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

45635

POPULAR COMMUNICATIONS

JULY 2005

Is It Safe To Use That Mobile Rig?

- Tokyo Rose: Infamous WWII Broadcaster Never Existed—Now, The Rest Of The Story
- Tech Showcase: Magellan's RoadMate 700 GPS—Getting Lost Is A Thing Of The Past

U.S. $4.99 / Canada $6.99

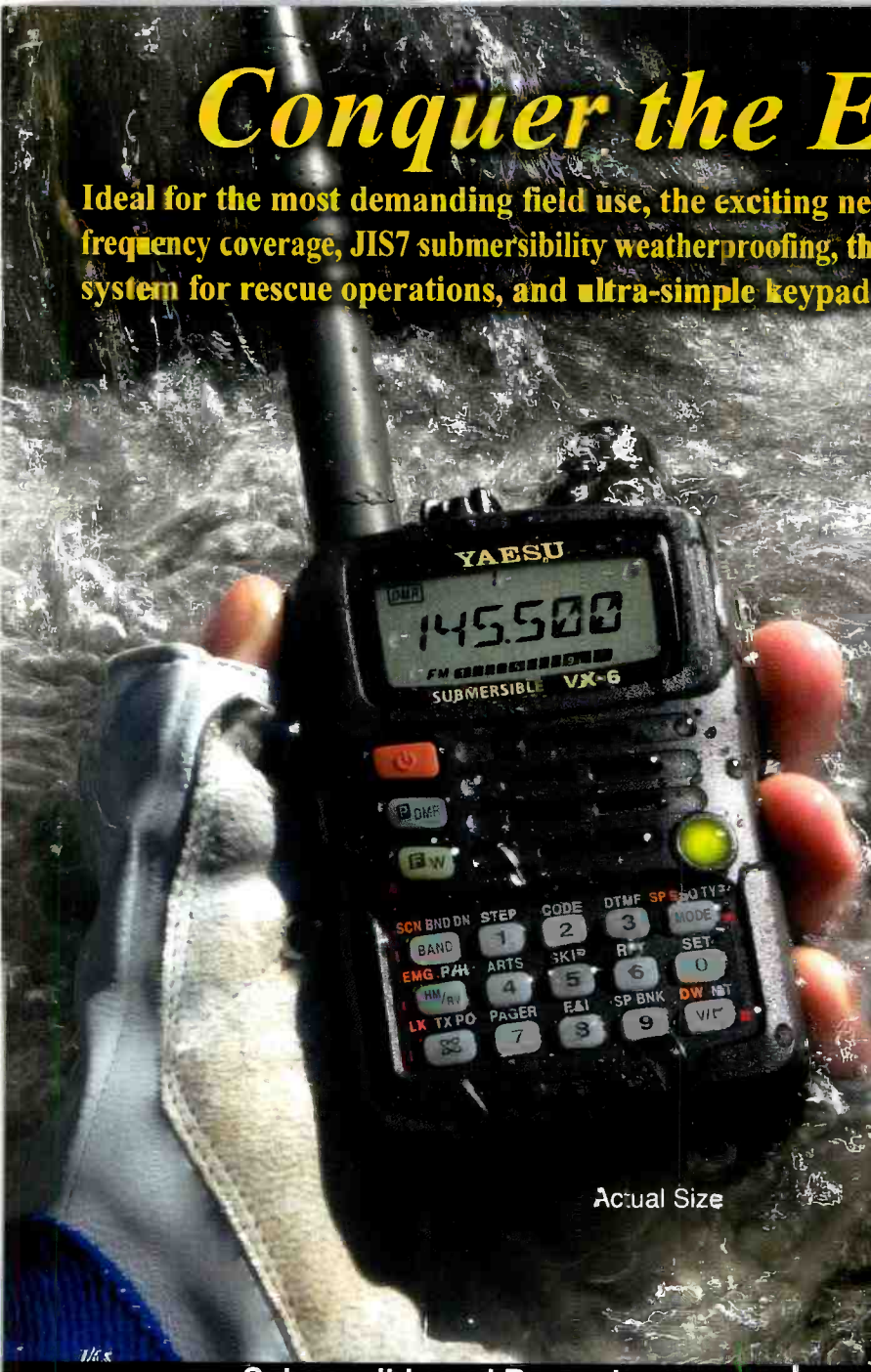
07>

0 09128 45635 5

PLUS: Software-Defined Radio • It's "Tropo" Time • Building A Shortwave Antenna • Military Tech Update

Conquer the Elements!

Ideal for the most demanding field use, the exciting new YAESU VX-6R features wide receiver frequency coverage, JIS7 submersibility weatherproofing, the Emergency Automatic Identification (EAI) system for rescue operations, and ultra-simple keypad access to the features you need now!



- Compact size, utilizing a rugged case with weatherproofing O-rings, rated to JIS7 submersion specifications (immersion to 3 feet for up to 30 minutes).
- High-capacity (1400 mAh) FNB-80LI Lithium-Ion Battery Pack provides a typical 5-Watt operating time of 7 hours.*
  *(144 MHz, duty cycle of 6 minutes TX, 6 minutes RX, 48 minutes standby)
- One-touch Direct Memory Recall (DMR) access to most important memory channels (similar to channel access on a car stereo).
- Large concentric control knobs for easy adjustments while wearing gloves.
- Wide frequency coverage: 504 kHz – 998.99 MHz (cellular blocked and non-restorable).
- 900 Memory Channels with alpha-numeric labels assignable into 24 Memory Banks.
- Internal temperature sensor built in, with barometric pressure display via optional SU-1 module.
- External DC operation capability while charging battery pack.*
  * Transmission not possible when just using charger connections.

144/430 MHz* Dual-Band Submersible FM Transceiver

VX-6R

*222 MHz band @ 1.5 W included.

Submersible and Rugged

Magnesium rugged, feature packed top of the line

5 W

VX-7R/RB

Field-ready, compact, and easy to use

EAI

5 W

VX-6R

Ultra-Rugged

Rugged Dual-Band HT with EAI

EAI

5 W

FT-60R

Ultra Compact

Tiny yet tough, and feature-packed

1.5 W

VX-2R

EAI : Emergency Automatic ID

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.

AOR AR7030 PLUS

The AOR AR7030+ is the result of a combined project between the AOR Company of Japan and a designer group in England. The AR7030+ represents the very latest and best design featuring exceptionally strong signal handling and is bristling with enhanced features. It offers greater than +35dBm IP3 and 104dB dynamic range (SSB, 2.2kHz, 20/-9kHz spacing). This coupled with excellent selectivity, makes the AR7030 a strong choice for the shortwave broadcast listener or DXer. Although performance is excellent, features have not been forgotten. You get: Synchronous AM, Passband Tuning, four levels of attenuation, dual VFOs and 24 hour clock-timer. The 400 scannable memories store frequency, bandwidth, PBS, Squelch and BFO settings plus alpha tagging. The mini headphone jack will accept a mono or stereo 3.5mm plug. The two line 48 character backlit LCD gives you the status of the receiver. The AR7030+ comes with four standard bandwidths. There is a 2.2 kHz filter for SSB. There is a Murata CFK455J 4.0 kHz for AM DXing (displays/sounds like 3.7 kHz in this radio). There is also 5.5kHz AM filter and a 9.5 kHz filter for NFM. The *supplied* full-featured 32 button infrared remote provides access to virtually all facilities including: volume, tone, numeric keypad, memories, PBT, filter selection, etc. A remote RS-232 level port is also provided for computer control. Made in England. Includes 120 VAC wall adapter. We invite you visit our website or request a color spec sheet for options and further information regarding this impressive receiver. *Order #3396* **$1489.95**

RFspace SDR-14 NEW!

The RFspace SDR-14 is a 14-bit software defined radio receiver, offering a broad range of spectrum analyzer and demodulation capabilities. The hardware samples the whole 0-30 MHz band using a sampling rate of 66.667 MHz. The digital data from the ADC is processed into I and Q format using a direct digital converter (DDC) and is then sent to the PC for processing using a USB 1.1 interface. All of the demod and spectral functions are done on the PC side. Supported formats include USB, LSB, AM, FM, WFM, CW, CWr and DSB. Filter bandwidths are continuously adjustable. DRM is now supported via special demod mode using third-party software (DREAM) by routing the demod audio through the mixer control. The SDR-14 supports high resolution spectral captures using up to 262144 point FFTs. The maximum spectral display width is 30 MHz simultaneously. One of the most exciting features of the SDR-14 is the ability to record band segments of any band to hard drive in realtime. This is done at a rate of 52GB/day for a 150 kHz wide segment. The stored file contains everything that happened in that segment of the band for the duration of the recording. The fidelity of the file is superb with over 96dB of dynamic range. The recording can be played back at any time with full tunability and choice of modes. The recording can also be analyzed for hidden signals and carriers. The SDR-14 comes with AC power supply, USB cable and computer CD. Please vist the Universal website to view screen shots, spectrograms and for complete specficiations. *Order #0014* **$999.95**

TEN-TEC RX-340

Universal is pleased to offer the Ten-Tec RX-320D, RX-340 and RX-350D receivers. Visit our website for details Model RX-340 shown. **$3950.00**

ICOM R75

Universal Radio is pleased to continue to offer the ICOM R75 receiver. 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 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 formerly optional **UT-106 DSP board** is now included and factory installed! The IC-R75 is truly a great value. *Order #0175* ~~$692.00~~ **$549.95**

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

www.universal-radio.com

◆ **Visit our website for more exciting new *and* used shortwave radios.**

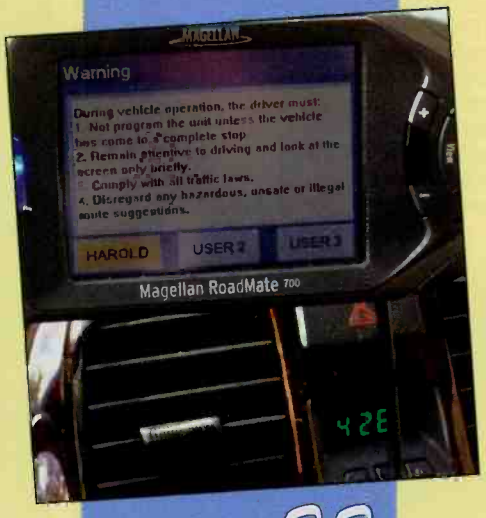
- Visa
- MasterCard
- Discover
- JCB

- Prices and specs. are subject to change.
- Special offers are subject to change.
- Returns subject to a 15% restocking fee.
- Prices shown do not include shipping.

Contents

POPULAR COMMUNICATIONS
Volume 23, Number 11 July 2005

12



22

26

Departments

On The Cover

A hearty "welcome back" to writer Jock Elliott, our new "On-The-Go Radio" columnist! His first column strikes a nerve with the question: "Is It Safe (To Use That Mobile Rig)?" Don't get caught on the road without his painless solution to protecting yourself—and your radios—from over-zealous cops! Read the new "On-The-Go Radio" column beginning on page 44—and be safe! (Photo by Larry Mulvehill, WB2ZPI)

Visit us on the Web: **www.popular-communications.com**

by Harold Ort, N2RLL, SSB-596

Diagnosis: Arrested Development

Following the President's announcement that FCC Commissioner Kevin J. Martin would chair the FCC, I got this sinking feeling as if I was in an endless dream—nightmare is probably more accurate—where I'm forever falling into a large Government Abyss with no way out. Frankly, I thought the President had his sights on Rebecca "Becky" Klein for the position, but it wasn't to be. I should have known; after all, a woman as Chairman? It's *still* a good-old-boy network, despite Klein's closeness to the President.

But I suppose, in hindsight the face doesn't matter as long as the head only nods up and down, not sideways. Usually, when the Top Government Dogs leave and the next ones come in, there are very few substantive changes. And despite the fact that Martin has butted heads with former Chairman Powell in the past, my gut tells me it'll be business as usual.

Chairman Martin, a 38-year-old attorney who has been with the Commission for four years, is from North Carolina. Now, I really hope he doesn't have any memory problems, but just three short months after ARRL CEO David Sumner, K1ZZ, met with Martin in July 2004, and was reassured that Martin would, according to the League, "take them seriously" and address BPL interference complaints, the Commission unanimously adopted new BPL rules *and* continued to virtually ignore BPL interference complaints. Seems to me that since Chairman Martin certainly had more than an inkling that he just might be on the short list for Chairman, he'd remember what he talked about with Sumner and company. If that were me, I'd have Post-It notes all over the wall reminding myself of pending problems and how I said my staff and I would look into them and fix them if I became Chairman.

But even as Chairman Martin took office, Mr. Sumner told him and the radio community, "Unfortunately, I must advise you that the Commission's record of addressing BPL interference has proved to be woefully inadequate." Sumner continued, citing continued BPL interference complaints, "To date the Commission has not ordered a single BPL system to be shut down, despite the failure of BPL system operators to resolve interference." He went on to call the BPL fiasco a "sorry situation."

Pretty strong words from the League, wouldn't you say? They're to be applauded for taking on the new Chairman *at the onset*, and Mr. Sumner himself gets a Big Gold *Pop'Comm* Star for telling it like it is on BPL. League members can say what they will about the organization, but Sumner's continued riding of the power utilities and Commission about the *seriously* flawed BPL concept and the Commission's love of the wrong technology all in the name of dollar signs is no easy task. For my dues, he's doing a fine job!

But the FCC's often sophomoric and less-than-professional attitude toward our radio community when it comes to BPL is another story. Some days I wonder how some of our public servants—like closed-minded delinquents—lost touch with reality. This isn't the FCC my father knew, that's for sure. (Then again, come to think of it, back in the mid/late '60s, Dad really never *knew* the FCC, much less gave a hoot what they did, as long as the enforcement truck didn't pull in to our driveway). That really was a different time in a lot of ways, wasn't it? We were at the height of the CB craze, more vehicles sported long whip antennas than there were enforcement officials and monitoring sites to keep track of the mess, there was no media monopoly, and grassroots radio in Middle America was still thriving. Times certainly change quickly!

I'll bet that if you were to poll a fairly large cross-section of America you'd find most folks don't know much about the Commission, much less than, say, the IRS, for example. The key difference between the two is in the way the Commission "takes" and "uses" your money. Still, those 1,933 Commission employees in six operating bureaus and 10 staff offices are still ever-vigilant in matters of enforcement, legal issues, rules, regulations, telecommunications, media, and a load of other areas. To be sure they know about the enforcement end of the stick, like fines against radio stations for profanity, overly explicit on-air antics, and errant two-way radio operators. But beyond that, it's largely an agency Joe Six Pack takes for granted. His taxes pay the salaries, but, oh man, that revolving door might as well have a big green $ symbol in the logo and on the sign outside the Portals II building.

People evolve and get smarter (most of us, anyway). Of course we know there's no going back to those days when our radio stations had live *local* on-air personalities, gave local weather, talked about local issues, and there was real variety on radio, but as citizens we *can* still be as active with the keyboard as we are with our push-to-talk buttons. You see, it's easy to row the boat from the shore and let the power brokers do our bidding—although it's a whole *lot* easier if we do nothing, but the consequences are obvious. It's a whole lot more comforting to be an *active* participant in our system, helping set the direction our Commission takes. Jogging their collective memory with a few phone calls and letters is sometimes all it takes.

We respectfully ask Chairman Martin to do *everyone* a service by really listening to—and remembering—those he serves and pulling back from the BPL brink. The clock is ticking. And we're growing weary of the double-talk.

Meanwhile, I'm here sitting under the tree on the lawn chair just outside the Portals II building, waiting for that Kodak Moment when Commissioner Kathleen Q. "Broadband Nirvana" Abernathy permanently leaves the building. I *do* remember, and hope you do, too. Besides, she'll probably leave via the side entrance, but when the door closes behind her, I feel good knowing I've given the doorman a crisp, cool $20 bill to give it an extra nudge on behalf of all radio hobbyists who care. ■

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.*

Use It Or Lose It?

Dear Editor:

Earlier this year, I read that one of the biggest "barriers" to implementing the next generation of wireless computing devices was a minority of ham operators sitting on huge swaths of unused radio channels (Mobile PC). Never mind that hams traditionally pioneered new modes and ever higher frequencies; they're not being used. I guess the problem is twofold: 1) encouraging people to become hams; and 2) encouraging them to try out the higher frequencies. Any suggestions? (You might have noticed the lack of a callsign. Perhaps I need some encouragement, too.)

Mike Neary
via E-mail

Dear Mike:

Thanks for your letter. My words of encouragement are what my wife tells me about exercising: just do it. Now, sometimes getting off my duff is easier said than done, but getting licensed is simply a matter of wanting to enjoy radio's many FUN aspects and studying to get that license. Go for it, Mike. You'll be glad you did.

He's Been There, Done That, And It's A Sore Subject!

(Editor's Note: The following letter is from one of our fine troops who is now back home after serving in Iraq and the Middle East. It is typical of the many we have received regarding supplying our troops with much-needed radios after our March 2005 article to which he refers. While nine out of 10 correspondents understood what we were talking about and how the "system" is, according to the many troops we've heard from, not performing as one would expect it should in the 21st Century, there were, of course, those who think our troops have no business "complaining" and should wait for the supply system to serve their needs. The thinking—if you want to call it that—is that to use an "unofficial" CB or FRS radio puts their lives in jeopardy. I find that logic rather amazing, frankly. I ask the Pentagon paper-pushers and manual writers who haven't been on the ground in this dangerous situation to stand up with the local media at your side at just one serviceperson's funeral. Then I'd like to see them tell the parents and families of that brave soldier or Marine that he or she didn't have proper vehicle armor, radios, or other military gear, but that's acceptable and troops need to, as one writer said, "suck it up." Having been there during the first Gulf War, I know firsthand that troops will and must do what they have to do if the system can't do it for them. If that means using an unauthorized knife, flashlight, bandage, or radio, they'll always opt for survival, despite what the manual says.)

Dear Editor:

It is with regret that I did not see that issue of *Popular Communications* [March 2005, "Speaking With One Voice"]. Being prior-service Signal Corps-turned truck driver, communications within the theater [Iraq] is a sore subject with me.

If I am permitted to say, intervehicular communications was SEVERELY lacking in ALL of the convoys I was on. I, along with the rest of the 1836th Transportation Company of Ft. Bliss, Texas, recently returned from 12 and a half months convoying throughout Kuwait and Iraq. There were at least three of us ham operators who protested when they refused to let us bring our 2-meter rigs along due to COMSEC/OPSEC, but all us NCOs pitched in to purchase some FRS/GMRS handhelds that we discovered couldn't cover the length of our serials.

Needless to say, after that first convoy my next week and a half was spent installing donated CB radios in our 90-some HETS [Heavy Equipment Transport System]. Most of those radios

(Continued on page 35)

POPULAR COMMUNICATIONS

EDITORIAL STAFF

Harold Ort, N2RLL, SSB-596, Editor
(E-mail: Popularcom@aol.com)
Tom Kneitel, K2AES/SSB-13, Senior Editor
Edith Lennon, N2ZRW, 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
Joseph Cooper, Computer-Assisted Radio
Gerry L. Dexter, Shortwave Broadcast
Steve Douglass, Utility Communications
Jock Elliot, KB2GOM, Mobile Communications
Richard Fisher, KI6SN, Legislative Affairs
Bill Hoefer, KBØULJ, Aviation Communications
Shannon Huniwell, Classic Radio
Kirk Kleinschmidt, NTØZ, Amateur Radio
Tomas Hood, NW7US, Propagation
Bill Price, N3AVY, Humor/Communications
Ken Reiss, Technical/Scanning
Dave Schmidt, AM/FM Broadcasts
Bob Sturtevant, KD7KTS 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
Doris Watts, Accounting Department
Melissa Gilligan, Operations Manager
Cheryl DiLorenzo, Customer Service Manager
AnnMarie Auer, 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.

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

News, Trends, And Short Takes

CQ Magazine Announces DX Marathon

CQ magazine recently announced the revival of the long-dormant CQ DX Marathon, last run in 1948. The new CQ DX Marathon will essentially be a year-long DX contest, with stations competing to contact as many different countries ("entities") and CQ Zones of the World as possible over a full-year period, then starting again at zero at the beginning of the next year. The new CQ DX Marathon is part of *CQ*'s broader "Waking Up DXing" program, the goal of which is to reinvigorate DXing, or contacting hams in faraway places. The program was outlined for the first time at the International DX Convention in Visalia, California, on April 16.

"DXing has always been the heart of ham radio," says *CQ* Editor Rich Moseson, W2VU, "and it continues to be the biggest thing that sets us apart from other forms of electronic communication. Healthy DXing activity is vital to the long-term health of amateur radio."

Bob Locher, W9KNI, of Idiom Press, provided the inspiration for the new activity and joined in the announcement at Visalia. "Many active DXers have noticed a drop-off in general DXing activity outside of contests and DXpeditions," notes Locher. "I suggested that *CQ* start up an event that would promote activity all year long, would minimize geographic advantages, and provide for simple scoring. It turns out that the CQ DX Marathon, which evolved after 1948 into the CQ World Wide DX Contest, was already based on the same concepts."

Scoring will be very simple, consisting of the total number of DX entities and CQ zones contacted over the course of a year. There will be no multipliers and each country and zone will count only once. In the case of a tie, the station whose last qualifying contact came earliest in the year will be the winner.

Complete details and rules for the new CQ DX Marathon can be found in the May issue of *CQ* magazine and will be posted on the CQ website (www.cq-amateur-radio.com) after the issue is in subscribers' hands. The first running of the event will be in 2006.

Australian Broadcasting Corporation Integrates Mobile Content

The Australian Broadcasting Corporation (ABC) has signed an agreement with Mobile 365, a provider of mobile messaging services, to supply its SMS (Short Message Service), IVR (Interactive Voice Response), MMS (Multimedia Messaging Service), and other WAP (Wireless Application Protocol) services. The provision of telephone information services to its TV and radio audiences and online users promotes and encourages audience interaction via mobile phone. This may be used to extend the life of programming, determine future programming, inform and educate new audiences, reflect the viewpoint or tastes of Australian society, or stimulate debate on contemporary issues.

Mobile 365's mobile applications platform manages both inbound and outbound services. Inbound services will incorporate votes, polls, and comments. A wide variety of outbound services is offered, including sports, news, weather alerts, and members clubs. By integrating mobile content with information feeds into the one platform, the ABC can offer users the ability to personalize their ABC service by setting up a profile and updating alert schedules. Users check in via their mobiles or the Web and the service provides them with numerous choices and expanded options.

Voice Of America Starts Newscast Service In Indonesian Language

Voice of America has begun delivering Indonesian language newscasts 25 times a day to its network of more than 200 radio affiliates in Indonesia. The new service, VOA Headline News, will, according to the VOA, "...deliver the freshest news possible every 30 minutes during the 12-hour period." The service was developed in response to Indonesian radio stations' requests for short newscasts throughout the day. Each newscast will cover world, regional, and U.S. news. The daily program will air every half hour between 0030 and 1030 UTC and a second segment between 1300 and 1630 UTC. VOA's Indonesian Service broadcasts an average of four and a half hours per day of news and information programming to Indonesia. Its radio programs are carried by more than 200 AM/FM affiliates across Indonesia.

Commencement Of The Digital Radio Mondiale Patent Licensing Program

Via Licensing Corporation, in association with the Digital Radio Mondiale (DRM) Licensing Committee, has announced the commencement of the Digital Radio Mondiale patent licensing program. The DRM patent pool brings together the essential DRM patents of multiple companies, making it straightforward and convenient for product manufacturers to acquire the rights from all of these licensors in a single transaction. The existence of a patent-pool licensing program providing access to a standard set of terms offered on a reasonable and nondiscriminatory basis ensures a level playing field on which a competitive market can develop for manufacturing and selling DRM-based products. The DRM patent pool includes patents essential to both the audio-coding and radio-transmission aspects of the DRM standard. Manufacturers and developers of professional encoding or transmission/monitoring products, as well as manufacturers of consumer receiver products, will benefit from the availability of this license.

Korea Ready To Launch Digital Multimedia Broadcasting

The Korean Broadcasting Commission has selected six broadcasters to launch the country's terrestrial digital multimedia broadcasting (DMB) services. Some of the services, including those of the public Korean Broadcasting System, are expected to start immediately, with the rest joining later this year. There will be six video channels, 18 audio broadcasts, and six data programs offered free in Seoul, Inchon, and Kyonggi Province. Users will have to purchase a terrestrial DMB-enabled handset to receive them. The system will be expanded nationwide next year.

(Continued on page 38)

RE_INVENTING RADIO

Through_Innovation

† XM Satellite Radio service and antenna sold separately.

E1

AM/FM/Shortwave/XM Ready Radio $500*

XM Radio offers hundreds of music, news, talk, and sports programming channels

- High-Performance receivers for international and local radio listening
- User-defined station memory presets with customizable organization
- SSB • Passband tuning • Synchronous detector
- Direct frequency entry for all bands
- Shortwave range of 1711 – 29,999 KHz
- 1700 station presets with memory scan function

Dimensions: 13.1"L x 7.4"H x 2.6"W Weight: 4lbs. 3oz.
Power Source: 4 D batteries (not included) or AC adaptor (included)

*Prices do not include Shipping/Handling and applicable taxes. To order please call us toll free at 1-800-793-6542

E100

AM/FM/Shortwave Radio $100*

Full-Size Features in Your Palm or Pocket

- Shortwave range of 1711 – 29,999 KHz
- 200 programmable memories
- Memory page customization
- Manual & auto scan
- Direct keypad frequency entry
- Clock with alarm, sleep timer & snooze functions

Dimensions: 4.9"L x 3"H x 1.2"W Weight: 7oz. Power Source: 2 AA batteries (included) or AC adaptor (not included)

E10

AM/FM/Shortwave Radio $130*

Intelligent Features, Strong Performance

- Shortwave range of 1711 – 29,999 KHz
- 550 programmable memories
- Memory page customization
- Manual & auto scan
- Direct keypad frequency entry, ATS
- Internally recharges included Ni-MH batteries
- Clock with alarm, sleep timer & snooze functions

Dimensions: 7.4"L x 4.6"H x 1.4"W Weight: 1lbs. 8oz. Power Source: 4 AA Ni-MH batteries (included) or AC adaptor/charger (included)

*Prices do not include Shipping/Handling and applicable taxes. To order please call us toll free at 1-800-793-6542

etón®
RE_INVENTING RADIO
www.etoncorp.com

Tokyo Rose: The Rest Of The Story

She Had A Crush On Jimmy Stewart, And Was A Registered Republican!

by R.B. Sturtevant, KD7KTS

She was probably, the most famous—or infamous, depending on your viewpoint—radio personality in the history of broadcasting, with an audience of hundreds of thousands spread over millions of square miles. Everyone who was anyone at the time—especially in the U.S. government—listened to her. Her name was Tokyo Rose, and one of the most important facts about her history is that she never existed.

Tokyo Rose was a general term created by the GIs who tuned in to *dozens* of female radio announcers who broadcast propaganda for the Japanese during World War II. Tokyo Rose was a composite of Foumy Saisho, who used the name "Madam Tojo," Myrtle Lipton (aka "Little Margie"), Ruth Hayakawa (aka "Nightingale of Nanking"), Iva Toguri (aka "Orphan Ann or Annie"), and dozens of others, with names like "Manila Myrtle" and "Manila Rose," who all could put forth a soft, pleasant female voice without too much trace of a foreign accent.

In an official statement issued in August of 1945, the U.S. Office of War Information said, "There is no 'Tokyo Rose'—the name is strictly a GI invention. The name has been applied to at least two lilting Japanese voices on Japanese radio...Government monitors listen in 24 hours a day and have never heard the words 'Tokyo Rose' over a Japanese-controlled Far Eastern radio." The only American citizen broadcasting for the Japanese was Iva Toguri. *She* was the one sent to prison and fined for being the famous Tokyo Rose.

Perfect American Girl

Iva Toguri was the "perfect" American girl. Born on the 4th of July in 1916, she was the daughter of Japanese immigrant parents living in south central Los Angeles. Raised as a Methodist, she never learned to speak Japanese at home. She listened to *The Shadow* and *Little Orphan Annie* on the radio, joined the Girl Scouts, played varsity tennis, took piano lessons, and had a crush on Jimmy Stewart. She took care of her diabetes-crippled mother and wanted to become a medical doctor. To this end she enrolled in UCLA and graduated with a Bachelor's Degree in Zoology in 1941. In 1940, she registered as a Republican in order to vote for Wendell Wilke.

After she graduated from college, Toguri's family learned that an aunt was very ill and needed medical care. Japanese family tradition required that a family member be sent as a representative to provide this care. Unable to get a passport processed quickly, Toguri left the country with a Certificate of Identification. The Certificate, she was told, would get her into the country and a passport could be applied for at the U.S. Embassy in Japan. Toguri listed her occupation as pre-medical student and the purpose of her trip as providing care for a sick relative and looking into the possibility of attending medical school in Japan. She left the day after her 25th birthday, July 5, 1941.

Iva Ikuko Toguri refused to give up her American citizenship yet broadcast for the Japanese as "Orphan Ann." She was tried and convicted of being Tokyo Rose, a person who never existed. (All photos courtesy of Dafydd Neal Dyar and his Dyar Straights website, "Orphan Ann Home Page")

Japan was no wonderland for an American girl, but Toguri tried to put a good face on her situation. After a few months, she wrote her family in Los Angeles "I have gotten used to many things over here and I think that in a few more months that I will be able to say that I don't mind living in Japan. It has been very hard and discouraging at times but from now on it will be all right I'm sure."

Her family in California told Toguri of the racial discrimination they were beginning to experience as tensions between Japan and the United States grew more pronounced. She encouraged her family not to return to Japan. Toguri was seeing for herself that Japanese society was becoming no better than Nazi Germany. Some have said that the Kempeitai (Japanese Secret Police) could have given lessons to the Gestapo, and if not, they both played in the same league. There were 100,000 American citizens in Japan at the time of the Pearl Harbor attack, and the Kempeitai was watching all of them.

She Wanted To Return To America

In September of 1941, Toguri applied to the U.S. Vice Consul for a passport and stated that she wished to return to America for permanent residence. Because she had left the country without a passport, her request was forwarded to the State Department for processing. On December 8 war was declared and diplomatic relations between the two nations were broken off. No further actions could be taken by American authorities with regard to her request.

Toguri applied to the Swiss Legation for repatriation to the U.S. For some reason, possibly Kempeitai pressure or the difficulty of the process, she withdrew her request and stated that she would remain in Japan for the duration of the war. Toguri

Toguri on the air with her show "Zero Hour."

repeatedly requested to be interned as an enemy alien, but was always refused. By this time she had enrolled in a Japanese language and culture school to help herself fit into Japanese society. Through all the persecution and suspicion, Toguri doggedly refused to give up her American citizenship. Many Japanese-Americans did succumb to 3 a.m. raids, coming home to find all their belongings in the street, and frequent questionings that lasted for days. They registered as Japanese citizens simply to make the Kempeitai stop bothering them.

No Place To Go

The Kempeitai was noted for throwing even loyal Japanese into prison, or even killing them, on little or no pretext. Having a foreigner in your neighborhood was not a good idea. Her relatives threw Toguri out of their homes because of complaints from the neighbors that she might be an American spy. It had also been noted that she had become very excited and cheered the Doolittle Raiders, even though she was forced to take cover in a bomb shelter.

To support herself Toguri got a job as a typist at the Domei News Agency in mid 1942. It was here that she ran across a news story listing families relocated to Gila River Relocation Center in Arizona. Her family was listed, and she learned that her mother had died en route.

In August 1943, Toguri took a second part time job at Radio Tokyo typing English language scripts. Here she met Major Charles Cousens, an Australian Army Officer captured at Singapore, and American Captain Wallace Ince and Lieutenant Normando Reyes of the Philippines Armed Forces, both captured at Corregidor. Ince and Reyes had been running a radio station encouraging the Philipino people to continue resistance when they were captured.

The three officers were already playing a dangerous game. Cousens had been a leading radio personality in Sidney before the war. He and the others had been forced by torture and starvation to produce propaganda broadcasts for the Japanese. They fought back by making on-the-air flubs, using innuendoes, double entendres, and sarcasm as well as giving rushed or mumbled readings. When their Japanese overseers became aware of this kind of sabotage, they resorted to mechanical intonations to sound like men being forced to read at gunpoint.

A Show Aimed At Americans

At first the three thought that Toguri was a Kempeitai spy planted in their midst. After a couple of months, however, they recognized her as someone they could trust and let her in on their secret. One of the problems Cousens had been having was moving around the radio station-POW compound and elsewhere freely. The rules said he could move more freely if he was accompanied by a Japanese companion. Toguri provided this cover. She also provided the prisoners with food, medicines, and other forbidden items from the black market.

About this time someone in the Japanese Army came up with the idea of putting on a show especially aimed at the Americans to make them homesick. The show was called "Zero Hour," and producing it fell in Cousens' lap. He immediately requested Toguri for the female voice of his program. George Mitsushio and Ken Oki, both Americans who had surrendered their citizenship, were supervisors responsible for the program and both agreed to Cousens request. Toguri reluctantly accepted the assignment and began to make broadcasts, at first anonymously. Her part of the 75-minute program involved about 20 minutes total time. She spoke in the opening and closing with a few light-hearted comments; the balance of the time was taken up with music and propaganda read by others.

In time, the Japanese authorities required that all on-air personalities to be identified by a name. Because Cousens always marked Toguri's speaking parts as ANN, short for announcer, Toguri used Ann or Annie for her name. She called herself Orphan Ann because she wanted to identify with the GIs she was talking to. Cousens' scripts often referred to them as the "Orphans of the Pacific." She would open the program with something like "Greetings everybody! This is your Number One Enemy, your favorite playmate, Orphan Ann on Radio Tokyo—the little sunbeam whose throat you'd like to cut! Get ready again for a vicious assault on your morale, 75 minutes of music and news for our friends—I mean, our enemies!—in the South Pacific." Her closes would be something like "According to union hours, we are through today! We close off another chapter of free propaganda in the form of 'Music For You'—for my dear orphans wandering in the Pacific. There are plenty of non-union boffs coming around the corner, so be seeing you tomorrow, but in the meanwhile always remember to be good!"

Zero Hour also gave out the names and serial numbers of POWs held by the Japanese as well as their home addresses. Toguri felt good about this at the time. In most cases it was the first word that families of the POWs had that their loved ones were still alive.

Toguri also used Cousens' resistance techniques. For example, one of the terms Cousens frequently used was "bone heads," an Australian equivalent of American "dog faces." Toguri often read the phrase as "boon heads," very risky when you consider there were English speaking censors in the room that could have her killed.

Changes—And Arrested By Americans

Things started to change at Radio Tokyo when Cousens suffered a heart attack and had to be hospitalized. Ince had already been taken away for insubordination and Reyes was declared a "friendly alien" when the Philippines was annexed by the Japanese. This left Toguri rewriting Cousens' old scripts and trying to keep faith with the work the four had started. She continued to be outspoken about her support of the allies off air and found company only in the person of Felipe d'Aquine, a pro-American Portuguese with Japanese ancestry whom she married in 1945. Toguri started staying away from work and took a month off without permission to convert to Roman Catholicism before her marriage. It was a great relief to her when the war ended.

When MacArthur's troops established themselves in Tokyo, Toguri was arrested as a War Criminal and kept in the same

prison as Prime Minister Tojo. She freely admitted what she had done, gave interviews, and thought herself something of a celebrity. The Army's Counter Intelligence Corps investigated her wartime activities and cleared her of any charges in October, 1946. Then she applied to go to America with her husband. Veterans groups protested her even being considered an American or allowed to enter the country. Walter Winchell demanded that she be brought back to face charges of treason. In 1948 she was taken, without her husband, by a squad of armed soldiers and put on a ship bound for San Francisco. Her father met her on arrival and barely had time to introduce her to her lawyer before she was arrested by the FBI, which then tried to interrogate her without counsel.

What followed was 13 weeks of the most expensive trial, at that time, in United States history ($750,000). Her old bosses, George Mitsushio and Ken Oki, testified against her, then both later admitted to perjury because of pressure exerted on them. Normando Reyes gave damaging testimony, which he later recanted saying he had lied because of prosecution threats. Cousens and Ince both came to her rescue at their own expense, but could not change what was becoming a kangaroo court. None of Toguri's activities to benefit the POW's were allowed into evidence. The scripts she had read from were also unavailable. The jury said they were unable to come up with a verdict and were forced back into deliberation by the judge. The same judge later admitted to an Associated Press reporter that he had been prejudiced against Toguri because he had a son who had served in the Pacific.

Toguri under arrest in Japan.

Charged with eight counts of treason, Toguri was found guilty of only one: "That she did speak into a microphone concerning the loss of ships." Toguri was only the seventh person convicted of treason in American history. The minimum sentence possible was five years in prison and a $5,000 fine. Toguri got 10 years and a $10,000 fine. She was taken to the Alderson Federal Reformatory for Women in West Virginia where she was considered a model prisoner and worked her way from supply clerk up to laboratory assistant. Here she also met Mildred Gillars Sisk, the famed Axis Sally who broadcast propaganda for the Nazis.

Fade Out

In January 1956, she gained early release because of good behavior and was handed a deportation notice ordering her back to Japan as she stepped out of prison. Her old attorney took her into his home and helped her fight the deportation order for two years. Then she was free to join her family in Chicago. Her husband, Felipe d'Aquine, was barred from entering the country as an undesirable alien. Toguri, fearing never being allowed back into the country, could not go to him. After many years the couple divorced.

In 1969, CBS aired a documentary called "The 'Tokyo Rose' Story" that made America aware of Toguri and her saga. In 1977, as one of his last acts in office, President Gerald Ford, who had personally experienced several kamikaze attacks during World War II, pardoned Iva Toguri. She now lives quietly in Chicago and according to all reports is doing well. ■

by Richard Fisher, KI6SN

Capitol Hill And FCC Actions Affecting Communications

Volunteers Praised In Disaster Exercise

Simulated terrorist attacks in Connecticut and New Jersey in April drew communications volunteers from around the northeast to exercises sponsored by the Department of Homeland Security (DHS). Called TOPOFF 3, the exercise depicted a complex terrorist campaign that drove the "exercise play through the homeland security system, beginning in Connecticut and New Jersey, and leading to national and international response," according to the DHS. Over several days fire personnel conducted search and rescue operations, hospitals treated the injured (played by role players), experts analyzed the effects of the attack on public health, and top officials deployed resources and "made the difficult decisions needed to save lives." The emergency exercises relied heavily on radio amateurs for disaster communications. "TOPOFF 3's goal was to push the system of first responders to beyond its limits to find the weak spots," the American Radio Relay League reported. American Red Cross emergency services director Mario J. Bruno applauded the amateurs' performance. "Operators were there when we needed them," he said in a note to the ARRL Connecticut Section leadership. "We have learned a lot about what ARES [Amateur Radio Emergency Service] can really do when things get messy, and TOPOFF 3 has been a clear example of how complicated a disaster can get." According to the *ARRL Letter*, visual realism played a key role in Connecticut, and prospective ARES volunteers were cautioned in advance. An explosion in New London "loud enough that the organizers passed out earplugs for the media gathered on the bluffs above" marked the start of the test. "As the mushroom cloud of smoke drifted away, hundreds of victims processed into the site to assume positions of death and agony," said Allen Pitts, W1AGP, the League's media and public relations manager. In New Jersey, the scenario was a bioterrorism incident in Union and Middlesex counties. In addition to the disaster simulation, the state's ARES members also provided communications with amateurs from New York and Pennsylvania during real-life flooding that plagued the area.

Organizations Comment On New FCC Chairman

The March appointment of Kevin Martin to chair the FCC drew praise from the president of the Association of Public-Safety Communications Officials. Greg Ballentine, head of APCO, said Martin "has consistently backed FCC actions promoting public safety communications. We are excited to continue our work with Martin and look forward to furthering our positive relationship with the FCC. Martin replaces Michael K. Powell, who stepped down in March. In congratulating Martin, David Sumner, K1ZZ, chief executive officer of the American Radio Relay League, reminded Martin of radio amateurs' "stake in the broadband over power line (BPL) issue." According to the League's *ARRL Letter*, Sumner and ARRL general counsel Chris Imlay, W3KD, met with Martin in July 2004 to express the organization's fears about radio interference from BPL systems. "Unfortunately, I must advise you that the Commission's record of addressing BPL interference has proved to be woefully inadequate," Sumner said. A frontrunner for the position, Martin expressed deep honor at his appointment. "I look forward to working with the Administration, Congress, my colleagues, and the FCC's talented staff to ensure that American consumers continue to enjoy the benefits of the best communications system in the world," he said. Martin thanked Powell for his "excellent stewardship" of the agency and said he looks forward to "continuing his efforts in bringing the communications industry into the 21st Century."

Company Named To Provide RFID Tags To U.S. Government

Intermec Technologies Corp. has been awarded a blanket purchasing agreement contract to provide passive UHF radio frequency identification (RFID) devices for the U.S. Department of Defense and the U.S. Coast Guard. The agreement is part of a government initiative to increase efficiency and inventory management. RFID is a complement to contemporary bar-code inventory and asset tracking systems, allowing private and governmental organizations to automatically track inventory across an entire supply chain. Automatic data collection systems such as RFID do not require the manual scanning process of bar-code systems.

Wireless Telecom Bureau Chief Steps Down

John Muleta, chief of the FCC's Wireless Telecommunications Bureau, left the commission in March. The WTB is responsible for amateur radio licensing, cellular, paging, broadband Personal Communications Service, and public safety. FCC Chairman Michael Powell said Muleta had been "a faithful and tireless public servant" leaving "a strong and commendable legacy in the wireless field that will have long and enduring impact on global communications." Muleta, who has headed the WTB since February 2003, has a 20-year history in communications as an engineer, businessman, and lawyer. Muleta served at the FCC from 1994 until 1998 in various capacities within the former Common Carrier Bureau.

Frequency Coordinators Named For 800-MHz SMR Pool

Six agencies have been certified by the FCC to coordinate 800-MHz Specialized Mobile Radio Pool frequencies. The United Telecom Council, the Association of Public-Safety Officials, Industrial Telecommunications Association, Personal Communications Industry Association, Forestry Conservation Communications Association, and the Manufacturers Radio Frequency Advisory Committee were named by the FCC as coordinators in March. ■

Getting Inside Tropo

Grab That Scanner Or Ham Walkie-Talkie And Get Signals From Just About Everywhere!

by Gordon West, WB6NOA

Every July and August, high-pressure weather systems provide us with exciting VHF, UHF, and microwave-extended propagation conditions. Known as "tropospheric ducting," or tropo for short, this propagation mode allows scanner listeners and hams on VHF and UHF to pick up signals from up to 1,000 miles away! And, unlike sporadic-*E* (*Es*) ionospheric skip, tropospheric ducting leads to an extended communications path lasting for days on end.

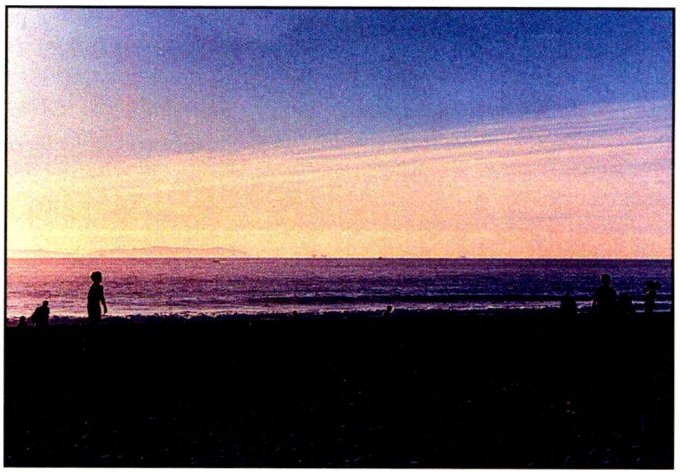
Most of the time our local weather is considered "normal," resulting in the equally "normal" refraction of radio signals. Under those normal weather conditions, you pick up the weather stations on 162 MHz from up to about 50 miles away, right?

Our atmosphere usually exhibits a decrease in air pressure with altitude in an approximately logarithmic ratio: the higher up we go, the less air pressure there is. Air temperature also decreases with altitude, dropping 20 degrees Fahrenheit for every mile of increasing height, up to around 40,000 feet. The number of water molecules also decreases with altitude, resulting in atmospheric density decreasing with height above the surface of the Earth.

When Weather Isn't "Normal"

So let's talk about abnormal weather conditions that regularly occur in July and August, the conditions that lead to some great VHF and UHF DX! Ham operators refer to this as the "Julaugust Tropo Time," and it's triggered by a west-to-east, slow-moving, high-pressure-system cell moving in over a stable, warm, moist "normal" surface weather layer, influenced by the regular flow of subtropical weather feeding in from the south. As this concentrated dry air from the high-pressure system traps the warm air below, distinct stratification can be seen on the horizon. With little surface wind to disturb the warm moist air below, descending heavier air from the high-pressure cell flattens out at about 1,000 feet (called subsidence), causing rising smoke to abruptly turn horizontal. This traps all the pollution right down at ground level, and it becomes one of those unbearable July and August "bad air" days that will soon turn wonderful when you turn on the VHF and UHF receivers!

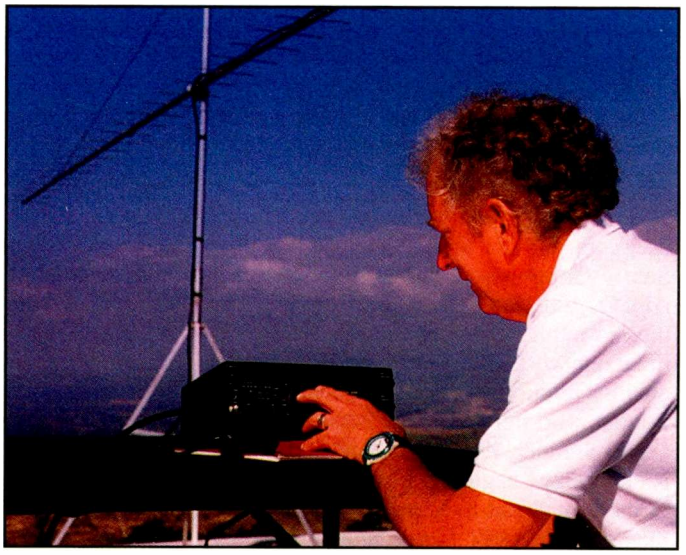
The formation of this inversion layer creates a tropospheric duct that contributes to the thick layer of super-refractivity sufficient to develop into an atmospheric waveguide and creating a near-perfect minimum attenuation path for radio signals from 50 MHz on up to travel over hundreds, sometimes thousands, of miles. Chances are you have read about this before and know that "VHFers" in Chicago tune in to Texas and that Texans have a microwave path to Florida, with Floridians pulling in signals from Nova Scotia! Ham operators running microwave equipment in Southern California work stations in Hawaii over a



The thin layer of clouds illustrates a good tropo duct forming from California to Hawaii.

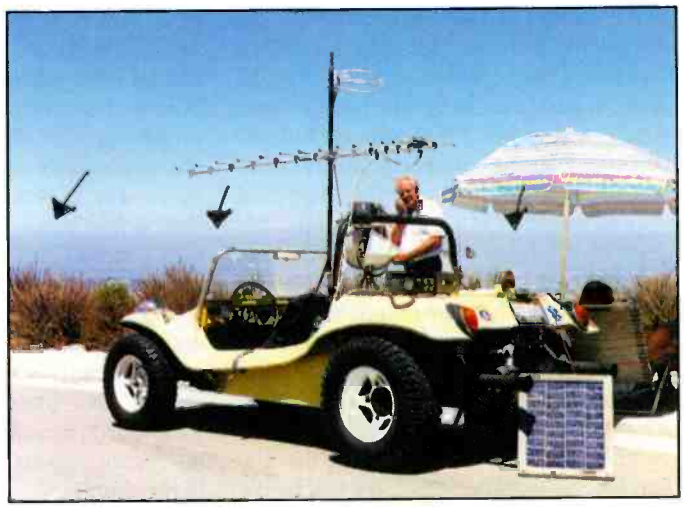
2,500 mile path with 10 watts of FM on 146 MHz! During a good Julaugust tropo, a TV set with simple old-fashioned rabbit ears can pick up stations 800 miles away! Your FM car radio might tune in a jazz station from 1,000 miles away—for hours on end!

Paul Lieb, KH6HME, operates a beacon site high atop the lava fields of Mauna Loa, Hawaii. "It takes an inversion temperature of +10 degrees to really give me a good path to the



Gordo testing tropo paths above the clouds on 432 MHz.

Flying within the California-Hawaii tropo near San Francisco. (Photo by WA6CAX)



Gordo hits the beach—any beach—with a radio, of course! Here 10-GHz tropo paths are better just below the local cloud bank.

West Coast," says Lieb, the holder of over-water VHF/UHF/microwave records from the lava fields of Mauna Loa to the West Coast of the United States—over 2,500 miles away. "Many times the cloud layer is well below my operating position on the side of the volcano, but there are times that I have established extremely strong contacts on VHF and UHF during a light drizzle with the cloud layer *above* my position," adds Lieb. Al, KH6IAA, another tropospheric ducting DX legend, has also experienced this.

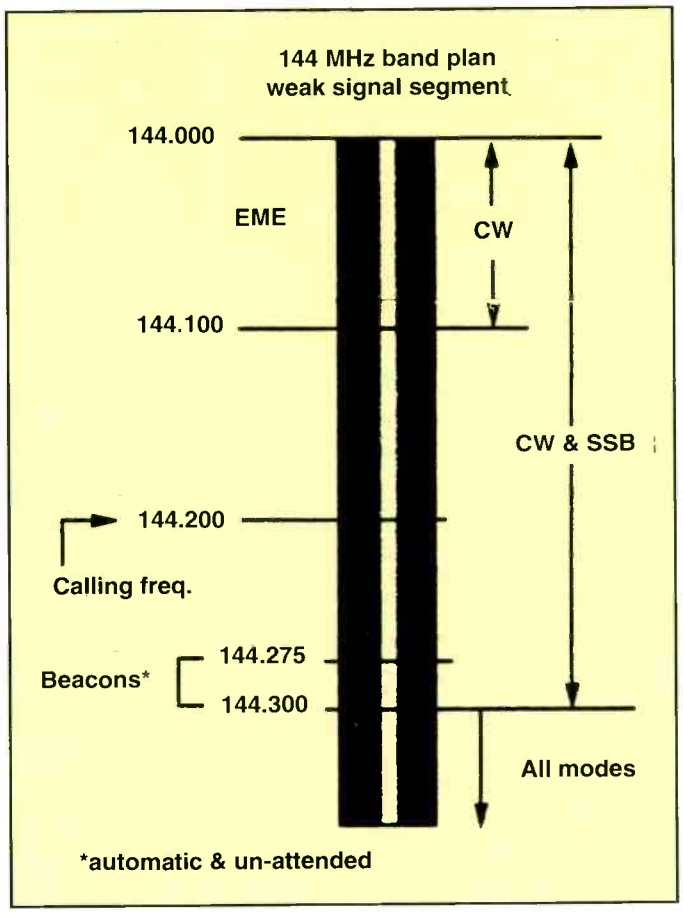
But conquering the Hawaii-to-California path has yet to be done on 10,368 MHz, the ham radio X-band. Chip Angle, N6CA, says contact across the 2,500-mile path over water during "Julaugust" tropospheric ducting will probably be made this year. "The path is there, and with the right weather conditions, we will make it this summer," says Chip, holder of numerous microwave records. Chip has new equipment and a new dish antenna system at both ends of the circuit to work the 2,500-mile duct at the 10,368-MHz X-band this summer if favorable tropospheric ducting weather patterns move in and stabilize over the all-ocean path.

"It's easy to spot a favorable microwave duct with satellite visible imagery. You see this beautiful smooth white sheet of clouds extending out to Hawaii, with a guaranteed band opening across the Pacific wherever the white sheet of clouds terminates along the West Coast," says Chip, who will undoubtedly be the first to make contact across the 2,500-mile, 10-GHz path with Paul, KH6HME, in Hawaii.

Where Do You Access The Duct Cloud Layer?

But the big question is exactly where do you access the duct cloud layer?

While we know that tropospheric ducting creates an atmospheric waveguide for VHF, UHF, and microwaves with almost no attenuation, radio experts have not universally concluded where the best spot *actually* is to access the tropo duct for maximum range and minimum signal attenuation. "When I am flying and running 2 meters and 432 SSB, I can hear the distant beacons best when I am just above the bottom edge of the stratified inversion layer," comments William Alber, WA6CAX, a pilot out of the Bay Area. He watches for the visual sign of



Listen for ham beacons transmitting CW between 144.275 and 144.300 MHz.

clear air above and a marked increase in air temperature, logging his strongest beacon signal strengths 200 feet *above* the smooth cloud layer on 2 meters and 440 MHz.

Will 10 GHz refract just *above* the cloud layer? Chip Angle says no!

"It seems as though you don't need to be down inside the cloud layer to work long-haul tropo on the lower frequencies,

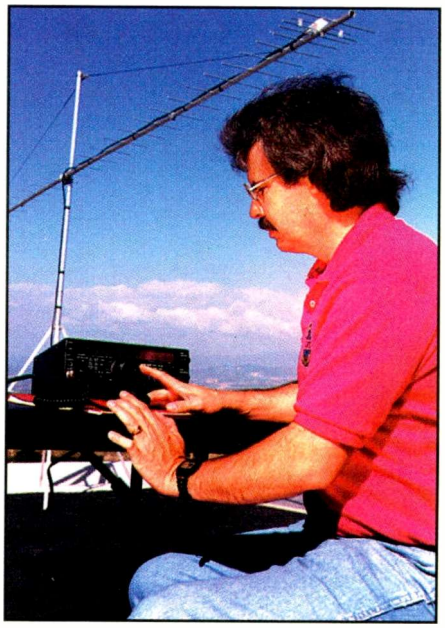
like 2 meters and 432 MHz. But for the microwave tropo contacts between California and Hawaii, you need to be down *under* the sheet of clouds," says Angle, citing his 2,500-mile completed communications between California and Hawaii on 6 centimeters (5760 MHz) and 9 centimeters (3456 MHz) bands. He describes going to the top of an 800-foot hill that overlooks the Pacific: "...as far as you can see, there are clouds below you going all the way out to the horizon—that's a microwave opening!" He says that the microwave operator might spot a good microwave opening from above, but not be able to actually start hearing the distant beacon until he gets down just below the tops of the clouds. "The clouds are usually around 800 feet, and this is where I set up to establish the 10-GHz contact," adds Angle, a further indication that the liaison frequency is usually 2 meters or 432 MHz.

So, when the long tropospheric ducting DX begins, will it always first start on 144 MHz, and then move up to the 222 MHz band, then 432 MHz, and then 1296 MHz? Chip Angle says, "Yes," but only from the top down. "Whatever band you are on, you will generally hear lower bands via tropo coming through, too." In other words, if you're listening or working a station on 1296 MHz, you will almost always hear distant 432, 222, and 2-meter beacons as well. But, depending on the *depth* of the duct, and where you are within or above the duct, higher bands may come in better than the lower ones; then a few hours later, the lower bands, like 2 meters and 432 MHz, will be better than the higher bands.

"QSB among the different bands to a set of beacons 1,000 miles away may vary independently and randomly," says Angle, "and most common is the 2-meter, long-haul tropo opening with absolutely no distant signals heard on 222, 432, or higher bands."

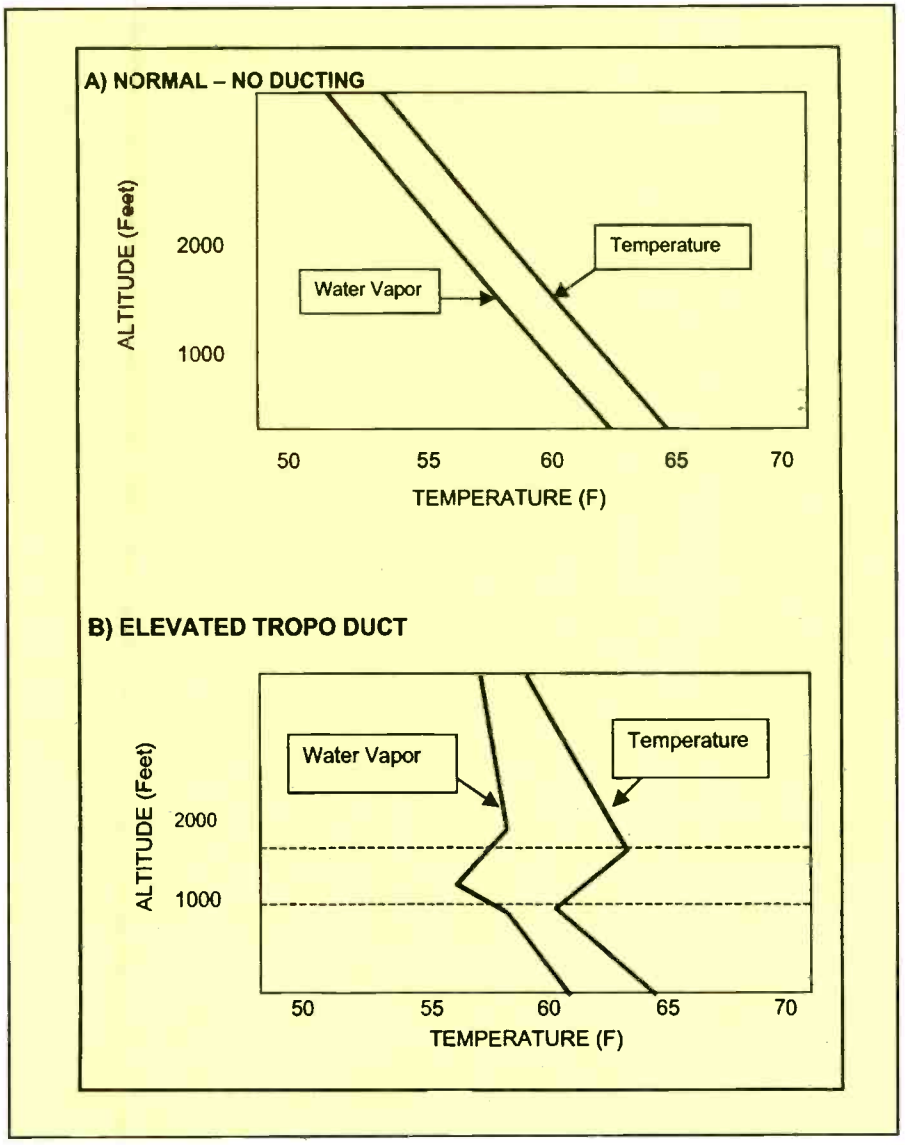
Tropo Clues

The best early indicator of good tropo conditions is the morning paper's weather map. Look for a high-pressure system moving in from the west. Next, check the Weather Channel for a clear, undisturbed weather pattern between you and a distant city, within a radius of the several hundred or even a thousand miles. Now go outside! Is it hot? Do your eyes burn with smog? Can you see a brown layer of pollutants hanging on the horizon? If so, go back inside, and turn on your radio or scanner.



It's Chip, K7JA, working the common Los Angeles-to-San Francisco 300-plus mile duct path.

If you are into tropo duct chasing, see what difference a few hundred feet might make by driving above a cloud layer and



Normal and tropo-inversion charts. (Courtesy Ken Neubeck, WB2AMU)

tuning in a weather station from maybe 400 miles away. Sometimes you'll get better reception below the smooth clouds; other times you might get reception *above* the clouds. Often there will be no clouds at all, but when you get to an altitude where temperature gets markedly warmer, your radio magically comes to life with distant tropo ducting signals.

Coast-to-Coast Excitement

Stay tuned for whether or not the world's longest X-band path gets worked this summer between California and Hawaii. Chip Angle has customized the transverter equipment at both ends of the circuit and will likely be a new record holder, along with Paul, KH6HME, this July or August. For those of you on the East Coast, who will be the first to work the United States to Europe from the Atlantic high that usually delivers extraordinarily long-range aeronautical contacts, with the likely path on VHF and UHF ham radio? And in the mid-United States, where high-pressure systems usually stall out, get set for some great north/south openings that will likely go beyond a thousand miles on both VHF *and* UHF, and quite likely on microwave bands, too!

Let me know what contacts you make and what you're hearing as a result of tropo. I look forward to hearing about your "Julaugust" radio experiences. Please write to me directly at *Popular Communications*, 25 Newbridge Road, Hicksville, NY 11801 or via e-mail at WB6NOA@arrl.net. ■

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

Strong Summertime Signals—It's Sporadic-*E* Season!

Earth's atmosphere is a mixture of gases held to the surface of the Earth by gravity. These gases vary in density and composition as the altitude increases above the surface. As the atmosphere extends outward from Earth, it becomes thinner and blends with particles of interplanetary space.

We have discovered distinct layers in this atmosphere, one of which is the ionosphere. The ionosphere, as we discussed recently, is further divided into roughly three to five main layers, the *D*, *E*, F_1, F_2, and F_3 ionospheric regions.

Between the *D* and *F* regions of the ionosphere lies the *E* region, which extends from about 56 to 65 miles. The region's height varies, as does its electron density (ionization), which depends on solar zenith angle and solar activity. During daylight hours, electron density (a measure of the ionization level) increases, while at night, when the supply of energy from the sun is cut off, ionization levels drop. These ionization densities and variations are expected under normal conditions.

Occasionally, though, very thin regions of extremely dense ionization can form within the *E* layer. These regions can apparently be caused by several mechanisms, and they are marked by a wide variety of characteristics. At times, these thin regions form into dense clouds, or patches, which are capable of reflecting radiowaves of frequencies much higher than those normally reflected. At times, these clouds make it possible to communicate over long distances on frequencies as high as 220 MHz. These clouds usually cover a rather small geographical region, approximately 50 to 100 miles in diameter. They occur more or less at random and are relatively short lived, usually disappearing within a few hours. Sporadic-*E* (*Es*) is normally defined as transient, localized patches of relatively high electron density in the *E* region of the ionosphere that significantly affect radiowave propagation. *Es* can occur during daytime or nighttime, and it varies markedly with latitude.

The shape of these ionized *E*-region clouds is likely ragged and not true circles or ellipses. Clouds have been shown to have concave undersides in many instances, with tilts up to 10 degrees. The vertical thickness of these clouds is usually quite small, no more than a few kilometers thick.

Very strong winds exist at the *E*-region altitude. After the formation of an ionized cloud, these wind currents move the cloud. Over North America, the winds tend to move large *Es* cloud groups to the west or northwest. Of course, *Es* clouds may move in any direction on occasion, especially north and south (and less likely to the east). The velocity of these clouds has been measured to be in the neighborhood of about 110 miles per hour, and higher velocities are thought to occur.

Very Little Signal Loss!

Reflection from *Es* clouds takes place with very little signal loss, resulting in exceptionally strong signal levels during most openings. Quite often it is possible to maintain communications considerably off the great circle path, the shortest terrestrial distance between two points on a sphere, between two stations by means of back and side scatter from an *Es* cloud. (A good source of addi-

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.

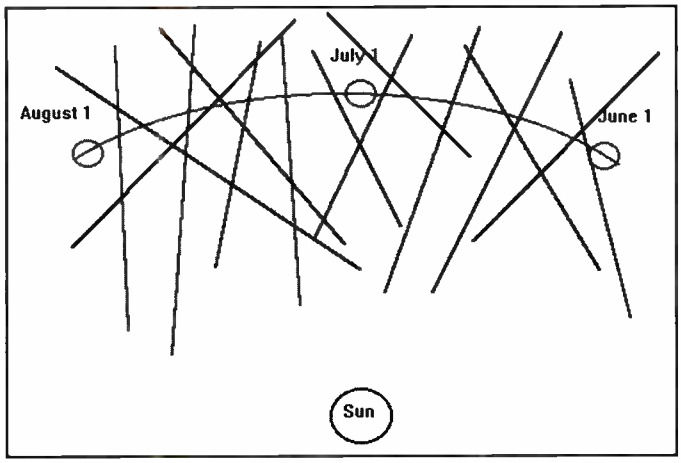


Figure 1. As the Earth orbits the sun during the period between June and August, it passes through the dust trails left by passing comets. The straight lines intersecting the orbit in this illustration are the many comet trails that possibly contribute to the development of sporadic E.

tional information is *VHF Propagation, A Practical Guide to Amateur Radio*, by Ken Neubeck, WB2AMU, and Gordon West, WB6NOA, available through CQ at www.cq-amateur-radio.com.)

Using simple geometry we can approximate the single-hop propagation via an *Es* cloud. The theoretical maximum distance for a transmitted signal propagated after only one encounter with a cloud in the *E* region is 2100 km. For the HF bands (below 30 MHz), this appears to be very accurate. However, many transmissions exceeding 2350 km have been observed in the VHF bands. This may be due to a combination of other propagation modes (tropospheric and groundwave enhancements, and so forth) which adds distance to the theoretical maximum on both sides of the typical propagation model.

If two *Es* clouds exist within the signal path, the theoretical distance propagated by *Es* can almost be *doubled*, as long as the clouds are in line with both the transmitter and receiver. This "double-hop" propagation is fairly common during widespread occurrences of *Es*, especially below 70 MHz. Three or more clouds could potentially line up, providing low-loss propagation over even further distances. Of course, the likelihood the clouds are of sufficient density and ionization, and are geometrically lined up, is pretty slim, especially if you're interest in higher frequencies.

Es propagation tends to occur in two peaks during the daylight hours, centered on either side of noon. *Es* occurrence during the year seems to follow a similar trend, with the main peak in the late summer and a second, but weaker, peak occurring in the winter.

During the winter peak, *Es* is most common just after sunset. The summer daytime peak is in the morning between 7 a.m. and 12 p.m. local time. A secondary peak occurs between 8 and 10 p.m. However, observations over many decades show a slightly stronger likelihood of *Es* in the morning than in the afternoon or evening. Despite the apparent greater likelihood of *Es* in the morning hours, this diurnal characteristic is much less noticeable in the day-to-day casual observation of DXers. In addition, check for *Es* after dark! I remember many summertime *Es* openings around midnight between Washington State and California on 10 meters. Many operators also remember an opening that occurred after midnight on June 19, 1992, that resulted in propagation of 144 MHz and higher signals.

And The Studies Say...

A pattern of the occurrence of *Es* noted by some observers suggests that *Es* is correlated with the presence of an excess of meteor or dust in the *E* layer, where it is pushed into dense patches on the outside of jet stream wind eddies. This possibility is loosely supported by the repeated presence of *Es* above certain locations, such as is seen from the UK over Nantes in France and, to a lesser extent, over Denmark.

Several studies over the past 30 years have confirmed the presence in *Es* clouds of dense patches of meteoric comet dust. This model is further supported by looking at the seasonal nature of *Es* and how it coincides directly with those times of year when the Earth passes through the dense tracks of comet dust (See **Figure 1**).

Es Propagation Chart

Here is a general guide to the distances possible with single-hop, double-hop, and multi-hop Es propagation:

45-70 MHz single-hop Es

Minimum range 300-400 miles.
Optimum range 900-1,300 miles.
Maximum range 1,350-1,500 miles.

45-70 MHz double-hop Es

Minimum range 1,750-1,900 miles.
Optimum range 2,000-2,600 miles.
Maximum range 2,750-3,100 miles.

45-70 MHz triple-hop Es

Optimum range 3,000-4,000 miles.
Maximum range 4,300 miles.

45-70 MHz multi-hop Es

Maximum distance record: 7,750 miles (12,500 km) - 48.2597 - CHE2, Iran received via multi-hop sporadic E, by N5HV, New Mexico.

88-108 MHz single-hop Es

Minimum range 350-500 miles.
Optimum range 900-1,300 miles.
Maximum range 1,350-1,500 miles.

88-108 MHz double-hop Es

Optimum range 2,000-2,500 miles.
Maximum range 2,700-3,100 miles.

Maximum distance record: 3,040 miles - 97.5 MHz WFGY-FM, Watertown, NY, USA received via double-hop sporadic E, by Paul Logan, North Ireland.

144 MHz double-hop Es

Maximum distance record: 2,250 miles (3,635 km) WA7GSK (DN13SO) - W4FF (EL96am) 29-May-1998.

Es Propagation And You

DX enthusiasts know that during the summer months, television channels between 45 and 108 MHz and FM radio stations between 88 and 108 MHz are regularly propagated long distances via *Es*. The first sign that an *Es* event is starting is the observation of "rolling" black bars across TV Channel 2 (or the appearance of signals on that channel if you have no local station on the channel). As the ionization level increases, Channels 3 through 6 and the FM band become filled with signals. During *Es* propagation, signals can abruptly appear or disappear. Signals are usually very strong during *Es*, and ordinary "rabbit ears" are adequate for reception and are even preferred by some TV and FM DXers as they can be sharply directional.

Is it possible that *Es* can support DX of signals in the higher VHF frequency band, say, 175 to 226 MHz? Well, doubling the frequency reduces the probability to one tenth. This means if you are

RE_INVENTING RADIO

Through_Innovation

S350

AM/FM/Shortwave Radio $100*

High-Performance Field Radio
- Aeronautical design with rugged body
- Excellent AM, FM, & Shortwave reception
- Line-level input, separate bass, treble
- External antenna input
- Wide/narrow bandwidth filter controls
- Alarm and sleep timer functions

Dimensions: 10.6"L x 8"H x 3.3"W Weight: 3lbs. 2oz. Power Source: 4 D batteries (not included) or AC adaptor (included)

YB550PE

AM/FM/Shortwave Radio $100*

Digital Expertise
- Shortwave range of 1711 – 29,995 Khz
- Autoscan, direct keypad, and scroll wheel tuning
- 200 customizable station presets
- Alarm and sleep timer functions
- AC adaptor and supplementary antenna inputs

Dimensions: 3.5"L x 5.8"H x 1.4"W Weight: 11oz.
Power Source: 3 AA batteries (included)

G2000A

AM/FM/Shortwave radio by F.A. Porsche $80*

Timeless Porsche Style
- Autoscan and direct keypad tuning
- 20 programmable station presets
- Dual alarm and sleep timer functions
- Snap-on protective leather case that converts to stand

Dimensions: 5.4"L x 3.7"H x 1.6"W Weight: 14oz. Power Source: 3 AA batteries (not included) or AC adaptor (not included)

*Prices do not include Shipping/Handling and applicable taxes. To order please call us toll free at 1-800-793-6542

RE_INVENTING RADIO

Through_Necessity

FR300

AM/FM Radio with NOAA, TV-VHF, Flashlight, and Cell Phone Charger $50*

All-In-One Self-Powered Weather Alert Radio
- "Weather Alert" plus all 7 NOAA weather channels
- TV-VHF channels 2-13
- Hand-Crank Power Generator
- Built-in Cell Phone Charger
- Built-in flashlight and emergency siren
- Inputs for AC adaptor and earphones

Dimensions: 6.6"L x 6.2"H x 2.5"W Weight: 1lbs. 5oz. Power Source: Hand-Crank Power Generator with rechargeable battery pack, 3 AA batteries (not included) or AC adaptor (not included)

FR250

AM/FM/Shortwave Radio & Cell Phone Charger $50*

Self-Powered Radio and Flashlight
- Receives 7 international bands
- Hand-Crank Power Generator
- Built-in Cell Phone Charger
- Built-in flashlight and emergency siren
- Inputs for AC adaptor and earphones
- Rugged splash-proof ABS body

Dimensions: 6.6"L x 6.2"H x 2.5"W Weight: 1lbs. 5oz. Power Source: Hand-Crank Power Generator with rechargeable battery pack, 3 AA batteries (not included) or AC adaptor (not included)

FR200

AM/FM/Shortwave Radio and Flashlight $40*

Emergency Crank Radio
- Hand-Crank Power Generator
- Built-in flashlight
- 12 International Shortwave bands
- Perfect for camping, hiking, and everyday use
- 6 colors: Metallic Red, Metallic Blue, Metallic Bronze, Yellow, and Sand.

Dimensions: 6.6"L x 5.8"H x 2.2"W Weight: 1lbs. 2oz. Power Source: Hand-Crank Power Generator with rechargeable battery pack, 3 AA batteries (not included) or AC adaptor (not included)

FR100

AM/FM Radio and Flashlight with Blackout Alert $30*

Plug-in Radio with Blackout Alert
- Just unplug it for bright light and an AM/FM radio
- Plugs into the wall for continuous charging
- Illuminates automatically during a power failure
- Rechargeable Ni-MH battery (included) lasts up to 16 hours for LED light or up to 8 hours of radio use

Dimensions: 3.1"L x 5.3"H x 1.4"W Weight: 10oz. Power Source: AC power (direct plug-in)

*Prices do not include Shipping/Handling and applicable taxes. To order please call us toll free at 1-800-793-6542

eton®
RE_INVENTING RADIO
www.etoncorp.com

Optimum Working Frequencies (MHz) - For June 2005 - Flux = 79, SSN = 18- 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	22	22	21	21	20	18	16	15	14	13	12	11	12	14	15	17	18	19	20	20	21	21	21	22
NORTHERN SOUTH AMERICA	28	28	28	26	24	22	20	18	17	16	15	14	14	16	19	21	23	24	25	27	27	28	28	28
CENTRAL SOUTH AMERICA	27	25	23	21	19	18	17	16	15	14	13	16	16	18	20	22	24	25	27	28	28	29	29	29
SOUTHERN SOUTH AMERICA	23	17	15	15	14	13	13	13	12	12	12	12	12	15	18	20	22	24	25	26	27	28	28	26
WESTERN EUROPE	12	12	11	10	10	9	14	13	12	11	10	12	15	17	18	19	20	20	20	20	19	18	17	15
EASTERN EUROPE	9	9	9	9	12	15	14	12	11	11	10	10	13	16	17	18	19	19	18	17	16	14	10	10
EASTERN NORTH AMERICA	25	25	25	24	24	23	21	19	17	16	15	15	16	18	19	21	22	23	24	24	25	25	25	25
CENTRAL NORTH AMERICA	14	14	14	14	13	13	13	11	10	10	9	8	8	9	10	11	12	13	13	13	14	14	14	14
WESTERN NORTH AMERICA	7	7	7	7	7	7	7	6	6	5	5	4	4	4	5	5	6	6	7	7	7	7	7	7
SOUTHERN NORTH AMERICA	23	23	23	22	22	22	20	18	17	15	14	13	13	13	15	17	18	19	20	21	22	22	22	23
NORTHERN AFRICA	17	15	14	13	12	12	14	13	12	11	11	14	16	17	18	19	20	20	20	21	20	20	19	18
CENTRAL AFRICA	18	16	15	14	14	14	14	13	12	11	10	13	15	17	18	19	20	20	20	21	21	21	21	19
SOUTH AFRICA	15	14	14	13	13	12	13	18	17	15	15	16	18	19	21	22	23	23	24	22	20	18	17	16
MIDDLE EAST	14	13	13	13	15	16	13	12	11	11	10	10	14	16	18	19	19	20	20	20	19	18	17	15
JAPAN	19	20	20	20	20	20	19	19	18	17	16	14	13	13	14	14	13	13	13	14	16	17	18	19
CENTRAL ASIA	20	21	21	20	20	20	19	19	18	17	15	14	13	13	14	15	17	16	15	14	14	15	17	19
INDIA	18	18	18	18	18	17	16	13	12	11	10	10	9	10	9	9	9	8	8	11	14	15	16	17
THAILAND	17	18	20	20	20	20	19	18	17	15	14	13	12	11	13	15	17	18	16	15	14	13	13	15
AUSTRALIA	29	30	30	30	30	30	29	28	26	23	21	20	18	17	16	15	14	14	13	13	15	21	25	27
CHINA	19	19	20	20	20	19	19	18	16	14	13	12	11	11	13	16	16	14	14	14	14	16	17	18
SOUTH PACIFIC	29	29	29	29	28	26	23	18	15	14	14	13	13	13	12	12	12	12	12	20	24	27	27	28

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	25	24	24	24	22	20	18	17	15	14	13	13	14	16	18	19	21	22	23	23	24	24	24	25
NORTHERN SOUTH AMERICA	26	26	25	23	21	19	18	17	15	14	14	13	13	16	18	20	21	23	24	24	25	26	26	26
CENTRAL SOUTH AMERICA	27	25	23	21	19	18	17	16	15	14	13	15	17	19	21	23	24	26	27	28	28	29	29	29
SOUTHERN SOUTH AMERICA	23	17	16	15	14	14	13	13	12	12	12	12	12	17	20	22	23	25	26	27	28	28	27	26
WESTERN EUROPE	15	13	12	11	11	10	13	13	12	12	14	16	17	18	19	19	20	20	20	20	19	19	18	17
EASTERN EUROPE	10	9	9	9	9	14	13	12	11	11	13	15	17	18	19	20	20	19	19	18	17	16	14	10
EASTERN NORTH AMERICA	18	18	18	17	17	15	14	13	12	11	10	10	12	13	14	15	16	17	17	18	18	18	18	18
CENTRAL NORTH AMERICA	8	8	8	8	8	8	7	6	6	5	5	5	5	6	6	7	7	8	8	8	8	8	8	8
WESTERN NORTH AMERICA	14	14	14	14	14	13	13	12	11	10	9	8	8	9	10	11	12	12	13	13	14	14	14	14
SOUTHERN NORTH AMERICA	16	16	16	16	15	14	13	12	11	10	9	9	9	10	11	12	13	14	14	15	15	16	16	16
NORTHERN AFRICA	20	19	17	16	15	14	15	14	14	14	15	16	17	18	19	19	20	20	20	21	21	21	21	20
CENTRAL AFRICA	18	16	15	14	13	13	15	14	14	14	15	16	17	18	19	19	20	20	20	20	20	20	20	19
SOUTH AFRICA	15	14	13	13	13	12	12	20	18	17	17	18	21	23	24	26	27	27	25	22	19	18	17	16
MIDDLE EAST	14	13	12	12	14	15	14	13	12	12	14	16	17	18	19	20	20	20	20	20	19	19	17	16
JAPAN	20	20	20	20	19	19	18	17	15	14	13	13	13	15	16	15	13	13	13	15	16	17	18	19
CENTRAL ASIA	20	20	20	20	19	18	18	16	15	13	12	12	13	15	17	18	18	17	15	14	14	15	17	19
INDIA	12	14	16	17	17	15	13	12	11	11	10	13	15	17	17	16	14	12	10	9	9	9	8	8
THAILAND	17	18	20	19	19	18	16	14	13	12	11	11	13	16	17	18	19	18	17	15	14	13	13	14
AUSTRALIA	29	30	30	30	29	29	28	26	23	21	20	18	17	16	15	14	14	13	13	13	16	22	25	28
CHINA	18	19	19	19	18	17	16	14	13	12	11	11	13	16	17	17	16	14	14	14	14	16	17	18
SOUTH PACIFIC	29	29	29	28	27	25	22	16	15	14	14	13	13	12	12	12	12	12	12	21	25	27	28	29

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	20	20	19	18	16	15	14	13	12	11	10	10	12	14	15	16	17	18	18	19	19	20	20	20
NORTHERN SOUTH AMERICA	23	23	22	20	18	17	15	14	13	13	12	11	13	15	17	18	20	20	21	22	22	23	23	23
CENTRAL SOUTH AMERICA	27	24	22	20	19	17	16	15	15	14	13	16	18	20	22	24	25	26	27	27	28	28	28	28
SOUTHERN SOUTH AMERICA	21	17	16	15	14	14	13	13	12	12	12	12	17	19	21	23	24	26	27	27	28	28	27	25
WESTERN EUROPE	16	15	14	13	12	12	13	12	12	13	15	16	17	18	18	19	19	19	19	19	19	18	18	17
EASTERN EUROPE	11	11	10	10	9	13	14	14	14	15	16	17	18	18	19	19	19	20	19	19	18	17	15	13
EASTERN NORTH AMERICA	9	9	8	8	7	7	6	6	5	5	5	5	6	6	7	7	8	8	8	8	9	9	9	9
CENTRAL NORTH AMERICA	19	19	19	18	18	16	15	14	12	12	11	11	12	14	15	16	17	18	18	19	19	19	19	19
WESTERN NORTH AMERICA	26	25	25	25	24	23	21	19	17	16	15	15	15	18	19	21	22	23	24	24	25	25	26	26
SOUTHERN NORTH AMERICA	20	20	19	19	18	16	15	14	13	12	11	11	12	13	15	16	17	18	18	19	19	20	20	20
NORTHERN AFRICA	21	19	17	16	15	14	14	15	15	15	17	19	21	22	23	24	24	25	25	25	25	25	24	23
CENTRAL AFRICA	18	16	15	14	13	13	14	15	14	15	17	19	21	22	23	24	24	25	25	24	24	23	21	19
SOUTH AFRICA	15	14	13	13	13	12	12	17	16	15	16	19	21	23	24	26	27	27	25	21	19	18	16	16
MIDDLE EAST	18	16	15	15	15	15	13	13	13	14	15	17	18	19	19	20	20	21	21	21	21	21	21	20
JAPAN	19	20	19	19	18	17	16	15	14	14	14	15	17	17	16	15	14	14	14	15	16	17	18	19
CENTRAL ASIA	20	20	19	18	18	16	15	14	13	12	14	16	17	18	19	19	19	17	16	15	14	14	17	18
INDIA	9	9	9	8	13	14	13	12	12	14	16	17	18	19	19	19	18	18	17	16	14	11	10	9
THAILAND	16	18	18	18	16	15	14	13	12	13	15	17	18	19	19	20	20	19	17	16	15	14	13	13
AUSTRALIA	29	30	29	29	28	26	24	22	20	19	17	16	16	15	15	14	13	13	13	12	18	23	26	28
CHINA	18	19	19	18	17	15	14	13	12	12	15	16	17	18	18	17	16	14	13	12	12	15	16	17
SOUTH PACIFIC	29	28	28	27	26	24	20	15	14	14	13	13	12	12	12	12	12	12	12	22	25	26	28	28

receiving, via *Es*, a signal of 50 MHz, then a 100-MHz signal will be propagated one-tenth of the time period of the 50-MHz signal. A 200-MHz signal will be propagated one-hundredth of the time. Since many high MUF (Maximum Useable Frequency) propagation paths are multi-cloud, the probability could be higher than these figures.

The MUF of a single cloud can be lower than the frequency propagated by a two-cloud path. In practice, it is difficult to know of a possible propagation path for the highest frequency because of the geometric restrictions imposed, and unless the DXer and the transmitter are in precise relative positions, the DX station will not be heard.

Since *Es* reception above 138 MHz often involves high path losses, it is important that you use the highest gain and lowest noise receiving equipment possible. A directional Yagi antenna, with at least 8 dB of gain, mounted 15 to 20 feet above ground level, with low loss matched coax cable, low noise receiver, and a low noise MOSFET pre-amplifier are ideal for receiving weak signals.

How High And How Far?

What are the minimum, maximum, and typical range of distances propagated via *Es* for various VHF modes? How far can one realistically expect to work using single and multi-hop *Es* propagation? With over a half-century of *Es* DX logs and observations, we now have a very large database of information that gives us a very good idea regarding what distances are possible on the VHF band. This data is mainly obtained from VHF ham radio and TV DX enthusiasts.

One factor affecting the maximum distance propagated by *Es* is the height of the *Es* cloud. According to ionosonde (devices used to measure reflectivity of the ionosphere) data, *Es* usually occurs at around 56 miles above the Earth. At this altitude, the maximum possible single-hop distance is about 1,500 miles. The highest frequency reflected back to the surface of the Earth, the *Es* MUF, varies from 20 MHz to at least 220 MHz.

The main factors that set the minimum and maximum distance limits for *Es* DX reception are geometry of the Earth, *Es* cloud electron density, the number of *Es* clouds, and *Es* ionization height. Refer to the ***Es* Propagation Chart** for a general guide to distances possible with single-hop, double-hop, and multi-hop *Es* propagation.

One method to identify your single-hop *Es* target area is to obtain a great-circle map from the Internet and draw two sets of boundary lines with a compass. For 45- to 108-MHz TV and FM, draw one at approximately 500 miles and one at 1,500 miles; this indicates your prime target area for single-hop *Es*. The same method can be applied to double-hop *Es*, with a boundary line drawn at 1,750 miles and another one at about 2,800 miles. A great-circle distance calculator is also useful for submitting longitude and latitude coordinates (see http://www.vwlowen.demon.co.uk/java/circle.htm).

There is an active group of propagation observers who are working to gather real-time data on *Es* and other modes. Using DSP software, computer automation, and radio control, they track and record the activity on a specific HF band (for instance, 6 meters). These data sets help reveal the presence of *Es* and other modes of propagation. Take a look at the details of this on-going research at http://groups.yahoo.com/group/PropNET-Online/.

HF Propagation For July

Solar activity is much quieter than it was just one year ago, resulting in lower MUFs than for the same period last year. Even so, expect fair openings into most areas of the world throughout the day on 22, 19, and 16 meters. Through the summer, you can expect propagation between north and south regions during the daylight hours. Nineteen and 16 meters will be the strong daytime bands, with 19 remaining a popular band throughout the year. Reception of stations located in tropical or equatorial areas may be possible well into the hours of darkness. For distances from 800 to several thousand miles, expect exceptionally strong signals. Multi-hop signals will be observed.

Twenty-five and 22 meters will remain open from just before sunrise to a few hours past sunset. From late afternoon to well into darkness, expect these bands to offer worldwide coverage.

Thirty-one meters is a year-round power band with outstanding domestic and international paths around the clock. During periods of low geomagnetic activity this summer, this band may offer DX all through the night.

Forty-one and 49 meters offer domestic propagation during daylight hours and somewhat during the night. The tropical bands (60, 75, 90, and 120 meters) are not noticeably affected by the solar flux, but are degraded during geomagnetic storminess. Through the summer, expect these bands to be more challenging, though less this year than last.

Overall, daytime bands will open just before sunlight and remain so a few hours after dark. Look higher in frequency during the day, as these frequencies will be less affected by any solar storms occurring and because more broadcasters have transmissions in these upper bands.

VHF Conditions

The summertime *Es* season for the Northern Hemisphere will be quite active through July. Usually these *Es* openings are single-hop events with paths up to 1,500 miles, but July's *Es* events, like June's, are often double-hop. Look for HF openings on the higher frequencies, as well as on low-VHF, throughout the day. Don't forget to check during the night hours, too.

Current Cycle 23 Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for March 2005 is 24.8, with the lowest daily sunspot value recorded on both March 1 and March 30 at 7. The highest daily sunspot count was 43 on March 11. The 12-month running smoothed sunspot number centered on September is 37.6, down from August's 39.3. A smoothed sunspot count of 16, give or take about 12 points, is expected for July 2005.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-centimeter observed monthly mean solar flux of 90.0 for March 2005, down a bit from February's 97.3. The 12-month smoothed 10.7-centimeter flux centered on September 2004 is 103.7. The predicted smoothed 10.7-centimeter solar flux for July 2005 is 79, give or take about 16 points.

The observed monthly mean planetary A-Index (Ap) for March 2005 is 12, just up one point from February. The 12-month smoothed Ap index centered on September 2004 is 13.6, about the same (13.8) as for both August and July 2004. Expect the overall geomagnetic activity to be quiet to active during most days in July, with some isolated periods of stormy activity.

Where's Your Letter?

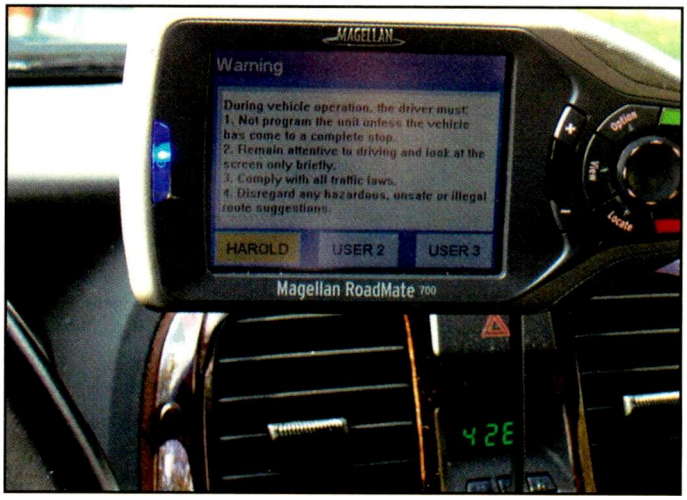
You can join in with others in discussing space weather, propagation, and shortwave or VHF listening at http://hfradio.org/forums/. Be sure to check out the latest conditions, as well as the educational resources about propagation, which I have put together for you at http://prop.hfradio.org/. I also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

by Harold Ort, N2RLL, Editor

Magellan's RoadMate 700 GPS—Getting Lost Is A Thing Of The Past!

Out of the box, the Magellan RoadMate 700 is as plug-n-play as you can get for a state-of-the-art vehicle Global Positioning System (GPS)—you really don't need to read the manual or listen to and view the free built-in tutorial. If you think that fact sets the stage for a fantastic driving adventure, you're absolutely correct. I've been using the RoadMate 700 for over a year now and can tell you with certainty after putting it through its paces that it's a worthwhile investment for your arsenal of mobile electronics.

The Magellan RoadMate 700 is about the size of a couple of digital cameras placed next to each other and is designed to be mounted on your vehicle's front windshield with the provided flexible goose-neck suction mount and bracket. It took less than three minutes from the time I opened the box to have the RoadMate operating. The unit itself connects to a cradle that fastens to the mounting assembly, which in turn simply sticks to the window. Because the windshield mount is flexible you can direct the front of the unit toward the driver or even a passenger for easy viewing. Bring the 12-VDC power cord down to your cigarette lighter socket, turn it on, and you're ready to go!



The Magellan RoadMate 700 lets three users store destinations in the unit. Three possible users = 300 destinations or addresses!

Hitting The Road With The 700

The RoadMate 700 has a built-in hard drive that's pre-loaded with mapping data and over two million points of interest in the United States and Canada. I'd be wrong to say it includes everything you'd need or the specific point of interest you want to drive to, but even if your destination is one of the rare ones not in the database, you can easily program it into the unit with a few simple key presses.

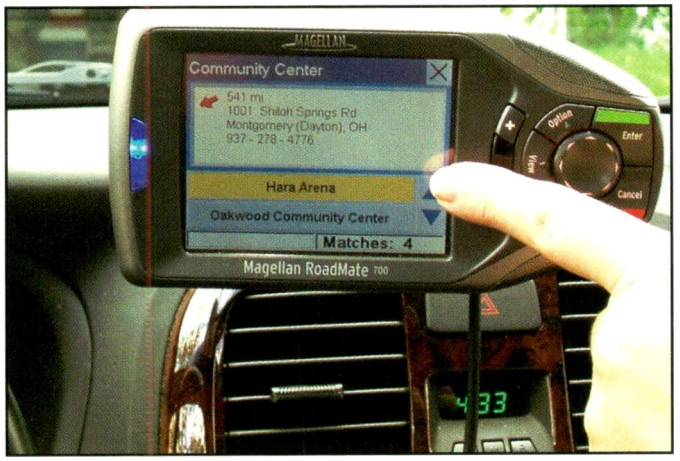
The front of the RoadMate 700 has a large color display (you can change the contrast and brightness for your particular driving situation and visibility). There are a total of 12 controls on the unit at your disposal. Please don't think that because there are more than three or four buttons the operation of the RoadMate 700 is complicated— nothing could be further from the truth. In fact, it's quite easy to use.

Anyone who knows me knows that there are times when I can get lost in my own town. Chances are I'm not alone (I just admit it). Yes, I really am directionally challenged! When going on a trip I'll typically bring a map showing the intended route, and even a text printout of the route. Even so, there are times when I goof. Then it becomes a matter of doing as my brother-in-law, Wes, likes to do (yes, *likes*!): Stop and ask for directions. I don't have a problem asking, but *once* is usually enough to get me going the right way!

Now, enter the Magellan RoadMate 700: My asking days are over, guaranteed. I haven't asked for directions since opening the box! (Except once in Pennsylvania with Wes when *he* had to be sure we were on the correct road.) When first using the 700 (and each time you turn it on) it has to access the correct number of satellites in order to pinpoint your location. On average, this takes anywhere from 10 seconds to a minute or so. I've always got a minute or two; it's time to just relax a bit and have a sip of coffee, double-check your seat belt, and be sure that you've got Aunt Millie strapped in before taking off.

Selecting "Dining, ATM, Gas..." from the screen gives you access to scads of points of interest, including parks, police stations, hospitals, wineries, car repair facilities, and gas stations!

With the small thumb-sized antenna tilted upward for the best signal, you simply push the on/off button for a half-second and you're instantly presented with a high-tech-looking screen with a few options. (You can buy an optional antenna from Magellan, but I don't think you'd ever need it; frankly there were times I forgot to tilt the antenna up and still accessed enough satellites!). If you don't choose any of the options, such as deciding on a destination from the 700's database or a previous destination you've entered into its memory (more about that in a moment), in a few seconds you'll see a very detailed



Dayton's Hara Arena is 541 miles from my home in New Jersey. The small red arrow at the top points in the precise direction of Dayton, Ohio!

Okay, everyone, let's spell "Dayton." The large keypad is highly visible in any light!

map pinpointing your location with a [x] triangle cursor. A colored, uncomplicated status bar along the bottom of the screen indicates the strength of the received signals; blue is best, green indicates a strong signal, yellow is average and red means no signal is present.

Obviously, based on your location, weather, overhead obstructions, and other reception factors, this status will change from time to time. But the good news is you're never lost! Why? If the 700 loses the satellites' signals temporarily, it will still provide you with a 3D picture guidance. So if you've asked the 700 to get you to the Hampton Inn on First Street and it loses the satellites momentarily when you're five minutes from the motel, the 700 will still give you turn-by-turn visual instructions, so you'll still get there without a problem.

The 700 goes a step further than some GPS units by giving you *verbal*, in either a male or female voice, turn-by-turn instructions. How cool is that, really? Let's take a look at look at how it worked on a trip I recently took and a few things heard and seen on the screen.

All Aboard For Dayton!

I've been driving to the Dayton Hamvention for a few years now—with maps, notes, and a cup of coffee or two or three. The first thing I did for the last trip out that way was to pop the RoadMate 700 onto my windshield.

For the first installation the unit comes with a small alcohol wipe as your windshield must be very clean and not coated with any anti-glare or anti-fog glass product. If it is, the suction cup won't hold. So do what you've got to do to get that invisible layer of gunk off the inside of your windshield and stick the 700 up there! You also MUST use a similar drugstore alcohol wipe each time you reattach the unit to your windshield. Admittedly there were many times I didn't—and wouldn't you know it, those were the times the 700 came loose. This isn't a design problem with the mounting hardware, but rather just something you as a user must adapt to and *work with* by securing it properly onto a *clean* windshield! Also, in very cold weather if you haven't warmed the windshield by putting your vehicle's defrost on for a few minutes, there's a chance the suction cup won't hold. You'll usually instinctively know when it's not firmly attached because the small thumb lever at the suction cup won't give you that "I've got a good grip on the window" feeling.

The Magellan RoadMate 700 programmed with the Dayton, Ohio, Hara Arena. Here it tells me I have 615 miles to go (not the 541 shown earlier), because I've asked it to get me there in the "Shortest Time." Shortest time doesn't always mean fewest miles—sometimes it's a few more!

Anyway, back to our example. The Hamvention is held at Dayton's Hara Arena, located on Shiloh Springs Road in Dayton, Ohio. Right after turning on my vehicle, I turned on the unit and waited a few seconds for it to cycle through the welcome screen. At the "Select Destination" screen, I simply touched the screen on the words, "Dining, ATM, Gas..." then press or scroll to "Select Category." While you might think the Arena could be in the "Exhibition Center," category, it's not; in the Magellan unit it's listed as a "Community Center." So, from the many choices (dining, airport, gas station, bank, etc.), using the touch screen or circular scroll button, I selected—you guessed it—"Community Center." It was that easy.

I was then given another screen with three simple choices to find the Community Center (in this case the Hara Arena): "Nearest," "List by City," or "All Areas." I selected "List by City" and, again using the touch screen, began "typing" the location, which was Dayton. (The 700 has what Magellan calls QuickSpell technology that, depending on the length of the entry you're keying in, after you've touched a reasonable number of letters—sometimes just two or three—it will provide you a list of cities). I scrolled down to "Dayton, OH" and touched that line. In a flash, up came another screen asking me to select a name.

As I began to spell "Hara Arena" I only get the "Ha" pressed and up popped a listing for the Hara Arena, complete with address and phone number. As that's where I was going, I simply touched the screen telling the 700 to give me a route, and I was given four choices: "Shortest Time," "Shortest Distance," "Most Use Of Freeways," and "Least Use Of Freeways." Since I don't want to take three days to get to Dayton, I'll typically choose "Shortest Distance," or "Most Use Of Freeways." Done, then came a pleasant, clear voice prompt saying, "Most Use Of Freeways, Calculating route." This "calculating route" process took only about five seconds, at which time the screen gave me a map pinpointing my location and driving distance to the destination—for me, a total of 541 miles.

As I drove, the cursor changed positions, "moving" along the programmed route, which is shown in pink. But you don't have to use the Magellan RoadMate 700 with a route. You can simply press "Map" when powering up the unit and you'll see a clear, highly accurate map showing your current location. You can zoom in or out using the "+" or "–" keys.

On The Road Again

As you use it, the 700 receives instantaneous signals (well, *nearly* instantaneous) from an array of GPS satellites and the unit itself tracks your driving progress. When I was still only a couple of minutes from home on my way to Dayton, the 700 informed me that the "shortest distance" to the Garden State Parkway was to turn left onto Front Street, which is a few blocks away from me, down Spring Street. As I approached Front Street, the Magellan 700's voice said, "Approaching left turn," giving me *plenty* of time to prepare for the turn. Come on, how cool is that? And as I got within a block or so of the turn, a maneuver status bar popped up on the bottom of the screen, moving as the vehicle moved, providing another visual indicator of just how far that upcoming turn was! Then right *at the turn* I heard a user-customizable bell/tone alerting me to the turn. If you're traveling at night and your wife or kids are snoozing, you can turn off the audio prompts, or the volume down to barely a whisper.

Remember, though, in metro areas or places where road congestion reigns supreme, you've *got to use common sense*, keep your eyes on the road along and take only an occasional glance at the screen, keeping your ears alert for the voice prompts. For example, when I'm on I-70, about ready to exit, a voice prompt says, "Prepare to exit in two miles." Pretty good, wouldn't you say; after all I'm moving along at 70 mph, and this gives me a chance to now ease off a bit and get ready to exit. With another prompt at the one-mile mark, one at the half-mile, and the maneuver status bar I'm told precisely when to exit. It's like having a personal driving assistant—all you've got to do is drive!

Changing Your Mind

Is the Magellan RoadMate 700 flawless? I'd be crazy to say it is, and I'd never put my trust *completely* in any GPS unit. But having said that, the 700 is so darned accurate and intuitive that I haven't looked at a roadmap since opening the box. I still *have* one for every trip, because if something happens, I'm prepared, but then again, that's just me.

With that in mind, let's say you're two minutes from home and realize the unit is telling you to turn left on Main Street. It's your hometown and you sense the GPS is going to take you to the Parkway through the downtown area. You sense it, but aren't sure, but you sure don't want to drive Main Street at noon. What to do?

My wife Carolyn takes her turn using the RoadMate 700. Notice that the driver's visibility isn't reduced and that a passenger can easily pull the 700 over slightly to view the route, if necessary.

Here's the turn-by-turn directions, accessed by pressing "view." You can see that from my home location I'll be making a right turn in one-tenth of a mile onto Spring Street, and my next turn will be a left onto County Road 34 (Harding Road).

You press the "View" button and you're presented with a sequential list of turns that the 700 will be asking you to make from your current location. There it is, showing you that you'll be making a left onto Main. In this instance, your common sense can override the 700's brains. It's okay to disagree with it.

You've got a couple of choices here: ignore the voice and visual commands for a few moments and do your own thing, or ask it to recalculate the route. I rarely ask the unit to recalculate (except when in unfamiliar territory), but instead follow my own tried-and-true way to the highway or restaurant or whatever. Just know that in the process (and you can adjust the volume of the voice prompts!) the 700 will tell you a few suggested turns, one of which might be, "When possible, make a legal U-turn." Again, don't be quick to follow the instructions over a cliff if your eyes tell you that turning around or going straight would put you in jeopardy; just use common sense again, and drive on.

There have been numerous times when making the Dayton trip that I've decided to get off the highway for lunch or just to take a break from the long drive and get off the highway. The Magellan RoadMate 700 will realize instantly that you're off the highway (unless you're on a service road, for example, that runs parallel to, and very, very close to the main highway) and try to get you back on track. So, if you've decided the kids are making you nuts and it's time to eat, just let the RoadMate 700 find the nearest McDonalds or, if you're in the mood for a more conventional restaurant, go to the RoadMate's "Select A Destination" screen, select, "Restaurant," and then select, "Nearest." In less than five seconds you'll get a list of up to 100 restaurants, including McDonalds if there's one nearby. Make a choice and go eat!

Like where you've been and plan on going back again next year? No problem, because the Magellan RoadMate 700 stores up to 300 destinations or addresses (100 per user, up to three users), so you're able to customized it and other family members can add their own destinations to the unit's memory, too!

Emergency!

Let's say you're driving along on a programmed route and need to go to a hospital right away. Even if the RoadMate 700 is in the middle of a voice prompt, simply press "cancel" to go back through the screens until you reach the "Select Category" screen. Scroll down to "Hospital" and select it. Press "Nearest" and, based on your location, you'll be given the locations, phone numbers, and distance from your current location of the nearest medical facilities. If you decide to go to one, select it and take the few seconds to let the 700 guide you safely there.

Direct Address Input

Besides the points of interest method of selecting a destination, you can also input street addresses or an intersection. Let's say you're a salesperson and your client has changed the meeting place. You've got the new address, but you're two blocks from the original meeting location. Pull over to a safe location (I don't recommend programming the GPS while driving, so stop the car or have a passenger program it, if possible!) and get to the "Select Address" screen. A couple of minutes later you'll be on your way after keying in the new meeting location and asking the RoadMate 700 to get you there in the "Shortest Time."

Let The Driving Fun Begin!

As I said earlier, I've used the RoadMate 700 for a while now and it has been the best traveling companion in the world (next to my wife, of course!). It comes complete; there's nothing extra to buy and there's even a built-in Tutorial that you an access anytime by pressing "Option" and "Tutorial." You'll be guided through simple step-by-step audio and visual instructions for the key features of the Magellan RoadMate 700. You can also get an online software upgrade to the 700's memory, because, let's face it, things change and you'll want to be on time for that next engagement!

This is simply the slickest driving tool you'll *ever* own—besides the vehicle and your radios, of course! I wouldn't be without mine, and once you get one, I'm sure you'll feel the same!

The Magellan RoadMate 700 is currently available at the Magellan website for $999.99 as well as from the company's dealer network. For more information on the Magellan RoadMate 700 visit www.magellangps.com and please tell them that you read about it in *Popular Communications*. ■

by Gerry L. Dexter, gdex@genevaonline.com

BBC Reverse-Logic, And Djibouti Is Back!

The kindly old BBC has tossed another egg at us. They have decided to discontinue use of the Antigua relay, which provided solid evening reception on 5975, even though it was no longer intended for a North American audience. The Antigua station is managed by the Caribbean Relay Company, which operates the facility for the BBC as well as Deutsche Welle. Consideration is being given to putting the station up for sale to a commercial broadcaster. You don't have to be a genius to guess what that kind of programming we'd be getting if that happens!

They're back! A once elusive DX target, silent for over a decade, has returned to the air. **Radio Djibouti** has been reactivated on its old frequency of **4780** and has been quite widely heard from sign on just before 0300. In earlier days they used a mere 4 kW, but their new transmitter is reported to be either 20, 50, or100 kW, depending on which source you believe.

SW Radio Africa, a clandestine in opposition to the Mugabe government of Zimbabwe has recently expanded its broadcasts. It's begun using **15145** at 1600 (widely heard), **11770** at 1700, and **11995** at 1800, all via VT Merlin sites. The Zimbabwe government is jamming the station. Also in use is **3230**, which has been heard in North America from 0300 sign on.

Another clandestine suddenly being noted is **Radio Horyall**, beamed at Somalia. It is currently using 12130, signing on at 1730 and running just to 1800. This appears to be based in Ontario and relayed from a transmitter in Russia. The programming is in Somali, and possibly Amharic as well.

New Ugandan Station, And Another U.S. Shortwave Broadcaster

A new religious station is due on the air in Uganda shortly. It will be operated by High Adventure Canada, teaming with a local Christian FM station in Kampala. No frequency or schedule has been announced yet, but the station will use a tropical band frequency and, with just 1 kW, it's likely to be a difficult catch.

Believe it or not, there's another U.S. shortwave broadcaster on the horizon. A group calling itself Transformation Media International, based in Albany, Oregon, has applied for a license to operate a 50-kW station to be located near Lebanon, Oregon. They plan to broadcast a variety of programming in several languages for foreign residents in the area. What will you wager that six months after this goes on the air they will be selling half-hour blocks, a la WHRI and all the others?

It seems that World Music Radio, which came on the air from Denmark last May accompanied by much ballyhoo, has gone silent and its future appears a bit uncertain. We'd guess they were confronted with too many bills chasing too few Kroner. We wish them luck and hope for a quick return.

Reader Loggings

Remember your shortwave broadcast loggings are always welcome! Please be sure you list them by country and include your last name and state abbreviation after each log. We also have a continual need for illustrative material, whether QSLs (good copies or originals you don't need returned), general station news and information, pennants, schedules, etc. And, last but not least—a picture of you at your monitoring position. Why be so shy?

Here are this month's logs. All times are in UTC, wherein 0000 equals 7 p.m. EST, 6 p.m. CST, 5 p.m. MST, and 4 p.m. PST. Double letters (SS, RR, AA, PP, etc.) are language abbreviations (Spanish, Russian, Arabic, Portuguese, etc.). If no language is specified the broadcast is assumed to have been in English (EE). For other abbreviations see the sidebar elsewhere in this column.

Bill Oliver sells NASWA t-shirts at the annual SWL Fest last March. Bill publishes "The NASWA Journal," the monthly bulletin of the North American Shortwave Association. You should join. (Thanks Rich D'Angelo, PA)

Rick Barton got this recent QSL from Radio Bulgaria.

Help Wanted!

We believe the "Global Information Guide" consistently presents more shortwave broadcast loggings than any other monthly SW publication! (This month we processed 514* loggings!) Why not join your fellow SWLs and let us know what you're hearing and become eligible for our monthly shortwave book prize as well! Send your logs to "Global Information Guide," *Popular Communications*, 25 Newbridge Rd., Hicksville NY 11801-2953. Or, e-mail them to Editor Harold Ort at popularcom@aol.com, or to your "Global Information Guide" columnist at gdex@genevaonline.com (please see column text for basic formatting tips.) So come join the party—we look forward to hearing from you!

**Not all logs get used; there are always a few which are obviously inaccurate, unclear, or lacking a time or frequency.*

ALBANIA—Radio Tirana, **6115//7160** at 0334 with talk, mentions of Albania. (Burrow, WA) **6205** in Albanian at 2136 and **7120** in EE at 2250. (DeGennaro, NY)

ANTIGUA—BBC Relay, **5975** at 0000. (Newbury, NE)

ANGOLA—Radio Nacional, **4950** in PP with news, highlife music at 0401. (Mirabal, PR) Songs and talks in PP monitored at 0405. (Brossell, WI)

ANGUILLA—Caribbean Beacon, **11775** with Gene Scot at 1845. (Charlton, ON)

ARGENTINA—Radio Nacional, **6060** in SS at 0135. (Charlton, ON) 0902. (DeGennaro, NY) RAE, **11710** at 0027 with

Abbreviations Used In This Month's Column

*	— (before or after a time) time the station came on or left the air
(l)	— (after a frequency) lower sideband
(p)	— presumed
(t)	— tentative
(u)	— after a frequency (upper sideband)
v	— variable
//	— in parallel
AA	— Arabic
ABC	— Australian Broadcasting Corporation
AFN	— Armed Forces Network
AFRTS	— Armed Forces Radio TV Service
AIR	— All India Radio
Anmt(s)	— announcement(s)
Anncr	— announcer
AWR	— Adventist World Radio
BSKSA	— Broadcasting Service of Kingdom of Saudi Arabia
CC	— Chinese
Co-chan	— co-channel (same frequency)
Comml(s)	— commercial(s)
CP	— Bolivia, Bolivian
CRI	— China Radio International
DD	— Dutch
DJ	— disc jockey
DW	— Deutsche Welle/Voice of Germany
EE	— English
ECNA	— East Coast of North America
f/by	— followed by
FEBA	— Far East Broadcasting Association
FEBC	— Far East Broadcasting Company
FF	— French
GBC	— Ghana Broadcasting Corp
GG	— German
GMT	— Greenwich Mean Time
HH	— Hebrew, Hungarian, Hindi
HOA	— Horn of Africa
ID	— station identification
II	— Italian, Indonesian
Int	— international
IRRS	— Italian Radio Relay Service
IS	— interval signal
JJ	— Japanese
KK	— Korean
LSB	— lower sideband
LV	— La Voz, La Voix
NBC	— National Broadcasting Corporation (Papua New Guinea)
ORTB	— Office de Radiodiffusion et Television du Benin
PBS	— People's Broadcasting Station
PP	— Portuguese
PSA	— public service announcement
QQ	— Quechua
RCI	— Radio Canada International
Rdf.	— Radiodifusora, Radiodiffusion
REE	— Radio Exterior de Espana
RFA	— Radio Free Asia
RFE/RL	— Radio Free Europe/Radio liberty
RNZI	— Radio New Zealand International
RR	— Russian
RRI	— Radio Republik Indonesia
RTBF	— RTV Belge de la Communate Françoise
Relay	— transmitter site owned/operated by the broadcaster or privately operated f or that broadcaster
relay	— transmitter site not owned by the broadcaster
SCI	— Song of the Coconut Islands (transition melody used by Indonesian stations)
s/off	— sign off
s/on	— sign on
SIBC	— Solomon Is. Broadcasting corp.
Sked	— schedule
SLBC	— Sri Lanka Broadcasting Corporation
SS	— Spanish
TC	— time check
TOH	— top of the hour
TT	— Turkish
TWR	— Trans World Radio
Unid	— unidentified
USB	— upper sideband
UTC	— Coordinated Universal Time (as GMT)
UTE, ute	— utility station
Vern	— vernacular (local) language
(via)	— same as "relay"
VOAS	— Voice of America
VOIRI	— Voice of Islamic Republic of Iran
WCNA	— West Coast of North America
ZBC	— Zimbabwe Broadcasting Corporation

Bridges in Prague, home of Radio Prague, as well as RFE/RL. (Thanks David Weronka, NC)

PP to Brazil. (DeGennaro, NY) 0215. (Maxant, WV) **15345** at 2301. (Charlton, ON) 2310 and **//6060**. (Alexander, PA) 2340 with tangos, SS anncr. (Yohnicki, ON)

ARMENIA—Voice of Armenia, **9965** in EE at 1922, IS, anthem, schedule, address and into news. (Burrow, WA) 1925 with EE news, comment. Many "Voice of Armenia" IDs. (Alexander, PA)

ASCENSION IS.—BBC Relay, **7105** in FF at 0445. (Brossell, WI) **12095** at 0000 and **15400** at 2300. (Newbury, NE) 15400 at 1515 with soccer match. (Wood, TN) 1955 with "Analysis" and "Newshour." (Jeffery, NY) **17830** at 1921 and **21740** at 1757. (Charlton, ON)

AUSTRALIA—Radio Australia, **5995** at 1400 with ID, news. (Brossell, WI) 6020 at 1300 and **9580** at 1100. (Newbury, NE) **7240//9475** with news and ID at 1809. And **9500**//9580//**9710**//**11880** with Australian news at 1934. Also **13675** in GG at 1630. (Burrow, WA) 9475 to SE Asia at 1307, 9580 at 1108 **and11660** in CC at 1328. (DeGennaro, NY) 9580//**9590** at 1115. (Maxant, WV) 9580 at 2121 and **21740** at 2248. (Charlton, ON) 21740 at 2245. (MacKenzie, CA) ABC Tennant Creek, **2325** with music program at 1145. (Barton, AZ) Voice International, **11840** at 1530 with many "Your Voice—all about real life" IDs. (Barton, AZ) 1612 with Christian pops. (Burrow, WA)

AUSTRIA—Radio Austria Int., **7325** with news and "Report From Austria" at 0045. (Rossetti, MA) 7325 at 0049, **13675** via Canada at 1637 and **13740** in GG at 1643. (DeGennaro, NY) 13675 via Canada at 1652. (Charlton, ON)

BANGLADESH—Bangladesh Betar, **7185** at 1809 with subcontinental music, talks in EE. Off at 1900. (Burrow, WA)

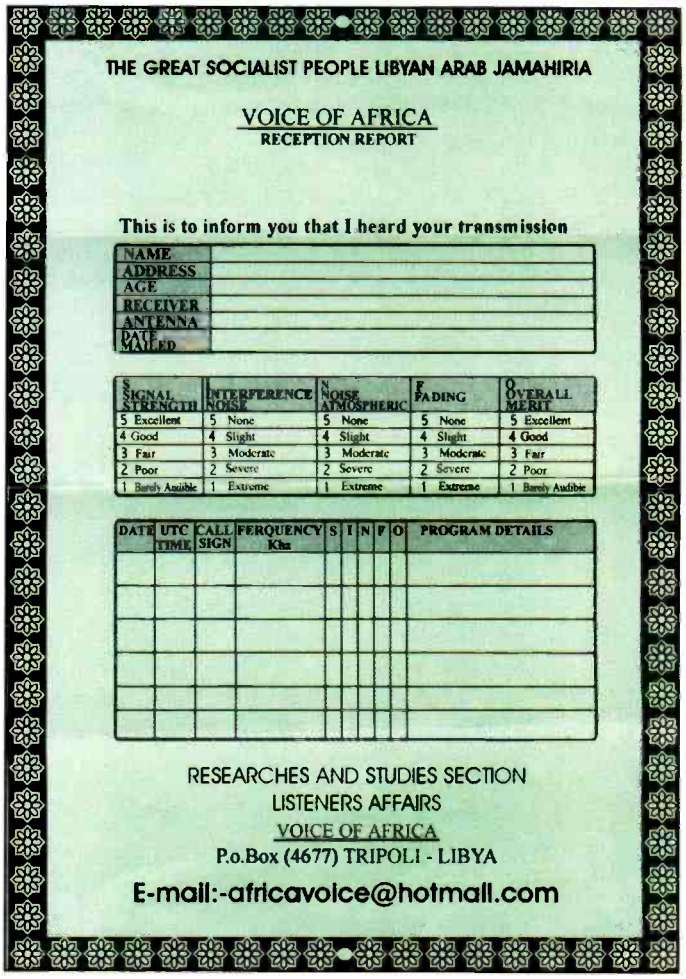
BELGIUM—RTBF, **9470** in FF to Southern Europe at 1021. (DeGennaro, NY)

BELARUS—**5970** at 0300 with EE news, ID, local pops, **//7210** which was barely audible. Also **7105** at 2030–2100 and 2200–2230, **//7340**. (Alexander, PA)

BOLIVIA—Radio San Miguel, Riberalta, **4900v** in SS at 1015. Continues to drift downward; I also notice a degradation of signal quality. (Wilkner, FL) Radio Chicha, Tocla, **4763.1**, very poor in SS at 1030. (Wilkner, FL) Radio Guanay, Guanay, **4761.8** at 2330–0010 with brief SS audio. (Wilkner, FL) Radio Santa Cruz, Santa Cruz, **6134.8** at 1020 with SS talk, IDs, CP music. (Alexander, PA) Radio Mosoj Chaski, Cochabamba, **3310** with SS songs at 0805. Terrible helicopter-type noise on the frequency. (Mirabal, PR) Radio Municipal, Caranavi, **4845.2** at 0917 sign on with possible provincial anthem, opening SS anmts and CP music. (Alexander, PA)

SERBIA-MONTENEGRO—Int. Radio of S & M, **7115** (via Bosnia) at 0108 with Gregorian chants, woman anncr in EE. (Newbury, NE)

BOTSWANA—VOA Relay, **9815** in FF at 2008 and **9885** at 0423. (Brossell, WI) **12080** in FF at 1950. (Charlton, ON) **15445** with news at 1702. (Mirabal, PR)



THE GREAT SOCIALIST PEOPLE LIBYAN ARAB JAMAHIRIA

VOICE OF AFRICA
RECEPTION REPORT

This is to inform you that I heard your transmission

NAME	
ADDRESS	
AGE	
RECEIVER	
ANTENNA	
DATE MAILED	

S SIGNAL STRENGTH	INTERFERENCE NOISE	NOISE ATMOSPHERIC	F FADING	O OVERALL MERIT
5 Excellent	5 None	5 None	5 None	5 Excellent
4 Good	4 Slight	4 Slight	4 Slight	4 Good
3 Fair	3 Moderate	3 Moderate	3 Moderate	3 Fair
2 Poor	2 Severe	2 Severe	2 Severe	2 Poor
1 Barely Audible	1 Extreme	1 Extreme	1 Extreme	1 Barely Audible

DATE	UTC TIME	CALL SIGN	FERQUENCY Khz	S	I	N	F	O	PROGRAM DETAILS

RESEARCHES AND STUDIES SECTION
LISTENERS AFFAIRS
VOICE OF AFRICA
P.o.Box (4677) TRIPOLI - LIBYA
E-mail:-africavoice@hotmail.com

This is an official reception report form for Libyan Radio. The glossy paper they used doesn't accept typewriter or ballpoint pen very well. (Thanks David Weronka, NC)

BRAZIL—Radio Educacao Cultural, Campo Grande, **4755** with prayers, mass in PP at 0011. (Mirabal, PR). Talks in PP at 0324. (Brossell, WI) Radio Congohas, Congohas, **4775** in PP at 0821. (Mirabal, Fl) Radio Guaruja Paulista, Presidente Prudente, **5045** at 0905 with music, time check, ID. (DeGennaro, NY) Radio Anhanguera, Goiania, **4915** with hymns and religious message in PP at 0857. (DeGennaro, NY) EE pops at 0358. (Mirabal, PR) Radio Clube Paranaense, Curitiba, **6040** with religious talk in PP at 0927. (DeGennaro, NY) Radio Itataia, Belo Horizonte, **5970** with religious message in PP at 0914. (DeGennaro, NY) Radio Educacao Rural, Tefe, **4925** with PP songs and talks at 1039. (DeGennaro, NY) Radio Brazil Central, Goiania, **4985** with PP music and talk at 0041. (Jeffery, NY) 0043. (Mirabal, PR) 0045. (DeGennaro, NY) **11815** with light instls and ID at 0215. (D'Angelo, PA) Radio Marumby, Florinapolis, **9665** with religious message in PP and music at 0927. (DeGennaro, NY) Radio Gaucha, Porto Alegre, **6020** with man and religious talk in PP at 0858. (DeGennaro, NY) Radio Brazil Central, Campinas, **4875** with PP songs and music at 0905. (DeGennaro, NY) Radio Rural, Santerem, **4765** with PP songs at 0820. (Mirabal, PR) ID at 0903, commls and anmts. (DeGennaro, NY) Radio Record, Sao Paulo, **9505** with commercials in PP, talk and music at 0959. (DeGennaro, NY) Radio Universo/Radio Tupi, Curitiba, **6060** with religious message in PP at 0932. (DeGennaro, NY) Radio Cancao Nova, Cachoeira Paulista, **9675** with PP call-in show at 0121. (DeGennaro, NY) 2337. (Charlton, ON) Radio Nacional, Macapa, **4915** at 0047 with contemporary Brazilian music. (Mirabal, PR) 0346 with PP language pops, ID 0401. (D'Angelo, PA) 0359. (DeGennaro, NY) 0418. (Brossell, WI) Radio

A QSL from Radio Malaisy, a pirate in Southern Europe, which operates irregularly in the 48-meter band (heard on 6310). (Thanks Rich D'Angelo, PA)

Clube do Para, Belem, **4885** at 0413 with PP songs. (DeGennaro, NY) 0504 with songs and anmts. (Brossell, WI) Radio Bandeirantes, Sao Paulo, **11925** with PP commls, ID at 0052. (DeGennaro, NY) 0240 with EE vocals, woman PP anncr. (D'Angelo, PA) Radio Nacional Amazonia, Brasilia, **17780** with PP call-in show at 0032. (DeGennaro, NY) 2255 with sambas. (Mirabal, PR)

BULGARIA—Radio Bulgaria, **5800** with EE to Western Europe at 2219, 7500 in FF to Mideast and Europe at 2120 and **11700** in Bulgarian at 1334. (DeGennaro, NY) **7400** at 0030 with ID, program on Bulgarian Orthodox Church. (Charlton, ON) 7400/**9700** at 0340 with ID, schedule, DX program. (Burrow, WA) 11700 with piano music at 1350 and **15700** in presumed Bulgarian heard at 1408. (Brossell, WI)

BURKINA FASO—Radio Burkina, **5030** at 2300 with FF talk, ID "Radiodiffusion Television du Burkina." Local tribal music and Afro-pops. Off at 0000. (Alexander, PA) 2316 with rap and pops in EE and FF. (Wood, TN) 2336 in FF. (DeGennaro, NY) 2340. (Jeffery, NY)

CANADA—Radio Canada Int., **9515** in FF at 1235. (Northrup, MO) **9880** via China at 0020. (Paszkiewicz, WI) **11855** in SS to Central and South America at 0044. (DeGennaro, NY) CKZU Vancouver, **6160** relay CBU at 0909. (DeGennaro, NY)

CHILE—Voz Cristiana, **11745** in PP to Brazil at 0035. (DeGennaro, NY) **17580** in SS at 1919. (Charlton, ON)

CHINA—China Radio Int., **5960** via Sackville at 1109, **6280** at 1114, **7170** via Mali in CC at 2305, **7190** in unid language at 1124, **7290** in RR at 1105, **9570** with CC lessons at 0056 and **11850** via French Guiana in PP at 0040. (DeGennaro, NY) **9580** via Cuba at 0117. (Charlton, ON) **11885** at 1320. (Northrup, MO) **13685** via Mali in FF at 2235. (Brossell, WI) CPBS, **4460** at 1150. (Barton, AZ) **6175** in CC at 1105, **9500** in CC at 1057, **11630** in CC at 2224. (DeGennaro, NY) **9675** in CC at 0540. (MacKenzie, CA) **9810** in CC at 1337. (Brossell, WI) Xinjiang PBS (p) **4980** with apparent news in CC at 0011. (Strawman, IA) Voice of Pujiang, **9705** in CC at 1350. (Brossell, WI)

CLANDESTINES—Radio Farda, **9335** via Sri Lanka, in presumed Farsi at 1948. (Brossell, WI) **9335** in Farsi at 2125 and **9585** via Morocco at 0101. (DeGennaro, NY) **15410** via Wooferton at 1518. (Wood, TN) 1658. (Mirabal, PR) Radio Free Asia, **9365** via Armenia in unid Asian language at 1336. (Brossell, WI) **11945** via Northern Marianas in CC at 1850. (Newbury, NE) **15510** via Northern Marianas with music at 2006. (Jeffery, NY) SW Radio Africa, **3230** at 0315 with local music, EE talk but hard to understand through high noise level. ID caught at 0328 when giving website as swradioafrica.com. (Alexander, PA) (t) At 0401 with snatches of EE and probably a second language. Numerous references to Zimbabwe but no ID. (D'Angelo, PA) **11995** (*pres. via England—gld*) at 1825 in unid language. Short EE anmt at 1831 and another at 1857 close. (Alexander, PA) Radio Liberty, **9520** via Greece in RR at 0526 with some EE inserts. (MacKenzie, CA) Voice of Mesopotamia, **11530** via Moldova at 1400 with talks and songs in presumed Kurdish. (Brossell, WI) Radio Free Syria, **9495** via Germany at 1932 with long AA talks and brief instl inserts. ID and presumed address at 1958 and off at 1959. (D'Angelo, PA) Voice of the Tigre Revolution, **5500** at 0355 opening with flute IS, vern. talk at 0400 and HOA music. //**6350**. (Alexander, PA) 0358 with IS and ID at 0400. (Brossell, WI) Radio Nacional de la RASD, **7460** in SS at 2350. (DeGennaro, NY)

COLOMBIA—La Voz de tu Concencia, Puerto Lleras, **5910** at 0200 relaying Marfil Stereo FM from Meta in SS. (Alexander, PA) 0900. Also **6009.8** with popular SS songs at 1235. (Mirabal, PR) 5910 at 1104. Also 6009.8 with religious songs and talk at 1054. (DeGennaro, NY) Radio Lider/Melodia, Bogota, **6139.8** with news in SS at 1030. (Mirabal, PR) 1059 with choral anthem, multiple IDs and frequency anmts, then news in SS with frequent IDs. (D'Angelo, PA) 1105 with news, frequent IDs and time checks. (DeGennaro, NY) 2325 with SS talk, IDs, pops and ballads. (Alexander, PA)

CONGO (DEM. REP.)—Radio Okapi, **11690** (*believed to be via Meyerton—gld*) at 0400 sign on with ID, FF talks, many spoken and jingle IDs. (Alexander, PA)

COSTA RICA—University Network, **9725** with the late Gene Scott at 0119. (Charlton, ON)

CROATIA—Voice of Croatia, **7285** via Germany at 0307 with local weather, ID. (Burrow, WA) In SS at 2351. Also **13830** at 2108. (DeGennaro, NY)

CUBA—Radio Havana Cuba, **9820** at 0116. (Newbury, NE) **11760** at 2125. (Charlton, ON) 11760 in SS at 1330, **11800** in SS at 1325, **11935** in SS at 1320. (Northrup, MO) 11760 in SS at 1338, **13750** in SS at 1646. (DeGennaro, NY) **13660** in SS at 2355. (Barton, AZ) Radio Rebelde, **5025** in SS at 2333. (DeGennaro, NY) 2358. (Wood, TN) **6060//9550** at 0715. (Barton, AZ) **15570** with SS news at 1707. (Mirabal, PR)

CYPRUS—BBC Relay, **9915** in AA at 1945. (Brossell, WI)

CZECH REPUBLIC—Radio Prague, **6200** with mailbox program at 0102. (Newbury, NE) **7345** at 2258 sign on with IS, anmts, ID and into FF. (Wood, TN) 0105 in EE. (Charlton, ON) 0358 with schedule, frequencies, talk. (Burrow, WA) 7345 at 2345, **9880** in GG at 1104 and GG at 1515 and **11665** via Ascension in SS heard at 0019. (DeGennaro, NY)

DJIBOUTI—RTD Djibouti, **4780** at 0341 in unid language. (DeGennaro, NY)

DOMINICAN REPUBLIC—Radio Amanacer, **6025** with SS religious talks and music heard at 0921. (DeGennaro, NY) 1423. (Mirabal, PR)

ECUADOR—Radio Buen Pastor, Saraguro, **4815** with religious message in SS at 0851. (DeGennaro, NY) LA pops at 0825. (Mirabal, PR) 1000 with SS religious music, ID, talk. (Alexander, PA) La Voz del Napo, Tena, **3279** at 0420 with "El Condor Pasa." (DeGennaro, NY) Religious talk in SS at 0800. (Mirabal, PR) Radio Quito, **4919** with LA pops, woman with ID at 0835. (Mirabal, PR) 1049 with choral anthem, ID, commls. (DeGennaro, NY) HCJB, **9745** in SS at 0015. (Charlton, ON) 9765 in GG at 0700 and **12020** in PP at 2345. (Barton, AZ) **12005** at 1310. (Maxant, WV) **12040** in GG at 2345. (Barton, AZ)

EGYPT—Egyptian Radio/Radio Cairo, **7115** in EE at 2326, **7260** in SS at 0058, **9990** in EE at 2125, **11655** in AA or Swahili to East Africa as "Voice of the Arabs" at 2211, **12050** in AA at 2237. (DeGennaro, NY) 7260 at 0316. (Barton, AZ) 0322. (Burrow, WA) **11790** at 2259. (Mirabal, PR) 12050 in AA at 1834. (Charlton, ON) 1840 in unid language. (Yohnicki, ON)

ENGLAND—Wales Radio Int., **6005** via England at 0300 with various features on Wales. Sandwiched between Cuba on 6000 and Sweden via Sackville on 6010. Saturdays only. (Alexander, PA) Sudan Radio, **11715** via England in AA at 1850. (Yohnicki, ON)

EQUATORIAL GUINEA—Radio Bata, **5005** at 0536 sign on with high-life music, ID, SS talk and more high-life. (Alexander, PA) Radio Africa #2, **15190** at 1605 with EE religious talk and music. Off at 1658. Mixing with BBC-Antigua. (Alexander, PA)

Another D'Angelo catch: The China Huayi Broadcasting Company, heard on 4830. (Thanks Rich D'Angelo, PA)

ERITREA—Voice of the Broad Masses, **7100** with AA news at 0430. (DeGennaro, NY)

ETHIOPIA—Radio Ethiopia, **9559** at 1628 with western pops, ID, gongs, time check and news at 1630. (Burrow, WA) Radio Fana, **6209.9** at 0257 with IS, opening anmts in vern. At 0300 with ID, HOA music. **//6940**. (Alexander, PA)

FINLAND—YLE/Radio Finland Int., **13655** in Finnish to NA at 1615. (DeGennaro, NY)

FRANCE—Radio France Int., **6185** in Romanian at 2140. (DeGennaro, NY) **9790** in FF at 2124. (Charlton, ON)

GABON—Africa No. 1, **9580** in FF at 2048. (Yohnicki, ON) 2235 in FF. (Charlton, ON) **15475** in FF at 1629. (Burrow, WA) 1843. (Brossell, WI) RTV Gabonaise, **4777** at 0531 sign on with FF talk, high-life music, ID 0600. (Alexander, PA) 0533 in FF. (Barton, AZ)

GERMANY—Bayerischer Rundfunk, **6085** in GG at 2200. (DeGennaro, NY) Deutsche Welle, **5910** via Russia in GG at 1315. (Barton, AZ) **11690** via Canada in GG at 2300. (Newbury, NE) **11865** via Portugal at 1935 and **17860** in GG at 1922. (Charlton, ON) **17800** via Portugal at 1900. (Brossell, WI)

GHANA—GBC, **4915** with EE hymns at 2232. (DeGennaro, NY)

GREECE—Voice of Greece, **5865** in GG at 0255, **7475** in GG to North America at 0009, **9375** in GG at 0027, **9420** in GG at 2028 and **15485** via Delano in GG at 2120. (DeGennaro, NY) 9420 in GG at 0510. (MacKenzie, CA) 1955. (Brossell, WI) 15485 (Delano) at 1942 and 2127. (Charlton, ON) RS Makedonias, **7450** in GG at 2039 and **9935** in GG with presumed news at 1321. (DeGennaro, NY)

GUAM—Trans World Radio, **12105** at 1545 with music, Singapore address and "Wonderful Words of Life." (Burrow, WA) Adventist World Radio, **11560** with music, ID, sked heard at 1730. (Burrow, WA)

GUINEA—RTV Guineenne, **7125** with news in FF heard at 2254. (DeGennaro, NY)

GUATEMALA—Radio Verdad, Chiquimula, **4052.5** at 1100 sign on with vocal version of anthem and then an ID. (Wilkner, FL) 0305 with instl music and SS talks. (Brossell, WI) 0545 with EE gospel music, 0555 with EE ID for "Radio Truth" and address. Long version of anthem at 0556 and off at 0601. (Alexander, PA) Radio Buenas Nuevas, San Sebastian, **4799.8** at 1059 with SS religious talk. (DeGennaro, NY)

HONDURAS—Radio Luz y Vida, **3249** with religious talk in SS at 0220. (Mirabal, PR) 0308. (Brossell, WI)

HUNGARY—Radio Budapest, **9710** in FF at 2128. Blocked by Iran at 2130. Also **9870** in HH at 0139. (DeGennaro, NY) **9775** at 0332. (Burrow, WA) 9870 in HH at 0113. (Charlton, ON)

INDIA—All India Radio-Port Blair (Andaman Is.) **4760** at 2358 (p) with opening anmts. Poor-fair and gone by 0009. (Strawman, IA) **4840**-Mumbai in apparent Hindi at 0016 and **4860**-Delhi at 0027 with man in pres. Hindi over percussive Indian music. (Mirabel, PR) **9445**-Banglaore, in EE at 2106. (Charlton, ON) **9635**-Aligarh in HH at 0120, **10330**-Bangalore in HH at 1508 and **11585**-Delhi in HH at 1511. (DeGennaro, NY) **9820**-Panaji (Goa) at 1515 and 10330-Bangalore at 1530. (Maxant, WV) **11715**-Panaji (Goa) at 2156 with Hindi vocals and EE ID, news and comment. Off at 2230. (D'Angelo, PA) 2208 with EE news and comment. (Wood, TN) 10330-Bangalore in pres. HH at 1338 and **13620**-Bangalore in AA at 1852. (Brossell, WI)

INDONESIA—RRI-**3325** Palangkaraya (Kalimantan) at 1158 with SCI under much stronger Radio Bouganville and into Jakarta news. (D'Angelo, PA) (p) 1247 with continuous pops. Also **4605**-Serui with pops at 1237. (Strawman, IA) Voice of Indonesia, **9525** at 1354 with talks in presumed II. (Brossell, WI) 1645 with drums and flutes. (Barton, AZ) 2005 with EE news, ID. (Burrow, WA)

IRAN—VOIRI **7165** in unid language at 1600. Also **9610//9940** in EE at 1616. (Burrow, WA) **9710** in unid language at 1230 and **9905** in SS at 0144 (DeGennaro, NY) **9860** in presumed Farsi at 0419. (Brossell, WI) 9905 in SS at 0055. (Mirabal, FL)

ISRAEL—Kol Israel, **6280** in HH at 2201 and **9545** in HH at 0016. (DeGennaro, NY) **7545** in HH at 0027. (Charlton, ON) News in EE at 0430. (Burrow, WA) Galei Zahal, **6973** in HH at 0245. (Mirabal, PR) 2210. (DeGennaro, NY) **15785** in HH at 1415. (Yohnicki, ON)

ITALY—RAI Int., **6010** in SS at 2124, **9840** in II at 0132, **11680** in FF at 1554, **11800** in II at 0035, **11875** in II at 1757 and **11880** in EE at 2040. (DeGennaro, NY) **7230** at 0445 and **9760** at 1931. (Burrow, WA) **9860** in II with IS at 2241. (Charlton, ON) 11800 in II at 2301 (Mirabal, PR) **15250** in II at 1835. (Brossell, WI) IRRS, **5775** with short features about the UN, music to 2300 ID and QSL info. Off at 2304. (D'Angelo, PA)

JAPAN—Radio Japan/NHK, **6145** via Canada with Pavarotti at 0050 and **11895** via French Guiana in JJ at 2233. (Charlton, ON) **9530** via French Guiana in SS at 1000. (Mirabal, PR) **9695** at 1100. (Barton, AZ) **11705** via Canada in JJ at 1500. (Newbury, NE) **11710** via Canada in JJ at 1330. (Northrup, MO) **11770** via Sri Lanka in JJ at 2203. (DeGennaro, NY) **15220** in JJ at 2250 to 2256 close. **//11665, 11895** (French Guiana) **11910, 17605** (Bonaire) and **17825**. (MacKenzie, CA)) Radio Nikkei, **3925** in JJ at 1420 and **6115** in JJ at 0745. (Barton, AZ) **9590** in JJ at 0534. (MacKenzie, CA)

JORDAN—Radio Jordan, **9830** in AA at 2010 and **11810** in AA at 1406. (Brossell, WI) **11690** at 1445 with woman DJ and Euro-pops. Off at 1550. (Mirabal, PR) 1456 with EE vocals, news by woman. "Listeners Choice" program at 1504. (D'Angelo, PA) 1609 with "Radio Jordan, 96.3 FM" ID. (Burrow, WA) 1523 with US pops. Also **11820** in AA at 2036. (DeGennaro, NY)

KAZAKSTAN—Deutsche Welle relay on **9395** in GG heard at 1333. (Brossell, WI)

KUWAIT—Radio Kuwait, **9855** in AA at 2011. (Brossell, WI) **11990** in AA at 1609. (DeGennaro, NY)

LATVIA—European Music Radio, **9290** at 2145 with pop vocals and EE anncr. Numerous "EMR" IDs. Off at 2203. (D'Angelo, PA)

LIBERIA—ELWA, **4760** at 0556 sign on with vibraharp IS, instl music, EE anmts at 0559 and into EE gospel music, local religious chorus, ID and into "Back to the Bible" at 0615. (Alexander, PA)

LIBYA—Radio Jamahiriya, **11635** with EE news at 1817, also **11860** in AA at 1753. (DeGennaro, NY) **11635** in AA at 1816 and **15220** in SS at 1656. (Charlton, ON) **15220//17840** in AA at 1620. (Mirabal, PR) (*all frequencies via France—gld*)

LITHUANIA—Radio Vilnius, **7325** with ID at 0059. (DeGennaro, NY) 0130–0200 in EE. Also **9875** at 0030–0100. (Alexander, PA) 0036 with ID, features, schedule. (Barton, AZ)

MADAGASCAR—Radio Netherlands Relay, **9590** with Indonesian service at 2350. (Strawman, IA) **12080** in EE at 1405. (Brossell, WI)

MALI—RTV Malienne, **4783** in FF at 2235. (DeGennaro, NY)

MALAYSIA—Radio Malaysia, **7295** with music dedication pgm at 1623. (Burrow, WA) Voice of Malaysia, **9750** at 1143 with long Indonesian talk to light instl music at 1156, anmts and ID, then news at 1200. (D'Angelo, PA)

MAURITANIA—Radio Mauritanie, **4845** in AA at 0020. (Mirabal, PR) 0021. (Jeffery, NY) 0026. (DeGennaro, NY)

MEXICO—Radio Educacion, **6185** in SS with music of the '30s

and '40s at 1017. (DeGennaro, NY) Radio Mil, **6010** with romantic ballads in SS at 1315. (Barton, AZ) Radio Huayacocotla, **2390** with instl music and SS anncr at 0030 in very bad band noise. (Wilkner, Fl)

MOROCCO—RTV Marocaine, **7135** in AA at 2257. (DeGennaro, NY) **15345** in AA at 1845. (Yohnicki, ON) 1907. (Jeffery, NY) 1909. (Charlton, ON) VOA Relay, **15220** in FF at 1831. (Brossell, WI) **15240** with "Encounter" at 1843. (Jeffery, NY) **17895** with "Studio One" at 1750. (Charlton, ON)

NIGERIA—Voice of Nigeria, **7255** at 1900 sign on with Afro-pops, news at 2001. Into FF at 2059. Also **15120** at 1700 sign on. (Alexander, PA)

NETHERLANDS—Radio Netherland, **11655** with news features at 1812 and **11895** via Madagascar in Urdu at 2335. (Charlton, ON) **11655** to Africa with "Europe Unzipped" at 1900. (Rossetti, MA) 2000. (Newbury, NE)

NETHERLANDS ANTILLES—Radio Netherland Bonaire Relay, **6165** with promos for upcoming programs monitored at 0124. (Newbury, NE)

NEW ZEALAND—Radio New Zealand, **9870** with "Dateline Pacific" at 1310. (Maxant, WV) 1340 with modern jazz. (Brossell, WI) 1408 with weather for Pacific islands. Also **15265** with "Morning Report" at 1910. (Barton, AZ) **9870** at 1535 with interview. (Newbury, NE) 1606 with Cook Islands weather and back to national network. (Burrow, WA) National and Pacific news at 1317. Also **9885** at 0958. (DeGennaro, NY) **17675** at 0213. (Charlton, ON)

NORTH KOREA—Voice of Korea, **6285//9335** with usual fare at 1040. (Barton, AZ) 9335 with news at 1335. (Brossell, WI) **11705** in KK at 1325. (Maxant, WV) **11710** at 1555 and **11735** at 0105. (Burrow, WA) **13760** in SS at 0009. (Paszkiewicz, WI) 0111. (Newbury, NE). **11545** listed for Voice of Korea at 1615 but with five-group KK numbers read by woman. (Burrow, WA)

OMAN—Radio Sultanate of Oman, **9650** in AA at 1533. (Charlton, ON) **15350** in AA at 1415. (Yohnicki, ON)

PAKISTAN—Radio Pakistan **9390** at 1558 with IS, time pips, possible ID and news. Off in mid-sentence at 1615. (Burrow, WA)

PAPUA NEW GUINEA—Radio West New Britain, Kimbe, **3235** at 1155 with group singing, male anncr with mix of EE and Pidgin. (D'Angelo, PA) Radio East New Britain, Rabaul, **3385** at 1152 with pops, man anncr in EE. (D'Angelo, PA) Radio Bougainville, Rabaul, **3325.1** at 1156 with island vocals, man in presumed Pidgin. (D'Angelo, PA) NBC, **4890** with news at 1000. (Mirabal, PR)

PARAGUAY—Radio Nacional, **9737** in SS at 0024. (Paszkiewicz, WI)

PERU—Radio Maranon, Jaen, **4835.5** at 0945 with OA music, opening anmts and ID. (Alexander, PA) Radio La Hora, Cusco, **4855.6** at 1040 in QQ. Poor. (DeGennaro, NY) Radio Huanta 2000, Huanta, **4747** with SS commls at 1031. (DeGennaro, NY) Radio Victoria, Lima, **6020.2** with anthem, preacher at 0503. //9720 very weak. (Alexander, PA) **9720** in PP at 0955. (DeGennaro, NY) Radio Tarma, Tarma, **4775** at 1007 with OA music, ID, SS anmts. (Alexander, PA) ID at 1023. (DeGennaro, NY) 0016 with male SS anncr and music. (Jeffery, NY) Radio Melodia, Arequipa, **5939.3** at 2330 with SS talk, "Melodia" jingles. (Alexander, PA)

Radio Melodia, Arequipa, Peru, sent this card to D'Angelo. They're on 5940. (Thanks Rich D'Angelo, PA)

PIRATES—Undercover Radio, 6925 at 0057, "Undercover Radio broadcasting from the middle of nowhere." E-mail: undercoverradio@mail.com and P.O. Box 293, Merlin, Ontario. Mentions of Commander Bunny and the rodent revolution. Off at 0017. (Wood, TN) **The Crystal Ship, 4070.9** at 0104 with rock and host "The Poet," rock number called "We Want the Airwaves" at close. Belfast address announced. Another date on **6857** at 0028 with rock, lyrics taunting the FCC, ID, Belfast address and e-mail: tcssshortwave@yahoo.com. (Zeller, OH) 0031 with ID "You are tuned to the Crystal Ship, plundering the pirate airwaves." Address as P.O. Box 1, Belfast, NY 14711. Various songs and audio clips from Dirty Harry and Star Wars. (Wood, TN) **Radio FCC, 6925** at 2218 with oldies, woman ID. Off at 2237. (D'Angelo, PA) **Voice of Laryngitis, 6925.4** at 0146 with segments from old programs, (Zeller, OH) **Ground Zero Radio, 6925.6** at 0001 with mostly rock, orchestral fanfare at the beginning. Also Bert the Turtle from the old "duck and cover" nuclear attack film. Elkhorn address. (Zeller, OH) **Indira Calling, 6925** at 2345 with sitar and other East Indian music announced as requests by DXers including myself. Providence zip code with Calcutta "address." Brief mention of WHYP, WHYP-FM Northeast so it could have been a WHYP relay. (Zeller, OH) **Radio Hojam, 6925** at 2140 with various IDs. "This was Bram Stoker of Radio Azteca," complete with *Bullwinkle* sound effects and normal station anmts. More or less a self-parody of Radio Azteca. Off at 2205. (Zeller, OH) **WKIL, 6926** at 2159 with slow blues and jazz. "Jack Black transmitting from a remote location." (Wood, TN)

PHILIPPINES—FEBC, **9430** in Mandarin at 1309. (Strawman, IA) VOA Relay, **15290** at 0004. (Paszkiewicz, WI) 0036 with news in Special English. (Jeffery, NY)

PORTUGAL—RDP Intl, **9410** in PP at 0044, **11635** with futbol at 2216 and **11980** with broadcast schedule in PP at 0057. (DeGennaro, NY) **15540** with play-by-play in PP at 2100. (Barton, AZ) **21655** with news in PP heard at 1802. (Charlton, ON)

ROMANIA—Radio Romania Int., **9515//11870** at 0425 with talk, mentions of Romania and Bucharest. ID at 0445. (Burrow, WA) **9525** in SS at 0024. (DeGennaro, NY)

RUSSIA—Voice of Russia, Kaliningrad, **6235** to close at 2159. **7125** via Moldova to Eastern North America at 0040, **7390** via Samara in SS to South America at 0105 and **9480** in FF to West Africa at 2035. (DeGennaro, NY) **7125** via Moldova at 0059 with news in RR and fast-paced "techno" type music. (Mirabal, PR) **7415** on Russian jazz musician at 1554. Off at 1559. (Burrow, WA) Radio Rossii, **6075** in RR heard at 1349. (Brossell, WI)

RWANDA—Deutsche Welle Relay, **12045** in GG at 1828. (Charlton, ON) **17860** in GG at 1905. (Brossell, WI) FEBA via Rwanda, **9550** in AA at 1957. (Brossell, WI)

SAO TOME—VOA Relay, **4960** with news at 0317. Also **13735** in FF at 1850. (Brossell, WI) **4960** with news at 0356. (DeGennaro, NY) **6105** at 0616 to 0631 close. (D'Angelo, PA) **11975** heard at 2110. (Charlton, ON)

SINGAPORE—Mediacorp Radio, **6150**

at 2330 with ID as "News Radio 9-3-8, a station of Mediacorp Radio." (Mirabal, PR) 1549 music and moral lessons. "Good night, Singapore" at 1557, off at 1600. (Burrow, WA) Radio Singapore Int., **6080** with current events at 1345 and **6120** with news at 1200. (Barton, AZ) BBC Relay, **9740** with sports at 1645. (Newbury, NE)

SLOVAKIA—Radio Slovakia Int., **7230** with ID, women talking at 0109. (Newbury, NE) "Listeners Tribune program at 0121. (Mirabal, PR) **7345** in FF at 2035. (DeGennaro, NY) **9440** in SS at 0136. (Charlton, ON)

SOUTH AFRICA—Channel Africa, **3345** with instl music at 0310. (Brossell, WI) **7390** with African environmental report at 0345. Off abruptly at 0357. Also **15285** with news at 1701. (Burrow, WA) **15285** at 1703. (Charlton, ON) 1645 in FF. (Mirabal, PR) Radio Sondergrense, **3320** with man in Afrikaans with rock at 0310. (Mirabal, PR) 2243 with hits of the '40s and '50s. (DeGennaro, NY) Adventist World Radio via Meyerton, **15295** with hymns and prayers at 2015. (Brossell, WI) BBC relay, **3255** at 0305 on 60th anniversary of Auschwitz liberation. (Brossell, WI)

SOUTH KOREA—KBS World Radio (ex-Radio Korea Int), **5975** at 1634 with recipe for rice balls and "Let's Learn Korean." (Burrow, WA) **9650** at 1252 with ID, URL and postal address. (Charlton, ON)

SPAIN—Radio Exterior de Espana, **6055** in EE at 0034. (Burrow, WA) 0111. (Newbury, NE) **11625** at 2228 in SS to Central America. (DeGennaro, NY) **17595** in SS at 1800 sign on. (Yohnicki, ON) **21610** in SS at 1653. (Charlton, ON)

SRI LANKA—SLBC, **6005** at 0122 with talk on sit-coms and weather for Asian cities. (Charlton, ON) VOA Relay, **12150** in Asian language at 1350. (Brossell, WI)

SUDAN—Radio Peace, **4750** at 0320 with talks in an African dialect. ID at 0416: "This is Radio Peace broadcasting on the 60-meter band at **4750** kHz. Thank you for listening." (Brossell, WI)

SURINAME—Radio Apinte, **4989** with news in DD at 1009. (DeGennaro, NY) **4990** heard at 0839 with operatic style music. (Mirabal, PR)

SWAZILAND—Trans World Radio, **3240** in an African dialect at 0310. (Brossell, WI) **4775** in GG at 0421, ID 0429. (D'Angelo, PA) **9500** with religious music at 1748. (Burrow, WA)

SWEDEN—Radio Sweden, **9490** with news in Swedish at 1130. (Maxant, WV) 0120 in Swedish. (Newbury, NE) 9490 in Swedish at 0010 and **11550** in EE monitored at 0134. (Charlton, ON)

SYRIA—Radio Damascus, **12085// 13610** at 2035 alternating short music bits and news items. Tentative IDs at 2042 and 2053 and definite ID at 2057, News at 2104 and anthem at 2105. (Burrow, WA)

TAIWAN—Radio Taiwan Int., **5950** via Florida with tourism feature at 0322. (Burrow, WA) **6120** via Julich in SS to Spain at 2151. (DeGennaro, NY) **15440** via Florida in FF at 2053, CC music and frequencies. (Charlton, ON) CBS, **15245** in CC heard at 0000. (Paszkiewicz, WI)

THAILAND—Radio Thailand, **5890** via Greenville with sports news at 0030. (Rossetti, MA) 0055 with weather in Thailand and other Asian locations. (Newbury, NE) 0100 with ID, bells, "the time is 8 a.m. in the Kingdom of Thailand." (Charlton, ON) 0319 with news. (Burrow, WA) **7285** in TT at 1055. (DeGennaro, NY) BBC Relay, **5975** with news items at 1455. (Barton, AZ) **15280** with news at 0020. (Jeffery, NY)

TURKEY—Voice of Turkey, **6020//7240** with Mid East music, schedule, ID at 0448, sign on and IS. (Burrow, WA) **7300** in TT at 2355 and **11955** in TT at 1605. (DeGennaro, NY) **15155** at 1330. (Maxant, WV) **15350** with continuous music at 1512. (Wood, TN)

TUNISIA—RTT Tunisienne, **9720** in AA at 2005. (Brossell, WI) **12005** in AA at 2052. (DeGennaro, NY) **15450** with Mid East music at 1530. (Wood, TN)

UGANDA—Radio Uganda, **4976** at 0320 with African news. Annoying utility QRM. (Brossell, WI) 0357 in unid language. (DeGennaro, NY)

UKRAINE—Radio Ukraine Int., **5840** in EE to Western Europe at 2215, **5910** at 0258 with ID and news. Also **7440** in UU at 0001. (DeGennaro, NY) 7440 at 0444 with report on HIV in Ukraine. Off at 0458. (Burrow, WA) **7545** in UU at 0005. (Charlton, ON)

USA—AFN/AFRTS, Key West, **12133.5 USB** with talk on food heard at 1624. (DeGennaro, NY)

UZBEKISTAN—Radio Tashkent, **7160** with woman talking about alcoholism, AIDS and radio-TV marathons. (Mirabal, PR) **9715** at 1345 with news and ID. (Brossell, WI) FEBC via Tashkent, **9450** at 1311 in listed Bengali. Off with IS at 1314. (Strawman, IA)

VANUATU—**7260.1** at 0636 with schedule, multiple IDs and mention of **3945** alternate. At 0643 Pacific island and contemporary music, ID again at 0649. First time heard! (Burrow, WA) (*very good—gld*)

VATICAN—Vatican Radio, **5885** with religious message in II monitored at 2212. (DeGennaro, NY)

VENEZUELA—Radio Nacional, **11760** via Cuba in SS at 2313. Also on **13680**. (Barton, AZ) 11760 at 2332. (Charlton, ON) Radio Amazonas, Puerto Ayacucho, **4939** with music and birthday anmts in SS at 1043. (DeGennaro, NY) Observatorio Naval Cagical, **5000** with SS time signals heard at 1047. (DeGennaro, NY)

VIETNAM—Voice of Vietnam, **6175** via Canada at 0100. (Newbury, NE) 0105 with ID, news. (Charlton, ON) 0333 with news. (Burrow, WA)

YEMEN—Republic of Yemen Radio, **9780** in AA at 2010. (Brossell, WI)

ZAMBIA—Radio Zambia, **4910** with tribal music and man in local language at 0325. (Mirabal, PR) 0410 in unid language. (DeGennaro, NY) The Voice of Africa, **4963** with gospel music at 0020. (DeGennaro, NY)

ZIMBABWE—Radio Zimbabwe, **3306** at 0402 with news in vernacular, 0405 ID, more news features including phone-in reports. (D'Angelo, PA)

And once again, order is restored! A mile-long string of thank-you's go to the following who did the good thing this time: Lou Rossetti, Arlington, MA; Bruce Burrow, Snoqualmie, WA; Sheryl Paszkiewicz, Manitowoc, WI; Michael Yohnicki, London, ON; Robert Charlton, Windsor, ON; Alvin Mirabal, St. Just, PR; Jerry Strawman, Des Moines, IA; Ed Newbury, Kimball, NE; George Zeller, Cleveland, OH; Dave Jeffery, Niagara Falls, NY; Charles Maxant, Hinton, WV; Joe Wood, Venore, TN; Rick Barton, Phoenix, AZ; Robert Brossell, Pewaukee, WI; Rich D'Angelo, Wyomissing, PA; Mark Northrup, Gladstone, MO; Brian Alexander, Mechanicsburg, PA; Robert Wilkner, Pompano Beach, FL; Ciro DeGennaro, Feura Bush, NY, and Stewart MacKenzie, Huntington Beach, CA. Thanks to each one of you.

Until next month, good listening! ■

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 **Joe Wood** in Tennessee. Universal Radio has sent Joe a copy of *Joe Carr's Receiving Antenna Handbook*. If you're not on Universal's mailing list for their great catalog of neat radio stuff, what are you waiting for? Call them at 614-866-4267, e-mail them at dx@universal-radio.com, or send a note to 6830 Americana Parkway, Reynoldsburg, OH 43068.

were fried within two months, due to extreme heat (150+ degrees F) and antenna damage. The SINCGARS radios [Official military radios] were trickling in, but slowly. Only the gun-trucks, maintenance, and a handful of "key" HETS had them, and even their range was limited due to terrain; the sand was soaking it up.

MTS [military version of APRS] was probably the most secure/consistent communications method we had; unfortunately, the screen is too small to efficiently read and the keyboard is too small to type on while the truck is bouncing down the road. Again, quantity was an issue, typically only two to three HETS per convoy had them along with the gun-trucks. There were a number of us who would have gladly installed the software on our laptops, but they cited security issues with that.

The unit did, about three months into the deployment, receive some very effective handheld radios that worked best with an external mag-mount antenna for the convoys. Again, not quite enough. All the NCOs and CLSs [Combat Life Savers] had them at least, but only half of us had the external antennas and I had purchased a 240-V inverter (out-of-pocket) to run the rapid-charger in my truck during convoys, because the trickle-chargers we were issued couldn't keep up. FRUSTRATING!!!

Up-Armor was also a joke, but I won't get into that here. Just glad to be back, stateside.

Richard Kinnison, aka KC0MCR
SGT, TXARNG, Activated
B Co 536th Sig BN
Attached: 1836th TC (Cbt Het)

One Man's Solar Story

Dear Editor:

I read with much interest the recent article on solar power. I have a related story to tell you. I live in what was initially called Sec. 8 Housing here in a small town about 20 miles south of Bangor, and about 40 miles north of Augusta, Maine. When our place was new in the early 1980s we had solar hot water in our building, which contains our washers and dryers, post office, etc. Big deal, I never have to get on the grid full time for an electric water heater. All went well till the first night of below freezing temps. Went to bed and all was okay, but got up the next morning to find the front of the building covered in ice. Seems they had filled the panels with just water, no anti freeze or anything and the pipes froze and burst overnight.

Sometime down the road they did repair the system and I think tried to use it during the warmer months, but it was eventually abandoned in place until the roof got re-shingled in the late 1990s. The panels and the outside pipes were taken down and/or capped. Now the building either has a gas water heater or an electric one, I'm not sure as I'm not connected with the maintenance people. Hope you enjoy my little story.

Don Hallenbeck
Pittsfield, ME

Popular Communications July 2005 Survey Questions

I buy most of my coax for my shack from:

A specialty cable manufacturer.....1
RadioShack 2
Hamfests - in the flea market.....3
Online from an amateur radio dealer ..4
Hamfests ñ from a dealer 5

Most of my radio equipment is:

New within the past year 6
One to two years old 7
Two to four years old 8
More than four years old, but less than 10 9
More than 10 years old 10
They're all analog, tube-type; I have nothing with digital frequency readout, etc.....11

In addition to my "base" shortwave receiver, I also own:

A portable shortwave for traveling or emergencies 12
Another "base" receiver at work 13
No other shortwave receiver, but an AM/FM portable for traveling/ emergencies 14

I'm a CBer, and my base antenna is:

A homebrew longwire/dipole cut for 11 meters.....15
A vertical antenna from RadioShack .16
A vertical antenna from another manufacturer 17
A commercial beam of two to four elements 18
A back-of-set antenna that simply screws into the SO-239 19

Lighting is important to me in my shack - I use a special lamp (or have lights independent of a ceiling or pole lamp):

Yes, a tabletop lamp - in candescent ..20
Yes, a tabletop lamp ñ fluorescent 21
Yes, LED lights 22
No additional lighting other than ceiling or pole lamp 23

Concerning emergency lighting in my home, I have the following (mark all that are appropriate):

A single flashlight.....24
Two to four flashlights 25
LED lighting powered by a 12 Vdc power source 26
Candles 27
Small light built into a 12 Vdc power supply.....28
Emergency home lighting that goes on if there's a power failure.....29
None.....30

I have extra batteries for my flashlights:

Yes.....31
No 32
Not sure.....33

I use a small external power inverter with my 12 Vdc power supply to operate low-wattage AC lamps:

Yes.....34
No 35
My 12 Vdc power supply has a built-in inverter 36

by Rich Arland, K7SZ, richard.arland@verizon.net

Field Day, Expedient Antennas, And QRP

Observant readers of this column will realize that I have a long-standing commitment to Emergency Communications (EmComm), training, and QRP (under 5-watt ham radio). Without a doubt, QRP and EmComm are NOT mutually exclusive terms. There is only a 13-dB (approximately 2.5-S-unit) difference between a 100-watt and a 5-watt signal over identical HF circuit paths. Add the American Radio Relay League's annual Field Day exercise into the mix, and you have a perfect opportunity to get out of the shack, hit the bush, and play radio. The ultimate goal, of course, is to test your EmComm skills, your "coping skills," do some outside-the-box thinking, and improve your ability to provide emergency communications in a field environment using expedient stations and antennas.

QRP provides a small, but growing, faction of radio amateurs the opportunity to use ultra-small, extremely portable radio gear, much of which can be built from scratch or kits, to provide communications on a worldwide scale. Antennas range from simple dipole antennas erected in the trees to beams on towers, and literally everything in between. QRP and antenna experimentation go hand in hand, as does the kit/scratch building of gear.

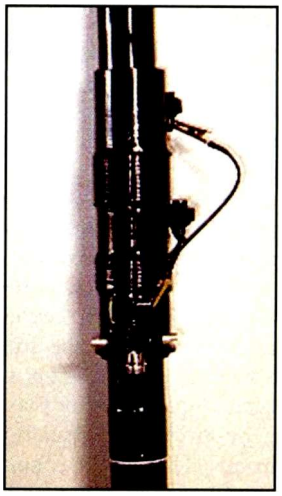
It's one thing to plan and participate in emergency training exercises but it's quite another to be involved in an actual emergency with little or no warning. Typically in emergency disaster training scenarios, there is a "ramp-up" time and everyone knows when and where the exercise will take place, where they're supposed to report, and what their basic duties are. Things go smoothly thanks to this "anticipatory thinking."

In the real world, however, seldom are we accorded any "ramp-up" time. All too often we (I am using the collective "we" as in all of us emergency communicators) are thrust into a situation with little or no warning. There is only time to react, and our initial reactions must be correct if we are to be useful during an emergency.

In the various military and civilian survival manuals I have in my library, it is stressed that the first few things you do, your initial reactions, to the emergency/disaster can mean the difference between life and death for you and your party. Knowing what to do and taking the time to think things through will enable you and your party to survive, whether we're talking about responding to a communications emergency or finding shelter during a tornado or earthquake, or reacting to terrorist actions like the events of 9/11. Confidence in your own abilities plus appropriate training, coupled with your ability to critically analyze a rapidly changing situation and to react properly to this dangerous situation (or multiple situations), will be your best weapons against terrorism and/or natural/man-made disasters.

Confidence comes from training, both "book learning" and realistic training, to be specific. Unfortunately while "book learning" is relatively easy to achieve, realistic training is very hard to accomplish, especially when working with volunteers who have lives.

As far as book learning goes, one of the best methods I can think of is to read, read, and read some more about actual emergencies and disasters with a critical eye toward evaluating how the responders and participants did their jobs and reacted to the various situations that arose during the real-world emergency. I have always been told, "You'll never know how you'll react until you are faced with a similar situation." How true that statement is. However, you can mentally condition yourself to respond in a given way if you put your mind to it. Training is a series of routines and sub-routines that are designed to help you cope with various situations.



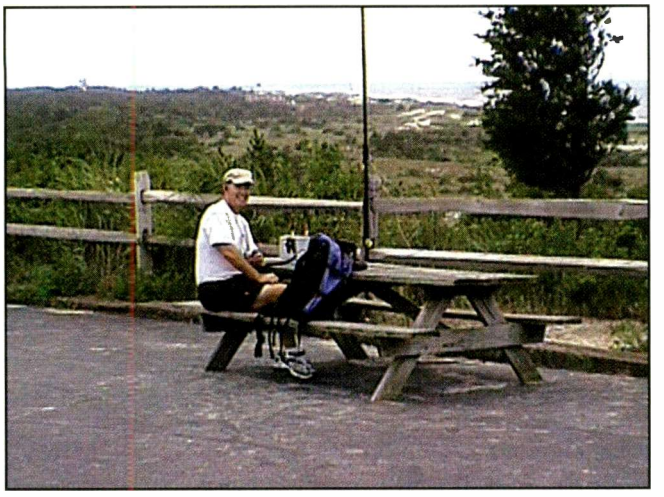
Here's a close up of the WA3WSJ "Black Widow" fishing pole vertical antenna coil. The custom-manufactured coil performs impedance matching for the 16.5-foot wire radiator that will allow it to resonate on 7 and 10 MHz (40 and 30 meters). For 20-meter operation, the coil is entirely bypassed and the wire vertical element is fed directly from the coaxial cable.

But how do we simulate "realistic training"?

QRP And Field Day To The Rescue!

With the annual ARRL Field Day looming on the immediate horizon (June 25, for more information contact the ARRL at www.arrl.org), it should be paramount that we EmComm volunteers hit the bush and participate in this realistic training exercise. While the annual ARRL Field Day is a great way to get out into the field, enjoy some radio-related operations, and have some fun with your fellow ham radio operators, there is a much more ominous reason to get out and participate in this annual event: Realistic training.

Field Day offers a unique opportunity for all of us to get out and practice our craft of emergency communications. While many hams think of Field Day as a contest, it really is not a contest at all, even though you can rack up points for making contacts with other Field Day stations. The emphasis is, or at least *should be*, on perfecting our collective emergency communications skills. Additionally, we should stress "outside-the-box" thinking when it comes to problem solving, for Edsel Murphy (of "Murphy's Law" fame) is not one to let things rest in the middle of a disaster. The anxiety and stress of dealing with a real-world disaster, coupled with the myriad things that go wrong during times of intense mental and physical strain, can cause even the most level headed person to run in circles, screaming and shouting great obscenities. I have not only seen this happen, I've been there myself! Field Day is a great train-



This picture shows Ed, WA3WSJ, with one of his antennas all set up and ready to operate some DX from a remote location. The grin on his face is directly proportional to the amount of DX he's working!

Although I snagged this picture from the Elecraft website, this K2 is virtually identical to the one I just built, right down to the German keyer paddle set! The K2 set the mark for all ham rigs back around 2000 when the ARRL Lab checked out the performance and rated it as good or better than some of the multi-thousand dollar imports from Japan. AND...it's a kit!!! That's right, you build this rig from a kit! Talk about pride in accomplishment! Add the optional DSP audio filter and you now have one heck of a great DX/Contesting machine!

A nice close up of the Elecraft KX-1 CW transceiver, all tricked out with the internal automatic antenna tuner, the 30-meter option, and the ambidextrous paddles. This compact transceiver covers 40, 30, and 20 meters, CW only, and, using the internal Lithium Ion battery pack, is capable of 1.5 watts of RF output. If you happen to have 12 to 15 VDC available, the KX-1 can put out a maximum of 4 watts. All you need to add is a set of ear buds and an antenna. Nice little "doomsday radio" package, huh?

ing ground to help us all polish our skills as emergency communicators. Don't let this golden opportunity slip by. Get out and participate!

This Year, Try Something Different

Instead of going out for Field Day this year with your local club to "rack up a great score," why not grab a dipole antenna, beg, buy, or borrow a QRP rig, and hit the bush QRP style? It's a great way to give your skills a real test and you'll be surprised at what you can accomplish with only a few watts.

This year, I intend to take my almost new Elecraft KX-1 transceiver, a WA3WSJ custom-made HF vertical antenna, and my New Jersey QRP Club Micro908 digital antenna analyzer out to a private bit of land and wring this "doomsday radio system" out during Field Day. The KX-1 is a CW-only rig, so I might also drag my brand new Elecraft K2 (I just built this last month while recovering from foot surgery), which will do CW, SSB, and data—just to give equal time to phone operation.

PSK31

Speaking of data, PSK31, an extremely narrowband (only 31 Hz wide) data mode, is fast becoming a standard in the world of EmComm. Field Day is a great time to try out new modes like PSK31 to see how well they work in real-world communications scenarios. PSK31 allows keyboard-to-keyboard contacts, much like the old Baudot RTTY mode it is rapidly replacing. This mode offers huge benefits for the EmComm volunteer. Data modes can transmit huge files, like those required to track evacuees and shelter management into and out of a disaster area and provide near error free communications even under extremely marginal band conditions. PSK31, unlike 600, 1200, or 9600 baud packet, does not need a great signal-to-noise ratio in which to operate. This data mode does a great job under normal and marginal conditions encountered in the everyday world of HF propagation. If I can get my ancient laptop to work correctly for more than 15 minutes, I plan on trying PSK31 this year myself during Field Day.

Ah, The Antenna

Earlier I mentioned an HF vertical antenna that would be making the Field Day trip with me this year. My good friend, fellow QRPer, and antenna aficionado, Ed Breneiser, WA3WSJ, designs and custom-builds these 20-foot HF antennas specifically for temporary outings, like trekking the Appalachian Trail, Field Day, day hikes, and canoe trips.

Ed uses a 20-foot carbon fiber fishing pole (commercially available as the "Black Widow" fishing pole) as the basis for the vertical element. To this he adds a custom-manufactured

coil that goes over the antenna bottom section and acts as a loading coil for 40 and 30 meters. For 20-meter operation, the coil is bypassed and the vertical radiator is fed directly to the center conductor of the coaxial cable feedline. The actual vertical element is a piece of wire that clips to the very tip of the fishing pole and extends downward to the coil (approximately 16.5 feet long). A coaxial fitting is placed on the side of the coil where a length of coaxial cable (also furnished with the antenna) is attached.

The antenna comes complete with radial sets and an optional bungee guy wire setup that will secure the vertical element in winds up to 40 mph. A ground stake is also furnished and is pounded into the ground to form a support for the bottom of the vertical antenna. The entire fishing pole collapses down into a short package, about 40 inches long. The coil assembly, coax, radials, ground stake, and guy wire set all go into an optional soft-pack kit that clips onto your belt or backpack.

Ed's antenna is a treat to set up and use. It is ultra-compact and even serves double duty as a walking stick while out in the brush. Setting it up, once you've done it a couple of times, is easily accomplished within five minutes. If you think you might like to have one of these rugged, ultra-portable antennas, point your Internet browser to www.wa3wsj.com and look things over for yourself. One word of caution: these are handmade, custom-tuned, trail-proven antennas, so they are not inexpensive. Plan on spending around $85 to $110 (including shipping) for one of Ed's creations.

Take The Challenge

So there you have it: a great expedient antenna to augment your EmComm Jump Kit. The lure and challenge of QRP and the thrill of tackling the annual ARRL Field Day using 5 watts or less isn't for everyone, but if you think you have what it takes, give it a shot. Here's hoping to meeting you on the air during Field Day 2005. ■

INFOCENTRAL *(from page 5)*

Pacific Ocean Radiostation To Start Broadcasting On Shortwave

The Maritime Territory radio branch of VGTRK (Russian State Television and Radio Company), GTRK Vladivostok, will start broadcasting Pacific Ocean Radiostation (Radiostantsiya Tikhiy Okean) programs near the end of this year. The press service of the Maritime Territory Television and Radio Company reports that an agreement to this effect has been signed between the head of the Vladivostok administration, Vladimir Nikolayev, and the director of the Vladivostok Television and Radio Company, Valeriy Bakshin. The city administration of Vladivostok will finance the bulk of the costs involved in the preparation and broadcast of the long-standing fishermen's radio program.

The Pacific Ocean Radiostation program is one of the most popular radio shows in the Russian Far East. It was begun by the Maritime Territory Television and Radio Committee in the early 1960s. For nearly 40 years, the Pacific Ocean Radiostation provided hundreds of thousands of fishermen in all corners of the ocean with a stable link to their native shores. Several years ago, due to a sharp drop in financial resources, the Vladivostok Television and Radio Company had to suspend the broadcasts of the Pacific Ocean Radiostation.

New 24-hour Propaganda Shortwave Radio Station From Zimbabwe

The government of Zimbabwe will soon launch a new 24-hour propaganda shortwave radio station to counter negative coverage from independent radio stations broadcasting from outside the country. The Zimbabwe government will launch the station, to be called Radio 24-7, to counter United Kingdom and United States-based radio stations targeting Zimbabweans.

SW Africa Radio and the United States-based Studio 7 are the only independent radio stations targeting Zimbabweans. There are no independent radio stations operating in Zimbabwe where the Harare authorities keep a tight leash on the media. Critics accuse the state-controlled Zimbabwe Broadcasting Corporation (ZBC) of churning out virulent propaganda against the government's perceived political opponents.

The new radio station is expected to take Zimbabwe's propaganda war to a new foreign arena. There have already been attempts to clog SW Africa Radio's network, with the station complaining last month that the Zimbabwe government had jammed its transmission networks from London by using Chinese jammers.

Americans Are Tuning Into Christian Radio

Statistics from a recently released survey by the Christian company The Barna Group showed that nearly half of all adults in the United States—around 46 percent—are tuning into Christian radio broadcasts in a typical month. That's 141 million Americans listening to some form of Christian broadcasting at least once a month.

The National Religious Broadcasters (NRB) meanwhile found in a separate study that the number of religious stations grew 14 percent in the past five years, compared with the four-percent growth in the overall radio industry.

However, according to the Barna survey, the reason for the decline in non-Christian broadcasting may be because the absolute number of radio listeners who do not identify themselves as Christians declined. In 1992, 38 percent of the radio audience was comprised of non-Christians, but the number dropped to 28 percent, the survey showed. ■

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 . . .

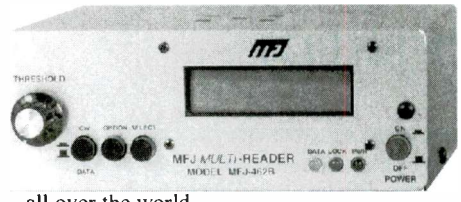
Eavesdrop on the World

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, $12.95. 5¼Wx2½Hx5¼D inches.

No Matter What™ 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.

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 in. Remote has 54" whip, 50 feet coax. 3x2x4 inches. 12 VDC or 110 VAC with MFJ-1312, $12.95.

MFJ-1024 **$139.95**

Indoor Active Antenna

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

MFJ-1020C **$79.95**

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, $12.95.

Compact Active Antenna

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 to 200 MHz including low, medium, shortwave and VHF bands. Detachable 20" telescoping antenna. 9V battery or 110 VAC MFJ-1312B, $12.95. 3⅛x1¼x4 in.

MFJ-1022 **$49.95**

Eliminate power line noise!

MFJ-1026 **$179.95**

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

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

MFJ-959C **$99.95**

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, $12.95.

High-Gain Preselector

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, $12.95.

MFJ-1045C **$99.95**

Dual Tunable Audio Filter

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 inches.

MFJ-752C **$99.95**

MFJ Shortwave Headphones

MFJ-392B **$19.95** **New!**

Perfect for shortwave radio listening for all modes -- SSB, FM, AM, data and CW. Superb padded headband and *ear cushioned* design makes listening extremely comfortable as you listen to stations all over the world! High-performance driver unit reproduces enhanced communication sound. Weighs 8 ounces, 9 ft. cord. Handles 450 mW. Frequency response is 100-24,000 Hz.

High-Q Passive Preselector

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 in.

MFJ-956 **$49.95**

Super Passive Preselector

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.

MFJ-1046 **$99.95**

MFJ Shortwave Speaker

This MFJ *ClearTone*™ restores the broadcast quality sound of shortwave listening. Makes copying easier, enhances speech, improves intelligibility, reduces noise, static, hum. 3 in. speaker handles 8 Watts. 8 Ohm impedance. 6 foot cord.

MFJ-281 **$12.95** **New!**

MFJ All Band Doublet

102 ft. all band doublet covers .5 to 60 MHz. Super strong custom fiberglass center insulator provides stress relief for ladder line (100 ft.). Authentic *glazed ceramic* end insulators and heavy duty 14 gauge 7-strand copper wire.

MFJ-1777 **$49.95** Ship Code A **New!**

MFJ Antenna Switches

MFJ-1704 **$69.95**

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.

Morse Code Reader

Place this pocket-sized MFJ Morse Code Reader near your receiver's speaker. Then watch CW turn into solid text messages on LCD. Eavesdrop on Morse Code QSOs from hams all over the world!

MFJ-461 **$79.95** **New!**

MFJ 24/12 Hour Station Clock

MFJ-108B, $19.95. Dual 24/12 hour clock. Read UTC/local time *at-a-glance*. High-contrast 5/8" LCD, brushed aluminum frame. Batteries included. 4½Wx1Dx2H inches.

New!

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 News, Commentary, Music, Sports, And Drama At Your Fingertips

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	7440	Radio Ukraine Int.	
0000	13760	Voice of Korea, North Korea	SS
0000	7545	Kol Israel	HH
0000	5940	Radio Melodia, Colombia	SS
0000	15245	CBS, Taiwan	CC
0000	9525	Radio Romania Int.	SS
0000	15280	BBC Relay, Thailand	
0000	11665	Radio Prague, Czech Republic, via Ascension	
0000	9535	Radio Exterior de Espana, Spain	SS
0030	15290	VOA Relay, Philippines	
0030	9737	Radio Nacional, Paraguay	SS
0030	5890	Radio Thailand, via USA	
0030	7400	Radio Bulgaria	
0030	11745	Voz Cristiana, Chile	PP
0030	11780	Radio Nacional Amazonia, Brazil	PP
0100	4775	Radio Tarma, Peru	SS
0100	9870	Radio Budapest, Hungary	HH
0100	6175	Voice of Vietnam	
0100	7390	Voice of Russia	SS
0100	6005	SLBC, Sri Lanka	
0130	11550	Radio Sweden	
0130	9440	Radio Slovakia Int.	
0130	7325	Radio Vilnius, Lithuania	
0130	6060	Radio Nacional, Argentina	SS
0200	4965	The Voice-Africa, Zambia	
0200	17675	Radio new Zealand Int.	
0200	4052.5	Radio Verdad, Guatemala	SS
0200	5025	Radio Rebelde, Cuba	SS
0200	11925	Radio Bandeirantes, Brazil	PP
0200	11815	Radio Brazil Central, Brazil	PP
0200	6120	VOIRI/V of Justice, Iran	
0200	9575	Radio Medi-Un, Morocco	AA
0230	9780	Republic of Yemen Radio	AA
0230	4810	Radio Transcontinental, Mexico	SS
0300	3320	Radio Sondergrense, South Africa	Afrikaans
0300	3345	Channel Africa, South Africa	
0300	3250	Radio Luz y Vida, Honduras	SS
0300	4750	Radio Peace, Sudan	EE/vern
0300	4780	RTV Djibouti	FF
0300	6940	Radio Fana, Ethiopia	Amharic
0300	6005	Wales Radio Int., via England	Sats only
0300	7260	Radio Cairo/Egyptian Radio	
0300	7285	Voice of Croatia	
0300	7210	Radio Belarus	
0300	6035	VOAA Relay, Botswana	
0300	15170	BSKSA, Saudi Arabia	AA
0330	4910	ZNBC/Radio Zambia	unid
0330	4960	Voice of America Relay, Sao Tome	
0330	4976	Radio Uganda	
0330	3280	La Voz del Napo/Radio Maria, Ecuador	SS
0330	4915	Radio Nacional Macapa, Brazil	PP
0330	7160	Radio Tirana, Albania	
0330	9675	Radio Cancao Nova, Brazil	PP
0400	3306	Radio Zimbabwe	vern.
0400	4775	Trans World Radio, Swaziland	G
0400	9860	VOIRI, Iran	
0400	11870	Radio Romania Int.	
0400	5500	Voice of the Tigray Revolution (clandestine)	vern
0400	11690	Radio Okapi, DR Congo, via South Africa	FF
0400	4885	Radio Clube do Para, Brazil	PP
0400	9885	VOA Relay, Botswana	
0400	4950	Radio Nacional, Angola	PP
0400	7190	RTT Tunisienne, Tunisia	AA
0430	6020	Voice of Turkey	
0430	7100	Voice of the Broad Masses of Eritrea	AA
0430	3965	Radio France Int.	
0430	5985	Radio Congo	FF
0500	6185	Radio Educacion, Mexico	SS
0500	6020	Radio Victoria, Peru	SS
0500	5030	Radio Burkina, Burkina Faso	FF
0500	9420	Voice of Greece	Greek
0500	11820	Radio New Zealand Int.	
0530	4777	Radio Gabonaise, Gabon	FF
0530	5005	Radio Bata, Equatorial Guinea	SS
0530	4770	Radio Nigeria	
0600	4845	Radio Mauritiane, Mauritania	AA
0600	4760	ELWA, Liberia	
0600	7125	RTV Guineenne, Guinea	FF
0600	4915	GBC - Radio Ghana	
0600	4783	RTV Malienne, Mali	FF
0600	9690	Tatarsan Wave, Russia	RR
0800	6115	Radio Nikkei, Japan	JJ
0800	7260	Radio Vanuatu	
0800	3310	Radio Mosoj Chaski, Bolivia	SS

UTC	Freq.	Station/Country	Notes
0800	5045	Radio Guaruja Pulista, Brazil	PP
0900	4990	Radio Apintie, Suriname	
0900	4815	Radio Buen Pastor, Ecuador	SS
0900	6025	Radio Amanacer, Dominican Republic	SS
0900	6160	CKZU, Canada (relay CBU-Vancouver)	
0900	9665	Radio Marumby, Brazil	PP
0930	6060	Radio Universo/RadioTupi, Brazil	PP
0930	9505	Radio Record, Brazil	PP
0930	6040	Radio Clube Paranaense, Brazil	PP
0930	4845	Radio municipal, Bolivia	SS
1000	9970	RTBF, Belgium	FF
1000	12085	Voice of Mongolia	
1030	4940	Radio Amazonas, Venezuela	SS
1030	7285	Radio Thailand	TT
1030	4800	Radio Buenas Nuevas, Guatemala	SS
1030	6135	Radio Santa Cruz, Bolivia	SS
1100	4919	Radio Quito, Ecuador	SS
1100	6140	Radio Lider, Colombia	SS
1100	6010	La Voz de tu Conciencia, Colombia	SS
1100	6280	China Radio Int.	
1100	9580	Radio Australia	
1100	9600	YLE/Radio Finland Int.	Finnish
1130	9490	Radio Sweden	Swedish
1130	3325	Radio Bougainville, Papua New Guinea	
1130	3385	Radio East New Britain, Papua New Guinea	
1130	5020	SIBC, Solomon Islands	
1200	6120	Radio Singapore Int.	
1200	6010	Radio Mil, Mexico	SS
1200	11705	VOA Relay, Philippines	
1200	9565	Radio Marti, USA	SS
1230	9650	KBS Int., South Korea	
1230	15425	HCJB, Australia	
1230	7185	Bangladesh Betar	
1230	9170	CPBS, China	CC
1230	9525	Radio Polonia, Poland	FF/EE
1300	9430	FRBC, Philippines	CC
1300	9935	Radio Makedonias, Greece	Greek
1300	9705	Voice of Pujiang, China	CC
1300	11885	China Radio Int.	
1330	9335	Voice of Korea, North Korea	
1330	9395	Deutsche Welle, Germany, via Kazakstan	GG
1330	9525	Voice of Indonesia	II
1330	9715	Radio Tashkent, Uzbekistan	
1330	12150	VOA Relay, Sri Lanka	unid
1330	6075	Radio Rossii, Russia	RR
1330	9810	CPBS, China	CC
1330	9365	Radio Free Asia, USA, via Armenia	unid
1400	9870	Radio New Zealand Int.	
1400	11810	Radio Jordan	AA
1400	12080	Radio Netherlands Relay, Madagascar	
1400	15785	Galei Zahal, Israel	HH
1400	15700	Radio Bulgaria	BB
1400	11530	Voice of Mesopotamia, via Moldova	Kurdish
1500	11690	Radio Jordan	
1500	10330	All India Radio	Hindi
1500	15450	RTT Tunisienne, Tunisia	AA
1500	15350	Voice of Turkey	
1500	11600	Radio Prague, Czech Republic	SS
1500	15400	BBC Relay, ascension	

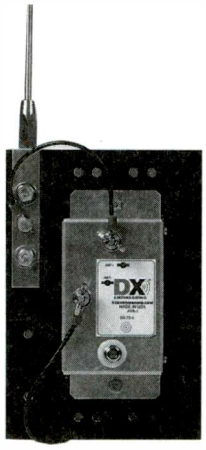
UTC	Freq.	Station/Country	Notes
1530	9650	Radio Sultanate of Oman	AA
1600	13665	YLE/Radio Finland	Finnish
1600	15190	Radio Africa, Equatorial Guinea	
1600	15145	SW Radio Africa, via England (clandestine)	
1600	11990	Radio Kuwait	AA
1600	11840	Voice International, Australia	
1630	15285	Channel Africa, South Africa	FF
1630	9740	BBC Relay, Singapore	
1630	15410	Radio Farda, USA, via England	Farsi
1630	13675	Radio Austria Int., via Canada	
1800	11635	Radio Jamahiriya, Libya, via France	AA
1800	21655	RDP Int., Portugal	PP
1800	17595	Radio Exterior de Espana, Spain	SS
1830	15475	Africa Number One, Gabon	FF
1830	11715	Sudan Radio, England	AA
1830	12050	Radio Cairo/Egyptian Radio	AA
1900	17860	Deutsche Welle, Germany, Rwanda Relay	GG
1900	15120	Voice of Nigeria	
1900	15345	RTV Marocaine, Morocco	AA
1900	17580	Voz Cristiana, Chile	SS
1900	11730	Radio Pilipinas, Philippines	EE/Tagalog
1900	13630	Emirates Radio, UAE	AA
1930	9550	Far East Broadcasting Assn., via Rwanda	AA
1930	15485	Voice of Greece, via Greenville	Greek
1930	11865	Deutsche Welle Relay, Portugal	
1930	9915	BBC Relay, Cyprus	AA
1930	9965	Voice of Armenia	
2000	15510	Radio Free Asia, USA, via Northern Marianas	
2000	9855	Radio Kuwait	AA
2000	15295	Adventist World Radio via South Africa	
2000	9815	VOA Relay, Botswana	FF
2030	15440	Radio Taiwan Int., via Florida	
2030	13610	Radio Damascus, Syria	
2100	11976	Voice of America Relay, Sao Tome	
2100	13830	Croatian Radio	
2100	9505	Radio Farda, via Greece	Farsi
2100	12040	RDP Int., Portugal	PP
2130	9710	VOIRI, Iran	unid
2130	9790	Radio France Int.	FF
2215	9760	Cyprus Bc Corp	Greek; wknds
2230	11895	Radio Japan/NHK, via French Guiana	JJ
2230	9840	RAI Int., Italy	II
2230	11630	Central Peoples Broadcasting Station, China	CC
2230	7120	Radio Tirana, Albania	
2230	21740	Radio Australia	
2230	13715	Trans World Radio, Guam	various
2300	11800	RAI Int., Italy	II
2300	11820	Radio Veritas Asia, Philippines	
2300	9395	Radio Free Asia, via Tajikistan	various
2300	12120	INBS, Iceland	II
2330	11760	Radio Nacional, Venezuela, via Cuba	SS
2330	12020	HCJB, Ecuador	PP
2330	13660	Radio Havana Cuba	SS
2330	7460	Radio Nacional de la RASD, via Algeria	SS
2330	9435	Democratic Voice of Burma, via Germany	BB
2340	15345	RAE, Argentina	SS

by Harold Ort, N2RLL

New, Interesting, And Useful Communications Products

DX Engineering's Active Receive Antenna System

DX Engineering has announced its Active Receive Antenna system, which offers full-size antenna performance from 100 kHz to 30 MHz with only a 102-inch whip as the antenna element. According to the company's news release, "A unique patent pending design makes it vastly superior to traditional active antennas in both strong signal handling and feedline decoupling. This results in significantly better weak signal reception due to lower spurious signal interference and reduced noise."



The new Active Receive Antenna System from DX Engineering is ideal for SWLs and hams alike.

The new DX Engineering Active Receive Antenna System is available in either a vertical or dipole configuration, and both systems include a non-conductive mounting plate, a coupler/amplifier and the necessary 102-inch stainless steel element. The dipole configuration makes a great antenna for the SWL *or* ham and can be mounted inconspicuously without compromising performance. It can also be easily mounted and turned by a small TV-type rotator.

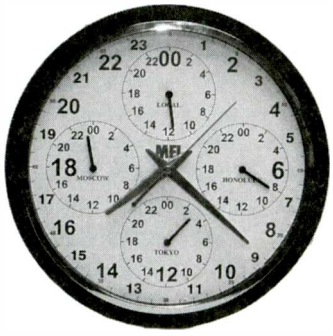
The vertical configuration can be used singly or as a building block for a multi-band directional array when used with the DX Engineering RFS-1P Receive Four-Square Controller. An F-style output connector allows the use of common low-loss CATV feedline cable.

The new DXE-ARAV-1P Active Receive Antenna Vertical Configuration is $229; the DXE-ARAH-1P Active Receive Antenna Horizontal Configuration is $259.00. For more information, contact DX Engineering, P.O. Box 1491, Akron, OH 44309; Phone 800-777-0703 for orders or 330-572-3200 for Tech Info/International or FAX the company at 330-572-3279. You can also visit DX Engineering on the Web at www.dxengineering.com. Be sure to tell them you read about it in *Popular Communications*.

MFJ' 24-Hour Quartz Wall Clock

MFJ Enterprises, Inc., announced its new 12-inch world time quartz wall clock for radio enthusiasts. It gives you five time zones at a single glance: UTC, local, Honolulu, Tokyo, and Moscow on five independently settable dials. The highly visible and easy-to-read clock has a black outer trim, a gold inlet, gold hands, and black numbers, and the white face makes it highly visible from across the room.

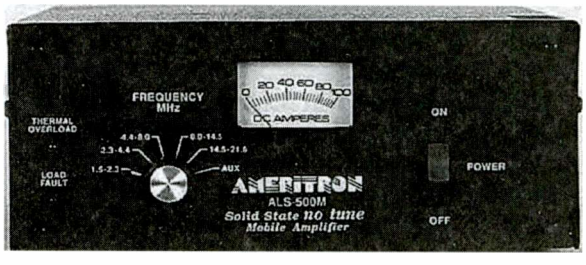
MFJ's new 24-hour quartz wall clock is easy to read from across the room.



The MFJ-135 24-Hour Quartz Wall Clock, that sells for $39.95, is backed by MFJ's "No Matter What" one-year limited warranty. For more information, to get a free MFJ catalog, or to locate your nearest MFJ dealer, call 800-647-1800 or write to MFJ, 300 Industrial Park Road, Starkville, MS 39759 or visit http://www.mfjenterprises.com.

Ameritron 500-Watt Mobile Amplifier Now With Remote Head!

Ameritron's ALS-500M solid-state mobile amplifier gives you 500 watts PEP SSB or 400 watts CW output! It offers instant operation without warm up, no tuning necessary, and has instant bandswitching. Its compact size fits in very small spaces in your automobile. Coupled with the company's new ALS-500RC Remote Head you can mount the ALS-500M amplifier anywhere and have full control; select desired band, turn On/Off, and monitor current draw on its DC Current Meter. The unit has power, transmit, and overload LEDs.



Ameritron's ALS-500M solid-state mobile amplifier gives you 500 watts PEP SSB or 400 watts CW output!

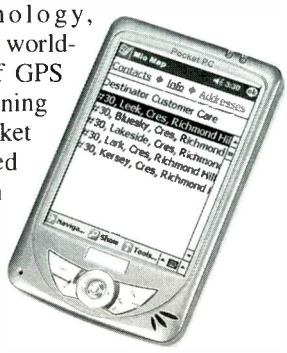
According to Ameritron, "Load Fault Protection eliminates amplifier damage due to operator error, antenna hitting a tree branch, or an aggressive 18-wheeler passing by. Thermal Overload Protection disables/bypasses the amp if temperature is excessively high, and it automatically resets itself."

The ALS-500M typically provides 60 to 70 watts in full output. The On/Off switch bypasses the amplifier for "barefoot" operation and the quiet fan comes on as needed. It offers excellent harmonic suppression, push-pull output, DC current meter, and covers 1.5 to 22 MHz (10/12 Meters with $29.95 kit, requires FCC license). It uses 13 VDC, at 80 amps and measures 3.5 x 9 x 15 inches (HWD) and weighs seven pounds.

The Ameritron ALS-500M 500-watt mobile amplifier sells for $799 on the Ameritron website; the ALS-500RC Remote Head sells for $49. To order, get a free catalog, or for your nearest dealer, call 800-713-3550 or 662-323-8211, write to Ameritron, 116 Willow Road, Starkville, MS 39759, or visit http://www.ameritron.com.

Mio's GPS Pocket PC Puts North America In Users' Hands

Mio Technology, Ltd., a leading worldwide vender of GPS (Global Positioning System) Pocket PCs, introduced to the American market the latest addition to its GPS pocket PCs, the Mio168RS. The new handheld device is a fully functional pocket PC featuring the company's newest mapping system that is fully interoperable with the built-in GPS antenna. The Mio168RS combines the reliability and accuracy of a GPS built-in receiver and sophisticated, yet easy-to-use MioMap mapping software in a slim pocket PC for a complete handheld navigation system. The palm-size device is great for those who are on the go, who need an inexpensive alternative for automobiles without GPS systems, and for anyone taking or planning a trip.



Mio's new 168RS GPS Pocket PC is ready to go from the box!

The Mio168RS combines a handheld GPS navigation system with features that come with a pocket PC and PDA. With Intel's Xscale 300-MHz processor and Microsoft's Pocket PC 2003 second edition, users can instantly power up the navigation software, Microsoft's Pocket Outlook, Word, Excel, Media Player, and Internet Explorer programs, and easily synchronize data with a PC in the palm of their hand.

Ready to go from the box and instantly on with the touch of a button, the Mio168RS provides GPS satellite access, easy navigation, millions of points-of-interest (POI). Users simply flip open the built-in antenna for GPS access and reliability offering comprehensive route planning and voice navigation. Point-to-point driving directions are given both verbally and visually in real time as users are in en route to their destination with turn-by-turn directions, including alternative route suggestions should a driver miss a turn, take the wrong road, or experience detours. You can also view photos and videos in landscape or portrait on the 3.5-inch color transflective LCD display with LED backlighting. It has a 32-MB flash ROM and 64 MB of SDRAM and includes an SD/MMC expansion slot for additional storage capacity.

The Mio168RS requires no monthly subscription, installation, or setup fees. The MSRP for the standard Mio168RS is $599. In the United States and Canada the Mio168RS is available through partnerships found on Web at http://www.miogps.com/where2buy.htm. For additional information on Mio and its products, contact the company's North American headquarters at 47988 Fremont Blvd., Fremont, CA 94538; Phone: 510-252-6950; Fax: 510-252-6930; E-mail: sales@miogps.com; Web: http://www.miogps.com/index.htm.

Australasian Shortwave Guide

The new 40-page *Australasian Shortwave Guide*, Edition 19, by Bob Padula, has just been released. It has over 1,400 entries covering the international shortwave transmission period commencing March 27, 2005, and concluding on October 31, 2005.

Many international broadcasters don't always make their schedules available to their listeners, and the *ASWG* provides those details. The *Guide* includes comprehensive schedules for broadcasts in English to Australia, Asia, the Far East, the Indian sub-continent, and the Pacific, and broadcasts in *all languages* to Australia and the Pacific. The data is arranged in two main sections: by studio country and starting time. Each entry shows broadcasting organization, frequency, starting time, finishing time, language, target area, transmitter site, transmitter country, studio country, and days of operation.

Edition 19 of the *ASWG* is available to Australian addresses for A$10, cash, personal check, Australian Money Order, financial institution check, mint Australian stamps, or PayPal. For mailing to countries outside Australia, the cost is U.S. $10, 10 Euro, 5 British Pounds to Robert J. Padula, 404 Mont Albert Road, Mont Albert, Victoria 3127, Australia.

by Jock Elliott, KB2GOM, lightkpr@nycap.rr.com

Is It Safe (To Use That Mobile Rig)?

Editor's Note: A special, hearty welcome back to Jock Elliott, a fulltime freelance writer who spends most of his time working with high technology and medical organizations. Jock is a former CB columnist for Popular Communications, *he has also written for* QST, Sky & Telescope, Passport To World Band Radio, The Backwoodsman Magazine, *and many others. He lives with his family in Troy, New York, and runs the Capital District Ham Radio Commuter Network every workday morning on the 146.94 repeater. He has ghost-written two books on sales and customer relations and recently published a book on CD, entitled* Elliott on Airguns *(for more information, visit http://home.nycap.rr.com/lightkeepercom/).*

In the movie *Marathon Man* there is a truly creepy scene in which an evil ex-Nazi (played by Lawrence Olivier) tortures a Jewish graduate student (Dustin Hoffman) by drilling the student's teeth without anesthesia while repeatedly asking, "Is it safe?" What follows in this article is equally creepy and may well have *you* asking, "Is it safe?"

Early in December, 1999, Bill Baran, N2FNH, was returning from a dinner with a bunch of fellow hams when he was pulled over by a Colonie, New York, police officer for a minor traffic infraction. The officer noticed an Alinco handi-talkie in the car. "Can it transmit?" the officer asked.

Baran answered, "Yes, I'm a licensed ham."

"Can it scan?" the officer asked. He wanted to see the radio. Then he saw another handheld in Baran's workbag. The officer seemed visibly upset that the radios were in the car, and his questioning became very abrupt.

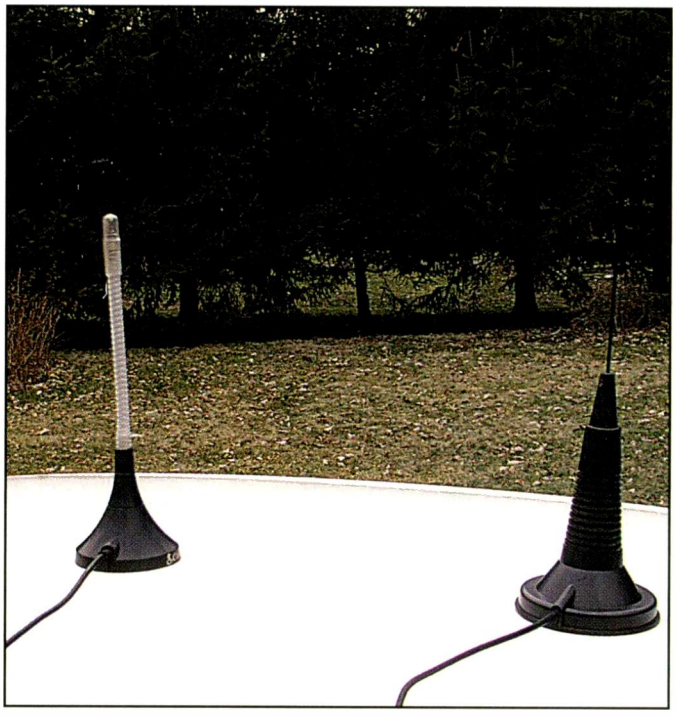
"Can this radio scan? Is it a scanner?" He keyed his police radio, trying to get the handheld to lock in on a police frequency. The policeman said, "If these are scanners, and they receive police frequencies, these radios will be taken from your possession."

He took the radios to his cruiser and was gone for 15 minutes, apparently listening to the radios to determine if they could receive police frequencies. After a time he returned, saying, "I am convinced that these radios are not receiving police transmissions, here they are."

In Baran's words, "The officer spent about four-and-a-half minutes of the first five minutes talking about the radios, trying to get the radios to do something. He asked barrage of questions, and he didn't ask me to prove that I am an amateur. It appears that he simply wanted to get the word scanner affixed to the radios so he could confiscate them."

If that weren't "interesting" enough, in July, 1999, Bill Continelli, W2XOY, was pulled over by a male Colonie officer. On request, Continelli produced his license, registration, and insurance card. The officer noticed the CB radio mounted on Continelli's dash. "What's that?" the officer asked. "It's a CB with weather channels," responded Continelli.

"Can it go outside the CB band at all?" the officer wanted to know.



Will a pair of antennas on the roof of your car get you in trouble? It might.

"It can receive the NOAA weather radio channels," Continelli answered.

"Turn it on," the officer demanded. He then made Continelli step through all 40 channels and all the weather channels. "What's the other antenna for?" the policeman asked.

"For 2-meter ham radio." The officer then wanted to know if Continelli had a ham license and if the HTX-202 could go out of band. He made Continelli turn on the radio and walk through all the memory channels. Once he was satisfied that the HTX-202 would not go out of band, he then asked Continelli, "Do you know why I pulled you over?"

"Because I have two antennas on my car?" Continelli inquired.

"No, for a rolling stop." The officer then let Continelli go with a warning.

Tony Pazzola, W2BEJ, didn't have it so easy. In October of 1996, a female Colonie police officer pulled him over. She confiscated his radios and wrote him a ticket for violating section 397, possession of a police scanner. It was almost dinnertime when Pazzola was pulling into the Colonie Shopping Center to pick up friend to have dinner together. He was about to pull into a parking space, when he saw the red flashing lights. It was dark out. There were two police cars and four officers. The alleged reason for pulling him over as offered by one of the officers was, "I didn't see your seatbelt." He was told to get out of the car and stay away from it. Then they asked if they could search the trunk and under the seats. Pazzola says, "I explained that I

What happens if an officer sees this scanner in your car? Read and find out—don't be caught by surprise.

Are you okay traveling with a ham handi-talkie with wide receiver coverage? You can be.

am a ham, that I am a sworn peace officer, a fire policeman in the Town of Colonie. They said, 'We read the law, do you have an FCC license?' I showed it to them. They could see my fire police paraphernalia in the back seat. They found my scanner and said 'You can't have this radio.' " Pazzola pointed out that he had sought and gotten permission from the Town of Colonie Radio Board.

By now, four police cars had arrived on the scene. The entire process took an hour. Some of the officers were in disagreement whether it was legal for Pazzola to have the radio, but they took his radio anyway.

Pazzola had to appear in court three times to resolve the matter. It cost him hundreds of dollars in legal fees, and a judge finally dismissed the ticket out of hand.

It certainly makes me wonder why, since the law was clearly in Pazzola's favor, the Colonie Police chose to pursue this matter.

A Strange, Out-Of-Focus Picture Develops

Are you starting to get a picture here? And this is just a sampling from just *one* town in New York State. There have been similar incidents in other towns in New York as recently as 2005 that my sources are aware of. According to http://www.afn.org/~afn09444/scanlaws/scanner5.html, Todd Sherman, KB4MHH's fine website, there are at least six states in which scanner use is illegal without an FCC license or permission, seven states in which scanner use is illegal in the furtherance of a crime, and two states in which scanner-related legislation has been proposed. Bluntly put, there are a number of states in the U.S. (to say nothing of individual towns or cities that have passed scanner-related laws or statutes) where the law may cast an unfriendly eye or your wideband receiver or transceiver.

The hams in Colonie had run afoul of two things. The first was New York State's Vehicle and Traffic Law, Section 397, which prohibits "equipping motor vehicles with radio receiving sets capable of receiving signals on the frequencies allocated for police use" unless one is exempted by one of the statute's provisions. Dave Stark, NF2G, has written an extensive report on Section 397, showing clearly its weaknesses. For a tiny fee (easily worth the price), you can download his exhaustively researched report at http://nf2g.com/scannist/VTL397.html. (Dave isn't just an interested ham, he's also an Adjunct Instructor of Criminal Justice at a local college. If you want a short education in the intricacies of radio law, by all means, purchase a copy of his report; you won't regret it.)

Ignorance Is No Excuse

Now, here's the really cool part: In August, 1993, the FCC adopted a memorandum opinion and order that *preempts state and local laws concerning amateur operator use of such equipment*. That's right—if you are a license ham, you can have such equipment in your vehicle. So, the second thing that the hams in Colonie ran into was *the ignorance of the local police concerning the FCC order* and how it affected the New York State law. And if the police in Colonie can be ignorant about the FCC order, they can be ignorant about it anywhere in the country.

As Dave Stark says, "Section 397 only prohibits equipping a motor vehicle with a police-frequency-capable receiver. It says nothing about actual monitoring of or tuning to police channels. Once the probable cause to charge a licensed ham operator with having an unauthorized receiver is overcome by the FCC's preemption order, there is no other offense to charge under Section 397. The usual legal phrasing of such a defense is 'no offense committed as defined in the statute.' " In other words, in the absence of other wrong-doing, the FCC order is like a "get out of jail free" card for licensed hams. And remember: the FCC order covers ***all*** state and local laws.

Todd Sherman raises the issue that the FCC order "(cited as 'FCC 93-410' in the *FCC Record*) does *not* in its current form cover SCANNERS owned and used by hams. It ONLY covers out-of-band-capable amateur radio *transceivers*." Dave Stark, on the other hand, argues that, since the very beginning of amateur radio, hams have used stations with separate transmitters and receivers, that one might properly argue that a separate receiver is part of the mobile ham's complete station. He adds, however, that "this is something about which reasonable men might disagree."

And so the question: Is it safe?

Uncle Jock's Recipe For Staying Safe

Here's how to keep yourself out of trouble while "on the go" with your police-frequency-capable receiver. First, *get your ham license* if you don't already have it. A ham license is a wonderful tool. I don't care if you already have a cell phone riding on your hip, when the potential mulch hits the rotating equipment, the cell phone towers are going to be jammed (this isn't theoretical boys and girls, it's happened time and time again) and ham radio may be the only way you can get through. It's my firm belief that you cannot be over-prepared for emergency communications. Second, if you insist on carrying a scanner/wideband receiver with you in your travels, make sure that it is an integral part of a ham transceiver. The FCC order is unambiguous about that. Third, carry your ham license with you and a copy of the FCC order, FCC 93-114, which you can download from the *Popular Communications* website here, www.popular-communications.com/FCC.pdf. If you travel so equipped and are stopped on the highway for possession of a receiver capable of receiving police frequencies, you can produce your ham license and the FCC order, demonstrate that the receiver is an integral part of your ham transceiver, and show that you are within your legal rights, as a federally licensed ham, to carry such equipment. At that point, in the absence of other wrong-doing, the conversation should be over.

Remember Me?

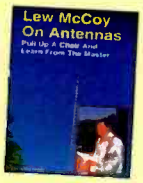
And now, for a personal note: Those of you with long memories may remember my stint as *PopComm*'s CB columnist. Well, it's great to be back, this time at the helm of the "On the Go" column. Our Editor, Harold Ort, has given me wide latitude to explore just about anything that involves electronics or radio waves or can be "on the go." So I hope that we'll have some fun along the way. I plan to review some products, and talk about some things that are on my mind. I welcome your input. If you like what I'm doing, I'd love to hear that. If you *don't* like what I'm doing, I want to hear that, too, especially if you can offer ideas on what I can do better. If there is a topic or a product you'd like me to cover, I welcome the suggestion. My e-mail is lightkpr@nycap.rr.com. I can't guarantee that I will act on every idea, but I promise to read every single one.

See you again next time, and remember to be careful when "On-The-Go!" ■

books calendars cds videos

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*

HR Anthologies

$19.95 ea.

Buy all 4 for only $75

Now you can enjoy collections of the best material published in *Ham Radio magazine*, conveniently arranged by subject and original publication date. Choose your interest, your time period and choose your anthology!

Homebrewing Techniques .... *Order # AHOME*
Test Eqpt & Repair Techniques...*Order # ATEST*
Antennas - 1968 - 1972 ... .*Order # ANTS1*
Antennas - 1973 - 1975 ....*Order # ANTS 2*
Get all 4 for $75 plus Free shipping ...Order # ASET

Contesting in Africa

Multi-Multi on the Equator

by Roger Western, G3SXW
and the Voo Doo Contest Group

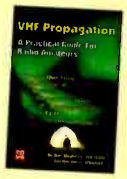
A compelling array of contesting and DXing experiences from one of the most unique operating venues on earth - the African continent. The personal stories told by the world-renowned and witty personality, Roger Western, G3SXW, make this book a must have in any ham radio library.

Order No.AFRI *$19.95*

VHF Propagation

A Guide For Radio Amateurs

by Ken Neubeck, WB2AMU
& Gordon West, WB6NOA



A comprehensive source-book on VHF propagation by two great authors!

Here's a sampling of what you'll find inside:
✳ Tropo Ducting ✳ Aurora✳ Meteor Scatter
✳ TEP ✳ Sporadic-E ✳Combo Modes

Order No.VHFProp *$15.95*

Heathkit - A Guide to the AR Products

by Chuck Penson, WA7ZZE

This greatly expanded Second Edition is a must for collectors and Ham history buffs! Pick up this 328-page volume and you won't be able to put it down!

Order No. HEATHKIT *$29.95*

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. Antenna restrictions a problem? This book could keep you on the air!

Order No. SVERT *$10.00*

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. W6SAI *$19.95*

Sale!

2005/06 calendars

January 2005 - March 2006

Classic Calendar
15 spectacular sepia-tone, vintage radio images!

Order No. CCAL ~~$10.95~~ *$8.95*

Ham Radio Operators Calendar
15 spectacular color images of shacks, antennas, scenics & personalities.

Order No. CCAL ~~$10.95~~ *$8.95*

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

Brought to you by CQ & ARRL

Hot Item!

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*

FREE Shipping & Handling with every $75 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

by Ron McCracken

Pack That CB, And An Update

Planning a road trip this summer? Well, here's a tip. Dig out that CB and put it to work for you. It can literally save your life. Oh, yes, take along the cell phone, too. But it *can't touch* your CB for getting important road information. I know. I just completed a road trip north from Florida. I never used the cell, but the CB was on all the way.

"Once again, that CB saved me all kinds of grief, thanks to those professional drivers along my route. Truckers tipped me to two serious wrecks on I-95 in Georgia alone."

Once again, that CB saved me all kinds of grief, thanks to those professional drivers along my route. Truckers tipped me to two serious wrecks on I-95 in Georgia alone. I knew about one when I was still an hour away, so I was ready when the slowdowns came. In North Carolina, an overhead sign on I-77 flashed "Road blockage ahead. Tune to CB Ch. 17 for detour." On I-90 in New York, a trucker asked, "Anybody out there?" No one answered, so in case he was in trouble I replied. He told me, "You've got two 18-wheelers wrecked up ahead. Take the next exit or you will be sitting for hours," he warned. I did, and I also kept ahead of a winter storm thanks to his kindness. I was home and snug in bed long before they ever cleared those two 18-wheelers, I'm sure. Yep, pack that CB (yes, and your cell) before you head very far.

Off And Running

Penobscot (Maine) REACT doesn't fool around. Chartered only last January, the Team participated with the Maine Emergency Management Agency in an emergency preparedness test just two weeks later. In March, Team members took an Incident Command System seminar with Pine Tree Red Cross. Later that month REACTers shared with Penobscot County ARES in presenting an emergency communications program to the northern section of the Maine VOAD (Voluntary Organizations Active In Disaster). Penobscot REACT wrapped up its first four months by cooperating with Pine State ARC and Penobscot ARES to support the Bangor Multiple Sclerosis walk with radio links. Five hundred walkers raised over $80,000 for MS, and the radio groups got to know each other a lot better. A few weeks later, they joined forces again to raise an antenna at the Pine Tree Red Cross Chapter. Not bad for starters, right?

Could You Repeat That?

Southeast Louisiana REACT (SELA REACT) was spared from serious effects of the hurricanes last summer—and that allowed it to put its system of linked amateur repeaters at the disposal of the state EOC. Currently, the system extends from Baton Rouge to New Orleans. Designed to pass emergency traffic, the REACT repeaters are also available for routine traffic by any licensed amateur. SELA REACT plans to expand the repeater network to Lafayette along I-10 and the Gulf Coast. Quite the achievement!

REACT Region 9 Director Fred Lanshe listens to a SERTOMA (Service To Mankind) Club member's Christmas wish list. Members of the two organizations relax after making Christmas brighter for needy kids in Allentown, Pennsylvania.

Cooperation Plus

Cedarloo (Iowa) REACT got a chance to work with Cedar Falls Emergency CB Club recently on a March of Dimes "Walk America" that spanned both their towns. The two groups worked off the Cedarloo REACT GMRS repeater to get the job done. Making their task somewhat more challenging was a YMCA fun run which used parts of the same route. At last report, everyone had gotten to their correct destinations. There's truly never a dull moment in REACT work.

"Graveyard" Shifts, Too

How about supporting an event with a start time of midnight? When over 800 bikers from the Oklahoma City area decided to help March of Dimes with a "Bikers for Babies" rally, midnight seemed like a very good start time. The rally would raise funds to help babies with birth defects. Oklahoma County REACT was asked by police to assist with traffic control for the all-night, all-day event. After a midnight poker run, the 800 bikers returned to town for a parade. When the parade concluded, REACT shepherded the huge contingent of bikers to a dinner and party where they celebrated the $45,000 they had raised to benefit the March of Dimes and babies with defects. Not a bad night's work.

There's Room At The Inn

REACT always needs new volunteers—like you. Check the "Team Directory" on the REACT website at www.reactintl.org

PENOBSCOT REACT

Radio Emergency Associated Communication Teams

President Jim Koritzky Vice President: Susan Hall Newsletter: Don Tarbet

Vol. 2 No. 2 Fall, 2004

REACT: READY FOR THE FALL

We have important events coming up this fall. We have a request for cooperation from Penobscot County ARES (Amateur Radio Emergency Service) in an emergency simulation event on October 23. To that end, we will hold a meeting at Husson College, Rm. 128, Peabody Hall, at 1 PM Sunday October 17 to prepare and conduct some final tests. We will see at that time who needs what in the way of radio equipment and see what is available to match with other team members.

We are pleased to note that REACT International has gotten a new insurance system through a different carrier.

Recent Events

REACT members have participated in a number of activities this year:

- March 1: Penobscot REACT members participated in an Incident Command System training session put on with the Pine Tree Red Cross.
- March 24: Penobscot REACT participated with Penobscot County ARES in presenting a program on emergency communication to the northern Maine section of Volunteer Organizations Active in Disaster (VOAD).
- April 18: Penobscot REACT participated with the Pine State Amateur Radio Club (PSARC) and Penobscot ARES in supporting the Bangor MS walk which had well over 500 participants and raised over $80,000 for MS. Participating groups also accomplished specific training and liaison goals at this event.
- June 12: REACT members participated with PSARC and ARES members in an antenna raising project at the Pine Tree Chapter of the American Red Cross in Bangor.
- July 24 – 25: Penobscot REACT members Jim Koritzky and Don Tarbet traveled to Vermont to help establish a New England REACT council. President Jim is the secretary of the new organization.
- October 5: Secretary Don Tarbet, KD1XU, was appointed Assistant Section Manager primarily for northern and eastern Maine, for ARRL (American Radio Relay League)

Coming Events

- October 17: Meeting, 128 Peabody, Husson College, 1 PM
- October 23: SET with Penobscot County ARES

SET

Every year the ARRL stages a simulated emergency to test communications preparedness. Each state, district, or county is given considerable leeway in designing the scenario most likely to represent emergencies that might occur that way. Leeway is also given in planning the date for the event.

This year Maine ARES will be conducting its SET on October 23. Penobscot ARES has discussed with Penobscot REACT our cooperation in the event. We would be asked to perform some short range communications that would free up longer range communications for inter-area coordination.

Specifically, we might be asked to test relaying from Red Cross shelters and Chapter Headquarters to the emergency communications headquarters. Participating REACT members that will be in field positions should prepare a jump or ready kit. This year's simulated emergency is weather-related as are most real disasters in Maine.

Basic Jump Kit

(up to 12 hours)

1. Change of clothing
2. Food and medication for a few hours
3. First aid kit (basic)
4. Comfort supplies
5. Seasonally appropriate weather gear
6. Radios and batteries
7. Writing materials
8. ID (esp REACT membership card)

Produced by Penobscot REACT, team 6088. 42 Sunbury Ave.; Bangor, ME 04401; info@nhest.org;207-942-8067

This page is a small part of the Penobscot (Maine) React Team publications, announcing amount other events, an "antenna raising" effort, with REACTers and ARES members from Penobscot taking part. The local Red Cross chapter benefited from the cooperative effort that supported their branch.

to see if there's a Team near you. The Directory will tell you how to contact the Team to see about joining. Please mention that you learned about the Team from reading about REACT here in *Popular Communications*.

If the Directory shows no REACT Team in your area, *you* can be the key to changing that. Request the application needed to charter a Team. At least two more like-minded people are all it takes to help launch a Team. You can show them these columns to give your would-be volunteers an idea of the varied ways REACT Teams serve travelers and their local communities. Your community can be the next to benefit. You can help make it happen.

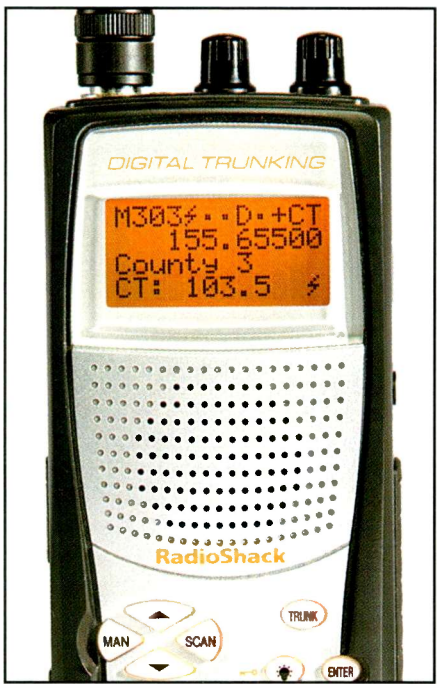
As the song goes, see you in September! ■

by Ken Reiss, radioken@earthlink.net

Painless Programming For The RadioShack PRO-96

The RadioShack PRO-96 has certainly attracted a lot of attention, as have many new trunktracking models lately. The PRO-96 is a full-featured, full-sized handheld scanner that adds a built-in digital decoder to an already impressive array of features, including trunking and alpha tagged memories. All in all, it's quite a package in a small box.

Unfortunately, all this convenience comes at a price. Many trunktrackers are not intuitive to program. Many longtime scanner enthusiasts who are new to the concept of trunking find themselves with a radio they can't figure out without lots of digging in a complicated manual. And to make matters more confusing, no two radio manufacturers seem to implement the programming in quite the same way. So, in an effort to be helpful, we present here the short guide to programming a trunked system on a PRO-96. If you don't own or aspire to own a PRO-96 you may find these instructions slightly less than helpful for your scanner. If that's the case, save yourself some aggravation and skip down to the "Frequency of the Month."



The PRO-96 in scan mode. Both conventional and trunked banks are being scanned, but here it's stopped on a frequency with CTCSS active.

As you first program a trunked bank you may see the "not trunked" message. Press the mode key as instructed.

Programming A Motorola Trunked System

We'll pick Motorola trunking first because it's the most common by a long shot for public safety applications. If you're interested in another type of system, drop me a note and I'll certainly address it if there's enough interest.

The PRO-96 has 10 banks of 50 channels, each active at any one time. We'll deal with the V-scanner mode later, but for all practical purposes, you program one set of 10 banks at a time, and that's all you can scan at once. Each of the 10 banks can contain a trunking system, conventional channels, or a mixture of the two if you want the conventional channels scanned at an interval during the trunked operation. I'd recommend putting conventional channels in their own bank so you can turn them on and off as desired. You cannot put more than one trunking system into a single bank *and* you cannot mix Motorola and EDACS systems in a single bank.

You'll need to think about how you want to use your banks if you have lots of trunking activity in the area. Once you've picked a bank, you're ready to start programming. As with almost all RadioShack scanners, you'll start by pressing the Program button. Pressing Func and then the up or down arrows will let you select the bank you'd like to program. Let's pick an empty one for now. Once the bank is selected, you can press TRUNK to set the correct trunking type, which is very important. The default for a bank that's never been programmed is Motorola, so you're in luck in this instance, but it's a good idea to get into the habit of checking it. Press MODE until it circles back around to Motorola. It's also possible that the bank will come up as Not Trunked and tell you to press the mode button. Either way, Motorola will be one of your choices.

Get Set

Once that's configured, you can press the program button to return to the frequency entry mode. You'll need to enter the control channel for the system you're trying to listen to. You can enter all of the channels if you like, but it's not necessary. Many of the larger trunked systems routinely change their control channel. Once a day is common, but it can be more often if the administrator chooses to configure it that way. You'll need *all* of the control channels entered. There's really two ways to get the control channels. You can see if you can find them in a reference guide, or you can listen for them. They're not hard to spot. If you don't have the control channels, program in all the *frequencies* that are licensed for the trunking system and let it scan. In just a second or two the scanner should lock up on a *buzzing noisy channel* that is the data control channel. That's the one that's in use right now.

Once you've pressed the mode key enough times (usually just once) the Motorola mode will appear. Press PGM to return and edit the frequencies for the bank.

Program that into a trunked bank and have fun. If in a day or two, or a few hours, you find that the trunking signal has disappeared, go back to the bank with the conventional channels and repeat the process. Add the newly discovered control channel to your trunked bank. In a few days or so, you'll have them all pinned down and it won't disappear again except for weak signal areas.

Go!

Press SCAN. That's it! Make sure your trunked bank is turned on in the scan bank list (the number will show on the scan screen rather than a "–" symbol). At this point you should start hearing radio traffic if you have the right control channel programmed and if the signal is strong enough. Once the radio recognizes that it is a trunked control channel, it will show you the ID number of the trunked system (a number programmed into the system that doesn't mean much to us) and the signal strength as a percentage. It seems an indication of about 25 percent or so is required to get reliable reception. This indicator doesn't show in the scan mode, but rather when you return to the manual mode and can see the actual frequency of the control channel that you programmed.

An Open And Closed Case

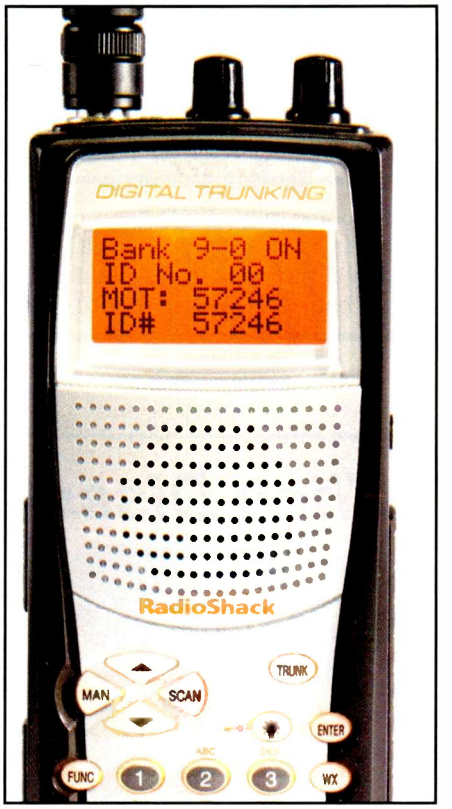
The PRO-96 uses an "open" and "closed" designation on banks to indicate what will be received. Right now, since you just programmed the bank, you're in the open mode, which means that any transmission will come through regardless of its ID. In a conventional scanning bank, open means that any tone squelch (CTCSS or DCS) settings will be ignored.

You can toggle the open and closed modes by pressing FUNC 5 while the radio is scanning in a particular bank, or stopped on a channel. If you're in a manual mode of some sort when you do this, the display will indicate that the bank is open or closed on the bottom line for a couple of seconds. If you're in the scan screen (where it shows all the active banks) a "–" sign will appear below the bank number to indicate that the bank is closed, and a "+" sign will indicate that the bank is open.

In a Motorola system, trunked channels are referred to as *talkgroups* and each talkgroup has a unique ID. These ID numbers can be referred to in hexadecimal or in decimal formats. In all the consumer trunktracker scanners, decimal numbers are preferred as they seem to make more sense to most of us, so a typical talkgroup will have a 5-digit ID number. That number will show on your screen as the transmission is received. Each talkgroup represents a channel to the officer in a police car or the dispatcher; so they won't refer to them as talkgroup 12345, they'll say switch to Channel 5—just like a conventional radio user would. Those channels are important as they represent the content you're interested in listening to—or not. For instance, you may find that the dispatch for your area is ID number 57488, while the parking meter enforcement is on ID number 59824. If you're interested in what the parking meter people are up to because you left your car double-parked someplace, then that's a handy ID to know, but otherwise we're probably interested more in the dispatch operations on 57488.

The PRO-96 allows you to store the ID numbers you're interested in hearing in ID lists. You can have as many as 150 IDs divided into five banks of 30 each in any given trunked bank of your scanner. One simple way to get IDs into your scanner is to press the TRUNK button when an ID you're interested in is active. The ID will be stored in the next empty channel and the display will tell you what that was. If the ID has already been stored, it will tell you that, too, so you don't fill up your ID list with the same channel.

The problem with this arrangement, ultimately, is that there is no arrangement to the ID lists. ID lists in a trunked bank act just like banks do to a conventional scanner. It's desirable to be able to turn a



Here's a good example of why alpha tags are so convenient. You'll have to memorize a lot of ID numbers if you don't use them.

"bank," or ID sublist in this case, on and off as desired. To accomplish this, you'll need to be a bit more sophisticated with your programming. Pressing PGM and then TRUNK will take you to the ID list. Each ID sublist is numbered, first with the scanner's bank number and then with the ID sublist number (1-0, 1-1, etc.). Each bank has five sublists numbered 0-4, each of which has 30 channels numbered 0-29 for a total of 150 IDs that can be stored per bank.

You can press the up and down arrows to scroll through the channels one at a time to see what's stored there. You can also press the TRUNK button to skip to the next subbank. When you find an empty one, or one you want to change, type the ID number that you want stored in that location.

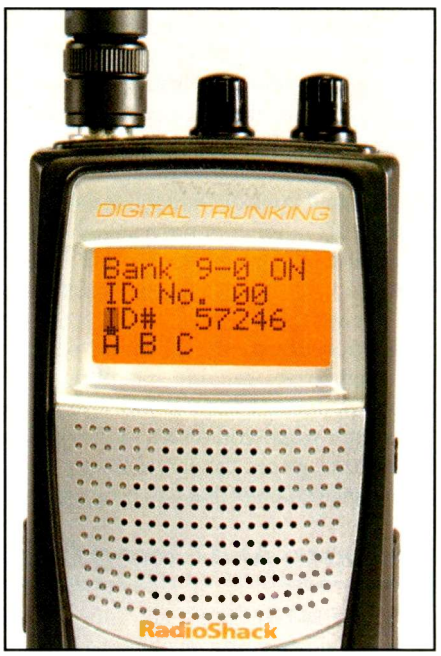
Once you've loaded your IDs into the scanner, you're ready to use the talk groups like banks. While you're in the PGM and TRUNK mode, you can press FUNC 1 to turn a bank on and off, which will be indicated on the display. If you're in closed Scan mode, pressing FUNC then TRUNK will turn off the ID sublist that the active channel belongs to. This is a quick way of getting rid of an entire bank

of channels when you want to focus on other ID lists that have something interesting going on.

Adding Alpha Tags

One of the truly nice features of more sophisticated radios like the PRO-96 is that they allow you to store alpha descriptions of both channels and ID info so that you don't have to try to remember all the ID numbers and frequencies you programmed. The first step is to navigate to the ID's memory, just like you did when you programmed it. Press PGM and then TRUNK to get to the ID list, and then use the arrows or the trunk button to find the sublist and then the particular ID you're interested in tagging. Press the TEXT button and you're ready to enter the text. The PRO-96 uses a somewhat unique text entry method for entering text. Once you get used to it, it's not bad, but if you're used to entering text on a cell phone or other device with a different method, you'll find this one a bit aggravating every time you use it.

To enter text, press the number key that contains the letter you need. Letters are shown on the keypad just above the numbers, so it's easy to find them. The three or four possible characters for that key



The PRO-96 has a unique way of entering text for alpha tags. Here, the 2 key has been pressed for A, B, or C; a press of 1, 2, or 3 is then required to pick from the three letters.

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 *Pop'Comm.*

Our frequency this month will be **154.600**. Have a listen and see what you come up with. E-mail me the results at radioken@earthlink.net and be sure to put the frequency in the subject of your e-mail so it gets routed correctly. You can also send your entry via more traditional methods to Ken Reiss, 9051 Watson Rd. #309, St. Louis, MO 63126. And, of course, other questions or comments are always welcome, too.

You can also enter a tag for the bank so you'll know what group the active frequency belongs to.

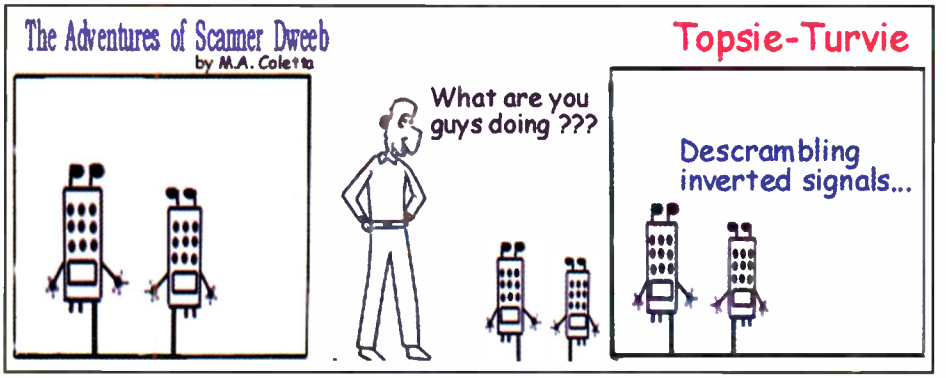
show up on the bottom line of the display. You'll need to press 1 for the first character, 2 for the second, and so on, so each character requires two key presses, no more and no less. Pressing the 1 button (which has no letters assigned to it) gives you a list of the numbers so you can enter an ID like DISTRICT 1. Pressing the 0 key gives you a list of special characters like the "–" and "#" symbols. By pressing the FUNC key after you press the number, you can get lower case letters if desired. However, if you're that serious about text tags, I'd strongly recommend that you consider a computer program that can enter both frequency and alpha data for you. It's quite a bit of work if you think about the 500 channels and 150 IDs per bank that you could need alpha tags for, not to mention the V-scanner settings—a total of 5,500 channels!

You can also enter a text tag for the bank itself, which appears on the bottom line of the display when the scanner stops on any channel in that bank. To do this you need to get to a channel (MANUAL mode). Press MAN, enter any channel in the bank and then press MAN again. Press PGM to enter the program mode and then finally FUNC 7 to program the text tag for the bank. Once programmed, it will apply to all channels of that bank. Of course, each individual channel can also have an alpha tag by just pressing TEXT in the program mode on any channel.

Once you've got a group of IDs entered, you'll probably want to put that bank into the closed mode so you only get those ID numbers and not just anything that comes along. While you're developing your list, however, you may find some IDs you definitely know you don't want. The good news is that there is also an ID lockout function. When you find an ID that you don't want to listen to, even in the open mode, just press the L/OUT button, just like you would on a conventional channel. That ID will be added to the locked-out IDs list. You can periodically check the list of locked-out IDs by pressing PGM, TRUNK to enter the ID list mode, and then FUNC and L/OUT to see any IDs that are locked out.

Scan!

Well, that should get you going. Of course, there are all sorts of other features of this radio that we haven't touched on, but this should be enough to get you going with a Motorola or APCO-25 system (which are the most common). If you have another system in your area and are interested in seeing step-by-step instructions, drop me a line and let me know. If I get enough requests I'll do this again. Until next month, Good Listening! ■



by Kirk Kleinschmidt, NTØZ

Don't AMPLIFY Your On-Air Problems!

The other day I happened to run into a pair of relatively new hams as we were all coming out of the main doors of a local health club. The topics the two were discussing were long-range "intertie"-style repeater networks and the perceived glory of linear amplifiers. Because I don't even own a VHF/UHF rig beyond the 6-meter coverage of my HF transceiver, the repeater topic went in one ear and out the other, but the amplifier issue struck a nerve. I remember my own Elmers giving me the "skill versus brute force" lectures, and I am always eager to pass on the wisdom. In short, I've ranted about this topic before, but it's important, so please bear with me!

We've all probably thought about buying a big amplifier at one time or another, but I'm here to tell you that for most hams, station amplifiers aren't terribly useful. In fact, they may be more trouble than they're worth—even if they're free!

Taking this to the extreme, if it were up to me I'd limit U.S. amateur operators to 250 watts PEP output on all bands. This would annoy a small subset of the population, but it would almost certainly improve our hobby. Attention regulators: hint, hint!

If you think you need a linear amplifier to chase away your radio blues, think again. Your 100-watt barefoot signal almost certainly provides more than enough power. If you need a bigger signal, what you likely need is a better antenna and/or a better feedline.

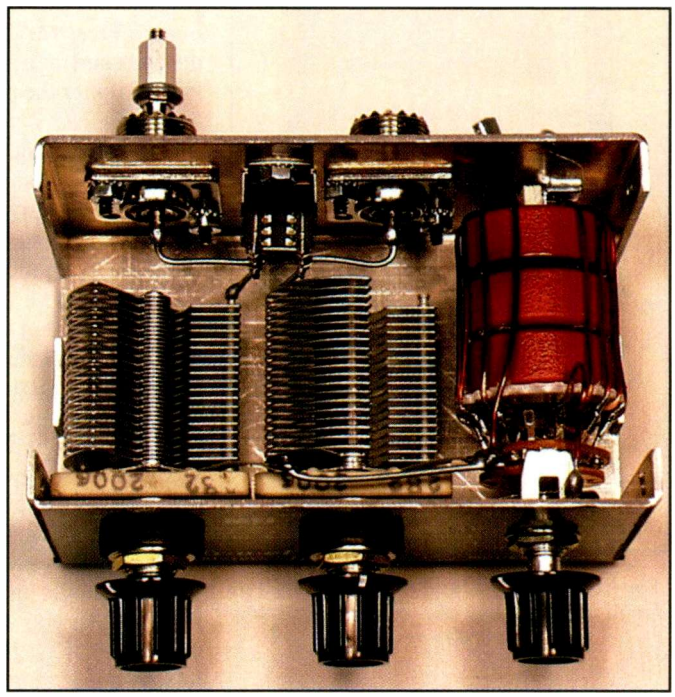
Here's Why

Beginning hams often struggle with deciding whether to buy an amplifier or improve their antenna system, or maybe both. It's a logical concern. They want to improve their station's signal quality, make more QSOs, work more DX stations, rack up higher contest scores, and chat with others while enjoying armchair copy. But which way to go? Are amplifiers a good investment? Will they provide the boost in readability you've been looking for? They are legal, but are they really in keeping with the amateur spirit?

Radio Responsibility

In case you've forgotten, the Amateur Radio Service is just that, a radio service, with rules, regulations, and goals that transcend hobby operation. One of the most important rules compels us to use the minimum transmitter power required to communicate. That doesn't eliminate amplifiers entirely, but it does (or should) limit their habitual use. The minimum necessary power rule protects us all. It promotes responsible, considerate operation. Try it sometime! Reduce your 100-watt signal to 50 or 25 watts. You'll maintain effective comms most of the time. You'll also improve your operating skills, enjoy a greater sense of achievement, and gain an intuitive sense of propagation.

Hams who are also decent human beings are concerned about others—other hams, neighbors, family members, etc. They try to fit in, to get along, to accommodate a community of interests in addition to their own. Just because we can transmit a 1500-watt signal doesn't mean we should. Just because we can erect a 200-foot-high antenna tower doesn't mean we should. Hams who follow the Golden Rule integrate their radio pursuits with the pursuits of others, and not because they have to, but because they want to!



Tired of using a hulking antenna tuner with your pocket-size DC-to-daylight HF transceiver when you're operating away from the shack? Well, the folks at MFJ thought you might be interested in a tiny travel tuner that's small enough to be almost unnoticeable (about 4 x 2 x 3 inches), yet can handle 150 watts from 80 through 10 meters—with plenty of built-in features. MFJ's Travel Tuner, the innards of which are shown in the photo, is perfect for modern mini-rigs and QRP transceivers that have built-in SWR meters. The tiny tuner can handle dipoles, random wires and even has a balun to allow the use of balanced feedlines, but the one thing it doesn't have is a built-in SWR meter. Considering that an external SWR/power meter might be physically larger than the tuner itself, weigh your options carefully! I've been playing around with one of these small marvels (officially dubbed the MFJ-902) for a month or so, and the little bugger still impresses me. Check it out at www.mfjenterprises.com/products.php?prodid=MFJ-902.

Just An Average Ham

Let's assume that you have a typical shack. A 100-watt transceiver feeds a coax-fed dipole (or two) through an antenna tuner. Because of the tuner, your rig can happily put out full power regardless of actual antenna/feedline SWRs on the various bands you work. This setup—used by thousands—works pretty well, right? Maybe. But maybe not.

You might have noticed that working stations, especially DX stations, on some bands doesn't seem as easy as it should. You might even be dreaming of solving your problem by cranking

up the power. By adding a glowing monster amp to your modest shack, you might think, those stations with once-marginal copy will respond with ease.

It's a comforting image, but it's probably a fantasy. Although you may not yet know it, you'll likely get a lot more signal for a lot less money if you upgrade your *antenna system* before (or instead of) shelling out the bucks for an amplifier.

Let's boost our signal and see how the decibels stack up against the pocketbook. If your amplifier budget is modest, a small solid-state or single-tube amplifier will boost your 100-watt signal to about 500 watts. That's enough to be noticed, or so you think. But just how noticeable?

Here's the bad news: Every time you double your power output, stations that are receiving your signal hear a 3-dB increase in strength. That's less than half an S-unit! To nudge the needle a full S-unit you need to quadruple your power output (a 6-dB increase)!

The progression looks like this: 100 watts doubled to 200 watts equals a 3-dB increase. Next, 200 watts doubled to 400 watts equals a 6-dB increase. Then, 400 watts doubled to 800 watts equals a 9-dB increase (exceeding the output power of our entry-level amplifier). Finally, 100 watts times 10 equals 1000 watts, a 10-dB increase in power output. Our 500-watt output amplifier gives us a smidgen more than a 1 S-unit boost on the other end. That's not much, especially when an amplifier in this class can cost as much as $1,000!

Want more power? Using our calculations from before, boosting your signal to a kilowatt output provides a 10-dB shot in the arm. That's just less than two S-units on the other end (S3 to S5, S7 to S9, etc.). That's enough of a difference to be noticed, but still not enough to "burn down the barn." And by the way, you're now shelling out $1,200 or more. If you go for a legal-limit amplifier, your 1500-watt signal will be about 12 dB stronger than your "barefoot" transceiver. Because of the "price of power," 1500 watts is still only two S-units stronger! And a legal-limit amplifier is hardly a casual purchase. It'll set your wallet back about $2,500.

A Better Way?

To save wear and tear on your neighbors, fellow hams, wallet, and even your house wiring (big amps require big AC power), consider improving your antenna system before investing in an amplifier. Here are some ideas to get you started.

One almost universal way to get out more signal is to get your antenna(s) farther up in the air (your present antenna or a new one). Build a taller mast, find a taller tree, or put up a tower.

If that dipole just isn't cutting it, put up a contest-winning and DX-catching secret weapon: a full-wave horizontal loop for 40 or 80 meters (up as high as possible, of course!). Feed it with coax and use a tuner on bands above the fundamental frequency. That's a "cheap 'n' dirty" way to snag an extra 2 to 10 dB, depending on frequency.

Disconnect the feedline from your coax-fed multiband dipole and replace it with 450-ohm ladder line. With a coax feed, even though your antenna tuner may be presenting a happy impedance to your transmitter, feedline losses due to high SWR may slash your signal by 6, 10, or 25 dB, depending on the band and the size of your dipole! By using 450-ohm open-wire line you'll likely reclaim most of that lost power. Now that's a 6- to 20-dB shot in the arm that anyone can afford!

For about the price of an entry-level amplifier you can buy a multiband beam antenna and a decent rotator. This dynamic duo, mounted reasonably high, will offer a 5- to 7-dB directional improvement to your signal. Remember, amplifiers only boost your transmitted signal and do nothing to improve reception. By rotating that directional antenna you can often boost the signal you're trying to receive while attenuating unwanted signals. For example, if I'm working a European ham from my Minnesota QTH, a potentially interfering signal from an op in Florida located in the side null of my directional antenna may drop 25 dB or more! The difference, more than 30 dB of signal enhancement, could never be achieved by a lone amplifier.

On SSB, learn to correctly use your rig's speech processor. That's another 3-dB (or more) improvement, this time in the modulation department! No purchase necessary!

The Big Decision

So, do antennas win out over amplifiers in your shack? Or will your operating table soon be sporting some heavy iron? Amplifiers do have their uses, especially after you've tweaked your antenna farm. Add a 10-dB amplifier to a 7-dB beam antenna and you've got a whopping 17-dB improvement in signal strength! That will put you on the map, especially when the minimum necessary power required to communicate requires maximum power.

By now I'm sure you've figured out that I'd choose a great antenna over an amplifier any day of the week. I hope you'll do the same. As always, send your QSL cards, questions, and letters to me here at "Ham Discoveries," *Popular Communications*, 25 Newbridge Rd., Hicksville, NY 11801. See you again next month! ■

by Steve Douglass, webbfeat@gmail.com

Back To Basics: Shortwave Antennas, Plus Attack Of The Killer Bees And A Nod To Storm Watchers

When it comes to listening to shortwave, you can't hear much of anything without a good pair of "ears." And that dinky "back-of-set" or telescoping "whip" antenna isn't worth much except for pulling in those power-house shortwave broadcast stations that pump out millions of watts. So, what do you do?

If you're a newbie and, after absorbing all the information in our *Back to Basics* series, are still having trouble intercepting utility communications, you've come to the right place. To you old crows, the following might seem like familiar stuff, but even so you might like to brush up on your knowledge of basic HF antenna construction, and you might even be inspired to build one for yourself.

One of the cool things about shortwave is that it is very easy and inexpensive to build your own antenna. Oh, sure you could slap down big bucks on a ready-made super-duper manufactured antenna (and they work well by the way). But for less than $20 you can do it yourself and wind up with an antenna one that works almost as well as those fancy ones.

Random Length Center-Fed Dipole Antenna

This month we'll start with the most basic of SW antenna designs that will improve the sensitivity of your radio tenfold over that back-of-the-set antenna. It's called the random length center-fed dipole because it's just that, a random (meaning non-calculated) string of copper wire attached at the center point by a balun (an impedance matching transformer) and a feedline that leads to the antenna input on your radio.

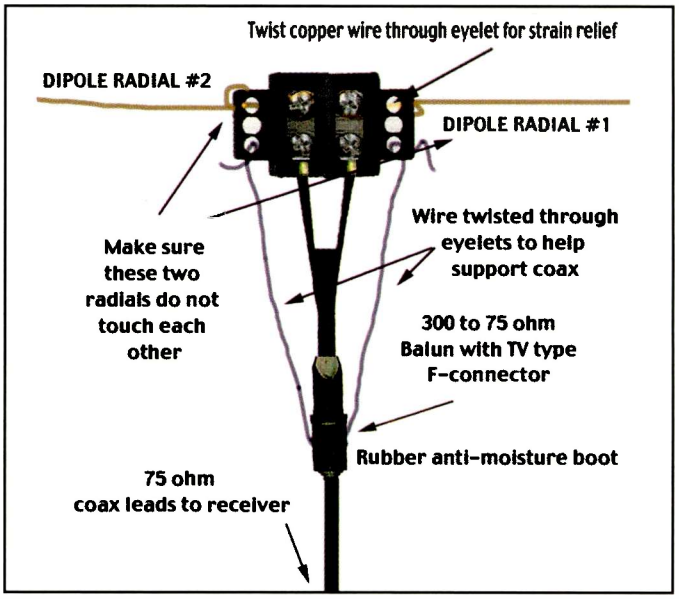
Construction

Always remember: SAFETY FIRST. Don't kill yourself climbing on a roof or up a tree. Use ladders and the proper climbing equipment. Do not attach your antenna to electrical wires or to a utility pole. Make sure to watch for power lines, or your first antenna project could be your last.

First locate a structure, tree, or pole that you can attach the end of your antenna to. Ideally your anchor point should be at least 12 to 20 feet above ground, say on the peak of a roof or in a tall tree. Mine is in a tall tree, about 70 feet away from the house. If you have a small yard and are on good terms with your neighbors, maybe by asking them politely they will allow you to attach the antenna to their roof, or you could erect a guyed antenna mast somewhere in the yard or attached to a fence. Next find another anchor point (again preferably 12 to 20 feet high) to anchor the other end of the antenna.

It will make construction much easier if you lay all your materials out on the ground (with the wires stretched out). Now stretch your copper wire between your two points, allowing for slack as a taut wire will break in high winds, and then cut it in half (see "Parts List"). This center point is where you will attach your balun and feedline. Now tie one end of your (preferably) nylon support rope to one of the holes in the insulator and wire-wrap one half of the antenna wire onto the other hole in the insulator. If you are confused about how to do this refer to the illustrations. Attach the nylon support rope on the other end as well in the same manner.

At the center point, attach both copper wires to each side of the dual-row barrier strip, which will serve as your solder-less

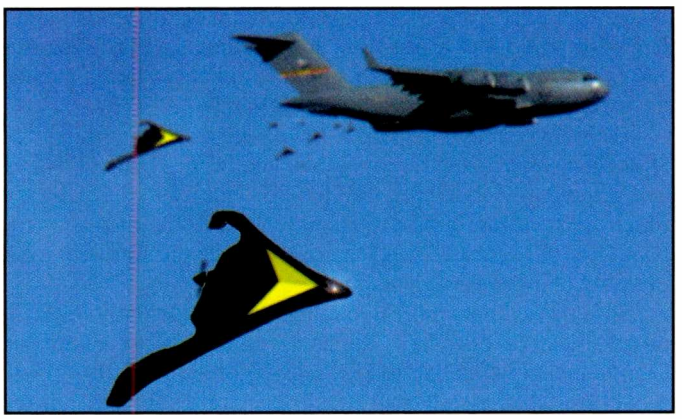


The random length center-fed dipole antenna is a basic shortwave antenna that will greatly improve your reception.

Parts List

60 to 70 feet of bare copper wire (any gauge, but cannot be easily broken thin wire or too stiff to work with)
Two 300-to-75 ohm baluns (RadioShack part #15-1143) or equivalent*
Two mini egg standoff insulators (RadioShack part #963-0673) or equivalent
50 to 100 feet of RG-6 or RGU 75 coax with cable TV type F connector installed on one end and the proper connector for your radio on the other
One dual-row barrier strip (RadioShack part #274-656)
Some kind of support rope (nylon) or standard guy wire

**Note: some radios have 50-to-75 ohm coaxial inputs and some have 300-ohm screw type antenna terminals on the back. If yours has the standard S0-239 (CB-type) connector you only need one balun.*



Artist's concept of a C-17 dropping "Killer Bees." (Artwork by Steve Douglass)

connection point for your feedline. On the two open screw terminals (on the barrier strip) attach your 300-to-75 ohm balun; then attach your coaxial cable (with attached F connector) to the balun and run it into your radio room, connecting it to the supplied external antenna-jack on the back of your receiver. Tie one end of the nylon support rope to your support structure, then tie the other end to the other support structure, pulling the antenna off the ground and into the air between the two support points. Don't pull it too tight or you risk breaking the wires. Now fire up your rig and enjoy.

The random length center-fed dipole antenna is a good basic HF antenna project and is simple enough for a beginner to construct in just under an hour. Don't be afraid to experiment with wire length and height or better ways to support the antenna and protect the connections from corrosion. I sealed mine by coating the entire dual-row barrier strip with silicone glue, protecting the connection points from moisture.

The NOT-SO Random Length Center-Fed Dipole Antenna

Now, if you want to build essentially the same antenna but cut it for optimum reception on your favorite frequency, all you need is a calculator and a simple formula for determining the length of a center-fed half-wavelength dipole antenna resonant at a desired frequency.

The formula is 468 divided by the desired frequency. For example, let's say we like listening to HF military on 6.739 MHz. Divide 468 by that number and you get 69.446505416234. Rounding that off to 70, which is how long, in feet, *each* element of your half-wave dipole antenna should be. It's that simple.

Next month we will look at the inverted Vee shortwave antenna, which can give you great sensitivity in limited space. In the meantime, I'd like to see photos of your antenna installation as well as your shortwave monitoring post. You can e-mail me at the address above or directly mail me at *Popular Communications*, 25 Newbridge Road, Hicksville, NY 11801.

The Attack Of The Killer Bees—A Military Tech Update

An innocuous military transport aircraft flies over another political hotspot, where yet another terrorism-fostering third-world despot has caused the lights at the White House to burn late into the night with his recent actions. But on this night the aircraft goes unmolested, tagged by enemy radar operators as just another of the dozens of reconnaissance "electronic-ferret" over-flights, designed to bait the hostile regime into scrambling fighters so the ferret aircraft can ascertain precious tactical intelligence, such as the numbers of jet fighters in the enemy's inventory or the frequencies used to communicate and guide them.

Unbeknownst to the enemy, however, the normally mundane C-17 "trash hauler" is on the attack against terrorist camps located in remote regions of the highlands and has released hundreds of "Killer Bees"—small remotely piloted, intelligent, unmanned, computer-networked flying-wing aircraft capable of seeking out enemy forces and attacking them in swarms, much like their biological namesakes.

This is just one of the scenarios envisioned by planners at Northrop Grumman and Swift Engineering, which have teamed up to fill a military need for small, stealthy, disposable long-endurance UAVs (Unmanned Aerial Vehicles) that can serve as tactical reconnaissance platforms or hunter/killers.

Looking much like a miniature propeller-powered B-2 bomber, these mini-flying wings can carry more payload than standard wing and tube designs, can be launched out of the back of a mother ship (at speeds of 200 knots or more and at altitudes approaching 40,000 feet), and can linger longer over a target area (30 hours for recon versions and eight hours for armed versions), making them a highly versatile future tool for Special Forces on the ground in hostile areas like Iraq where insurgents hide seemingly around every corner.

Production Killer Bees will be built in three pieces and constructed of composite graphite epoxy pieces. Payloads will vary from sensors to explosives, and so will the size of the Killer Bees, with models having three-foot to 30-foot wingspans. Planers foresee the Killer Bees launched from the back of a mother ship at up to 300 knots or from telescopic bungee cord slingshot units from the back of Humvees.

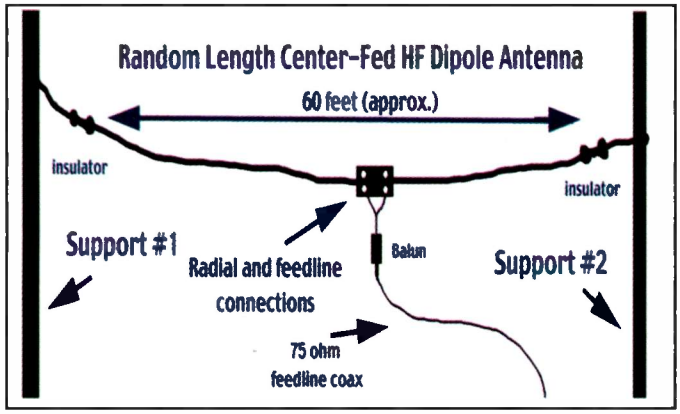
Designed for easy fielding, the Killer Bees' human operators will require no piloting skills and can be totally autonomous. Unlike large UAVs, such as the Predator, Killer Bees will be hard to spot, inexpensive to build, and disposable. Killer Bees can go into high-risk enclosed urban areas where ambushes are common. If one gets shot down, so be it. We've all seen news-footage of Iraqi insurgents celebrating when they managed to shoot down one of the Army's balsa-wood UAVs, but what they don't understand is that better a downed drone than a dead soldier. By shooting at the UAV they give away their positions so larger ordinance can come to bear.

Killer Bees are the next logical step in the technological evolution of small expendable UAVs, not just a military technologist's pipe dream of the far future. Northrop Grumman's own Killer Bees have already begun flying and are quite possibly undergoing operational tests in Iraq.

You Saw What On eBay?

Some of you might remember the short piece I did a few months ago in this column on how the USAF wanted to build a fighter/bomber version of the F-22, called the FB-22. In the course of Air Force military aircraft development, it seems to be standard operating procedure to take a good design and turn it into the equivalent of a flying Swiss Army Knife—the ultimate do-all and be-all aircraft capable of shooting down enemy aircraft and attacking ground targets on the same mission.

This tradition has met with varying degrees of success, with



The random length center-fed dipole antenna is a great all-around HF antenna that will take under an hour to construct.

some bomber incarnations becoming hangar queens and gas hogs. The Air Force can't leave well enough alone and insists on taking fast and stealthy aircraft and hanging all kinds of launchers and bomb pylons off the wings. Sure, they may turn the aircraft into a great ground pounder, but at the same time sacrificing speed, agility, stealth, and lethality in air-to-air combat.

Still, the Air Force hasn't had a good medium bomber since the F-111 was retired, and although they claim the F-15E fits that role nicely, it isn't stealthy and can be tracked on radar easily.

So, since the advent of stealth and the success if the F-117 and the F-22, Air Force planners wished they had at their command a stealth aircraft that wasn't a billion-dollar bomber (like the B-2) and that offered more than a two-bomb capacity (like the F-117). What they really wanted was a stealth version of the F-111, a medium-sized high-speed fighter/bomber that filled the gap between heavy bombers like the B-1B, B-2, and B-52 and the bomb-load-challenged (and limited in number) F-117A.

Knowing this, Lockheed began working on a fighter/attack version of the F-22 Raptor, the semi-secret program we detailed in this column a few months ago. Lockheed's design looks like a real winner, sacrificing nothing for increased bomb-load, range, and speed, yet still maintaining a stealthy profile.

But since the Pentagon never liked to put all it's eggs in one basket and is also under considerable pressure from pork-barrel politicians to spread out its military wealth, it appears there was (or is) another secret competitor fighting to win a lucrative stealthy fighter/attack aircraft contract. Northrop Grumman with a—until now—secret concept known as the F/B-23 Rapid Theatre Attack Aircraft.

Aircraft aficionados may remember that it was a McDonnell Douglas/Northrop Grumman design (the F-23 Black Window) that competed with Lockheed to build the next generation fighter and barely lost out to the Lockheed F-22 design. In many respects, the F-23 was a better aircraft, even stealthier and just as capable as the F-22, but some military insiders said it was too radical a design and USAF head honchos wanted something that looked more like the F-15. In any event, the design team at Northrop Grumman, and many in the aviation press, were stunned by the Pentagon's decision to go with the F-22 over the F-23.

Because of this momentous decision, the F-23 was relegated to a mere footnote in the book of good ideas; it was, in many a military pilot's opinion, the greatest fighter never built.

Interestingly enough, stealth aircraft buffs recently noticed that one of the F-23s languishing in an Air Force bone-yard was crated and sent back to Northrop Grumman for "refurbishment." It was rumored that it was to be used again as a prototype in a top-secret project, but those rumors could never be backed up through official documentation or sightings.

It does appear that there may have been a secret competition to build a stealthy medium-payload and range fighter/bomber, and it looks like Northrop Grumman's entry may have been a Mach 2+ medium-bomber version of the F-23, known as the RTA (Rapid Theatre Attack) aircraft with the missing prototype possibly being used as a test bed.

How do we know this? Because it was accidentally revealed on (of all places) eBay! Yes, someone, quite possibly a Northrop Grumman employee, posted for sale a professionally built desk model on what amounts to being the world's biggest virtual garage sale, visited by millions of eager buyers daily. It was spotted by eagle-eyed military aircraft collectible hunters and soon the word spread across the Internet through stealth chaser newsgroups and aviation websites that a model of a secret aircraft was for sale on eBay.

Suddenly, and without explanation the auction was yanked, but not before the photos had been snatched up by those who recognized them for what they were. Since the photos are the property of the owner and something I can't publish without the permission of the original photographer (and most likely would never get permission to do), I instead used the photos as the source in creating an artist's rendering of what the aircraft looks like. So with the cat out of the bag, published here, for the first time in print, check out the FB-23 ATA!

Support Your Local Storm Spotters

Today I received a nice letter from George Speck, KAF 6149 GMRS, who writes:

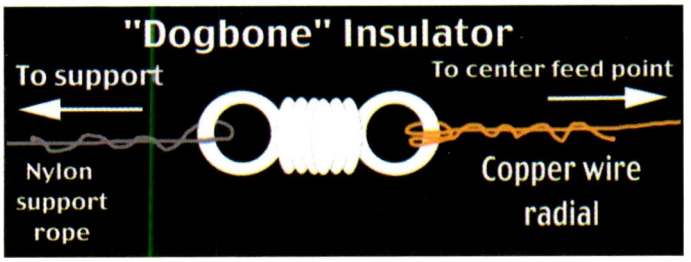
I was reading your story "Into the Storm" in the June 2004 issue of *Pop'Comm.* and it gave me great insight into being ready for severe storms.

I agree that when they strike having the proper monitoring gear is a must, at home or at work. I work for a security company at night (and outside), and I need to always keep a close eye on the weather.

Here is a list of the radio gear I keep in my mobile: GMRS/FRS radio (with built-in WX alert radio), a scanner programmed with storm spotter and emergency frequencies, a Maxon 210+3 handheld GMRS radio with three repeater frequencies programmed in, my cell phone, and a Motorola two-channel UHF business-band walkie-talkie. I also carry other emergency gear, such as a 500-amp portable car jump-starter kit, an emergency stick-on cell phone antenna, a portable air compressor, flashlights, extra batteries, and a Vector 12-volt power supply. I want to upgrade my gear by adding a portable color TV and a TrunkTracker scanner. Keep up the fine work!

Great to see you are prepared, George. I'm glad to see my article inspired you. Speaking of storms, by the time you read these words, chances are (if you live in Tornado Alley) you've already ridden out quite a few severe storms. Like most of us who live in twister-prone areas, you no doubt listen in on the storm spotters as they go about the sometimes harrowing task of providing the National Weather Service and local emergency management agencies with the all-important human backup factor: trained eyes that confirm what radars are reporting.

As a certified spotter for the city where I live, I know first-hand about the sacrifices volunteer spotters make, both in terms of personal time and expense, so they can be out in the storm and serving their communities.



The "dog bone" insulator, commonly referred to as an "egg insulator," supports each end of the antenna.

Although storm spotting does have its many rewards (such as being a witness to mother-nature's amazing beauty and power, not to mention the chance to give something back to the community), I'm constantly surprised at how many people see spotters as just gung-ho thrill-junkies or nimrods who couldn't tell the difference between a tornado and a rain shaft. Usually, when they find out I'm a certified storm spotter, they ask one of two things: "You have a death wish or something?" or "How come you guys sounded the tornado sirens last week and we didn't even get a drop of rain at our house!?" Rarely, very rarely, do we get a pat on the back and a thank-you for a job well done. Maybe it's because the public confuses storm spotters with *storm chasers*. Chasers do it for the thrill or for money, with some even conducting "tornado tours" for well-healed tourists who'll pay big bucks to have their picture taken with a tornado in the background. For some reason you never see the exploits of storm *spotters* on the Discovery Channel.

Don't get me wrong. Some chasers do double duty as storm spotters and I appreciate them, but when a few more seconds of precious warning time could make the difference between someone making it to safety (or not), it galls me to see these chasers reach for their cameras instead of their cell phones first.

It's okay to take pictures of the storm—and I've taken hundreds of stills that would take your breath away—but for citizens' safety sake, report the tornado first! Besides, if you want to see tornadoes, you can ride along with me and it won't cost you a dime.

So the next time you find out that a friend or acquaintance is a storm spotter, give him or her a pat on the back or treat to a brew and say thanks. Even though we'd be out in the storm anyway, we'd appreciate your appreciation.

Reader Logs

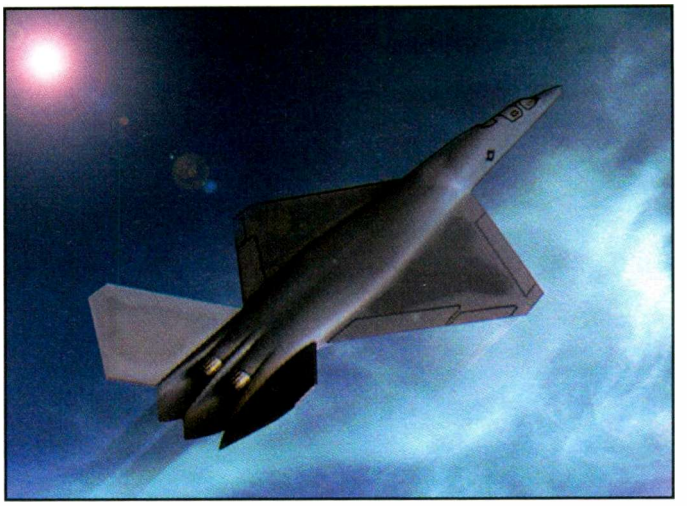
Want to see your utility logs in print? Then send them to me via e-mail in the format below. So they get in the next issue, send them in by the 1st of the month. Help me out by formatting them in numerical (frequency) order. It makes my job that much easier and ensures that your logs get in the magazine. Don't forget, we want your VHF and UHF MILCOM logs, as well!

3167.4: J7M and U4X in Link 11/16 coordination net in JAX OPAREA at 1149. (MC)

4013.4: NNN0LSO, NCS for a Kentucky MARS net. Took check-ins, then traffic passed. USB at 0100Z. (CG)

4165.0: UNID YL/EE repeating "CIO2" phonetically in USB at 1734Z. (CG)

4036.0: AAM5EOH, NCS for a MARS net. Much traffic passed, followed by discussion of operating procedures. LSB from 0040–0100Z. (CG)



Artist's conception of the F/B-23 based on eBay model photographs. (By Steve Douglass)

4461.0: UNID YL/EE with letters given phonetically, no apparent grouping. USB at 2137Z. Also on 7838 at 2113Z. (CG)

4490.0: NCS015 (National Communications System station): 1102 USB/ALE sounding. (RP)

4562.0: ALBNY (Nat'l Guard, Albany NY): 1100 USB/ALE TO BNGNY (Nat'l Guard Binghamton NY). (RP)

4703.0: Danish Air Force, Karup, Denmark with various comms in accented EE. USB at 1815Z. (CG)

5320.0: USCGC SHEARWATER (WPB-87349) wkg Group Atlantic City to report they are heading into Cape May to refuel and plan on RTB Hampton Roads in the morning at 2346. (MC)

5696.0: O2D wkg CAMSLANT to report they have located 18–20 migrants stranded on an island in position 23-29N 079-30W. They are in comms with migrants via dropped radio and they have also dropped food & water. Five migrants are suffering from dehydration. They request CAMSLANT pass info to Sector Key West at 2233. (MC)

5711.0: HHS (Dep't of Health & Human Services, Wash DC): 2317 USB/ALE sounding. (MC)

5732.0: Parkhill encryption then JACKKNIFE wkg 41SK for take-off time at 0229. (MC) (RP)

5746.0: "Lincolnshire Poacher" numbers station in USB monitored at 1800Z. (CG)

5746.0: "Lincolnshire Poacher" numbers station with callup of "42118." YL/EE in USB at 2108Z. (CG)

5792.0 1103 (unidentified): 0454 USB/ALE sounding. (RP)

5800.0: CHM721 (Canadian Army 721 Comm Troop, Glace Bay): 0031 USB/ALE TO CHM723 (Canadian Army 723 Comm Sqdn, Halifax). (RP)

5800.0: CLO (unidentified Canadian Army): 0241 USB/ALE TO CHM (unidentified Canadian Army). (RP)

5800.0: CHM (unidentified Canadian Army): 0150 USB/ALE TO CHM723 CJC (Canadian Army 723 Comm Sqdn, Halifax). (RP)

5800.0: CHM721 (Canadian Army 721 Comm Troop, Glace Bay): 0107 USB/ALE TO CHM721CT (Canadian Army 721 Comm Troop, Charlottetown). (RP)

5875.0: EAATS (Eastern Army Aviation Training Center, Muir AAF, Ft Indiantown Gap PA): 1705 USB/ALE sounding. Also noted on 04036.5. (RP)

6604.0: Gander Radio, Newfoundland, OM/EE with aviation wx in USB heard at 2250Z. (CG)

6694.0: RESCUE 17 p/p to HALIFAX SEARCH. They are told to continue sector search for ELT until 2300 and plan on refueling in St. Johns. They request they have M/V contact them on Satcom heard at 2058. (MC)

6715.0: RTTY followed by HALIFAX MILITARY informing SWORDFISH 17 last transmission was garbled. Another transmission

Severe storms are coming your way? Are you prepared? (Photo by Steve Douglass)

follows which is garbled and SWORDFISH states they will need to use voice comms at 1124. (MC)

6721.0: CG 1500 (HC-130) ALE initiated call to Elizabeth City Ops for ALE check at 1927. (MC)

6739.0: Offutt AFB, Nebraska with long EAM in USB at 2340Z. (CG)

6739.0: NAVY CW 950 (C-130T, VR-54) p/p via Ascension HF-GCS to Norfolk Base Ops with inbound message at 2327. (MC)

6745.0: RESCUE 326 clg TRENTON MILITARY. QSY 5717 kHz at 0309. (MC)

6754.0: Trenton VOLMET with WX at 2311. (MC)

6754.0: Trenton Military, Canada, OM/EE with aviation WX in USB at 0020Z. (CG)

6761.0: UHAUL 99 clg MASH 83. BLUE 82 answers at 0100. (MC)

6761.0: SKULL 26 (B-52H) looking for any available tanker. BOLT 21 on training mission from MacDill answers at 2339. (MC)

6833.5: NNN0KTK, MARS station in QSO. Much discussion of ALE and computers. USB at 2335Z. (CG)

6865.0: AAF (unidentified): 0443 USB/ALE sounding. (RP)

6911.5: 86OPS (86th Med Coy, VT NG, Colchester/Burlington VT): 1625 USB/ALE sounding. (RP)

6939.5: UNID with "6E" over and over in CW at 2330Z. (CG)

6959.0: UNID YL/EE with 5-figure groups given twice, followed by the "Lincolnshire Poacher" song. USB at 1942Z. (CG)

7500.0: TRUENO (unidentified): 0527 USB/ALE sounding. (RP)

7903.5: LR1 (FBI, Little Rock, AR): 0443 USB/ALE TO MM1 (FBI, Miami FL). (RP)

7903.5: WF1 (FBI, Wash DC Field Office): 2344 USB/ALE sounding. (RP)

7903.5: LR1 (FBI, Little Rock, AR): 0444 USB/ALE TO HN1 (FBI, Houston TX). (RP)

7957.0: AA1 (Israeli Air Force): 0421 USB/ALE sounding. (RP)

8135.0 AAA (Israeli Air Force): 0315 USB/ALE sounding. Also sounding on 07839.0. (RP)

8135.0: AAA (Israeli Air Force): 0333 USB/ALE sounding. (RP)

8170.0: AAB (unidentified): 0658 USB/ALE sounding. (RP)

8171.5: R01651 (prob UH-60A): 1604 USB/ALE TO T4Z101 (4/101st Avn, Ft Campbell KY). Also noted on 09081.5. (RP)

8337.6: SHARK 02 taking ops & position report from DOLPHIN 20 at 2145. (MC)

8600.0: 100 (unidentified): 2304 USB/ALE TO 1304 (unidentified). (RP)

8858.0: AA2 (Israeli Air Force): 0319 USB/ALE sounding. Also sounding on 07957.0. (RP)

8858.0: AA1 (Israeli Air Force): 0150 USB/ALE sounding. (RP)

8957.0: Shannon VOLMET, Shannon, Ireland, with WX reports in USB monitored at 1940Z. (CG)

8971.0: WAFER 20 (P-3C) wkg F7F to report they are on second leg of pattern inbound for third at 2051. (MC)

8992.0: O6T p/p via Andrews HF-GCS to 4LX with EXERCISE ESTEEM HIGHLY ALPHA message at 1356. (MC)

9007.0: RAFAIR 7493 wkg TRENTON MILITARY for WX at Bangor and NAS Brunswick at 2342. (MC)

9007.0: CG 1503 (HC-130, CGAS Elizabeth City) on International Ice Patrol with 14 SOB wkg TRENTON MILITARY. Passes ETA to St. John's at 1838. (MC)

9025.0: QUID 99 (KC-135) p/p via Andrews HF-GCS to Charleston AFB CP to request status of their receiver GRITS 91 at 2333. (MC)

9081.5: R00367 (prob UH-60A/L): 1607 USB/ALE TO T7Z101(&/101st Avn, Ft Campbell KY). Also noted on 06911.5. (RP)

9198.0: BRE (Chilean Navy): 0027 LSB/ALE TO TAC (Chilean Navy). (RP)

9251.0: UNID YL/EE with 5-figure groups given twice in USB at 2143Z. (CG).

10051.0: New York Radio OM/EE with aviation WX in USB at 1715Z. (CG)

11175.0: PANTHR (OPBAT Service Center, Nassau Bahamas): 1612 USB/ALE sounding. (RP)\\11175.0: SKIER 91 (C-130H 139 AS/109 AW NY-ANG) p/p via Puerto Rico HF-GCS to Schenectady County AP-Stratton ANGS to pass ETA. They are informed about drifting snow on runway and generally poor conditions at 2152. (MC)

11205.0: SHARK 67 checking in with SMASHER at 1955. (MC)

11226.0: 538878 (KC-135R # 63-8878, 97th AMW, Altus AFB OK): 1636 USB/ALE sounding. Also sounding on 13215.0. (RP)

11232.0: Trenton Military (weak): 1905 USB w/Sentry 52 (E-3B AWACS, Tinker AFB-weak) in pp w/Tinker Metro (weak) w/WX for Tinker AFB. (RP)

11232.0: CANFORCE 4950 wkg TRENTON MILITARY reporting departure from Sigonella en route Brize Norton at 1201. (MC)

12270.0: FPR (unidentified): 1551 USB/ALE TO RLD (unidentified). Also noted on 18314.0. (RP)

13257.0: NAVY LL 23 (P-3C, VP-30) p/p via TRENTON MILITARY. Came over from 11232 kHz at 1549. (MC)

13270.0: New York Radio with aviation WX in USB at 2240Z. (CG)

13375.0: UNID YL/EE with 5-figure groups given twice. USB at 1744Z. (CG)

13457.0: FAASJU (San Juan PR ARTCC): 1348 USB/ALE sounding. RP

13503.6: KWL92 (US Embassy/ Consulate Asia??): 1509 USB/ALE TO KWL95 (US Embassy/Consulate Asia??). (RP)

13503.6: KWL92 (US Embassy/ Consulate Asia??): 1455 USB/ALE TO KWL90 (US Embassy/Consulate, Manila). Also noted on 16238.6. (RP)

13528.0: UNID repeating letter "S" in CW at 2244Z. (CG)

13558.0: UNID repeating "HI" in CW at 2247Z. (CG)

13927.0: REACH 325Y p/p via AFA1RE Maine for WX at Mildenhall at 1302. (CG)

14680.0: KNY25 (Romanian Embassy, Wash DC): 1225 USB/ALE TO CENTR5 (Romanian MFA, Bucharest). (RP)

14493.5: LR1 (FBI, Little Rock, AR): 1559 USB/ALE TO SC1 (FBI, Sacramento CA). (RP)

14458.5: LR1 (FBI, Little Rock, AR): 1555 USB/ALE TO PX1 (FBI, Phoenix AZ). Also noted on 14493.5. (RP)

14761.5: RUH980 (UH-60A helo, 1/228th Avn Bn, Soto Cano AB Honduras): 1913 USB/ALE TO SKYWAT (US Army Flight Following Service (AFFS), Soto Cano AB, Honduras). (RP)

15034.0: Trenton VOLMET with WX at 2049. (MC)

15094.0: FAAZLA (Los Angeles ARTCC): 2318 USB/ALE sounding. Also sounding on 09106.0 & 17487.0. (RP)

15953.5: LR1 (FBI, Little Rock, AR): 1542 USB/ALE TO JK1 (FBI, Jacksonville FL). Also noted on 14532.0. (RP)

16084.0: "Lincolnshire Poacher" numbers station, YL/EE with callup of "24840", then into 5-figure groups given twice. USB at 1507Z. (CG)

16084.0: UNID YL/EE with 5-figure groups given twice. USB at 1341Z. Also on 6959 at 1725Z and 9251 at 1931Z. (CG)

16886.0: TAH, Istanbul Radio, Turkey with CW and SITOR beacon at 1458Z. (CG)

16160.0: CID (Rockwell Collins, Cedar Rapids, IA): 2123 USB/ALE sounding. (RP)

16144.5: RUH006 (UH-60A helo, 1/228th Avn Bn, Soto Cano AB Honduras): 1910 USB/ALE TO RUH962 (UH-60A helo, 1/228th Avn Bn, Soto Cano AB Honduras). (RP)

16283.6: KWL92 (US Embassy/ Consulate Asia??): 1501 USB/ALE TO KWL93 (US Embassy/Consulate Asia??). (RP)

16283.6: KWL94 (US Embassy/ Consulate Asia??): 1505 USB/ALE sounding. (RP)

16283.6: KWL92 (US Embassy/ Consulate Asia??): 1501 USB/ALE TO KWL93 (US Embassy/Consulate Asia??). (RP)

17359.0: Olympia Radio, Greece, YL/EE with voice announcement in USB at 1337Z. (CG)

17458.5: HQ703N (Nat'l Guard Readiness Center, Arlington VA): 1639 USB/ALE TO A090ZN (Nat'l Guard, Arizona). (RP)

17458.5: HQ7 (Nat'l Guard Readiness Center, Arlington VA): 1635 USB/ALE TO M010EN (Nat'l Guard, Maine). (RP)

17487.0: NCS009 (National Communications System station): 1842 USB/ALE TO 444 (unidentified). Also noted on 15094.0. (RP)

17649.0: CER42 (French MFA, Paris): 1525 USB/ALE TO AMMAN (French Embassy, Jordan). (RP)

18003.0: NW1 (Nightwatch 1, E-4B USAF Airborne Cmd Post): 1605 USB/ALE TO HAW (USAF GSC, Ascension Island). (RP)

18003.0: 537987 (KC-135R # 63-7987, 319th ARW, Grand Forks AFB ND): 1823 USB/ALE TO GUA (USAF GSC, Guam). (RP)

18248.6: KWK96 (US Embassy/ Consulate): 1747 USB/ALE TO KWK98 (US Embassy/Consulate). (RP)

18248.6: KWK96 (US Embassy/ Consulate): 1735 USB/ALE TO KWK97 (US Embassy/Consulate). Also noted on 20810.6. (RP)

18396.0: CER 11(French MFA, Paris): 1547 USB/ALE TO RABAT (French Embassy, Morocco). Also noted on 10825.0; 14671.0; 15921.0 & 17477.0. (RP)

19602.0: AAA (Israeli Air Force): 1655 USB/ALE sounding. (RP)

20503.0: KNY25 (Romanian Embassy, Wash DC): 1203 USB/ALE TO CENTR4 (Romanian MFA, Bucharest). Also noted on 14680.0. (RP)

20810.6: KRC81 (US Embassy/ Consulate): 1256 USB/ALE TO KRC83 (US Embassy/Consulate). (RP)

This month's contributors were Chris Gay (CG), Ron Perron (RP), and Mark Cleary (MC). Many thanks to all. ■

by Joe Cooper, carm_popcomm@hotmail.com

Software-defined Radio—Part II
Getting Used To It In Its Early Stages!

Last month I introduced you to a significant trend that is going to have a big impact on radio communication in the immediate future. That new trend is being spearheaded by the development of two new technologies called "Software Defined Radio" (or SD Radio) and "Cognitive Radio" (or Cog Radio). This month I'm going to outline the theory and practice behind the construction of a SD Radio so you can better understand how this technology differs so radically from how radios have been designed and constructed in the past. This will lead into the next column, where I will outline how you can actually *build* your own SD Radio using a home computer running the LINX operating system and some special (but not hard to get) hardware components.

If you have been following this column since its beginnings three years ago you have all the technical background required to understand the theory and practice of SD Radio. This is where all the ideas I've discussed come together and become extremely relevant to the "new school" of radio monitoring that I've been talking about. I'm not talking about a "fad" here, but a complete paradigm shift in technology that's being driven by a $25 billion investment by the United States military through the JTRS (Joint Tactical Radio System) initiative. The goal is to have one platform that will support 33 waveform profiles, including cellular phone standards, over a frequency range of 2 MHz to 55 GHz. There is also a massive international involvement in the development of this technology for JTRS on the part of companies such as Boeing, Singular Wireless, General Dynamics, Intel, Lockheed Martin, Northrop Grumman, and Raytheon, just to name a handful of those involved (and I've not even touched on universities, research groups, government agencies like NASA, and so forth).

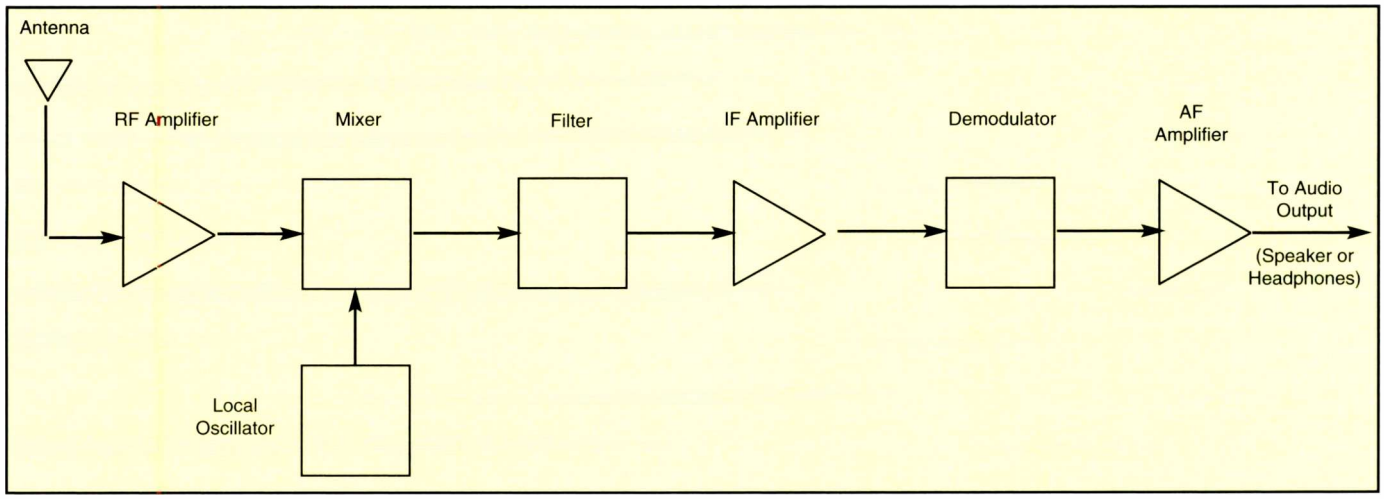
A Shrinking, But Powerful, Technology

The goal of all of this work and research is to eliminate the need to have a truck filled with multiple radios and operators, along with a patch system for cross-mode or agency communications, and to replace it with one small box about the size of a mini-fridge. More importantly, once you have this small box in place, all you have to do is plug your computerized device into it and it connects up automatically. Once that happens you will be talking to the person you need to without interference and in a mode that will give you the proper amount of information (voice, text, graphics or whatever). This device can do all this because, other than the "container" (which is really nothing more than a specialized computer), all its radio components and circuits are "virtual." By that I mean that rather than being the "real" physical components that used to take up large amounts of space and power, they are now represented as mathematical equations in computer software.

By using special analog-to-digital converters to turn the radio signals into "real-time" digital form, these software based radio circuits are able to process these digitized radio signals in exactly the same way as coils, capacitors, and transistors used to. What's even more exciting about this new technology, particularly for increasingly cost-conscious military and government purchasers, is the impact that SD Radio will have upon the economics involved in upgrading to new technology. By agreeing on a standard for the main "box" that will run the software, so that its design will remain fairly constant and unchanging over the next few years, all necessary design changes can focus on the software being used. Significant generational changes in circuit design will be accomplished by simply uploading the new software into the box, which can be used for several generations before the box itself will need a re-design.

The bottom line for radio monitoring is that if we want to continue to be active participants in our own hobby we are going to have to learn some significant new skills. We're going to be building radios using computer programming rather than with soldering irons and some components we bought down at the electronic supply store. If we don't develop these skills within our ranks, we are going to end up being appliance operators who will be at the mercy of the equipment manufacturer to supply us with our products (as if we are not almost at that point already).

What's worse, this new digital technology contains something that the old analog equipment didn't—the ability to contain built-in, tamper-proof controls that will prevent you from listening to, or recording, a wide range of signals. There is already a precedence set: a new FCC regulation that specifically prohibits ordinary citizens from building their own SD Radios



This block diagram illustrates the basic parts of a typical Super Heterodyne radio. It works by mixing an amplified radio frequency (RF) signal that has been tuned from the radio's antenna with another RF signal produced by the local oscillator. Through a process called heterodyning, these two signals are mixed together to produce a third intermediate frequency (IF) signal. This IF signal remains fixed on one constant frequency, which is much easier to filter and amplify than all the multiple frequencies available to you when you tune directly from the antenna. Originally invented by Edwin Howard Armstrong in 1918, the Super Heterodyne has been so successful that it became the foundation for virtually all radios designed and built from the early 1920s through today.

with high-definition television (HDTV) reception capability will come into effect on July 1, 2005. As I pointed out in last month's column, the reason for this is to prevent people from making high-quality copies of HDTV programs. This is important because, in the end, an SD Radio that can monitor HF, VHF, or UHF radio frequencies can also be used to receive and decode HDTV signals. This is not a case of comparing apples and oranges because it's all about a "one box does all" type of technology where the entire spectrum of radio frequencies go in one end and you get to choose whatever medium you want to use coming out the other. Your ability to have unrestricted access to this new technology is now being fought for by activists in the computer and civil rights fields, such as the Electronic Frontiers Foundation (http://www.eff.org) and the Free Software (as in free speech) Foundation (http://www.fsf.org). I will tell you more about these organization, and others, in a separate column.

So now that you have a good idea about the background issues surrounding SD Radio, let's take a look at the theory behind its construction and operation. As you'll see, SD Radio is a radical departure from the types of receiving equipment you're used to using, including those that employ PLL (phase lock loop) tuning or DSP (digital signal processing); this is a whole new way of doing things. Like it or not, it is the way in which we are going to be building and using radio technology for the next few decades, or until something equally new comes along to replace it. So whatever you may think about SD Radio, this what radio will be in the 21st Century. Better get used to it by learning more about it now while it's still in the early planning and deployment stage.

SD Radio Basics

What exactly is the difference between an SD Radio and a conventional radio? Frankly, at this time giving a *specific* answer is difficult because the term SD Radio refers to a variety of technologies that are slowly emerging into a final form.

The goal of the engineers developing an "ultimate" SD Radio is to create a device composed of a single non-changeable hardware platform through which upgradable computer software is run that is used to define the mode(s) of transmission and reception which will be available when the radio is in operation. Part of that goal is to develop an ultimate "black box" SD Radio that would be capable of receiving and transmitting in any mode, on any frequencies in the RF spectrum at any time, and with multiple operators. Such a radio would never require its hardware to be upgraded, because all the hardware functions would be dedicated to simple operations, such as running the processing software or amplifying sent or received signals. More importantly, the actual configuration of that SD Radio circuitry could be constantly changed or modified "on the fly," because it would be made up of "virtual" components defined through computer software that was easily uploaded into the aforementioned hardware. The ultimate aim of this device would be to overcome the problems faced by conventional radio systems where differences in hardware platforms and the modes of communication employed prevent one or more people from being able to communicate with each other.

In practical terms a person can now own a cell phone, cordless phone, wireless Internet gadget, pager, GPS tracker, wireless intercoms, ham radios, Citizens Band radios, FRS radios, and more. Each one of these can use their own special circuitry, band of frequencies, and mode of transmission, all of which requires a great deal of regulation, government inspection and monitoring, plus specialized production. By switching to an SD Radio, however, the hardware would be reduced to a single generic base that is configurable for specific tasks by the use of modules (such as antennas or RF front ends). That hardware would then run computer software, which would allow multiple protocols of communications, and even complete reconfigurations of a radio's features and functions via a simple download, rather than having to purchase an entirely new radio. By taking this approach the entire question of "how do I connect to someone or some service over a radio?" is replaced by "which service or person do I want to connect to over a radio?" With

SD Radio that connection is completely transparent, to the point of being automatic, for the user because all the steps and procedures required to do so are managed by software.

So again, how is this different from today's radio systems? Let's take a look at what makes today's "conventional radios" what they are.

The Problem With Conventional Radios

All radio transmissions going back to the days of Marconi's early experiments are based upon the modification of the amplitude or frequency of a radio frequency (RF) carrier of some type. In order to transmit a radio signal, some type of modulation must take place within the transmitter. More importantly, since all RF transmissions exist in a range of electromagnetic frequencies that are beyond capabilities of the human senses, they must be converted back into a form that a person can either see or hear. This is done through de-modulation circuitry in the radio, which removes the "intelligence" (words, music, text, data, or any other information) from the RF transmission and makes it available through a speaker, TV screen, or computer monitor (to list a few possible devices).

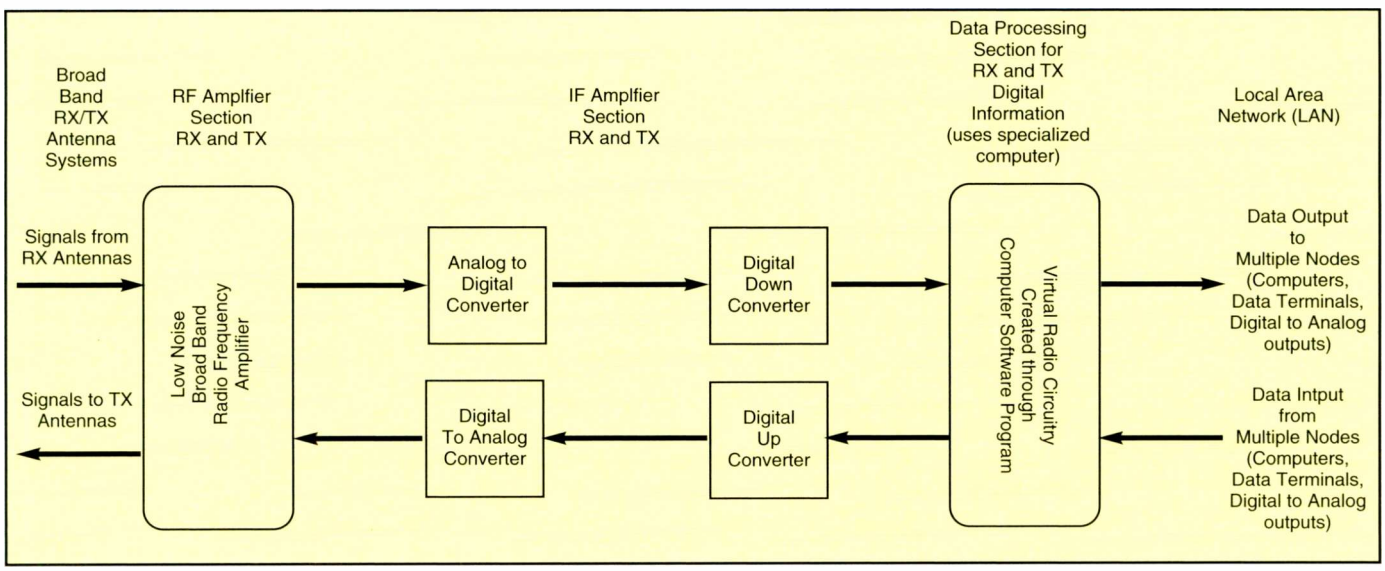
By definition then, all of today's conventional radios have one thing in common: all use fixed hardware circuits to convert an RF signal into either voice or data. So when you go into a store to buy a radio, each one has one or more built-in hardware circuits designed to demodulate specific intelligence according to your particular requirements. Now when you're talking about a conventional radio used for very general purposes, like an AM, FM, or shortwave radio, the issues involved in building and designing a demodulation circuit are not that complicated. Radios of this type have existed for years, with separate demodulator circuits built in and made accessible by simply using a switch or a button. However, when you get into more sophisticated modes of communication, particularly when it comes to commercial communications systems such as those used by emergency and public safety services, cell phone companies, and data communications, you start to run into some real problems. Communications of this type are increasingly taking place using shared frequencies, encryption techniques, digital IDs, and computerized switching, much of which is proprietary to a specific manufacturer.

At one time you'd deal with this problem of multiple modes and protocols by sticking with one manufacturer's brand and specify that if people wanted to talk to each other they would have to use that brand over another. That was all fine and good when people didn't move around that much or only had to deal with the employees of one service or company. The problem today is that we can't afford to keep everyone isolated from each other if we are going to be dealing with the big problems the world is facing. This hit home on 9/11, when it became obvious that because of too many different communications protocols in New York City and the surrounding metropolitan areas, the police, fire, ambulance, and other safety services simply could not talk to one another on that fateful day.

Even in day-to-day situations, it is absolutely critical that all of these groups remain in communication in order to deal with ordinary activities such as crime control. As it stands right now you can have a criminal being pursued from one jurisdiction to another in an automobile, for example, and in many instances there's absolutely no means of handing over the chase to another police force because of communication barriers between two systems.

Likewise, it's also clear that we are now living in a global economy with a global marketplace that's being held together through a wide variety of communications protocols, with cell phones playing a critical role. The fact that a cell phone from one company cannot transfer text data to another because of protocol incompatibilities, or simply will not work in another city or country, is a matter of real difficulty for the businessperson who may travel between three or four different countries *in one day*.

Again, having to use multiple radios to deal with multiple modes is not a solution, because it is not cost efficient, energy



This block diagram shows the main components of a Software Defined (SD) Radio receiver (note that it is also capable of transmitting). Unlike the Super Heterodyne radio, the SD Radio does not receive on one single frequency. Instead it "samples" a broad band of radio frequencies all at once (which can range from several megahertz to many gigahertz) and then converts them into digital form for further processing. Software in the digital processor (or computer) "defines" how the radio is used by creating virtual radio circuits through which the digitized signals pass.

efficient, or user friendly. This is where SD Radio comes in.

Enter The SD Radio

Most of us who have worked with conventional radios are familiar with the basic layout of the circuitry. The majority of radios built today are a variation on the original design invented by Edwin Armstrong in 1918, called the Super Heterodyne receiver. The principle behind this type of receiver, sometimes called the Superhet, is that all frequencies being received are converted to single frequency, called an intermediate frequency (IF), which is then amplified using special IF amplifiers before being detected. The design has been extremely successful because of its overall simplicity and efficiency. Rather than having to amplify all the RF signals being received, which is a very difficult process in conventional analog circuits, only one narrow range of frequencies has to be boosted in strength. This method of amplification lends itself to easy approaches to filtering a signal and de-modulation.

However, while this all works very well when you are dealing with analog signals, it is very inefficient when applied to more sophisticated protocols, particularly those that employ high-speed digital signals. While you can replace some of the analog circuits with digital ones, such as when you use DSP to filter or amplify signals using simple virtual circuitry, it is not the same as true SD Radio.

What makes an SD Radio different from any other radio you may have used before, including those with DSP circuitry? The answer is in the amount of bandwidth that can be processed at any one time and the way in which it is processed. For instance, rather than taking one frequency off an antenna and converting it to a single frequency (as is done in a Superhet radio) and then amplifying and detecting it, the SD Radio amplifies *all* the frequencies from an antenna over a very wide bandwidth and then converts *all signals found in those frequencies—whether they're manmade or natural*—from analog into digital form. So to use the proper term, an SD Radio *samples* a broad bandwidth of the RF spectrum as it is received at the antenna, then amplifies it and digitizes it. Then, rather than detecting the intelligence in one signal, SD Radio uses its built-in software program to *process the information* contained in the digitized RF spectrum to gather the information found there, rather than using conventional detection circuits to do so. The intelligence found on the RF signal can then be passed on to any number of digital devices where it can be either displayed or converted into analog modes, such as audio sound.

Two factors are of special importance here: the broad bandwidth of the RF signal being sampled and the speed at which the processing of the intelligence is taking place. The bottom line is that rather than having to tune through each RF frequency one at time, as you have to with a conventional Superhet radio, the SD Radio can tune and process multiple frequencies at one time and gather the intelligence of each frequency even within multiple modes of communication. Quite simply, SD Radios have rendered all analog Superhet radios obsolete, just as the Superhet radio rendered all tuned radio frequency (TRF) radios obsolete when that technology was invented 87 years ago.

Even if all an SD Radio could do was receive, it'd still be pretty impressive. But it can also transmit by performing the same processes in reverse. Starting with whatever intelligence you want to transmit (again, it can be voice, text, or data), the SD Radio processes the information using an appropriate software algorithm, modulates it through digital processing, converts the digital signal to an analog RF signal, and then amplifies it using a broadband amplifier. Even more important is that thanks to the computer software creating virtual circuitry, the size and power consumption of this unit for both transmit and receive is several orders smaller than anything you've ever seen. And this is only the beginning!

Don't forget, we're still just in the *early* development stages of this exciting new technology.

And That's Not All—It's Adaptive!

So what you have with an SD Radio is the capability of simultaneous reception and transmission taking place over multiple frequencies using multiple modes by multiple people. More importantly, by using a computerized system, the radio is more than simply a way of sending and receiving information, because being computerized, the radio is capable of being adaptive. I'll be getting into how this adaptability works at the software and hardware level in an upcoming column in this series. For now, however, the key point is that through this adaptability function an SD Radio unit can perform a wide range of activities which are completely impossible for a conventional analog radio (such as transforming itself into another radio on the fly).

Here's a scenario to demonstrate how SD Radios differ radically from conventional radio systems:

Let's say that it's about five years from now (maybe even sooner) and we're at the headquarters of a national safety organization that manages events during natural disasters. Rather than having multiple handheld radio units sitting in battery chargers waiting to be used, there are what appear to be radio components sitting on shelves in a storage area.

A disaster occurs, such as a flood, and the person in charge of setting up radio communications begins to put together the radios that are needed for the specific task. Starting with the body, the radio specialist clips on a RF front end, antenna, and specialized modules that are appropriate to the activities that are to performed by various personnel. After turning on all the radios so their internal computers boot up, a wireless computer network immediately transfers individual software to each unit. This software contains all the frequencies the emergency personnel are going need for this occasion, as well as the modes under which the radios will be operating. Detailed maps, lists of personnel, individual duty rosters, and other pertinent information is downloaded at the same time.

When everyone on the emergency team their radio, it immediately provides them will all the information required to do their jobs effectively. A Global Positioning Module incorporated in the radios will allow each member of the team to see where every other member is on a map of the area. The radio itself is small enough to fit on a belt, with the video-capable data display located on a the wrist, much like the old Dick Tracy radio of comic strip fame.

Again, everything I am talking about is already on the shelf or at least on the drawing board getting ready to be put into production. This is neither science fiction nor speculation, but hard fact that will transform the way radio is going to be used. At this point we are seeing the slow but steady transformation of the radio communication infrastructure, beginning first with the military and then slowly moving down through the various public safety agencies, starting with the state

police and various municipal based agencies. Finally we will begin to see SD Radios move into the public sphere as public communication systems, such as cell phones companies, begin to switch over. At that point, your cell phone will be replaced by something that will not only provide you with voice communication, but also open the front door of your house, start your car, open the garage door, get you into your office, and pay for the soft drink you get out of a vending machine. The biggest issue here is the cost, both in terms of research and development, and then deployment. The fact is that there are billions of dollars of existing radio communication equipment out there that's working just fine, but it could be improved upon. As with all new inventions, what appears fantastic today will be commonplace tomorrow. How many electronic gadgets do you have that you now take for granted (but couldn't live without) that were once the great new thing?

Yes, it's a little bit disconcerting how many tasks an SD Radio will be capable of beyond voice communications. What you'll be holding in your hand will be more like an electronic Swiss Army knife than a walkie-talkie, only with more tricks, attachments, and accessory paraphernalia than you could ever imagine.

Next Month: You Can't Get Any More 21st Century Than This!

Okay, you're probably asking "So just how do you make one of these SD Radios you've been talking about, Joe?" Luckily, that's what I'm going to be looking at in detail next month, giving you the schematics, so to speak. That will lead up to the following month where I will show you how to actually make such a device.

"Is it really that hard to actually assemble an SD Radio," you might ask next. Well it's definitely not for the beginner, but frankly you might be surprised at how much of this technology has been worked out already by other people, making it fairly accessible for someone who's willing to take their time and learn the basics I'll be outlining for you. I'll give you information on how to build the base unit as well as how to connect it to the antenna and the computer. After that I'll give you a list of free downloadable software you will need to run your radio, both in the base unit and the computer. This is exciting stuff and everything I'll be writing about is now on the very leading edge of computer-assisted radio monitoring. You can't get any more 21st Century than this, my friends!

For those of you who may be a bit intimidated by computers and technology, in the fifth column of this series I'll be looking at true SD Radios designed specifically for radio monitoring that you can buy off the shelf right now. You'll be surprised at how far we've come already to "plug and play" modules. After that I'll also take a good look at the legal and political issues surrounding SD Radio, which have some very important implications for the future of the radio-monitoring hobby in the digital age. So be prepared for a very interesting journey.

As always, I'm interested in any pictures you may have of your own computer-assisted monitoring station or stories about how you have built and run it. You can contact me via e-mail with any submissions or questions at carm_popcomm@hotmail.com. While I can't answer general questions on computers, I'll 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. Also, on my personal webpage (www3.sympatico.ca/joe_in_ey) you'll find a list of the columns I've done over the past two years, along with a summary of the content, and instructions on how to purchase back issues of *Popular Communications*. Remember that I cannot release previously published material as *Pop'Comm* owns the copyright.

Please also remember our troops overseas and give them your support. While the "Any Service Person" mail program has been suspended for security reasons, you should visit the U.S. Department of Defense's official webpage, "Defend America." They have a section, found at http://www.defendamerica.mil/support_troops.html, which provides an amazingly wide range of practical and useful ways that you can directly help. Please take some time to check out the resources suggested on that webpage and put them to use.

See you again next month! ■

by R.B. Sturtevant, KD7KTS

Radio Fun And Going Back In Time

Q. Who was the last working civilian telegrapher in the world?

A. The question is actually misstated. It should be who *is* the last working telegrapher in the world? His name is Gao Zizhong and he lives and works in the village of Badain Jaran in the northern part of China's Inner Mongolia. At 42 Gao has put in 23 years and is the only telegrapher in town. His Telegraph Office is the only means of communications into or out of the 47,000-square-mile Gobi Desert, the world's fourth largest desert.

The office was set up by the Chinese government 30 years ago, and Gao is only the second operator to work there. It's made up of two rooms, one for the kilowatt generator and one to send and receive the 800 messages each year. The service to send and receive messages is free to the 38 herder families scattered over 3,000 square miles. The government supplies 1,500 Yuan ($180) to run the office and a salary of 800 Yuan a month. A telephone does not seem to be in the area's future. Gao gets a 10-day holiday once a year. He uses it to hurry to the nearest town (five days each way by camel) for a haircut.

Q. What was the highest priority target for the Resistance and Airborne troops on D-Day?

A. When the Allies were planning to make the D-Day invasion they told the French Resistance and the Airborne troops jumping in to France that their highest priority was to take down all the telephone lines they possibly could. One of the most frequently ask questions was "Shouldn't we go after bridges, railways, attack ammunition dumps, and make roadways impassable before we bother with telephone lines?" The answer was always "NO!" The reason was classified until long after the war. The Allies radio intercept services were so good that the Allied High Command wanted to force the Nazi's to transmit orders and reports by radio. Cutting the telephone lines would make that necessary. When the phones were down the Nazi's never made a move the Allies didn't hear about.

Q. I've heard some interesting news coming out of Great Britain about Low Frequency operation. Do American radio amateurs have anything going on with the Lowfers?

A. I contacted the good folks at the FCC and found out that we do. The FCC replied that Part 15 (specifically 15.207) allows "for a max one-watt input to the final stage in the range of 160–190 kHz without a license." The Brits are working between 30 and 200 kHz VLF (Very Low Frequencies) for through-the-rock transmission of radiowaves for transmissions from caves and mines. VLF is used for exploration parties as well as for emergency search and rescue work. Interestingly they also use VHF for line-of-sight transmissions inside caves when group members are setting up lights for underground photographs. Check out a neat website on this subject at www.bcra.org.uk/creg.

Q. Are listener reports by mail or e-mail the only way international broadcasters have to tell how their signals are reaching the world?

A. Like everything else in the world, nothing is as simple as it seems. The Voice of America (VOA), for example, spends tens of millions of dollars to get the American message out. You've got to know that they are depending on more than cards and letters. This question is really about Technical Monitoring and is better phrased, "How well is my signal being received at different points in the target area?" As a professional courtesy, other international broadcasters exchange reports from their own locations. Listener reports are good, but one of the shortcomings in the SINPO (a simple numerical report of the strength of the Signal, amount of Interference, Propagation conditions, and Overall reception rating) reporting system is standardization. You may live a block from me and report a 5 by 5 signal, but I report 34433. That's because I'm harder to please than you are (I hear that a lot, by the way).

The International Broadcast Bureau (part of the VOA & Co.) has about 60 radios hooked to computers stashed around the world. The computer tunes the radio back and forth across the dial, picking up the signals of interest and sending a report to Washington and other points around the world. If you want to hear the signals, check out http://monitor.ibb.gov/rms/. There's also a group of DXing SWLers who tune in 24/7/365 and make signal reports regularly. Now there's a government job for you! They still need listener reports, however. How else would they know when they're sending out a lame program? Technical Monitoring only tells them if the signal is getting through or not. ■

Looking Back...

Five Years Ago In *Pop'Comm*

RadioShack's PRO-94 scanner was brand new and reviewed by Ken Reiss. It had 1,000 channels divided into 20 banks, *and* used standard "AA" alkaline batteries! Like we always say, some things never change; such was the case when another radio bad boy in the so-called "freeband" was fined $17,000. And Bruce Conti asked the big question, "Whatever Happened To Top-40 Radio?"

Ten Years Ago In *Pop'Comm*

New from OptoElectronics was the OptoElectronics Scout 40 that sold for $439 and automatically tuned your AOR 8000 or ICOM scanner. Jock Elliott's "CB Scene" was all about using sideband to effectively double your range on CB—good stuff, and 10 years later, CB still comes through when the chips are down!

Twenty Years Ago In *Pop'Comm*

Still in turmoil, Ethiopia was asking for help back in 1985, and some of those clandestine stations are still chattering to the world! The lead feature by Tom Kneitel, entitled "War Of The Words," highlighted Ethiopia's problems and some radio voices that still echo today! Who would have imagined that 16 years after our article in 1985, "Aircraft Emergency: Hear It!" our Nation would be immersed in turmoil from the skies. Some of the frequencies have changed, but the threat still exists!

by Peter J. Bertini, radioconnection@juno.com

Workbench Basics: Basic Soldering Skills What's Hot, And What's Not

On the surface it appears easy: melt a small amount of lead-tin metal alloy (solder) so it flows over an electrical connection, thus ensuring a good mechanical and electrical bond when it cools and hardens. For simplicity, and to keep this month's column down to earth, I'll limit this discussion to what you'll need to know and have on hand to handle the soldering chores encountered in day-to-day working with tube-based radio gear. One important note: many of the soldering tools I'll be showing you shouldn't be used on sensitive solid-state equipment. There are good reasons for this. Some of these irons aren't grounded and may have enough AC leakage voltages to damage sensitive semiconductors; for that same reason, they may not provide protection from static electrical charges. The Weller Solder Stations are the exceptions.

Solder

The solder used in electronic or electrical equipment is a lead and tin alloy; the exact percentages determine the melting point and other characteristics of the solder. Electrical solder is generally sold in *wire* form and is available wound on one-pound spools for convenient handling.

Solder comes with and without fluxes. The flux is very important first step in making a good solder connection as it cleans the metal surfaces of dirt and oxidation so the solder can flow and adhere to the metal. ***Never use an acid flux solder for radio or electrical work!*** The acid flux residue is forever corrosive, gradually eating away and corroding the wire and terminals in the soldered connections for years to come.

The flux is carried in the solder in a hollow tube, or core, that runs through the center of the solder. The most popular flux for electrical work is rosin core solder. The rosin is derived from pine rosin (albeit acid.) Rosin solders are now made with non-activated and activated rosin fluxes, which differently affect how aggressively the flux will clean away oxides (see **Table 1**). Zinc chloride is one activator, but there are also newer, even more aggressive fluxes, which are water-soluble organic compounds for soldering printed circuit boards. To avoid damage to pc boards, any remaining activated flux must be removed after the soldering is complete. While a water bath will remove the organic flux residues on a printed circuit card, it is best to avoid fully activated fluxes for restoration work, as there is no practical way to wash away flux residues on a tube radio chassis.

Table 1. Solder Flux Aggressiveness Designations

R	Rosin, non-activated
RMA	Rosin, mildly activated
RA	Rosin, fully activated

Tip: Clean wires or connections can be soldered with any of these, but cheaper parts or terminals with zinc-plate surfaces may require a more activated flux. Fully activated flux residues are corrosive, so unless you can fully clean and remove the residues after soldering, solders containing them are best avoided.

Alloys

The most popular solder used by old-timers was 60/40 rosin core solder. The 60/40 is the alloy ratio, which means that the solder contains a ratio of 60 percent tin and 40 percent lead. 60/40 solder has an intermediate plastic state as it cools from a liquid into a solid state. Another popular alloy is Eutectic solder, which uses a 63/47 ratio of tin to lead. This alloy goes instantly from a liquid to a solid without the intermediate plastic state, meaning it sets up quicker, lessening the chance of disturbing the solder and causing a bad solder joint before it solidifies. (See **Table 2**.)

Table 2. Fluid And Solid-state Temperatures (Centigrade) For The More Popular Solder Alloys

Solder	Alloy	Solidus	Liquidus	
60/40	Sn/Pb	180	188	Electronic Solder
63/37	Sn/Pb	183	183	Eutectic Electronic Solder

Tip: Whether you prefer the 60/40 or Eutectic solders is a personal preference—either will do fine. I suggest trying both and seeing which you prefer. Kester and Ersin Multicore solders are popular and respected brands. Solder frequently turns up on the surplus markets, and I recently bought ten 1-pound rolls of Kester "44" activated rosin-core .066-inch solder on eBay for one-third the retail price! If you have a chance to buy solder from a surplus dealer, be sure you know exactly what is being sold. Remember that non-activated rosin-core solder will not clean overly oxidized component leads—you'll need to run these leads through a Scotchbrite pad or through an Emery cloth before solder will *wet* (adhere) to them.

Photo A. Here are two one-pound rolls of Kester rosin core solder. One is a .031-inch diameter, too small for point-to-point wiring work, but ideal for printed circuit boards. The larger diameter solder is .062 inch and is the best size for working on vintage equipment.

There are also special alloys with a small percentage of silver. These are good quality solders. Many early Tektronix oscilloscopes used ceramic wiring terminals, which required silver bearing electrical solder. Some Tektronic equipment even had a few inches of the proper solder included inside the equipment to facilitate proper repairs!

Solder Diameters

I have spools of solder with diameters ranging from .015 inch to .062 inch. If you're soldering older equipment with point-to-point wiring (electronic gear with tube sockets, leaded resistors and capacitors, etc.), I'd suggest using a .062-inch diameter rosin core solder. I've heard of .05-inch diameter solder, which also is a good choice for point to point wiring work, but it doesn't seem to be readily available. The .031-inch and smaller sizes are too small for tube equipment. (See **Photo A**.)

Soldering Guns

When I began building kits in my teens, my first and only soldering tool was a 100-watt Weller soldering gun. It helped a young ham build a lot of Heathkits. It did a good job, too, despite being dropped on hard floors numerous times. By the time it was retired many years later, its Bakelite case was mostly held together with generous wrappings of Duck tape.

Weller solder guns are still available and they do a fine job. There are a few minor drawbacks with solder guns, however:

- The guns' soldering tips have a relatively short life. The solder tips are made from copper, and the solder eventually eats away at them. Better grade replacement tips are plated and will last longer.
- The gun has a warm-up time; it takes several seconds after the trigger is depressed for the tip to reach soldering temperature.
- The gun has a rated duty cycle that can't be exceeded or the gun will overheat.

Photo B. This dual-wattage Weller gun is rated at 200 and 300 watts. The wattage is determined by two positions on the trigger. Two styles of replacement tips are shown: bare copper and plated.

- Solder guns are relatively heavy, and your arm will get a good workout using one all day.

But there is one advantage to the gun: it's running and using electricity only when you're actually depressing the trigger and using it. That means there's no hot iron idling on the bench, and no worries about forgetting to unplug a hot soldering iron at the end of the day.

If you do use a soldering gun, buy the proper replacement tips for the gun. A lot of folks take heavy gauge copper wire and fashion their own crude replacement tips, but I don't advise doing so. First, the homemade tip doesn't have the same thermal mass as the manufacturer's replacement tip, and using a crude substitute could damage the gun. Nor do they last as long or produce the same thermal output.

Soldering guns work by passing a low voltage at extremely high currents through the copper soldering gun tip. A few volts, at a few hundred amps, passed through the low resistance of the gun's tip results in quite a bit of heat energy! It's important to keep the soldering gun connections clean and tight, as even a fractional ohm resistance from an oxidized mounting nut results in large losses and lower heat output. Frequently loosen and retighten the solder gun tip connections to keep the gun running at full potential!

I have two Weller guns. The smaller model (**Photo B**) is a dual-wattage unit rated at 200 and 300 watts; the bigger gun, a model D550, is rated at a whopping 240/325 watts! It's great for soldering ground leads direct to a metal chassis and does a bang up job of soldering the braid on PL-259 coaxial connectors.

A lot of old timers are still using their first soldering gun decades later.

Soldering Irons

I've used a variety of soldering irons over the past 45 years, and I've learned you get exactly what you pay for. My favorite soldering irons for general heavy duty soldering were formerly made by Ungar. Ungar and Weller are now divisions of Cooper Tools, and many of the older product lines have been discontinued or updated. See **Photo C** for a few examples. These irons featured quality handles that are both comfortable and cool run-

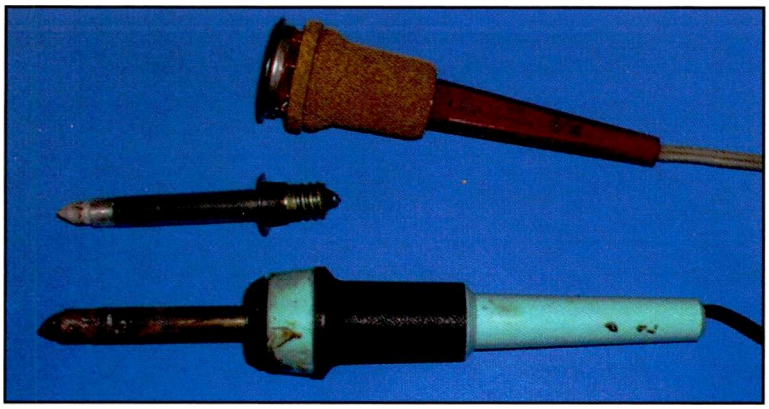


Photo C. These Ungar irons are rather dated and have probably been replaced by newer styles. Note that the solder cartridges are easily replaced; one handle can use several different wattage cartridges. Other cartridge styles feature interchangeable screw-on tips. These particular soldering tips are not removable.

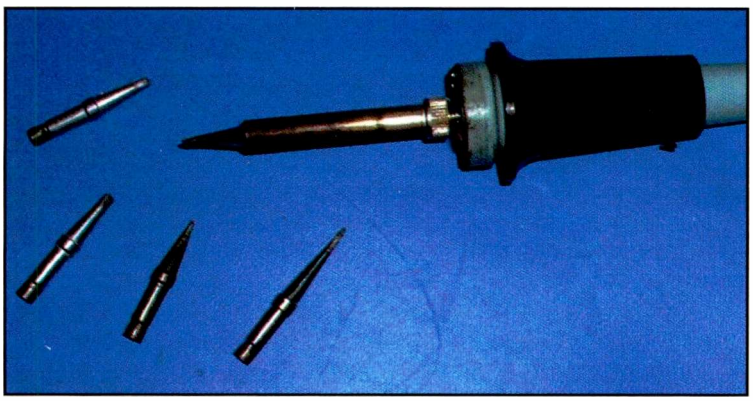


Photo D. The Weller Stations use 24-volt heaters, and the soldering iron tips contain a magnetic alloy that becomes demagnetized at specific temperatures; when the designated operating temperature is reached, an internal magnetic switch removes power from the 24-volt heating element. Also available are 600-, 700-, and 800-degree F tips.

ning. They use a combined heating element and soldering tip assembly that features screw-in replacements that are available in various wattages and tip styles. Some cartridges have replacement tips, other styles don't.

The tip size and wattage should be matched to the work being done. Higher temperature and wattages, and wider tips, are intended for soldering to heavy masses, such as a metal chassis. For soldering wires on terminal strips or tube sockets, a 700-degree F 30-watt iron should do fine. Expect to pay between $40 and $50 retail for a good one. Cheap imported irons don't last; in general, they typically run overly hot and self-destruct. Here's a suggestion: use your bench Variac (variable AC transformer) to reduce the AC voltage as a means to control the soldering iron temperature.

Soldering Stations

These are the workhorses of choice for contemporary workbenches. The more expensive models feature full electronic tip temperature monitoring and regulation—and they are pricey. Current models will set you back a few hundred dollars. But they're rated at 60 watts and allow precise settable tip temperatures between 350 and 850 degrees F. Simpler, more basic models use special interchangeable tips that are designed to self-regulate at specific temperatures. I keep a variety of tip styles with 600-, 700-, and 800-degree F ratings for my two Weller WTCPT 60-watt soldering stations (see **Photo D**). Besides the two WTCPT solder stations, I also have an older EC2001 60-watt electronic station on my bench, which is the soldering tool I use most frequently (**Photo E**).

Many technicians feel soldering stations don't have the heat energy to handle tube radio repairs. I admit that they might bog down when attempting to directly solder on a metal chassis, but they do an admirable job for over 90 percent of my soldering needs. The bigger irons and solder guns are always on hand for the bigger jobs.

Ham radio flea markets and eBay are good resources for finding reasonably priced pre-owned soldering equipment. You can save a lot of money if you shop carefully for good used soldering implements. I found my soldering stations at local hamfests.

Soldering Tool Maintenance

Right up front, please know that nothing I advise should circumvent the manufacturer's directions for your soldering tools. Run your irons only when you need them. All irons deteriorate with heat and age, no matter how well made they are or how much you paid for them. Unless directed otherwise by the manufacturer, here is what I suggest for getting the most life out of your soldering iron tips. First, buy and use only *plated* tips. These must be carefully *tinned* when first used or the delicate protective plating can be destroyed! To "tin" a metal means to allow molten solder to flow over it and adhere to its surface. You'll often hear old-timers advising you to tin old resistor or capacitor leads before using them. What they are saying is that you should flow solder on the leads so the fluxes can clean away oxides and flow a fresh solder coating on the leads so they can be easily soldered.

First, allow enough time for the new tip to come up to full temperature, then add enough fresh solder to the tip so it's fully covered in molten solder. ***Do not disturb the tip for at least two or three minutes, and do not wipe of the excess solder until the recommended time has elapsed!*** Add fresh solder as needed. After, and only after, the tip has been properly tinned, wipe it clean on a damp sponge. Doing so too early will destroy the plating—and the tip. If the tip is attached to a new $40 replacement Ungar cartridge, you're not going to be too happy if you ruin it. Again, I suggest waiting at least two or three minutes to give the solder time to properly react with the iron's plated tip before wiping it on the damp sponge.

When your iron is idling, keep the tip freshly tinned with frequent applications of fresh solder. Before turning the iron off for the day, re-tin it, wipe it, and add and leave fresh solder on the tip. Never allow the iron to run dry, or you risk oxidizing the tip and damaging the plating. Once the plating is gone, it will be impossible to tin the tip or to use it for soldering. It is ruined.

The more inexpensive soldering tools use bare copper tips that can be filed and cleaned as needed, and they also must be kept properly tinned. They will have shorter usable lives, as the corrosive action of the solder and fluxes will gradually eat away the copper. Some old timers keep a sal ammoniac (ammonium chloride) block on the bench to help clean up dirty soldering iron tips. These were probably once available at the local hardware store, and may still be at older ones. I do know that they're

Photo E. I keep three Weller stations on the workbench. All of these were purchased inexpensively at local ham flea markets. The variable electronic regulated station controller is on the left of the second shelf; one of the fixed temperature versions is on the first shelf. The irons are shown in their Weller holders, which you'll note include damp sponge holders for wiping and cleaning the tips.

still being packaged and sold for this purpose in one-quarter to two-pound blocks.

Soldering Safety

An unattended or forgotten powered solder iron is a fire risk. It's a good idea to have a master power switch on your bench to ensure that all equipment is turned off at the end of the day. Always keep your iron idling in a good quality soldering iron stand when it is in use. My worst experience was several years ago when I fell asleep at my bench late one night. My arm brushed against a 1000-degree F soldering iron that wasn't in a stand, resulting in a painful and severe burn. I was lucky I didn't burn the house down in the process of branding myself. Many solder iron stands come equipped with a companion damp sponge holder for cleaning the tip.

Risks From Lead In Solder

Solder contains lead, and lead, if ingested, is poisonous! Children are at the greatest risk from exposure to lead, and the effects are cumulative. There's a developing awareness of the hazards of lead in our landfills leaching into our aquifers from the solder in old discarded consumer electronic goods. Our disposable society is catching up to us. Just as lead has been banned in plumbing for potable water supplies, it's expected that non-lead solders will eventually replace lead-based solders in electronics, as is already happening in Europe.

On the other hand, you'll probably be fine by following these common sense practices when handling solder: Never eat or drink while soldering, and always thoroughly wash your hands after handling solder. Never hold pieces of solder in your mouth (many folks do this!). Keep solder away from children and pets, and clean up and safely dispose of solder splashes on the bench and chassis.

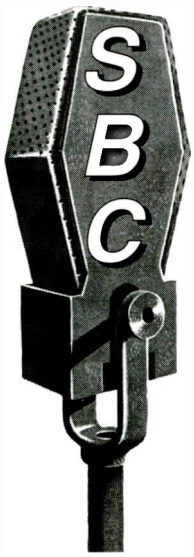
Many people have expressed concerns about the releasing of lead fumes when soldering. But, the real hazards are the gases released from the organic fluxes! Never inhale solder fumes, and work in a well-ventilated area when soldering. Where I work, which is an office building, I use a bench-mounted fume extractor. This is simply a fancy-looking fan and carbon filter on an articulated arm that can be positioned over the area where the soldering is being performed.

Next Month

I'm running out of room this month, so in next month's column I'll show you how to desolder and remove old leads, as well as how to prepare the new connections for resoldering. Until then, 73 and keep those irons warm—but be safe as well! ■

by Shannon Huniwell, melodyfm@dreamscape.com

Careful, Kid, Or You'll Lose Your License... Maybe Even Get Abandoned!

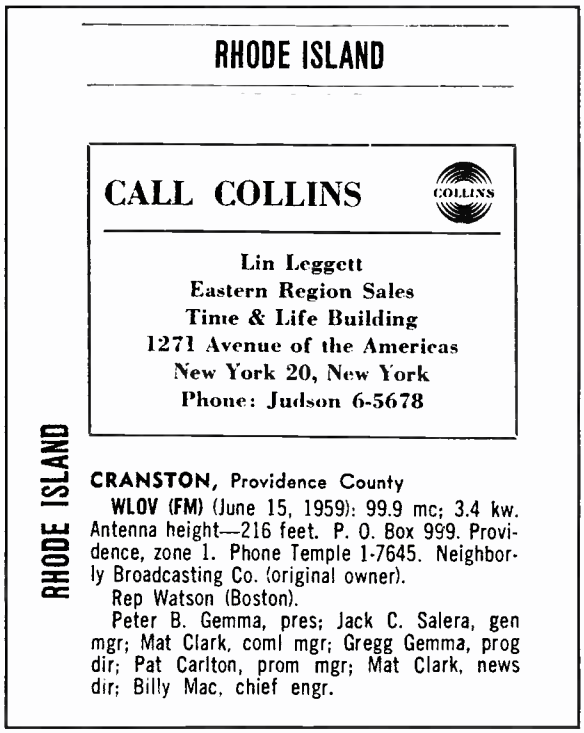


All Peter Knight did was miss just one of the Pawtucket, Rhode Island AM's quarter-hour meter readings. Even though, by 1973, the FCC no longer required stations to chronicle transmitter performance that frequently, a stickler WGNG engineer, who seemed to materialize like a spy through the dimly lit studio hallway, shook the official operating log at the novice DJ and shouted, "Where did you learn radio regulations, over in Cranston at WLOV-FM?"

Knight had no idea what the agitated tech meant, but was shaken enough to sheepishly apologize and make several extra xmtr readings before his all-night weekend air-shift ended. A week later, while nervously filling in for the station's ailing mid-day jock, Knight heard another reference to the mysterious FM. "Hey, you're careless enough to work at WLOV!" one of the practical-joking ad salesmen quipped when Knight accidentally spilled coffee on a stack of papers covering the receptionist's desk. And it wasn't long before Knight noted the WGNG production director referring to that weird Cranston broadcast outlet. The guy promised the bookkeeper to look again for some notarized affidavit form he'd misplaced. It was requisite for properly billing a big advertising client. "Don't worry," he chuckled, "if the darn thing is actually lost, we can always send them a sworn statement from WLOV!" Reacting poorly to that remark, the accountant shouted, "I'll WLOV you right in the nose!" and slammed her door. Knight resolved to open the next *Broadcasting Yearbook* he found in order to investigate where this WLOV was on the dial and why it seemed to be such an object of derision in Rhode Island radio.

"Trust Me, Kid, It Was A Megacycle Mess!"

But neither the 1972 *Yearbook* nor a 1965 edition squirreled away on the chief engineer's bookcase contained any evidence that a Cranston, Rhode Island, FM had existed. Knight asked a few broadcast veterans about WLOV, but got little response other than, "You don't want to know," or "Don't ask, kid. It was bad news." With his curiosity having been unceremoniously put on hold by those who didn't care to discuss the enigmatic FM, Knight pretty much forgot about it until he was hired by WGNG's main rival, WPRO Providence. Soon after his arrival, Knight's new employer (Capital Cities Communications, which later bought ABC) relocated the WPRO AM and FM studios to the big-signaled station's AM transmitter site near Barrington, Rhode Island. While in transition mode, the WPRO engineering head mounted the FM remote control unit in a newsroom equipment rack, but temporarily made a daily trip to the FM transmitter site in Johnston to directly read the meters himself.



RHODE ISLAND

CALL COLLINS

COLLINS

Lin Leggett
Eastern Region Sales
Time & Life Building
1271 Avenue of the Americas
New York 20, New York
Phone: Judson 6-5678

RHODE ISLAND

CRANSTON, Providence County

WLOV (FM) (June 15, 1959): 99.9 mc; 3.4 kw. Antenna height—216 feet. P. O. Box 999. Providence, zone 1. Phone Temple 1-7645. Neighborly Broadcasting Co. (original owner).

Rep Watson (Boston).

Peter B. Gemma, pres; Jack C. Salera, gen mgr; Mat Clark, coml mgr; Gregg Gemma, prog dir; Pat Carlton, prom mgr; Mat Clark, news dir; Billy Mac, chief engr.

Here's the upper left-hand corner of the 1963 Broadcasting Yearbook's *Rhode Island section with WLOV-FM occupying the first station listing for that little state. The "216 feet" indicates height above average terrain of its antenna. Such a modest elevation for what was originally licensed as a full "Class B-metropolitan" facility probably indicated a rooftop-mount on some downtown highrise building. The Collins ad was one of many that the upscale equipment maker sprinkled throughout the* Yearbook. *Most broadcasters were on a strict budget, though, and called their Gates Radio Company sales representative for gear that was typically less expensive than Collins. If Collins was the broadcast industry's Cadillac, Gates could be compared to Chevy.*

"Sorry to bother you for what is probably a very dumb question," Knight said to the engineer about two weeks following the move, "but I can't get the remote unit to read the FM meters. I notice that all of the other guys are filling in the FM readings, but for the life of me I cannot figure out which buttons to push to track the readings."

"Ah ha! You win the honesty prize!" the chief engineer beamed. "Finally, someone who cares enough about radio rules to ask about the remote unit function! Son, I haven't even installed the remote wiring yet, but I see that the other DJs are simply filling in the same readings—with no change whatsoever—that were on the last entry before we moved from downtown Providence. All those guys should be banished to WLOV!"

"WLOV? Wasn't that an FM in Cranston?" Knight took the opportunity to query. The tech barely nodded as if he didn't want

anyone to know he had mentioned such a place. "Is that a mythical station," Knight quickly asked. "You know, something people say to invoke fear, kind of like Big Foot?

"No, WLOV is real alright, or at least it was for a while," whispered the engineer with his forefinger touching pursed lips. From his desk drawer, the CE produced a 1963 *Broadcasting Yearbook*. Quickly dropping it on the desk, as if the heavy paper-bound book was haunted, he cautiously invited Knight to take a look. Still a bit skeptical, the curious young announcer rested the *Yearbook's* ample spine in his palm and slowly flipped the alphabetical pages until fingering the start of Rhode Island's radio section. There, for the first time, he saw palpable evidence that the enigmatic station wasn't just something conjured up from apocryphal ether. The word "Cranston" jumped out at him. And there it was in black and white: "WLOV (FM) 99.9 m.c., Neighborly Broadcasting Company."

"Satisfied?" the engineer asked.

"Yeah, but what happened to her, WLOV, I mean?"

From the back of the *Yearbook*, he pulled a once wadded-up and then flattened-out page ripped from the February 4, 1963, edition of *Broadcasting* magazine. He pointed to where a brief article stated "the death penalty was dealt to WLOV (FM) Cranston, R.I., by the FCC last week." Beyond that, the account was sufficiently vague to prompt Knight to wonder if the WPRO engineer knew more intimate details.

"Let's just say that it's important to play by the rules, even if you've only got an FM in this (speaking in 1974) AM world."

"Hey Shannon, You Always Ask For Comments And Questions, So Here Goes..."

A few months ago, Knight, a longtime *Pop'Comm* subscriber, e-mailed me to see if traces of WLOV info had ever made it to my files. Not a hint of those calls in any of the cabinet's four long drawers. That led me to fire off a station history request to *Broadcast Pro-File*, or *B/P-F* for short. (You can, too, for most any AM or FM by contacting them at 28243 Royal Road in Castaic, CA 91384-3028). Though referenced with backgrounds on hundreds of well-known stations, their new catalog also promises custom Pro-Files on oddball audio outlets such as WLOV *B/P-F*'s Jan Lowry quickly came up with that winter 1963 *Broadcasting* piece that Knight recalled, as well as details of the short, unhappy life of the long defunct 'LOV.

Though no one exactly remembers today, it was probably in late 1956 or early the next year when Jack Salera, his wife Lorraine, and Peter Gemma began seriously discussing the possibility of starting a Rhode Island radio station. We do know, though, that their 1957 FCC application for a new 10,000-watt FM at Cranston, a few miles south of state capitol of Providence, was granted on December 5. Salera and Gemma indicated to the Commission that ownership of their Neighborly Broadcasting Company had been divided up in such a way that they each held 47.5 percent with the remainder going to Mrs. Salera.

Neighborly almost immediately requested the positively expressive callsign W*LOV*-FM, and prepared the way for their frequency modulation project to get airborne on Little Rhody's 99.9 megacycle (today megahertz) spot. For reasons also lost to evaporated decades, it took Neighborly a year and a half to fire up WLOV-FM. This during a period when, in order to get going on a shoestring, many independent FMs quickly rented a bit of space in some tall building where the transmitter could be stuck near the structure's existing mechanicals (air-conditioning/venting units, etc.) on the top floor, and where an antenna might be easily affixed to a pole on the roof. Whatever the reason for an 18-month gestation, WLOV's birth occurred on Monday, June 15, 1959, in its Cranston studios at 188 Gansett Avenue.

Might WLOV-FM have looked like this neat publicity photo in the 1960 Gates catalog? Well, the Cranston station certainly could've had a couple of those Gates 12-inch turntables, but the multi-studio custom installation (photographed at WXYZ in Detroit) was probably significantly more deluxe than the enigmatic Rhode Island FM's setup.

"Did We Say Cranston? We Meant Providence, Or Legally Visa-Versa"

As can be easily understood, Neighborly's sights were really set on having WLOV-FM be considered a "greater Providence" broadcast outlet, not as "that Cranston FM." And, certainly by hurling its hefty, FCC-authorized 10-kW signal in the relatively uncrowded pre-stereo FM station milieu, WLOV-FM could leap well beyond Cranston and blanket the state's major population, as well as significant portions of Massachusetts. That's why it isn't surprising to learn that the company established a Providence mailing address and opened a Providence studio in early 1960. No mention of the Cranston studio continues thereafter, but it seems that one must have been in place there. At the time, arcane regulations would have precluded Neighborly from abandoning the Cranston studio site, unless it co-owned an AM sister (from which it could control its FM transmitter) in Providence—which it in fact did not.

Though the 1960 jump to Providence is understandable, Neighborly's late 1959 power reduction to 3.4 kW presents radio historians with a true mystery. Maybe there were transmitter or antenna problems that required expensive repairs in order to get WLOV-FM up to 10,000 watts again. Or, perhaps the station never managed to issue a 10-kW signal (or even buy the gear needed for the originally proposed and authorized level), and the 3.4-kW change on the FCC's books officially indicated the extent of the station's technical prowess. That figure, just over 3-kW, is a telltale sign that Neighborly wanted to retain its "metropolitan" Class "B" status, which would have been summarily downgraded by government regulators (to "local Class 'A") had WLOV-FM plunged to 3,000 watts or less. Interestingly, WLOV-FM president Salera (though remaining as general manager) traded titles with partner and VP Gemma not long before the power drop came to the Commission's attention. Not much

RHODE ISLAND

Call Letter	City	State	1st Dial	2nd Dial	3rd Dial	Wave Length	Watts
WDWF	Cranston	R. I.				440.9	500
WEAN	Providence	R. I.				270	500
WCBR	Providence	R. I.				209.7	100
WJAR	Providence	R. I.				305.9	500
WCWS	Providence	R. I.				209.7	100

A check of a mid-1920s radio roster indicates WLOV-FM was not Cranston's first broadcast facility. The 500-watt WDWF briefly hailed from that city-of-license. It, too, has long since faded from Little Rhody's ether.

INDIANA

Call Letter	City	State	1st Dial	2nd Dial	3rd Dial	Wave Length	Watts
WHBU	Anderson	Ind.				218.8	10
WCMA	Culver	Ind.				222	100
WGBF	Evansville	Ind.				236	500
WHBJ	Ft. Wayne	Ind.				234.4	50
WOWO	Ft. Wayne	Ind.				227	500
WFBM	Indianapolis	Ind.				268	250
WJAK	Kokomo	Ind.				254	50
WBAA	Lafayette	Ind.				273	250
WRAF	Laporte	Ind.				223.8	100
WIBW	Logansport	Ind.				220	100
WFBE	Seymour	Ind.				226	10
WSBT	South Bend	Ind.				275	500
WRBC	Valparaiso	Ind.				278	500

From a 25-cent guide out of Lincoln, Nebraska's Radio League Publishing Company came this 1926 roster of Indiana stations. Though it was complied in broadcasting's infancy, none of our "heave-hoed Hoosier" AMs were still active enough to make it to print, leaving only WFBM serving Indianapolis. By the way, the blank boxes labeled, "1st Dial," 2nd Dial," and "3rd Dial" were meant to be penciled-in by radio listeners wanting to remember the number positions (typically labeled 1 to100) on their receiving sets where the listed station was actually heard. At that time, few radio dials were marked in kilocycles or any numeric terminology that corresponded to the broadcast band.

of a paper trail exists from this point until July 1961 when Neighborly took WLOV-FM dark, citing now historically frustrating "undisclosed reasons."

What's This We Hear From A Silent Station?

On November 1, the FCC told Neighborly officials that it had evidence of enough shenanigans to take away WLOV's license. What was going on in Cranston anyway? Historical speculation leads me to suspect that *nothing was*, because the station had no studio in its city of license. The power level issue was a likely contributor, too. And, there were probably money troubles that precluded Neighborly Broadcasting Company from acting as neighborly to the FCC as it could have, had WLOV-FM coffers been full enough to allow for timely repairs to any technical or venue violations troubling Uncle Sam. When the Commission scheduled a winter 1962 hearing to determine WLOV's fate, Neighborly wrote to Washington and waived its right to appear there in person. Instead, the station ownership "admitted some of the transgressions, claimed that some of the technical violations had been corrected, and said that [license] revocation was too severe a punishment in view of failings due primarily to human frailties rather than a pernicious design to reap huge profits by making deceptive representations." Eloquent as that *mea culpa* might have seemed to its writers, the letter did little to satisfy FCC bigwigs. On January 30, 1963, they "decided that WLOV had a total disregard for [FCC] rules and that [Commission officials] could not depend upon the word of [anyone associated] with the station." With that declaration, the FCC stripped Neighborly of the Cranston FM license and deleted the WLOV-FM callsign.

But What Did Neighborly Really Do?

Radio folk in the Providence market must have known specifics, otherwise Knight wouldn't have still been chided or kidded with references to the transgressions some 13 years after WLOV-FM left the airwaves in '61 (having racked up only about 24 months of air time). He did hear an offhand remark from a fellow DJ who claimed to have chatted with another announcer who was very briefly associated WLOV. "The guy said they didn't have any transmitter logs or programming documentation. Totally disorganized!" However, other than this admittedly third-hand, imaginative recollection, along with the Commission's legalese that Neighborly "made misrepresentations, [probably wasn't] financially qualified to be a licensee, and [didn't correct] various technical violations," broadcast buffs are left to wonder how bad things got on and off the air.

Is There Anybody Tuned-in? Anybody?

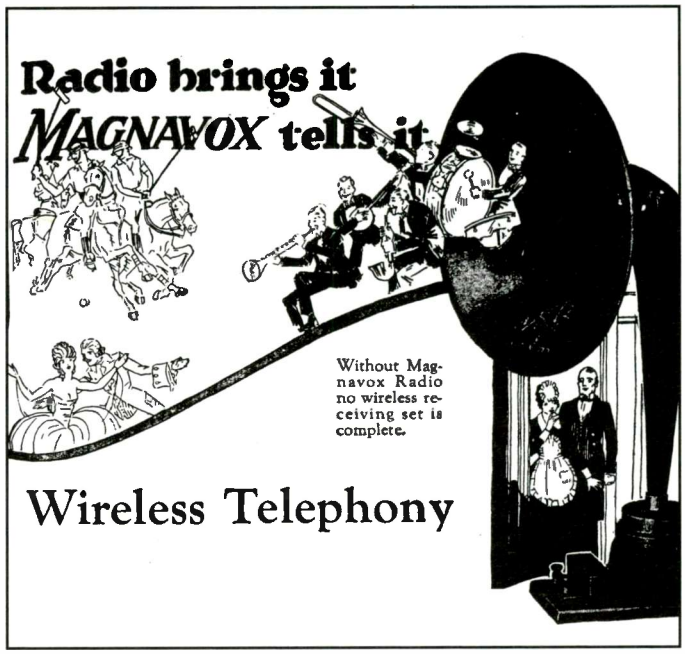
What happened to the people who'd worked at WLOV-FM? Might one or two still be around to fill in the tale's gaps? And, what about the equipment? Could it have been auctioned off to other stations where legends connected with its previ-

ous owner were passed along to new operators? While we're asking questions, how about a few more: What did WLOV-FM sound like? Anybody have an aircheck or memory of a typical broadcast day? When Knight asked his contacts years ago (about WLOV's format), the most solid answer he got from an alleged listener was, "Who could tell?" Certainly there must have been some rhyme or reason to WLOV's air product. Why would its founders invest in the project without figuring out a format? Most FM's of its day issued a minimum of talk between semi-classical, easy listening, or light pop music. Unless corrected by someone once in the WLOV-FM audience, it is logical to assume the Cranston outlet offered such fare.

In the academic world when research scholars are mystified and hit dead ends, they often conclude their journal articles with a call for further study. That's what I'll do here. Surely a broadcasting company called Neighborly—although apparently less than that to the FCC—and a station with pleasantly evocative calls such as W*LOV* must have made enough of an impression on at least one old-time Rhode Island area radio enthusiast and *Pop'Comm* reader to stick in his or her memory. I will most appreciate hearing whatever you might know about the mysterious Cranston station.

Heaved-Ho Hoosiers

With enigmas on the mind, let's twist the squares of our radio Rubik's Cube towards early broadcasting in Indiana. That's where an epidemic of *abandoned* stations broke out in the 1920s. Research from *Broadcast Pro-File* dials in seven short-lived Hoosier AM outlets starting with 5-watter **WLAX**, which took to the air around Greencastle during September 1922. Licensee



When the likes of Indiana's long lost WLAX and WHAY were on the air, "wireless telephony" enthusiasts who owned a Magnavox horn speaker accessory could make those stations talk out loud. Small print once accompanying this May 1922 ad promised radio listeners "a new world of information, education, and inspiration; an Aladdin's dream realized in actual fact." Magnavox also boasted, "In the air, day and night, superb concert and dance music, important addresses, hilarious vaudeville, world weather reports, also correct time signals [were] being broadcasted by radio transmitting stations in every part of the country."

Putnam Electric Company fired up its transmitter from 7:30 to 8:30 Tuesday and Thursday evenings when "lectures and music" were presented.

The tubes got another workout at 7:30 p.m. on Sundays while church service broadcasts emanated from the WLAX equipment. Putnam Electric's store at 17 Washington Street, East, served as the station's headquarters. Long before the FCC came into being, broadcasting authorizations were issued by the Radio Division of the Bureau of Navigation, which was part of the Department of Commerce. By early 1924, this agency gave WLAX a permit to jump its power output to 10 watts and then later that year to make a minor licensee name change to Greencastle Community Broadcasting Station. For some reason, the organization's interest in radio transmission sagged to the point where "no regular programming schedule was maintained [throughout much of] 1925." A few weeks before Christmas, one of WLAX's then-rare program offerings ended with the announcement that it wasn't certain when broadcasting might resume. Nothing further was heard from WLAX. The Feds considered that the station had been "abandoned," so regulators deleted the facility's callsign and license prior to the new year.

What The W-*HAY*?

In April 1922, principals of *The Huntington Press* decided to get into the radio business. The Indiana newspaper's parent, Huntington Publishing Company, received the governmental okay to construct a 10-watt broadcast outlet on the then-common AM frequency of 833 kilocycles (identical to WLAX's dial assignment). Huntington's authorization came with the caption: "Provisional Limited Commercial License #705," but was granted permission to take to the air daily from 4:00 p.m. until midnight. The document also indicated that the new station would be called WHAY (from a sequentially assigned pool of alphabetical characters).

I bet if someone had time to go through microfilmed summer and fall 1922 issues of The Huntington Press, she or he would catch an article about WHAY's debut. And if that investigation rolled the microfilm into the summer of the following year, one might see a piece about WHAY's conspicuous silence. Then again, maybe nobody would have bothered to cover the here-today/gone-tomorrow AM. Radio Division regulators noticed that Huntington's first station had been "abandoned" by its founders and so deleted it from Washington's active rolls sometime in September 1923.

We Won't Hog The Airwaves Too Long

Perhaps hearing WHAY and knowing it died inspired the Huntington Broadcasters Association to seek governmental approval for another try at local radio in Huntington. The result was 15-watt WHOG on 1240 kilocycles and an inaugural airdate of November 1926 from facilities at 409 North Jefferson Street. Announcers there enunciated, "this is Huntington's opportunity gateway, station W-H-O-G," for about six months, anyway. In a now confusing action—or inaction—WHOG's owners, who were invited to renew their three-month broadcasting license, did so once, but never again contacted radio nabobs at the newly formed Federal Radio Commission in April 1927 when the second authorization lapsed. That's why the FRC believed the station to be "abandoned" and struck WHOG from its roster a few months later.

The Fastest Disappearing Stations In Speedway City

First to cross Indianapolis' radio debut finish line was WLK. It snagged the Commerce Department's Limited Commercial Broadcasting License #281 shortly after 1922 dawned. A year earlier, WLK's owner Francis F. Hamilton had been a "ham" amateur radio operator under the call 9ZJ, but he wanted a "commercial" authorization that might be used to promote his Hamilton Manufacturing Company. Records show WLK packed 50 watts and could be dialed at 833 kilocycles beginning in April 1922. On the heels of WLK's founding, WOH Indianapolis was authorized. Favoring timeshare arrangements for smaller stations, the Feds bunched these two together at 833 kc. In the middle of 1922, WLK moved its studio/transmitter setup from 201 Alabama Street, North to 75 North New Jersey Street. Mysteriously, the Hamilton Manufacturing Company simply "discontinued" broadcasting after a March 27, 1923, program. U.S. Commerce officials heard nothing more from WLK, causing them (at the end of May) to delete Indianapolis' first broadcasting outlet from the list of stations in good standing.

The aforementioned WOH became airborne in April 1922 under one of those "provisional limited commercial" licenses (#298) issued to the Hatfield Electric Company of 531 North Meridian Street in Indianapolis. Owner T.B. Hatfield (who "sold and serviced" radios) used his 20-watt station's airtime "to provide a free farmer information service." Admittedly, area agriculturists weren't given enough time to fall in love with Hatfield's programming. By the following Valentine's Day, "WOH was reported abandoned," so got summarily de-listed from the Commerce Department's books. Indy's second broadcaster had lasted only 10 months.

An even quicker fade to black happened over at WBBI, another 20-watter founded in January 1924. The Indianapolis Radio Club put this peanut whistle on the air from a modest (1721) North Somerset Street studio/transmitter arrangement. Its "limited commercial broadcast" license, #1299, specified operation on 1280 kilocycles. Anyone who has ever joined a special interest club probably now knows that an organization's volunteers either run hot or cold about keeping the club's activities going. The WBBI group made the mistake of maintaining "no regular program schedule," which likely gave members a "maybe we'll do a show tomorrow" attitude. Whatever the reason for the drop in enthusiasm, WBBI was "abandoned" in April, just when its three-month license term required an extension from the Commerce Department.

Sequentially assigned calls, not far from WBBI's government-picked moniker, went to a Mr. Noble Butler Watson of 233 Iowa Street, Indianapolis. His WBBZ took to the ether in the Spring

of 1924 and ran 50 watts at 1320 kilocycles. Not long after New Year's Day, 1925, WBBZ could be heard on 1260 kc. "Special programs" (a euphemism for "we'll think of something") were aired Monday through Saturday afternoons from 3:00 to 4:00, and "varied programs" (another code for indecision) got transmitted Sunday nights during the 8:30 to 10:00 timeslot. Watson's announcers issued the station slogan, "WBBZ Indianapolis, Indiana, near the center of population of the United States." By spring, however, the broadcasts—"varied," "special," or otherwise—stopped when WBBZ went dark. Reasons are unclear why Watson "abandoned" WBBZ after only about a year of service. He must have regretted dumping this broadcasting facility, though, because in 1926 he filled out an application that netted him a new Circle City station, which eventually became the long-running WIRE Indianapolis.

In retrospect, it seems nonsensical to have "abandoned" any pioneer radio station in communities like Greencastle, Huntington, or especially Indianapolis where lots of potential listeners and advertisers lived. During the early 1920s, keeping a 5,- 10,- 15,- 20,- or even 50-watt transmitter going for a few hours per week with basic programming (maybe just someone singing or reading) doesn't seem like much effort when the reward for such perseverance would have likely meant a big stake in the broadcasting business, which had skyrocketed by 1930. But, as they say, hindsight is 20/20.

All Pieces Of History

Fact is, few circa 1922 station owners recognized broadcasting's public service and financial potential. Most saw it as an experiment that'd be fun to try, a craze to be part of. Perhaps that's why many early broadcast licensees didn't possess the commitment needed to concentrate on radio as a profession rather than an avocation. No matter, those of us who appreciate America's rich radio history understand that even those folks who dabbled with some fleeting 10-watter during broadcasting's dawn (or an infamous circa-1960 FM) contributed to today's wide-ranging electronic communication fabric. Remember, I'd like to hear from you if you've got any information on Rhode Island's WLOV!

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

ADVERTISERS' INDEX

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.

by Bill Price, N3AVY

Cowboy Norm

It's been a while since I've seen Norm (you all remember Norm, whose Spaniel drove his car into the lake? Whose kilowatt AM transmitter caused just a little bit of interference with his apartment-dwelling neighbors? Who had me on a New England rooftop in a winter wind trying to solder a 14-gauge wire with a butane soldering iron in a 30-mph wind? Oh, I could go on and on but by the time I got through reminding you who Norm is, there'd be no room to tell you of the latest incident. But I don't want to leave you with the impression that Norm is a bad person, or less than smart, or any such thing. Norm is first of all a good friend. Even after some three years of not seeing one another and only an occasional letter, I know I could count on him for anything I needed, and vice versa. He *has* had some hair-brained ideas from time to time, but so have I. And I would bet that you loyal readers have had a few that you're not sharing with the world either.

So Norm arrived at my rented farmhouse here in Cowfield County, Virginia, just as my landlord had brought a trailer-load of heifers or hoofers or some kind of young cows over to the part of the farm where I live to practice their mooing or whatever it is that they do here. Before I remembered that I'd told Norm that the landlord had strictly prohibited any antennas, he introduced himself and asked if it would be alright to string a longwire antenna up to the top of that silo over there.

Now my landlord is the kindest person this side of the Continental Divide, or maybe even the International Dateline, and his list of prohibited activities involves only those things that might hurt something or someone or some animal.

"Long as it doesn't hurt anything, put up anything you want—just so it doesn't look ugly."

Oh no. Norm would be here for a whole week—with carte blanche from my landlord, and me with enough bare copper wire to wrap the Earth a few times over. Now for sure I was going to own an antenna farm before the week was over. And I just *knew* he had some monstrous old tube transmitter in the back of the humongous old station wagon he was driving. At *least* one—maybe more. I could see my excuses for not getting on the air blowing away in the wind as my landlord hauled the empty trailer down the dusty lane and the new neighbors began mooing behind me.

While Norm wondered how we'd scale the concrete structure, I remembered that the county agriculture people came periodically to check on the nesting pair of barn owls that lived in that silo. Perfect! I quickly called the landlord and reminded him of that while Norm listened. My landlord said, "Oh, well, you can put the wires up anywhere you want," and I said, "Yeah, that's too bad. Oh, well, some other time, maybe," and hung up the phone.

I could have kissed those owls right on the beaks!

Without a barn or silo to attach an end to, there is just no place to locate a decent dipole or longwire on this farm. The trees are either 20 feet apart, or a half-mile apart, and none are very tall. The land is flat, the way a farm ought to be, and there are no old windmills or unused utility poles just idling about. So Norm brought out an old 2-meter base station.

"I've got a nice Yagi in the car and we can put it up there on your roof, by the chimney," he told me.

"Norm," I said. "we're both too old to climb this roof. It's *steep*. It's metal. It's old. I don't know how strong the rafters are under that part of the roof, and we can't get in there to look at them."

"Okay, I've got four 10-foot pieces of mast in the car. We'll put it up against the gable end of the house. I don't have a rotor, but we can aim it in the best direction for the most activity."

I would look ungrateful if I argued. At least he couldn't work me on 2 meters from where he lived, so he'd never know that I wasn't using it. With just a couple of clamps, it went up nicely. And from a comfortable seat in the bathroom, I was able to reach out and turn the mast as needed.

The whole job was pretty disappointing, because with my years of antenna experience in my HPJIE*, antenna and transmission line installation is pretty much automatic for me (although the roofs I climb around at work are usually flat). All those years of escapades with Norm had me waiting—almost anticipating—for something ridiculous to happen. I hadn't had a good laugh in a while, and this job was just not going to give it to me. I almost felt as if I should do something silly, like hook the coax around the bumper of his car and then ask him to run to the store for something.

I was inside when Norm yelled, "Old man, you better come out here right now." Yes, he is probably the last ham to use "old man." I sort of waddled out quickly to find him face to face with about 20 young cows. Someone had not fastened the gate securely. This happened about once a year, and even though I'm just a tenant, I do my best to help round up the cows, particularly when there are no farm hands nearby, as was the case this day.

Norm was *NOT* a farm boy. To say that he was out of his league is an understatement. He might as well have been amid a pride of lions or a herd of rhinos. I sent him in the house to call the main farm and tell them, "...20 cows out at Price's place—hurry!"

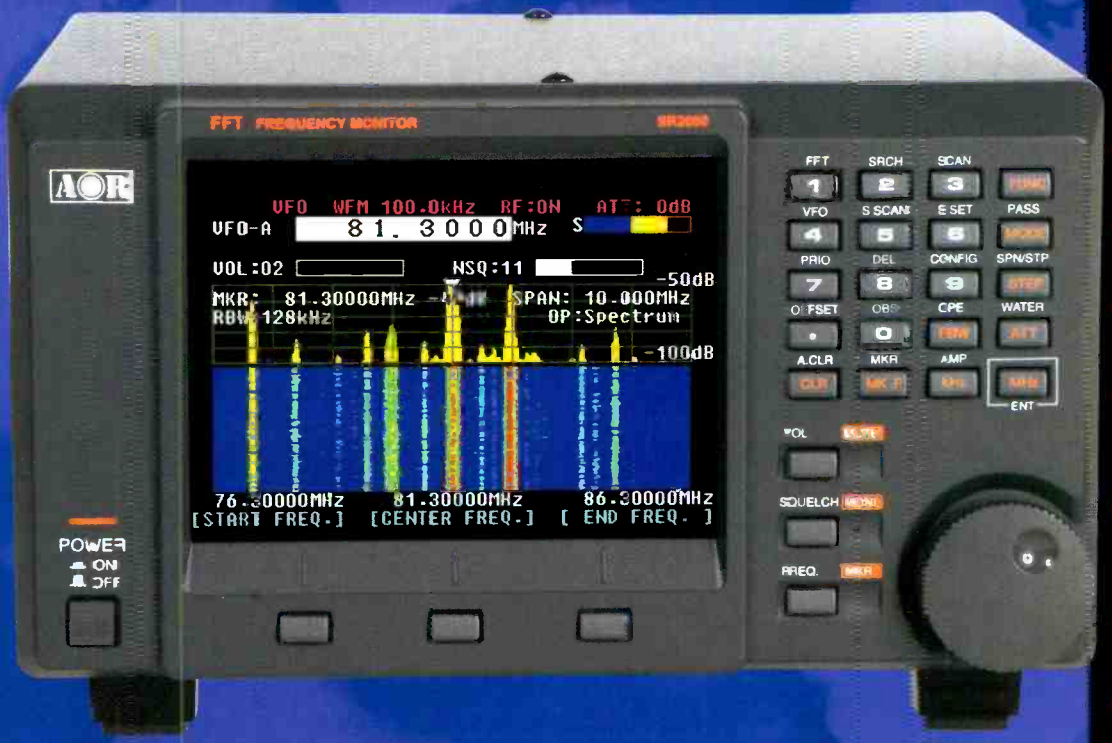
He came back outside and I gave him a stick. I said, "Watch what I do and copy me—they won't hurt you unless they step on your foot." I yelled things like "hey cow, giddyup cow, c'mon cow hay cow," and waved my arm and tapped them with the stick and herded them toward the open gate, trying to get around them (which would have been much easier on horseback, like in the movies, because I'm old and out of shape and could stand to lose a pound or two).

Norm drove cows like a champ. He was probably scared out of his wits, but he did what needed to be done, and by the time the farmers arrived, we were escorting the last cow through the gate and Norm was closing it behind them. I was proud of him, and I know he was proud of himself, as he told my landlord, "well, looks like we got 'em under control."

The antenna is indeed up, and no words can express how glad I am that he didn't call my landlord "old man." ■

AOR SR2000 Frequency Monitor

Seeing is Believing!



High Speed FFT Search – Scans 10 MHz in as little as 0.2 seconds! Instantly detects, captures and displays transmitted signals.

- FFT (Fast Fourier Transform) high speed display
- Displays up to 10MHz of spectrum bandwidth
- 5 inch TFT color LCD display
- Waterfall (time) display function
- High speed FFT search quickly captures new signal transmissions
- Versatile color display uses state of the art digital signal processing
- Average or peak value readings
- Frequency coverage: 25MHz ~ 3GHz (no gaps)
- Ultra-stable, high-sensitivity triple-conversion receiver
- AM/NFM/WFM/SFM receive modes
- 1000 memory settings (100ch x 10 memory banks)
- Easy menu-driven operation
- PC control through serial port (or optional USB interface)

The SR2000 is an ultra-fast spectrum display monitor with a high quality triple-conversion receiver

AOR puts the power of FFT (Fast Fourier Transform) algorithms to work in tandem with a powerful receiver covering 25 MHz ~ 3 GHz continuous. The result is a compact color spectrum display monitor that's ultra-sensitive, incredibly fast, yet easy to use. The SR2000 is perfect for base, mobile or field use and can also be used in combination with a personal computer. It's another example of why so many Federal and State law enforcement, military units, surveillance agencies, government users, hospitals, RF labs, News Media and monitoring professionals rely on AOR, the Serious Choice in Advanced Technology Receivers.

SR2000

Standard Accessories:
AC adapter, control cables

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

All Icom handheld receivers are programmable PC programmable

See your dealer for details.

IC-R5

Compact performance!

150 kHz – 1.3 GHz* • AM, FM, WFM • 1250 Alphanumeric Memories • CTCSS/DTCS Decode • Weather Alert • Dynamic Memory Scan • Icoms Hot 100 Preprogrammed TV & Shortwave Channels • Weather Resistant • 2 AA Ni-Cd Batteries

IC-R3

See & hear all the action!

• 500 kHz – 2.45 GHz* • AM, FM, WFM, AM-TV, FM-TV • 450 Alphanumeric Memories • CTCSS with Tone Scan • 4 Level Attenuator • Antenna with BNC Connector • 2" Color TFT Display with Video and Audio Output Jacks • Lithium Ion Power

IC-R10

Advanced performance!

500 kHz – 1.3 GHz* • AM, FM, WFM, USB, LSB, CW • 1000 Alphanumeric Memories • Attenuator • Backlit Display & Key Pad • VSC (Voice Scan Control) • 7 Different Scan Modes • Beginner Mode • Band Scope • Includes AA Ni-Cds & Battery Charger

IC-R20

Dual watch!

150 kHz – 3.3 GHz* • AM, FM, WFM, USB, LSB, CW • 1250 Alphanumeric Memories • CTCSS/DTCS Decode • Dual Watch • Audio Recorder • Weather Alert • Dynamic Memory Scan • Icoms Hot 100 Preprogrammed TV & Shortwave Channels • Weather Resistant • Lithium Ion Power

Tune in the world with Icom!

DSP included, US models only**

IC-R75

Pull out the weak signals

• 30 kHz - 60.0 MHz* • AM, FM, S-AM, USB, LSB, CW, RTTY • 101 Alphanumeric Memory Channels • Twin Passband Tuning (PBT) • Commercial Grade • Synchronous AM Detection (S-AM) • Optional DSP with Noise Reduction Auto Notch Filter • Triple Conversion • Up to Two Optional Filters • Front Mounted Speaker • Large Display • Well Spaced Keys and Dials • PC Remote Control with Optional Icom RSR75 Software for Windows®

AMATEUR | AVIONIC | LAND MOBILE | MARINE | RECEIVER | WWW.ICOMAMERICA.COM

ICOM®

*Cellular frequencies blocked on US versions. **With purchase of a new IC-R75. See authorized dealer for details.