Advertiser	Page #	Website Address
AOR USA, Inc.	Cov. III	www.aorusa.com
Advanced Specialties	55	www.advancedspecialties.net
Antique Radio Classified	75	www.antiqueradio.com
Atomic Time, Inc.	27	www.atomictime.com
C. Crane Company	55	www.ccrane.com
CQ Bookstore	15,53	www.cq-amateur-radio.com
CQ Magazine	28	www.cq-amateur-radio.com
CQ VHF Magazine	67	www.cq-vhf.com
Computer Aided Tech.	43	www.scancat.com
Everhardt Antennas/Marvel Comm.	51	www.everhardtantennas.com
Grundig/Eton	8,9	www.etoncorp.com
Homeland Security	49	www.ready.gov
ICOM America, Inc.	Cov IV	www.icomamerica.com
Lentini Communications	31	www.lentinicomm.com
MFJ Enterprises, Inc.	39	www.mfjenterprises.com
Monitoring Times	51	www.grove-ent.com
NILJON Antennas	55	www.niljon.com
PowerPort	55,79	www.powerportstore.com
REACT International, Inc.	10	www.reactintl.org
Radioworld, Inc.	23	www.radioworld.ca
Universal Radio, Inc.	1	www.universal-radio.com
W5YI Group, The	73	www.w5yi.org
Yaesu	Cov. II	www.vxstdusa.com

Reach this dynamic audience with your advertising message, contact Arnie Sposato at 516-681-2922, FAX 516-681-2926, or e-mail: PCAdvertising@aol.com.

readers' market

Advertising Rates for Readers' Mart: Non-commercial ads are 30 cents per word, including abbreviations and addresses; minimum charge $6.00 per issue. Ads from firms offering commercial products or services are $1.00 per word; minimum charge $20.00 per issue. Boldface words are $1.20 each (specify which words). Leading key words set in all caps at no additional charge. All ads *must be prepaid in full* at time of insertion; a 5% discount is offered for prepaid 6 time insertions. All ads must be typewritten double spaced.

Approval: All ad copy is subject to Publisher's approval and may be modified to eliminate references to equipment and practices which are either illegal or otherwise not within the spirit or coverage scope of the magazine.

Closing Date: The 10th day in the third month preceding date of publication. Because the advertisers and equipment contained in Readers' Market have not been investigated, the Publisher of *Popular Communications* cannot vouch for the merchandise listed therein. Direct all correspondence and ad copy to: Attention: Classified Dept., PC Readers' Market, 25 Newbridge Rd., Hicksville, NY 11801.

COMMUNICATIONS MONITORING ANTENNAS, HF/VHF/UHF Super Discone $49.75, AntennaCraft Scantenna $47.70, 30–1200 MHz. 4–12 dB Log Periodic $69.50, 806–900 MHz. 13 dB 9 element Yagi $74.00, MURS/GMRS Dual Band Base $48.95. All prices **INCLUDE** Priority S&H&I. See these antennas plus many, many more for Amateur, Business, CB, and Monitoring radio, plus cellular phone antennas on the web at: **www.antennawarehouse.com** MC/Visa Order line 877-680-7818. To help maintain our low pricing, we do not print catalogs.

loose connection

radio communications humor

by Bill Price, N3AVY, chrodoc@earthlink.net

Memory Lane Goes To Washington

Editor's Note: Please take a moment this month in our departure from a truly humorous column to reflect on The Greatest Generation with Bill and the rest of America, when broadcast radio was barely two decades young.

Yesterday I witnessed the dedication of the World War II Memorial on the Mall in our nation's capital. I am fortunate to live only 45 air-miles from the Washington Monument and consider it a privilege to be able to attend such functions (though I've yet to be invited to an inaugural ball). I am a vet, but from the Vietnam era (but stateside all the while), and it was my dad who was a World War II vet. Fifth Army, Field Artillery, forward observer in France and Italy. I don't know if anything bad or dangerous ever happened to him; he wouldn't say. He only talked of the good times, and to him the camaraderie and the wonderful people in Italy made up all of his good times.

I took his picture with me to the dedication, and later we walked around the Memorial. We watched a two-hour performance of the Artie Shaw Orchestra, then more by the Eric Felton Jazz Band (which specializes in World War II-era music).

There was plenty of security, and it was good to see that none was needed. Six traffic cops could have handled the crowd. Everyone was respectful of everyone else. I thought for a while that I was on another planet. Old soldiers saluted young soldiers; the young ones stopped to talk and shake hands with the seniors.

This was also the weekend of Rolling Thunder, an event in which a bazillion veteran-bikers circle the D.C. beltway then visit the Vietnam Memorial to remind the world of those still Missing In Action and perhaps still held as POWs. Those leather-clad vets also attended the dedication of the World War II Memorial and added to the camaraderie and reverence of the event.

"What I did not see was any radios; radios of the communication type, that is."

There was the typical omnipresence of the cell phone, yet even the use of those hideous intrusions into the sanctity of life seemed limited on this day. What I did not see was any radios; radios of the communication type, that is. I think that all the medical personnel used cell phones if needed, and the numerous police departments in D.C. (you couldn't begin to name all the jurisdictions) use such small belt-mounted devices with earpieces or collar mics that they just blend in with the uniforms.

And not a ham radio to be seen.

I'm sure there was one, at least one, if not a dozen or so, but I never saw one. Nor did I hear one. There were enormous widescreen TVs every two or three hundred feet, so that everyone could see the ceremonies "up close" even though only a very special few (few thousand, that is) got to sit in the amphitheater set up by the new Memorial. And, if truth be told, those watching TV got a better shot of it all.

It seems that every military medical person stationed in or near D.C. was on duty there, in uniform, to be of service to our World War II vets, whose average age is now about 80 years. The weather was tailored specifically to those vets, and the day was more comfortable than any other in the entire recorded history of Washington, D.C., whose heat and humidity is more fitting for, say, Guatemala than for the Mid-Atlantic seaboard.

Wal-Mart must have donated 10,000 cases of bottled water, which was kept on ice and handed out freely to anyone, regardless of age or military involvement. They say that Wally-World is very vet-centered, and I tend to believe it. *The Stars And Stripes* listed it (and its employees/customers) as the number one private contributor to the design and construction of the Memorial. Interesting point about a company which so many think is out to take over the world.

"I thought often of how much he must have hiked through Europe, carrying far more than I was carrying, and in a much more hostile environment."

So I spent a long day, carrying a folding chair, some harmonicas, food, and water (I could have left the water home) and walking some 10 miles in all. My dad (well, his picture) was safely in my shirt pocket most of the day. I thought often of how much he must have hiked through Europe, carrying far more than I was carrying, and in a much more hostile environment. I remembered the shower I'd had before leaving for D.C., and realized that for him and a few hundred thousand others, a dunk in a creek might have been like a day at a spa during "the Big One."

I took out my dad's picture often and showed him the people and the events. I introduced him to a few vets who seemed as if they might have liked to have known him. At the end of the day, as the sun set, I showed him the Memorial itself, and the bright orange glare from the west side of the Washington Monument, seen from the new Memorial.

I think—I hope—that my dad had a good day. Yeah, I wish he were still alive to be there with me, but at least I had his memory along for the trip. ■

AOR SDU5600 Spectrum Display Unit

Spectrum Display Just Got More Interesting!

With sampling at up to six times per second, you're quickly aware of new active frequencies. The "waterfall display" function is a new convenience, along with a host of menu driven selections and features.

The AOR SDU5600 is the "next generation" in spectrum display units. Using a five-inch TFT color display, DSP and FFT (Fast Fourier Transform), faster sampling rates and color imaging, the SDU5600 opens the door to new possibilities and applications.

Enjoy full control of compatible AOR receivers. The 10.7 MHz input may be compatible with receivers from other manufacturers as well. PC control is also present, as is highly accurate frequency management.

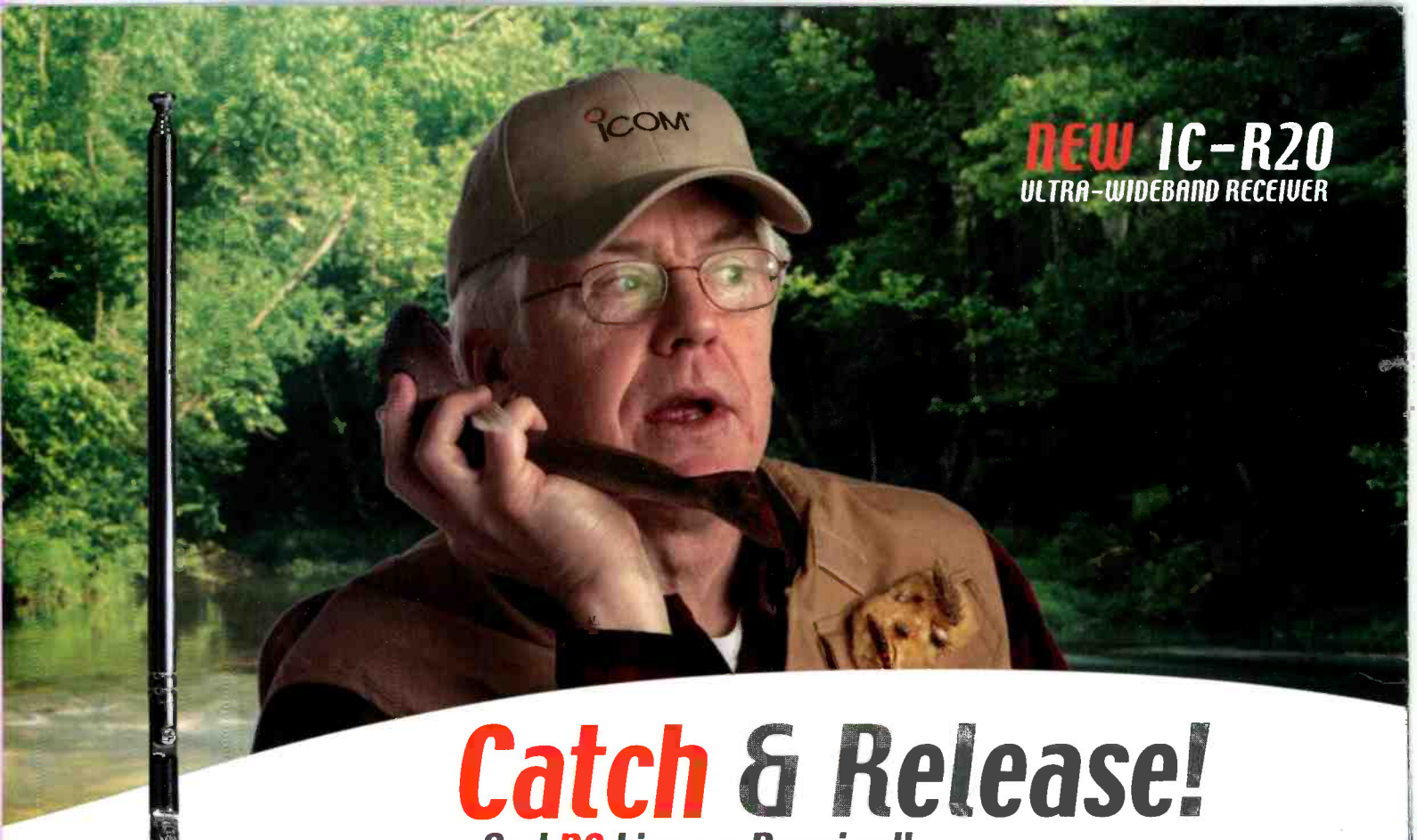
AOR SDU5600

- High resolution 5 inch color TFT display
- Built-in "waterfall" display function
- Now features FFT signal analysis
- DSP
- Uses 10.7 MHz IF input frequency
- Wide input level range: 0 ~ -90 dBm
- High dynamic range, 60 dB
- Fully interactive with AOR AR5000 models, AR8600, AR-ONE
- 10 MHz bandwidth (± 5 MHz from center frequency)
- Samples up to 6x per second
- Four frequency resolutions: 4, 32, 64, 128 KHz
- Image output to your PC
- Bus signal can be saved to memory
- Graphic display and statistical (text) data
- Menu driven operation
- Two RS-232C ports for receiver and computer control
- Easy to operate

AOR
Authority On Radio Communications

AOR U.S.A., Inc.
20655 S. Western Ave., Suite 112, Torrance CA 90501, USA
Tel: 310-787-8615 Fax: 310-787-8619
info@aorusa.com http://www.aorusa.com

The Serious Choice in Advanced Technology Receivers™



NEW IC-R20
ULTRA-WIDEBAND RECEIVER

Catch & Release!
And NO License Required!

Casting around for your next strike in a handheld receiver/scanner? Scale up your listening pleasure. On-the-fly, Icom's IC-R20 allows you to digitally record and play back up to 4 HOURS* of whatever you want to tune in on. *Zzzzzzzzzing!*

- **150kHz – 3.3GHz** (cellular blocked)
- **SSB/CW/AM/FM/WFM**
- **Dual Watch** – on the R20's easy-to-see, dot-matrix LCD. It, and the keypad, has backlighting
- **Internal Bar Antenna** – for improved low-band reception
- **1250 Memory Channels** – enter by front panel, or by optional PC software
- **Icom's Dynamic Memory Scan (DMS)** – store memories in up to 18 banks of 100, then mix and match your memories to scan as you like. Plus link the banks!
- **1650 mAh Li-Ion battery** – powerful, lightweight, and lasts for many hours of listening pleasure. Recharger included
- **Telescoping Antenna** – multi-angled, with popular BNC connection
- **CTCSS/DTCS/DTMF Decode** – listen in on the repeaters and "channelized" transmissions
- **Pre-Set Most Popular Memories** – fast access to all broadcast TV and FM radio frequencies
- **And Much More!** – Auto Squelch, Noise Blanker, Auto Noise Limiter, Attenuator and RF Gain controls, Multiple Scan functions (including Voice Scan Control), CI-V ready, and still more! Even a USB cloning cable is included!

Stop floundering and start listening, even if just for the halibut. With the R20, you'll be shouting WAHOO! Perch yourself at your favorite authorized dealer – they'll net you a reel good deal!

Dual Watch Between Bands!

www.icomreceivers.com
download frequencies right from the web

Coming Soon!
Download the FCC registered frequencies for any U.S. area–FREE.
Then download them straight into your R20 using Icom's optional cloning software.

Strike! Zzzzzzzing!

www.icomamerica.com

ICOM®

*1, 2 or 4 hours, depending on record compression level.