

# POPULAR COMMUNICATIONS

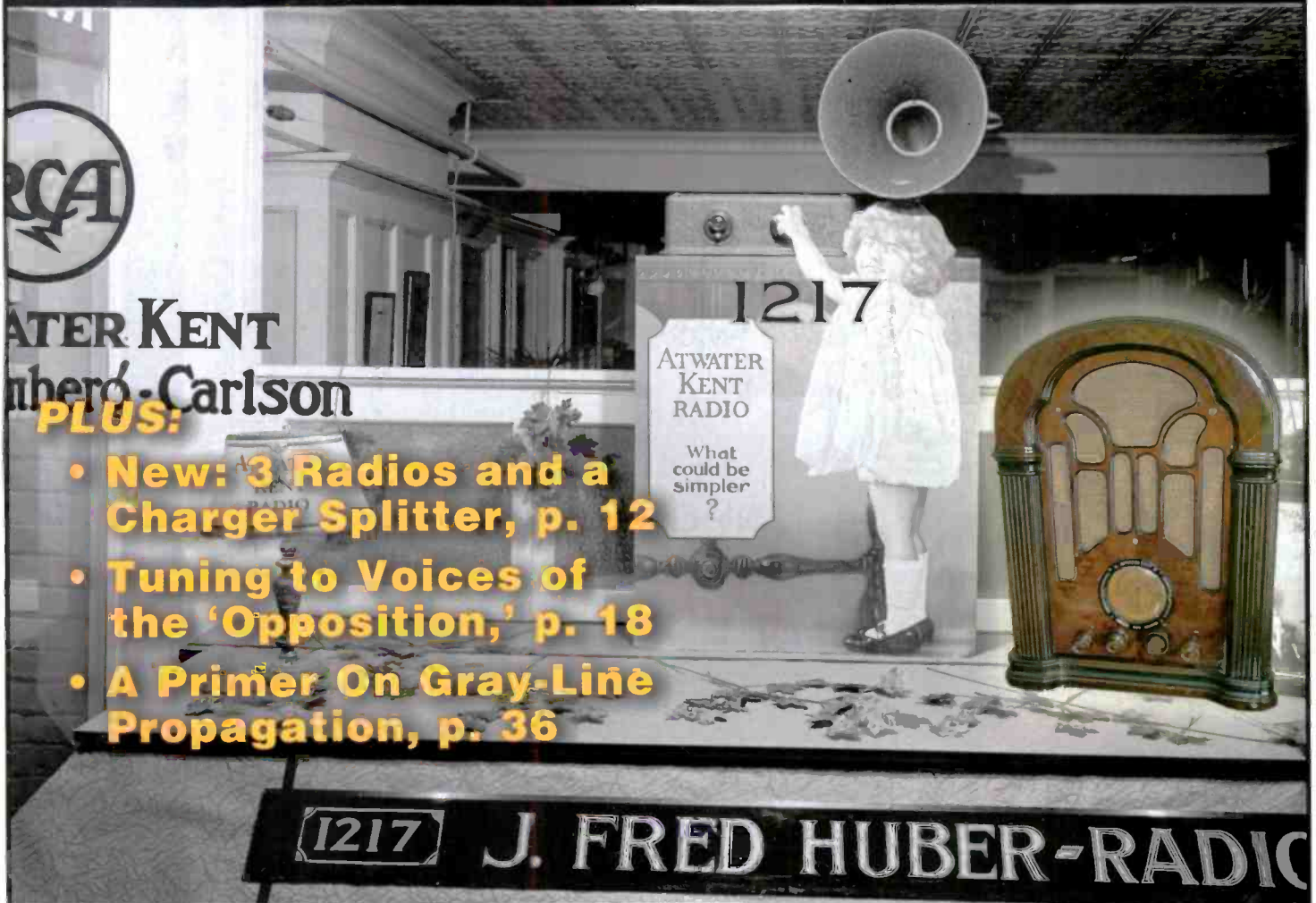
MARCH 2012

Shortwave Listening • Scanning • AM & FM • Radio History

## CLASSIC RESCUE

*A 1934 Atwater Kent Comes Back From the Brink, p. 74*

# RADIO



**ATWATER KENT**  
**Huber-Carlson**  
**PLUS:**

- **New: 3 Radios and a Charger Splitter, p. 12**
- **Tuning to Voices of the 'Opposition,' p. 18**
- **A Primer On Gray-Line Propagation, p. 36**

**1217 J. FRED HUBER-RADIO**

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769  
P042  
0282

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- ▶ The PSR-800 combines simple controls like those used in an MP3 player with the power and sophistication of a state-of-the-art scanning receiver!
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✓ Receive a **FREE Grundig G6** with your Satellit 750 purchase. **G6**  
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The Grundig G6 *Buzz Aldrin Edition* provides great listening options. Tune in to longwave, AM, FM, the VHF aircraft band or continuous coverage shortwave. This advanced dual conversion circuit features *Single Side Band* reception. This radio has keypad entry, manual tuning knob, 700 alphanumeric memories, backlit display with signal strength indicator, clock-timer, and mega-bass switch. There are jacks for earphones and external antenna. Operates from two regular or NiCad AA cells (not supplied). With AC adapter and earbuds. 5 x 3 x 1.2" 9 oz. The Grundig G6 will be included **FREE** with your Satellit 750 for a limited time. This radio may also be purchased separately for \$99.95.

The Grundig Satellit 750 is an exciting portable that brings you the world of long wave, AM and shortwave reception as well as FM and the VHF aeronautical band. Your complete shortwave coverage includes the S.S.B. mode allowing the reception of ham radio operators, maritime and shortwave aeronautical stations. Tune your favorite stations by the conventional tuning knob, quick keypad entry or via the 1000 memories. Enjoy the fidelity you have come to expect from Grundig enhanced by separate bass and treble controls. Other features include: backlit LCD, wide/narrow selectivity, signal strength meter, rotatable AM ferrite antenna, earphone jack, external antenna jack, line output jack plus a 24 hour clock with dual alarm and sleep feature. 14.65 x 7.24 x 5.75".  
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The Grundig G3 *Globe Traveler* is an innovative portable radio covering long wave, AM, FM (stereo to earphone jack), continuous shortwave plus the VHF aircraft band. It features dual conversion AM/SW circuitry for exceptional sensitivity and image rejection. It offers S.S.B. - single sideband reception. It has a large 700 channel alpha memory system with memory scan and auto tuning storage. Unlike other portables in its class, the *Globe Traveler* offers Synchronous Detection. This special feature addresses the issue of selective fading and adjacent channel interference on shortwave. Other enhancements include: Wide/Narrow selectivity, auto search, RDS, signal indicator, Local/DX switch, direct frequency entry and 24 hour clock with four alarm timers. It has an external antenna jack and a Line In/Out Jack. Requires four AA cells (not supplied). If four NiMH AAs are inserted, they may be recharged inside the radio. Supplied with manual, protective pouch and AC adapter/charger. 6.62 x 4.13 x 1.1". 13 oz.  
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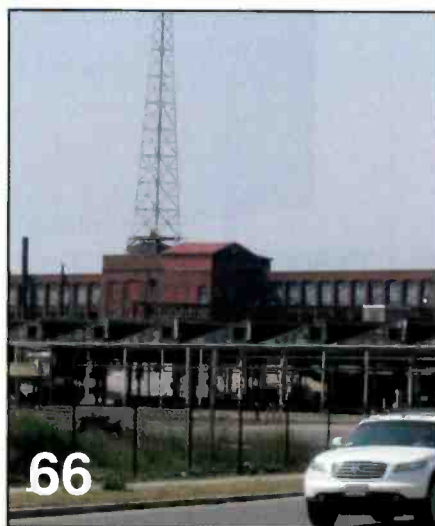
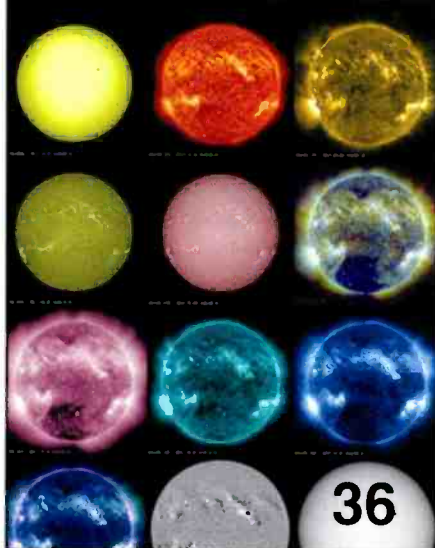
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## ON THE COVER

Manfred Mornhinweg got the surprise of a lifetime when he found out the radio a friend was giving him was a classic 1934 Atwater Kent 206-X receiver — the focus of this month's Wireless Connection. In Part I of a two-part series, Mornhinweg describes what it took to bring the set back to store-window quality, much as it might have looked in the shop of J. Fred Huber Radio in Washington, DC from years gone by. (Photograph of J. Fred Huber Radio shop window courtesy of Library of Congress; Atwater Kent inset picture from Manfred Mornhinweg.)

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# Tap into secret Shortwave Signals

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



MFJ-462B  
\$199<sup>95</sup>

Plug this self-contained MFJ Multi-Reader™ into

your shortwave receiver's earphone jack.

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

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Monitor any station 24 hours a day by printing transmissions. Printer cable, MFJ-5412, \$11.95.

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## Easy to use, tune and read

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

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## Super Active Antenna

"World Radio TV Handbook" says MFJ-1024 is a

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## 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."

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, \$15.95.

## 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, \$15.95. 3¼x1¼x4 in.



MFJ-1024  
\$159<sup>95</sup>



MFJ-1020C  
\$99<sup>95</sup>



MFJ-1022  
\$69<sup>95</sup>

## Eliminate power line noise!

MFJ-1026  
\$199<sup>95</sup>

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  
\$119<sup>95</sup>

## High-Gain Preselector

High-gain, high-Q receiver preselector 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, \$15.95.

## 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-752D  
\$119<sup>95</sup>

## MFJ Shortwave Headphones

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\$24<sup>95</sup>

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## High-Q Passive Preselector

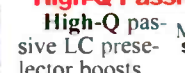
High-Q passive LC preselector boosts your favorite stations while rejecting images, intermod and phantom signals. 1.5-30 MHz. Preselector bypass and receiver grounded positions. Tiny 2x3x4 in.

## 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 loss. Air variable capacitor with vernier. 1.6-33 MHz.

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## EDITORIAL STAFF

**Richard Fisher, K16SN**, Editor

(E-mail: editor@popular-communications.com)

**Jason Feldman**, Editorial Assistant

(E-mail: jason@popular-communications.com)

**Richard S. Moseson, W2VU**, Editorial Director

(E-mail: w2vu@popular-communications.com)

## CONTRIBUTING EDITORS

**Peter J. Bertini, K1ZJH**, Restoration/Electronics

**Kent Britain, WA5VJB**, Antennas And Accessories

**Bruce A. Conti, AM/FM** Broadcasts

**Rob de Santos**, Trends In Technology

**Gerry L. Dexter**, Shortwave Broadcast

**Mitch Gill, NA7US**, Homeland Security

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**D. Prbakaran**, News

**Bill Price, N3AVY**, Humor/Communications

**Ken Reiss**, Technical/Scanning

**Dan Srebnick, K2DLS**, Computers And Radio

**Bob Sturtevant, AD7IL**, Puzzles And Trivia

**Jason Togyer, KB3CNM**, Cartoons

**Gordon West, WB6NOA**, General Radio Comm.

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**Emily Leary**, Production Manager/Webmaster

**Hal Keith**, Technical Illustrator

**Larry Mulvehill, WB2ZPI**, Photographer

**Rod Somera**, Webmaster

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25 Newbridge Road  
Hicksville, NY 11801-2953 USA

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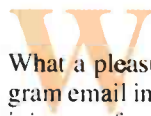
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## EDITORIAL

### Tuning In

by Richard Fisher, KPC6PC/K16SN  
<editor@popular-communications.com>

# So Many Monitoring Station IDs . . . So Many Stories



What a pleasure to kick off 2012 by finding a *Pop'Comm Monitoring Station* program email inbox jammed with requests for station identification signs, notes of reminiscence from a monitoring community of years ago, and enthusiasm for a new generation of listeners.

*Popular Communications'* initiative to energize a monitoring community for a new millennium was off and running. *And how!*

Before the last college football bowl game of the day was completed January 2, we'd received almost 100 requests for station ID signs from 30 U.S. states, Canada, Mexico and Brazil. And we were just getting started!

**Glenn Riffey**, who requested and was assigned the *Pop'Comm* station identification sign **WPC3GR** at Cumberland, Maryland, fondly recalled AM broadcast and shortwave DXing in the 1970s and '80s: "I had a Panasonic RF2600 with a dipole out back. I sort of got out of it as the kids started growing and I went into coaching youth sports . . .

However, I recently purchased an Eton/Grundig G3. *I love it.* The (monitoring) bug has hit again and I'm spending a great deal of time surfing the world instead of the Internet."

**AJ Tilton, WPC9AJ**, of Sycamore, Illinois, is one of a new generation of listeners who sees value in being part of a monitoring community and station ID signs he'd only heard about: "I faintly remember ones that existed in years past," he wrote.

"I have been an SWL since I first tuned the old Zenith Transoceanic on the farm in southwestern Indiana back in the late 1950s," wrote **Ernie Rice, KPC8ELR**, from Hamilton, Ohio. "I can't wait to proudly display my certificate on my wall!"

**Marty Johnson, WPC5URY**, chose his station ID in commemoration of his grandfather, whose amateur radio callsign was W5URY. Marty's listening post is in Shreveport, Louisiana.

**Glenn Pederson, WPC9JYL**, of Sussex, Wisconsin said he's "carrying on the tradition." He also holds WPE9JYL and WDX9JYL from earlier monitoring station ID programs.

Symmetry was on the mind of **Weldon Wales** when he applied for — and was granted — **KPC5VEL**. "It's close to my amateur radio callsign, KA5VEL." He listens from Forth Worth, Texas.

There were lots of hams who felt similarly to Weldon, such as **Rick Kaumeier, KPC0VJ**: "Like most hams, my callsign — K0VJ — is as much a part of who I am as my given name. I grew up SWLing in the mid '70s and have been an avid listener ever since. The chance to tie my ham radio and SWL activities together with 'fraternal twin' identification signs is an exciting one." He monitors from Littleton, Colorado.

For **Joseph Szczech**, it was *déjà vu*, all over again. "I was WPE1EIT as a young SWL! I still have the slip of paper that was sent to me with my (*Popular Electronics*) WPE assignment," he wrote, "but I have long lost my certificate." Joseph is now **WPC1EIT** from his listening post at East Haddam, Connecticut.



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## IC-R9500 The Ultimate Wide Band Receiver

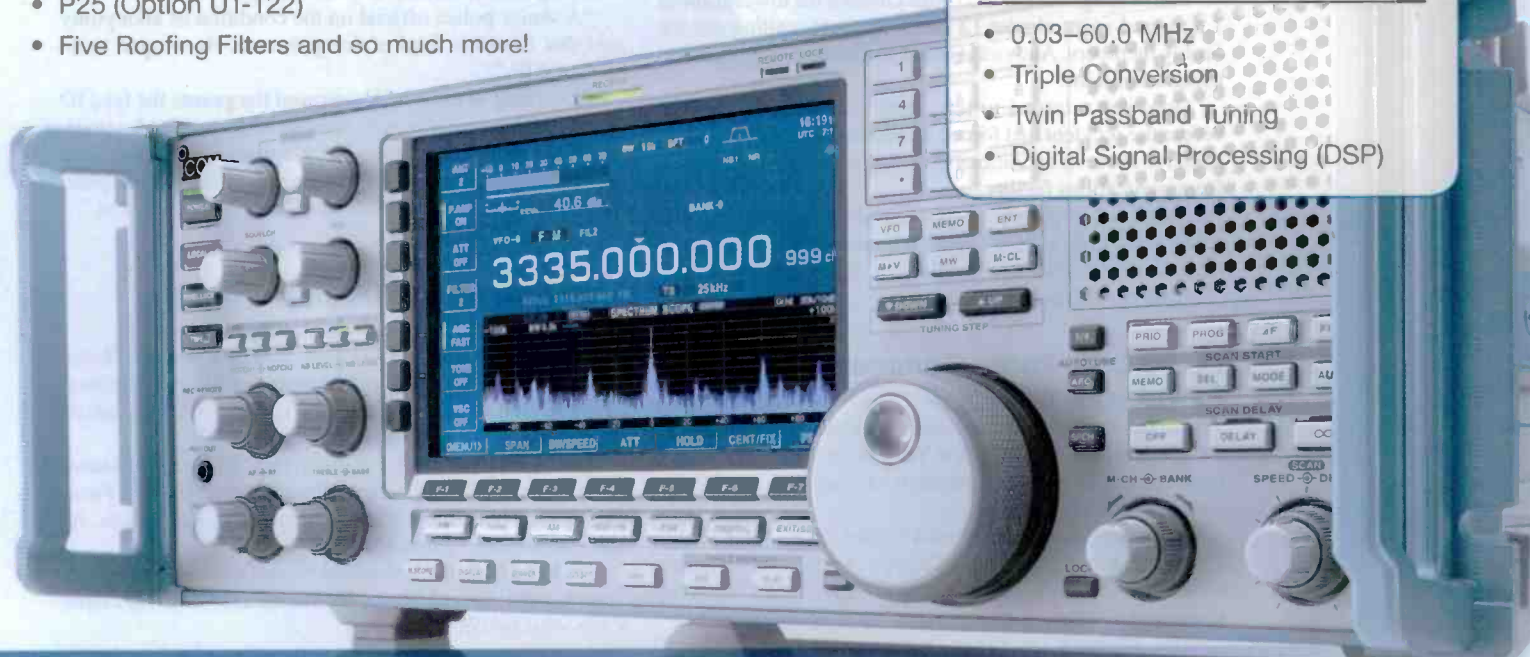
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- 0.03–60.0 MHz
- Triple Conversion
- Twin Passband Tuning
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AND for those on the go!

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- RX: 0.150–3304.999MHz\*
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- 100 Ch/Second High Speed Scan
- Computer Programmable<sup>2</sup>
- Water Resistance Equivalent to IPX4



## IC-R6 Pocket Compact

- RX: .100–1309.995MHz\*
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- 1300 Alphanumeric Memory Channels
- 100 Ch/Second High Speed Scan
- Computer Controllable<sup>1</sup>



## IC-R2500 2 Wide Band RX in 1 Black Box

- RX: 0.01–3299.99MHz\*
- AM, FM, WFM, SSB, CW (Main)
- AM, FM and WFM (Sub)
- 1000 Memory Channels
- Optional D-STAR (UT-118)
- Optional P25 (UT-122)
- Optional DSP (UT-106)
- PC Controllable



## IC-PCR1500 PC Control Wide Band RX

- RX: 0.01–3299.99MHz\*
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- Record and Save Audio as .WAV File
- USB Cable Connection
- Optional DSP

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## The Weirder Side of Wireless

by Staff

### Tower Climber Is 'High' for About 12 Hours

A 27-year-old Florida man got high — in the literal sense — when he climbed to the top of the Kissimmee Police Department's 185-foot communications tower and refused to come down.

Police allege Joseph Gonzalez climbed the tower at about 1 a.m. and spent almost 12 hours up there, calling out for family members. Authorities tried communicating with him using a bullhorn.

Gonzalez returned to terra firma about noon, but not before the incident had forced Kissimmee police's dispatch center to move its operations to the Osceola County Sheriff's Communications facility.

Police asked people to stay out of the area around the Kissimmee Police Department, where the tower is located. Gonzalez was taken to a hospital for observation.

(Source: Published reports)

### Radio Chat Room Comment Sends Police Scrambling

Police arrested a 44-year-old Appleton, Wisconsin man for allegedly posting in a New York radio station's Internet chat room that he was planning a shooting spree, the Associated Press reported.

According to reports, the man visited a Hard Rock Radio Live chat room where he allegedly wrote that listeners should watch national news because he planned a shooting spree in Appleton.

The station's co-owner, who is based in Windsor, Ontario, Canada, called Appleton police after the man allegedly followed up by requesting a heavy metal band's song that has a violent theme.

"Detectives found the man by tracking his computer," the AP reported. "Appleton police Sgt. Pat DeWalt said he was arrested on a computer at the Appleton Public Library, where he (allegedly) posted his online threat a day earlier."

(Sources: Associated Press, published reports)

### Car-Flinging Record Set By Aussie Radio Station

Australia is claiming the world record for car-flinging after a Volkswagen Beetle was catapulted 76.94 meters, (252.43 feet), at a Sydney speedway track.

"The stunt, organized by Nova radio station, required weeks of preparation and the construction of a 20-ton catapult," according to an Asia-Pacific News report.

(WATCH: YouTube video of the record-breaking car-flinging Nova Radio stunt, <<http://bit.ly/vgLVFS>>.)

"So many people got involved in this just for the sake of throwing a car and we still don't know why we did it," a Nova radio spokesman said.

(Source: Asia-Pacific News)

### Report: Aspiring Radio Actor Arrested @ All India Radio

"Now here's a novel way of getting yourself On Air," writes Atul Krishan on Mid-Day.com, based in India.

"Parliament Street police have arrested a man who entered the offices of All India Radio (AIR), using a fake

ID card, posing as the director of the broadcast agency. According to reports, all the accused wanted was to stage a radio play."

The man, identified as Khalil Ahmed, of Rampur in Uttar Pradesh, "was booked under sections 419 (impersonation) 468 (forgery for purpose of cheating) and 471 (using a genuine forged document)," the online report said.

"A senior police official on the condition of anonymity said that Khalil is fond of doing theatre. He wanted to do one for AIR."

According to police: "He showed the guards the fake ID card . . . after which he was allowed to go inside. A security official found him roaming inside suspiciously and asked him the reason. Khalil was flummoxed and could not explain his position. Police were informed and he was arrested."

(Source: MidDay.com)

### Broadcaster Bob Uecker Is Hall-of-Famer<sup>2</sup>

Broadcaster Bob Uecker was inducted into the Radio Hall of Fame in 2001 and honored with the National Baseball Hall of Fame's Ford C. Frick Award for broadcast excellence in 2003.

On April 17 he'll be inducted into the National Association of Broadcasters, Broadcasting Hall of Fame during the NAB Show Radio Luncheon in Las Vegas. As Uecker might say, "Front row!"

(WATCH: Bob Uecker interview pro-wrestler Honky Tonk Man along with Jimmy Hart at the WWE Hall of Fame, <<http://bit.ly/tiSR6K>>. — Ed)

Uecker is entering his 42nd year calling play-by-play on the Brewers Radio Network and Journal Broadcasting Group's WTMJ in Milwaukee. The former-player-turned broadcaster has completed 30 seasons as the club's lead announcer, and he will celebrate his 57th year associated with professional baseball in 2012.

(Source: NAB)



Photo A. Milwaukee Brewer play-by-play announcer and former major leaguer Bob Uecker — a member of the Radio Hall of Fame who will be inducted into the NAB Hall of Fame next month — interviews pro-wrestler Honky Tonk Man, right, and Jimmy Hart at the World Wrestling Entertainment Hall of Fame. (WATCH: <<http://bit.ly/tiSR6K>>.) (Internet screen grab)



## News, Trends, And Short Takes

by D.Prabakaran  
<bcdxer@hotmail.com>

### NASA Launches 'Third Rock' On the Internet

NASA's mission of "discovery and exploration" is being showcased in a custom-produced Internet music radio station that is crafted specifically to speak the language of tech-savvy young adults, authorities said.

*Third Rock — America's Space Station, Photo A*, was launched with a new rock/indie/alternative format. The station is being developed and operated at no cost to the government through a Space Act Agreement.

*Third Rock* can be accessed from NASA's home page <<http://www.nasa.gov>> and is expected to be available through NASA iPhone and Android mobile applications.

NASA is collaborating with Houston-based RFC Media to launch the station.

Third Rock also will help partner companies fill high-tech job openings in the engineering, science and IT fields. (**LISTEN: To NASA's Third Rock — America's Space Station:** <<http://bit.ly/sUgDuw>>. — Ed.) (Source: NASA)

### Vatican Radio Beams DRM Broadcast to India

In October, Vatican Radio introduced a DRM (Digital Radio Mondiale) broadcast beamed to India on 15,190 kHz at 15:30-15:50 UTC, Sunday-Friday, in English. The same broadcast on Saturdays is 15:30-16:00 UTC and it carries the Catholic Mass in English.

(**IN DEPTH:** For more information on DRM, visit: <<http://bit.ly/twRPD2>>. — Ed.)

Vatican Radio started DRM service to promote this standard in India considering the plan undertaken by the Indian Government to switch to digital. (Source: *Vatican Radio*)

### GAO Strongly Critical of Radio/TV Martí Management

The board that supervises Radio/TV Martí failed to provide sufficient information to the U.S. Congress about its costs and audience in Cuba, the U.S. Government Accountability Office (GAO) said.

In a strongly worded report, the GAO also recommended that the Broadcasting Board of Governors (BBG) study "sharing resources" between the Martí stations and the Voice of America's Latin America division. Established during the Reagan administration to break the Cuban government's monopoly on information in the island, the Martí stations have long been one of the most controversial parts of the BBG operations.

Critics have recommended that the stations be shut down altogether or folded into the Spanish-language section of the Voice of America. (Source: *Published reports*)

### ABU Digital Broadcasting Symposium Slated for March 6-9

Digital Radio Mondiale (DRM), supported by consortium members Continental Electronics, Fraunhofer IIS, Riz Transmitters, Thomson Broadcast and Transradio, will be sponsors of ABU Digital Broadcasting Symposium 2012 to be held in Kuala Lumpur March 6-9.

(**IN DEPTH:** For more information on DRM, visit: <<http://bit.ly/twRPD2>>. — Ed.)

The symposium — with the theme *Decision Time for Stakeholders* — is the eighth in a series of annual symposiums staged by the ABU to help radio and television broadcasters and the industry to make the digital transition.

The 2011 symposium attracted more than 700 participants from the Asia-Pacific region and beyond.

The 2012 symposium will feature presentations by experts, panel discussions, workshops, as well as an exhibition showcasing the latest broadcasting products and services. Several side-events will provide opportunities to industry leaders to convey their message to the broadcasters and the industry at large. (Source: *DRM Consortium*)

### Voice of America's Croatian Service Signs Off

Voice of America's Croatian Service has signed off after 19 years of broadcast history that began during the bloody breakup of the former Yugoslavia, and ends with Croatia's emergence as a democratic member of the European community.

VOA Director David Ensor called the service "a model of journalistic integrity that provided the people of Croatia with fair and impartial news during the dark days of civil war in the Balkans." He commended the service, which "served as a vital source of independent reporting and insight into American policy."

Voice of America established its Croatian Language Service on February 20, 1992 — a time when "the most brutal war since World War II was raging in the Balkans."

Spun off from the former Yugoslav Service that had been broadcasting to the area since 1943, VOA Croatian broadcasts began on radio, but were quickly expanded into television.

The service was one of VOA's first to establish an online presence. (Source: VOA)



**Photo A.** Featuring a rock/indie/alternative music format, NASA has launched Third Rock — America's Space Station — on the Internet, designed to "speak the language of tech-savvy young adults." (**LISTEN: To NASA's "Third Rock — America's Space Station:"** <<http://bit.ly/sUgDuw>>. — Ed.) (Internet screen grab)



# Capitol Hill And FCC Actions Affecting Communications

by Richard Fisher,  
KPC6PC/KI6SN

## NTSB Takes Aim at 'Portable Electronic Devices'

The National Transportation Safety Board (NTSB) has recommended that states ban the nonemergency use of all cellular telephones and other *portable electronic devices* (PEDs) by anyone driving a motor vehicle.

"This would include hands-free cell phone operation and all text messaging while mobile," according to a report in the *ARRL Letter*.

The NTSB recommendation, issued December 13, rekindled the "distracted driving" issue that has been under scrutiny for several years.

"To avoid unintended consequences to amateur radio operation," the ARRL reported, the American Radio Relay League "has been closely involved with this issue for several years," and as of early 2012, details of the recommendation were unavailable. "It is not yet known whether the broad term 'portable electronic devices' might be construed as including all or some amateur radio equipment," the League said.

More than three years ago, the ARRL Board of Directors Executive Committee "approved and released an ARRL position paper on Mobile Amateur Radio Operation. In that paper, the ARRL encourages licensees to conduct amateur radio communications from motor vehicles in a manner that does not detract from the safe and attentive operation of a motor vehicle at all times, but points out that mobile two-way radio equipment has been in use for at least 70 years and is quite dissimilar from full-duplex cell phones." (Source: *ARRL Letter*)

## FCC OK's Implantable Medical Devices on 413-457 MHz

FCC commissioners voted unanimously to permit the use of implantable wireless medical devices that operate in spectrum between 413 and 457 MHz. This includes the entire 70-centimeter amateur band (420-450 MHz). These low-power devices, like amateur radio, will have a secondary allocation on the band. Federal government radar is the primary.

According to the *ARRL Letter*, Medical Micropower Networks will use multiple transmitters implanted in the body that will use electric currents to activate and monitor nerves and muscles in hopes of restoring mobility and function to people who have lost the use of limbs or organs. While there is little risk of interference to amateur radio from these ultra-low-power networks, there is concern that amateur transmitters may cause interference to these devices. The FCC is expected to issue a *Report & Order* specifying the new rules for these devices in the near future. (Source: *CQ Newsroom*: <<http://www.CQNewsroom.blogspot.com>>.)

## Alleged Radio Pirates Issued Notices Nationwide from FCC

According to an analysis posted on *Radio-Info.com*, the following *Notices of Unlicensed Operation* (NOUO) were issued late in 2011 across a broad swath of the U.S., from the Bronx and Brooklyn, to Massachusetts, Oregon, and Washington state.

The alleged FM radio pirates detected by Commission

agents and listed on the FCC Field Notices website <<http://bit.ly/vCc8QU>> included:

- **Lorraine M. Strauch**, Bronx, NY, allegedly operating at 106.9 "from your broadcast station located at your residence," on November 17 and 20.
- **Deborah Ramkissoon**, Brooklyn, NY, allegedly found operating from her residence at 92.1 MHz on November 2.
- **Brian Figerox**, Brooklyn, NY, allegedly operating a station at 90.3 MHz on October 14.
- **Thadeus Kyenkyenhene**, Worcester, Massachusetts, allegedly broadcasting at 102.9 MHz from an office, on November 8.
- **Paul Winquist**, Hillsboro, Oregon, allegedly producing a signal at 97.5 from a residence on October 28.
- **Joshua M. McMurchie**, Prineville, Oregon, allegedly operating at 97.9 on October 18.
- **Clarence and Pamela Langer**, Sherwood, Oregon, apparently the owners of property where a signal at 97.9 MHz was heard on October 18.
- **Janice L. Pinhero**, Ashland, Oregon, the owner of a property in Olympia, Washington where agents picked up a signal at 98.5, on October 25.
- **Catherine S. Hom**, Olympia, Washington, also cited in the October 25 detection of a signal at 98.5.
- **William A. Huntley** also of Olympia, likewise cited in the October 25 observation of an unlicensed signal at 98.5.

"The 'NOUO' letters from the FCC say, in capital letters that 'unlicensed operation of this radio station must be discontinued immediately,'" *Radio-Info.com* reported. (Source: *Radio-Info.com*: <<http://bit.ly/uXZ9cQ>>)

## FCC's McDowell Expresses Concern About 'Internet Freedom'

An FCC Commissioner believes Internet freedom is "under threat by emerging global powers seeking a salient increase in government regulation," according to a report in *The Washington Times*.

"The proponents of Internet freedom and prosperity have been asleep at the switch," Robert McDowell told the newspaper. "Or maybe I should say *asleep at the router*."

McDowell said "those who are pushing for new inter-governmental powers over the Internet are far more energized and organized than those who favor Internet freedom and prosperity."

(**WATCH:** *Video of FCC Commissioner Robert McDowell's remarks on international Internet regulation*, <<http://bit.ly/rALW80>>. - Ed.)

According to McDowell, a number of countries believe the current model is "dominated" by the U.S. As such, "emerging powers will attempt to gain more control over the Web's availability, financial model and infrastructure."

According to the *Times* story, "China and Russia — along with Brazil, South Africa and India — are expected to push for the renegotiation of a 24-year-old treaty that deals with international oversight of the Internet at the UN's upcoming International Telecommunications Union (ITU) meeting in Dubai. McDowell, who recently met with State Department and Commerce officials, confirmed the U.S. was attempting to halt the initiative, which could potentially lead to the 'Balkanization' of the Internet." (Source: *TGDaily.com*: <<http://bit.ly/s2wfeK>>)



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# What the Next 'App Revolution' Might Look Like

by Rob de Santos, K8RKD  
<commhorizons  
@gmail.com>  
Twitter: @shuttleman58

*"If you could get an app-friendly radio, would you buy it?"*

**I**f you don't own an *iWhatever*, a smartphone, or a touch screen computer you've probably heard of "apps" — or small programs that have been created by the tens of thousands. What does it mean for the average ham or shortwave listener?

The obvious answer is what it provides on the devices now. The availability of handy tools to do everything from checking call signs to listening to scanner feeds from around the world is already having a huge impact on the communications hobby. With my phone, I can check which international broadcasters are on the air at this moment, design an antenna, check the magnetic fields in the area, and practice my code skills.

To do this though, I need at least one more device, perhaps two, beyond what I already drag around with me. The additional device might replace the phone or laptop I used to carry, so maybe it's not too bad.

What if I didn't need to do that and these extra apps would run on my radio? Now, that would be very powerful. No need to key into the radio the frequencies that the propagation app says are working right now. One tap or click and away I go. And that brings us to the question: *Why hasn't it happened yet?* Let's examine the possible explanations:

**Customers haven't asked for it.** I put a fair amount of stock in this, at least from the standpoint of time. However, customers didn't originally ask for many of the features we have now, but imaginative engineers saw the possibilities and moved forward.

**Radios must be redesigned to make it possible.** This is almost certainly true. Most hobbyist radios, be they receivers or transceivers, are based on proprietary chips and operating systems which have traditionally been closed or had very limited developer access. Nevertheless, given the history of the ham community and its natural affinity with computer hackers (the benign variety), you would think that the first manufacturer to harness this would have a huge market advantage.

**The radios would pose new regulatory issues.** Perhaps this is true and perhaps the regulatory agencies aren't fully prepared for it. However, nothing in this is intrinsically insurmountable. It's all about the security and the operating system. If your phone can make it past the regulatory agencies, your handheld could too.

**The radio would be too expensive.** Certainly, the first generation product would be more expensive than the current radios, but compared to the cost of existing ham radios and products in the smartphone space, it wouldn't be unreasonable. A bigger concern would be the economic conditions

in the United States, Europe and Japan that make it harder for the companies in the shortwave, amateur and scanner market to introduce new radios.

None of the issues is a showstopper. It will be interesting to see if any manufacturer takes the leap of faith and tries the concept. Radio hobbyists have historically been great experimenters and that spirit is certainly present among those who modify and manipulate electronics today. Providing a more flexible platform for ham radios would almost certainly be a winner.

## Some Comm-Related Apps

While we wait for the future, here is a small sample of the many communications-related apps available for the Android platform. Some are available, as well, on other platforms including Apple products and Blackberry. Check your app store to add them to your phone or notepad:

- **Metaloid:** Carry around your own magnetometer with a meter and large digital display. Measurements are in microTeslas. The developers have a number of other excellent audio analysis apps worth looking into. Learn more at <<https://sites.google.com/site/bofinit/>>.
- **Morse Code Trainer:** One of many available apps that let you learn code at your own pace and wherever you are. Practice makes perfect. Here are some examples: <<http://bit.ly/trll10>>.
- **Shortwave Radio Schedules:** Display the broadcasts available in English at any given time, for any listed station, or by frequency. It automatically downloads and uses the excellent information at PrimeTimeShortwave.com. For more information: <<http://blog.cooperuk.com>>.
- **Scanner Radio:** Gordon Edwards' fine app lets you listen to scanners available from online sources around the world. The app will work with your premium subscription at RadioReference.com. Visit: <<http://on.fb.me/tNvE2Z>>.
- **Amateur Radio Callsign DB:** Look up any ham callsign data as the FCC or QRZ.com have it. See: <<http://bit.ly/tv5Bnh>>.
- **Echolink:** Though it might be heresy to many hams, this app will let you connect to Echolink repeaters via your phone and talk on them. Check out: <<http://bit.ly/rufqUM>>.

## Let's Hear From You . . .

*There are dozens, probably hundreds of more apps. What apps would you like to see? If you could get an app-friendly radio, would you buy it? Let me know. I'll have more on the new horizons in communications technology next month.*



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# A Trio of Radios and a Battery Charger Splitter That Warrant Your Attention

By Gordon West, WB6NOA

The 2012 International Consumer Electronics Show, January 10 through 13, in Las Vegas <<http://www.cesweb.org/>>, always had plenty of new wireless products and accessories.

C.Crane, well known to radio enthusiasts across the spectrum, had a giant booth with new and upgraded gear, **Photo A**.

There was also a very interesting product displayed by PulseTech that is bound to get your battery-charging juices flowing — the QuadLink Battery Charger Splitter.

Here are snapshots of these pieces of gear, which I found particularly *hot*.

## The C.Crane CCRadio2

C.Crane's wildly popular CCRadio now has the number 2 in its title — now available in two colors, as well as 2-meter FM ham radio reception. C.Crane's overseas engineer increased the AM receiver sensitivity and selectivity for enhanced AM radio reception <<http://www.ccrane.com>>.

"The boost in AM performance comes from our patented twin-coil ferrite AM antenna, plus improvements to the receiver's front end," CEO Bob Crane said. The company added the 2-meter ham band in place of analog FM television audio reception because television is now digital with audio imbedded within the digital stream.

The radio's 2-meter amateur radio band offers five programmable memories for instant access to local repeater or simplex frequencies.

Weather channels may also be monitored, including the automatic weather alert. The FM broadcast band is included, and the big speaker really leads to some high-fidelity reception.

**Photo A.** C.Crane's CCRadio booth at the annual Consumer Electronics Show in Las Vegas is always a fun gathering spot for shortwave listeners. And all products are live on the shelf!

*"Three radios from C.Crane and the QuadLink Battery Charger Splitter from PulseTech deserve a look from the communication hobbyist community."*

The CCRadio 2 comes in black or silver and runs about \$160. **(IN DEPTH:** For an overview of the CCRadio2, visit: <<http://bit.ly/rGyxbp>>. — Ed.)

## The C.Crane CC Gozo

Brand new to C.Crane is the CC Gozo — a battery-operated or AC portable AM/FM radio in a small size. Kids and adults will love it! **Photo B.**

It has an input jack to channel music patched-in from personal entertainment devices, such as an iPod.

"The excellent acoustic full-range audio is accomplished with a fairly small 2.5-inch speaker but it uses an additional





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**Photo B.** The C. Crane *CC Gozo* is a compact AM/FM portable radio with analog-style turning, plus a jack to patch-in a personal stereo device, such as an iPod.



**Photo C.** The *CC Gozo* tuning knob is free of backlash, but a little stiff on a cold morning. C. Crane says the stiffness is by design (see text). The dial lights up when adjusted — very clever!



**Photo D.** These knobs on the *CC Gonzo* control on/off, volume, bass response, and band selection.

passive radiator speaker enclosure,” Crane said. “And the precise vernier dial allows for easy frequency adjustment.” **Photo C.**

Run it on six AA batteries for a trip to the beach, or in the kitchen with the included AC adapter.

The carry handle swivels to act as a tilt stand. The instruction sheet identifies the three small upper knobs as volume, tone control, and the choice of AM, FM, or the auxiliary input port, **Photo D.**

The AM ferrite antenna is on the inside, and the FM antenna uses a telescopic whip that nestles on the top of the radio.

The AM/FM tuning knob is a little stiff — *on purpose*. When speaking with the C. Crane product development team, the hefty tuning feel prevents vehicle, boat or train vibrations from slightly skewing the frequency. After a while, you get the “feel” for really grabbing the knob, then enjoying that feel as you cruise through AM and FM frequencies.

One other performance feature I discovered — certainly not specific to just this radio, but all AM radios — is that the hard-working internal automatic gain control circuit (AGC) purposely keeps strong signals from overloading the receiver and, conversely, keeps weak AM stations coming in at about the same volume.

When tuning across several weak stations, the volume remains steady, and white noise between the weak stations is slightly suppressed.

If you tune in an extremely strong local AM radio station, the AGC faithfully suppresses the signal intensity within the receiver so as not to overload. *Fabulous!*

However, when slowly tuning away from a powerful nearby AM signal, pronounced white noise immediately rushes in where the AGC lets loose of the very strong carrier. Tune further away and things get back to normal. Just don’t be surprised that turning the dial away from a powerful AM station will produce the white noise *rush* as you move away.

You can get some great sounds out of the Gozo by putting it into the amplifier mode, and taking audio out of a personal listening device and piping it into the powerful amplifier circuit. Now, that’s great for the beach!

C. Crane offers all kinds of headphones and earbuds, and they simply plug into the back on the Gozo receiver.

Price of the Gozo is about \$110, and the simple tuning dial demystifies this receiver for *Great Grandma* to find her favorite station!

*(IN DEPTH: For more information on the C. Crane Gozo, visit: <<http://bit.ly/tnFYEx>>. — Ed.)*

## The Sangean ATS-909X

Here’s a shortwave receiver that is ideal for local sailors to tune in the U.S. Coast Guard weather broadcasts and to decode the incoming analog sounds of weather radio facsimile.

It’s the Sangean ATS-909X, with single-sideband capability on shortwave to tune in ham and marine upper and lower sideband broadcasts, **Photo E.**

By the way, C. Crane, as a distributor, has included the ATS-909X in its catalog.

This receiver covers the standard AM and FM broadcast band, longwave broadcasts below the AM broadcast band, and shortwave from the AM broadcast through the entire high-frequency spectrum. Frequencies can be immediately loaded into memory, and fine tuning allows you to zero in on single sideband broadcasts.





**Photo E.** Sangean receivers are always a big hit at the annual Consumer Electronics Show in Las Vegas. C.Crane carries selected radios from the Sangean line, including the ATS-909X.

A great way to log some of those rare stations is by tuning in powerful double-sideband shortwave stations, but using single sideband to minimize interference.

So, grab the Sangean ATS-909X and have some fun tuning up and down the bands.

For example, this SSB receiver does a super job of picking up long-range U.S. Coast Guard weather broadcasts, **Photo F**, <<http://www.navcen.uscg.gov>>:

- 4,426.0 kHz USB (Upper Sideband)
- 6,501.0 kHz USB
- 8,764.0 kHz USB
- 13,089.0 kHz USB
- 17,314.0 kHz USB



**Photo F.** The Coast Guard still uses high-frequency single sideband for communications and weather broadcasts. But remember: It's always Upper Sideband — a receive mode featured in the Sangean ATS-909X from C.Crane.

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15,000 kHz	AM	daytime
20,000 kHz	AM	daytime

This radio also tunes in the high seas upper sideband telephone service from powerful WLO in Mobile, Alabama, <<http://www.shipcom.com>>:

8,788 kHz	USB
13,110 kHz	USB
17,260 kHz	USB
19,773 kHz	USB

If your computer has weather facsimile decode capability, try one of these frequencies on upper sideband <<http://www.nws.noaa.gov/om/marine/RFX.pdf>>:

8,459 kHz	USB	Alaska
12,784.1 kHz	USB	West Coast
11,088.1 kHz	USB	Hawaii
12,748.1 kHz	USB	Atlantic
12,788 kHz	USB	Gulf

For some hot ship-to-ship listening:

8,294 kHz	USB
12,353 kHz	USB
16,528 kHz	USB

Nearly 24 hours a day, ham radio operators continuously guard and work ship-to-shore traffic on their one dedicated frequency — upper sideband, 14,300 kHz. These radio amateur net control operators take great pride in continuously guarding this one-and-only maritime mobile hailing channel, where on an almost weekly basis you can hear priority and distress calls coming in from ham sailors at sea.

The Sangean ATS-909X SSB receiver from C.Crane sells for about \$250.

*(IN DEPTH: For more information on the ATS-909X, visit: <<http://bit.ly/svKKh7>>. — Ed.)*

## Read All About It . . .

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On the Web, visit: <<http://www.ccrane.com>>. To order by phone: (800) 522-8863.

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## 'QuadLink' Battery Charger Splitter From PulseTech

If your RV or boat, or maybe your garaged four classic cars, each need battery charge maintenance, you may no longer need to run out and buy individual chargers for each battery.

A new product from PulseTech called QuadLink turns your current 12-volt battery charger into a four-station maintenance charger — automatically splitting and distributing all of the



**Photo G.** Here's a close view of the QuadLink battery charger splitter. "We tested the quad splitter using the PulseTech solar charger," Gordon West, WB6NOA said. "It puts out about 1,000 mA. Some meters were added to watch the charging current during the 10-minute charge to each battery."

charger's capability into 10-minute sequencing charge segments, **Photo G.**

"This product saves users both time and money, because with QuadLink there is no longer a reason to use multiple chargers on vehicles or batteries in storage," said Pete Smith, President, Specialized Products Co., (SPC). It is sold through PulseTech distributors and dealers.

When the multiple batteries are each hooked into extension leads, the source battery charger will only see an individual battery, rotating every 10 minutes.

If there is no battery connected, it simply skips that channel. If the present charger you are using features "smart charge" electronics, it will immediately sense the individual battery's voltage, and deliver the proper amount of current to charge it, or float it.

What this four-bay multiplier does is to isolate each of your four batteries to your present charger, preventing one low battery from discharging the rest. Even if you have several batteries in parallel, your present smart charger will sense the load and adjust properly.

Remember, the charging technique on this four-bay multiplier is specifically dependent on your current source



charger. I use a 10-amp "ship 'n' shore" Schumacker automatic battery charger, which incorporates a DC ampere meter and needle movement.

I watched as the four-bay multiplier cycled to each battery, and there was no question which batteries needed a hefty charge — the ampere meter would instantly jump-up indicating this was a battery now receiving replenishment. When it switched to another battery that was brim full, the needle would just take a quick flick, and then settle in at less than an ampere.

Keep your eye on that meter — if you see it constantly pumping 4 or 5 amps into a specific battery, cycle after cycle, there is a good chance that battery is either low in electrolyte or it is beyond service.

If the charger you currently have is simply a trickle charger, this system will automatically trickle each battery individually for 10 minutes each.

I run the PulseTech 25-watt SP-25 photovoltaic smart charging system, **Photo H**, and now have a neat way to maintain our communications van batteries — one at a time, yet all hooked up in parallel with isolation diodes.

Just keep in mind that your existing charger is the "brains" to the success of this multiplier. If your current charger has the ability to properly adjust the charge of different types of batteries, the QuadLink will allow it.

But, if you have batteries with different chemistries and each requires a different specific form of recharging, the four-channel QuadLink won't detect the difference, and you could inadvertently undercharge or overcharge battery chemistry not designed for your present charger.

There was no provision to inspect the inside of this four-bay multiplier. What I was most interested in was the diode protection between each of the four batteries. Let's say you hook up four batteries. Three of them are relatively new, but the fourth is deeply discharged.

Could there be enough cross-current flow within the four-bay multiplier that the healthy batteries might try to pass 10 to 20 amperes to a nearly-dead battery "down the line?" I don't have an answer yet. QuadLink tends to be a little secretive on *exactly* what's inside its charger multiplier.

I strongly suspect the company would have designed-in some kind of protection against current flowing where it shouldn't be flowing between batteries.

If you want to allow a certain battery to have more relative charge time within



**Photo H.** The new QuadLink Battery Charger Splitter from Pulse Tech allows charging up to four batteries from one battery charger — one at a time, automatically. The QuadLink gives each battery connected a 10-minute charge before rotating to the next battery in line.

the charge cycle, you can double-connect a station to any given battery, allowing twice the time for your charger to bring it up to a full charge.

This \$99 unit is simply a splitter/isolator, for up to eight amps of charging,

and saves you the hassle of frequently moving your single battery charger over to each battery to get a fill up.

(IN DEPTH: For more information on the QuadLink Charger Multiplier, visit: <<http://bit.ly/sGgdX6>>. — Ed.)

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# An Update for Listening In On 'The Opposition'

By Gerry Dexter

In recent years it has become fairly common knowledge — as well as common sense — that most clandestine broadcasters have a rather brief existence.

If they don't find their studio riddled by an AK-47 as they are about to "dis" *El Presidente* yet again, a well-placed charge of C-4 is just as likely to do the job. At least, this was sometimes the case during the civil wars in Nicaragua and El Salvador 20-some years ago. And let's not forget the heydays of clandestine radio during Vietnam almost 50 years ago — a war that eventually spilled over into Laos and Cambodia.

In the past, the hotbeds for this kind of broadcasting were in Southeast Asia, Cuba, Central America, and Southern Africa. But as time has passed, the scene has shifted. Target countries are in the Middle East and the Horn of Africa, although North Korea and China seem to be permanently on the hit list, as well.

Still, there are some broadcasters that have remained more-or-less stable through the years:

- North and South Korea still bang away at one other. North Korea, of course, gets the most attention.

- China, too, is a favorite target of late. Many of the broadcasts to China come from Taiwan — especially the Sound of Hope. It broadcasts on numerous frequencies, but not all of them are active at the same time.

Today, though, the biggest threat to these opposition broadcasters comes not from a gun muzzle or an explosive blast, but from a bank account quickly diminished to anemic status.

Transmitter rental costs the broadcaster or its funding group must pay can put operations in jeopardy. They find themselves unable to pay for *Radio Whosit's* twice weekly 30-minute broadcasts up

*"In the past, the hotbeds for opposition broadcasting were in Southeast Asia, Cuba, Central America and Southern Africa. But the scene has shifted."*

on, say, a 15-MHz relay. That, I think, is why the line-up of opposition broadcasters changes so rapidly: One group finds itself with a sickly bank account while another gets fired up with revolutionary passion — perhaps in, or about a completely different country and situation.

It is sometimes a case of a station going off the air even before news of its existence reaches the DXing public — much less allowing listeners time to *give it a try*.

Even the people who maintain Web listings of clandestine or opposition broadcasters often find themselves defeated by the task of keeping them accurate and up to date.

Not surprisingly, many of these broadcasters have their points to make. They run the gamut of preaching freedom and democracy and all things *pink and pretty*, to everyone happily bowing to *the law*, whether we like the idea or not.

Even if you could understand Arabic or Tigrinya or Chinese, it's doubtful you would agree with everything aired in any of the broadcasts.

In short, some of the opposition and clandestine broadcasters are troublemakers. They are bullies on the block. Territory tormenters. They want to alter things in your mind: The way you think and act to make you forget what you

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Shiokaze (Seabreeze) uses shortwave from Japan's Yamata transmitters to reach Japanese citizens believed to have been kidnapped to North Korea.  
(All illustrations are courtesy of Rich D'Angelo, Wyomissing, PA)



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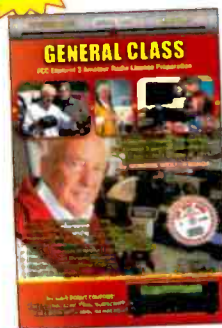
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QSL No. 2008-Oct17-06-1

Mr. Richard A. D'Angelo  
2216 Burkey Drive,  
Wyomissing, PA 19610  
U.S.A.

Dear Richard A. D'Angelo

Thank you for your recent letter and reception report. We appreciate your interest in our station, and your reports of reception conditions are very important to us.

We are happy to confirm your reception of Open Radio for North Korea.

Date : 2008-10-08

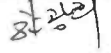
Time(UTC): 21:47-22:00

Frequency : 9950kHz

We're sorry that we currently have to issue QSL Letters rather than cards, as a result of a temporary printing difficulty. The usual cards will resume very soon.

Enclosed please find a copy of our current programme schedule.

With very best regards,

  
Han Gwang Hee  
Programme Director



Radio Voice of the People speaks to Zimbabwe through transmitters in Madagascar.

believe in. They may want to eliminate your right to vote this way or that, according to their principles.

It is perfectly OK to use them as DX targets and write to them for verifications, but I wouldn't get any closer. You'll know which ones I'm referring to when you hear them. They're the broadcasters *on the fringe*. You don't want to become infected with *clandestine cooties*, now do you?

It's even fine to make hunting clandestine or opposition broadcasters your main shortwave listening interest. In fact, a few more specialists — even *experts* — in that area would be a positive thing!

The crop of opposition broadcasters we had in 2011 is quite different from the line-up we find in 2012. This month, we're going to fill you in on those changes with our breakdown of the current broadcasters.


The accompanying chart lists their times, frequencies, days and, of course, the target country in question. Use *Pop'Comm's*

Open Radio for North Korea, also beams to that country from Tashkent, Gavar (Armenia) and South Korea.



Sound of Hope employs at least two dozen frequencies aimed toward China, which jams it with its "Firedrake" transmissions.





*Democratic Voice of Burma*

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Norway

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Democratic Voice of Burma is intended for Myanmar.




**자유북한방송**  
Free North Korea Radio

Free North Korea Radio is one several aimed at Kim Jong Un.



Radio Y'Abadanga is aimed at Uganda.

list of opposition broadcasters this month as a base and we'll help you keep up to date with changes in future editions of this magazine and via *Pop'Comm On the Web*: <<http://www.pop-commmagazine.blogspot.com/>>.

Not included in the breakdown are the U.S.-based/IBB broadcasts such as Radio Free Asia, Radio Free Europe-Radio Liberty, Radio Free Afghanistan, Radio Marti, Radio Farda and such. For one thing their schedules are extensive and pretty complicated.

In some cases the operating times listed are not comprehensive, nor are the frequencies listed necessarily all those in use. This is particularly the case with Sound of Hope, whose times and frequencies are quite extensive. I've tried to include those frequencies most likely to be used.

To read the accompanying chart, note that:

- In the DAYS column, the figure "1" represents Monday; "2" Tuesday, and so on.
- Blank cells in the DAYS column generally indicate seven-days-a-week operation.
- All times are in UTC.
- Double capital letters are language abbreviations: SS for Spanish, KK for Korean, EE for English, and so on.

Many of the broadcasts come from outside the target country. The majority of broadcasts on 31, 25 and 19 meters emanate from many of the major relay stations. So the broadcasts from the likes of Radio Y'Abaganda, broadcasting to Uganda, may

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well be coming from Wertachtal in Germany — or the Sound of Hope, to China, broadcast from Taiwan. I don't think there are any cases where an opposition broadcast comes from within the target country anymore. The classic clandestine station has largely become more of a curiosity than anything else.

I'll claim here that chasing down opposition/clandestine broadcasts is at about the top of the *frustration scale*. Not only do you have to deal with not-so-common languages and con-

fusing station names, you may also need to venture into propagationally-unfriendly frequency ranges during times you'd be better off spending in bed.

What's more, the information is often devilishly hard to come by and often from unreliable sources, to boot.

Despite these possible liabilities in regard to accuracy, this *Pop'Comm* listing should more than get you started on the chase.

BROADCASTER	TARGET	FREQUENCY	TIME(S)	DAYS	LANGUAGE
Dem. V. of Burma	Burma	"6225, 7510"	1515-30		vernaculars
Denge Mezopotamia	Kurdistan	"7540, 11530"	04-20		Kurdish
Dmetse Tewahedo	Ethiopia	15370	1830-1930	7	Amharic
Echo of Hope	North Korea	"3985, 6003, 6348"	early AM		Korean
ESAT Radio	Ethiopia	15370	17-18	"3, 5, 6, 7"	Amharic
ESAT Radio	Ethiopia	15390	17-18	"2, 4, 6"	Ahmaric
Fursato no Kaze	North Korea	"9780, 9950"	"11, 13, 15"		JJ
Ginbot 7 Dimts Radio	Ethiopia	"6100, 7140, 7175, 7185"	"06, 1730"	"3, 5, 7"	Amharic
Gunaz Radio	Azerbaijan	7610	1400-1900		Azeri
Hamada Radio Intl.	Nigeria	"7530, 11865"	"0530, 1930"		Hausa
Khmer Peoples Power Movement	Cambodia	9955	1300-1400	"1, 7"	Khmer
Khmer Post Radio	Cambodia	9960		"4, 5, 6"	Khmer
Korean Ntl. Dem. Front	South Korea	"3481, 4450, 4557"	early AM		KK
La Voz de Djibouti	Djibouti	21525	1200-1300		Somali
Ming Hui Radio	China	6030	1300-1400		Chinese
Nippon no Kaze	North Korea	"9950, 9965, 9975"	15-16		JJ
North Korea Reform Radio	North Korea	7590	1500-1900		KK
Ntl. R. Saharan Arab Rep.	Morocco	6297	late aft.		SS/AA
Open Radio for N. Korea	North Korea	"7475, 7560"	"14, 15, 21"		KK
R. Damal/V of Somali Peop	Somalia	"11740, 11970, 15700"	"04-07, 18-21"		Somali
R. Ashur/VO Assriyan Rep.	Iran	9155	"07-08, 16-19"		
R. Free North Korea	North Korea	11510	12-14		KK
R. Voice of Kurdistan	Iran	3930			Kurd/AA
R. Voice of the People	North Korea	"3480, 3912, 4450, 6410," "6518, 6600"			KK
Radio Denge Kurdistan	'Kurdistan'	3290	0145-0330		"Kurd, Farsi"
Radio Free Chosun	North Korea	7505	"12-15, 15-21"		KK
Radio Free Sarawak	Malaysia	15420	1000-1200		Malayan
Radio Hage Somalia	Somalia	"3980, 6915"	"0900-10, 13-15"		Somali
Radio Republica	Cuba	"5954, 9490, 9780"	2100-1000		Spanish
Radio VO People	Zimbabwe	"7245, 9445, 9870"	04-05		
Radio Xoriyo	Somalia	15515	15-16	6	Somali
Radio Y'Abaganda	Uganda	17725	17-1715	7	Swahili
Rado Democratica	Somalia	21555	12-13	1	Amharic
Saab a Moo Zoo	Asia	7530	2230-2300		Hmong
Shiokaze	North Korea	"5910, 6110"			JJ/EE
Sound of Hope	China	"6280, 7280, 9150, 9380"	24 hr on some		Chinese
Sudan Radio Service	Sudan	"9840, 13720, 17745"	"17-1730, 0400"		AA/EE
SW Radio Africa	Zimbabwe	4880	17-19		EE
Voice of Asena	Eritrea	15360	17-18		
Voice of Peace & Dem.	Eritrea	"7325, 9560"	0400-0430		Tigrinya
VO Dem. Erit-Eth Lib.	Ethiopia	13820	1700-1730	5	Tigrinya
VO Dem. Erit-Eth Lib.	Ethiopia	13820	1700-1730	5	Arabic
VO Iranian Kurdistan	Iran	"3970, 4870"	0230-0430		"Kurd, Farsi"
VO Iranian Revolution	Iran	"3880, 4375"	1600-1900		
VO Iraqi Kurdistan	Iraq	6335			
VO Kurdish Toilers	Iran	4235	0230-0430		Kurd/AA
VO of Iranian Cmst Party	Iran	"3880, 4375, 6348"	0330-0430		
VO Oromo Lib. Front	Ethiopia	11995	1600-1630	1	Oromo
VO Oromo Liberation	Ethiopia	"5060, 11810"	"0430-05, 14-16"		Tigrinya
VO Tigray Revolution	Ethiopia	"5950, 5980"	0430-0530		Tigrinya
Voice of Wilderness	North Korea	6275			KK
Zimb. Community Radio	Zimbabwe	4895	1755-1855		EE/vernacular



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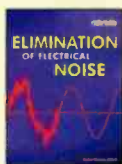


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## MONITORING STATIONS

Listening, Around the World

# The Shortwave Era

By Richard Fisher,  
KPC6PC

*“As the time goes on, the interest in shortwaves is becoming greater and greater. It may well be said that we have as yet not scratched the surface.”—  
Hugo Gernsback,  
September 1928*

As we watch the *Pop'Comm Monitoring Station Program* strengthen and grow, this month we look back to the late 1920s — a time when Hugo Gernsback, an SWLing proponent and editor and publisher of *Radio News* magazine, wrote often about shortwave and its rapidly protracting legion of hobbyist-followers.

*Why such enthusiasm? Why at this time?* Because SWLers in the late '20s could “now receive broadcasts on (their) loudspeaker or headphones from practically any country from around the world,” Mr. Gernsback wrote.

It takes two to tango. The proliferation of broadcasters and listeners worldwide was setting the foundation for the monitoring landscape we look upon today. We offer Mr. Gernsback's perspective from more than 80 years ago as validation of the strength of our hobby in the 21st century.

— Richard Fisher, KPC6PC

By Hugo Gernsback,  
Editor and Publisher,  
*Radio News*, September 1928

Once more a silent, but nevertheless most important revolution is making itself known in radio. These periodic revolutions in the art of radio are a novelty no longer, but occurrences to which the careful observer has become quite accustomed. Only a short year ago the radio art began to turn away from battery operation of sets and started to electrify them. Late last year, still another revolution brought the complete AC-operated set.

During the past few months, a new era seems to have opened in what will be known hereafter as the “Shortwave Cycle.”

Not that shortwaves are something new in radio; quite the contrary. This work goes back to 1908, when amateurs first began to converse with each other, by dots and dashes, below 200 meters. The amateurs have kept at this ever since, without making much, or any, impression upon the general public. The reason for this lack of interest, of course, is that, in order to operate either a shortwave transmitting set or a shortwave amateur receiving set, you had to be conversant with the “code;” and this is something at which the general public has always balked.

To the average radio listener, to the radio fan, and to the set builder in general, dots and dashes are so much noise and “static,” not to be taken seriously at all.

Of course, these listeners lose the best part of radio through not being able to understand or work code, and miss many of the thrills that the amateur enjoys in deciphering a message that comes from the Antipodes. Yet, the general radio public, in spite of all its love of novelty, is quite apathetic to these possibilities and the amateurs have failed to gain much ground. But of late the broadcast listener is becoming very much interested in



**Photo A.** The cover of the September 1928 *Radio News* shows a relaxed, pipe-smoking viewer watching the “ideal television of the future” — whose technology at that time faced the hurdle of keeping the camera and the receiver in synchronization. The control in the viewer's left hand is to make adjustments to compensate for those “sync issues.” It was deep within the pages of this edition the Hugo Gernsback wrote about *The Shortwave Era*. (Courtesy of *Radio News* magazine, via Wikimedia Commons)



**Photo B.** Here's how Mr. Gernsback's article "The Shortwave Era" appeared in *Radio News* in September 1928. (Courtesy of *Radio News* magazine, via Wikimedia Commons)

# Radio News

Hugo Gernsback Editor & Publisher

Editorial and General Offices, 230 Fifth Avenue, New York

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Vol. 10
SEPTEMBER, 1928
No. 3

## The Short-Wave Era

By HUGO GERNSBACK

**O**NE more a silent, but nevertheless most important revolution is making itself felt in radio. These periodic revolutions in the art of radio are a novelty no longer, but occurrences to which the careful observer has become quite accustomed. Only a short year ago, the radio art began to turn away from battery operation of sets and started to electrify them. Late last year, still another revolution brought the complete A.C.-operated set.

During the past few months, a new era seems to have opened in what will be known hereafter as the "Short-Wave Cycle."

Not that short waves are something new in radio; quite the contrary. This work goes back to 1898, when amateurs first began to converse with each other, by dots and dashes, below 200 meters. The amateurs have kept at this ever since, without making much, or any, impression upon the general public. The reason for this, lack of interest, of course, is that, in order to operate either a short-wave transmitting set or a short-wave amateur receiving set, you had to be conversant with the "code"; and this is something at which the general public has always balked.

To the average radio listener, is the radio fan, and to the set builder in general, dots and dashes are so much noise and "static," not to be taken seriously at all. Of course, these listeners lose the best part of radio through not being able to understand or work code, and miss many of the thrills that the amateur enjoys in deciphering a message that comes from the Antipodes. Yet, the general radio public, in spite of all its love of novelty, is quite apathetic to these possibilities and the amateurs have failed to gain much ground. But of late the broadcast listener is becoming very much interested in short waves, not because he wishes to listen to code and its dots and dashes, but because he can now receive broadcasts on his loud speaker or headphones from practically any country throughout the entire world.

A reader in New South Wales, Australia, writes us that while he was writing his letter he was listening to WRNY's short-wave transmitter, 2XAL, on a three-tube set; and had to turn down the volume, otherwise he would wake up his family. All this at a distance of some 10,000 miles! Yet 2XAL, it may be said in passing, uses less than 500 watts; a quite negligible amount of power, as power is rated these days.

The radio set manufacturers for the past few years have claimed vociferously that the day of DX fishing and long-distance records is past. In their hearts, the manufacturers knew that this is not the case, but that the truth is, the average manufactured set is poor for long distance and is constructed primarily to receive local stations and others not more than 100 to 250 miles away. Manufacturers stress an assertion that set owners no longer wish to receive long-distance signals, on the theory that such reception is never good. We might take issue with the manufacturers on that score and point out that, with the average manufactured set, distant reception is usually not good; but, if you have a really good set, distant reception certainly is good. Hence, worth to say, the set manufacturers to the contrary, the public is still interested in bringing into our everyday, humdrum existence the thrill of covering great distance. If this were not so, how otherwise explain the sudden and tremendous popularity of short-wave broadcast reception?

During the past six months, every time *Radio News* ran a constructional article on a short-wave receiver, set builders and radio fans have responded in the ratio of three to one, compared to those following up the regulation broadcast-set articles. In other words, there still is a thrill in getting distance; because our set builder builds a short-wave receiver unless he is interested in receiving broadcasts from distant stations. This should be quite obvious because, within 100 to 200 miles of a short-wave transmitter, the usual short-wave receiver is hopelessly inefficient, on account of the so-called "skip-distance" effect.

It is quite the thing now for the radio fan to own one or more broadcast sets for the usual upper-wavelength broadcasts on 200 to 600 meters, and also a separate short-wave set which brings in broadcasts from 20 meters up to 200.

And as time goes on, the interest in short waves is becoming greater and greater. It may well be said that we have as yet not scratched the surface. Technicians believe that in due time all broadcasting will be done on short waves; everything seems to point that way. Already many stations are operating two transmitters simultaneously; one in the upper waveband, and the other in the lower waveband. These stations in doing so are simply staking out their claims for what is to come in the future; and the recent scramble for short waves for television purposes points unmistakably in the same direction.

Most radio engineers today are convinced that the final solution—unless an entirely new invention comes along—of television rests in the lower-wave spectrum. Companies and individuals have been awarded licenses to broadcast television on the lower wave channels and, unless a new invention does come along pretty soon, most of the television broadcasting will be done on these lower waves. Such developments, of course, like all revolutions of this kind, are slow and orderly; but they are revolutions nevertheless.

It would not surprise me at all if, during the next five years, the broadcast-ing of both sound and sight will be done completely on short waves; and the upper wave-channels from 200 to 600 meters gradually abandoned, as fast as we learn more about the short waves. At the present time, the only thing that stands in the way of universal adoption of short waves is the skip-distance effect. Take, for instance, 2XAL, broadcasting on 30.91 meters; within 200 miles of New York, the reception is poor. Beyond this distance it becomes better and better, the further you get away from the transmitter. This is one of the problems that has yet to be solved and, when it has been solved, there is little doubt that all stations will move down into the short-wave part of the spectrum.

In the meanwhile, it is encouraging to note that the radio broadcast listener and the radio set builder have become more and more impressed with the importance of the short-wave situation. The movement is assuming greater proportions every month, and it will not be long before the set builder will desert the upper wavelengths entirely, and construct only short-wave receivers, to the exclusion of all others.

Mr. Hugo Gernsback speaks every Tuesday at 9:30 P. M. from Stations WRNY (136 meters) and 2XAL (30.91 meters) on various radio and scientific subjects.

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*Whatever the monitoring need, AOR products deliver exceptional performance for use by federal, state and local law enforcement agencies, the military, emergency managers, diplomatic service, news-gathering operations, and home monitoring enthusiasts.*



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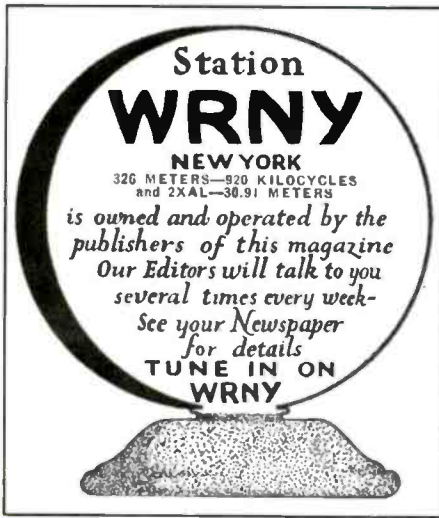
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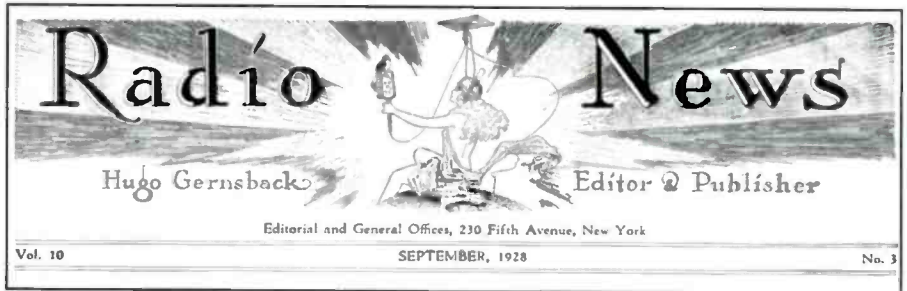
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**Photo C.** A magazine advertisement invites listeners to tune in to Hugo Gernsback for a radio talk "on various radio and scientific subjects . . . every Tuesday at 9:30 p.m. from stations WRNY (326 meters) and 2XAL (30.91 meters)." (Courtesy of *Radio News* magazine, via Wikimedia Commons)



**Photo D.** The page-topping nameplate above Hugo Gernsback's editorial captures some of the excitement and anticipation listeners experienced as "The Shortwave Era" was, indeed, burgeoning in the late 1920s. (Courtesy of *Radio News* magazine, via Wikimedia Commons)

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### SPURIOUS SIGNALS By Jason Togger KB3CNM



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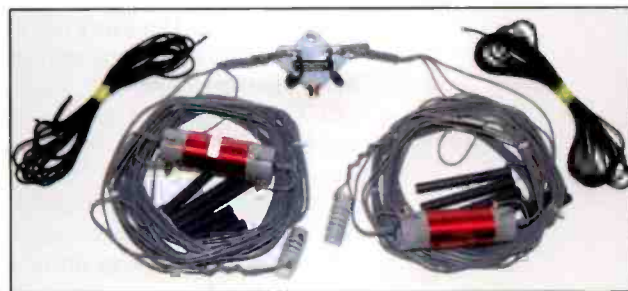
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## A Curmudgeonly Luddite Looks @ Logbooks and Low-Tech

by Kirk Kleinschmidt, NTOZ  
<kirk@cloudnet.com>

*“I use computers to log contest QSOs . . . but I still keep a paper log or at least print out a hard copy of computerized contest logs for safekeeping.”*

**N**ow that the sunspot cycle is cooperating and DXing on the high bands is returning to “good old days” levels, at least for a while, you’d think I’d be rarin’ to get on the radio. But during the week-end of the 2011 ARRL 10-Meter Contest, I didn’t even turn the radio on, let alone work a few stations. I was checking my e-mail, however, and during the entire event I was deluged with mail from QRP-L (the Internet group for low-power operators) mailing list members who were gushing about the fabulous conditions on 10.

So, why didn’t I participate? It’s true that I was really busy with lots of other stuff, but the main reason shocked even me. As I later reflected on the situation, I discovered, I was actually caught up in worrying about the status of my computerized log and the PC that it resides on!

I have been trying for many months to find a logging and rig-control solution that “works the way my brain works” and, for a variety of reasons, just haven’t found one yet. I’ve tried several, and while I like certain things about each one, nothing seems to have it all under one roof.

The fact that I’m using my FLEX-1500 SDR almost exclusively nowadays makes matters even more challenging, as my logging software, the FLEX-1500 software and any digital-mode software all need to be configured and running at the same time on the same PC. My shack PC was recently disconnected because I had used it as a backup machine while a customer’s PC was in for service. Although it was sitting in its usual place on the left side of my operating table, it wasn’t connected, configured and operable.

So, what materialized out of all this stuff was that, instead of reconnecting the shack PC (even minimally, just to run the FLEX) or using a paper log, I simply didn’t turn on the radio. In my mental state at the time it was just too much — despite the groovy DX potential and propagation the likes of which I hadn’t seen in years — and it was simpler to just ignore it and get some other stuff done. How sad!

Despite the fact that I’m a lifelong PC enthusiast and work as a PC tech at one of my day jobs, it’s apparent that I’m a curmudgeonly Luddite of sorts when it comes to logbooks, physical books and things that just “go better” when tactile senses are involved. I enjoy reading books on the Kindle, but I still prefer reading “real” books. I enjoy the fact that my computerized logbook can

grab band and mode data from my radio in real time, but I still prefer the “physicality” of my paper logbooks.

A lot of business people are at a similar crossroads with the myth (as of yet) of the long-promised “paperless office” which will free us from the drudgery of filing paper documents of every sort. As the sales pitch goes, desktop PCs will be replaced by laptops, which will be replaced by smart phones, and so on. Filing cabinets will be found only in museums.

Hams have been trying to sort this stuff out, too, with logbooks, QSL cards, books and magazines. The convenience is undeniable, as is the ability to carry around every issue of every ham radio magazine on one USB thumb drive or e-reader, but the potential downsides are largely unexplored.

Although somewhat post-apocalyptic, we’re all betting that the infrastructure that allows for digital storage will be around — essentially forever.

But what if that doesn’t happen? If you don’t want to make that bet with your ham radio data and logbooks, consider “getting physical!” Besides, we humans have long appreciated our tactile, visceral connection to the printed word, modern or ancient. In a way, it’s only natural.

E-reader convenience aside, if I have the choice between reading an electronic book or magazine or the real thing, I’ll take the real thing almost every time. And if the book smells a bit musty — an unmistakable, but not unpleasant, odor that hints at the book’s age and place in the universe — so much the better.

Of course, we want the speed and capacity of computers and digital systems, but we don’t want to lose the superior presentation and durability of the printed page — or printed logbook. I ran out of printed, blank logbooks several years ago, which is sort of funny, as I distinctly remember stocking up on them, dreading the day when I would run out and hoping that computerized logging would advance sufficiently.

Since that day hasn’t yet arrived — for me at least — I’m once again torn between converting to sterile, yet speedy, computer logs; buying more logbooks; or crafting an interim solution. For now, while I test ham radio software in search of the “perfect program,” I scanned a blank logbook page, printed 100 copies and punched them for a three-ring binder. I hate three-ring binders, but that’s another story . . .



DATE TIME	STATION CALLED	CALLED BY	HIS FREQ. OR DIAL	HIS SIGNAL RST	MY SIGNAL RST	FREQ. MHZ	EMIS- SION TYPE	POWER INPUT WATTS	TIME OF ENDING QSO	OTHER DATA	QSLs	
											NAME	S
4/16/77												
23:10	WBØTQY	X	80M	599	599	3.7	A1	75	23:50	FIRST QSO DAN BLAINE, MN	✓	✓
14:42	X	WD4EWW	15M	589	579	?	"	"	15:01	RAY - ASTATULA FLA	✓	✓
15:19	DA1KV	X	15M	459	449	?	"	"	15:30	BILL - BITBURG, GERMANY	✓	✓

**Photo A.** This composite image of two of my key teenage QSOs was made by scanning the first page of my first amateur radio logbook. In addition to the raw QSO data, other physical cues spark my memory. Although it's only from 1977, the old ARRL logbook style is apparent. My first QSOs were made with a borrowed Drake 2NT transmitter that ran 75 watts of "input power," which was how transmitter power was noted back in the day. Also, note the "called" and "called by" fields. That's old school. Dan, WBØTQY, in Blaine, Minnesota, sent me a wonderful, encouraging letter commemorating my first QSO. My first DX QSO came in November of 1977. As shown, it was with Bill, a U.S. soldier stationed in Bitburg, Germany. What's not shown, even in this treasured, historical document, is how crazy-excited I was to be "at last working DX!" (Courtesy of NTOZ)

The off-the-cuff scheme I invented as a teenager to track QSL card "send-sent-received-tallied-tracked" status still works today, but it's not terribly efficient. Computerizing my log data would really simplify QSL-tracking chores, but it doesn't provide any warm fuzzies. And what if my data becomes toast? A lifetime of ham radio goodness down the drain? I still can't get past that!

As a veteran PC tech, I know the necessity of redundant data backups and I lecture customers about it almost every day, but I also know that the archival storage qualities of recorded CDs, DVDs and even hard drives are pretty abysmal when we're talking about preserving important information for 50 to 100 years or more. Until affordable, impervious, long-term storage media

arrives and is made affordable, nothing beats paper, which can survive for 1,000 years or more in ideal conditions.

Recognizing that your logging needs may differ from mine, let me remind you that logging isn't even required these days. Back in the day, however, the FCC insisted that hams keep station logs that detailed the date, time, mode, call signs, frequency, power output — you name it — for each and every QSO and CQ call! Yes, hams had to log each transmission, QSO or dead air.

But even if logging isn't required, it's still worthwhile today, and will be priceless tomorrow.

For me, looking through my old logbooks — or looking through stacks of older QSL cards — is like jumping into a time machine, **Photo A.** Without the benefit of a log, I can remem-

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For over a decade CQ has been bringing you The CQ Amateur Radio Operators calendar. This year's calendar is better than ever! Fifteen spectacular color images of some of the biggest, most photogenic shacks, antennas, scenics and personalities from across the country!

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ber a few of my most prominent early QSOs. But with the log, I can remember those QSOs in great detail, as if I'm watching a big-screen movie in my mind's eye. I can hear the sounds and see the sights. The logbook, filled with scrawls and notations, corners bent, exuding a faint musty smell, is a fantastic mnemonic-

ic device. It's way more effective at spurring old memories than a sterile, yet efficient, PC log.

By simply keeping a station log, those memories have remained fresh for almost four decades, and will remain so as long as I'm around. If you don't keep a station log for any other

## DVDs That Last 1,000 Years?

By Kirk Kleinschmidt, NTOZ

Although this month I'm touting the archival benefits and tactile feel of *good ol' paper* logs, the first affordable, archival, "actually etched in stone" data storage technology has just become affordable. If you're looking to securely back up your ham radio log data, or any important digital data, forever, the new M-disc is worth a serious look. Besides, other than paper, it's the only game in town!

Millenniata and LG are now shipping a new optical disc and reader-writer. **Photos B and C**, that can store any data — ham radio logbooks, movies, music, whatever — essentially forever. Better still, the archival DVDs can be read in any conventional DVD or BluRay player.

Millenniata M-Discs can't be erased or corrupted without intentionally destroying them, and to highlight this point, a company demonstration video shows an M-disc being dipped into liquid nitrogen, and then boiling water, while suffering no damage!

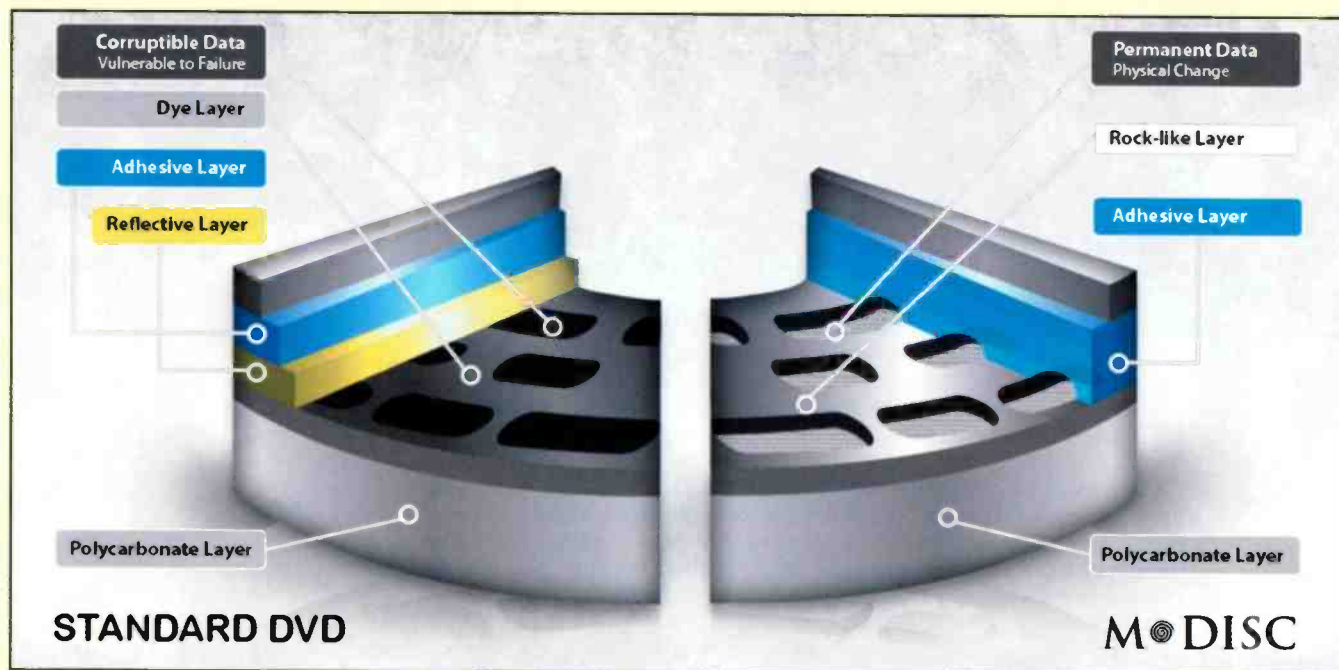
Using conventional DVD drive mechanisms outfitted with a higher-power laser, M-disc compatible recorders etch permanent pits into a rock-like data layer on each disk. Conventional drives merely change the opacity of optical dyes, which makes them ultimately impermanent.

Blank M-discs store 4.7 GB of data and, at press time, cost

less than \$3 each — and may dip below \$1 each later this year. M-disc recorders can be purchased for less than \$25! At a time when conventional optical disc usage is declining because of online storage, low-cost hard drives — neither of which is archival — and the iron will of the late Steve Jobs, it will be interesting to see whether the M-disc catches on. Military and government purchasers are already etching important data into stone!



**Photo B.** LG's GH22NS90 optical recorder can read and write CDs, DVDs and the new M-disc archival DVDs. One of several drives that can handle the new archival discs, this low-cost model is available online for less than \$25. (Courtesy of NTOZ)



**Photo C.** Conventional recordable discs use a low-power laser to change the opacity of light-sensitive media, while Millenniata's M-disc, using essentially the same drive mechanisms, uses a higher-power laser to etch pits into rock-like media. That's how you get a DVD to last a thousand years. (Courtesy of NTOZ)



reason — and there are many good reasons to keep accurate station logs even though they're not officially required — keep one for your own future nostalgia.

I almost always use computers to log contest QSOs, and I sometimes use logging software to track awards, but I still keep a paper log or at least print out a hard copy of computerized contest logs for safekeeping. Because I don't make thousands of QSOs, my logging process isn't overly tedious. Plus, my computer log (or PC) has crashed a time or two, but my logbooks are still going strong. It's an endless debate — PC or paper — but it's one worth having.

## A Data Archive for Your Station

In addition to keeping tabs on QSOs, award data, and so on, your station log is the perfect place to keep track of a whole range of station-related information. You can track modifications and changes to your equipment. Not only will the information be easy to find for future reference, it will be easier to note the effects of such changes by referencing contacts before and after. How does your new dipole antenna compare to your old trap vertical? Check out the signal reports in your logbook and you'll have a good idea!

I use my logbook to store schematics and equipment interconnect diagrams. When I need to connect a PC sound card, let's say, to the audio input pin of my rig's microphone or accessory connector, I don't have to tear the place apart because I have the data sheet stored with my logbooks. The same goes for the connector layouts of every piece of gear on my bench, as well as a schematic of my RF and ground connections, and so on.

DXers often refer to their logs when trying to work into specific parts of the world. When is the best time to work Japan in the winter? A quick check of last year's log entries will probably turn up the required information.

Feel free to note other changes in your log, too. When you upgrade your license, note it in your log. When you get a new rig or put up a new antenna, write down the particulars — and don't forget to include a few details that might spark a grin 20 years into the future when you stumble across your station log.

Although it's one of those things that goes without saying, here I am saying: *Whether paper or paperless, keep a station log!*

# Pop'Comm March 2012 Reader Survey

Your feedback is important to us at *Pop'Comm*. It helps guide us to make the magazine even more valuable to you each month.

Please take a few minutes to fill out this month's Reader Survey Card and circle the appropriate numbers corresponding to the questions below. We'll pick a respondent at random for a year's free subscription or an extension of an existing subscription as thanks for your participation — so don't forget to fill in your mailing address and other contact information.

We encourage your comments and suggestions in the space provided, as well. Thank you.

*Last, but not least:* You can now take this survey online. See details below.

## Looking at my communications gear, this year I . . . (choose all that apply)

- Plan on updating my existing equipment . . . . . 1
- Will take the plunge, and get some new radios . . . . . 2
- Expect to add some accessories to enhance my setup . . . . . 3
- Realize my antenna system stinks. I'll improve it . . . . . 4
- Wouldn't change a thing. It's perfect. . . . . 5

## My family — especially my significant other — is:

- Fully supportive of my radio interests . . . . . 6
- Is as crazy about radio as I am . . . . . 7
- Is tolerant, even to the point of mild interest . . . . . 8
- Doesn't understand my radio passion, but is accepting . . . . . 9
- Waiting for the right moment to throw my gear out the window . . . . . 10
- Oblivious. Just the way I like it . . . . . 11

## When meeting new people, I:

- Am eager to talk about my radio interests . . . . . 13
- Don't bring up my hobby — ever . . . . . 14
- Am reluctant to mention radio due to the *geek factor* . . . . . 15
- Mention radio if I want to end the conversation . . . . . 16
- Mention radio if I want to bring things to "the next level" . . . . . 17

## What has been your biggest thrill or accomplishment as a communications hobbyist? (Use the comment line.)

## Take This Reader Survey Online

You can now participate in this reader survey via the Internet. Simply go to *Pop'Comm On the Web*: <<http://www.popcommmagazine.blogspot.com/>> and click the link to the *Pop'Comm March 2012 Reader Survey*. It's quick and easy.

## The Envelope, Please . . .

For participating in the *Pop'Comm* Readership Survey, the winner of a free subscription or extension is **G. Stewart Tyler, WA4JUO, of Suffolk, Virginia**. Way to go, G! And thanks for your suggestion about doing more articles featuring simple construction projects. Good idea. — Ed.

# A Primer On Gray-Line Propagation

by Tomas Hood, NW7US,  
<nw7us@arrl.net>

*“When the Sun is exactly 12 degrees below the horizon, this ‘twilight zone’ is called the ‘gray-line,’ or in astronomical terms, the ‘terminator.’”*

During the daylight hours, the energy from the Sun ionizes our upper atmosphere, causing distinct layers of ionized gas to form. These regions form what we call “the Ionosphere.”

The region closest to the Earth is called the D-region. Because this region generally absorbs some of the energy of a radio wave, the D-region is often called the “absorption layer.” Higher up in our ionosphere we find the E-region which plays a role in “Sporadic-E (E<sub>s</sub>)” propagation, as well as some absorption. Higher yet, we find the F-region (which at times during the day split into up to three different distinct regions, F1, F2 and F3, with the F3 primarily existing over the equator).

The E-region and F-region refract radio signals back to Earth if the signals’ frequency is at or below the Maximum Usable Frequency (MUF). During the day, the Sun is ionizing all of these ionospheric layers.

## Through the Layers

As a radio signal travels through the D-region, it gets attenuated. The more ionized the region, the greater the attenuation.

During solar flares, hard X-rays (wavelength < 1 nano-meter) increases the D-region ionization, as well. The more intense the X-ray radiation, the denser the D-region becomes, and the higher the frequencies blocked.

The rest of the time, without the increased X-ray radiation from a solar flare, the daytime D-region will only block the lowest HF frequencies, while higher frequencies will lose some of their energy. Since solar radiation has to travel the farthest to get the D-region, absorption is usually minimal. Unless there is a major solar radiation storm, we have minimal daytime absorption and good skip propagation.

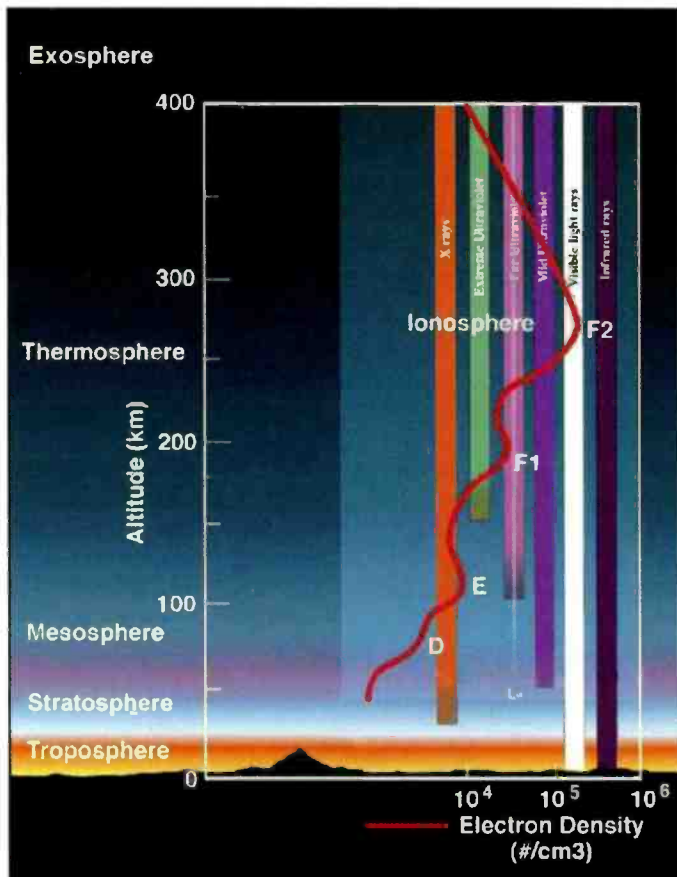
If the radio signal makes it through the D-region, it then reaches the E-region. If the E-region is highly ionized (say, during a sporadic-E condition) and the frequencies are low enough, the signal will be refracted back to the Earth much like a light beam from a flashlight is refracted by a mirror.

Lower HF signals tend to be refracted by the E-region, especially at night. During the day, the D-region generally blocks these lower HF signals.

## ‘Skip Propagation’ and ‘Recombination’

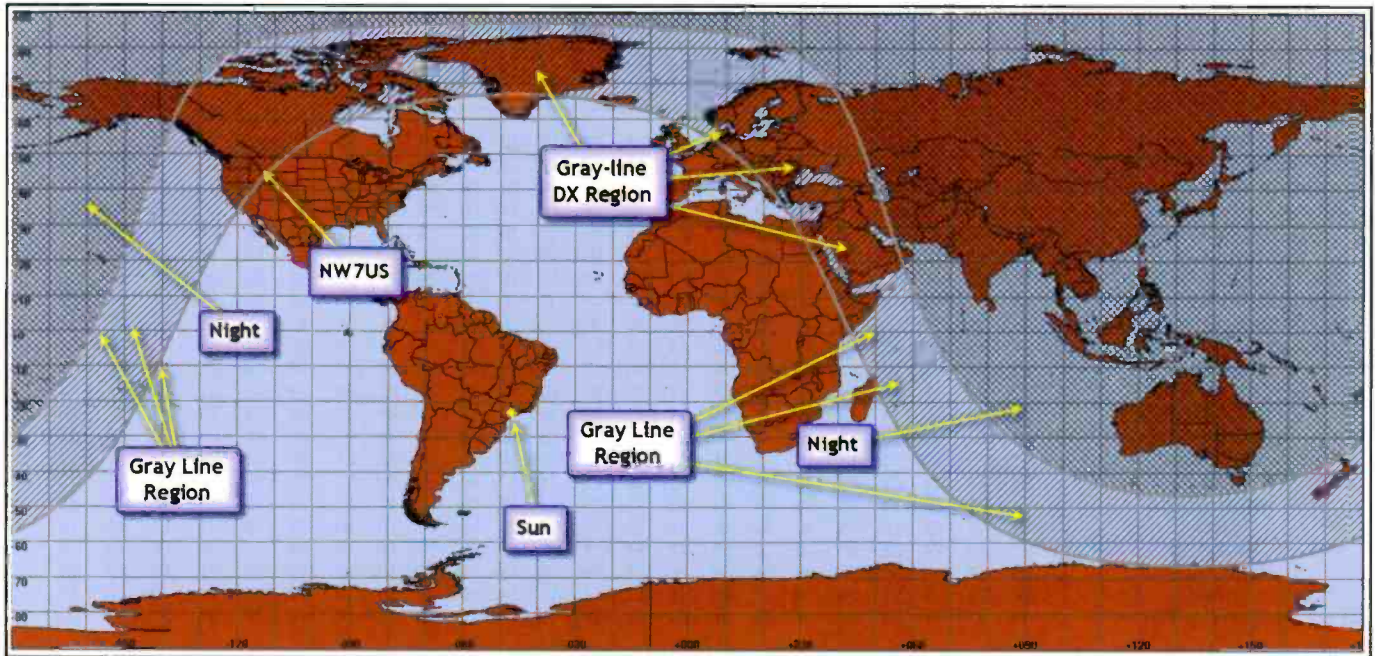
Higher frequencies, however, punch through the E-region and reach the F-region. If they are at or below the MUF, they too are refracted back to the Earth, but at greater distances away from their source. This is called “skip propagation.”

At sunset, solar radiation no longer strikes the ionosphere and the active solar-induced ionization stops. Without this solar radiation, the regions of ionization decrease in density by a process called “recombination.” This causes the MUF to go down as well, which is why by total darkness the highest HF bands close down.



**Figure 1.** This diagram shows the layers within Earth’s ionosphere, following the ion density curve in the atmosphere (red line). The D-region is the lowest, and is mostly present during the daylight hours. The D-region absorbs radio waves from longwave to shortwave. The other regions refract shortwave frequencies (see text). (Courtesy of NASA)





**Figure 2.** This map includes the daylight and gray-line regions created by the position of the Sun. Notice that the gray-line region is not a narrow, hard 'line' dividing daylight and darkness. The terminator region is quite wide. When the transmitting and receiving stations are both located in the gray-line region, and if the MUF along that radio path supports propagation, signals tend to be strong and reliable, because the D-region is weaker than during the hours of daylight. In this example, the columnist's station in Montana is still inside the gray-line region, and Europe and the Middle East are still in the gray-line region as well. A little later, and the Montana location will be in direct sunlight, where the D-region will be fully present, while the other will be in full darkness. Conditions will not be as good once these two regions fall outside of the gray-line region (see text). (Courtesy of NW7US)

Those frequencies do not get refracted, but continue on out into space.

## As the Sun Goes Down . . .

The D-region is the first layer where ionization stops. Since it is closest to the ground, when night arrives, sunlight no longer reaches it, while higher levels of the atmosphere remain in sunlight. Think about how you can see a passing satellite by the sunlight reflected on its surface while you are standing in darkness. It's dark on the ground, but the satellite is still being illuminated. As the D-region goes into recombination, the electron density goes down, and the absorption dies down.

During twilight hours the D-region rapidly loses its ionization and does not absorb radio signals passing through it, while the E- and F-regions are still being ionized by sunlight. This makes for about 45 to 60 minutes of stronger signal propagation on a wide range of HF frequencies.

As the ionization decreases, lower and lower frequencies start to punch through the D-region with almost no signal attenuation. Yet the MUF is still high, allowing long-distance skip propagation. Then, when the Sun is blocked from illuminating the E- and F-regions, the MUF can drop dramatically and very quickly — within minutes.

## The Twilight Zone

When the Sun is exactly 12 degrees below the horizon, this twilight zone is called the "gray-line," or in astronomical terms, the "terminator." The same principles apply at sunrise: The upper ionosphere begins to become ionized, while the D-region is still dark and low in density, offering free passage of very low HF signals, even MW signals.

Signals that are aimed along a path that stay within the gray-line often experience significant improvements in propagation. When propagation is open between two regions that are simultaneously experiencing sunrise or sunset, we refer to this as "gray-line propagation," and is a very exciting way to hear exotic DX signals.

These signals may be coming in from the long path as well as the short path, but always along this gray-line. The frequencies that "skip" along this terminator are dictated by the MUF along the given path.

There is an excellent article regarding gray-line propagation on Steve Nichols, GØKYA's, Internet page, <<http://bit.ly/tISsIB>>. He is a member of the Radio Society of Great Britain's Propagation Studies Committee, and believes that propagation around sunrise and sunset is not fully understood. His article outlines the mechanisms behind gray-line and other twilight propagation modes, and also explains a research project designed to better understand these modes.

As we are right at the rise phase of Solar Cycle 24, gray-line propagation brings exciting DX. Tune around the lower shortwave bands about an hour before sunrise, and again right before sunset, and look for these long-distance signals. Of course, gray-line DX will occur on most of the HF spectrum, but is quite noticeable on these lower shortwave bands, since DX signals on these bands are rare.

## High Frequency Propagation

As the Spring Equinox approaches (April), the boundary line (the "gray line terminator") between daylight and darkness begins to run straight North and South. With the gradual return of sunlight to the polar north, the HF bands are improving



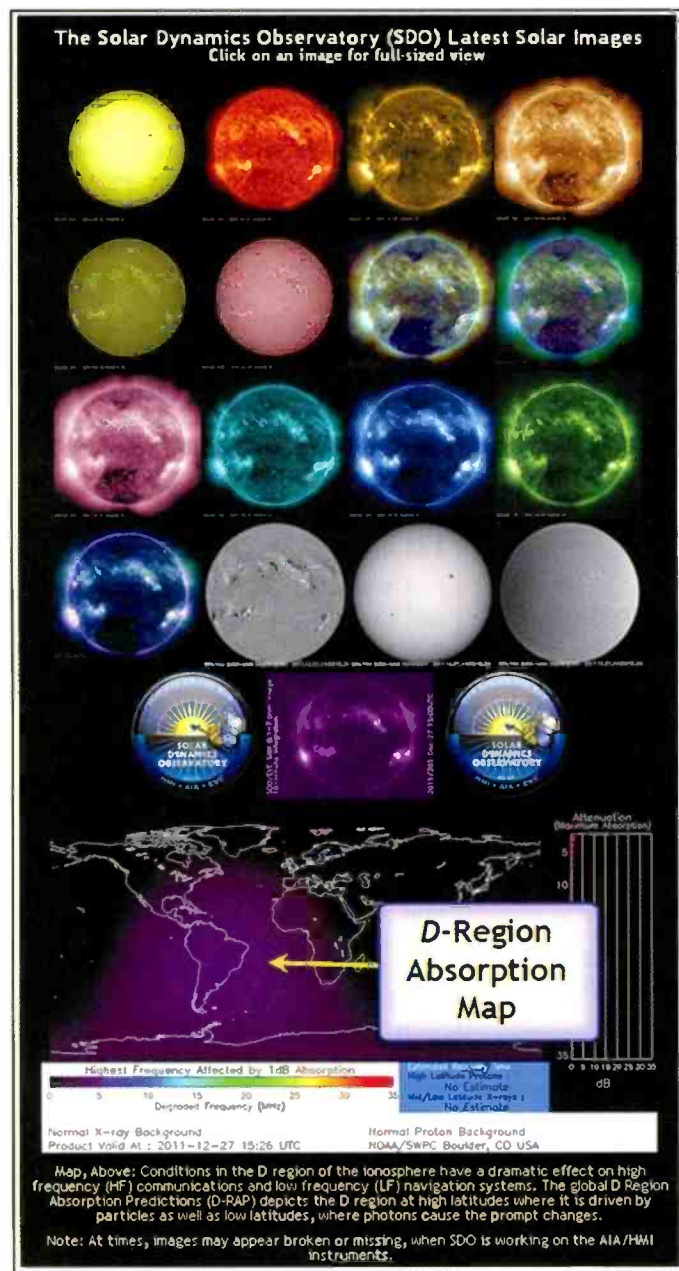
Optimum Working Frequencies (MHz) - For March 2012 - Flux = 135, Created by NW7US

UTC	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
TO/FROM US WEST COAST																									
CARIBBEAN	26	25	23	20	18	17	15	14	14	13	12	12	12	13	20	23	25	26	27	28	28	28	28	27	
NORTHERN SOUTH AMERICA	35	34	32	29	26	24	22	21	19	18	17	17	16	15	23	26	28	30	32	33	34	35	35	35	
CENTRAL SOUTH AMERICA	35	32	29	27	24	23	21	20	19	18	17	16	16	16	25	29	31	32	33	34	35	35	35	35	
SOUTHERN SOUTH AMERICA	36	35	34	30	28	25	23	22	20	19	18	17	17	16	19	26	30	33	35	36	37	38	38	37	
WESTERN EUROPE	12	11	11	11	10	10	10	11	11	11	10	10	10	10	17	19	21	22	22	22	21	20	19	16	12
EASTERN EUROPE	11	10	12	14	16	12	12	11	11	11	10	10	10	14	18	19	19	18	18	18	17	16	15	14	
EASTERN NORTH AMERICA	28	27	24	19	17	16	15	15	14	13	13	13	12	19	24	27	28	30	30	31	31	31	30	30	
CENTRAL NORTH AMERICA	16	16	15	13	10	9	8	8	8	8	7	7	7	7	11	14	15	16	16	17	17	17	17	17	
WESTERN NORTH AMERICA	9	8	8	7	6	5	5	4	4	4	4	4	3	3	3	6	7	8	8	9	9	9	9	9	
SOUTHERN NORTH AMERICA	27	26	25	22	19	17	16	15	14	14	13	12	12	12	18	22	24	26	27	28	28	29	28	28	
HAWAII	25	24	24	23	22	20	18	16	15	14	13	12	12	11	11	10	12	17	19	21	23	24	24	25	
NORTHERN AFRICA	12	12	11	11	11	10	10	11	11	10	10	10	10	17	20	21	22	23	23	21	19	15	14	13	
CENTRAL AFRICA	17	16	15	14	13	12	12	11	11	11	10	10	10	17	19	21	22	22	23	23	23	21	19	18	
SOUTH AFRICA	23	22	20	16	15	14	13	13	13	12	12	12	12	21	24	26	27	28	29	29	29	29	28	26	
MIDDLE EAST	11	10	10	10	12	12	12	11	11	11	10	10	10	15	18	20	21	21	18	13	12	12	11	11	
JAPAN	24	24	23	23	22	20	17	13	12	12	11	11	11	10	10	10	11	10	10	10	17	20	22	23	
CENTRAL ASIA	24	24	23	23	22	20	17	13	12	12	11	11	11	10	10	10	15	15	15	14	14	13	20	24	
INDIA	15	15	16	16	16	16	12	12	11	11	10	10	10	10	10	10	10	10	10	11	13	14	14	15	
THAILAND	21	24	23	22	21	20	17	13	12	12	11	11	11	10	10	16	18	17	16	15	15	14	14	16	
AUSTRALIA	30	32	33	34	33	30	26	24	22	21	19	18	17	17	16	16	19	19	18	17	18	22	25	28	
CHINA	22	23	23	22	21	19	17	13	12	11	11	11	11	10	10	10	11	11	11	10	10	10	17	20	
SOUTH PACIFIC	36	37	37	36	34	31	28	26	24	22	20	19	18	17	17	16	18	17	17	23	27	30	33	34	
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NORTHERN SOUTH AMERICA	32	32	30	27	25	23	21	19	18	17	16	15	15	18	22	25	27	28	30	31	32	32	33	33	
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CENTRAL NORTH AMERICA	9	9	8	7	6	5	5	5	4	4	4	4	6	8	9	9	10	10	10	10	10	10	10	10	
WESTERN NORTH AMERICA	16	16	15	13	10	9	9	8	8	8	7	7	7	7	11	14	15	16	17	17	17	17	17	17	
SOUTHERN NORTH AMERICA	19	18	17	15	13	12	12	11	10	10	9	9	9	10	14	16	18	19	20	20	20	20	20	20	
HAWAII	28	28	27	25	22	19	18	16	15	14	14	13	13	12	13	15	20	23	25	27	28	29	29	29	
NORTHERN AFRICA	16	15	13	12	12	11	11	11	10	10	10	14	19	21	22	23	24	24	25	25	24	20	18	17	
CENTRAL AFRICA	18	17	13	12	12	11	11	11	10	10	10	14	19	21	22	23	24	25	25	24	22	21	19	19	
SOUTH AFRICA	24	22	21	19	18	17	17	17	16	16	15	25	30	33	35	36	37	36	34	31	28	26	26	26	
MIDDLE EAST	11	11	11	10	10	11	11	11	10	10	10	12	18	20	22	23	23	22	19	15	13	13	12	12	
JAPAN	24	23	22	20	18	13	12	12	11	11	11	10	10	10	11	11	10	10	10	17	20	22	23	23	
CENTRAL ASIA	23	23	22	20	18	13	12	12	11	11	11	10	10	10	15	17	16	15	14	14	13	13	19	24	
INDIA	10	10	11	11	11	11	11	11	10	10	10	10	11	11	11	10	10	10	10	9	9	9	9	9	
THAILAND	21	22	21	19	17	13	12	11	11	11	10	10	10	17	19	20	18	17	16	15	15	14	14	14	
AUSTRALIA	31	32	34	32	29	25	23	21	20	19	18	17	16	16	15	21	20	19	18	17	19	23	26	29	
CHINA	21	22	21	19	17	13	12	11	11	11	10	10	10	10	12	11	11	11	10	10	10	16	19	19	
SOUTH PACIFIC	37	37	35	34	31	28	26	24	22	20	19	18	17	17	16	18	18	17	20	25	29	32	34	35	
UTC TO/FROM US EAST COAST																									
CARIBBEAN	24	23	21	19	17	16	15	14	13	12	12	11	14	18	20	22	23	24	25	26	26	26	25	25	
NORTHERN SOUTH AMERICA	29	28	26	23	21	20	18	17	16	15	14	14	15	18	21	23	25	26	27	28	29	29	29	29	
CENTRAL SOUTH AMERICA	34	31	28	26	23	22	20	19	18	17	16	16	22	25	27	29	31	32	33	34	34	35	35	34	
SOUTHERN SOUTH AMERICA	36	35	32	29	26	24	22	21	20	18	18	17	19	24	27	30	32	34	35	36	37	37	37	37	
WESTERN EUROPE	11	11	10	10	10	10	10	9	10	9	15	18	20	22	22	23	23	22	22	21	20	18	15	12	
EASTERN EUROPE	11	11	11	10	10	10	10	10	10	10	14	19	21	22	22	22	21	21	20	19	17	12	12	12	
EASTERN NORTH AMERICA	9	8	7	7	6	6	5	5	5	5	4	4	7	8	9	10	10	11	11	11	11	10	10	10	
CENTRAL NORTH AMERICA	21	19	17	14	13	13	12	11	11	10	10	10	11	17	20	21	22	23	24	24	24	24	23	22	
WESTERN NORTH AMERICA	29	27	24	19	17	16	15	15	14	14	13	13	13	19	24	27	29	30	31	31	31	31	31	30	
SOUTHERN NORTH AMERICA	23	22	20	18	16	15	14	13	13	12	11	11	11	16	19	22	23	24	25	25	25	25	25	24	
HAWAII	30	28	26	21	20	18	17	16	15	14	14	13	13	15	15	14	16	21	25	27	29	30	31	31	
NORTHERN AFRICA	18	16	16	15	14	14	13	13	13	13	19	24	27	29	30	31	31	31	30	28	26	22	20	19	
CENTRAL AFRICA	19	17	16	15	15	14	14	13	13	13	19	24	27	29	30	31	31	31	30	28	26	24	22	20	
SOUTH AFRICA	24	22	21	19	18	17	17	18	17	17	16	23	28	31	34	35									



because more of the ionosphere is being energized during the longer period of daylight each day.

To this seasonal improvement on the shortwave spectrum we add the increase in solar activity as the Sun become ever more active in this beginning upward phase of Solar Cycle 24. This results in an exciting DX season developing on the high frequencies.



**Figure 3.** This screen capture from NW7US's space weather and radio propagation website <<http://sunspotwatch.com>> shows images of the Sun, as well as the D-Region absorption map. The region that is colored is the area in which D-region absorption is occurring. The color purple illustrates weak and lower frequency absorption. If the color changed from purples and blues into red, then absorption is very strong, and high in frequency (effectively absorbing all frequencies from medium wave through high shortwave). This map is in real-time, and will also indicate the impact of an X-ray flare. (Courtesy of NW7US, SWPC, NASA, SDO, AIA)

While we will see the highest HF bands beginning to see more openings, they will still be shorter and sometimes weak. The most reliable paths will be north/south, with only slight improvement for east/west propagation paths.

By next month, though, this improvement will be noticeable. Amateur radio operators may look for 10-meter DX openings in early morning and again in early evening, though there will be openings throughout the day for shorter paths. On 12 through 15 meters, this change will be more pronounced.

Shortwave radio listeners will find more DX from international broadcasting stations on 16 and 19 meters. These bands will be fairly stable for regional as well as DX propagation, following the Sun (DX from the east of the listener's location during the early morning, moving to the west of the listener's location by evening). The prime evening hours in the United States are sunrise hours across parts of Asia, Europe, the Middle East, and Africa. Look for long-path propagation, as well, on these bands.

Between sunset and midnight, expect exciting DX openings between the 41-meter band and 16 meters, especially from the east and south azimuths from your location, as well as via the polar paths. After midnight through morning, propagation will be spotty above the 31-meter band, but from 31 meters down to the tropical bands, expect hot propagation.

One adverse change this month is the slow rise in atmospheric noise on the shortwave spectrum, due to weather changes and the way this RF noise propagates long distances via the ionosphere. Of course, with the rise in solar activity, geomagnetic conditions are expected to become more chaotic, with occasional storm periods that will degrade shortwave propagation (a strong geomagnetic storm can lower the effective maximum usable frequency over a given path between two stations by as much as 30 percent). The increase in noise as well as geomagnetic disturbances will make for periods of more challenging DXing.

Look for gray-line DX in the mornings and evenings on lower frequencies. Trans-equatorial propagation will be more likely toward sunset during days of high solar flux and a disturbed geomagnetic field (look for days with an  $A_p$  greater than 15, or a planetary K index —  $K_p$  — greater than 3). Sporadic-E openings should be increasing, for shorter-range openings.

### VHF and Above

Check for low-VHF short-skip openings during the daylight hours. Some short-skip openings over distances of about 1,200 to 2,300 miles may occur. The best times for such openings are during the afternoon hours.

Auroral activity often occurs during periods of radio storminess on the HF bands. Look for days where the  $A_p$  is climbing, when the  $K_p$  reaches 4 or higher. These are the days on which VHF auroral-type openings are most likely to occur.

### Current Solar Cycle 24 Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for November 2011 is 96.7, up from 88.0, and the highest yet in Solar Cycle 24. The lowest daily sunspot value of 68 was recorded for November 28. The highest daily sunspot count was 123 on November 9. The 12-month running smoothed sunspot number centered on May 2011 is 47.6, up from April's 41.8. A smoothed sunspot count of 83, give or take about 9 points is expected for March 2012.

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The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 153.1 for November 2011, up from 137.2 for October 2011. The 12-month smoothed 10.7-cm flux centered on May 2011 is 105.6, up from April's 100.4. The predicted smoothed 10.7-cm solar flux for March 2012 is 135, give or take about 9 points.

The observed monthly mean planetary A-Index ( $A_p$ ) for November 2011 is 4, a very sharp decrease from October's 7 though both indicate rather quiet conditions, overall. The 12-month smoothed  $A_p$  index centered on May 2011 is the same as for April: 7.5.

There will be a number of days when the geomagnetic conditions will reach storm levels. Refer to the Last Minute Forecast published in *CQ* magazine or on the author's website <<http://sunspotwatch.com>> for the outlook on what days that this might occur.

### I'd like to hear from you

I welcome your thoughts, questions, and experiences regarding this fascinating science of propagation. You may email me, write me a letter, or catch me on the HF amateur bands.

On Twitter, please follow @NW7US (and if you wish to have an hourly automated update on space weather conditions and other radio propagation-related updates, follow @hfradiospacewx).

I invite you to visit my online propagation resource at <<http://sunspotwatch.com/>>, where you can get the latest space data, forecasts, and more, all in an organized manner.

If you are on Facebook, check out <<http://www.facebook.com/spacewx hf radio>> and <<http://www.facebook.com/NW7US>>.

Speaking of Facebook — check out the *Popular Communications* fan page at <<http://www.facebook.com/PopComm>>. This is a great place for the *Pop'Comm* community to participate and share information, tips, DX spots, and photos of your antennas, radios, or your excursions into the field with your radio gear for that DX hunting trip.

*Until next month . . .*

73 de NW7US, Tomas Hood

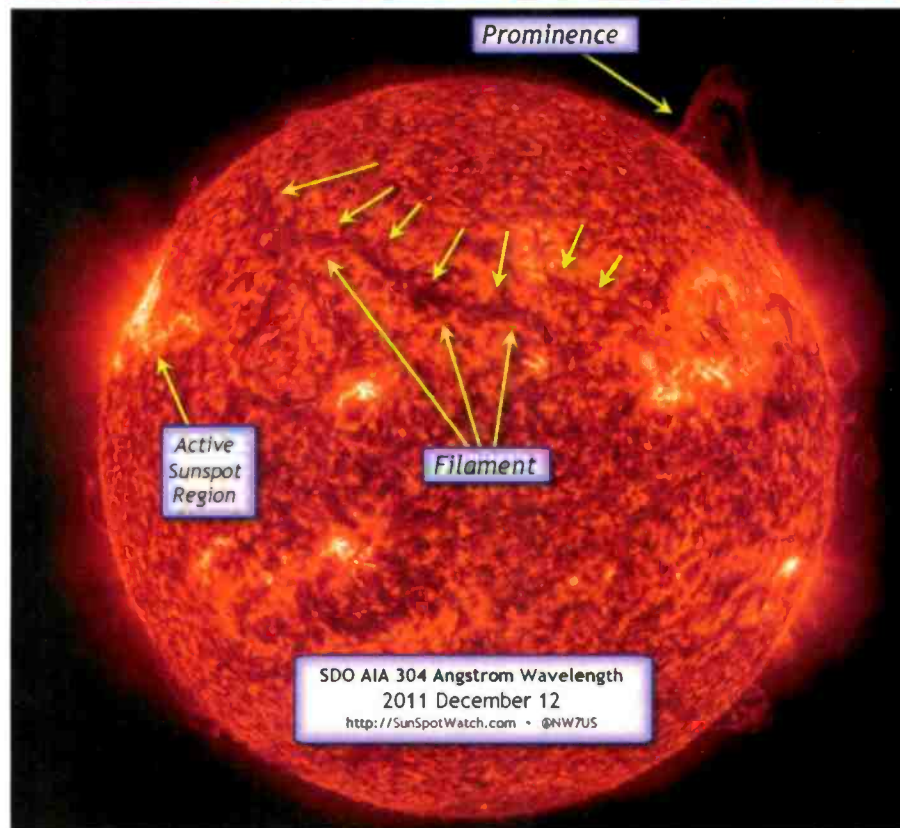
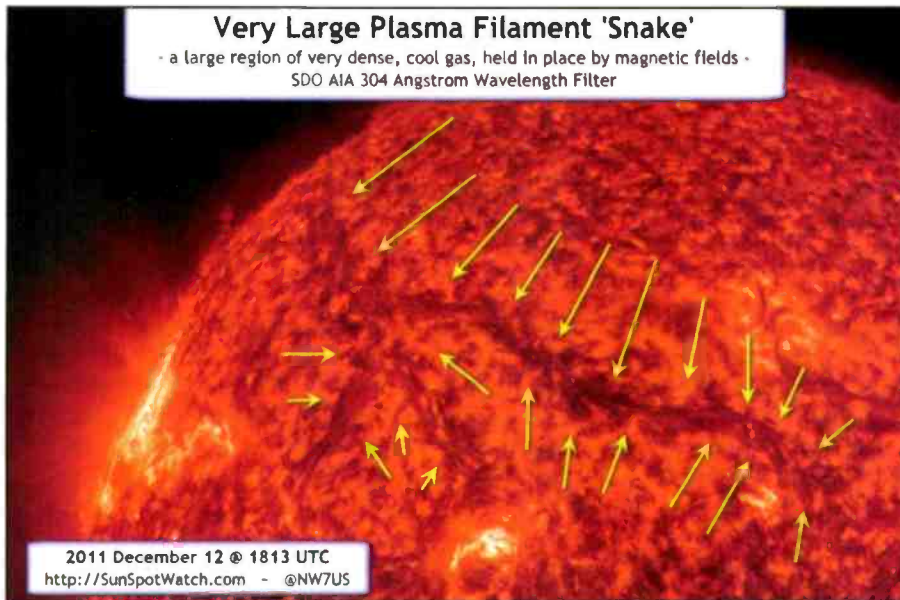
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**Figure 4.** The Sun, at the 304-Angstrom wavelength (revealing the Sun's plasma at about 50,000 degrees, Celsius) reveals huge plasma structures known as filaments and prominences. A prominence is a large, bright feature extending outward from the Sun's surface, often in a loop shape. If a prominence is seen over the solar disc, however, we call it a filament. Prominences are anchored to the Sun's surface in the photosphere, and extend outward into the Sun's corona. While the corona consists of extremely hot ionized gases, known as plasma, which do not emit much visible light, prominences contain much cooler plasma, similar in composition to that of the chromosphere. A prominence forms over timescales of about a day, and stable prominences may persist in the corona for several months. Some prominences break apart and give rise to coronal mass ejections. As can be seen in this image, a filament looks dark against the background of the Sun, but bright when viewed against space. Both structures have the same characteristics; they are just in different locations, both held in suspension by strong magnetic fields. (Courtesy of SDO/AIA)

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## BROADCASTING

### World Band Tuning Tips

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

This listing is designed to help you hear more shortwave broadcasting stations. The list covers a variety of stations, including international broadcasters beaming programs to North America, others to different 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	UTC	Freq.	Station/Country	Notes
0000	7445	BBC Middle East Relay, Cyprus	Dari	0300	7215	Trans World Radio, via South Africa	Amharic
0000	13580	China Radio International	CC	0300	3240	Trans World Radio, Swaziland	Shona
0000	7290	Radio PMR, Rridnestrovie		0300	4976	UBC-Radio Uganda	
0000	9865	International Radio of Serbia, via Bosnia		0300	6040	Vatican Radio, via Bonaire	
0000	15190	Radio Incondfidencia, Brazil	PP	0300	7175	Voice of Broad Masses, Eritrea	Amharic
0000	9860	Radio Tirana, Albania		0300	9515	Voice of Turkey	
0100	15755	BBC, Thailand Relay		0300	9885	Voice of America Relay, Sao Tome	
0100	6160	CKZN, Canada		0300	4780	Radio Dibouti	AA
0100	12000	HCJB Global, Ecuador, via Chile	SS	0300	5915	Zambia National Broadcasting Service	
0100	6190	International Radio of Serbia, via Bosnia		0300	7200	SRTC, Sudan	AA
0100	3350	Radio Exterior Espana, Costa Rica Relay	SS	0400	4960	Voice of America Relay, Sao Tome	
0100	11780	Radio Nacional Amazonia, Brazil	PP	0400	5910	Alcaravan Radio, Colombia	SS
0100	15720	Radio New Zealand International		0400	9855	Deutsche Welle, Rwanda Relay	
0100	6145	Radio Romania International		0400	9235	Galei Zahal, Israel	HH
0100	11905	Sri Lanka Broadcasting Corp.	Hindi	0400	6185	Radio Educacion, Mexico	SS
0100	5960	Voice of America, USA		0400	9805	Radio France International	
0100	12105	Voice of Greece	Greek	0400	11725	Radio New Zealand International	
0130	15745	Sri Lanka Broadcasting Corp.		0400	11690	Radio Okapi, Congo (DR) via S. Africa	local/ FF
0200	15310	BBC, Thailand Relay		0400	5025	Radio Rebelde, Cuba	SS
0200	4965	CVC One Africa, Zambia		0400	7305	Radio Romania International	
0200	11710	Radio Argentina al Exterior		0400	6130	Radio Romania International	
0200	9315	Radio Cairo, Egypt		0400	6875	Radio Taiwan International, via Florida	
0200	4885	Radio Clube do Para, Brazil	PP	0400	4055	Radio Verdad, Guatemala	SS
0200	5010	Radio Madagasikara, Madagascar	Malagasy	0400	3290	Voice of Guyana	
0200	15490	Radio Pakistan	Urdu	0400	9840	Voice of Russia	
0200	7250	Voice of Russia		0400	7240	Voice of Turkey	
0200	6175	Voice of Vietnam, via Canada		0400	9655	Voice of Turkey	
0200	9625	CBC Northern Quebec Service, Canada		0400	3215	WWCR, Tennessee	
0230	7425	Radio Tirana, Albania		0400	3255	BBC, via South Africa	
0300	5040	Radio Havana Cuba	SS	0400	6165	RN Tchadienne, Chad	FF
0300	6145	Adventist World Radio, via Austria	Farsi	0430	7315	Radio Dabanga, Sudan, via France	EE/AA
0300	7255	BBC Relay, Ascension Island		0500	6070	CFRX, Canada	
0300	6145	BBC, via South Africa		0500	11995	Radio France International	
0300	7375	Croatian Radio/Voice of Croatia		0500	6110	Radio Japan, via Canada	
0300	11560	Miraya FM, Sudan, via Ukraine	AA/EE	0500	6090	University Network, Anguilla	
0300	4990	Radio Apinte, Suriname	DD	0500	7255	Voice of Nigeria	
0300	5900	Radio Bulgaria		0500	7230	Channel Africa, South Africa	
0300	7210	Radio Fana, Ethiopia	Amharic	0500	7245	Radio Mauritanie	AA
0300	11895	Radio Romania International		0500	7285	Radio Sonder Grense	Afrikaans
0300	15355	Radio Sultanate of Oman		0700	13710	China Radio Intl, via Albania	
0300	4790	Radio Vision, Peru	SS				



UTC	Freq.	Station/Country	Notes	UTC	Freq.	Station/Country	Notes
0700	5995	RTV du Mali	FF/vernacular	1600	9655	KNLS, Alaska	RR
0800	6010	La Voz de su Concencia, Colombia	SS	1600	15140	Radio Sultanate of Oman	AA
0800	9635	RTV du Mali	DD	1600	11625	Vatican Radio	Swahili
0900	6030	CFVP, Canada		1700	15205	Broad. Service of Kingdom, Saudi Arabia	AA
0900	6050	HCJB Global, Ecuador	Quechua	1700	9835	Radio Japan	JJ
0900	9765	Radio New Zealand International		1700	9470	Radio Pakistan	Urdu
0900	6135	Radio Santa Cruz, Bolivia	SS	1700	11600	Radio Television Libya	FF
0900	4805	Radio Difusora Amazonas, Brazil	PP	1700	15345	RTV Marocaine, Morocco	AA
0900	5035	Radio Aparecida, Brazil	PP	1730	15190	Philippine Broadcasting Service	Tagalog
0900	6010	Radio Mil, Mexico	SS	1800	11670	All India Radio	
1000	3330	Ondas del Huallaga, Peru	SS	1800	17795	BBC, England	
1000	5039	Radio Libertad, Peru	SS	1800	12095	BBC Middleeastern Relay, Cyprus	
1000	6174	Radio Tawantinsuyo, Peru	SS	1800	7400	Radio Bulgaria	
1000	3925	Radio Nikkei, Japan	JJ	1800	17790	Radio Canada International	
1000	9955	WRMI, Florida		1800	11740	Radio Damal, via Germany	Somali
1000	3310	Radio Mosoj Chaski, Bolivia	Quechua	1800	13650	Radio Kuwait	
1000	4955	Radio Cultural Amuata, Peru	SS	1800	11655	Radio Nederland, Madagascar Relay	
1100	9440	China Radio International	CC	1800	7330	Voice of Russia	
1100	9540	China Radio International	Cantonese	1800	13590	CVC-One Africa, Zamia	
1100	11665	Radio Taiwan International	CC	1900	9580	Africa No. One, Gabon	FF
1100	9910	Trans World Radio	CC	1900	9445	All India Radio	
1100	2325	ABC Northern Territories Service		1900	17695	CVC One Africa, Zambia	
1100	3260	Radio Madang, Papua New Guinea	Tok Pisin	1900	13670	Islamic Republic of Iran Broadcasting	
1100	5020	Solomon Islands Broadcasting Service		1900	9605	Radio Exterior Espana, Spain	
1200	13585	Voice of America, Philippine Relay	KK	1900	15300	Radio France International	FF
1200	15180	Korea Central Broadcasting, North Korea	KK	1900	7425	Radio Nederland, Madagascar Relay	
1200	11910	Radio Exterior Espana, via China	SS	1900	12005	RT Tunisienne, Tunisia	AA
1200	3325	Radio Republik Indonesia	Indonesian	1900	9725	RT Tunisienne, Tunisia	AA
1200	9720	Radio Thailand		1900	15580	Voice of America, via Bonaire	
1200	11545	Sound of Hope, Taiwan	CC	1900	15120	Voice of Nigeria	
1200	5765	AFN/AFRTS, Guam	usb	2000	9705	Radio Ethiopia	Amharic
1200	12085	12085	Voice of Mongolia	2000	11615	Radio Nederland, Madagascar Relay	
1300	9675	China Radio International	RR	2100	7550	All India Radio	
1300	12085	Radio Nederland, via Philippines	DD	2100	11715	All India Radio, (Goa)	
1300	9430	Far East Broadcasting, Philippines	Mandarin	2100	9410	BBC Seychelles Relay	
1300	9580	Radio Australia		2100	17560	Broad, Service of Kingdom, Saudi Arabia	AA
1300	12140	Radio Free Asia	Khmer	2100	7360	Radio Belarus	
1300	9455	Radio Japan	CC	2100	11930	Radio Marti, USA	SS
1300	9975	Trans World Radio/KTWR, Guam	CC	2100	12060	Family Radio, USA, via Ascension	
1300	11710	Voice of Korea, North Korea	JJ	2100	13670	Radio Havana Cuba	SS
1300	9930	World Harvest Radio, via Palau		2100	17550	Radio Kuwait	
1300	5985	Shiokaze, Japan, to North. Korea	KK	2200	15370	Adventist World Radio, Guam	Mandarin
1300	9525	Voice of Indonesia		2200	17680	CVC-La Voz, Chile	SS
1400	11890	BBC, Singapore Relay		2200	15560	Radio Australia	
1400	15120	Broad. Service of Kingdom, Saudi Arabia	AA	2200	15455	Radio Canada International	SS
1400	11530	Denge Mezopotamia, via Ukraine		2200	13650	Radio Japan	
1400	12045	Deutsche Welle, Germany, via Russia	Urdu	2200	13630	Radio Australia	
1400	15065	Radio Cairo, Egypt	Pashto	2200	7450	Radiofonikos Macedonias, Greece	Greek
1400	6260	The Voice Asia, via Uzbekistan	Hindi	2200	13760	Voice of Korea, North Korea	SS
1400	6285	Voice of Korea, North Korea	RR	2215	9760	Cyprus Broadcasting Corp.	Greek, wknds
1400	9690	All India Radio		2300	15370	Radio Havana Cuba	SS
1500	9410	BBC Relay, Oman		2300	15265	Radio Japan, via Bonaire	JJ
1500	15525	Islamic Republic of Iran Broadcasting		2300	15240	Radio Australia	
1500	9835	Radio Malaysia, Sarawak	B. Malaysian	2300	9745	Radio Bahrain	AA
1500	9335	Voice of Korea, North Korea		2300	6165	Radio Chad	FF
1500	12020	Voice of Vietnam		2300	17810	Radio Japan	Indonesian
1600	11740	Adventist World Radio, Guam		2300	15345	Radio Nacional, Argentina	SS
1600	15410	Deutsche Welle, via England		2300	9665	Voz Missionaria, Brazil	PP
1600	9640	KBS World Radio, South Korea					

# Communications Trivia and Other Pursuits

By R.B. Sturtevant,  
KPC7RBS/AD7IL



**Photo A.** Mego brought out toy Star Trek communicators in the 1970s “that were supposed to reach an amazing 1,300 feet,” writes R.B. Sturtevant. The base station was called the “Command Communications Console.” (**WATCH:** A Mego Co. advertisement for the Star Trek Command Communications Console: <<http://bit.ly/rNRkmh>>. – Ed.) There were handheld “Communicators,” as well, sold in pairs. (Youtube video screen grab)

## Boldly Going, Where . . . ?

**Q:** A while ago you talked about Star Trek communications. It brought back some fond memories of my childhood playing Star Trek with my friends. We used blocks of wood for communicators. Did anyone go farther with the idea?

**A.** Yes, a company named Mego brought out toy communicators in the 1970s that were supposed to reach an amazing 1,300 feet. There was a base station “Command Communications Console,” **Photo A**, and handheld “Communicators” sold in pairs . . . *Command Center sold separately!* All systems ran off a 9-volt battery. You probably got better range and coverage out of your block of wood and a little imagination. (**WATCH:** A Mego Co. advertisement for the Star Trek Command Communications Console, circa 1970s: <<http://bit.ly/rNRkmh>>. Ed.)

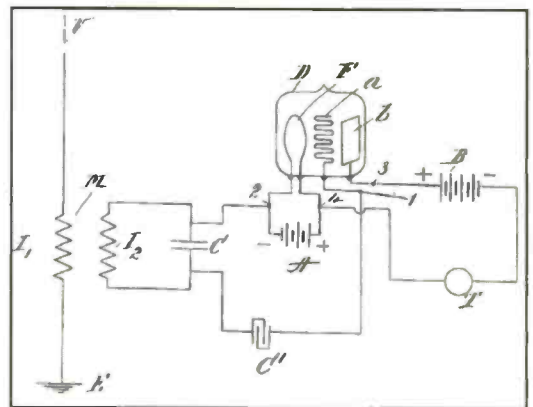
## Radio Broadcasting, Circa 1907

**Q.** You said recently that Lee DeForest was among the first to broadcast entertainment and educational programming before 1920. Where and when did he go on the air?

**A.** Between 1907 and 1912 DeForest, **Photo B**, broadcast programs of opera from New York City. Between 1916 and 1917, then again in 1919, he demonstrated radio broadcasting from stations in New York and San Francisco. He failed to establish a permanent station until 1919 and thus failed to establish a regular audience until then.



**Photo B.** Communications pioneer Lee DeForest was reported to have made broadcasts of operatic performance from New York City as early as 1907. (Courtesy of Wikimedia Commons)



**Photo C.** A schematic shows DeForest’s Audion tube in an electronic circuit. He was challenged in court with his claim to its invention because DeForest was unable to explain how it worked. (Courtesy of Wikimedia Commons)

These broadcasts were made possible because of his invention of the Audion tube, **Photo C** — which was an area of contention that found DeForest in an ongoing court battle, where he was unable to explain how it worked.

## Challenges of Radio Operation in a Cold Hot War (Brrrrrrr)

**Q.** I’ve heard that during the Battle of Stalingrad weather conditions made it difficult or impossible for the radios on both sides to work properly, **Photo D**. Do you know why?

**A.** I don’t. But I’m lucky to have an electronics-technician friend who has some pretty good ideas.

First you must know that there is very little historical information on what happens to a radio of that era when used at 30-degrees-below zero (Fahrenheit). But here are some guesses:

- Batteries at those temperatures won’t put

(Continued on page 73)



## New, Interesting and Useful Communications Products

### NXP Announces Silicon TV Tuner With LTE Immunity

With the growth in popularity of smart phones that utilize frequencies that were formerly allocated to analog television, interference from these handsets are becoming a big concern in the television industry, officials say.

NXP Semiconductors has a solution with the introduction of its new TDA18274, a high-performance silicon tuner for worldwide terrestrial and cable TV reception. Supporting all analog and digital TV standards, the TDA18274 hybrid silicon tuner is optimized for direct "on-board" designs and will be available in two versions: A 48-pin HLQFN package version featuring full-integrated RF filters, and a 40-pin HVQFN package version with external UHF and VHF filters.

The TDA18274 is also optimized for multi-tuner applications, eliminating the need for a companion chip by integrating the RF splitter function, enabling shared use of a single 16-MHz crystal via a crystal oscillator output buffer, and providing a control interface that can manage four tuners via four I2C addresses.

Significantly, the TDA18274 provides strong immunity to LTE interference — a mounting concern in the TV industry, according to NXP. In addition, the TDA18274 offers improved handling of DTG D-Book 7 requirements, as well as strong immunity to other spurious and field interference including EMI.

#### Features include:

- RF input bandwidth extended to 1 GHz in anticipation to OCUR specifications.
- Flexible low-IF output interface from 3 to 7.5 MHz, enabling high compatibility with SoCs.
- Return loss higher than 8 dB with 4-dB noise figure.
- Two (2) General Purpose Output pins.
- No need for external LNA, SAW filters and extra balun, or for manual alignment.
- Reduced Bill of Materials to less than \$0.30, including eBoM, connector and shielding.
- Availability in both 48-pin (7-mm x 7-mm) and 40-pin (6-mm x 6-mm) HL/HVQFN packages.

For more information, visit: <<http://www.nxp.com/pip/TDA18274HN>>.

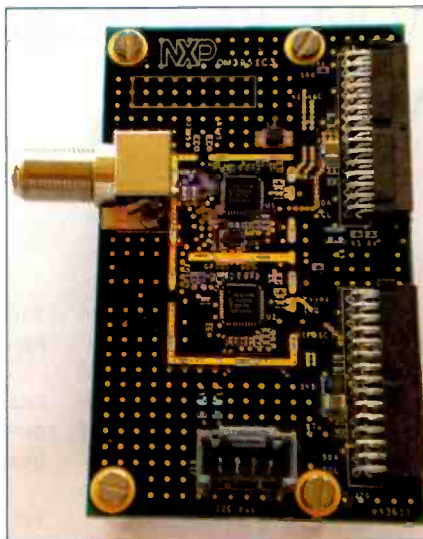
### New Fifth Edition of The Worldwide Listening Guide

Master Publishing Inc. has announced that it has released the latest edition of *The Worldwide Listening Guide* by John Figliozi. Completely updated and expanded, the new fifth edition covers listening options from traditional shortwave to WiFi radio and Internet listening.

It contains more than 4,000 program listings from around the world, with a comprehensive cross-reference by program type.

New this year is a link to a website designed to keep the listings up-to-date, with blog-style postings by the author.

The MSRP is \$24.95 and is available through The W5YI Group <<http://bit.ly/u4Ke3W>>, Amazon.com <<http://amzn.to/Wt3aT>> or local amateur radio dealers.



The TDA18274 offers protection from 4G LTE interference. (Courtesy of NXP Semiconductors N.V.)



*The Worldwide Listening Guide, Fifth Edition.* (Courtesy of Master Publishing, Inc.)

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# Hyper-Local Community Radio Quietly Makes Noise on Your AM Dial

by Bruce A. Conti  
<contiba@gmail.com>

*“You might be pleasantly surprised to discover an . . . alternative to big market programming from your hyper-local community AM radio station.”*

**T**here’s a gentle revolution taking place over the AM broadcast airwaves. Across a radio dial dominated by nationally syndicated news/talk and sports networks, hyper-local commercial broadcasters are making their voices heard. Three local broadcasters are profiled as Broadcast Technology takes a listen to *localism in action* on AM radio.



## Hometown Station KHTS

AM 1220 KHTS Canyon Country, Santa Clarita, California, is a prime example of a commercial radio station that has become very successful by serving the community with locally produced programming exclusively. KHTS owner Carl Goldman was kind enough to share the station’s background along with his insights about operating a successful local radio station.

“My wife and I own KHTS AM radio. We are second generation radio operators. Both of our Dads worked in the business, although both tried to persuade us not to make it into a career,” Goldman said. “We bought the station out of bankruptcy in 1990 after it had only been on the air for one year. We sold it to Clear Channel in 1998, then purchased it back again in 2003.

“Because we are inside the Los Angeles metro area, we are hyper-local,” Goldman said of the decision to go local. “That is the only way to make KHTS successful. Our valley has 280,000 residents. Our geography seals us off from Los Angeles and separates us from other communities, and because our population is a small drop in the Los Angeles metro area, we have virtually no competition.

“All our revenue comes from local business. We receive virtually no regional or national agency dollars, so being hyper-local is the only

way to survive and compete against the other media that penetrates into our market.”

Building a new locally-oriented commercial radio station from the bottom up wasn’t easy — never mind the element of risk in starting a new business during an economic downturn.

“Buying the station back again in 2003 was very risky,” Goldman said. “We were the first radio station Clear Channel let go as they were still gobbling up other stations.

“When we repurchased it, we had to start from scratch all over again. Clear Channel had been simulcasting KIIS-FM on it for the previous few years. There was nothing local remaining. No local programming, no local advertising, no local office or studio. We had to build it a second time.

“It was easier the second time because we already were well known in our community and what’s more important, we knew our community. It has been challenging since the economy began tanking, but we will survive and be better for it as the economy recovers.”

Goldman’s formula for success? “Local radio needs to stay with local owner/operators who live



**Photo A.** Charity Christmas tree light rides on KHTS’ 1948 antique fire truck are part of the hyper-local station’s community outreach initiative in Santa Clarita, California. (Courtesy of KHTS)



in their communities and pull up their sleeves, serve on local non-profit boards and have an impact in their community,” he said. “There isn’t any secret sauce to operating a successful local radio station. It is just a lot of hard work, but also making certain we (and our staff) are out in the community every day making a difference.

“My wife and I are on many non-profit boards,” Goldman said. “In fact, we’re responsible for the formation of several important non-profits and dozen other station branded events and organizations — for example, Habitat for Heroes, part of Habitat for Humanity geared toward veterans; our community lobbying trips to Sacramento and Washington DC; Providence/Holy Cross Art of Healing; our annual Congressional Art Awards; our Home & Garden Show and Emergency Expos; our charity Christmas tree light; rides on our 1948 antique fire truck (**Photo A**); our formation of a Disaster Coalition, to mention just a few.

“We are out making sales calls every day on our own and with our staff. It makes a difference when the owner walks in and can share important information with a prospect that doesn’t just talk about our radio station. Making sales calls daily allows us to stay in touch.”

Goldman added that, “we’ve met other radio owners who get it and are also doing great things in their communities. But we’ve also seen many owners who live in their communities but don’t get onto the front lines. Many are only attending the weekly rotary meeting and playing a round of golf with the local car dealer. While that is important, doing just that doesn’t cut it anymore.

“Owner/operators need to be out on daily sales calls with their sales staff, they need to be visiting the local schools, serving on non-profits, meeting with their government officials and becoming true leaders in their markets. The tools are sitting there for them, they just need to pull up their sleeves and make an effort to be out there every day.”

Goldman underscored: “Radio does work locally. That’s our strength,” adding that, “stations that are just running music and liners will have a much bigger challenge surviving in a local market as media convergence continues over the next few years and consumer choices continue to increase.

“If they can’t distinguish themselves from all the other choices, they won’t last, even if they hit on a successful music format, because as soon as they do, someone else can come in and do it better. By becoming the local media source, they can defend their position much easier as more competition from new media expands.”

*(LISTEN: To 1220 KHTS online while checking out its program schedule and history at: <<http://www.hometownstation.com>>. – Ed.)*



## Longtime Local WIRY

AM 1340 WIRY Plattsburgh, New York, is another example of local commercial radio at its best. WIRY has persevered through decades of changes in the radio broadcasting industry by remaining local and live.

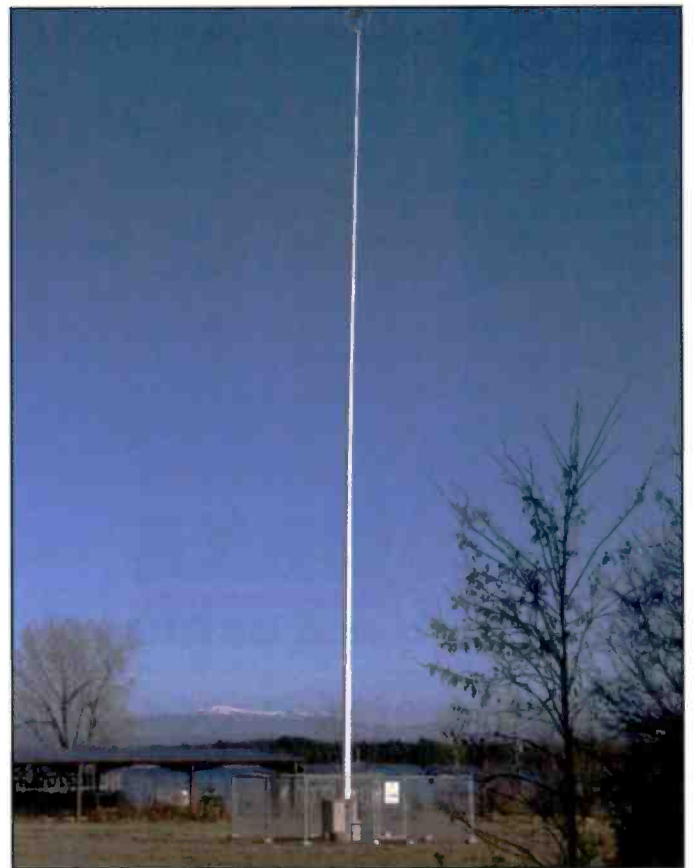
“WIRY has been local, since the first day we went on the air, January 30, 1950,” said Bob Pooler, WIRY station manager, **Photo B**. “We’ve kept our programming local ever since the first day, reading birthdays, deaths and informing listeners on all the latest local news throughout the day.

“As you know, many broadcasters had AM stations first and then put FM on the air,” Pooler noted. “The FCC really helped the FM band, while really putting us on the AM at a big disadvantage.

“Back in the early ’70s, *Billboard* magazine did a story on WIRY about being one of the few stand alone rock Top 40 radio stations left in the country. We’ve changed our format to New



**Photo B.** “We’ve kept our programming local ever since the first day,” says WIRY Station Manager Bob Pooler, “reading birthdays, deaths and informing listeners on all the latest local news throughout the day.” (Courtesy of WIRY)



**Photo C.** The WIRY antenna is just 35-feet tall, “but tricks the current to think it’s twice that high,” says Bob Pooler, WIRY station manager. (Courtesy of WIRY)

Country and Top 40 oldies. Country music is really big across the country and big in our area. We are live 24/7 news, music, etc. That is really unheard of in today's radio business. We can localize a story if something comes up. We've always found that to be very important to our listeners."

The WIRY antenna site is different from the guy-wired steel towers typically used for AM radio. I asked about the antenna and transmitting facilities.

"About 12 years ago we replaced our old transmitter with a new BE Stereo version. It really sounds fantastic — if you have an AM stereo radio. It really never caught on," Pooler said of technological upgrades.

"We built a new station three years ago and replaced our old 150-foot metal tower and guy wires with the new one. It's a Viacom and works very well, **Photo C**. It's only 85-feet tall but tricks the current to think it's twice that high. If you look on our website, you'll also see a picture of one of the old Gates boards from 1950. We still have it and it works great, believe it or not. We also still have the original Gates transmitter from 1950 when we first went on the air and use it as our backup."

Looking at the WIRY website, one might be surprised to see turntables and a vinyl record library in the studio.

"Yes, we play vinyl records — mostly CDs — but we play plenty of vinyl," Pooler said. "We don't use any music service. I rely on *Billboard* and program from there. Lots of local artists are also featured. I pre-select all the oldies and the DJ's can then play from the group I've selected, always a great blend of country, oldies from the '50s to the present, and even some classic country we play on Saturday and Sunday mornings."

WIRY looks and sounds like a fun place, reminding me of my brief radio experiences at 1450 WKRI in Rhode Island and 91.7 WRBB Boston back in the '70s.

"Yes, as I've always said, WIRY is the way radio used to be and wish it still was," Pooler said. "I've been here over 39 years. Most of the DJ's have been with us for 10 to 12 years, most (are) SUNY Plattsburgh grads in communications."

"We intern young folks every year and really enjoy introducing young people to the business. We're very proud of what we do as a little radio station, still No. 1 in *AM drive* for listeners 25+."

*(LISTEN: To 1340 WIRY while checking out more photos and station information: <<http://www.wiry.com>>. — Ed.)*



### KXA Returns to the Airwaves

AM 1520 KKXA Snohomish, Everett, Washington, is a brand new radio station that signed on last year under the slogan "Classic Country 1520 KXA" as a tribute to early pioneer radio station KXA.

Initially the station is up and running with a locally-selected mix of country music while future plans take shape which include the addition of local personalities.

"We intentionally focused on running the music ourselves,

and choosing music was a close tie with our alternative option — really close," said Andrew Skotdal, President and General Manager of KKXA, and sister station 1380 KRKO, **Photo D**.

"No satellite service is worth the commercial load imposed on stations, regardless of how they localize it," Skotdal said, "and there are some truly fantastic music consultants available and capable of providing well-curated playlists modified to meet local needs.

"Country songs that play well in Nashville don't necessarily play well in Everett," he said, "and we're able to accommodate distinctions in local taste — another way that satellite radio tends to fail. Without the satellite commercial load, we're able to air up to 17 songs in an hour and still maintain four, two-minute commercial breaks, which has been a great way to start."

As the new radio station moves ahead, KXA has found an interesting strategy of introduction through Facebook while developing a combined KXA and KRKO website.

"Facebook was an easy way to begin communicating about the radio station while we were still formulating our programming concepts," Skotdal said. "Most radio station Web initiatives have been a waste of money and time. Facebook was free, quick and instantly interactive. Facebook is not our long-term plan, though.

"Radio's single best opportunity is creating a community Web portal. For example, Bonneville took all three of their Seattle stations and elected to eliminate individual station websites in favor of creating a fourth business: MyNorthwest.com. All three of their radio stations point listeners to MyNorthwest.com.

"MyNorthwest.com, depending on the section of the website, news, sports, etc. reflects back to their over-the-air news talk or sports station based on the user content being consumed on the website," Skotdal said. "That model is smart. Radio can exploit inherent advantages through a community web portal model that print-only operators can't ever touch. We have transmitters and distribution to radios that scales exponentially for no cost.



**Photo D.** "Country songs that play well in Nashville don't necessarily play well in Everett, (Washington)" says Andrew Skotdal, President and GM of KKXA, "and we're able to accommodate distinctions in local taste." (Courtesy of KKXA)



## This Month in Broadcast History

**75 Years Ago (1937):** “Four years ago, action did not come until the eleventh hour. It was almost too late,” said FDR in the first fireside chat radio address of his second term in office. “If we learned anything from the depression, we will not allow ourselves to run around in new circles of futile discussion and debates, always postponing the day of decision.” (**LISTEN:** *To FDR's first fireside chat, delivered via radio on March 12, 1933* <<http://bit.ly/w0Ld8X>>. – Ed.)

**50 Years Ago (1962):** The Beatles debuted with their first live recording for radio on the BBC. “Stranger on the Shore” by Mr. Acker Bilk was number one on the last “Fabulous Forty” music survey issued by 1130 CKWX, Vancouver before switching from rock ‘n’ roll to a middle-of-the-road format. (**LISTEN:** *To Mr. Acker Bilk perform “Stranger On the Shore” live:* <<http://bit.ly/rTRPSi>>. – Ed.)



**25 Years Ago (1987):** In Canada, the Department of Communications commissioned a study regarding the lack of regulation for radio antennas and their supporting structures amid growing concern over health, safety and aesthetic impact.

– Bruce A. Conti

“Our two radio stations (KXA and KRKO) will essentially have more listeners combined than the local newspaper has subscribers. That’s why we’re dumping our station websites and launching EverettPost.com. It will be thin to start, but that doesn’t matter.

“This is a long-term strategy to create a third business in addition to our two radio stations. How fortunate to be able to talk to our listeners every day about what is happening on our community web portal. And the web portal will have its own set of users, separate from the stations, who will end up finding the stations for the first time.”

While on the topic of local radio, Skotdal shared his thoughts about the state of AM:

“Very few of the large group operators and almost none of the consultants place any value in AM radio now,” said Skotdal. “They view it as a worthless albatross that prevents them from getting more FM stations in a market because of ownership caps and they say research proves younger people don’t go to the AM band. We can debate why that has happened, and whether it’s true, but there are many cases where you can make an AM succeed. And then it depends on your definition of success.”

For a large conglomerate, Skotdal adds, “A radio station making \$200,000 net, annually, probably isn’t worth their time. A great deal of independent business owners still consider that a successful business. That being said, there are limits on the amount of local program-

ming you can do and make a business out of an AM station.”

*Wait a minute: Local radio really isn't the answer to life, the universe, and everything? Local radio doesn't necessarily mean good radio or an automatic success?*

“Local for the sake of local is a mistake,” suggested Skotdal. “Rush Limbaugh succeeds across the U.S. because he puts on a great show. Oprah succeeded because she put on a great show. If a radio station’s local isn’t a great show, it doesn’t matter if they’re interviewing the mayor. Nobody will tune in.

“There is a lot of bad local radio being done in America right now, and I’d actually prefer to hear Ryan Seacrest to some of the local content I’ve heard on stations. Many stations would do well to just pare their air staff back to the one or two best possible people they can find, and reset their situation by better leveraging a technology investment,” he said.

“People have also lost perspective on what radio was like from the ‘20s to the ‘50s. Since the earliest days of commercial radio, stations have relied on networks and syndication. I’ve spent over 80 hours in the National Archives in College Park, Maryland. I’ve seen the FCC ascertainment reports, and I know this to be true.

“The biggest, most successful stations of yesteryear were either syndicating their programming to others or taking syndicated programming from someone. Those who simply argue radio was better or more local in the past have historical amnesia. The argument is too generic to

foster a meaningful discussion about how to make radio stations more relevant to their audiences.”

In conclusion, Skotdal said he’s “a proponent of radio and am aware of the history of our medium,” making reference to R.B. Sturtevant’s feature “Reginald Fessenden’s Joyful Noise – December 24, 1906” in December 2011’s *Popular Communications* (page 12).

Skotdal graduated with a degree in history from the University of Virginia, was a radio board member of the National Association of Broadcasters, and currently serves on the board of the Washington State Association of Broadcasters.

Visit KKXA on Facebook: <<http://www.facebook.com/kkxa1520>> to monitor the evolution of this new local radio station.

## Make Your Own Hyper-Local AM Discoveries

If you haven’t checked the AM radio dial lately, give it a spin. You might be pleasantly surprised to discover an informative and entertaining alternative to big market programming from your hyper-local community AM radio station. – 73 and Good DX!

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# A Pitched Battle Between the Bug Tracker and Industrial Spy

By Kent Britain, WA5VJB  
<wa5vjb@cq-amateur-radio.com>

*“These bugs are devilishly hard to find. If there is a cell phone bug, which signal is it?”*

**W**atch out. Bugging an office has moved to the digital world. Oh, they are cute little transmitters. Based on a GSM cell phone (Global System for Mobile Communications), today's bugs are very sophisticated.

*The industrial spy* can take a standard cell phone, remove the display, remove the keys, remove the speaker, and add a preamp on the microphone. Now the device becomes quite small like the GSM module in **Photo A**. Or *the industrial spy* now has room for a much bigger battery.

Heck, one bug even had an LED flashlight built into it so *the industrial spy* could see what he was doing rummaging around under a conference table in the dark.

Thus far all the ones on the market seem to be GSM — no CDMA (Code Division Multiple Access) models as yet.

In action the bug is controlled by text messages. At 3 a.m. *the industrial spy* gets a text message from his bug that translates, *I heard something*.

Now, let's see. If it's 3 o'clock, the bug is probably picking up the cleaning crew. So he texts the device: *Go back to sleep*.

If it's 1 p.m. and *the industrial spy* gets that *I heard something* text message, well, that just might be the afternoon status meeting. He texts back: *Transmit audio*, and listens for a while.

If the audio is good, *the industrial spy* congratulates himself for getting that SIM (Subscriber Identity Module) card for the unlimited plan. Not interesting? He texts *Go back to sleep*, to save battery life.

These bugs are devilishly hard to find. In a typical office building there may be dozens and dozens of cell phones in the area. *If there is a cell phone bug, which signal is it?*

## Where Antennas Make a Difference

Recently I built a set of special antennas for a chap who professionally does RF sweeps of offices looking for bugs.

The wide bandwidth and short duration transmissions of these GSM-based bugs are almost impossible to catch and see with a traditional spectrum analyzer. The bursts are too short for the spectrum analyzer to even finish a single scan.

The exception would be when the bug is fully on, and *the industrial spy* wouldn't keep it turned on unless he thought there was something important to listen to. Keeping the bug on uses that limited battery and runs up the charges on the SIM card.

## The Power of Information

Here is where a good knowledge of the GSM phone system becomes important. A cell phone checks into the network on a regular basis. This is how the cell operator knows how many phones are on each cell in his network, and where to route a call back to a particular cell phone.

This check-in time varies between cell operators — more check-ins allow better control of the cell network and its planning, but more check-ins use up battery power and are using system resources. But every 2 to 15 minutes is typical.

So even during quiet times, the bug transmits every few minutes. It's only a single GSM time slot, a few milliseconds, but that quick burst is a well-known length of time.

## Focusing On RF Energy Instead of Frequency

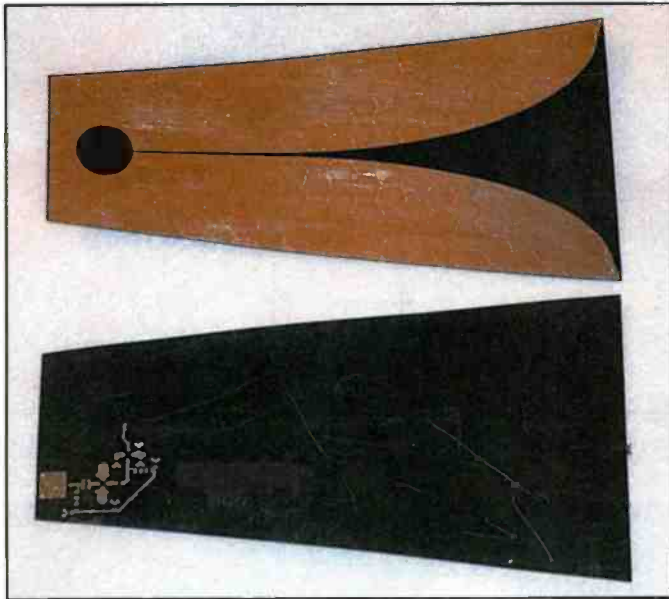
This RF direction finding system actually depends on finding the bursts of RF energy and is not frequency dependent.

In **Photo B**, I have the top and bottom of a Vivaldi — a *very* broadband antenna. These have



**Photo A.** A U.S. quarter is used to show the size comparison of this cell phone module.





**Photo B.** The Vivaldi is a great broadband antenna, "but for a GSM phone system I actually used four modified log periodic antennas," WA5VJB writes.

a wideband RF preamp built into the antenna followed by a voltage doubling detector — as you can see in **Photo C**. So, in **Figure 1**, we have a fancy variation of a crystal diode set.

Now I have to do some fancy footwork not to step on a bunch of toes. The Vivaldi is a *great* broadband antenna, but for a GSM phone system I actually used four modified log periodic antennas — kind of like the ones in **Photo D**. (*I am not going to show the bug chaser's antennas. He wouldn't like that, and I really don't want to make an investigator disgruntled.* — WA5VJB.)

## Detection, Times 4

Our *bug chaser* uses four of these antenna-RF-detectors looking in four directions connected to a four-channel oscilloscope much like the one in **Photo E**. (*OK, the guys with the sharp eyes have noticed that my personal digital scope is only two channels. I do have a Tektronix 2467, a four-channel analog scope, but not something I would want to haul into the field* — WA5VJB.)

The new digital oscilloscopes have a lot of fancy trigger options. This time the scope is set to trigger on a pulse with the same pulse width as a GSM cell phone time slot.

Our de-bugging expert — aka, *bug chaser* — gets a hit, looks at the four scope traces and knows from which channel has the strongest trace that the GSM transmitter is *over that way*.

He moves the equipment closer and waits for the next hit — while looking around a bit at likely hiding places of course. In less than an hour he has a pretty good idea where the cell phone bug is hidden.

## Using the Right Technology

Now, for that broadband preamp built into the antennas, there are three MMIC (Monolithic Microwave Integrated Circuit) amp parts I am using these days. All three come out of RFMD — RF Micro Devices.

First is the SPF5043, an amazing little part with a 0.8-dB noise figure. (*Yes, it's less than 1 dB from 50 MHz to 2,500 MHz, and the part is usable to over 4,000 MHz.* — WA5VJB.)



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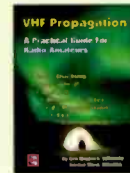


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The next parts are the NBB-300 and NBB-400. These guys work from audio. You could use a pair as a stereo headphone amplifier, or at the top end they work up to 14,000 MHz. (*That's audio to 14 GHz. Broad enough for you? – WA5VJB.*)

OK, you have just downloaded the RFMD specification sheet. "Kent is full of it," you say. "That part is only rated to 8 GHz!" There is a bit of clever marketing going on here. Any part that works between 8 and 10 GHz is considered as having military X-Band RADAR potential — thus export controlled. Have a look at the S parameters!

## Stay Tuned

For next time, I'm working up an article on how RFID cards can be read without the owner's knowledge, and a simple way of making that clandestine RFID detection of your cards a lot more difficult.

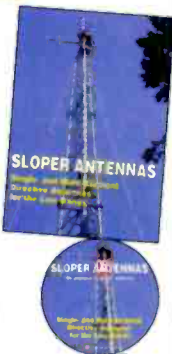
*We welcome questions from our readers and especially suggestions for column topics. Your suggestions are always handy during my frequent bouts with writer's block. Write: Popular Communications, 25 Newbridge Road, Hicksville, NY 11801. Via email: <WA5VJB@cq-vhf.com>. For additional antenna projects, see the reference section: <http://www.wa5vjb.com> – WA5VJB.*

## SLOPER ANTENNAS

By Juergen A. Weigl, OE5CWL

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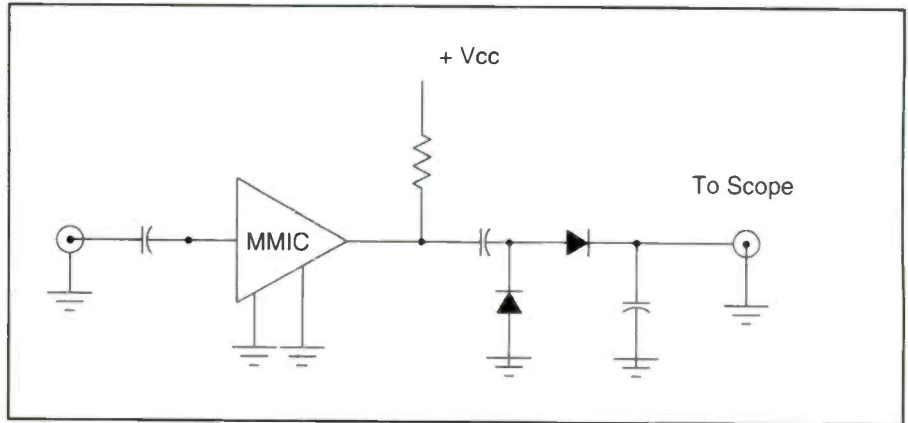


Figure 1. Here is a schematic for the 'scope driver.

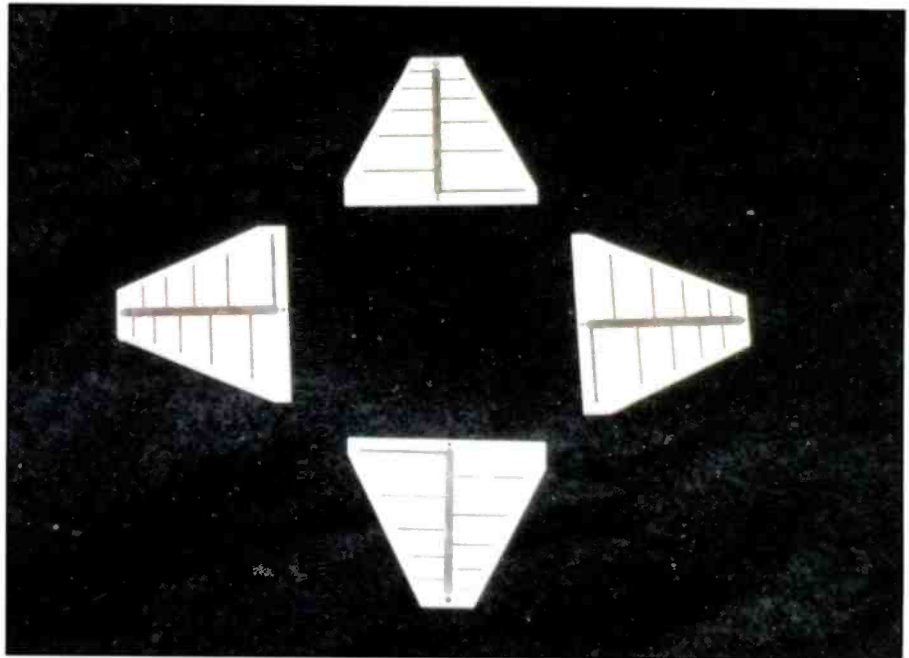


Photo D. These four log periodic antennas are looking in four directions.

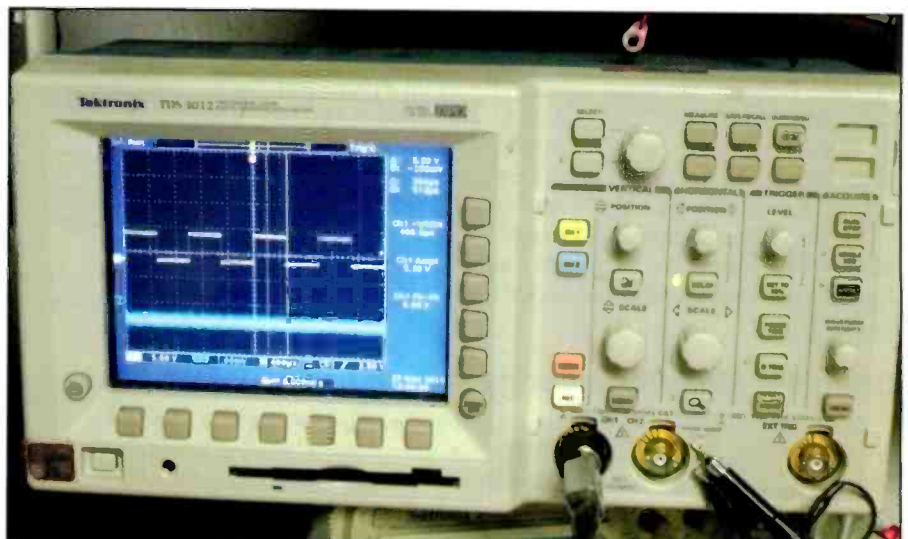


Photo E. A four-channel digital oscilloscope, somewhat like this two-channel Tektronix 3012, is used in the hunt for the bug.



# Voice of Justice in Azerbaijan: There's Good News, and Bad

by Gerry L. Dexter  
<gdex@wi.rr.com>

*“Remember, your shortwave broadcast station logs are always welcome.”*

**I**t was inactive for a couple of months, but now the so-called Voice of Justice in Azerbaijan — formerly part of the Soviet Union — has resumed operation on 9678 kHz (actually 9677.8) with daily broadcasts in Azeri at 1500-1527 UTC.

**The good news:** It's the return of a radio country.

**The bad news:** It has been heard only in nearby countries, but certainly not in North America — at least so far! (*IN DEPTH: For more information on broadcasting from Azerbaijan, visit: <http://bit.ly/tfJ4dL>.* — Ed.)

## Reaching Out to the Khmer People

KPPM is not the callsign of some Arizona medium-wave station. It stands for the Khmer People Power Movement and speaks for a group that attempts to advance the progress of freeing Cambodia from the influence, domination or possibly invasion from neighboring Vietnam.

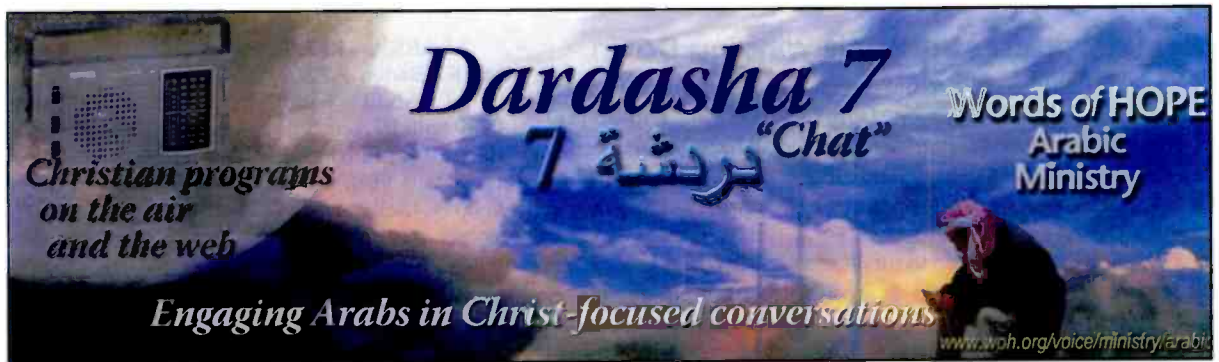
The group works toward its goal by spreading the word to the Khmer people. One method KPPM uses in attempting to achieve its goal is through radio broadcasts on shortwave. The schedule is Tuesday through Sunday from 1200-1300 via T8WH, Palau. (*LISTEN: To KPPM's live streaming audio: <http://www.kppmradio.org>.* — Ed.) KPPM has a mailing address in Fresno, California.

## Ethiopian Satellite TV

Another new broadcaster is the unusually named Ethiopian Satellite Television, which has recently begun a daily service to Ethiopia on shortwave to circumvent the regime's blanket on news coverage.

Opting for shortwave is EST's attempt to get around the jamming in which the Ethiopian government engages. (*Just wondering: How come the U.S. Congress hasn't created a U.S.-run "Radio Free Africa?"*)

The latest schedule I have for this one is



Radio Dardasha 7, a service of Back to God Ministries, QSL'd D'Angelo via email. The organization has offices in Illinois and Ontario but the broadcasts come from Germany.



Pirate Renegade Radio QSL'd for Larry Shaunce, WDOAKX.

Monday, Wednesday, Friday at 1700-1800 on 15390 kHz and, at that same hour, Tuesday, Thursday, Saturday and Sunday on 15370. (**WATCH:** *Ethiopian Satellite TV:* <<http://bit.ly/tLMJJ>>. **VISIT:** *ESTV at:* <<http://ethsat.com>>. – Ed.)

### Sad News from Liberia

Even though ELWA, Monrovia, Liberia, has not been on shortwave for years (plans to return had been announced previously), I'm still sorry to hear that its facility was destroyed by fire in early November.

All of its recorded programming was lost, including its music. The station had already been through tough times during Liberia's long civil war, having to rebuild at least once during those years. It will be a long, long wait before we hear ELWA's signal on 4760 again, if ever. (**INDEPTH:** *Learn more about ELWA at:* <<http://bit.ly/saDRZO>>. – Ed.)

### B-11 Broadcast Season's Winding Down

It is difficult to believe but the end of March means the end of the B-11 broadcast season. *Didn't we just have Christmas?*

Anyway, that means that most, maybe all international broadcasters will be doing the kaleidoscope dance and it will be a week or two before the new times and frequencies are sorted out for the A-12 season.

So, if you've managed to misplace your favorite program on Radio Nacional Venezuela or The Voice of Vietnam, just be patient; all will be well — eventually. Meantime you could spend your tuning time checking for some of the stations recently being noted. They serve more localized audiences than the internationals and are not subject to as many seasonal changes as the internationals. Here are a few of the more unusual recently being noted:

- Trans World Radio in Swaziland in evenings on 3200, 3200 and 4775.
- Radio Mosoj Chaski, Bolivia, in SS on 3310 in the evenings and early (early) mornings.
- Bangladesh Betar, around 1300 or 1400 on 4750.
- Radio Tarma, Tarma, Peru, 4775 in SS around 1000.
- Radio Oriental, Tena, Ecuador, 4781.6 in SS in both the early evenings and also around 1000.
- Radio del Pacifico, Lima, Peru, 4974.8 in SS just before 1000.

### Help Wanted

We believe the Global Information Guide — month after month — offers more logs than any other monthly SW publication! (Just over 550 shortwave broadcast station logs were processed this month!) Why not join the fun and add your name to the list of GIG reporters? Send your logs to Gerry Dexter, Global Information Guide, 213 Forest St., Lake Geneva, WI 53147 or email them to <[gdex@wi.rr.com](mailto:gdex@wi.rr.com)>. See the column text for formatting suggestions, and — please cite the site!

*\*Not all logs get used. There are usually a few which are obviously inaccurate, unclear or lack a time or frequency. Also discounted are unidentifieds, duplicate items (same broadcaster, same frequency, same site) and questionable logs.*

These six selections should occupy you until the other bands have shaken the dust out.

### Now, Let's Hear From You!

Remember, your shortwave broadcast station logs are always welcome. But *please* be sure to double or triple space between the items, list each logging according to home country and include your last name and state abbreviation after each.

Also needed are spare QSLs or good copies you don't need returned, station schedules, brochures, pennants, station photos, and anything else you think would be of interest. And how about sending a photo of you at your listening post? It's way past your turn to grace these pages!

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

**ALASKA**—KNLS, Anchor Point, 9655 at 1600. Strong, opening in RR. (Barton, AZ)

**ALBANIA**—Radio Tirana, 7420 at 0225 with IS, opening EE at 0230 with ID, schedule and news. (Alexander, PA) 7425 with carrier on at 0142, IS 0145, EE ID, schedule including the 0030 and 0145 broadcasts. 9680 with EE news at 0034, but already off when I returned at 0044. (Sellers, BC) 7425 at 0228-0257\* opening of EE pgm some vocals, cultural features and sports round-up. (D'Angelo, PA) 0430 with Albanian news, (Maxant, WV)

**ANGUILLA**—University Network, 6090 with Dr. Scott at 0515. (Maxant, WV)

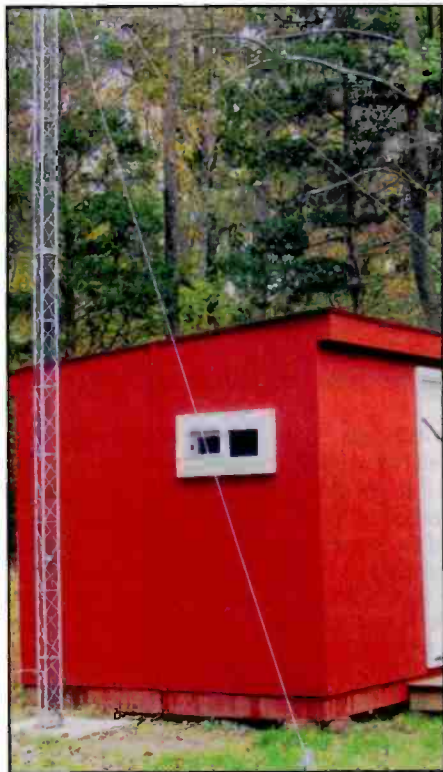
**ARGENTINA**—Radio Argentina Exterior/Radio Nacional, 11710 at 0200 with time pips, multilingual IDs then EE new headlines and ID "This is RAE, Argentina's voice throughout the world." (Coady, ON) 11711 with EE news at 0215. (Sellers, BC) (MacKenzie, CA) 15345 in SS at 0040. (MacKenzie, CA) 2345 in SS with ballads. Off at 2356. (Coady, ON)

**ASCENSION ISLAND**—BBC South Atlantic Relay, 6005 with *Network Africa* pgm at 0438, and 7255 with world news at 0303. (Sellers, BC)

**AUSTRALIA**—Radio Australia, 9580 with *Saturday Night Country* at 1106, 15560 at 2202 with new, pgm highlights, interviews and 17795 at 2329 with *Asia Review*. (Coady, ON) 9480 with world news at 1300. (Maxant, WV) 11880 with news at 1909, 15415 at 0326 with *Around Australia*. 17750 with news at 0203, and 21725 with news at 0211.//15515. (Sellers, BC) 13630 with pop songs at 2250. (Brossell, WI) 15240 in EE at 2326 and 15560 in EE at 2228. (MacKenzie, CA)

ABC Northern Territories Service: VL8K, Katherine, 2485 at 1345 with long talk by man in apparent news pgm. (Barton, AZ)





Rich Parker, KB2DMD, (PA), constructed this separate building to house his long-wave DXing shack.



Parker's 20-foot tower, next to his new shack, supports a Clifton Labs Z1501D antenna.

**BAHRAIN**—Radio Bahrain, 9745 at 2330 with local music, indigenous vocals and local chants, AA talk, with carrier plus USB and poor with adjacent channel splatter. (Alexander, PA)

**BELARUS**—Radio Belarus, 7360 at 2102 with two M and news, ID: "You are listening to Radio Belarus" and more news. (Coady, ON)

**BOLIVIA**—Radio Santa Cruz, Santa Cruz, 6134.8 at \*0858 sign on with choral and SS talk, flute IS, opening SS anmts and local music. (Alexander, PA)

**BOTSWANA**—Voice of America, 9885 at 0417 with interview, VOA News ID, f/by an editorial. (D'Angelo, PA) 9885 at 0305 with *Daybreak Africa* and 15580 at 1831 on African sports. (Sellers, BC)

**BRAZIL**—(all in PP - gld)  
Radio Municipal, Sao Gabriel da Cachoeira, 3375 with vocals and instrumentals at 0940. (Wilkner, FL)

Radio Clube do Para, Belem, 4885 at 0222 with M and phone interview, excited ancr. (Coady, ON) 0700 playing a bit of "Secret Agent Man." The strongest Brazilian here at that hour. (Wilkner, FL) 0459 with Maner and echo playing middle of the road LA pops. (Wood, TN)

Radio Educacao Rural, Tefe, 4925.2 at 1000 with M/W comments, Brazilian music and then all talk from 1011. (Wilkner, FL)

Radio Capixaba, Vitoria, (t) at 0125 with Maner, some musical features and a M/W discussion. (D'Angelo, PA)

Radio Brazil Central, Goiania, at 0120 with M talk, mention of "Brazil Central," and into a ballad. (Coady, ON) 0149 with two M and heated discussion about sports, then later several IDs and music. Fair here but very good on 11815. Also heard 11815 on a different day with Brazilian pops at 0124. (D'Angelo, PA)

Voz Missionaria, Combariu, 9665 with religious talk at 2310, //5940. (Alexander, PA)

Radio Nacional Amazonia, Brasilia, 11780 at 0059 with *Nacionale Inorma* news by M. (Rippel, VA) 0130 with men singing and M comments. (MacKenzie, CA)

Radio Incofidencia, Belo Horizonte,

15190 at 0001 with ID and broadcast schedule. (Rippel, VA) 0137 with EE song and ID at 0140. (Sellers, BC) 2300 with classical music, //6010 was very weak. (Alexander, PA)

**BULGARIA**—Radio Bulgaria, 5900 in EE at 0302 just after sign on, then going into news headlines, //7400. 7400 at 1845 discussing trade unions there. (Sellers, BC) 11675 in EE at 1500. (Barton, AZ)

**CANADA**—Radio Canada International, 15455 in SS at 2225, //11990, 17735 at 2152, //15235 and 15330. (MacKenzie, CA) 17790 at 1845 a bit choppy with songs and listener letters. (Barton, AZ)

CBC Northern Quebec Service, 9625 at 0428 with *Quirks and Quarks*. (Sellers, BC)

CFVP, Calgary, 6030 with songs and "Classic country AM 1060" promo. (Sellers, BC)

CFRX, Toronto, 6070 at 0445 with "Newstalk 1010" ID and talk pgm. (Sellers, BC)

CKZU, Vancouver, 6160 with CBC News at 4. (Sellers, BC)

CHU, Ottawa, 7850 with time signals at 0450 and 14670 at 1310. (Maxant, WV)

**CHAD**—Radio Nationale Tchadienne, 6165 at 2302 with M and news in FF f/by hlife vocals. Off with NA at 2330. (D'Angelo, PA)

**CHILE**—CVC-La Voz, Santiago, 17680 at 1514 in SS with M/W hosts, EE Christian songs. (Sellers, BC) 2200, fair to good in SS. (Barton, AZ)

**CHINA**—China Radio International, 5965 at 1445 with long talk by W at 1500 and into RR; 13710 via Albania with news at 0700; 13640 in JJ at 2215. (Barton, AZ) 7405 with EE interview at 1839; 9655 with *Chinese Studio* pgm; 9730-Beijing with *China Drive* at 1350. Also 11650, Beijing with *Beijing Now* business news and; 15120. Beijing with business news at 0335, //15110 Kashi. (Sellers, BC) 7215 Xi'an with *Heartbeat* at 1010. (Coady, ON) 9440-Kashi in (I) Khmer at 1210; 9540-Beijing in (I) Cantonese at 1153; 9675-Shijiazhuang in RR at 1305; 11620-Xi'an in JJ at 1157; 13580, Urumqi in RR at 1653; 13700, Urumqi in CC at 1827; 13790, Urumqi with pops at 1228. (Brossell, WI)

### This Month's Winner

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

**Richard Parker, (PA)**, takes the prize this month, in the form of a copy of the *World Radio TV Handbook* — that's *the* book you need if you ever expect to find your way around the mysteries and pitfalls awaiting you on the higher frequencies. From frequencies to times, languages to meters, powers to people — it's all in this valuable reference volume. Don't turn on your receiver without it! The WRTH is available at radio equipment dealers, the usual online book outlets or your nearby big box retailer.





Larry Shaunce in his classy Minnesota shack.

## Here's Your "Blast From the Past" For This Month:

Radio Moscow, 4810 via Yerevan (Armenia), in RR at 0120 on February 2, 1991.

Cyprus with sports report at 1551; and 15755 Thailand at 0156 with *From our Own Correspondents*, Off at 0200. (Sellers, BC) 6145 at 0315 with *The World Today*. (Coady, ON) 7445 Cyprus with talk in (I) Dari at 0035; 17795, Skelton on the E.U. at 1835. (Brossell, WI) 15410, Rampisham at 1652 on Asian prisons, pgm previews. Carrier off in mid-sentence at 1658. (D'Angelo, PA)

CVC-The Voice, 6260 via Uzbekistan in Hindi at 1406. (Sellers, BC)

**ETHIOPIA**—Radio Ethiopia, 9705 at 2040-2101\* with local HOA style music, off with NA at 2059. (Alexander, PA)

Radio Fana (t). 7210.8 in possible Amharic with M talk and nice instl music until overwhelmed by TWR sign on at 0325. (Sellers, BC)

**ERITREA**—Voice of the Broad Masses, 7175 at \*0257 with instls, M in Amharic with opening ID and anmts, HOA vocals. (Alexander, PA) 9730 at 0315-0325 with HOA music and vernacular talk; 7175 good. 9820 at 0340-0330 with HOA music, vernacular talks, much stronger on //7175; and 9830 at 0320 HOA music and vernaculars, //9730. (Alexander, PA)

**FRANCE**—Radio France International, 9805 at 0401 with M/W mentioning their website <www.english.rfi.fr> f/by news. (Coady, ON) At in EE at 0444 with *Paris Live*. (Sellers, BC) 11995 with EE comments at 0520. (Maxant, WV) 15300 in FF at 1745. (Barton, AZ) In FF at 1928. (Brossell, WI) 21690 in FF at 2045. (MacKenzie, CA)

**GABON**—Africa No. One, 9580 at 1915 in FF with pops. ID at 1918 (Sellers, BC) 2136 with hit songs by Lionel Ritchie, M host in FF. (D'Angelo, PA)

**GERMANY**—Deutsche Welle, 9735 Portugal Relay with various sports reports in EE, news at 2143 and 15410, Rampisham at 1652-1658\* ending pgm of news features, pgm previews and carrier off. (D'Angelo, PA) 9855 Rwanda Relay with *Spectrum* pgm at 0441, //7350 and 6180. Also, 12045 via Armavir in Urdu at 1430 with sign on with DW IS and news. (Sellers, BC) 13860 at 1830 in (I) Hausa, 15410 Portugal Relay in (I) Farsi at 1823; 15510 in RR at 1648; and 17610 Portugal Relay in PP at 1940. (Brossell, WI) 15640 Rwanda at 2140 on African leaders. (MacKenzie, CA)

**GREECE**—Voice of Greece, 12105 in Greek at 0110. (MacKenzie, CA)

Radiofonikos Staathmos Makedonias, 7450 in Greek at 2149 with talk and music selections. (D'Angelo, PA)

**GUATEMALA**—Radio Verdad, Chiquimula, 4055 in SS with a hymn at 0204. (Sellers, BC) 0408 with inspirational music in, W anc in SS M EE preacher. (Wood, TN) 0545-0604 with gospel song, closing multi-lingual ID anmts and off with NA at 0559. (Alexander, PA)

**GUAM**—Adventist World Radio, 9975 in CC at 1313; 11740 at 1655 giving website and email address. (Brossell, WI) 15320 in EE with M comments at 2250; and 15570 in Mandarin at 2254. (MacKenzie, CA)

Trans World Radio/KTWR, 9910 in CC at 1148. (Brossell, WI)

**GUYANA**—Voice of Guyana, 3290 in EE with hints of folk music at 0420. Sounded like it was a BBC pgm. (Wood, TN) 0502 with BBC News. (Sellers, BC) 0800-0840 with ID and Islamic music. (Wilkner, FL) 0840 with a variety of Hindi vocals. (Coady, ON)

**INDIA**—All India Radio, 4970, Shillong at 1511 with W ending pgm, but poor signal; 9445, Bangaluru at 1900 with ID, news; 9470, Aligarh with W and EE news; 9590, Bangaluru, acknowledging listener letters and reports; 11670, Bangaluru with EE at 1819; 11715, Panaji (Goa) at 0230 it W in Nepali, off suddenly; 11985, Bangaluru at 0215 sign on in Kannada; 13645, Bangaluru at 1515 sign on in Gujarati; 15175, Panaji (Goa) at 1515 in (I) Gujarati; 13710, Bangaluru in EE at 1428. (Sellers, BC) 11605, Bangaluru at 0230 with M hosting cultural pgm. (Rippel, VA) 7550 at 2110 with sitar music, ID and

11650 at 0000 in EE, //11790; 11945 in CC at 0122; and 13580 in CC at 0057. (MacKenzie, CA)

China National Radio/CPBS: Voice of the Strait, Fuzhou, 4940 with *Focus on China* at 1501, into CC at 1530; Beibu Bay Radio, Nanning, 5050 in CC with M/W with "BBR" IDs, EE ID at 1430; PBS-2 Sichuan 6060 with string instruments and flutes, (p) in Tibetan, Xizang PBS, Lhasa (Tibet), 6110 at 1530 moving from CC to EE sign on with "This is Holy Tibet" ID, //4905, 4920; 11960, Beijing in Mandarin at 0217. (Sellers, BC) CNR-1, 6125 briefly at 1615, M music presenter. (Barton, AZ) 7450, Xizang PBS (Tibet), in CC at 1207. (Brossell, WI) CPBS, 11750 in CC at 2337; //11740 CPBS, 11960 in CC at 0118; CPBS, 13610 in CC at 2343. (MacKenzie, CA) CNR, 11710, Beijing in CC at 2312. (D'Angelo, PA)

Firedrake music jammer, 7970 at 1030, //12230, 10300 at 1025, //s 7970, 12600 and 12230, 12230 at 1120, 13680 at 1225, //13920. (Barton, AZ) 15900 at 0159 but off just before 0200. (Sellers, BC)

**COLOMBIA**—Radio Alcaravan, Puerto Lleras, 5910 in SS with ID at 0430 and pgm of lively LA music. (Wood, TN) 0920 with M SS talk and rancho-type music. (Coady, ON)

La Voz de su Concencia, Puerto Lleras in SS at 0815 with ID, local music. (Alexander, PA)

**CONGO (D.R.)**—Radio Okapi, 11690 via Meyerton at 0417 with local language, M/W with apparent news and many mentions of "Congo," singing ID at 0427. (Coady, ON)

**CROATIA**—Croatian Radio/Voice of Croatia, 7375 via Germany with "Glas Hrvatska" ID at 0300 and M with "This is Croatian Radio, the Voice of Croatia" ID and W leading into news. (Coady, ON) 0305 with W and news, ID and sports report, (Sellers, BC)

**CUBA**—Radio Havana Cuba, 13670 in SS at 2140. (Barton, AZ) 15370 SS at 2322, //15230. (MacKenzie, CA)

**CYPRUS (Northern)**—Bayrak Radio, 6150 at 2248 with EZL pops and M with TT ID and chatter to 2303 and more talk with station name mention, W with talk and back to music. Weak and noisy. (Coady, ON)

Cyprus Broadcasting Corp., 9760 at 2217 with M/W and talks in Greek, //6180 and 7220. (Coady, ON)

**ECUADOR**—HCJB Global 6050, Pinchincha, 0935 in Quechua with religious talk, later brief Andean vocals, time pips at 1000 and into SS. (Coady, ON) 12010, Santiago in SS at 0115. (MacKenzie, CA)

HD210A, Guayaquil, 3810 at 0847 with SS time anmts. (Coady, ON)

**EGYPT**—Radio Cairo, 9315 with F vocals, anthem and news at 0215. (Coady, ON) 15065 (p) at 1442 in (I) Pashto with ME-type vocals. (Sellers, BC)

**ENGLAND**—BBC, 6134 via South Africa at 0256 with *World Book Club*, ID and promo for BBC Africa Service; 9410 Oman Relay at 1509 with various news features; 12095 Oman Relay with an interview at 1835; 15310 Thailand Relay on Italian political crisis; 15420 at 1452 with a historical feature on El Salvador's civil war; 15510



an address by the prime minister; 9445, Bangaluru with GOS at 2214. (Coady, ON) 9870 at 1600 with ID and music. (Barton, AZ) 11670 at 2115 on exports. (Maxant, WV) 11715, Panaji (Goa), 2154 with domestic vocals leading to 2200 news. (D'Angelo, PA) 13605 at 0020. off at 0045. (MacKenzie, CA) 13695, Bangaluru in (I) Telugu. (Brossell, WI)

**INDONESIA**—Radio Republik Indonesia, Palangkaraya, (Kalimantan), 3325 in II at 1407 mentioning African cities. (Sellers, BC)

**IRAN**—Islamic Republic of Iran Broadcasting, 11980 at 1900 in (I) Albanian. (Brossell, WI) 13670 with world news at 1949; 13785 with EE pgm lineup at 1537. No QRM, unlike other days. 15525 at 1533 with call to prayer, and prayer by W. (Sellers, BC)

**ISRAEL**—Galei Zahal, 9235 in HH with M talk and music background, later an Israeli song. (Sellers, BC)

**ITALY**—Italian Radio Relay Service, 15190-nf (ex-15190) via Romania at \*1257 with inspirational music, 1300 into Brother Stair and Overcome Ministry. (Alexander, PA) 1428. (Sellers, BC)

**JAPAN**—NHK Radio Japan, 5955 at 1405 on Bangkok flooding, and 17560 with M/F ancrs in JJ. (Sellers, BC) Heard on 9455 at 1300 with talks in CC; 11815 in JJ at 1150 and 1445 via Germany in JJ at 1852. (Brossell, WI) 6110 via Canada with news at 0505. (Maxant, WV) 11665 in JJ at 2345; 13650 in VV at 2336; 15195 in CC at 2354; 15265 in JJ at 2315; 17605 in JJ at 2302; 17810 in JJ at 2307. (MacKenzie, CA) 9835 with JJ with jazz at 1745; and 13650 at 2350 with closing anmts colliding with CRI in (I) Burmese. (Barton, AZ)

Radio Nikkei, 3925 at 1050 in JJ with M/W talk and piano music. (Coady, ON)

**KUWAIT**—Radio Kuwait, 13650 at 1815 with ME music. (Barton, AZ) 17550 in AA at 2103. (MacKenzie, CA)

**LIBYA**—Radio Television Libya, 11600 at 1732 with FF talk, many music bridges of "Dance France" song, light classical music and IDs. Sign off at 1804. (Alexander, PA) 15215 with talks in (I) Hausa at 1825. (Brossell, WI)

**MADAGASCAR**—Radio Madagascar, 5010 at 0211 with local vocals, IS, choral anthem and Malagasy talk at 0231, then more local music. (Alexander, PA)

**MALAYSIA**—Radio Malaysia Sarawak, 9835 at 1500 in Malaysian with time pips and possible ID, RTM ID and into news. (Sellers, BC)

**MALI**—RT Malienne, 5995 at 0555 sign on with FF ID, IS, anthem, flute IS and opening ID anmts. talk and rustic vocals. Also 9635 at \*0801 with vernacular talk, some rustic vocals, but otherwise all talk. (Alexander, PA)

**MEXICO**—Radio Mil, Mexico City, 6010 in SS with lively ballads and simple "Radio Mil" ID at 0931. (Wilkner, FL)

Radio Educacion, Mexico City, 6185 in SS with classical music at 0410. (Maxant, WV)

**MONGOLIA**—Voice of Mongolia, Altay (p), 4830 at 1435 with CC opera, but very weak, with //4895 barely audible. (Sellers, BC) 12085 at 1035 in vernacular with short music interludes and promptly off at 1100. (Rippel, VA)

**MOROCCO**—RTV Marocaine, 15345 with talks in AA at 1751. (Brossell, WI)

**NETHERLANDS**—Radio Nederland, 7425 Madagascar Relay at 1906 with *The State We're In* pgm and 11655, Madagascar at 11822 with *Earthbeat* pgm. (Sellers, BC) 11615, Madagascar, 11615. //7425 interviewing a U.S. Senator. (Coady, ON) 15745, Madagascar with F vocals at 1520. (Barton, AZ)

**NEW ZEALAND**—Radio New Zealand International, 5950 with Pacific island news at 1319; 15720 at 0211 with Spanish flamenco and W about a historical event on NZ's South island. (Sellers, BC) 9725 at 0915 with a pgm of classical music. (Coady, ON) 11725 with world news at 0410 and into U.S. pops. (Maxant, WV) 12085 via Philippines at 1317 in (I) Dutch. (Brossell, WI)

**NIGERIA**—Voice of Nigeria, 15120 on ME and Syria at 0435. (Maxant, WV) \*0446 on with test tone IS and opening EE anmts at 0456, local weather and pgm preview. (Alexander, PA) 0500 with W and talk on rule of law there. (Coady, ON) 1540 on illegal trade of rhino horn. (Sellers, BC) 1818 on entrepreneurship there. (Sellers, BC)



Mario Filippi, N2HUW, in his nice New Jersey shack,



Pirate XFM sent this QSL to D'Angelo for his recent reception. (Courtesy of Rich D'Angelo)

**NORTH KOREA**—Voice of Korea, 6285 in RR at 1407, 7570 in SS at 1901 with NA at sign on; 9325 at 1520 with ID and into commentary; 9730 with EE political talk and orchestral music at 0353; 15180 with W on energy, ID and sked. (Sellers, BC) 11710 at 1545 suffering badly from KJES QRM; 11735 at 0720 with marches, M in RR; 13760 at 2225 with long SS talk; 15100 in CC at 0032 with W comments in SS. (Barton, AZ) 11710 at 1505 with EE ID and chorus and praise of Kim; 13760 at 0135 with patriotic vocals, *Ancient Korea* feature. (Coady, ON) 11710 at 1321 on Japanese "hooliganism." (Brossell, WI)

KOREAN Central Broadcasting Station, 15180 at 1202 with an impassioned talk in KK. (Brossell, WI)

**OMAN**—Radio Sultanate of Oman, 15140 with EE news at 1433, ID mentioning FM, piece by Michael Jackson. Also, 15355 (p) in AA at 0256, 0300 chimes, anmts and music but very poor. (Sellers, BC) 15140 in AA at 1653 with AA vocal to 1700 when fanfare and apparent news. (Coady, ON)

**OPPOSITION**—Sound of Hope (to China), 11545 via Tajikistan in CC at 1220. (Brossell, WI)

Denge Mezopotamia (p) (to Iran), 11530 via Ukraine at 1445 with M presenter to TOH close. (Barton, AZ) 1453-1500\* close with domestic Kurdish music and vocals. (Alexander, PA)

Echo of Hope (to N. Korea), at 1420 with W in KK. (Sellers, BC) Radio Damal-Voice of the Somali People (to Somalia); 11740 via Germany at 1850 in (I) Somali. (Brossell, WI)

Radio Darbanga (to Sudan), 7335 via France at \*0438 with singing Radio Darbanga, opening ID and anmts in AA. News followed at 0430. (D'Angelo, PA)





Radio Free Euphoria QSL'd for D'Angelo . . .



. . . As did the International Radio of Serbia.

Radio Y'abaganda (to Uganda), 15410 at \*1700-1715\* opening with local African music, choral anthem, talk in (l) Swahili and many mentions of Uganda. (Alexander, PA)

**PAKISTAN**—Radio Pakistan, 9470, Islamabad at 1702 with W and EE news, ID 1710 and into (p) Urdu. Poor level. (D'Angelo, PA) 15490 at 0206 with news in Urdu, ID at 0209 and headlines repeat and off air at 0210. //11800 barely audible and off 10 seconds later. (Sellers, BC)

**PALAU**—World Harvest Radio Relay, 9930 at 1310 with EE sermon. (Brossell, WI)

**PERU**—Ondas del Huallaga, Huanuco, 3329.5 at 0945 with M in SS over music, into SS talk, time check and more music. (Wilkner, FL)

Radio Manantial, Huancayo, 4986.3 at 1100 in SS. (Wilkner, FL)

Radio Libertad, Junín, 5039.2 at 1030 with time checks, greetings in SS. Excellent music and strong signal. (Wilkner, FL)

Radio Tawantinsuyo, Cusco, 6174 at 1031 with slow talk in SS by M, deep fades, later lost in the mush. (Wilkner, FL)

**PIRATES**—WBNY/Radio Bunny, 6295.1 at 2350 and \*0047 with rap and comedy songs. (Zeller, OH) 6925 at 0215-0230 giving Belfast, NY, address; 6932 at 0303 with ads. Commander Bunny. (Alexander, PA) 6925.1 at 0308 with song parody, QSL via Belfast address. Also, 6932.5 at 0305-0319\* hosting a quiz show called *The Pirate Feud*, with mentions of the Poet and comic ads, said was a production of the Bunny Network. (D'Angelo, PA)

Radio Free Manitoba, 6930 at 0233 and 0302 requesting reports to the Free Radio Network, radio/TV audio clips, fried chicken skit. (Sellers, BC)

XFM, 6951u at 0229 with well-produced Halloween pgm, said "XFM the power of X", emails to: <xfmshortwave@gmail.com>, spoofs of scary songs and SSTV-FAX segment at 0340. (Hassig, IL)

Cracker Radio, 6925 at 0235 with rock and repeated "Boy, boy, boy, ah boy." SFX IDs as

"They call me Cracker," "This is Cracker Radio" and "Cracker Radio International." (Coady, ON)

Radio Jamba International, 6815 at 0132 with Cracker (?) DJ, lots of old blues, PBS jingle. No address, also same thing at 0328. (Hassig, IL) 0240-0250 with rock and 0405-0425 with IDs, weird and X-rated songs and talk. (Alexander, PA)

Radio Free Euphoria, 6925 at 0000 with strange rock, rambling talk <radiofreeeuphoria@yahoo.com>. (Hassig, IL) 0000. (Alexander, PA) 0337-0347 with mainly music, nice ID at closedown and email for reports. (D'Angelo, PA) At 2341-2357 with rock and numerous mentions of marijuana. (Zeller, PA)

Random Radio, 6925 are 0003-0006\* with tail end of music and talk, ID before carrier was cut at 0006. (D'Angelo, PA)

WMPR, 6925 at \*2221-2308\* with lengthy rock things and three clear IDs. No address. (Zeller, OH) 2242-2300\* with techno-dance combined with numerous IDs: "Thank you for tuning into W-M-P-R, micro power radio. This is W-M-P-R." (D'Angelo, PA)

WFMP-Family Radio, 6924.7 (or perhaps "WFMT") at 0020-0129\* with variety of pops and instrumentals, classical music and '70s disco. (Alexander, PA) 0028-0110 with various pieces of music, including "Hallelujah chorus." ID at 0110. (Sellers, BC) 0116-0128, several W vocals, M anc and W with several IDs. Off at 0128. (D'Angelo, PA) \*2117-2229 with IS at open and close, multiple clear IDs, discussion of the family, various pops and blues and a comedy sketch. (Zeller, OH)

Radio Mushroom, 6925u \*2237-2302\* pgm of rock and M who claimed stn was powered by nuclear energy and claiming the station plays all kinds of music: <radiomushroom@gmail.com> for reports. (Zeller, OH) 2243-2303\* with pops "This is Radio Mushroom" ID at 2343 and QSL info and email address. (Rippel, VA)

Northern Relay Service, 6930 at 0325 with pgm of anti-government clips and rants, snip-

pets from Alex Jones pgm and talk of the "anonymous" movement with Beethoven's Fifth in background. (Hassig, IL)

Wolverine Radio, 6925 at 0101-0150 and 0201-0304 with early 60s songs, nice Halloween-themed pgm. SSTV-FAX feed 0302. Nice pgm of big band music. (Hassig, IL) 0020 with great, big band music on a cold fall night. (Rippel, VA)

Crystal Ship, 6925 with Halloween theme rock, reports to <tcshortwave@gmail.com> John Poet reading a poem, Elmer Fudd singing "kill the wabbit." (Hassig, IL) 6930 at 0332 with comedic bits, Commander Bunny mentioning their "network" and email address. (Sellers, BC) At 0306 with rambling talk of political situation in U.S. and email address. (Hassig, IL)

Radio Mars (t), 6925 at 2310 with repetitive ID by M, miscellaneous selections. (Rippel, VA)

High Plains Relay Service, 6925u at 0055 with a few rock things after relaying Crystal Ship. (Hassig, IL) "fcc" 6925u at 0153 saying "Where are you pirates, then. This is the FCC monitoring station. Cease and desist" said several times. (Hassig, IL)

Radio 212 International, 6925 at 2315-2331 with techno pops and industrial dance. This might be WMPR under a new name. (Hassig, IL)

Black Arrow Radio (Netherlands), 21490 at 1310-1425\* with M thanking listeners for reports while playing music and giving several IDs. (D'Angelo, PA)

Cupid Radio, (Netherlands), 21460.2 at 1625 with Euro-pops, IDs, Said they were running 350-300 watts. Email address as: <cupidradio@hotmail.com>. Acknowledging several reports and drifting up slightly. Very good level. (Alexander, PA) 1650-1732 techno dance. Said they'd been received in India, Japan, Russia and U.S., among other places. (D'Angelo, PA)

Laser Hot/Hits (Euro), 6970 at 0630-0645 and 0700-0740 with pops. Weak to worse and very weak on //4026. (Alexander, PA)



Radio Powerliner International (t) (Netherlands), 6205 weak with pops at 2320-0030. (Alexander, PA)

Radio Malta (Euro), 6940.1 at 0535-0550 with lite music and blues. ID. Was weak, but readable. (Alexander, PA)

Radio Waves International, Lithuania, via France, 9895 at 1525-1528\* with pops. IDs, address. (Alexander, PA)

(WE NOW RETURN YOU TO OUR REGULARLY SCHEDULED COUNTRIES!)

**PHILIPPINES**—Radio Pilipinas/PBS, 15190 at \*1730 sign on by M, ID, snippets of broadcast schedule heard through het, time pip at 1900 and intro music and ID. (Rippel, VA) 17700 at 0204 with W and national news items, ID at 0210 and back to news. (Sellers, BC)

**ROMANIA**—Radio Romania International, 7305 at 0455 on Romanian caves. (Maxant, WV) 6015-Galbeni at 2334 with EE to Western Europe with various features and IDs, //7220, Galbeni, also 9530, Tiganesti. (D'Angelo, PA) 6130 at 0453, closing anmts at 0455 with schedule, website, IS and off. 6145 at 0152 discussing ceramics, ID, contest details. Also, 11895 at 0313 with various EE features, fair to good on //s 7335 and 9645. (Sellers, BC) 15210, //15430 at 1136 with pops. (Brossell, WI)

**RUSSIA**—Voice of Russia, 7260, Vladivostok with M and EE news at 1402; //4975, Tajikistan; 7340, Irkutsk in (l) Urdu with traditional song at 1416, apparent news at 1432. (Sellers, BC) 9840, Petopavlovsk-Kamchatska at 0423 on liquid natural gas project; 11655 at 1551 with on/off tone to 0600 sign on in FF; and 11660 via Tajikistan (Uzbek), in EE at 1442 interviews. (Sellers, BC) 7205, Chita at 0920 with W hosting classical music. (Coady, ON) 15425 in RR with classical music composers at 0315. (Maxant, WV) 15465, Moscow in FF at 1815. (Brossell, WI)

**SAO TOME**—Voice of America Relay, 4960 with *Daybreak Africa* at 0436. Also 9885 at 0436. (Sellers, BC) 12015 with U.S. hit parade at 1834. (Brossell, WI)

**SAUDI ARABIA**—Broadcasting Service of the Kingdom, 15120 at 1444 in (l) Bengali with call to prayer, then gone at 1458 recheck. (Sellers, BC) 15205 with Korean recitations at 1738. Also heard on 15435 at 1753 with AA talks. (Brossell, WI) 17560 in AA at 2100. (MacKenzie, CA)

**SERBIA**—International Radio of Serbia, 6100 via Bosnia with W and news at 2201, this is the International Radio of Serbia. Stay tuned, stay tuned." (Coady, ON) 6190 at 0148 with an English cultural pgm; 9865 at 0040 with W talking about Kosovo, later on castles in a northern province. (Sellers, BC)

**SEYCHELLES**—BBC Indian Ocean Relay, Mahe, with ID, website info and interview at 1833. (Sellers, BC) 2003 with W and world news and reports. (Coady, ON) 2149-2159\* with EE reports on Herman Cain allegations and on a UK memorial. (D'Angelo, PA)

**SINGAPORE**—BBC Far Eastern Relay Station, 5975 with correspondent reports on

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Egyptian protests; 11890 with report on the Arab League's involvement in North African events. And, 15335 at 0150 with *From our own Correspondents*. (Sellers, BC) 6195 at 1110 with World Service news. (Wilkner, FL) 9740 at 1029 ending sports report, ID and observances of Remembrance Sunday; 15335 with news at 0102. (Coady, ON)

**SOUTH KOREA**—KBS World Radio, 9640 with news at 1603. (Sellers, BC) 9560 via Canada with Korean pops pgm at 1240; 9650 via Canada at 1200 opening EE programming. (Barton, AZ)

**SPAIN**—Radio Exterior de Espana, 3350 Costa Rica Relay, in SS at 0224. (D'Angelo, PA) 0159 in SS; 9605 with EE with pops. (Sellers, BC) 9765 in SS at 0027; 11680 in SS at 2335; 11840 in SS at 0127; 15110 in SS at 2137; 15160 in SS at 2355. (MacKenzie, CA) 11910 via Xi'an in SS at 1209. (Brossell, WI) 13720 with IS at 0700 open. (Barton, AZ)

**SRI LANKA**—SLBC/Radio Sri Lanka, 7180.7 at 0027 with Hindi vocals, but poor with ARO splatter. (Alexander, PA) 11905 (p) at 0126 with nice pgm of Hindi vocals and brief Hindi talk between selections; 15745 at 0124 with tone on carrier, drumming, choral anthem, more drumming and chorus, 0120 time pips and EE ID. (D'Angelo, PA) 11905 at 0050 with Hindi songs, //7190. (Sellers, BC)

**SUDAN**—Miraya FM, 9940 (nf) at 0401-0420 with EE news, into AA talk at 0413, Afro-pops. On an earlier date 11560 at 0310 with local Afro-pops and AA talk, into EE at 0331. (Alexander, PA) 0357 (p) with Afropops, M at 0400 with news headlines. Very poor. (Sellers, BC)

**SURINAME**—Radio Apinte, 4990 at 0257 with local pops and M talk in Dutch. Off at 0300. (Coady, ON) 0900 with a ute on top occasionally, M in DD at 0920 some vocal and instrumentals. (Wilkner, FL)

**SWAZILAND**—Trans World Radio, Manzini, at 0304 with religious talks in (I) Shona with musical selections. Poor and distorted. (D'Angelo, PA)

**TAIWAN**—Radio Taiwan International, 6875 via Florida discussing the Euro. (Maxant, WV) 9625 at 1440 in (I) VV. (Barton, AZ) 11665 at 1154 in CC. (Brossell, WI)

**THAILAND**—Radio Thailand, 9720 at 1234 with M/W and news. (Coady, ON)

**TUNISIA**—Radio Tunisienne, 9725 at 1951-2010\* with ME music, 2000 ID and news in AA. (D'Angelo, PA) 12005 in AA at 1901. (Brossell, WI)

**TURKEY**—Voice of Turkey, 7240 at 0423 ending *Ataturk, Rebirth of a Nation* //by a recipe pgm. 9515 at 0321 looking at Turkey music, ID'd as Turkish *People for Beginners*. 9655 at 0358 with IDs and IS, 0400 time pips and sign on, schedule. (Sellers, BC) 9655 at \*0357 with ID by W, EE pgm at 0400, 5+1 time pips, ID, open anmts and news by W. (D'Angelo, PA)

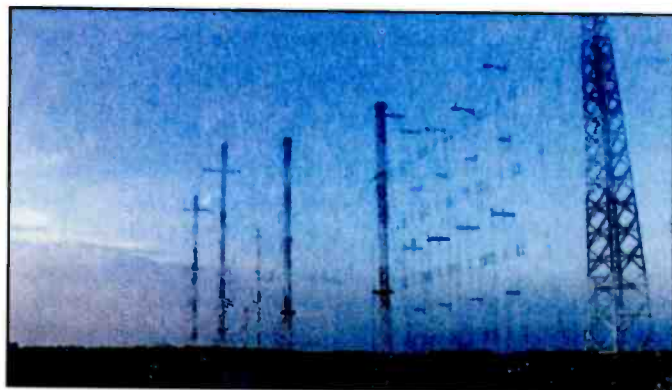
**UGANDA**—UBC/Radio Uganda, 4976 noted weakly at 0400. (Wilkner, FL)

**UNITED STATES**—Voice of America, 5960, Greenville with special English news at 0138; //7465, 7465, Greenville with *Science in the News*; 9555 Philippines Relay with KK/EE lesson; 13570 Lampertheim Relay at 1517 with *Border Crossings*. (Sellers, BC) 6140 Thailand Relay at \*1500 and news by W; 12150 Philippines Relay at 1230 with group discussion. (Barton, AZ) 13585 Philippines Relay in KK at 1224. (Brossell, WI) 15580 via Bonaire with *Encounter* pgm at 1950. (Coady, ON)

Radio Free Asia, 11870 Northern Marianas Relay; 11870 in CC at 1702; 12140 NM Relay at 1319 in (I) Khmer; 13830 via Tajikistan in (I) Tibetan at 1231; 15585 NM Relay in (I) Mandarin at 2315. (Brossell, WI) 15550 via NM in CC at 1550; 15585 NM in CC at 2345. (MacKenzie, CA)

Radio Marti, 11930 via Greenville, in SS at 2153. (MacKenzie, CA)

Family Radio/WYFR, 6220 via Huwei (Taiwan), poor at 1105; 6240, Paochung (Taiwan), at 1100 and //6220. (Wilkner, FL) 7360 via French Guiana at 2358-0000 with just theme music, but poor until consumed by noise. (D'Angelo, PA) 7395 via Madagascar with Bible reading at 1846, 9500 via Wertachtal at 1933 with IS and sign on in AA, 9705 via South Africa at 1904 with Bible reading; 9985, Okeechobee with hymn at 0222, into pgm *Beyond Intelligent Design*; 11520 via



Antennas at International Radio of Serbia. (Courtesy of Rich D'Angelo)

Kazakhstan at 1434 in (I) Urdu; 11610 via U.A.E. with Bible reading at 1549; 11995 via U.A.E. with Bible reading at 1507; 21480 via Ascension at 1530 given address in Nigeria and into *Searching the Scriptures*. (Sellers, BC) 11550 via Taiwan in (I) II at 1150; 11895 via Irkutsk in VV at 1203; and 12060 via Ascension on why Judgment Day didn't occur on October 21. (Brossell, WI)

Trans World Radio, 7215 via South Africa at 0325 with IS, IDs, organ music and M in (I) Amharic. (Sellers, BC)

Adventist World Radio, 6145 from Austria at 0330 with W and ID, into Farsi. (Coady, ON) 12105, Guam at 1206 in (I) Mandarin. (Brossell, WI)

WRMI, Florida, 9840 at 1946 with a preacher. (Sellers, BC) 9955 at 1004 relaying Radio Prague. (Coady, ON)

WWCR, Tennessee, 3215 at 0431. (Wood, TN)

WWRB, Tennessee, 3185 at 0530. (Maxant, WV)

WEWN, Alabama, 11520 at 0330. (Maxant, WV) 15610 at 2125. (MacKenzie, CA)

KSCS, Ft. Worth, 25990 (Studio-TX link) at 1925 with continuous country songs. (Alexander, PA)

KOA, Denver, 25950 (Studio-TX link) 1950 carrying Rush Limbaugh and Fox news. (Alexander, PA)

**VATICAN**—Vatican Radio, 3975 at 0459 with IS, 0500 musical sign on and M in (I) Polish; 6040 at 0249 with IS, sign on, pgm line up; //7305 via Canada; 9660 via Madagascar with ID at 0300; 9900 via Novosibirsk with on/off tone at 1222, Vatican bells at 1230 and open in CC; 11625 with IS, 1800 sign on in Swahili. (Sellers, BC) 11625 at 2022 with interview, ID for African Service at 2027, brief IS and off. (Coady, ON) 9660 at 0510 with African Service. (Maxant, WV) 15180 (DRM mode) at 1530 with Catholic Mass. (Rippel, VA) 15570 in (I) Amharic at 1637. (Brossell, WI)

**VIETNAM**—Voice of Vietnam, 6175 via Canada at 0230 with sign on, ID, anthem, pgm line-up; and 12020 at 1518 with EE ID and Music Bridge. //9840. (Sellers, BC)

**ZAMBIA**—CVC-One Africa. (p) at 0209 with hymns and easy Christian pops and African-accented M with occasional talk. (Coady, ON) 13590 with talk show on how to get over disappointment. (Brossell, WI) 17695 with Christian rap, British DJ with *Kick Start* pgm. (Sellers, BC)

That'll do it for this month, except to extend grateful high fives to the following who checked in this time: Harold Sellers, Vernon, BC; Rick Barton, El Mirage, AZ; Stewart MacKenzie, Huntington Beach, CA; William Hassig, Mt. Prospect, IL; Rich D'Angelo, Wyomissing, PA; George Zeller, Cleveland, OH; Chuck Rippel, Chesapeake, VA; Brian Alexander, Mechanicsburg, PA; Joe Wood, Greenback, TN; Charles Maxant, Hinton, WV; Mark Coady, Peterborough, ON; Robert Wilkner, Pompano Beach, FL; and Robert Brossell, Pewaukee, WI.



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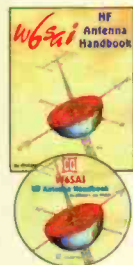
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## This Month's Feedback from Pop'Comm Readers

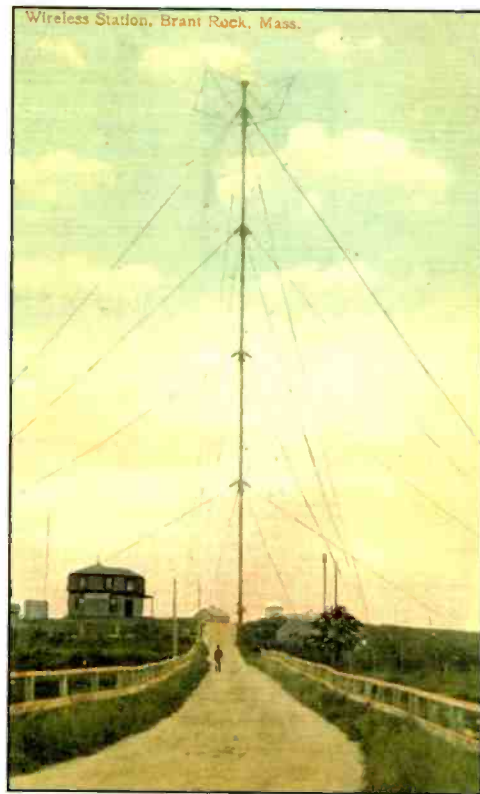
### Giving Mr. Fessenden His 'Due,' Thoughts On the Monitoring Community and More on DTV Reception

*Pop'Comm appreciates and encourages comment and feedback from our readers. Via email, please write: <editor@popular-communications.com>. Our postal service address is: Editor, Popular Communications, CQ Communications, Inc., 25 Newbridge Rd., Hicksville, NY 11801-2953 USA. – Richard Fisher. K16SN*

#### Fessenden's Historic Broadcast: Much More Than a 'Footnote'

Editor, *Pop'Comm*

R.B. Sturtevant's story in the December 2011 *Pop'Comm* about Reginald Fessenden's radio broadcast of 1906 (*Reginald Fessenden's Joyful Noise – December 24, 1906, page 12*) was of particular interest to me as I used to live in the general area in which the transmission took place (at Brandt Rock in Massachusetts, **Photo A**).



**Photo A.** A colored postcard shows the radio tower at Brant Rock, Massachusetts where Reginald Fessenden made the first radio broadcast by voice on December 24, 1906. (Courtesy of Wikimedia Commons)

As a kid, there wasn't too much (published) about this historic event beyond what might be called a footnote.

However, David Reilly, AA1A, a local ham, has for years worked to have Fessenden's title changed from "The Forgotten Man of Radio" to "Radio's First Broadcaster." **Photo B.** He and other Marshfield,

**Photo B.** Reginald Fessenden died in January 1932 — largely a forgotten man. (Courtesy of Wikimedia Commons)



**Photo C.** Standing at the base of the antenna at Brant Rock is Edward F. Perry, Jr., owner of WATD-FM in Marshfield. The tower that once stood here was used for the first voice broadcast over a radio transmitter on December 24, 1906. In part, the plaque beside him reads: "Site of First Radio Broadcast . . . By Reginald Fessenden." (Courtesy of Wikimedia Commons)



Massachusetts hams for a number of years have had a special event 2-meter station every Christmas Eve at the site of Fessenden's broadcast. Reilly also got Ed Perry, **Photo C**, owner of commercial station WATD-FM (93.3 FM) so interested, that every Christmas Eve a group does a reenactment.

In 2006 there was a Fessenden Centennial Celebration at Marshfield from August 4 to 6, held in the summer — avoiding winter's cold as well as to attract tourists.

— Bob Fraser,  
Belfast, Maine

(Bob: Thanks for your insight. It is wonderful to see that this giant of radio history is getting the recognition he deserves. The Fessenden Centennial Celebration flier and newspaper clippings from *The Boston Globe* and Quincy Patriot Ledger you included with your letter certainly show that there are many people who want to keep Fessenden from being "The Forgotten Man of Radio" and are helping to endorse his place in wireless history as "Radio's First Broadcaster." Much appreciated! — Richard Fisher, KPC6PC/KI6SN)

## Let's Bring More People into the Monitoring Community

Editor, *Pop'Comm*,

In regard to the *Pop'Comm Monitoring Station* Program: I have been involved in the radio hobby for many years — more than I care to admit.

I was an over-the-road truck driver and radio helped pass the time for many lonely hours.

I grew up at the end of a dirt road on a farm in the middle of South Dakota. At the time, radio was our only entertainment, especially for a small boy. *The Lone Ranger* . . .

I am a medium-wave DXer and short-wave listener using everything from ultra-light radios to high-end receivers. Back when CRB was issuing station ID signs, I received one: KSDØAY. I didn't use it much, but it sure looked nice hanging on the wall. It made me an individual in a vast generic crowd.

It is great that *Pop'Comm* is undertaking its Monitoring Station program. I plan on registering. Will I use my *Pop'Comm Monitoring Station* ID sign? Probably.

I think some of the snobbishness expressed by people who feel the pro-

gram is "phony, pretentious and *for wannabes*" drives people away from the hobby . . . Some guy or gal DXing medium wave with a \$40 portable is just as important and just as good as the people who look down on the SWLer who has a station ID.

This is a good time to draw people into monitoring. Times are not good. Money is short. People need an outlet. Radio DXing is a great answer.

Buy a cheap radio. Use your car radio. Just join in! All you need is a spiral notebook and pen and a radio. *Shazzam!* You have a monitoring station! And with it, you can have a *Pop'Comm Monitoring Station* ID sign.

What we don't need are people driving potential newcomers away from our hobby.

— Terry Jones,  
Plankinton, South Dakota

## Defying Convention with His Homemade DTV Antenna

Editor, *Pop'Comm*,

Thanks for the articles back in August/September 2011 on homemade DTV antennas ("*Seeing is Believing: A Simple DTV Antenna You Can Build*, August; and "*Sending a Homemade DTV Antenna Outside*," September, by Richard Fisher, KPC6PC/KI6SN. — Ed.)

After some hemming and hawing, I finally got around to picking up the parts, mostly due to the excellent suggestion made by Larry Shaunce, WDØAKX, in January's *Pop'Comm* about using copper-coated welding wires. (*Across the Spectrum*, Page 31)

I'm not the most technically inspired person when it comes to electronics, so I had to wing it with what I had at hand.

The elements bent quite nicely after I came up with a jury-rigged *bending point* on my workbench.

I had some 16-gauge stranded wire laying around and with some careful spot-stripping, used a pair of the wires for the phasing lines. Would that be a problem?

The other issue I realized after I finished the build was that I put the transformer in-line with the middle set of elements. Having 14 rods, I went with 7 on either side, placing it on the fourth set of elements. This does leave three sets of elements above and three below — making the removal of that middle element possible if necessary.

I grew up DXing TV and shortwave. I was pleased to have picked up a TV sta-

tion out of Norton, Virginia from my home in Racine, Wisconsin. On short-wave, my greatest DX was Radio Australia — and the phone call that followed, leading to a nice chat with the engineer on duty.

— Kris Herzon,  
Racine, Wisconsin

(Chris: Great work on building a DTV antenna for some continued DXing on the new digital channels. It is probably best to make all elements of your antenna from similar material. Stranded-wire phasing lines will have much different properties than solid wire. Changing the feed point will also have a significant impact on the antenna's receiving pattern. However, sometimes defying convention can lead to some remarkable findings. I'd suggest giving your DTV antenna a good workout and make your decision on how well it works based on the results of your reception. That's part of the fun of TV antenna experimentation. When you've gotten the results, please let us know. We'll share your findings with *Pop'Comm's* print and digital readership. — Richard Fisher, KPC6PC/KI6SN)

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by Mark Francis, KIØPF



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# Aunt Beezee's Electric Clothesline

by Shannon Huniwell  
<melodyfm@yahoo.com>

*"It wasn't much of a trick to tune WBZ on the homebrew crystal receiver, as the signal only had to travel a few hundred yards."*

**T**here's an incredibly strange expression in the Williamson family that is tagged with the equally odd suffix, "Aunt Beezee's clothesline." Nancy Williamson Reynolds remembers it being prefaced with just about any noun and some competitive adjective, as in *That Dachshund dog is LONGER than Aunt Beezee's clothesline* or *Those hippies are HIGHER than Aunt Beezee's clothesline!*

In fact, Nancy recalls the original form of such idiosyncratic statements indicated that the clothesline of whomever this Aunt Beezee was, operated electrically. When someone in her clan really needed a superlative simile for describing some extraordinarily incredible person, place or thing, the full expression went into effect. For example: *My old English teacher was meaner than Aunt Beezee's electric clothesline!*

That's the kind of workout the unique phrase got by the patriarch of the Williamson family at a reunion last summer. As 96-year-old Harold Williamson proudly surveyed the assemblage of relatives in his son's meticulously maintained suburban Albany, New York-area backyard, the elderly gentleman exclaimed through tears of joy, "I thank the Good Lord for granting me the chance to live to see so many generations of Williamsons. Why, I dare say, if just the Williamson great-grandkids alone, stood side-by-side, they'd extend even further than Aunt Beezee's electric clothesline!"

Hearing her grandfather make that declaration, Nancy, thought she'd seize the opportunity to do a bit of first-hand research on the expression's genesis and maybe add an interesting footnote to



**Photo A.** "The drivers of both of these cars honked and hit their brakes," reports Nancy, our story's catalyst who took her grandfather to see the old towers atop this defunct Westinghouse factory. "They couldn't figure out why an old man was making his way into the middle of the street and snapping pictures." Nancy intervened, motioned for the guy in the white SUV to roll down his window, and then explained that her overly excited 96-year-old Gramps lived nearby during the 1920s and watched the structures being built. "He can hardly believe they're still there," Nancy told the curious driver of the second vehicle. That fellow, a local history buff, happily pulled into the gas station parking lot where Nancy's car idled, and jotted down some of Gramps Williamson's radio recollections about the towers' — and related wire antenna — purpose: To send into the ether WBZ, America's first-licensed broadcasting station.





**Photo B.** Gramps was clicking his granddaughter's digital camera in rapid six-shooter fashion while jay-walking East Springfield, Massachusetts' Page Boulevard. All the while, he pointed out various facts about his photo subject, Westinghouse Electric & Manufacturing Company, its rooftop towers, and the wire antenna array that was once strung between them. "When the wires were there, that's what we called Aunt Beezee's electric clothesline!" he announced enthusiastically. For a vintage peek into what the "clothesline" looked like on one cloudy New England morning when synchronous AM station WBZA leapt from the antenna wire, hit <<http://www.springfieldradio.com/wbz.html>>. There, you'll also enjoy World War II-era blueprints of WBZA's complete antenna system. And, check out images of the historic sticks' November 2011 demolition, as developers raze the once vibrant factory to make way for a shopping center. Incidentally, the final radio waves to be aided by the venerable towers didn't belong to WBZ or WBZA — rather they originated from "commemorative" amateur station W1Z working 75 meters for about four hours before the structures were cut down.

her genealogy hobby project . . . Nancy later admitted she never figured that the question would result in a trip with her *Gramps* to a derelict factory in East Springfield, Massachusetts, but that's where the old man said the definition might still be found.

At least a decade earlier, Nancy's father — Harold Williamson's son — had suggested she might mine some fascinating family history by driving the senior Williamson through his boyhood haunts. "I will someday, Dad," she'd respond. "But would need to find a free weekend. Plus, I'd have to make sure that Gramps will be completely agreeable to being driven three hours each way. Last time we were in the car, he insisted on driving," Nancy reminded her father. "And even in a mall parking lot that was scarier than . . . well, I suppose, scarier than Aunt Beezee's electric clothesline!"

"Just don't let him get behind the wheel this time!" Nancy's dad laughed. "Anyway, you'd be wise to take Gramps sooner than later or you might be sorrier than you-know-who's clothesline."

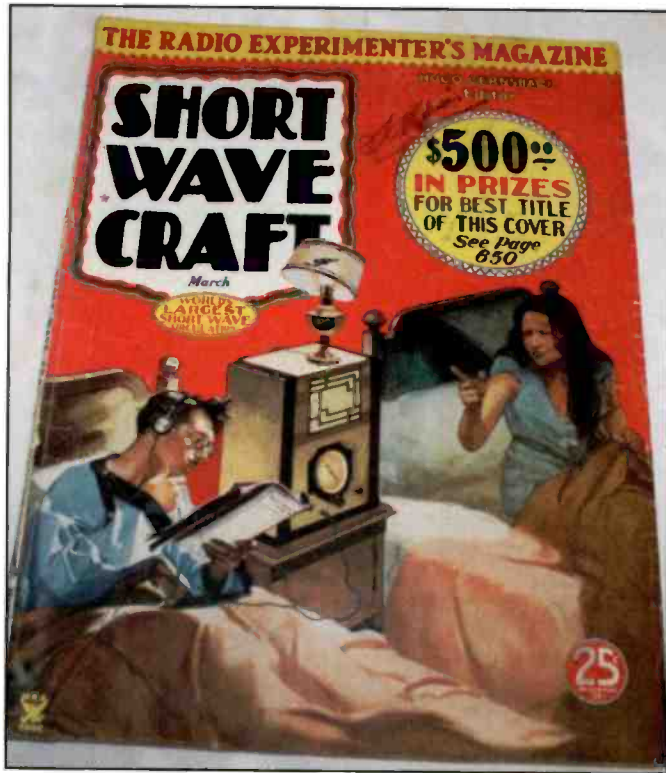
So, early on an unseasonably warm 2011 September Saturday morning, Nancy fetched the eldest Williamson from his tidy, assisted living apartment complex, made him solemn-

ly swear that he'd be happy to occupy the passenger seat, and headed for the nearest southbound onramp of the New York State Thruway. By the time they hit Massachusetts, the two were happily engaged in sharing family folklore — typically with Nancy recounting some tale she'd heard her parents tell in her youth, and Gramps offering a much more robust version.

Though she'd broached the "clothesline" subject along the way, her grandfather promised to reflect about it later. For Nancy, this heightened the mystery, like some intricately wrapped gift prominently placed under the tree a week prior to Christmas.

### Among The Earliest Broadcast Boogiemen

"See that big old house there?" Gramps pointed out about 10 minutes after he'd directed Nancy off a Springfield exit of the Mass Turnpike and onto a blue-collar side street that had clearly seen better days. "Some of my earliest memories come from the attic of that place," he said, as if the opening credits to a documentary about his life were materializing on a screen in his mind's eye.



**Photo C.** Nancy's grandfather recalled seeing a long-ago radio magazine cover depicting a grouchy woman scolding her radio enthusiasts husband. "That's how I imagined Aunt Beezee," he laughed. While nobody is certain if this 1935 *Short Wave Craft* is the publication in question, Nancy agreed that the scan I emailed to her sure looks like somebody who could scare you if you happened to catch a glimpse of her through your window some night.

"Five of us, your great-grandfather; great-grandma; my big sister, Phyllis; older brother, Donald; and me lived in a cold water flat up in the attic. Except for where my folks slept, it was pretty much one big room separated by those folding screens that tend to get knocked over by kids roughhousing. *BANG!* they'd go down. Scared the daylight out of me.

"But what was truly frightening for a long-ago five year old," Nancy's Gramps enunciated slowly, as one grappling with a fear bubbling up from nine decades of repression, "was the eerie sight of two shadowy skeletons standing against moonlight and dark drifting clouds."

Nancy immediately imagined feeling cold shivers up and down her spine. She'd pulled alongside the curb three houses down from her grandfather's former walk-up and was engrossed in his past. "Whose bones were they?" she wanted to know.

With resolve, Gramps had decided that the timing of his saga would be key. He simply replied, "Got your camera, girl?" and then gestured a few turns worth of driving directions. Nancy pulled her car into a nearby gas station and waited for Gramps to start his next chapter, **Photo A.** "Up there," he nodded. "I can hardly believe my eyes, but they're still standing. See them? Up on the roof of that closed factory?"

"Those two rusty towers?" Nancy pointed. "From this close, they're kind of larger than life . . . Reminds me of a picture of the Martian death ray machines invading New Jersey in that old story *War of the Worlds!*" **Photo B.**

"Now you know how I felt, as an impressionable kid seeing

those giants taking over the factory rooftop. From a dormer window near my bed, I remember seeing them going up around the time school let out . . . Must have been about 1922.

"More than once," he continued, "I ran to my folks' room, certain that those metal monsters were going to march over to my open window and pull me right out of the house. Your great-grandparents — who were only in their early 30s in those days — sure didn't want any kiddo budging between them in their small Jenny Lind spindle bed. About three minutes after this petrified entrance, my father would pronounce me too big to be scared of things that couldn't possibly walk off the Westinghouse factory roof.

"Mom would then carry me back to my 'room,' sit on my bed and look right through the window at those towers. "Is that what you're afraid of, honey?" she'd softly ask.

"Yes, and especially that thing that goes between them. My friend, Jimmy Rafferty says it's a huge web for a 50-foot poisonous spider!"

"Oh that sounds like nonsense to me," my mother smiled. "Doesn't it seem like a bit of blarney to you when you think about it, Harry? Besides, your father tells me that those wires between the towers send out radio waves from a broadcasting station at the factory. Any spider trying to walk on them would surely get a nasty shock, fall into the street and get squashed by a Model T Ford. Don't you agree?"

"When what my mother was saying started making sense," Nancy's Gramps continued, "I agreed to face my worst fears and stare right into the moonlit tower backdrop."

"There now," Little Harry Williamson's mother smiled. "Doesn't that sight make you think of the old line on which our landlady, Mrs. Donnely, lets us hang our freshly washed clothes? You think about that for a minute while I ask your father for the name of Westinghouse's broadcasting station." A minute later, she returned, all the while repeating the call sign, W-B-Z, **Photo D.** "Let's see," she imagined with her eyes creatively closed. "Daddy says the station is called W-B-Z, so how about we name the gadget on that roof *Aunt Beezee's clothesline!*"

"You're forgetting that it's electric," young Harold Williamson noted.

"OK then," his mother happily agreed, it's decided. Whenever you see that contraption standing there, looking back at you through your little window, just tell it, *I'm not afraid of you! You're just old Aunt Beezee's electric clothesline! You're about as scary as a huge threadbare pair of pink and white striped underdrawers flapping in the breeze!*"

They both laughed at the very thought of that silly sight, and then the boy's mother retired to her bedroom. On the way, she mentioned that Father was planning to buy the parts necessary for building a radio set to hear what Aunt Beezee was saying. Little Harry dared to take a quick look out of the window. He wondered what kind of a voice could possibly come from those once-mortifying wires and towers.

## A License for Talking to the Public

On November 2, 1920, the Westinghouse Electric and Manufacturing Company made print headlines by providing news of the U.S. presidential election results over its fledgling broadcast outlet, KDKA, based in a rooftop studio on a Westinghouse factory in East Pittsburgh, Pennsylvania.

Several historians believe that Westinghouse had not yet been OK'd for what then was termed a *limited commercial broadcasting license*, so might have been identified via the





**Photo D.** In this 1921 photo, emblazoned with the call letters WBZ, engineers — presumably at Westinghouse's East Springfield, Massachusetts station — have their hands full moving patch cords, watching meters, and listening to the AM broadcast station's output. The card is on display at the Hammond Radio Museum. WBZ is credited with being the first-licensed commercial broadcast radio station in the United States. (Courtesy of Donna Halper via Wikimedia Commons)

experimental-temporary designation, 8ZZ. Concurrence with this supposition can be found within the fascinating website <<http://earlyradiohistory.us>>, and states: *Often overlooked is the fact KDKA was not originally intended to be a broadcasting station — it was actually pressed into service for broadcasting purposes on short notice.*

*KDKA was originally intended primarily as a radiotelegraph station, for communication between various Westinghouse factories. In fact, its first license, issued October 27, 1920, makes no mention of broadcasting, only that it was to be used for two-way communication with other Westinghouse stations in Cleveland, Ohio; Newark, New Jersey; Springfield, Massachusetts; and Brooklyn, New York. In addition, the station's first few days of entertainment broadcasts, which began with election results broadcast on November 2, 1920, actually went out under a Special Amateur callsign, 8ZZ, which explains why L.R. Krumm (Superintendent of Radio Operations at Westinghouse) refers to KDKA as the "matured successor of 8ZZ" <<http://bit.ly/sB68sk>>.*

Throughout early 1921, the Pittsburgh station took to the air typically when some special event, like a political speech or choir concert presented the opportunity for salient programming. While Westinghouse officials can arguably be credited with recognizing the value of using the emerging "wireless" or "radiotelephony" technology for mass appeal broadcast purposes, their decision to seek a radio license for the firm's East Springfield, Massachusetts plant appeared to be for purposes other than reaching the general public.

Electronics historian, Jan Lowry, found that Westinghouse's application "indicated that its original use was to be for *inter-works communications*." The idea called for each of the company's factories to be linked via radio waves. Additionally, Jan discovered another surprise within the ancient paperwork. Westinghouse specifically sought the callsign KDKS for its Springfield outlet. Perhaps based on the name recognition of

KDKA — though this had been a randomly assigned *handle* — Westinghouse figured to retain K-D-K as a prefix and use the fourth letter as a location designator; the "S" in the case of proposed KDKS for Springfield.

Apparently, Pittsburgh's non-sequitur "A" (as in KDK-A) could simply denote the Pennsylvania station as the venerable firm's flagship or "A" *Alpha* installation.

Fortunately for Westinghouse, on September 15, 1921, someone at the U.S. Department of Commerce's Bureau of Navigation (aka: The Radio Division) ignored the "two-way" station request and licensed East Springfield for one-way Limited Commercial Broadcasting.

Serendipitously, as Jan points out and Westinghouse long cherished, "this license received from the Bureau was the first ever to be designated for broadcasting transmissions intended for reception by the general public."

Officially, that gave the East Springfield authorization a coveted *Number One* in broadcast history, often confusing the honor with its older sister, KDKA, which had offered its debut election coverage nearly a year earlier.

That long-forgotten Commerce Department clerk did an additional inadvertent favor for Westinghouse when he recycled a callsign recently retired (in July 1920) from the radio transmitter aboard the American steam ship, *Santa Elena*, and branded the Springfield ticket with the vessel's erstwhile W-B-Z. This helped the government practice its new geographic callsign prefix plan for "K" (west of the Mississippi River) and "W" (east of that waterway), and provided Westinghouse with a quickly coveted set of three letter calls.

The manufacturer's factory at 625 Page Boulevard in East Springfield was approximately 60-feet high. The Feds authorized Westinghouse to erect a pair of 75-foot "tapered steel masts" atop the four-story plant and run "a 360-foot-long, T-type wire antenna" between them.

Copying KDKA's initial programming headquarters, the initial WBZ studio was contained in "a roof-top shack." Although WBZ's license was good up to 1,500 watts (at 833 kilocycles), the station's debut broadcast — a remote hook-up from the nearby Eastern States Exposition fair — emanated just 100 watts on the evening of September 19, 1921.

Within a month, WBZ shifted slightly down the dial to 800 kilocycles for a less-congested dial position, gained a "new 500-watt, vacuum tube-type broadcast transmitter" (though remained throttled back to only a fifth of its power potential), and earned a room inside the factory's fourth floor for conversion into a more suitable studio.

More frequency relocations occurred (back to 833 kilocycles then down to 710 kilocycles) while crews removed WBZ's original antenna support masts and installed a matched set of 125-foot-tall, self-supporting Milliken (some sources say Millikan) towers with a series of 220-foot antenna wires strung between them.

This is the mid-June 1922 construction that little Harry Williamson fearfully observed from his bedroom window. In November, WBZ's dial position shifted to 750 kilocycles, giving it "a less populated wavelength for better reception by New England listeners-in."

## 'Hey! Let Me Hear What's On the Clothesline!'

Nancy estimates that her grandfather's dad made good on his promise to build a radio for the family sometime in late 1922





**Photo E.** Any sign of WBZ at Boston's Hotel Bradford? There appear to be a couple of masts on the roof, but when the WBZ calls moved from Springfield to Beantown in 1931, and occupied new quarters at the Bradford, the station's antenna system was no longer a rooftop affair. Instead, it emanated from a new, designed-for-radio site in Millis Township, Massachusetts, about 20 miles southwest of the state capitol. Less than a decade later, WBZ would give this transmitter site to Uncle Sam and inaugurate an even more modern seaside RF generating venue across the harbor from downtown Boston. WBZ checked-out of the Bradford in 1948 for the custom-built digs on Soldiers Field Road that it occupies today.

or early 1923. "Gramps remembers having to wait patiently for his turn to don the earphones," she reports. No matter if he, his parents, or siblings were at the controls, it wasn't much of a trick to tune WBZ on the homebrew crystal receiver, as the signal only had to travel a few hundred yards.

"Some of the first words Gramps heard on the rig as a kid," Nancy related, "came from a local hotel." She asked Gramps to put on his thinking cap and dig back through the years in order to recall anything more specific. He grimaced as if his brain were being contorted by the effects of some time machine, then reported that WBZ's announcer would say something like, "... *Coming to you from our studio in the Downtown Hotel.* Whatever the fellow said," Gramps recounted, "I remember it sounding like our pish-posh school principal reading Shakespeare!"

Jan Lowry looked for a hotel connection in his WBZ files and found two germane to this period: In December 1922, WBZ built a remote studio in downtown Springfield's Hotel Kimball.

This HQ gave Westinghouse the provenance to get government permission for calling Springfield (rather than the subservient, East Springfield) as its Massachusetts city of license.

A truly remote rooftop studio — on top of the Hotel Brunswick in Boston, some 80 miles east of the East Springfield transmitter site — was wired into the system during the last week of February 1924. Including the station's main quarters in the Westinghouse factory, these venues accounted for WBZ's triple studio capability.

Meanwhile, WBZ's "electrics" continued to be in a happy state of constant flux. That is to say, this era's broadcasting business was subject to all kinds of growth spurts. Besides the studio additions, the station moved to 810 kilocycles and jumped from 100 to 750 watts (by early summer 1923).

To accomplish this boost, a 1-kilowatt transmitter that had seen service at the Newark, New Jersey Westinghouse plant's WJZ (the future WABC, 770 New York) was shipped to East Springfield. For a while, it was set to cruise at 750 watts. Regulators also ordered WBZ to another dial position, 890 kilocycles, a change effective July 23, 1923. Less than four months later, the Feds also stipulated that WBZ needed to run its RF generating gear at a full kilowatt. And yet another power increase — this time to 1,500 watts — was authorized in the summer of 1924.

The most significant Westinghouse Massachusetts radio event of 1924, however, did not occur in the Springfield area. Rather it related to that remote Boston hotel-based studio which "was operated in conjunction with (sponsorship and programming help from) the *Boston Herald-Traveler* newspaper." There, a 250-watt "booster station" began operation during mid-November 1924. It was dubbed WBZA and simulcast (from a Hotel Brunswick rooftop transmitter) its Springfield (WBZ) mother station's programming.

There may have been occasions when the "booster" ran a program independent of WBZ Springfield's, though from WBZ's remote Boston studio. There's mention of WBZA Boston operating on 1240 kilocycles (while WBZ occupied 900 kilocycles) from August 1925 through mid-May 1926.

## The Old Switcheroo!

When I requested one concise history of Westinghouse's Springfield broadcast operation, Jan Lowry sent me two: One for WBZ and another chronicling WBZA. My initial read-throughs of his well-crafted documents caused me to quickly recognize that the subject stations were no less than AM radio's version of Siamese twins. In other words, trying to separate their individually-unique pasts would take a surgical precision in deciphering which WBZ or WBZA was being noted.

Though a pair of power increases — 2,000 watts in April 1925 and up to 5 kilowatts some 11 months later — kept the impression that the first-born Springfield operation was Westinghouse's favorite Bay State child, behind the scene, company officials began making plans to give its fledgling Boston "booster" the birthright rightfully due the Springfield station.

Jan paints Westinghouse's Massachusetts scenario this way: "Using crystal-control synchronization, WBZ and WBZA began broadcasting experimentally on 900 kilocycles (with this latest frequency change happening) on May 20, 1926. The program was carried 'by wire line' to the WBZA transmitting site at Boston's Hotel Brunswick. In effect, programs were presented from WBZ's studios in Springfield and Boston and fed to two transmitters."





**Photo F.** Actress Debbie Reynolds on the air from one of WBZ's performance studios, circa 1950. Do-it-yourselfers might notice the garden variety galvanized plumbers' pipe, tees and elbows, that some ingenious Westinghouse engineer used to convert a standard floor microphone stand into a "dualie." Had WBZ still been the East Springfield Westinghouse factory, some on-the-ball plant manager would likely have the boys down in the foundry cast a more finished looking piece!

By summer 1927, WBZ Springfield (still the main Westinghouse New England-located station) moved its Boston studio to tonier digs in the newly-opened Hotel Statler, became an important affiliate of the then recently-launched National Broadcasting Company, and jumped power at the East Springfield transmitter facility to 15,000 watts. (WBZA was also allowed some extra juice: Up to 500 watts.)

A few weeks prior to Thanksgiving 1928, this big WBZ Springfield and Boston's little 250-watt tagalong, WBZA, shifted to 990 kilocycles to comply with "a major nationwide frequency reallocation plan." Westinghouse's plans to love the bright lights of Massachusetts' capitol city more than the utilitarian blue collar ambiance of Springfield became apparent when it asked the Federal Radio Commission for an OK to move the WBZ calls and higher transmitter power authorization from Springfield to Boston.

FRC officials smiled on the request and blessed Westinghouse's 1931 construction of a state-of-the-art, RF-generating plant featuring two, 300-foot towers on Dover Road in Millis, about 22 miles southwest of what would be identified as WBZ Boston's main studio and offices in yet another venue upgrade — this time within the Hotel Bradford at 275 Tremont Street, **Photo E.**

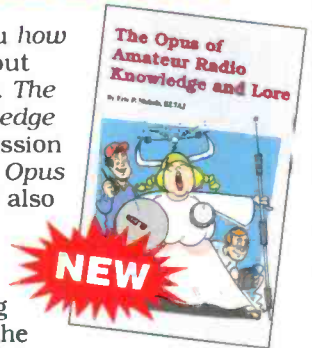
Several footnotes are in order here so that we can close out the WBZ Boston portion of this piece *in peace*. By March 1932, Westinghouse rented WBZ Boston and demoted (to "repeater")

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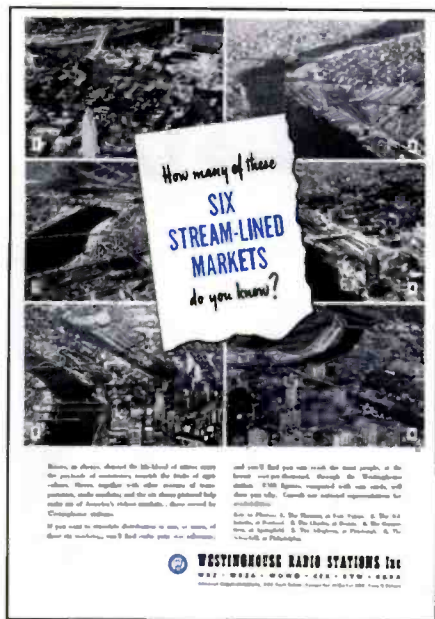
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**Photo G.** Here's an industry publicity ad for Westinghouse's radio stations. This 1947 piece challenges readers to identify the cities-of-license for the company's six AM outlets, WBZ Boston; WBZA Springfield; WOWO Fort Wayne; KEX Portland; KYW Philadelphia; and KDKA Pittsburgh. Technically, WBZA was a synchronous amplifier of WBZ, but the separate callsigns caused the FCC to categorize them as autonomous stations. After adding a Chicago AM and then wanting to buy another in New York, Westinghouse was reminded that WBZA would be included in Westinghouse's then Government-mandated limit, so was silenced to clear the deck for the firm's desired Big Apple acquisition.

WBZA Springfield to NBC. While later in a 1937 "thanks, but no thanks" return of the Springfield lease to Westinghouse, the network poured significant monies and influence into the Boston operation and kept radio landlord Westinghouse busy filing improvement applications for the FRC. These resulted in updates such as a May 1932 power bump to 25 kilowatts and an ultimate increase to 50,000 watts (via a Westinghouse model 50-HG transmitter) the following November.

RF science had progressed to the point where it was undeniable that vertical radiation and optimum ground conductivity reception day and night was far superior to the "old" ways of transmitting through horizontal antenna wiring and-or rooftop installations. While WBZ's Millis site wasn't roof-mounted, it couldn't compare to a conductively-favorable salty spot that Westinghouse engineers figured into plans for a then-new practice of

directional antenna patterns in Hull, Massachusetts.

On July 27, 1940 the FRC's successor Federal Communications Commission got word that WBZ "began broadcasting from its (even newer) 50-kilowatt Westinghouse transmitter at (Boston Harbor's peninsula) Hull, Massachusetts utilizing two-guyed, 500-foot Truscon-brand vertical radiators in a salt marsh there. *(These sticks were phased to run a directional pattern, pushing the signal up and down the New England coast and away from the ocean. — S.H.)*

A Cape Cod-style house was built on the site by WBZ. Concurrently, its old Millis, Massachusetts site was turned over to the United States government."

It should also be mentioned that WBZ's 1940 upgrade coincided with Westinghouse re-assuming — from NBC — complete programming control of its two Bay State AM broadcasting operations, though remaining an NBC affiliate. Our departure from the Boston WBZ has a Springfield connection, as both outlets got re-dialed from 990 to 1030 kilocycles during the famed March 29, 1941 North American Radio Broadcasting Agreement (NARBA) Treaty frequency shifts.

## Meanwhile, Back At The Big Brick East Springfield Plant . . .

Here's where I feverishly fumbled back and forth through Jan's stack of WBZ-WBZA paperwork. My mission was to see a clear delineation between the paternal twins that had each been called separately by both names.

Anyway, in 1931, when Springfield-licensed WBZ was recast as WBZA. On paper it appeared that the station received a power increase (from 500) to 1,000 watts. If judging by actual station location, however, the move represented a huge loss to the former 15-kilowatt East Springfield-generated signal.

Jan's research uncovered a very interesting contradiction to the conventional wisdom that Springfield's WBZA broadcast through its iconic early 1920s rooftop horizontal wire array into the 1960s. An FCC report from 1941's big frequency reallocations notes that WBZA was already "transmitting from a Truscon self-supported 150-foot vertical radiator at East Springfield."

Jan found, too, that "effective July 16, 1956, WBZA closed its Hotel Kimball studio and dropped its synchronized programming schedule with WBZ. All

operations were then relocated to its tower site at 651 Page Boulevard, East Springfield." This struck me as rather odd in that a separately programmed one-kilowatt WBZA at 1030 kilocycles, broadcasting within the 50-kilowatt footprint of WBZ, also on 1030, would surely frustrate listeners who were more than just a few miles from the East Springfield transmitter site, albeit on the factory rooftop or at the enigmatic Truscon stick a couple of address numbers down from the Westinghouse plant's 653 Page Boulevard designation.

Imagine the competing hash on 1030 kilocycles, coming through the radio speaker! A Web search on the "individually-programmed and vertical radiation" mysteries yielded little more than a bit of blogger chatter. One old-timer mused that WBZA's "end-fed inverted 'L' wire antenna (made a) good horizontal component for sky-wave" transmission.

He said when he was DXing in the late '50s, it provided a nice nighttime skip signal in parts of the midwest. Another commenter recalled something that clued me into how one could tell if he were hearing WBZ or WBZA, both on 1030 kilocycles. The guy could make an easy catch of WBZA when WBZ left the air for a few early Monday morning transmitter maintenance hours and the East Springfield RF remained hot.

Though Jan reports that WBZA's apparent 1956 hiatus from duplicating WBZ's programming ended sometime in 1958 and returned the sisters to saying the same thing, another question is raised: When the WBZ announcer on the microphone during these early Monday Boston transmitter outages, did he customize the programming to the Springfield market?

I was hoping Nancy's grandfather could help fill in details, but she indicated that during this era of interest he had long since moved to the Albany, New York area. In fact his father relocated the family there around 1930 after leaving Westinghouse for a better position at General Electric's huge plant in Schenectady. "That recent afternoon we arrived in East Springfield," Nancy said, "was the first time Gramps saw those radio towers since he was a teenager."

## Sign-Offs

WBZA finished out its life as kind of a buy-one-get-one-free arrangement for WBZ advertisers. In 1962, and under the old FCC rule of 7s — a 7 AM station, 7 FM station, 7 TV station ownership limit





**BOYS! A REAL RADIO SET ABSOLUTELY FREE**

RUSH your name and address and we will tell you HOW you can get this RADIO SET ABSOLUTELY FREE.

RADIO SET comes to you complete, with single slide tuning coil, crystal detector and phone condenser. AND DOUBLE HEAD PHONES. No batteries required; no experience.

Write Today for Free Radio Plan

HOME SUPPLY CO.  
131 Duane St., Dept. 200  
New York City

**Photo H.** Maybe there's no such thing as a free lunch, but an outfit called Home Supply Company promised 1922 *Popular Mechanics* readers that it would give them a radio without cost. According to the ad, recipients needed "no batteries" and "no experience." Though neither the erstwhile boy nor his father in our story had prior experience with radio construction, a WBZ engineer who worked with the youngster's dad at the nearby East Springfield Westinghouse plant adeptly assembled a crystal radio for them from various and sundry parts. "No charge for labor," the tech smiled as he handed the little set to his colleague and then gave some rudimentary operating instructions. "With WBZ transmitting from right across the street from your house," he nodded, "I'm reasonable sure that you'll hear something through the headphones no matter which wire you hook to which."

— when Westinghouse had the chance to add New York City-based WINS to its portfolio of major market radio stations, Commission officials noted that the company already had its 7 AM stations cap. That's because WBZA was counted in the total.

Arguably, WBZA could have been considered a "synchronous amplifier" like 1110 kilocycles WBT Charlotte's separate transmitter in Shelby, North Carolina, also on 1110, and not necessarily categorized a distinct radio station.

With its sights set on that 50-kW WINS prize in America's number one media market, however, Westinghouse had no appetite to jeopardize the deal by quibbling with the FCC. Consequently, it shut-down WBZA in the summer of 1962 and asked the Commission to cancel the license, delete the call letters, and then quickly approve the purchase of WINS.

Nancy says her grandfather remembered hearing something on the news — years ago — about the Springfield station going dark. It was on a TV newscast he was watching in early November 2011

## WBZ - WBZA

(Synchronous Operation)  
BOSTON-SPRINGFIELD—1921  
NBC-NERN

Frequency: 1030 Kc. . . . Power: WBZ, 50,000  
Watts; WBZA, 1000 Watts  
Owned-Oper. By . . . Westinghouse Radio Stations, Inc. (Synchronous Operation)  
Business-Studio Add. . . 1170 Soldiers Field Rd.  
Phone Number . . . . . ALgonquin 4-5670  
Transmitter Location . . . . . WBZ, Hull, Mass.;  
WBZA, East Springfield, Mass.  
Air Time . . . . . Unlimited  
News Service . . . . . AP, UP  
Transcription Service . . . . . Thesaurus, Associated  
Representative . . . . . Free & Peters  
Membership . . . . . BMB  
President . . . . . Walter Evans  
Vice-President . . . . . Walter E. Benoit  
General Manager . . . . . J. B. Conley  
Station Manager . . . . . W. C. Swartley  
Sales Manager . . . . . C. Herbert Masse  
Promotion Manager . . . . . John Stillis  
Program Manager . . . . . W. Gordon Swan  
Publicity Manager . . . . . W. A. Davis  
Chief Engineer . . . . . WBZ, W. H. Hauser;  
WBZA, Harold Randol

**Photo I.** Here is the WBZ Twins' 1950 listing in *The Radio Annual* yearbook. It appears that the only WBZA Springfield employee was its chief engineer. By decade's end, Westinghouse's Massachusetts radio publicity always alluded that WBZ was America's most powerful AM station. This was depicted with a graphic that listed WBZ's 50 kilowatt and the 1 kilowatt of WBZA:  $WBZ + WBZA = 51,000 \text{ watts!}$  How would you have liked to see that kind of formula in math class?

that the toppling of the former WBZ-WBZA East Springfield radio towers was shown.

"All excited, Gramps called me that evening," Nancy smiles. "He wanted me to know about the old towers and thanked me for having taken him to see them. What made things so memorable was that at the time of our trip, neither of us imagined the towers would be soon gone."

And about a month later, Nancy's grandfather suddenly passed away. One of the assisted living community staff members had been the last to talk with him. What had they spoken about? "Well, I'm not 100 percent sure," the health aide admitted to Nancy. "Your Gramps was peacefully relaxing in his recliner with his eyes closed. Maybe he was dreaming or something, because when I asked him how he was feeling, he said something about having seen the Lord in Heaven. Then I asked him what that was like. He just smiled and whispered that it was a whole lot more beautiful than some electrician's clothesline . . . or something — whatever that means."



**Photo D.** A Soviet military communications operator smiles for a photograph during the Battle of Stalingrad, circa 1943. Weather and environmental conditions made wireless operation a great challenge for both the Soviets and the Germans during the battle. Nothing to smile at. (Courtesy of Georgi Zelma via Wikimedia Commons)

out the same amount of voltage as they will at what we call "room temperature."

- Temperature coefficients interfere with the pre-tuned and pre-aligned circuits.

- There may be some interference with the functions of some components such as resistors, capacitors and so on.

- Antennas, if they don't fall down from the weight of the ice formed on them, will have signals attenuated by ice and snow covering the antenna wire. Why is not always clear but it is known to happen in extremely cold weather.

- Magnetic storms often occur in the ionosphere in cold weather and are associated with the Aurora Borealis.

- Condensation can form in the back of the radio and switches or dials will short or freeze in place and not move.

- Then there are the operators themselves. Working in heavy clothes and gloves can make it difficult to work around radio equipment.

There is another reason that we do know was certainly a problem: *Rats!* With thousands of people working in such a filthy environment, Stalingrad was infested with rodents. They gnawed on the insulation of any wire they could get to.

Rat-infested German tanks were useless. Turrets wouldn't move. Guns wouldn't fire. Soldiers couldn't even read maps because the internal lighting was gone.

We can only imagine what a rat infested radio would be like. (If you're eating breakfast, though, let's not.)

# Radio Rescue: The Surprise Was On Him

## Part I: Walking a Vintage 1934 Atwater Kent 206-X Receiver Back from the Brink

by Manfred Mornhinweg

*“I had expected ‘any’ old radio, but finding an Atwater Kent cathedral from 1934 was certainly beyond my expectations!”*

Once upon a time, I think it was in 2002, my friend and colleague Alain Maury told me that in the storage room of the house he was renting he had found an old radio. He knew I restored and collected radios, so he asked me if I would be interested in yet another one. Alain also asked the house owner if the radio had any future prospects, and got permission to dispose of it.

When I went to pick it up, the surprise was on my side: I had expected “any” old radio, but finding an Atwater Kent cathedral from 1934 was certainly beyond my expectations! This is the first Atwater Kent in my collection, and I had wanted one for years!

The radio was in somewhat poor condition — little of its cabinet finish remained. There were signs of having been scraped with a sharp object during an earlier refinishing attempt — the veneer delaminating almost complete, all knobs missing, and the electronics had been drastically modified.

Still, it looked very restorable, but would take some work. I brought it home and decided to give it the very best treatment I could.

In case you are wondering: Of course, **Photo A** shows the radio *after* restoration!

### A Label Tells This Radio’s Story

**Photo B** shows a label attached to the inside of the radio’s cabinet. The X in the 206-X designation indicates this Atwater Kent was an *export* version. The radio was made specifically for countries with 220-volts mains distribution. There was also a 206 model without any letter, which was the same radio but with the transformer primary wound for 110V.

There was, as well, a quite different 206-D version, which was for 110-volts DC. Instead of a rectifier tube, that one had a second output tube, necessary to achieve enough output power at the low supply voltage of 110 volts.

This radio is a superheterodyne using 2.5-volt tubes. There is a 58 tube used as RF preamplifier, a 2A7 converter, a 58 IF amplifier, a 2A6 detector and audio preamplifier, a 2A5 power amplifier, and a type 80 rectifier.

A transformer delivers 5 volts at 2 amps for the

filament of the rectifier, 2.5 volts at about 6 amps for the filaments of the other tubes and the dial lamps, and a high voltage for the plate supply.

### Missing In Action

Unfortunately, my specimen was lacking this power transformer! There were just the mounting holes, and black marks where the transformer



**Photo A.** For Manfred Mornhinweg, a 1934, three-band Atwater Kent 206-X was a most unexpected and pleasant surprise when he was called to retrieve a radio from the house where a friend was living. After hours of inspection, reflection and restoration, the radio looks very much like the day it was on a showroom shelf. (All photography courtesy of Manfred Mornhinweg)



had burned. Whoever repaired this set when the transformer failed chose to modify the radio for transformerless operation.

None of the original tubes were there. Instead, the tubes were a 6D6, 6A7, 6D6, 75, 43 and 25Z5, with the filaments in series, fed from 220 volts through a dropping resistor that dissipated close to 50 watts. And, the chassis was *live* at line voltage!

I decided to restore this radio to its original circuit, if I managed to get the tubes. Fellow collector Renato Menare supported me in this decision, and he was the one who provided most of the tubes and many other parts, as well. My own collection could provide only two of the six tubes I needed.



**Photo B.** An inscribed metal label on the inside of the radio shows it to be Atwater Kent's model 206-X — with the "X" indicating the receiver was an export version, made for 220-volt AC mains power distribution.



**Photo C.** "This radio is full of numbers," writes Mornhinweg. "The dial has its part number carefully hand-written on the otherwise type-set dial. There are part numbers on the speaker, the cabinet, the chassis, and many of the components."

This radio is *full* of numbers. The label is 28188. I guess that's what counts as a serial number for the whole radio. The dial has its part number carefully hand-written on the otherwise type-set dial, **Photo C**. There are part numbers on the speaker, the cabinet, the chassis, and many of the components.

## Atwater Quality Spanning Three Bands

The Atwater Kent 206 covers three bands: The standard AM broadcast band and a shortwave band spanning 5.9 MHz to 15.5 MHz, are its main coverages. The circuit provides adjustments to achieve good performance and dial calibration on them.

The range between the two — 1.6 MHz to 5.9 MHz — is provided as a third band, but without adjustments, and thus with lower performance.

The famous Atwater Kent quality shows in every detail. **Photo D** is a picture of the backside of the stamped brass dial escutcheon. Not only are the brand name, model number and decorative figures formed in great precision, but also there is a texture stamped into the metal. Looking very closely, I discovered a very tiny, but crisp and precise "WHITEHEAD-HOAG" there. I wondered: *Was that a contractor stamping these pieces, or what?*

Pete Olin wrote to me with the following piece of information: W&H was a major stamper of small metal parts, especially campaign buttons back to the 1890s. So, Atwater Kent indeed outsourced the stamping of these dials, contrary to the urban myth that this brand built every part in house!

The texture appears on both sides of the metal. But the small text is only on the backside, without any traces on the front. They must have used enormous pressure to stamp the metal in this way!

## Getting Started

When I had the tubes, I was ready to proceed and turn the radio back to its original circuit. **Photo E** shows the underside of the chassis after I removed the non-original parts and wiring used for the modification.

I did not remove the phono connector. It is non-original too, and was riveted to the chassis but never connected! The lugs show no signs of solder. I chose to leave it in place because a non-original phono connector looks better than a non-original empty hole in the chassis!

From this point, I moved slowly and went over the circuit from the antenna input to the output and power supply, component by component; wire by wire. Every part was checked to make sure it was in acceptable condition, and correctly wired.

Several bad parts were found — mostly leaky paper capacitors and severely value-shifted resistors. Some resistors had grown up to 500 percent in their resistance, and one of them was open. Of course, all electrolytic capacitors were dry, including a non-original one probably added in the 1960s.

## Crazy Color Coding

**Photo F** shows a poorly-soldered resistor. It is non-original, as well, and is 470 ohms, while the original was 20K. You wonder why the technician who replaced this resistor missed the correct value by so much? Well, Atwater Kent had its own, private, and quite fancy color code for resistors! Nobody who didn't have access to AK literature had a chance to decode those values!

For example, the blue-yellow-gray resistor at the lower-right of the photo is nominally 165 ohms. The order of the colors didn't matter, in the manual this resistor is listed as *blue-gray-yellow*! A blue-resistor would be 100K. One with a single black band is 65K. A single gray band means 30K, and one with no colors at all is 40K! The 50K value is black-yellow-red. Purple alone is 6K, but purple with yellow is 12.5K. If you see any logic in this, do tell me, please!

The funny thing is that the standard color code was in ample use by 1934. Apparently AK chose to roll its own instead!

### Oh, Now Those Crazy Capacitors

Atwater Kent capacitors are marked in code numbers. The first number is voltage: 1 for 100 volts, 2 for 200 volts, and so on.

The other two numbers give the capacitance, increasing with larger numbers. So, if we know that a capacitor marked 104 is 0.3 $\mu$ F, 100 volts, what would you expect a 204 to be? Logic would say, 0.3 $\mu$ F at 200 volts, right? *Wrong!* It's 0.015 $\mu$ F! It's Atwater Kent logic! If you want a 0.3 $\mu$ F, 200-volt capacitor, that would be a 217 . . .

AK made paper capacitors in inductive and non-inductive construction. Of the examples cited above, the 104 and 217 are non-inductive, while the 204 is inductive.

And there are special gadgets: The 419 used in this radio is a special *tone condenser*. It has two sections — 0.004 $\mu$ F and 0.001 $\mu$ F — with carefully controlled inductance to yield just the right sound quality! Replacing it by two standard, modern capacitors totally messes up this radio's beautiful sound! It hides in the skin of a paper capacitor, but functionally it's a dual LC circuit!

### Next: Inductors and Wiring

As the hunt continued, I found an RF coil, **Photo G**, with trimmers mounted on its top. I had to remove this and other coils because their connection wires had cracked insulation — so much so, they shorted everywhere.

Interestingly, some colors of rubber insulation degraded much more than others. Throughout the radio, the brown rubber is totally brittle, while the blue and red are much better.

Probably the kind of dye affected the stability of the rubber. Also, the wires are in much better condition in all those places where the radio doesn't get too hot, and where there is little air circulation. It looks like strong ventilation brings in too much oxygen, and the rubber gets oxidized!

I had to replace most of the radio's wiring.

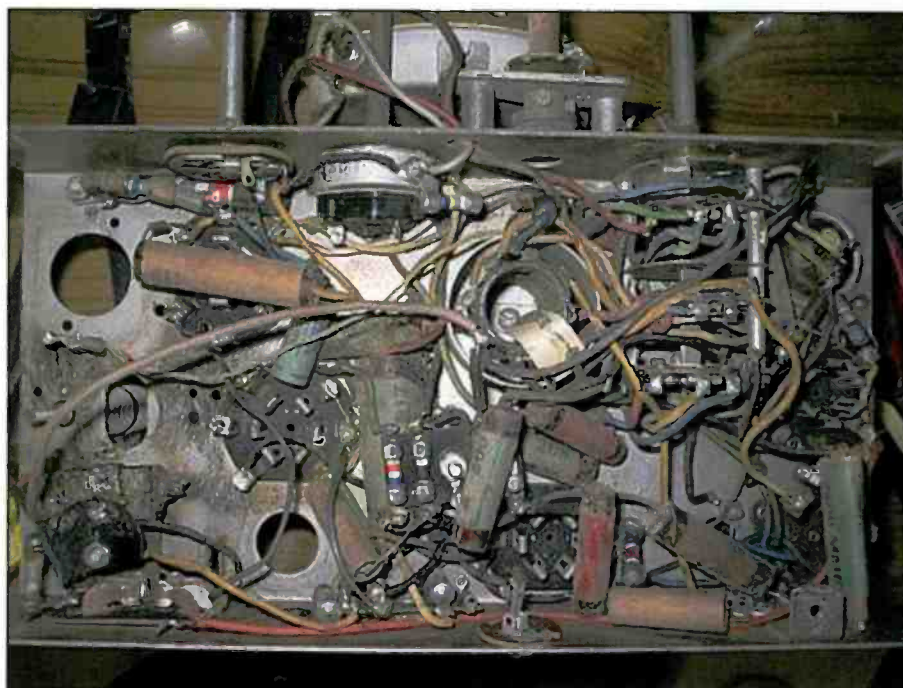
### Custom-Making a Power Transformer

In the course of the reconstruction of this radio, a power transformer had to be custom-made. I do have a simple winding machine, which was given to me by a radio amateur friend, Enrique Villanueva. He gave it to me many years ago when I was a student. This machine has proven enormously useful, many times!

First, though, I had to get a suitable core. The space available is quite tight for a transformer of this power rating — 80 watt — so, I wanted to use the biggest one that would fit.



**Photo D.** A close examination of parts in the 206-X shows the care and quality that went into the manufacture of this radio. "Whitehead-Hoag" — barely visible in this stamped metal piece — "was a major stamper of small metal parts, especially campaign buttons back to the 1890s. So, Atwater Kent indeed outsourced the stamping of these dials, contrary to the urban myth that this brand built every part in house!" writes radio expert Pete Olin.

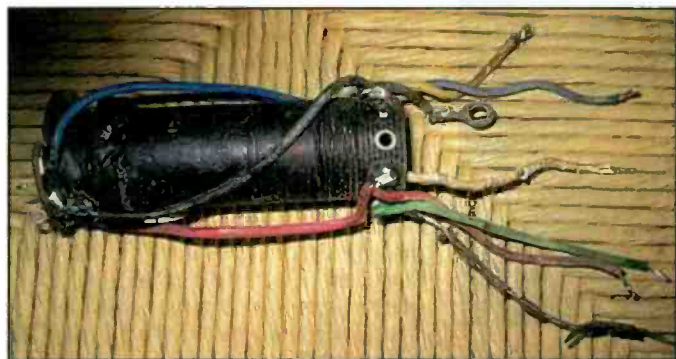


**Photo E.** Here is the underside of the chassis after Mornhinweg removed the non-original parts and wiring used for the modification. "I did not remove the (non-original) phono connector . . . The lugs show no signs of solder. I chose to leave it in place because a non-original phono connector looks better than a non-original empty hole in the chassis!"





**Photo F.** Atwater Kent had its own parts coding system, which confused many people attempting to restore its radios. For example, here's a poorly-soldered resistor. It is non-original and 470 ohms. The original was 20K. Nobody who didn't have access to AK literature stood a chance in understanding the company's unconventional resistor color-coding scheme.



**Photo G.** "I had to remove this and other coils because their connection wires had cracked insulation — so much so, they shorted everywhere," Mornhinweg writes. "Interestingly, some colors of rubber insulation degraded much more than others. Throughout the radio, the brown rubber is totally brittle, while the blue and red are much better."

I asked several friends for old transformers in the suitable range of sizes. Romelio Gajardo was *the winner*, giving me an old 220-110-volt autotransformer that had almost exactly the optimal size. I took it apart, and rewound it for this radio.

The filament requirements were clear enough. But I had my doubts with the high voltage. The service manual for this radio, however complete it might be in most regards, does not give the voltage of the transformer's high voltage winding!

So to the drawing board I went.

- I had to start from the voltages given for the tube plates . . .
- Add the drop for the speaker field coil . . .
- Add an estimated drop in the rectifier tube . . .
- Consider the capacitor filtering effect, the wire resistance . . .

I arrived at two-times-280 volts. I wound the transformer for this voltage, and the radio is playing great with it. But the voltages ended up a tad lower than those given on the diagram — the rectifier drops more voltage than expected! Winding the transformer for 300 volts would have been better. But 280 volts is close enough. I won't remake the transformer for that small difference! It has a total of 3,580 turns of wire, which even using a machine take some time to wind!

After taking **Photo H**, the transformer was painted black. With the light yellow paper insulation, it looks quite antique!

## Taking On the Radio's Mechanics

The mechanics required quite a bit of work. **Photo I** shows the drive mechanism of the variable capacitor. There is a vernier drive with a rubber roller connecting to a softly dented wheel. And this roller was dry, brittle and worn — so much so that it slipped without even trying to engage with the teeth!

I considered just wrapping it in something, but after repairing the vernier drive I caught flight, and opted for the correct way to repair the roller.

I went to a store that sells all sorts of rubber pieces, and bought a door stopper that was big enough to put in my lathe. I deep-froze it using freezing spray, and turned it to slightly larger size than what the roller needs to be. Then I put the brass sleeve in the lathe, ripped off the old bad rubber and cleaned the rubber mounting surface with the lathe.

Then I vulcanized the new rubber piece onto the brass sleeve with heat and sulfur. When that was done, I again froze the rubber, turned it down to the exact size, and then gave it a smooth surface by slightly melting it with a grinding stone in a Dremel tool.

The result is just perfect, **Photo J!** It works as it should, and several people who have seen it just don't want to believe that this part isn't an original Atwater Kent spare part!

## More Rubbery Trouble . . .

The soft, slotted rubber washers, which are used in almost all radios to keep chassis vibration away from the variable

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capacitor, had decomposed into a somewhat-crystallized, rosin-like goo, **Photo K**. I could find no rubber that's soft enough for this purpose, and in most old radios these washers need replacing. So I decided to solve the problem once for all time!

**Photo L** shows the new washer. It's made from silicone caulk. This material has precisely the right properties to be used in this application!

Using my lathe, I turned some molds from polyethylene, which does not adhere to silicone. Then it was just a matter of pouring silicone, letting it set, take the new washer out of the mold, and pour



**Photo H.** Mornhinweg had to custom-make a power transformer to replace one that had burned in the Atwater Kent 206-X he was restoring. "I do have a simple winding machine, which was given to me by a radio amateur friend, Enrique Villanueva," he said. "He gave it to me many years ago when I was a student. This machine has proven enormously useful, many times!"



**Photo I.** The drive mechanism of the variable capacitor was worn and useless. "There is a vernier drive with a rubber roller connecting to a softly dented wheel," Mornhinweg writes. "This roller was dry, brittle and worn — so much so that it slipped without even trying to engage with the teeth."

silicone again. In a matter of some days, I made all the washers I will ever need! Renato also got some, since he, too, has radios that need new rubber pieces.

### Striking an Ugly Cord

The radio came with a plastic power cord from the 1960s or so. *Ugly!* I decided to give it a new cord — a nice, fabric covered and brown one. But the only fabric covered power cord I could find was white with black dots! So I bought that, and dyed it with walnut extract, **Photo M**.



**Photo J.** A custom-made drive mechanism replacement was crafted from a door stopper — the kind you find at home improvement stores. "Several people who have seen it just don't want to believe that this part isn't an original Atwater Kent spare part!" Mornhinweg says.



**Photo K.** Soft, slotted rubber washers that were commonly used in almost all radios of the time "had decomposed into a somewhat-crystallized, rosin-like goo," he says. "I could find no rubber that's soft enough for this purpose." The washers were used to minimize chassis vibration's effect on the variable capacitor.



**Photo L.** A new set of washers was made using silicone caulk. "This material has precisely the right properties to be used in this application," Mornhinweg says. "Using my lathe, I turned some molds from polyethylene, which does not adhere to silicone. Then it was just a matter of pouring silicone, letting it set, take the new washer out of the mold, and pour silicone again. In a matter of some days, I made all the washers I will ever need!"



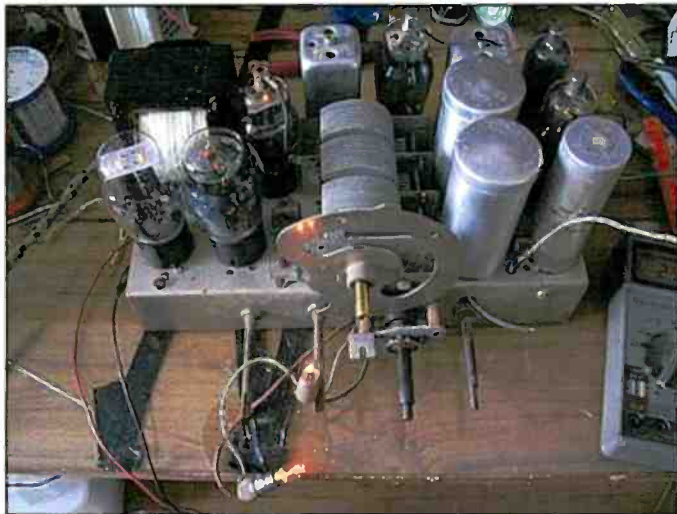
**Photo M.** The unrestored Atwater Kent 206-X's original power cord had been replaced with one made of plastic from the 1960s. "Ugly," Mornhinweg says. Reverting to a cloth-covered power cord meant buying a length colored white with black dots and dyeing it with walnut extract.



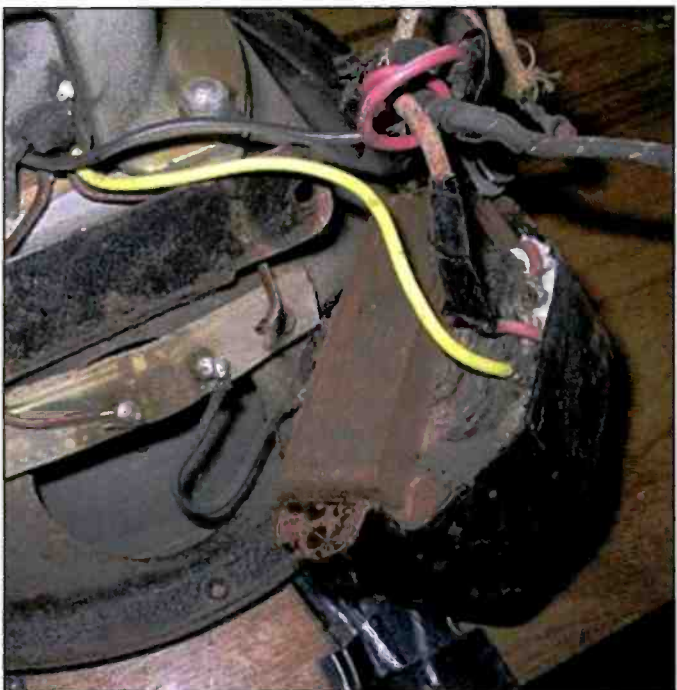
It came out quite decent, but not perfect. Next time I do that, I will use a different dye, trying to make it better!

## If Glows in the Dark (Again)

Now, the filament test! At last, the chassis was ready, reconstructed component by component. I let the filaments run for some hours, to warm up the tubes and activate the getters, so



**Photo N.** When it was time to apply power, Mornhinweg "let the filaments run for some hours to warm up the tubes and activate the getters so that any residual gas would be adsorbed before applying high voltage. The dial lamps are 6.3 volts. They light as dimly as the tube filaments. I later found the correct 2.5-volt lamps."



**Photo O.** Wiring around the 206-X speaker was a mess — a "kludge of patches, held together by more patches, and missing at least yet another patch because there was still no continuity in the transformer primary," Mornhinweg discovered.

that any residual gas would be adsorbed before applying high voltage.

The dial lamps in **Photo N** are 6.3 volts. They light as dimly as the tube filaments. I later found the correct 2.5-volt lamps.

## From Sounds of Silence to Joyful Noise

Meanwhile I tested the speaker so I could go to the big test! But alas, the speaker was dead . . .

In **Photo O** you can see the sorry condition of the speaker wiring. It was a kludge of patches, held together by more patches, and missing at least yet another patch because there was still no continuity in the transformer primary.

Fortunately the problem was just with the connection of the primary winding to the terminal. I was able to dig into the transformer insulation and fish out the tiny wire, reconnecting it. Then I tried my radio, and it worked right away!

It was a surprise to find that despite my extensive disassembly, change of parts, wiring, and all, the radio actually held its alignment well enough to work right away!

But then I noticed that the news broadcasts coming out of the speaker were not local, and that the lady talking did definitely have a non-Chilean accent.

The next revelation was that I was listening to a Spanish radio station! The band switch just happened to be on shortwave and this resurrected radio was receiving Europe on a 1-meter long wire antenna, without even having been realigned! **WOW!**

## A Proper Realignment

Despite the fact that this AK was receiving, of course I realigned the set. The broadcast band dial was a bit off the truth, and after 70 years and a complete reconstruction, alignment is sure to be non-optimal.

My first surprise was to find the IF adjusted to 455 kHz! That was the work of a previous repairer. He had then tried to bring the dial into alignment by brutally tightening some trimmers, to no avail, because this radio is designed for an IF of 472.5 kHz!

I realigned the IF transformers to the correct frequency, and then the rest of the adjustments were easy to do — with all the trimmers ending up somewhere near midrange.

As I aligned the set, it really came to life! This thing is so sensitive, and has such good AGC action that on a 1-meter-long antenna wire laid on the bench it receives international broadcast stations at the same volume control setting as a local station! That kind of performance was not usual until many years later.

## 'Mr. Speaker . . .'

The sound quality, though, was very poor. The speaker was scratchy, which was no wonder, considering how the cone looked, **Photo P**.

I tried re-centering it, but there was no way. The voice coil was bent, and always scraped at some place, regardless of how I pushed and shifted it.

The coil was non-original. The cone had several patched rips, and some unpatched ones. The spider was totally deformed, ending up in a position that left it no motion range. After pondering the possibilities, I decided, with quite some pain in my poor suffering heart, to part with the original Atwater Kent cone, and re-cone this speaker.

I made the cone from the same stiff paper I use to print my business cards. I made a polyethylene former for the voice coil, using the lathe, and made the coil, using an old QSL card as material for the support, **Photo Q**.

Fortunately I had just the right size of wire at hand. The two layers of wire, measuring as much as the width of the magnet poles, gave me precisely the 3.2 ohms specified for this speaker. The next small-



**Photo P.** "The voice coil was bent, and always scraped at some place, regardless of how I pushed and shifted it," Mornhinweg recalled. "The coil was non-original. The cone had several patched rips, and some unpatched ones. The spider was totally deformed, ending up in a position that left it no motion range. After pondering the possibilities, I decided, with quite some pain in my poor suffering heart, to part with the original Atwater Kent cone, and re-cone this speaker."



**Photo Q.** "I made the cone from the same stiff paper I use to print my business cards," he said. "I made a polyethylene former for the voice coil, using the lathe, and made the coil, using an old QSL card as material for the support."

er gauge of wire would have given close to 5 ohms, while the next larger one would be too thick to fit the gap!

I first glued the fabric to the cardboard ring, then the cone to the fabric, then the coil to the cone. During all this gluing, painstaking care was applied to keep everything well aligned. The polyethylene former was removed only after all gluing was done, so it could keep the coil perfectly straight while gluing.

**Photo R** shows the rebuilt speaker! Shudder, those colors! Originally I had the noble intention of spraying it black, but then I decided against this. The paint might stiffen the cone, making it sound tinny. Anyway, these colors aren't visible when the radio is assembled.

Instead, I exerted more care, color-wise, when replacing the speaker cable. The original was beyond repair, with all the insulation cracked, and the conductors shorted.

I used plastic-insulated wires and sheathed them in the fabric removed from a piece of power cord, dyed brown with walnut extract.

With the repaired speaker, the radio was now sounding good! All the scratchiness was gone. It was time to move to woodworking . . .

*(Part II of the Atwater Kent 206-X receiver restoration will appear in next month's Popular Communications. — Ed.)*



**Photo R.** *Voila* — the rebuilt speaker! "Shudder, those colors!" Mornhinweg said. "Originally I had the noble intention of spraying it black, but then I decided against this. The paint might stiffen the cone, making it sound tinny. Anyway, these colors aren't visible when the radio is assembled."



## About the Writer

Manfred Mornhinweg, 46, has lived all his life in Chile. "I got interested in technology at an early age," he says, "building my first steam turbine at age 7, a pivoting piston steam engine at age 9, my first electric motor at age 10, and my first radio at age 12."

He got his amateur radio license as soon as he turned 15, "which was the minimum legal age in Chile back then. Before that age I had already built several transceivers, but couldn't legally try them on the air, so older friends had to do that for me!"

While still in high school, Mornhinweg repaired and built electronic equipment for other people in his spare time, while attending university.

"Then, in 1989, I went to work as an electronic engineer for an international scientific organization in Chile's north," Mornhinweg says, "where my job was mainly to build toys for scientists, and repair whatever they broke. At the same time I continued to do electronics as a hobby — picking up antique radio restoration as a sideline of that hobby."

In 2007 Mornhinweg resigned from his job, "bought a piece of forest land in Chile's south, and had a round house with some clever features built there. I also built a micro-hydro power plant there that provides all the energy needed at home, including heating, hot water, and cooking, so that I can now enjoy living off-grid and without fuel or energy bills — *except for the car, that is.*"

Today, Mornhinweg pursues several hobbies, "which include photography, music and woodworking, after having largely abandoned model airplanes, para-glider flying and mountain climbing. I also do some free-lance work in electronics."

*(To access Manfred Mornhinweg's website, visit: <<http://ludens.cl/Index.html>>. — Ed.)*



# 'Crusade for Freedom' Peers Behind the RFE Curtain

Reviewed by Gerry Dexter

## BOOK REVIEW

Radio Free Europe's 'Crusade for Freedom'  
*Rallying Americans Behind Cold War Broadcasting  
1950-1960*

By Richard H. Cummings

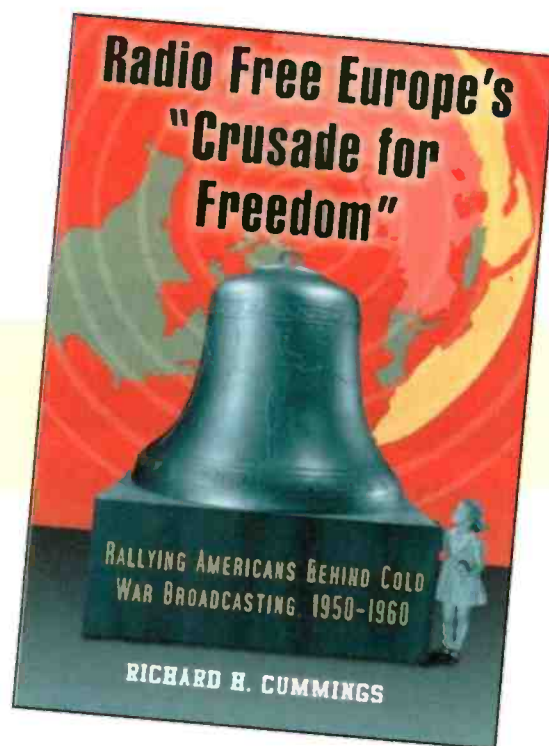
It is likely that most shortwave enthusiasts are familiar with the story of Bulgarian defector Georgi Markov. Highly critical of Bulgaria's communist government, he left the country in 1969 and nine years later had written much that angered his former government masters through his writings, his broadcasts over the BBC, and Radio Free Europe's Bulgarian service.

One day in September 1969, on Waterloo Bridge, **Photo A**, while waiting for a bus on the way to his job at the BBC, Markov felt a sting on his right thigh. A voice from behind said, "excuse me." That sting, delivered by the poisoned tip of an umbrella, led to Markov's death by Ricin poisoning, three days later.

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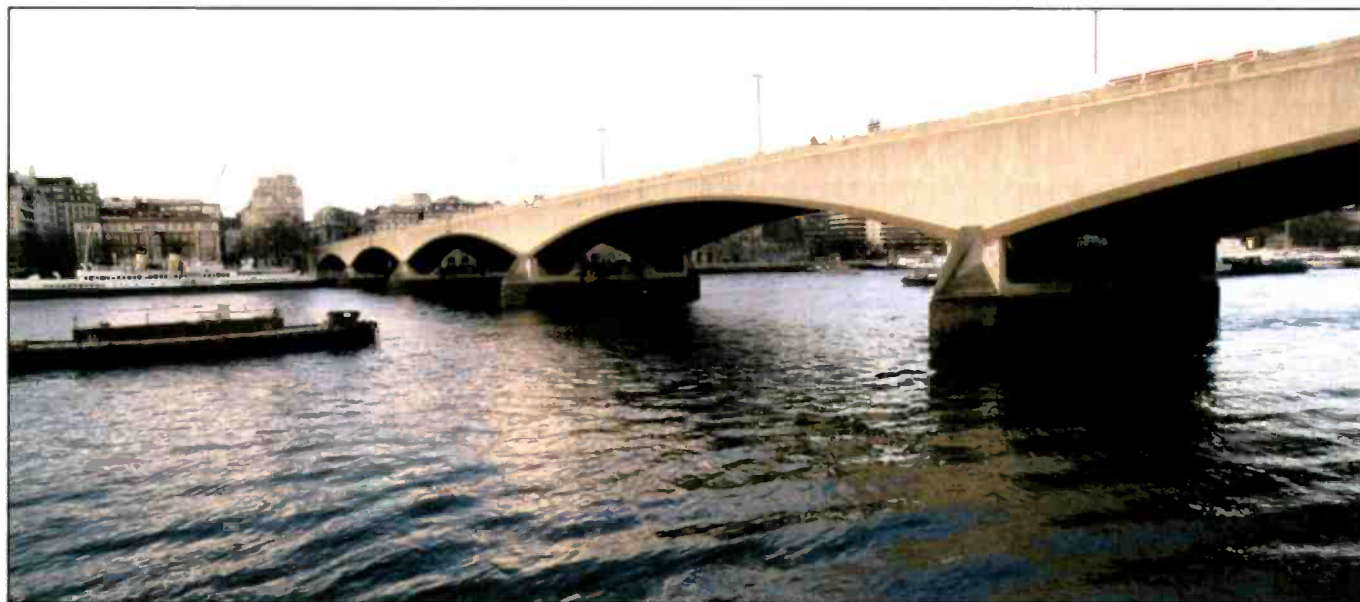
*"'Crusade' is a book you'll want to pursue if you have any radio history DNA within you."*

---



This book — about RFE and the U.S. government's effort to sell the public on Radio Free Europe — takes place between 1950 and 1960. The Markov murder did not follow for nearly 20 years, but the example does illustrate the importance of RFE's work — especially when one considers the effect RFE's broadcasts would have on Communism.

For more than a decade the general public had been fooled into believing the Crusade for Freedom was a privately-



**Photo A.** A bus stop on London's Waterloo Bridge was where Bulgarian defector Georgi Markov contracted Ricin poisoning believed to have been administered through the tip of a murderer's umbrella. (Courtesy of Bruno Girin/WikiMedia Commons)

funded effort when, in fact, it was a massive propaganda blanket thrown over the entire country — a mammoth initiative to raise huge amounts of money to fund a government-run operation.

From its beginning in 1949 to 1971, operating Radio Free Europe and Radio Liberty cost the taxpayers \$465 million. That's pocket change by today's spending rates. But in those days it was real money!

People signed "Freedom Scrolls," sent "Freedom-grams," **Photo B**, attended fund-raising dinners and lunches, partici-

pated in writing contests, bowling tournaments — any type of event those in charge could envision. The public bought into the Crusade without question. It was viewed as a good and worthy thing. It was a way — however small — to hit back at the wrong-headed types in Russia and Eastern Europe.

In fact, I can remember scheduling and airing many public service announcements on the radio during those early days, thinking I was proudly doing my part. Then word began to come out that the Crusade for Freedom and RFE, (later RFE/RL) were really being supported, if not actually operated, by the CIA! The agency, in fact, had funded and controlled much of the broadcaster's work. That, I don't feel, was any kind of damnation. RFE/RL did prove to be one of the most effective efforts, because of the news and information RFE/RL made available to people who had no other reliable information source. RFE/RL served a sort of a "radio termite" that ate away at the foundation of Communism, and is generally credited with playing a significant part in its decline.

Cummings focuses, in large part, on the government's efforts to get American citizens to back the work of RFE/RL and support it with their dollars. Through a giant, nationwide sales campaign, Washington covered the country with propaganda for the Crusade. Cummings views the Crusade and its efforts as a sort of "benign fraud" on the American people.

Some of the country's best-known advertising agencies were used, including Batten Barton Durstien and Osborne (BBD&O) and, later J. Walter Thompson.

Famous names were used to push the Crusade's goal: Arthur Godfrey, **Photo C**; Walter Cronkite; Bob Hope; Art Linkletter; Ed Sullivan; Duke Ellington; Ronald Reagan; Dwight Eisenhower; John Kennedy; and Richard Nixon. And lesser knowns: "Our Miss Brooks" (Eve Arden), Steve Allen, Henry Luce, Ralph Bellamy and numerous others.

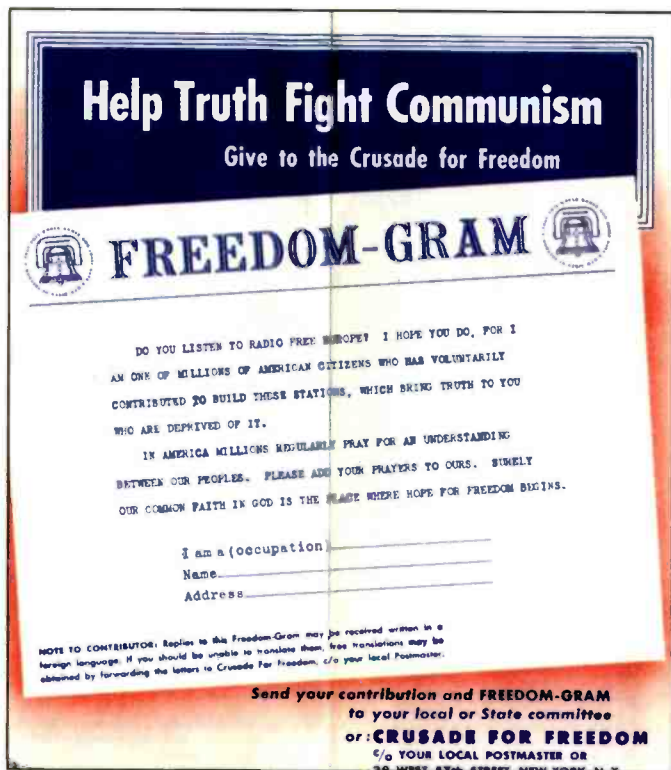
You get a feel for what those "ancient" times were like, as well as a feel for just how widespread and varied the "Crusade for Freedom" was — involving radio and TV public service announcements, print advertising, posters, parades, motorcades, balloon launches, and carrier pigeons — probably ads on heat protector sleeves for your coffee cup — if they had had such things then!

The book also devotes quite a few pages to the newest guy in the group — Radio Free Asia. And there are appendices covering the initial press release, the text of a speech by President Eisenhower, and a breakdown of contributions received versus operating costs by year.

Richard Cummings served as head of security for RFE/RL from 1980 to about 1995, a job which must have kept him up more nights than not. His carefully researched book should find a place in your radio library.

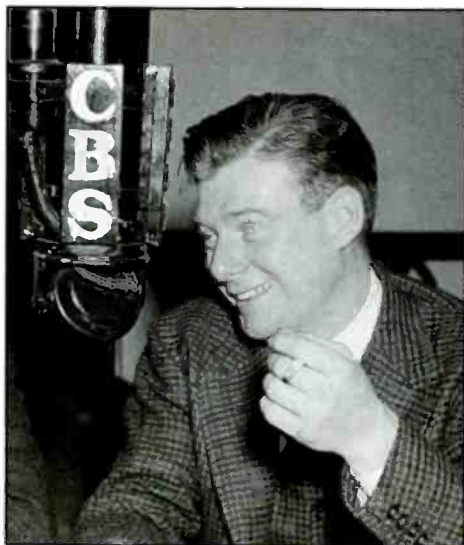
It won't be of much use to you in your hunt for the next DX catch, but that's hardly Cummings' intention. He makes an excellent effort to capture what went down in that decade and fill you in on why the Crusade seemed legitimate. The book is a nice read, dished out in smooth, bite-sized slices. It sends you back to a much more innocent time. It's a book you'll want to pursue if you have any radio history DNA within you.

*Radio Free Europe's "Crusade for Freedom" — Rallying America Behind Cold War Broadcasting, 1950-1960 by Richard Cummings (McFarland Publishing, 2010. ISBN: 078-0-7864-4420-6 \$45. 265pp 28 Illustrations, appendices, notes, bibliography, index. Softcover. <<http://www.mcfarlandpub.com>>. Orders: 800-253-2187.*



**Photo B.** "Do you listen to Radio Free Europe?" asks the sender of a Freedom-gram, volunteering to do his or her part to "bring truth to you, who are deprived of it." (Courtesy of Richard Cummings)

**Photo C.** Arthur Godfrey, legendary radio announcer and amateur radio operator K4LIB, was among the entertainment luminaries who supported Radio Free Europe's "Crusade for Freedom." (Courtesy of the Library of Congress)





**Tuning In**  
(from page 4)

From Benton, Kentucky, **Glenn Wells, WPC4KY**, wrote that he has been "listening to shortwave for years (and) always found it funny to listen to Moscow back during the Reagan years to hear the slant they put on a story. Cuba was about same way. You can always find something interesting once the sun goes down, and if all else fail, it's fun to put in CDs of the old radio programs from years gone by!"

**Gene Pearson, WPC4AIX**, writes from Perrysburg, Ohio: "I was WPE4AIX back in the day (1959-63) in Birmingham, Alabama, as a teenager with my Knight Kit Space Spanner, then National NC-60 — augmented by an RME DB-23 preselector, Heathkit frequency standard, Olson S-meter and a potentiometer in series with the IF stage's cathode to bring that stage up to regeneration, as described in a *Popular Electronics* article. Then I got a Hallicrafer SX-110. I sent my reception reports to Hank Bennett for his *Short Wave Report* column in P-E."

From Cheektowaga, New York, **Larry Heverley, WPC2OWY**, recalls starting "SWLing in 1960 with an old Zenith floor model with the green tuning eye that was stored in our garage from the estate of a maiden aunt. My first 'real' shortwave radio was a Knight Kit — the regenerative receiver with the press-board cabinet. It was cheaper than the StarRoamer. I think it was about \$25 back then, but I cannot recall the name. I was *Popular Electronics* Shortwave Monitor WPE2OWY, hence my first choice for a WPC station ID. I got my ham license in about 1965: Novice WN2HDZ and then WA2HDZ." (*Can anyone help Larry with the name of his Knight Kit radio? — Ed.*)

Then there's **Joseph Haddakin**, of Hemet, California: "No preference" for a station ID sign, he wrote. *Welcome aboard, KPC6JTH!*

So many station ID signs, and so many more stories to tell. Stay tuned, and tuning!

— Richard Fisher, KPC6PC/KI6SN

(For an instructional video and details on how to join the Pop'Comm Monitoring Station Program, visit the Pop'Comm Monitors On the Web blog at: <<http://popcommmonitors.blogspot.com/>>.

— Ed)

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## My Antenna: To Be, Or Not to Be? That's a Good Question

by Bill Price, N3AVY  
<chrodoc@gmail.com>

*"... Something keeps me from firing that slingshot up into the trees. Maybe it's knowing my friends would want me to start to transmit."*

**M**arch. Hmmm. Maybe we'll have a couple of warm days. A good "test" month for antennas — as if the annual "radial ice vertical weight" test wasn't enough. Sort of makes me glad my antenna is still in a box in the kitchen.

Friend Norm has had "mechanical beam tilt" added to his array, since (in his words) "Some hippie driving a furniture truck clipped a guy wire." He believes his chances of not having to pay for this out of his own pocket are slim.

I have my slingshot connected to a nice spincasting fishing reel, ready to launch the preliminary strings and wires for my antenna. Of course, I've had these things ready since late last summer, and so far the urge to launch them just hasn't moved me — or the slingshot.

It may be that I'll always be a listener. My goal after leaving the Coast Guard was to work the MF band (in the vicinity of 500 kilocycles — they were still kilocycles then — and some of the HF band from a commercial CW station somewhere on "the beach.")

Somehow, I never caught on to living near the ocean (something about property values) so I ended up with a ham license (or two or three) until I received N3AVY in the mail. I wanted to work traffic, and that just wasn't to be.

I send more CW through an oscillator on the kitchen table than I've ever sent on the ham bands. Maybe I'm just mentally defective (you'll get a quick agreement on that from the long-suffering Mrs. N3AVY).

Could it be that I'm just an eavesdropper? An RF voyeur? Whatever the case, I'm a listener. Car radio through morning and evening drive-time — my big RX and my little Grundig at home. I would benefit from an outdoor antenna, even for the diminutive G3, but something keeps me from firing that slingshot up into the trees. Maybe it's knowing that my friends would want me to start to transmit.

My friend David G. (his real name, but cleverly disguised) has even gone so far as to offer me a nice handheld 2-meter rig, and he sometimes sends me pictures of that nice little 5-watt HF portable rig that everyone is now using. In the days before I had my first transmitter with its one

crystal, I had drooled over just about every transmitter and transceiver made by man (at least those with VFOs).

I eventually got a nice, simple Ten-Tec Century 21 and I strung some antennas, built a breadboard antenna tuner — I even had some 0.5-inch hardline feeding a 40-meter dipole, which looked like a long black snake standing up in midair (since you couldn't easily see the dipole). I should have coiled the base of the transmission line in a basket.

I once worked someone in Japan. And Riga, Latvia. Even Wyoming. But at the end of my "watch," I was used to filing traffic reports, relaying my messages to NMH or NMY for further dissemination to the OBS and AMVER centers. Instead, old N3AVY just turned off the power and went to bed. My QSOs didn't matter. N3AVY went dark.

But hey — I'm supposed to be making you laugh. It's a good thing that Norm and his leaning tower are too far away for me to join in his antenna party.

The last time I helped Norm raise a tower, I ended up being the chainsaw operator. I'd already had plenty of experience with a chainsaw, and the cutting at Norm's installation was all small stuff — nothing that could fall on a person's head. However, the chainsaw had a habit of continuously squirting gasoline onto my right arm as I worked.

I made sure that no one smoked anywhere on the project. At the end of the day, we ceremoniously burned my jacket and shirt, which needed only a spark to get them going. I remember that day well. Our mutual friend, Jim, who also worked at "that place that shall not be named," was our climber while the three of us on the ground tagged the temporary guy-lines until the permanent lines were installed.

I think Norm gave me a shirt and jacket to wear. Norm wears a small. I wore a 2XL at that time. It was pretty comical, but those were good days. Now Norm has to wrangle some local help some 700 miles away from me to get that leaning tower nice and straight again. I miss doing that stuff. Friends make good memories.



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