POPULAR
COMMUNICATIONS
AUGUST 2010
Shortwave Listening • Scanning • AM & FM • Radio History

CB Radio

A Fresh Look At A Hobby Classic

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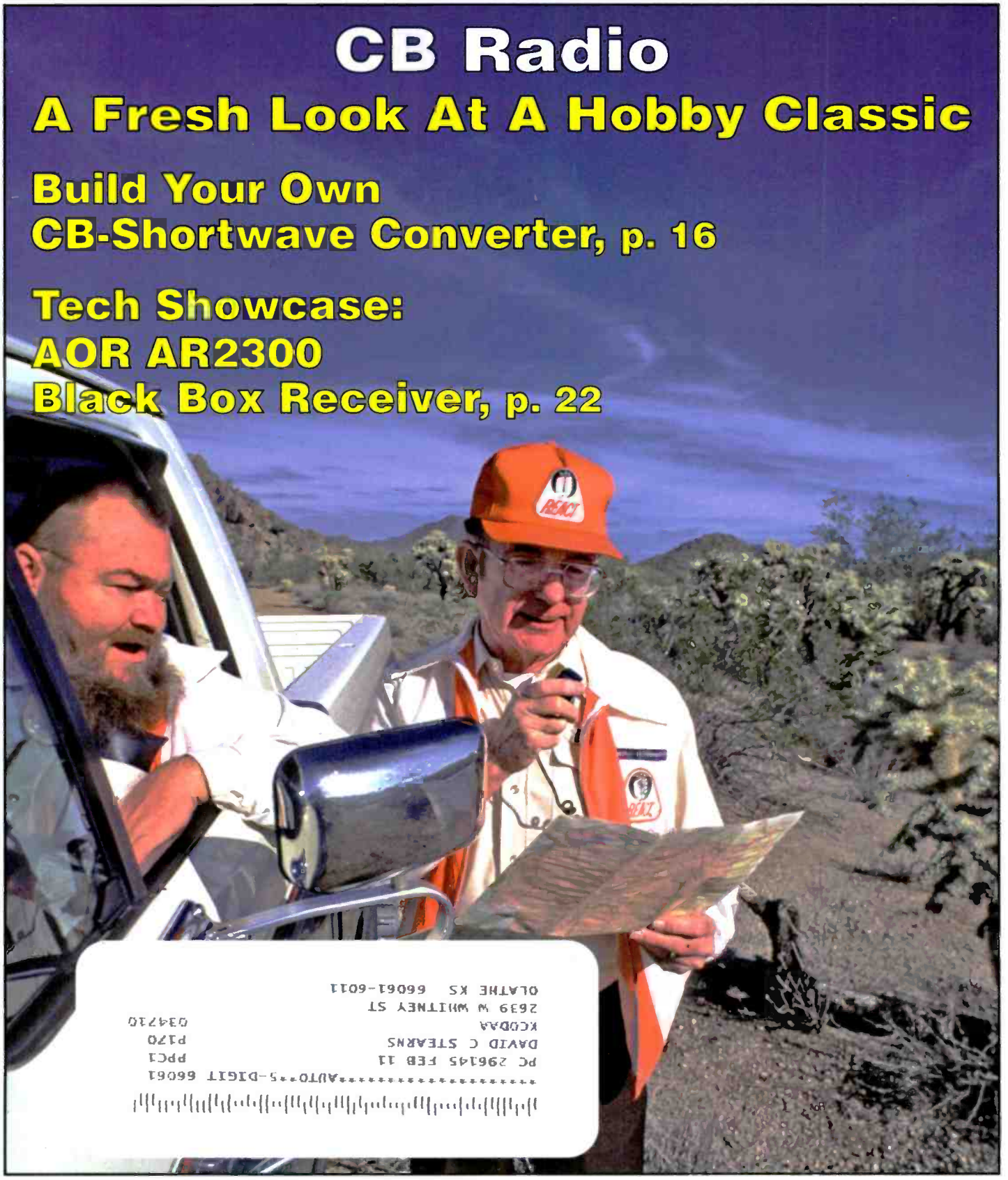
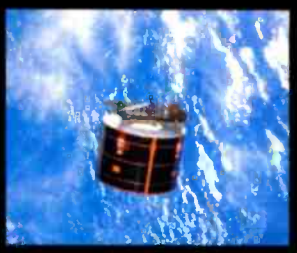
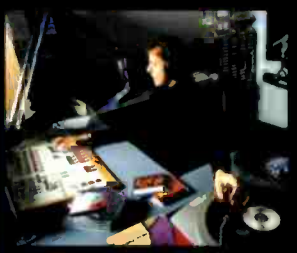


THE PROFESSIONAL STANDARD



- Continuous Frequency Coverage: 100 kHz ~ 2.6 GHz / LSB, USB, CW, AM-Narrow, AM, Wide AM, FM-Narrow, and Wide FM (cellular frequencies are blocked)
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GRUNDIG G4000A SUPER SPECIAL

This may be the best shortwave radio offer in our 67 year history! Buy the Grundig G4000A at our special sale price of $99.99 and we will also include both:

- ✔ ***FREE*** **Grundig AN200** AM loop antenna
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G4000A	$129.95
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AN200	29.95
Regular Total	$219.88

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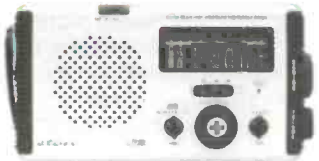
AN200 and FR350 are also sold separately.

GRUNDIG G4000A

The **Grundig G4000A**, historically has been our best selling radio here at Universal. We think the reason is value. Dollar for dollar no other radio offers this much performance and so many features. Coverage is complete, including long wave, AM band and shortwave from 1711 to 30000 kHz. FM stereo is provided to the headphone jack. A thumb wheel knob on the side of the radio provides smooth single sideband (SSB) tuning. The illuminated digital display provides tuning resolution at 1 or 5 kHz on shortwave. Two bandwidths are featured (narrow for maximum selectivity, or wide position for best audio fidelity). The keypad will quickly get you to any frequency or store up to 40 of your favorite stations in the presets. The presets may be accessed directly or you can scan through them by using the radio's second set of Up/Down buttons. The G4000A can also frequency search. The dual digital clock is visible while the radio is playing. Other refinements include: snooze and sleep buttons, lock, High/Low tone switch, Local/DX switch, and 9/10 kHz MW scan selection. Jacks for: earphone (3.5 mm), antenna (3.5 mm) and 9 VDC input. The G4000A comes with: AC adapter, stereo earbuds, wind-up antenna, and *Owners Manual*. Requires six AA cells (not supplied). The cabinet has a stunning titanium colored finish. 8"Wx5"Hx1.5"D. 1 Lb. 5 oz. One year limited warranty.

Grundig G4000A *Order #4000* Regular Price $129.95 **SALE $99.99**

etón FR350



Be prepared with the **etón FR350** emergency radio. This affordable portable receives AM, FM plus 7 shortwave bands: 5800-6350, 6950-7500, 9350-10050, 11550-12200, 13400-14000, 15000-15700, 17400-18050 and 21200-21950 kHz. The FR350 operates from a wind-up generator, 4.5 VDC or 3 AA cells (not supplied). The generator charges the supplied NiMH battery. There is also a built-in triple LED emergency light source and a siren function. The FR350 has the additional capability of recharging certain cell phones. With canvas carry case, AC adapter and NiMH battery. Only 8.7 x 4.5 x 2" 1.3 Lbs.

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FR350 Blue	*Order #4912*	$58.98
FR350 Red	*Order #4909*	$58.98
FR350 Black	*Order #4910*	$58.98

CLIPRAY

The **etón Clipray** is a self-powered LED flashlight. It is great for emergencies and also has a USB cell phone charging port. 2½ x 6 x 1½ inches.

etón Clipray *Order #0166* $14.95

GRUNDIG Satellit 750

✔ **Receive a *FREE* etón FR350 with your Satellit 750 purchase.**

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'.

Grundig Satellit 750 *Order #0750* List Price $400.00 **$299.95**

GRUNDIG AN200

The **Grundig AN200** is a passive, fully adjustable indoor AM band antenna. Inductive coupling makes it easy to use with most portables that have an AM Ferrite bar antenna. Simply placing this antenna near the radio will improve reception! Just adjust the AN200 tuning knob for maximum gain. There is also an output jack for a "wired" connection to radios with AM antenna terminals. The supplied cable has a 3.5mm plug at one end bare wires at the other end.

Grundig AN200 *Order #0912* **$29.95**

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AUGUST 2010
VOLUME 28, NUMBER 12

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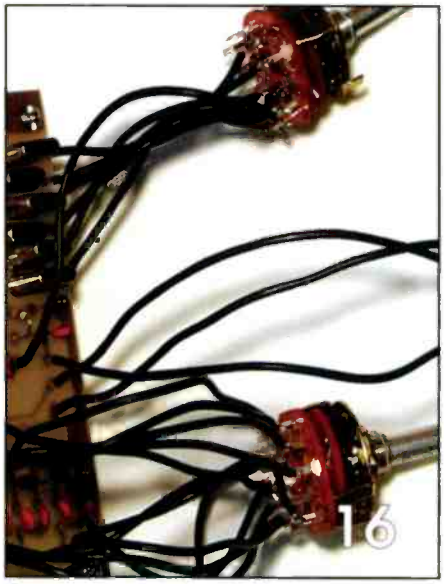

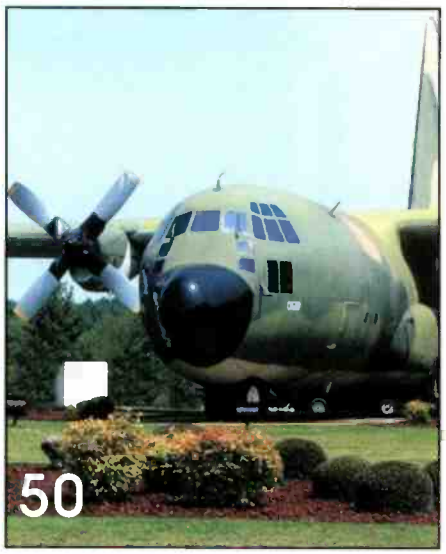

FEATURES

FEATURED COLUMNS

ON THE COVER

The only thing hobbyists love as much as new gear is a well-preserved specimen of vintage radio. Finding just such a treasure—a classic Cobra 135 CB rig—inspired Jeffrey Reed's celebration of his favorite operating mode: single sideband CB. See his feature starting on page 10. (Cover from the *Pop'Comm* archives: William G. Stewart II (in vehicle) and Walter L. Stewart of the Superstition REACT, Inc. Team C320 in Mesa, Arizona, were photographed in 1998 during a practice search in the desert; photo by Larry Mulvehill, WB2ZPI)

COLUMNS

DEPARTMENTS

Tap into secret Shortwave Signals

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

MFJ-462B **$199.95**

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

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

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

Eavesdrop on the World

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

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

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

Monitor Morse code from hams, military, commercial, aeronautical, diplomatic, maritime -- all over the world -- Australia, Russia, Japan, etc.

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

Save several pages of text in memory for later reading or review.

High Performance Modem

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

Easy to use, tune and read

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

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

It's easy to read -- front-mounted 2 line 16 character LCD display has contrast adjustment.

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

Use 12 VDC or use 110 VAC with MFJ-1312D AC adapter, $15.95. 5¼Wx2½Hx5¼D inches.

WiFi Yagi Antenna -- 15 dBi 16-elements extends range

MFJ-1800 **$29.95**

16-element, 15 dBi WiFi Yagi antenna greatly extends range of 802.11b/g, 2.4 GHz WiFi signals. 32 times stronger than isotopic radiator. Turns slow/no connection WiFi into fast, solid connection. Highly directional -- minimizes interference.

N-female connector. Tripod screw-mount. Wall and desk/shelf mounts. Use vertically/horizontally. 18Wx2¾Hx1¼D inches. 2.9 ounces.

MFJ-5606SR, $24.95. Cable connects MFJ-1800/WiFi antennas to computer. Reverse-SMA male to N-male, 6 ft. RG-174.

MFJ-5606TR, $24.95. Same as MFJ-5606SR but Reverse-TNC male to N-male.

Super Active Antenna

MFJ-1024 **$159.95**

"World Radio TV Handbook" says MFJ-1024 is a *"first-rate easy-to-operate active antenna ...quiet... excellent dynamic range... good gain... low noise... broad frequency coverage."* Mount it outdoors away from elec- trical noise for maximum signal, mini- mum noise. Covers 50 KHz-30 MHz. Receives strong, clear signals from all over the world. 20 dB attenuator, gain control, ON LED. Switch two receivers and auxilary or active antenna. 6x3x5 in. Remote has 54" whip, 50 feet coax. 3x2x4 inches. 12 VDC or 110 VAC with MFJ-1312, $15.95.

Indoor Active Antenna

MFJ-1020C **$99.95**

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

MFJ-1022 **$69.95**

Plug this *compact* MFJ all band active antenna into your receiver and you'll hear strong, clear signals from all over the world, 300 KHz to 200 MHz including low, medium, shortwave and VHF bands. Detachable 20" telescoping antenna. 9V battery or 110 VAC MFJ-1312B, $15.95. 3⅛x1¼x4 in.

Eliminate power line noise!

MFJ-1026 **$199.95**

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

MFJ Antenna Matcher

MFJ-959C **$119.95**

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

Preamp with gain control boosts weak stations 10 times. 20 dB attenuator prevents overload. Select 2 antennas and 2 receivers. 1.6-30 MHz. 9x2x6 in. Use 9-18 VDC or 110 VAC with MFJ-1312, $15.95.

High-Gain Preselector

MFJ-1045C **$89.95**

High-gain, high-Q receiver preseletor covers 1.8-54 MHz. Boost weak signals 10 times with low noise dual gate MOSFET. Reject out-of-band signals and images with high-Q tuned circuits. Push buttons let you select 2 antennas and 2 receivers. Dual coax and phono connectors. Use 9-18 VDC or 110 VAC with MFJ-1312, $15.95.

Dual Tunable Audio Filter

MFJ-752C **$119.95**

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

MFJ Shortwave Headphones

MFJ-392B **$24.95**

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

High-Q Passive Preselector

MFJ-956 **$69.95**

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

Super Passive Preselector

MFJ-1046 **$119.95**

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

MFJ Shortwave Speaker

MFJ-281 **$12.95**

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

MFJ All Band Doublet

MFJ-1777 **$59.95**

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

MFJ Antenna Switches

MFJ-1704 **$79.95** MFJ-1702C **$39.95**

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

Morse Code Reader

MFJ-461 **$89.95**

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

MFJ 24/12 Hour Station Clock

MFJ-108B, $21.95. Dual 24/12 hour clock. Read UTC/local time *at-a-glance*. High-contrast 5/8" LCD, brushed aluminum frame. Batteries included. 4½Wx1Dx2H inches.

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EDITORIAL
Tuning In

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Longing For My Old "Transistor"

by Rich Moseson, W2VU

With this issue's focus on "radio classics," I turn this page over to Rich Moseson, W2VU, editor of sister publication, CQ, for his musings on one aspect of the topic.—ed.

"Roll your bod! Roll your bod!" It was one of the sounds of summertime around New York City in the 1960s and '70s, as WABC disk jockey Dan Ingram reminded sunbathers every half hour or so to roll over so they wouldn't get sunburned. If you were walking along the beach on Long Island or at the Jersey Shore, you would see hundreds of teenagers rolling over in response to his reminders. Of course, they were all listening to him on their "transistors"—portable, battery-operated radios, for those too young to remember—which usually were playing loud enough (and nearly all tuned to 77 WABC) that one could leave the blanket and walk up to get a hot dog without missing a song.

I was reminded of this recently while listening to a baseball game on my car radio on the way to the supermarket, and wishing that I could keep listening once I went inside. My car radio is a great entertainment system: it has AM, FM, and satellite radio, a CD player, and a jack where I can plug in my iPod. But, except for the iPod, I can't take any of it with me when I leave the car. And my iPod doesn't have a radio. Later, when I got home, I heard one of the local TV stations promoting its news "app" for smartphones so one wouldn't miss out on any breaking stories.

It made me realize that as the world becomes more unplugged and "wireless," the device that started it all—the pocketsize "transistor" radio—has become a rarity. The first commercially viable transistor radio was introduced in 1954 in a joint venture between Regency Electronics and Texas Instruments. It not only unplugged the radio from the wall socket in the kitchen, making radio broadcasts available wherever you went, but it spurred a technological revolution that changed everything about the way we create, collect, share, and distribute information and entertainment.

As the first consumer product to use transistors (which had been invented only seven years earlier), the transistor radio became the foundation upon which PCs and PDAs, cell phones and smart phones, iPods and iPads, satellites and space stations, email and the Internet, and just about every technological tool and toy we use today, have been built.

I'm writing this while sitting on my front porch on a warm evening. If I turn on my iPod, I can listen to whatever I've recorded on it…but I can't listen to the radio on it. I can bring up the Internet on my wireless laptop and listen to Internet radio, or any number of domestic and international broadcast stations streaming over the Web, but it's the *Internet*, it's not *radio*. There's no challenge, there's no romance, but there is a price tag.

Broadcast radio is about the only "free" source of information and entertainment we have left. Your only direct cost is buying the radio. Beyond that, there's only our tacit agreement to consider buying the products that a station's advertisers are trying to sell. It's a formula that has worked well for nearly a century.

Television used to be free, too, operating under the same tacit agreement. But how many of us today get our TV signals over the air with an antenna on the roof? Especially now that the government has shut down analog TV broadcasts? The vast majority of Americans today pay a cable company, a satellite company, or the phone company to bring television programming into their homes. And it ain't cheap! My cable TV service costs over $60 a month. My cable Internet connection is close to $50 more. So much for all that "free content" on the Internet—$600 a year isn't exactly free.

Which brings us back to radio. It's still free, it can still go wherever I go, it's still fun, and I don't need an "app" to hear the latest news. I want my "transistor" back!

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The Weirder Side Of Wireless

by Staff

¿Qué?

In a news item in the *Tri-City Herald* (Washington), the Associated Press reported that Hermiston, Oregon, residents with tone alert NOAA weather radios were recently puzzled by a strange message around dinnertime, when the National Weather Service tried sending a severe thunderstorm warning. Instead of receiving enlightening information, after the alert tone, listeners instead heard only a long period of silence followed by a few words in Spanish. The National Weather Service office in Pendleton, Oregon, is working to figure out what caused the glitch. (Some hobbyists may be reminded of a shortwave "numbers station" parody that broadcast the names of Mexican foods. Since the report didn't say *which* words were heard, perhaps they were taken from another menu.)

1.2 Zettabytes And Counting

The research and consulting firm IDC has calculated that the Digital Universe—meaning every stored piece of electronic data in the world—will reach 1.2 million petabytes, or 1.2 zettabytes, in 2010, according to a piece on ZDNet. Despite a global economic slowdown, this is reportedly 62 percent higher than 2009's estimate of 800,000 petabytes. IDC said that most of this content is not unique, with almost 75 percent a copy of another piece of data, but it estimates that by 2020 the amount of data will have grown 44-fold, to 35 trillion gigabytes. As the amount of data increases, so does the need for security. The IDC report warned that by 2020 nearly half of all data will require a level of IT-based security beyond basic virus protection and physical protection. But IDC says it believes the staffing and investment required to manage the evolving Digital Universe will grow modestly between now and 2020, meaning the cost to manage each byte will steadily drop, which may be an incentive to create still more information. As if we don't have enough already.

Get Me Out Of This Elevator!

An item on the Taylor on Radio-Info blog references a *Radio Today* report that London's "Smooth Radio" tried again to get government permission to drop its "smooth jazz" format. But the GMG Radio-owned Smooth Radio London and North West were again denied permission by Ofcom (the UK's equivalent of the FCC) to drop the remaining smooth jazz portion of its lineup. In 2005 the station was renamed as "Smooth" (dropping "jazz"), then in 2007 it unsuccessfully petitioned Ofcom for permission to change formats entirely. Its current license calls for "45 hours a week of specialist jazz programs" as part of an "easy listening station featuring lifestyle-oriented speech, targeting an audience 50+." Now the request is back before Ofcom to retain the "easy listening music" identification, while broadcasting only "12 hours a week of specialist music programs." It's been rumored that station deejays are volunteering for stays in Guantanamo in exchange for their own station break.

RFID Goes Viral

Bloomberg Businessweek carried a HealthDay News report that a researcher in England is warning that implantable medical devices, such as pacemakers, defibrillators, and cochlear implants, are becoming vulnerable to "infection" with computer viruses. To prove his point, Mark Gasson, a scientist at the University of Reading's School of Systems Engineering, allowed himself to be "infected" with a computer virus programmed into a tiny radio frequency identification (RFID) chip, which he had implanted into his left hand. Gasson explained he wanted to draw attention to the risks involved with the use of increasingly sophisticated implantable medical device technology. "Our research shows that implantable technology has developed to the point where implants are capable of communicating, storing and manipulating data," he said. "They are essentially mini computers. This means that, like mainstream computers, they can be infected by viruses and the technology will need to keep pace with this so that implants, including medical devices, can be safely used in the future."

The chip Gasson self-implanted gave him access to his office and cell phone and allowed others to track and profile his movements. But once "infected," the chip disrupted the system it was communicating with, and could have similarly disrupted other devices connected with the network, he said. "By infecting my own implant with a computer virus, we have demonstrated how advanced these technologies are becoming and also had a glimpse at the problems of tomorrow," Gasson said. On the positive side, it could be a long-awaited breakthrough in the quest for a zombie army.

News, Trends, And Short Takes

by D. Prabakaran

South Korea May Resume Loudspeaker Broadcasts To North

South Korea is considering resuming loudspeaker propaganda broadcasts along the border with North Korea if the communist nation is found to be behind the deadly sinking of a naval ship, a military official said. The two Koreas had blasted propaganda messages across the border for decades before suspending them under a 2004 accord as part of reconciliation efforts. Loudspeakers and other propaganda facilities along the 248-km long border had been dismantled, but ties between the two sides have frayed badly since South Korean President Lee Myung-bak took office in early 2008. The North has protested his hard-line stance against Pyongyang, which links aid to the impoverished neighbor to progress in efforts to end its nuclear programs. Tension on the divided peninsula has spiked in recent months amid widespread suspicions that North Korea sank the 1,200-ton South Korean patrol ship *Cheonan*, in waters near their Yellow Sea border on March 26. Pyongyang has denied responsibility. "We're considering resuming loudspeaker broadcasts on the border as part of military measures for us to take if it is confirmed the North is behind the sinking," a military official said on condition of anonymity. "A working-level study into that possibility is now under way."

(Source: Yonhap News Agency)

DRM Tests From Brazil On 26040 kHz

The Brazilian Telecommunications Agency has issued an authorization to the Padre Anchieta Foundation, an organization that develops educational radio and television programs, for the testing of DRM. Tests will be done on 26.040 MHz, with a bandwidth between 10 kHz and 20 kHz, in São Paulo. The tests will be conducted over a period of one year, but may be extended, and aim to support a decision about the standard to be adopted by the country. The experiment will be suspended if harmful interference occurs to licensed radio stations. At the end of March, a decree published by the Ministry of Communications announced the technical guidelines for deciding what digital radio system would be deployed in Brazil. One of the requirements is that the standard to be adopted covers both the AM and FM systems to ensure that the consumer does not have to buy two different receivers. According to the Ministry of Communications, so far the two systems tested—DRM and IBOC—did not meet all the technical requirements. According to the tests already carried out, the digital systems in the world today do not produce a quality far superior to that of FM analog. DRM has the advantage of being an open system, which opens the possibility of technology transfer. The U.S.

(Source: Padre Anchieta Foundation)

All MediaCorp Radio Stations Can Now Be Heard Online

With MediaCorp and the Recording Industry Performance Singapore (RIPS) reaching an agreement on simulcasts, all MediaCorp radio stations are back on the Internet. Six radio stations were re-launched on the Internet in December 2009. The remaining seven (Gold 90FM, Symphony 92.4FM, Love 97.2FM, Ria 89.7FM, Warna 94.2FM, Oli 96.8FM and Expat Radio 96.3XFM) can be heard online at http://entertainment.xin.msn.com/en/radio/. The stations are also available for iPhone users through the download of a free app, MeRadio.

(Source: channelnewsasia.com)

Colombian Army Dismantles FARC Radio Station

The Colombian army has dismantled a FARC radio station found in the central Colombian department of Meta, according to an El Espectador report. The station, called The Voice of the Resistance (La Voz de la Resistencia), was located at an altitude of 11,700 feet and allegedly belonged to the FARC's 53rd Front. The radio station, which was used by the guerillas to send motivational messages to their fighters and threats to civilians, was hidden among caves and tunnels housing transmission equipment, antennas, and a camp. The camp was destroyed and the communications equipment removed in a joint operation between the Colombian air force and the Colombian army. A Colombian air force official described the operation as a "sharp blow to disrupt the FARC's main method of disseminating information and spreading fear about fighting back against this guerilla group."

(Source: Colombia Reports)

Capitol Hill And FCC Actions Affecting Communications

by Richard Fisher, KI6SN

California Radio Station Lodges Complaint Alleging Digital Interference

An Idyllwild, CA-based radio station is filing a petition with the Federal Communications Commission asking for relief from what its owner company alleges is "ongoing and destructive interference caused by the hybrid digital operations on station KRTH." All Pro Broadcasting, owner of KATY-FM (101.3) says its engineering analysis "demonstrates that the interference is adversely affecting reception of station KATY-FM over a substantial portion of the area within [the station's] 60-dB? signal contour. The analysis is partly based on measurements of the KRTH Upper Digital Sideband made in accordance with FCC rules," according to a report posted on RBR.com.

"All Pro is also sending the FCC a CD containing recordings of interference as heard on a factory-equipped car radio," a posting on RadioInk.com said. "The recordings were, the company says, 'made while the vehicle was driven along several heavily traveled Southern California roads' within KATY's contour." All Pro is asking the FCC "to order CBS Radio to reduce KRTH's digital power and to cooperate with All Pro to resolve the problem, saying that it has 'previously and unsuccessfully tried to get CBS to address the matter. In light of CBS's inaction, All Pro concluded that it had no choice but to seek redress at the FCC.'"

According to the RadioInk.com story, "this is apparently the first interference complaint to be lodged since the new rules went into effect on May 10," although several petitions have already have been filed at the FCC against the recently approved higher-power digital radio rules.

"If further complaints follow, there could be an impact on the entire high-power proceeding, since the new rules explicitly state that the FCC may revisit the elevated power levels allowed if significant complaints are received," the report said.

Twenty-Five MHz Being Freed Up After FCC 2.3-GHz Ruling

Twenty-five MHz of the 2.3-GHz band utilized for mobile broadband services is being freed-up by the FCC as part of its initiative to make 500 MHz available in the coming 10 years. "The FCC agreed to change the usage rules governing the Wireless Communications Services (WCS) spectrum and institute rules to avoid interference problems," according to a report on FierceBroadbandWireless.com. "Interference issues have long been a problem due to interference from DARS [Digital Audio Radio System] terrestrial repeaters and a strict out-of-band emissions limit," the report said.

The order was characterized by FCC Chairman Julius Genachowski as a "strong down payment on a vital national need." The National Broadband Plan calls for freeing up 300 MHz of spectrum for wireless broadband in the next five years, the report said.

Additions And Changes To 5 MHz Allocation Proposed By FCC

The FCC has issued a Notice of Proposed Rule Making (NPRM) to modify rules that govern radio amateurs' secondary use of five channels in the 60-meter (5-MHz) band. The Commission action followed on the heels of a petition submitted by the American Radio Relay League. Designated ET Docket No 10-98, "the proposed changes would substitute a new channel for one that is seldom available because of occupancy by the fixed service," the ARRL noted, "which is primary in this range. Also proposed is an increase in power from 50 to 100-watts effective radiated power (ERP) and the addition of CW, PSK31 and PACTOR-III modes with provisions to ensure that such operations would be compatible with the primary service."

"Spectrum Dashboard" Search Tool Available Online

The beta version of an FCC program for browsing who is using certain portions of the RF spectrum is now openly accessible online, according to a report on the KB6NU website. The Commission's Spectrum Dashboard can be searched for users by location, frequency, name, or license category. The dashboard covers 225 MHz to 3700 MHz, which excludes the commercial AM and FM broadcast bands and VHF broadcast frequencies from 184 MHz to 216 MHz (formerly used by analog television Channels 7 through 13). The former TV analog frequencies are "still used for digital broadcast TV, although the channel numbers don't necessarily correspond to the analog-era TV channels," the KB6NU site reported. "For example, a DTV channel 7 might operate on what was the 6-MHz band that was formerly used for analog channel 9, but the station may still call itself channel 7." The KB6NU site says the Spectrum Dashboard "can be a useful tool for finding who is broadcasting in year area. That can help with RF testing or EMC [Electromagnetic Compliance] emissions tests where you need to identify sources of ambient emissions." For more information, visit http://reboot.fcc.gov/reform/systems/spectrum-dashboard.

The Evolution Of Language—Technically Speaking

by Rob de Santos
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"We can lament the fact that there is less voice communication by telephone or less face-to-face interaction, but throughout history, advances in technology have altered communication more often than we realize."

Every hobby and every age group develops its own lingo or slang. If I walked up to someone fairly close to my own age and said, "Hey, man. That radio makes your Chevy a wicked machine. Want to lay some rubber?," I might have heard a reply that I'm a "hep cat." In the radio world we have a lingo all our own. More than one new radio fan has been bewildered by phrases such as "I had a QSO with a YL on 40 meters and added another QSL." The advance of technology has now introduced communication channels such as Twitter, instant messaging, and Facebook. Each has its own lingo, and some of that is seeping into the wider culture. What can we learn from this about the future of communications?

Debate has arisen recently about whether the unique language surrounding Internet-based communications is affecting the social development of young people. In part, this is because when you have 800 Facebook friends and you primarily communicate with others in your social group via SMS texts and posts on their Facebook profile pages, you may never speak to them via telephone or face to face. Tied in with this is the use of a lingo and shorthand unique to the medium. As my daughter might observe: "*OMG Dad no way!! C ya*"

We can lament the fact that there is less voice communication by telephone or less face-to-face interaction, but throughout history, advances in technology have altered communication more often than we realize. I'll leave it to the sociologists to determine if the current situation is harmful or not, but I suspect that what history tells us is that we adapt and we keep on adapting. Let's consider one example: the invention of the printing press. Wait, that's how you are most likely able to read this, isn't it? Prior to the invention of the printing press in the 15th Century, almost all communication had to be by voice, and within shouting distance, as few could read or had a reason to learn. We should not underestimate how culture and communications were forever changed.

In the January 2010, issue of this magazine I mentioned the "Inverse Law of the Internet": *the shorter the messages the more likely people are to read them.* To a great degree, that's exactly what happens when a new medium opens up and people begin to communicate over it. One of the great recent examples of this was the CB Radio craze of the 1970s. Entire books were written on how to talk in "CB lingo." As the craze faded, the majority of the lingo went with it. Very little CB lingo entered the language on a long-term basis and most people would look at you strangely if you said "*10-40 good buddy*" now. I suspect that Facebook, Twitter, and SMS have a longer lifetime than CB radios did, but how long? And how much of its vocabulary is particular to the generation using it?

On the latter question, research suggests a great deal is generational. Just as we no longer describe things we like as "*groovy*," it may well be that 20 years on, another set of teenagers will roll their eyes when their parents use "*c ya.*" Questions of changes in spelling and linguistics will keep the researchers busy, but I'm betting some of it sticks. It will just fade into the general lexicon and we'll forget how or why the word or abbreviation came into being. How many know the origins of the distress signal "SOS" in Morse code? (Hint: It wasn't an abbreviation for any specific words at the outset.)

How long the current hot media will persist is hard to say. Alternative ways to communicate will be invented, and we will flock to them, inventing new lingo and shorthand as we go. A few of these will persist long enough to have lasting impact on our culture and the ways we communicate. Many more will come and go and the lingo will die with them. Future teenagers will invent their own shorthand and changes to language and spelling to suit their place and time. Future parents will lament what it's doing to their communications skills.

Do the children of the 21st Century communicate differently than those in the 15th? You bet they do. Is it better or worse? I think it's better. Is it changing? Yes, way! Be a cool dude and share with me, using a lingo of your choice, what you think. We'll chat again next month!

This classic CB SSB base station consisting of a vintage Uniden President Washington rig with an Astatic D-104 desk microphone was the envy of many an operator back in the day—and still is.

CB SSB—Revisiting A Classic Mode Of Communications

A Self-Confessed Radio Junkie Finds His Latest Fix In A Vintage Rig

by Jeffrey Reed

As radio aficionados, there are few things we love as much as filling our shacks with the latest high-tech toys. Even if budgets are too tight, it's just as much fun to simply search for hidden treasures, not unlike Indiana Jones on a quest for precious artifacts. It's all part of the hobby of radio communications.

My latest treasure hunt yielded quite a bonanza: a Cobra 135 SSB (Single Side Band) base station CB radio in terrific working order. Discovering a Cobra 135 online truly qualified as finding a needle in a haystack. Imagine my delight when a local seller was glad to unload this classic CB right onto my lap. Better yet, my initial on-air contact with a local SSB operator who offered resounding approval of my strong, clear signal made for one happy radio junkie.

Sure, my shack already included a Cobra 148 GTL 40-channel mobile CB used as a base unit, but the addition of a Cobra 135 added a gem to my shack, and also provided a trip down memory lane.

Jeffrey Reed is an award-winning Canadian freelance writer, and a life-long communications hobbyist. He lives in London, Ontario, with his "better half" Beth, his beloved golf clubs, and his collection of CB radios.

His website is www.jeffreyreedreporting.com.

SSB: A Brief History

Single sideband (SSB) CB is an entirely different animal compared to simple AM-mode operation , yet they are communications cousins. They share the same 11-meter radio spectrum and channels, but that's where the similarities end.

SSB CB can provide twice as much range as AM under identical conditions, and can provide up to 12 watts legal peak power versus 4 watts for AM. Voice quality is crystal clear compared

to sometimes static-filled AM. The secret lies in additional circuitry, which we'll talk a bit more about later in this article.

Before SSB became available, the FCC issued the first license for CB Radio (or Class "D" 27-MHz band) in early 1948 to Al Gross. He communicated with license 19W0001 of the Citizens Radio Service. By the 1960s, truckers, small business operators and radio hobbyists were using CB transceivers on a daily basis. Then, it hit—with hurricane force.

When the U.S. government imposed a 55-mph speed limit during Arab the oil embargo of 1973 with its attendant gas shortages, much media coverage was given to truck drivers who were communicating via CB radios to locate gas and to warn others of police speed traps. The CB craze was born.

Add C.W. McCall's 1976 song, "Convoy," and a movie by the same title in 1978, and you had a communications phenomenon that would not be surpassed until the Internet was born. CB was so popular, you could walk to the corner store, purchase a mobile CB transceiver and antenna for as little as $75, and after a quick installation join in on the fun—if you could get a word in edgewise.

With the original 23 channels clogged, the FCC allowed 40 channels in 1977, and that's where things remain today. Higher-end CBs boast both AM and SSB, effectively providing 120 channels. Under normal atmospheric conditions, and using properly installed antennas, two home—or base—SSB CB operators can communicate over distances of up to about 40 miles.

SSB CB equipment has been available since 1964. In Tom Kneitel's book, *Tomcat's Big CB Handbook*, the founding editor of *Popular Communications* wrote:

> The first commercially produced CB sideband rig was the result of a project started in early 1963. Mark Products, a division of Dynascan, hired Gil Kowols to design a CB sideband transceiver.

Kneitel, who passed away in August 2008, also wrote , "Manufacturers such as Tram, Browning, Stoner, CPI, Cobra and others produced sideband transceivers that live on in both legend and also in actual current use."

I was delighted to find Kneitel's description of my shack's latest addition: the Cobra 135. He wrote, "The Cobra 135 was a dazzling base station that had a mystique of its own and still has a cult of fanatic followers."

In 1967, E.F. Johnson Company released an SSB CB radio and helped fuel SSB popularity, but it wasn't until the 1970s when combined AM/SSB radios hit the market that SSB soared to enormous heights.

How Does It Work?

The secret behind SSB really is no secret: it's just a more sophisticated design. With AM transmissions, the power is distributed across the carrier and upper and lower sidebands. SSB is much more efficient, however, using only one of the sidebands to get your message across. Because there is no carrier,

This vintage CB SSB radio, the Cobra 135, still has a cult following today. Classy enough to display anywhere, from your shack to your living room, this base unit retailed for about $450 in the early- to mid-1970s. The Cobra 2000GTL took its inspiration from the Cobra 135.

unless you speak into a keyed microphone, the operator at the other end will hear nothing and see no signal on his S-meter.

SSB also boasts less noise and interference than AM—forget about heterodyne whistles when two or more AM CB operators transmit at the same time. However, if you're conversing via SSB (Channels 31 through 40 are typically preferred for SSB, with different communities using their favorite channels), you will occasionally hear heterodyne interference from AM operators on the same channel. AM operators may also hear interference from SSB operators, which can sound a little like Donald Duck yapping in the background. Either way, common sense applies: find another channel yourself, or politely ask those interfering to find another channel.

SSB Language

The culture of SSB CB operators is itself a distant cousin of the AM CB hobby. If you shout out on SSB asking for a radio check or looking for a good buddy, you're bound to be scorned by veteran SSB operators.

SSB is a place where normal, everyday conversations are welcome; it's sort of like ham radio without the required license and tech knowledge. SSB conversations are not rushed shout-outs looking for the nearest gas station, a time check, or confirmation that your new rig sounds crystal clear. Rather SSB promotes friendly conversation, not unlike amateur radio, in a very relaxed setting.

The SSB CB universe has seen clubs like the SSB Network (established in 1964 at one time the world's largest such organization with more than 125,000 members)unite SSB users under one moniker. The lingo takes on a more everyday flavor, but may incorporate Q-Signals, rather than the 10-Code (for example, QSY translates to "switching to another channel," and QSL means "transmission acknowledged").

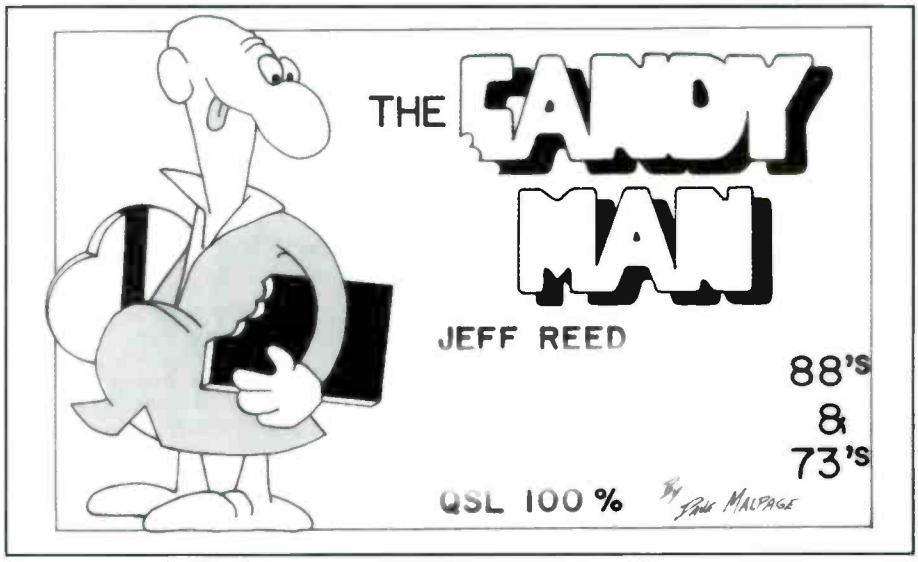
SSB Today

Despite its current comeback, CB Radio remains just a shadow of its 1970s' self. There remains, however, a loyal group of SSB operators, as I found out when I put the Cobra 148 GTL, and then the Cobra 135, in my shack. Within minutes, I was able to find local SSB users and carry on a normal conversation—a pleasant change from the constant chatter on Channel 19 in the AM mode . Don't get me wrong: listening to the professional drivers on 27.185 MHz AM is a constant companion for me at my home office. But when it's time to grab a cup of java and chit chat with some local CB operators, the time spent on SSB is much more leisurely and relaxed, not to mention crystal clear.

Rigs Of Dreams

Permit me to revel a bit more in serendipity of the Cobra 135 in my shack. As a teenager in the mid-1970s, I only dreamed of owning this rig, so it's surreal to see this beauty sitting on my

Here's one of the favorite mobile radios of all time: the Cobra 148GTL. An SSB version of the Cobra 29LTD Classic—of course, with more bells and whistles to accommodate SSB—the Cobra 148GTL transmits loud and clear with included stock microphone. Adding a Cobra handheld power mic offers a more powerful signal.



The author's QSL card, proving that the SSB crowd is a friendly and courteous bunch. Jeffrey says he chose The Candy Man as a handle because it was the nickname of his favorite baseball player, pitcher John Candelaria of the Pittsburgh Pirates. He adds: "Interesting note: I was a Pirates fan because we received all the home games from Pittsburgh on WWWE Channel 35 Erie, Pennsylvania."

desk today. The wood grain case combined with gleaming black finish and silver knobs , not to mention large SWR meter and old-style flip clock makes for a great conversation piece. The casing is a little rough around the edges, but again, it's in fantastic working order, which is what really counts.

During its heyday in the early- to mid-1970s, the Cobra 135 cost about $450. It served as the inspiration for later rigs, including Cobra's 2000GTL base station and the 2010 GTL WX. Cobra's 148 GTL is a full-featured SSB mobile radio, picking up where the famous Cobra 29 LTD leaves off with its AM-only operation. Galaxy also manufactures some very nice SSB radios, including the DX 2547 base unit, and DX 959 and DX 979 mobile rigs. Another nice radio on today's market is the Midland 79-290 mobile unit with WX (NOAA weather reception). Again, expect to pay slightly more for SSB units than you would pay for AM-only CB radios.

History Repeating?

Still not convinced that CB Radio is on the comeback trail? It only makes sense that in today's communications-crazy society—and struggling economy—that an inexpensive communication method would be welcomed with open arms.

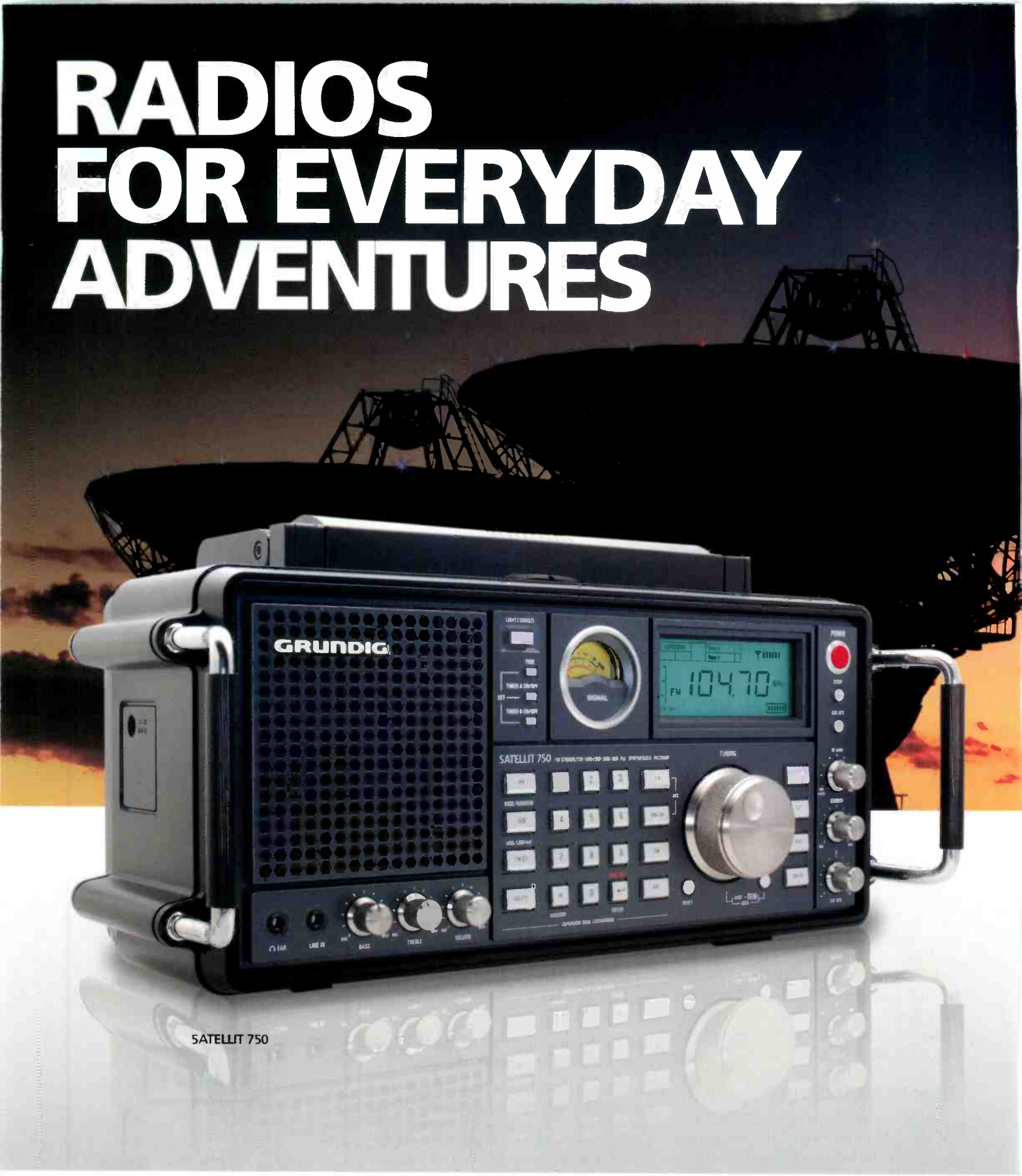
RoadTrip America (www.roadtripamerica.com), a premiere online destination for North American road trip information, has stated about CB Radio:

The author at his station, making friends via SSB.

These relatively low-tech devices are enjoying a resurgence of popularity among professional truck drivers and road trip enthusiasts for some very good reasons. They're relatively inexpensive to buy and free to use. They work well, and they provide communication under circumstances where other forms of technology still don't do a very reliable job.

I can't argue. And in the case of SSB, it adds just another element to my ever-growing hobby of communications.

RADIOS FOR EVERYDAY ADVENTURES



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An Inexpensive Shortwave Converter You Can Build Yourself

Here's A Homebrew Approach To Tuning In The World Of HF With A CB Radio

by Matt Burns, KC8COM

Editor's Note: Experienced builders can construct this converter project in an afternoon. Those new to construction might want to ask a more experienced friend for some assistance. All parts required are readily available, but for those who would prefer a single source, the author provides them in kit form.

Imagine turning on your CB radio and hearing the BBC, Radio Havana Cuba, the Voice of Russia, and even hams and HF utility stations. It may be kind of an eerie feeling at first, but it's not magic. Designing and building a receive converter is actually a fairly straightforward process and can be accomplished with a handful of inexpensive parts and a little bit of simple math. In addition to being an enjoyable way to spend time, there are also plenty of practical reasons you might want to try this construction project.

The 1959 edition of *The Radio Handbook* stated that for mobile operation it was more practical to use a converter connected to the car's AM receiver than to have a separate dedicated receiver. Over 50 years later the (inflation-adjusted) price of radio equipment has dropped significantly, along with the size of rigs and the number of standalone amateur radio transmitters on the market, virtually eliminating the need for converters. But there is still a great disparity in the prices of specialized HF receivers and more widely produced equipment like CB radios and AM/FM radios. This disparity leaves a good number of radio enthusiasts with no or very limited access to the HF spectrum. Reenter the converter.

Matt Burns, KC8COM, holds an Extra class amateur radio license and a general radiotelephone operator's license. He is the proprietor of Cycle 24 Kits in Rock, West Virginia.

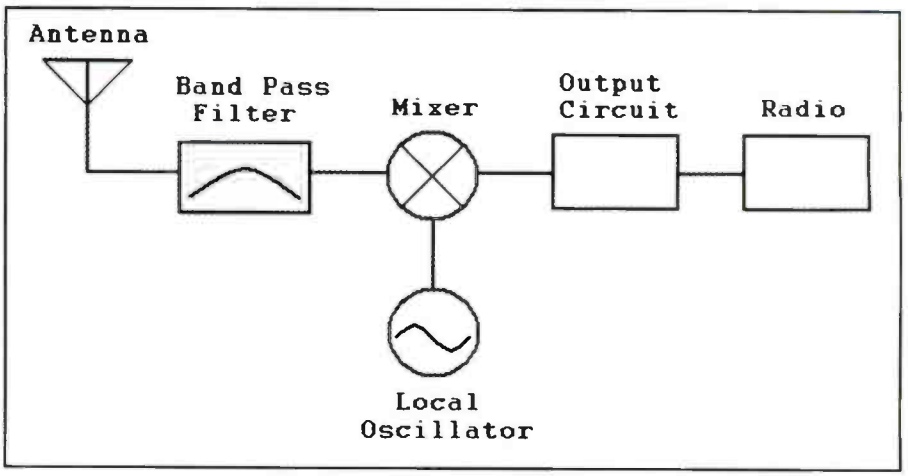


Figure 1. A block diagram of a simple receive converter.

With a simple and inexpensive homebrew converter, a band of the HF or even VHF spectrum can be received with a common CB radio or AM broadcast receiver. With the addition of switchable bandpass filters and switchable local oscillator crystals, multiple bands can be received. While this can't possibly rival the performance of a top-of-the-line HF receiver, it's still a very useful and fun project and a practical alternative to more expensive HF receivers. Depending on builder preferences, this project may cost approximately $25, or considerable less.

How It Works

As with any project, it's important to understand how a converter works before attempting to build one. Let's start by breaking the circuit down into its block diagram components: power supply, bandpass filter, mixer, local oscillator, and output circuit (see **Figure 1**). These are all fundamental components to nearly any piece of radio communication equipment and, while they are tailored to our specific application in this case, having at least a basic comprehension of how they work will demystify many of the cryptic drawings on the pages of radio books and magazines that have befuddled casual readers for years.

The Power Supply

The power supply is probably the most logical place to start with any project because nothing works without power. For this project, a voltage between 4.5 and 8 VDC will be needed to power the mixer IC, and a voltage between 4.5 and 15 VDC will be needed for the local oscillator circuit. The current draw for both of

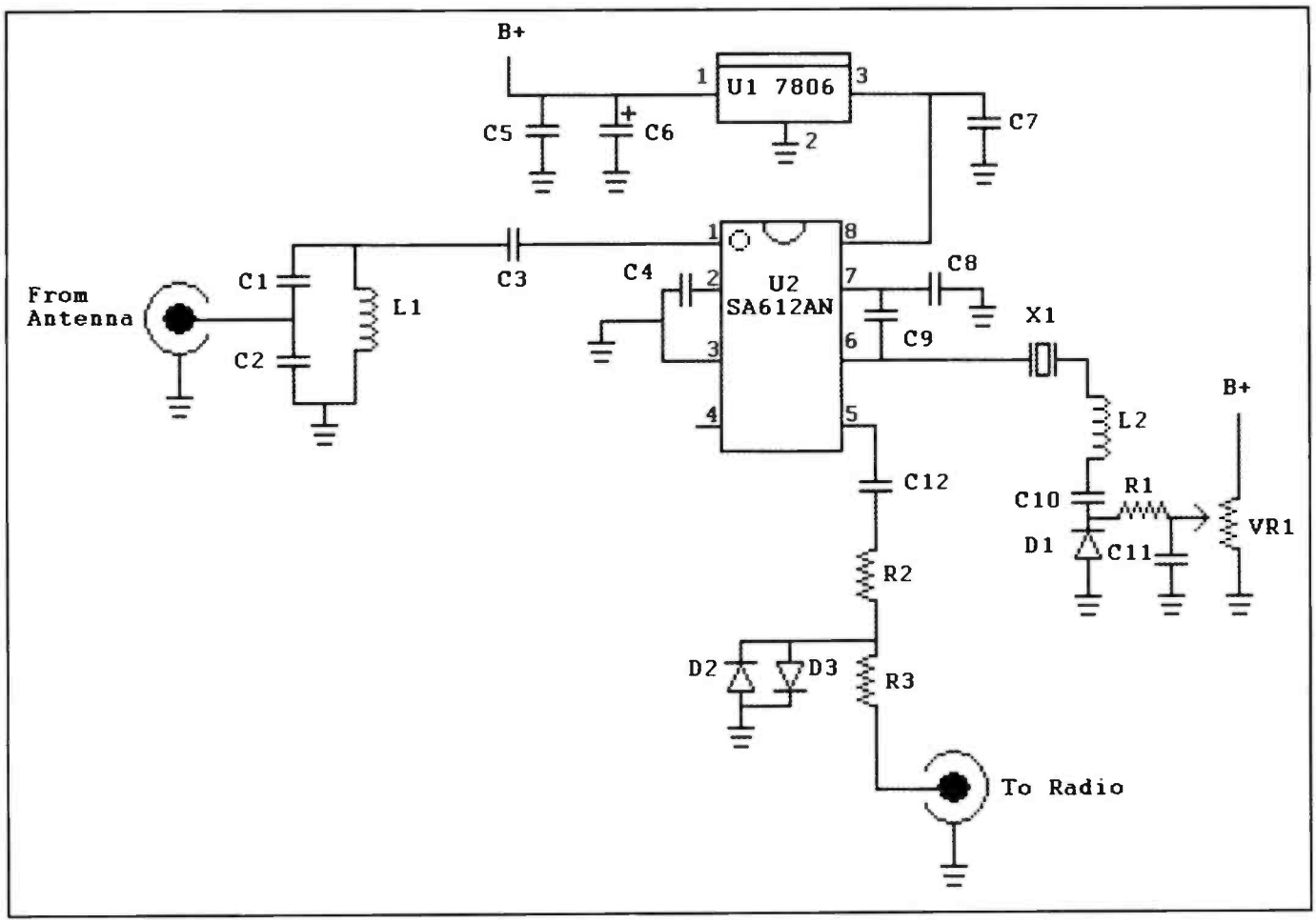


Figure 2. The schematic diagram of the converter described in the article, see "Parts List" for component values.

these combined will be less than 5 milliamperes. The easiest way to do this would be to power the circuit with four rechargeable "AA" batteries; this would provide enough power to operate the converter for months and would introduce no power supply noise.

While batteries are arguably the best way to power the converter, they are somewhat unconventional for mobile and stationary installations. The converter also can be powered from a car battery or 13.8-volt power supply through a number of means. The safest and easiest method is the three-terminal voltage regulator. The 7805 or 7806 of the widely available 7800 series would be the regulator of choice for this application. The "M" (500 mA) and "L" (100 mA) variants will also work due to the low power consumption of the circuit.

The Band Pass Filter

The band pass filter in this circuit actually serves two purposes. The first is to attenuate or reduce the strength of signals outside the "pass band," thereby reducing images and other unwanted signals. The second is to provide an impedance transformation from a 50-ohm coaxial cable to the 1.5k ohm input of the mixer IC.

In its most basic form, the band pass filter is a parallel resonant circuit with each component having a reactance of about 250 ohms at the desired frequency. For the purpose of the impedance transformation, however, the capacitor or the inductor must be "tapped" at a point having 50 ohms of reactance from ground. This tap provides a 50-ohm load for the signal coming in from the antenna. It wouldn't be an easy task to physically tap a ceramic capacitor or an epoxy coated inductor, but we can get around this by simply connecting a capacitor (C2) with a capacitive reactance of approximately 50 ohms at the design frequency in series with the ground side of the existing capacitor (C1) and using the junction of the two capacitors as the tap. This additional series capacitance will increase the resonant frequency of the filter; to compensate for this, the value of C1 should be adjusted to have a reactance of 225 ohms at the design frequency.

The Mixer

The mixer, while performing a very basic role, is the heart of the converter. By mixing the signals from the bandpass filter and the local oscillator, the mixer produces signals at the sum and difference of the two frequencies. This is the same principal used in superheterodyne radio receivers to convert an off-the-air signal to the 455-kHz intermediate frequency (IF). The IF, in the case of the converter, will be a fairly broad band of frequencies through which an external receiver can be tuned.

For the sake of simplicity, the SA612AN, a double-balanced mixer and oscillator IC, will be used for the mixer and local oscillator in this circuit. While it has been demonstrated that these are not optimal for the front ends of receivers due to their tendency to overload from strong signals, they still provide

acceptable performance and greatly simplify the circuit.

The Local Oscillator

The local oscillator (LO), simply stated, is the circuit that generates the signal to be mixed with the signals coming in from the antenna. The frequency of the local oscillator is what determines what input frequency will be converted to what output frequency; for example, a shortwave broadcast station on 7335 kHz will appear on 27335 kHz or CB Channel 33 when mixed with the signal from a 20-MHz local oscillator. In other words 20 MHz would be added to the frequency of all signals within the pass band of the filter.

Because CB radios and most modern digital tuning AM broadcast receivers use 10-kHz steps, a fine tuning control will be needed to allow reception of stations that fall between channels. This is accomplished by using a VXO, or variable crystal oscillator, for the LO. A VXO consists of a crystal oscillator with an inductor and a variable capacitance in series with the ground lead of the crystal. By adjusting the capacitance, the oscillation frequency can be tuned up or down by a few kHz.

Since variable capacitors are often difficult to mount and are becoming increasingly scarce (and expensive), it's more practical to use a common rectifier such as the 1N4004 as a "tuning diode." By connecting the anode (the side of the diode without the stripe) to ground and a variable positive voltage from a potentiometer to the cathode (the side with the stripe) the capacitance of the diode can be varied. In this configuration a few additional "support" components will be needed, but the overall cost and mechanical complexity of the project will be decreased.

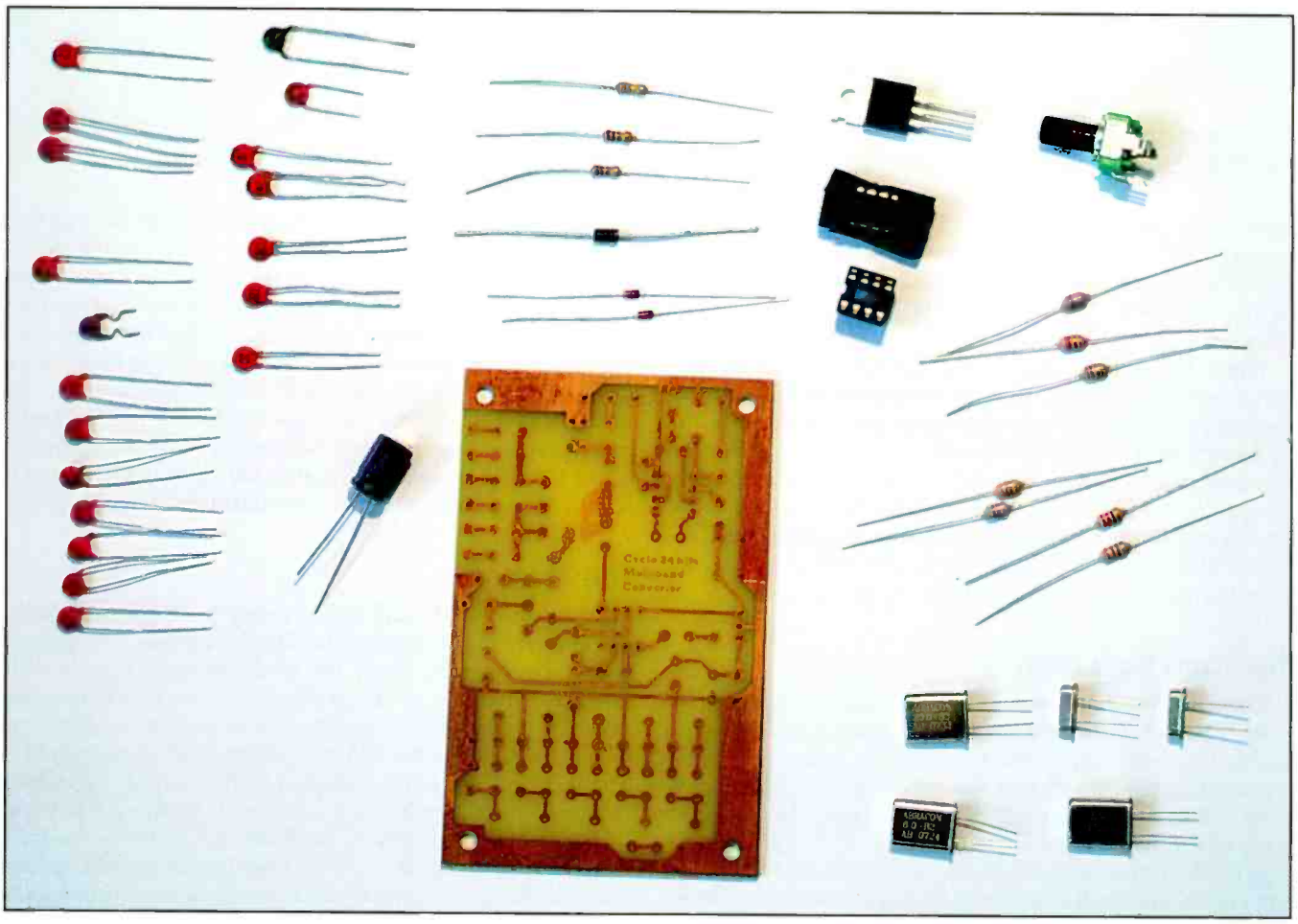
The Output Circuit

The output circuit is a simple but important circuit that couples the output of the mixer with the input of the radio and protects the mixer and radio from accidental "key-ups" when being used with a CB radio. Because the converter is designed so it can be used with either an AM broadcast receiver or a CB radio, an untuned resistive output circuit is employed. Resistive matching circuits are quite lossy but the SA612AN has plenty of gain to make up for much of the loss.

To protect against accidental transmissions, a pair of fast-switching diodes in parallel, facing opposite directions, are connected between a point 100 ohms from the output of the converter and ground. Under normal receive conditions the diodes will be virtually invisible to the circuit. In the event of an accidental transmission, however, the diodes will conduct, allowing the 100-ohm resistor to act as a dummy load and temporarily dissipate the power from the transmitter.

Before You Start Building

Now that you understand how converters operate, you will need to do some simple design work before you gather the components together (see "Parts List") and begin construction.



All parts laid out with the printed circuit board and ready to start assembly. The parts and board shown are from the kit but the components will be the same for a "scratch-built" converter.

Parts List

(Format: component, value, Mouser Electronics part number)*

C1, C2, L1 (see "BPF Specifications")		
X1, L2 (see "LO Specifications")		
C3, C4, C5, C7, C10, C11, C12	0.01µf	140-50Z2-103M-RC
C6	220µF	140-RGA221M1EBK0811P
C8	82pF	140-50S2-820J-RC
C9	47pF	140-50N2-470J-TB-RC
R1	100Ω	660-CF1/4C104J
R2	1kΩ	660-CFS1/4C102J
R3	100kΩ	660-CF1/4C101J
D1	1N4004	625-1N4004-E3/73
D2, D3	1N914	512-1N914
U1	7806	512-LM7806CT
U2	SA612AN	771-SA612AN/01
VR1	10k Ω pot.	31CR401-F

* While I obtained these components from Mouser Electronics (contact info below), they are available from many sources. Use your favorite supplier.

Mouser Electronics
1000 North Main Street
Mansfield, TX 76063
(800) 346-6873
www.mouser.com

BPF Specifications

18.5–29.3 MHz

C1	20pF	140-50N5-200J-RC
C2	120pF	140-50S5-121J-RC
L1	2.7µH	434-22-2R7

12.21–19.1 MHz

C1	47pF	140-50N2-470J-TB-RC
C2	220pF	140-50P2-221K-RC
L1	2.7µH	434-22-2R7

8.5–13.1 MHz

C1	68pF	140-50N5-680J-TB-RC
C2	330pF	140-50S5-331J-RC
L1	3.9µH	434-22-3R9

5.9–8.9 MHz

C1	120pF	140-50S5-121J-RC
C2	560pF	140-50P2-561K-RC
L1	4.7µH	434-22-4R7

3–6 MHz

C1	150pF	140-50S2-151J-TC
C2	330pF	140-50S5-331J-RC
L1	12µH	434-23-120J

1.59–2.58 MHz

C1	330pF	140-50S5-331J-RC
C2	1500pF	140-50P2-152K-RC
L1	22µH	434-23-220

LO Specifications

(Format: crystal frequency X1 and inductor value L2, coverage with AM radio, coverage with CB radio)

27 MHz	815-AB-27-B2	2.7µH	434-22-2R7 27.530-28.700	0-0.405
20 MHz	815-AB-20-B2	2.7µH	434-22-2R7 20.530-21.700	6.965-7.405
13 MHz	815-ABLS-13.0M-T	4.7µH	434-22-4R7 13.530-14.700	13.965-14.405
9 MHz	520-HCU900-SX	4.7µH	434-22-4R7 9.530-10.700	17.965-18.405
6 MHz	815-AB-6-B2	8.2µH	434-22-8R2 6.530-7.700	20.965-21.405
5 MHz	815-AB-5-B2	8.2µH	434-22-8R2 5.530-6.700	21.965-22.405

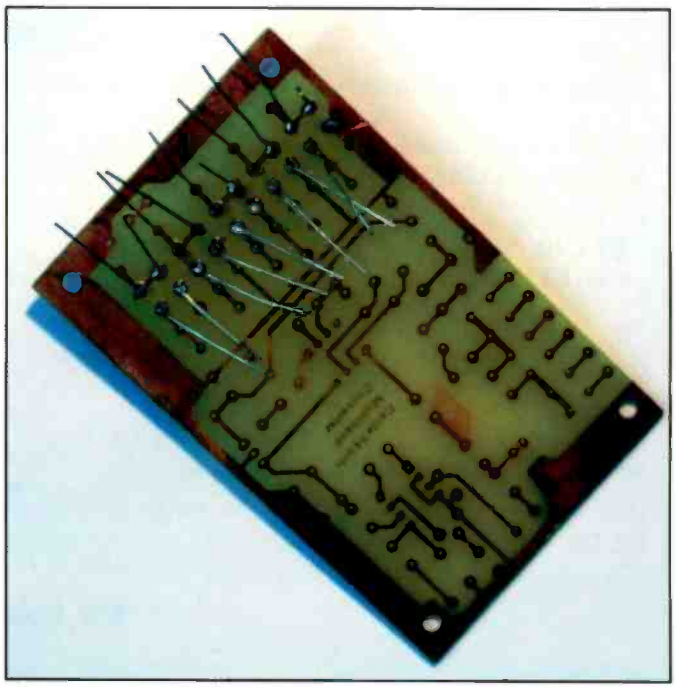
Formulae

Inductive Reactance
$X_l=2*PI*F*L$

Capacitive Reactance
$X_c=1/(2*PI*F*C)$

(The parts list and tables call for values in megahertz, microhenries, and picofarads. However the formulae call for values in hertz, henries, and farads; following are the conversions.)

1pF=0.000000000001F
1µH=0.000001H
1MHz=1000000 Hz



The solder side of the converter board with the first 10 capacitors installed. The kit includes five bandpass filters, each with two capacitors.

First you should decide what band you would like to receive and whether you would like to receive it with an AM broadcast receiver or a CB radio. Once you've done this you can select component values for the band pass filter and the local oscillator crystal. The accompanying tables of "BPF Specifications" and "LO Specifications" list some values for these. If you require a filter for a band not listed in the table, component values may be calculated for any frequency in the LF, MF, HF, or even VHF range using inductive and capacitive reactance calculations (see "Formulae").

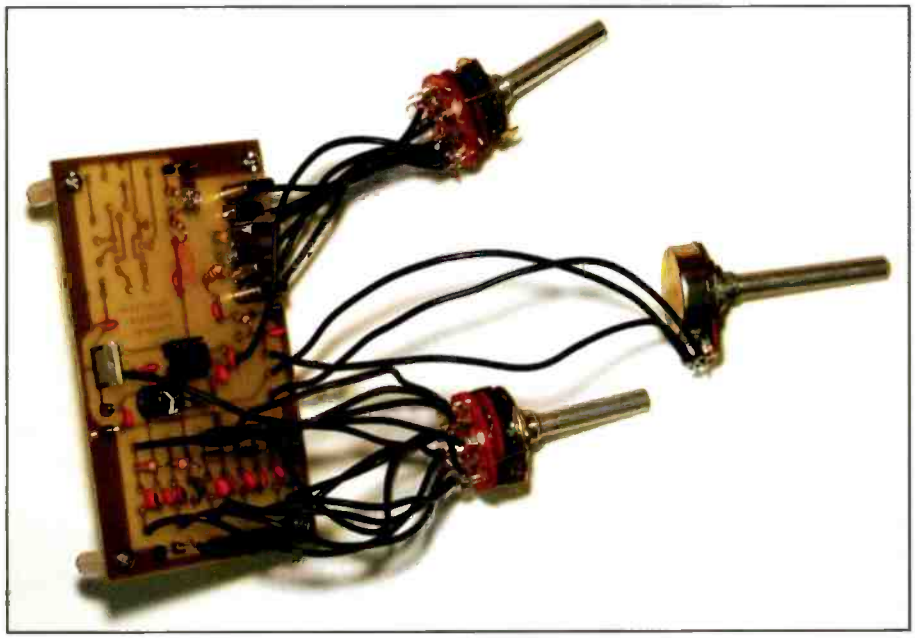
Construction

For the sake of brevity, I'm going to assume at least a basic familiarity with electronic schematics, soldering techniques, and general electronic construction methods. If you're not confident with your abilities in any of these areas it may be best to enlist the assistance of someone with experience constructing electronic projects.

You may also decide to build the converter from a kit, available through my website (www.cycle24kits.com), or "from scratch." Because the kit includes instructions that are specific to the PC board, this section will focus on "from scratch" building. While this is more challenging, it can also be more rewarding.

To start I like to lay out all of the components on a sheet of typing paper and arrange them like they'll be assembled according to the schematic (**Figure 2**). This takes a little extra time, but it will help you visualize where everything goes on the board and generally yields a neater, more organized project.

Once you have your parts in order you can start assembling the converter according to the schematic. This is a relatively simple process, but care must be taken to observe proper polarity/orientation when installing the mixer IC, the voltage regulator, the diodes, and the electrolytic capacitor. It's also good



The completed converter ready for testing.

practice to avoid excessive heating of the components during soldering as this may damage some of the more sensitive components. One way to avoid damaging the mixer IC with heat is to use an 8-pin DIP IC socket and plug the IC in after you're finished soldering.

After you've finished assembling the converter board, it's a good idea to give it a good look over to be sure that everything is connected properly and that there are no solder bridges. If you do spot a solder bridge it can be easily removed by soaking up the excess solder with desoldering braid.

Testing

The easiest way to test the converter is to hook it up and try it out. Simply connect the converter's antenna connector to an antenna and the radio connector to your radio's antenna connector, apply power to the converter, and tune around with your radio. With any luck you'll be able to tune into at least a few shortwave stations right away.

Troubleshooting

If the converter doesn't work on the initial test there's no need to be discouraged. Mistakes are easily made and can be just as easily fixed.

First it's a good idea to verify that there are signals to be received on the band in question. This can be done with a quick scan of the band with another receiver. If there are no signals in the band, or just a few very weak ones, it's a good idea to wait until there are at least a few strong signals before proceeding with the troubleshooting.

Once you've determined that the converter really isn't working, double-check all your work and fix any problems you may find. If no mistakes are found, you can start by measuring the voltage on pin 8 of U2 relative to ground; it should measure +6 volts (or anywhere from +4.5 to +6.5 volts if running from AA batteries). If this isn't the case, check your power supply connections, make sure U1 is installed properly, or, if running from batteries, make sure they're properly charged.

If it's determined that the problem isn't the power supply, you can verify the functionality of SA612AN by listening for the local oscillator on another receiver tuned to the local oscillator frequency. Because the VXO circuit is designed to pull the frequency of the crystal, it may be necessary to tune a number of kilohertz above or below the frequency of the crystal. If you're unable to hear the local oscillator, make sure U2 is installed properly, and double-check all connections to U2, paying special attention to pins 3, 6, 7, and 8.

Enjoy!

Hopefully this has provided you with not only a fun rainy day project, but also with some useful knowledge and experience that will come in handy for future projects. While building your own gear can understandably be a bit intimidating at first, it can also be a very rewarding aspect of the radio hobby.

I invite your questions and comments. Contact me via email at support@cycle24kits.com. I would also like to extend a special thanks to Mr. Wil Lindsay for his assistance in testing the converter and providing photographs for this article.

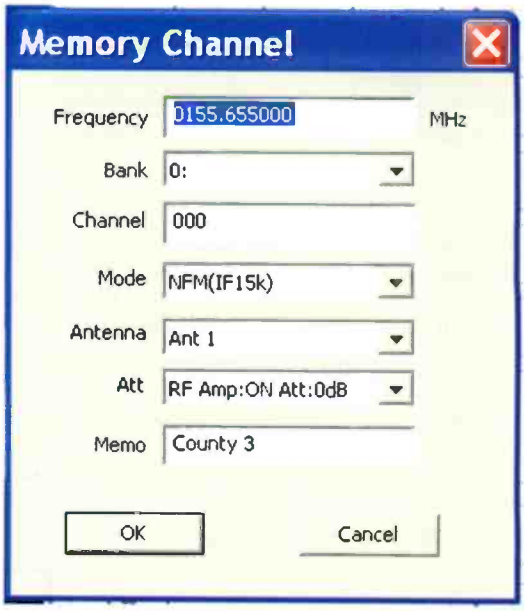
The AOR AR2300 Black Box Receiver

by Ken Reiss
radioken@earthlink.net

AOR just introduced its AR-2300 black box receiver to the U.S. market, and what a receiver it is. For starters, it offers 40 kHz to 3.15 GHz coverage for starters. Follow that up with including all the common modes like USB/LSB, CW, AM (all good for HF reception) FM wide and narrow, FM stereo, and even APCO-25 with an optional internal card. This is a true computer-controlled black box communications receiver built for the commercial market.

For scanner enthusiasts, CTCSS and DCS are included. While there's no built-in trunking, software could easily offer this feature at some point in the future, although that will be dependent on software development by both AOR and third parties. If any of the software developers do get involved, the sky will be the limit on functionality of this excellent receiver. A programming manual is provided for those who might want to write their own software.

The software that AOR includes is quite good for controlling the AR2300 for everyday use and shows off the receiver's capabilities quite well. A spectrum display is the most eye-catching section of the software, as it provides real-time wide band scanning using a Fast Fourier Transform scan. The three strongest signals (by default, although up to 10 can be selected) are tagged by the software and listed as 1, 2, and 3 in the upper right corner of the display, taking a lot of the guesswork out of what you're seeing as it scans. This is a very nice function for looking for new and unknown frequencies.

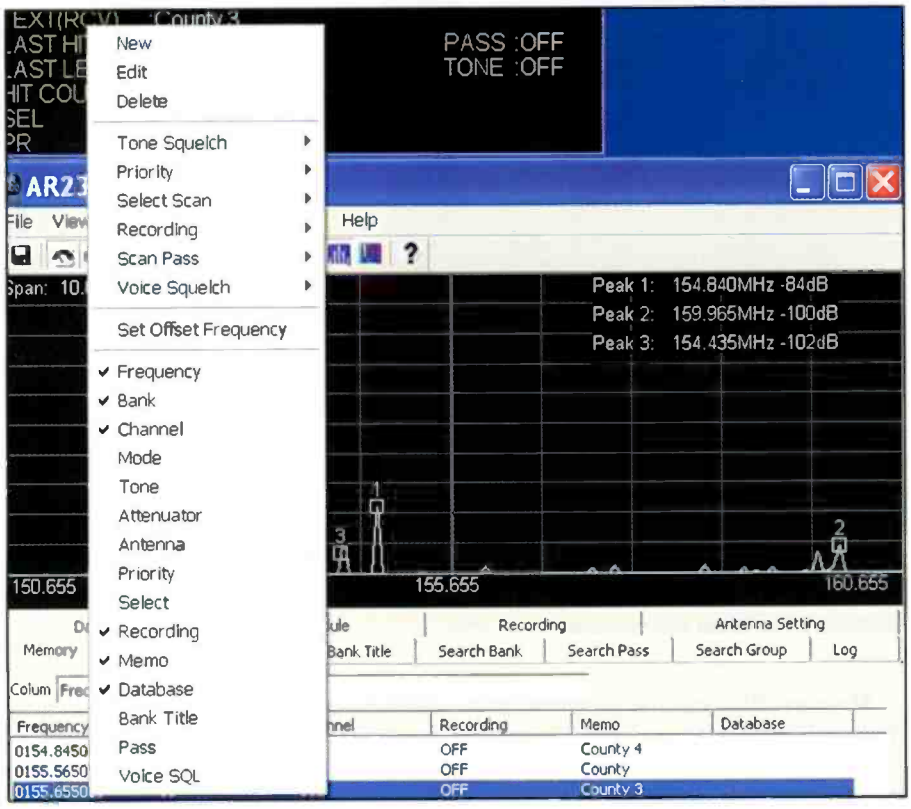


Entering a new memory channel from the frequency on the VFO is quite simple, but as I later discovered, all the data isn't here.

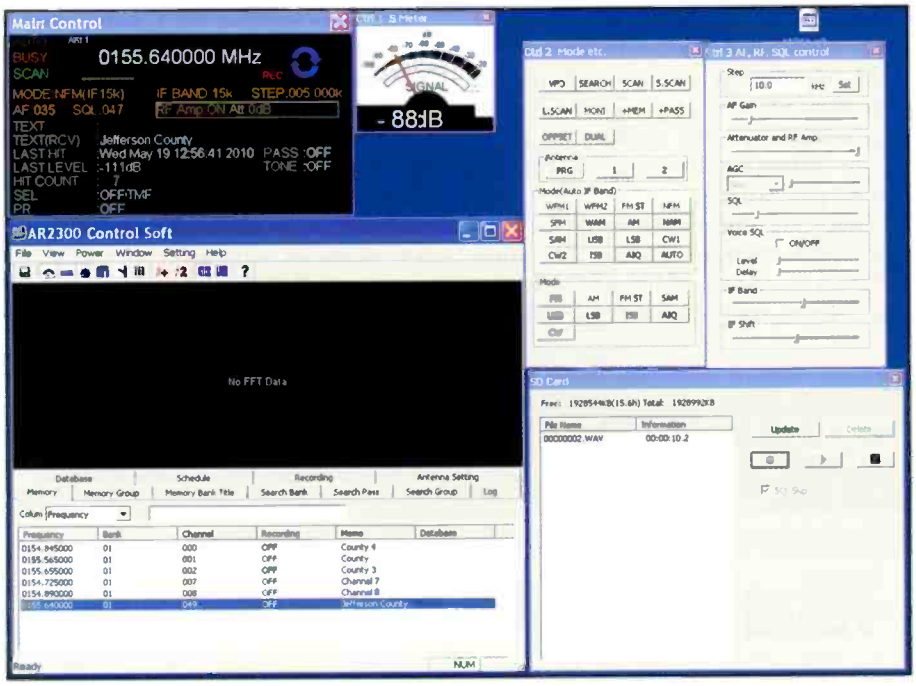
Ken Reiss is *Popular Communications'* "ScanTech" columnist.

AOR's AR2300 Black Box professional-grade receiver offers high performance, state-of-the-art specifications, and a full menu of optional additions. The U.S. consumer version should be FCC-accepted by the time you read this.

"The specs say that there is an interesting mix of single, double, and triple conversion reception taking place inside the receiver...A very interesting design indeed!"



By right clicking one of the line entries on the memory list, you get lots more options including settings for recording, tone squelch settings, priority, and select for later use in scanning.



The scan screen showing the main display at the top left, the S-Meter center, and some of the control screens top right. The lower window is the Spectrum display (not available when scanning) and the memory and data list. On the bottom right is the SD card recording window.

The controls for the FFT spectrum display allow for a bandwidth from .8 MHz to 10 MHz. Even at 10 MHz, the system is quite responsive and very versatile. On HF, smaller bandwidths would be more useful, but the option is there to experiment with.

You can also select to have it tune the strongest signal that it finds on the FFT. It's quite interesting to observe how the system works its way up or down the spectrum, finding stronger signals here and there. Used as a search tool, this might be a very productive technique.

There's also an excellent and responsive S meter available if you like. It shows signals in both an analog S-meter display and a digital dB display. While not necessary for normal use, it's a nice feature and helps us old-timers feel more at home with these newfangled gizmos.

Big Black Box (...Well, Dark Grey, Actually)

The first thing that struck me as I removed the AR2300 from its shipping

At A Glance

The AOR AR2300 Black Box Receiver

Major Features And Specifications

Covers 40 kHz to 3150 MHz
Up to three channels can be monitored simultaneously
All functions can be computer controlled
Monitoring and storage of up to 2,000 frequencies
Digital signal processing
Direct digital sampling
Built-in digital audio recording
High-performance analog RF front-end
DDS local oscillator
Can detect hidden transmitters
Remote control operation uses optional LAN controller
Unattended long-term monitoring with internal SD audio recorder
Spectrum recording with optional AR-IQ software for laboratory signal analysis

List Price

Govt. Version (AR2300U): $3,799
U.S. Consumer Version (cellular blocked: $3,699

Contact

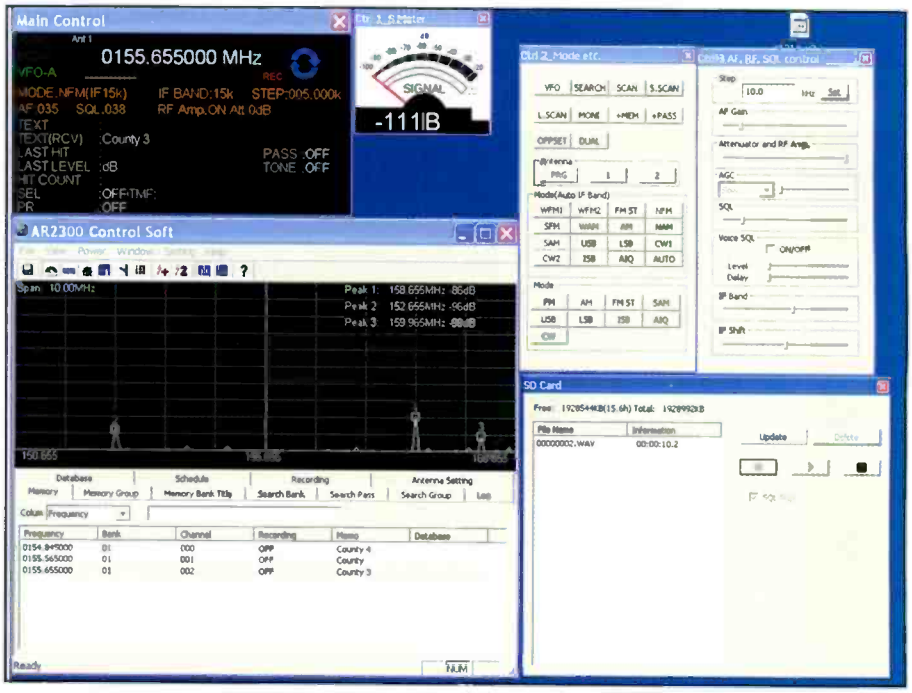
www.aorusa.com

box was that it's larger than most of the black box receivers we've seen at the consumer level to date. At 2 3/4 x 8 1/2 x 11 1/4 inches (HWD), it's much more in line with the AR5000 dimensions than any of the other recent black box receivers. This is just the first hint that what's inside *this* black box makes it different.

Weighing in at 6.6 lbs, it's no lightweight, either—inside is one solid communications receiver. The power supply is the external brick-type that we're used to seeing on laptop computers and other electronic gadgets of late. The unit can also be powered by 13.8 VDC in a mobile environment if desired.

One of the features that adds to the AR2300's weight is a beefy speaker that's quite useful for a built-in system. There's a full 2 watts of audio available, so you shouldn't have any trouble hearing it, even with an external speaker if you choose.

Dual antenna inputs are provided. The antenna 2 connector is used for everything that the receiver is capable of, including HF. The antenna 1 is used only for VHF/UHF reception from 25 MHz up. The chosen antenna is switchable per memory channel, if desired, so there's a lot of flexibility here depending on the actual antennas that are connected and how you might want to use them.



Here's the screen when the radio isn't scanning; note the very nice spectrum display in the lower left window.

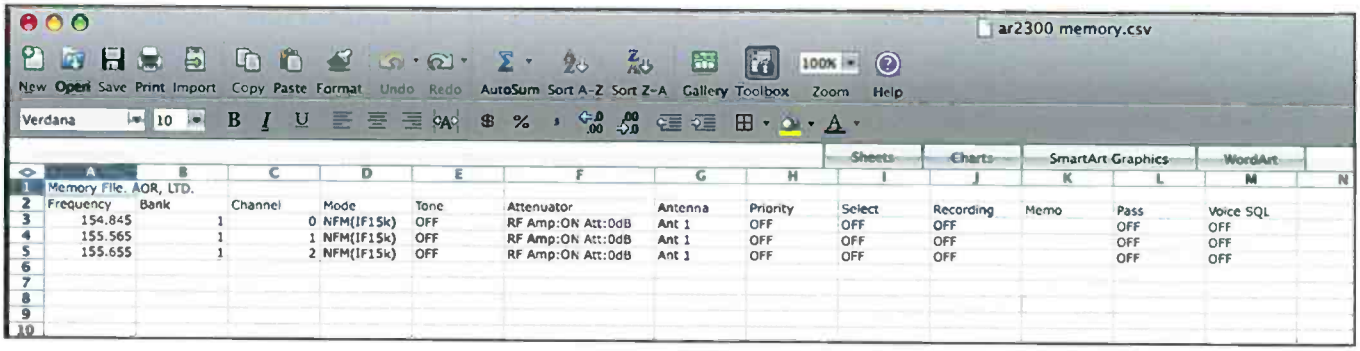
Lots Of Channels

Memory capacity in the software is 2,000 channels, in 40 banks of 50 channels each. Each bank can be customized between 5 and 95 channels, again providing lots of flexibility. And if that's not enough, since it is after all a software-based receiver, it's a simple matter to save another set of memory as long as your hard drive has room.

Memory files can be exported and imported with a common CSV file, so it's very easy to open them in a program like Excel to see what you have. In doing this, I also discovered some extra features per channel, as there's some stored information about the channels, such as a record switch per channel, that isn't obvious from the table presented on screen. That's a nice feature, but it would be even better if the information was available on the main memory save screen. Right clicking on a frequency in the memory list pulls up an extensive menu of selectable options per channel.

There are three scan modes available in the control software. The simple scan is a scan of the active bank. The S Scan scans frequencies that are marked as "Select" in the 40 memory banks. A maximum of 100 frequencies out of the 2,000 can be marked as Select, so this might be a useful option for certain special circumstances, but it isn't going to be very useful for most day-to-day scanning, unless you don't scan many channels.

The final mode is the L scan, which scans all of the channels stored in the 2,000 memory channels. Of course, it's easy to open and save multiple sets of memories so this may prove to be the most useful mode, using disk files to quickly load and unload what you need. It will take some planning and getting set up with sets of memories, but that's not always a bad thing either...sometimes you can learn a lot about what you're



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Memory File. AOR, LTD.													
2	Frequency	Bank	Channel	Mode	Tone	Attenuator	Antenna	Priority	Select	Recording	Memo	Pass	Voice SQL	
3	154.845	1	0	NFM(IF15k)	OFF	RF Amp:ON Att:0dB	Ant 1	OFF	OFF	OFF		OFF	OFF	
4	155.565	1	1	NFM(IF15k)	OFF	RF Amp:ON Att:0dB	Ant 1	OFF	OFF	OFF		OFF	OFF	
5	155.655	1	2	NFM(IF15k)	OFF	RF Amp:ON Att:0dB	Ant 1	OFF	OFF	OFF		OFF	OFF	
6														
7														
8														
9														
10														

The CSV files are easy to open with something like Excel for easy editing. Data can be reimported into the memory or database section of the software.

really scanning when you start looking at it closely.

Built-In Digital Audio Recording

One of the many really cool features of the AR2300 is its built-in audio recording capability. There's an SD memory slot on the front of the receiver, which will take an SD or SDHC card. Once mounted, this card can be used to capture the audio in a WAV file with a 17-kHz sample rate. It many not be high fidelity, but it's certainly enough to listen to the communications.

These files are easily converted to other formats since the WAV is a Windows standard, and can then be transferred to your iPod or other MP3 player for later listening (just like Tivo for radio). You can save them to hang on to important communications or for verification of reception if you like.

Approximately eight hours of audio is available per GB of space on the SD card. A 2GB card is enough for up to 16 hours of audio, and there is a control to halt the recording while the squelch is active, making the recorder ideal for scanner communications and rapid listening after the fact. Convert it and take it with you and you've got a whole day's worth of scanning in just a few minutes of listening. Unfortunately, in this mode, the audio is subject to frequent dropouts. I did not have time to investigate the cause, and my slow computer may have played a role. I understand, however, that a firmware update is coming out that is supposed to deal with some of these issues, so this may well even be fixed by the time you read this.

There are a couple of other areas where the software could be easier to use or more complete. I've already mentioned the hidden memory settings, and another aspect I found annoying is the squelch control. You can click the volume on the main window and adjust it right there. However, the squelch does not work that way and must be set with the mouse or by using the control hidden on one of the control panels. I expect the issue will be worked out in this or other control software.

Performance

As we've come to expect from AOR, performance of the 2300 is excellent, both on HF and VHF/UHF. Scan speed is quite good for use as a conventional scanner, which is a bit unusual for a communications receiver.

The specs say that there is an interesting mix of single, double, and triple conversion reception taking place inside the receiver. HF up to 25 MHz is direct conversion, while 25 to 200 MHz is double conversion. From 200 MHz to 420 MHz is a triple conversion design, and then above 420 MHz it returns to a double conversion design. While I did not do extensive testing, I heard nothing that indicated the receiver was anything but great on any of the frequencies I normally listen to. A very interesting design indeed!

Information provided by AOR states that the "AR2300 utilizes outstanding direct sampling digital architecture for reception below 25 MHz. It features a 14 bit 65 MS/s analog to digital converter, a high-performance FPGA-based digital down converter and DSP based demodulation circuitry. The direct sampling architecture offers exceptionally high linearity against input signals." I confess that I'm not completely sure what all that means, but I have to agree with the conclusion: it's an excellent receiver below 25 MHz (and above, too).

Some Technical Features

The AR2300 has some more high-end features for the commercial and advanced market that we'll just briefly touch on here. One that might be of interest is that it is possible to receive three frequencies at once: one below 25 MHz and, using the offset, receive VFO 2 VHF/UHF frequencies within 5 MHz of each other. The dual mode (one HF, one VHF/UHF) might be very useful.

The receiver features an optional I/Q signal unit, which can dump raw signal data with a bandwidth of 1 MHz onto a PC hard drive. This would be great for surveillance applications and government spy stuff. There is also a 45-MHz analog IF output that can be connected to external spectrum displays and other devices.

Check It Out Soon

As of this writing, the U.S. consumer version has not been approved by the FCC, but it is expected to be available by the time you read this, or should be very close to approval. The AR-2300 is an expensive receiver, but it's also well worth it if you're looking for really high-end performance.

A Hearty Welcome Back To Sundry Shortwave Voices, Plus Where In The World Are They?

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

"Do you think you are really hearing a signal transmitted from Japan? You might want to think again."

A couple of months back we alerted you to the fact that the Voice of Guyana was to return to the air shortly. Now it has, as noted by several on 3290 in the evenings and (very) early morning. Radio Guinee from Conakry has also reawakened and is active again on 7125, now being heard in French until sign off around 2300—and, presumably, from around 0700 sign on. Another African reactivation is La Voix du Sahel in Niger on 9705, signing on at 0500 and running until 2300. Also back on the air is Radio Oriental in Tena, Ecuador, on 4781 and Radio Altura in Cerro de Pasco, Peru, on 5014. And still another returned South American is the Brazilian, Radio Roramia, Boa Vista, on 4875. Radio Republik Indonesia at Jambi (Jawa) is also said to have been reactivated on its former 4925 frequency.

A good example of the complexity with relay sites these days is NHK World Radio Japan's line up for the current broadcast season. Do you think you are really hearing a signal transmitted from Japan? You might want to think again. I'll bet your chances of it being from the Yamata site are 50-50 at best. For the A-10 season Radio Japan's signal goes out via Bonaire, Wertachtal (Germany), Rampisham, Skelton, and Wooferton (England), Sackville, Issoudun (France), Kranji (Singapore), Gavar (Armenia), Santiago (Chile), Moscow, Sitkuani (Lithuania), Tashkent (Uzbekistan), Santiago, (Chile), Al Dhabbayya (UAE), and Talata-Volonodry (Madagascar)—that's *16* different sites!

And Radio Japan is just one in a long list. These days, the old line "you can't tell the players without a scorecard" is truer than ever. Most international broadcasters have multiple site arrangements, as do a lot of the private stations, such as TWR, CVC, Adventist World Radio, HCJB Global and—certainly—ye olde doomsayer WYFR/Family Radio. All can be coming from nearly anywhere but the site of their own studios! In fact, there are international broadcasters that do not even transmit from within their own countries anymore! Deutsche Welle, Radio Nederland, and Polish Radio are national voices that are, in a sense, homeless, having to rely on foreign transmitters to get their message out. So, reporting one of these stations under the country's name only misleads the reader, at best. In short—cite the site in your log reports!

One of the studios at Channel Africa. (Thanks Charles Maxant)

Reader Logs

I have a quick note on the logs before we dive in: Due to the huge increase in submissions that I've experienced during the past few months, I'm revising the approach taken with pirate logs. Pirate reports are still very welcome, but the focus will now be on reception times, ID content, and contact info. Much of the program content will be left out since most of the stations program similar fare.

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 that don't need returned, station schedules, brochures, pennants, station photos, and anything else you think would be of interest to our readers.

Send Your Shortwave Logs Today

We believe the "Global Information Guide" offers more logs than any other monthly SW publication (nearly 560* 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 "Global Information Guide," 213 Forest St., Lake Geneva, WI 53147. Or you can email them to gdex@wi.rr.com. Please note that attachment files do not always go through. See the column text for formatting tips.

**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.*

Of course, that also includes a shack photo, if you can call up the nerve!

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.

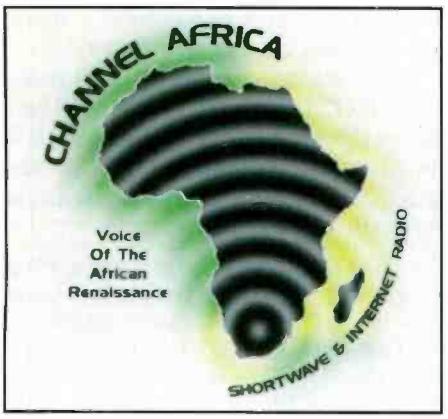
ALASKA—KNLS, Anchor Point, 9795 in (p) RR at 1145–1200. (Linonis, PA) 12105 with W and CC talk at 1010. (Ng, Malaysia)

ALBANIA—Radio Tirana, 6130 on Serbia and Kosovo merge. (Maxant, WV) 7430 with Albanian folk music at 2110. (Wood, Germany)

A Guide To "GIG-Speak"

Here's a partial list of abbreviations used in the "Global Information Guide":

(l)	listed
(p)	presumed
(t)	tentative
*	sign on/off time
//	parallel frequency
AA	Arabic
ABC	Australian Broadcasting Commission
AFN	Armed Forces Network
AFRTS	Armed Forces Radio TV Service
AIR	All India Radio
am	amplitude modulation
ancr	announcer
anmt(s)	announcement(s)
AWR	Adventist World Radio
BBCWS	BBC World Service
BSKSA	Broadcasting Service of the Kingdom of Saudi Arabia
CBC	Canadian Broadcasting Corp.
CC	Chinese
CNR	China National Radio
co-chan	co-channel (same) frequency
comml	commercial
CPBS	China People's Broadcasting Station
CRI	China Radio International
DD	Dutch
DJ	disc jockey
DW	Deutsche Welle/Voice of Germany
EE	English
f/by	followed by
FEBA	Far East Broadcasting Association
FEBC	Far East Broadcasting Company
FF	French
GBC	Ghana Broadcasting Corp.
GG	German
HH	Hebrew; Hungarian
HOA	Horn of Africa
ID	identification
II	Italian; Indonesian
Intl	International
IRIB	Islamic Republic of Iran Broadcasting
IRRS	Italian Radio Relay Service
IS	interval signal
JJ	Japanese
KBS	Korean Broadcasting System
KK	Korean
Lang	language
LSB	lower sideband
LV	La Voz; La Voix
M	man
NBC	National Broadcasting Corporation (Papua New Guinea)
nf	new frequency
ORTB	Office de Radiodiffusion et Television du Benin
PBS	People's Broadcasting Station
PP	Portuguese
PSA	public service announcement
QQ	Quechua
RAE	Radiodifusion Argentina al Exterior
RCI	Radio Canada International
Rdf	Radiodifusora, Radiodiffusion
REE	Radio Exterior de Espana
RFA	Radio Free Asia
RFE/RL	Radio Free Europe/Radio Liberty
RFI	Radio France International
RHC	Radio Havana Cuba
RNZI	Radio New Zealand International
RR	Russian
RRI	Radio Republik Indonesia; Radio Romania International
RTBF	RTV Belge de la Communaute Francaise
s/off	sign off
s/on	sign on
SIBS	Solomon Is. Broadcasting Corp.
sked	schedule(d)
SLBC	Sri Lanka Broadcasting Corp.
SS	Spanish
TC	time check
TOH	top of the hour
TT	Turkish; Thai
TWR	Trans World Radio
unid	unidentified
USB	upper sideband
UTC	Coordinated Universal Time (= GMT)
UTE, Ute	utility station
v	variable
vern	vernacular (local language)
VOA	Voice of America
VOIRI	Voice of Islamic Republic of Iran
VOR	Voice of Russia
W	woman
ZBC	Zambian Broadcasting Corp.



The current logo used by Channel Africa. (Thanks Charles Maxant)

ANGOLA—Radio Nacional, 4950 in PP at 0307, but with a poor, fluttery signal. (Brossell, WI)

ANGUILLA—University Network, 11775 with Gene Scott heard at 1145. (Maxant, WV)

ARGENTINA—RAE, 15345 in SS at 2308. (MacKenzie, CA)

Unidentified domestic feeder, 15830-lsb in SS at 2154–2344. (Alexander, PA)

ASCENSION IS.—BBC South Atlantic Relay, 11810 with *Newshour* monitored at 1945. (Brossell, WI) 12095 at 2136. (MacKenzie, CA)

AUSTRALIA—Radio Australia, 7240 at 1437 on daily life in China. (Strawman, IA) 1359 sign on and 13630 at 2112, //11660, 12080 and 15515. (Yohnicki, ON) 9660 at 0510, 11645 at 0910, 11945 at 0845, 12080 at 2110 and 12630 at 0840. (Maxant, WV) 9710 in Tok Pisin with Pacific Island news. (Linonis, PA) 13630-Shepparton at 2305, 13690-Shepparton heard at 0324, 15515-Shepparton at 2105, 15560-Shepparton at 2320, 17795-Shepparton at 2313 and 21725-Shepparton at 0235. (MacKenzie, CA) 11875 with news analysis at 2345. (Barton, AZ)

ABC Northern Territories Service: 2325-Tennant Creek with interview at 1220 and 2425-Katherine with fanfare and news at 1330. (Barton, AZ)

HCJB Global, Kununurra at 0835. (Maxant, WV)

AUSTRIA—Adventist World Radio, 9830 with classical music heard at 2125. (Maxant, WV)

BOLIVIA—Radio Santa Cruz, Santa Cruz, 6135 in SS at 1000 with ID, anmt, promos. (Alexander, PA)

BOTSWANA—VOA Relay, Mopeng Hill, 12080 at 0410. (MacKenzie, CA) 2012 in FF. (Brossell, WI)

BRAZIL (All in PP)—Radio Clube do Para, Belem, 4885 heard at 0403 with traditional LA music and some pops. (Wood, TN)

Radio Difusora de Macapa, Macapa, 4915 with ancr over music at 0409. (Wood, TN)

Radio Brazil Central, Goiania, 4985 with song, jingles and back to music at 2339, ID at 2341. (Montgomery, PA)

Radio Cultura do Para, Belem, 5045 at 0458 with Brazilpops. (Wood, TN)

Radio Senado, Brasilia, 5990 at 0920 with vocals. (Maxant, WV)

Super Radio Deus e Amor, Curitiba, 6090 at 2301 with ID anmts, religious talk. Also, 11765 at 0100 with religious talk, anmts, promos. (Alexander, PA)

Radio Voz Missionaris, Florianopolis, 9665 at 0120 with a preacher and contemporary PP religious music, // 5940 very weak. 11750 at 0140 with religious talk and music. (Alexander, PA)

Radio Nacional Amazonia, Brasilia, 11780 at 0010 with vocals. (MacKenzie, CA) 2240 with talks. (Brossell, WI)

BULGARIA—Radio Bulgaria, 6200 with sign on in BB at 0430. (Padazopulos, Greece) 7400 at 0343 and 11700 heard at 2317. (MacKenzie, CA)

CANADA—Radio Canada Intl, 6100 at 2337 with *The Link*. Possible Romania in SS underneath. (Montgomery, PA) 9640 in SS with news at 0000. (Barton, AZ) 11705 at 1133, then sudden loss of signal. (Maxant, WV) 11990 in SS at 2248, 13730 in SS at 2332, 15330 in FF at 2108 and 17765 in FF at 2157. (MacKenzie, CA)

CKZN, St. John's (Newfoundland), 6160 with a call-in show at 0535. (Maxant, WV) 2344 with *Women in Terror* pgm. (Montgomery, PA)

CFRX, Toronto, 6070 with commercials at 0315. (Maxant, WV)

CHU, Ottawa, 7850 monitored at 0315 with time signals, also 14670 at 2130. (Maxant, WV)

Bible Voice Network, 7305 via Germany with *Right From the Heart* pgm at 0030. (Ng, Malaysia)

CHAD—Radio Nationale Tchadienne, 6165 at 0457 after Radio Nederland sign off with Afropops and hilife, FF talk, local drums. Also, afternoons in FF, variously to as late as 2330 close. (Alexander, PA)

CHILE—CVC-La Voz, 17680 in SS with Christian vocals monitored at 2320. (MacKenzie, CA)

CHINA—China Radio Intl, 6190 at 0425. (Maxant, WV) 7415 with EE lesson at 2146 and 17680 in SS at 0728. (Padazopulos, Greece) 9425 in Cantonese at 0425, 9690 via Spain in CC/EE at 0256, 9695 in CC at 1708, 9790 at 0338 on the Asian Games, 11840 via Canada with *China Horizon* pgm, 13655 in CC at 0248, 15160 in CC at 0245, 15785 at 0319, 17710 in RR at 0305 and 17735 in Tamil at 0310. (MacKenzie, CA) 9550-Beijing in VV at 1240. (Ng, Malaysia) 9600-Kashi at 2115 on world economy. (Brossell, WI) 11790 at 2300 with ID, news. (Barton, AZ) 13655 via Albania on a literary festival in Beijing, //13790 and 15205 in FF at 1240. (Wood, Germany) 15145-Xi'an in a CC dialect giving a Mandarin lesson at 0750 and 15335-Kashi at 0800 with CC ID and into RR. (Ng, Malaysia)

CPBS, 11750 in CC at 2230, 11960 in CC at 0314, 15170 in Hakka at 0730 and 15220 in CC at 0100. (Ng, Malaysia) 11960 in CC at 0415 and 15270 in CC at 0335. (MacKenzie, CA)

China National Radio-Voice of Pujiang, 5075 in CC at 1240. (Ng, Malaysia) Xinjiang PBS, Urumqi, 7340 in (l) Kazak at 1255. (Brossell, WI) China Business Radio, 9820 in Mandarin at 2310 with a discussion pgm from 2311. (D'Angelo, PA)

Firedrake jammer, 15140 at 0020 and 15265 at 2338. (MacKenzie, CA)

COLOMBIA—La Voz de tu Concencia, Puerto Lleras, 6010 at 0800 with local music,

A new 500-kW transmitter at WEWN, currently running at 250. (Thanks Charles Maxant)

Pirate Radio Free Euphoria's full color QSL. (Thanks Rich D'Angelo)

EE ID at 0808 mentioning call and frequency, SS ID at 0820. (Alexander, PA) 1135 with SS vocals. (Maxant, WV)

La Voz del Guaviare, San Jose Guavaire, 6035 at 0935 in SS. Also noted at 0210-0346 close. (Alexander, PA)

CROATIA—Voice of Croatia, 7375 at 0305 with times and frequencies for different areas of the world. (Maxant, WV) (*via Germany—gld*)

CUBA—Radio Havana Cuba, 5040 in SS at 0154 in FF, ID and news in SS at 0200. (D'Angelo, PA) 0038. Also, 6110 in SS at 0450, 9660 in SS at 2308, 12020 in SS at 0338, 12030 in SS at 2144,13670 in SS at 2120 and 15370 in SS at 2305. (MacKenzie, CA) 5040 at 0413. (Padazopulos, Greece) 0240 in SS. (MacKenzie, CA) 6040 with *DX'ers Unlimited* pgm at 2352. (Montgomery, PA) 6060 in SS at 1000. (Linonis, PA) 6120 in SS at 0900, unlisted here at this time. (Montgomery, PA)

Radio Rebelde, 5025 in SS at 0235 in SS with ID and vocals. (MacKenzie, CA) 0820 in SS. (Maxant, WV)

CZECH REPUBLIC—Radio Prague, 5930 with cooking secrets at 2120. (Brossell, WI) 7345 at 0405 on Prince Charles and his visit to Prague, 7355 to Africa at 2330 with *Letter to Prague* and 9855 at 0430. (Maxant, WV)

DJIBOUTI—Radio Djibouti, 4780 in AA with HOA music heard at 0304. (Brossell, WI)

ECUADOR—HCJB Global, 11920 in PP at 2345. (MacKenzie, CA) (*site, please!—gld*)

EGYPT—Radio Cairo, 6270 with domestic music and talk on Koran. (Maxant, WI) 2049 in FF. Also 9960 in AA heard at 1914. (Brossell, WI)

ENGLAND—BBC, 7310 South Africa Relay at 0440 on how children are treated in Africa. Also, 12095 Cyprus Relay at 0352 on recent terrorist attacks. (MacKenzie, CA) 7325 in AA at 0530, 9410 and 12095 at 0536, 13610 at 1625, 15300 at 0730, 17830 at 0726 and 21470 at 1214. (Padazopulos, Greece) 9740 Singapore Relay on soccer at 1432. (Strawman, IA) 9610 via? at 0200 after Vatican goes off. IS, ID and into FF. (Linonis, PA) 9605 Singapore in Mandarin at 1330 and 11895 Thailand Relay with *World Update* at 1015. (Ng, Malaysia)

CVC, 9500 via Uzbekistan to Asia monitored at 1325 in (l) Hindi. (Brossell, WI)

UK Rocks the World, 15760 with a one-day test from an unknown site to 1552 close. Address given as ukrocksthe world@googlemail.com. (Balint, OH)

EQUATORIAL GUINEA—Radio Africa, Bata, 15190 at 1930 with EE religious talk, Radio Africa ID at 1925. (Alexander, PA)

ETHIOPIA—Radio Ethiopia (p) 5990 at 0930 in (p) Amharic with mentions of Somalia. (Linonis, PA)

Radio Fana, 6890 at *0258 with IS, Amharic talk, HOA music at 0306. Weak but readable, //6110 weak under Cuba. (Alexander, PA)

Amhara State Radio, 6090 monitored at 0314 with HOA music, talk in (p) Amharic, Fair, with Anguilla off the air. (Alexander, PA)

Voice of the Tigray Revolution, 5950 heard at *0256 with familiar IS, opening anmts and ID, (p) Tigrinya. Poor. (D'Angelo, PA)

FRANCE—Radio France Intl, 7215 with news in FF heard at 0432, 15300 and 17620 with FF commentary at 1415. Also, 15605 and 17605 at 1626 and 21780 with news at 1217. (Padazopulos, Greece) 9805 with news at 0410. (Maxant, WV) 15605 with *Crosstalk* at 1630. (Linonis, PA)

GABON—Africa Number One, 9580 in FF with ID at 2110. (Yohnicki, ON)

GERMANY—Deutsche Welle, 5905 in GG at 1045. (Linonis, PA) 5905 Portugal Relay at 0430. (Maxant, WV) 9540 Sri Lanka Relay in (l) Bengali at 1534, opening EE at 1600. (Barton, AZ) 11725 Rwanda Relay in GG at 1938 and 15375 Rwanda in (l) Hausa at 1315. (Brossell, WI) 11830 via Russia in CC at 2356, 11865 Rwanda at 2153. Also, 15640 via Cypress Creek in GG at 2250. (MacKenzie, CA) 9885 Sri Lanka with pgm *In Box* at 0030, 11770 Sri Lanka in II at 1240 and 17520 Sri Lanka in GG at 0800. (Ng, Malaysia) 13780 Sri Lanka at 1908. (Fraser, ME)

Deutschlandfunk, Berlin, (t) 6190 in GG at 1247 mentioning several German cities. (Wood, Germany)

GREECE—Voice of Greece, 9420 with US vocals at 0330. (Maxant, WV) 0421 in Greek and 15630 in Greek with folk music at 2056. (MacKenzie, CA) 9420 at 1226, 15630 at 1210 and 15650 at 1622. (Padazopulos, Greece)

RS Makedonias, 7450 in Greek at 1900. (Linonis, PA) 2015. (Brossell, WI) 9935 at 1236. (Padazopulos, Greece)

GUAM—KTWR, 11840 with religious songs heard at 0905. (Maxant, WV)

Adventist World Radio/KSDA, 9625 under Canada at 2140. (Maxant, WV) 11850 in (l) Sudanese at 2215 and 17645 in RR at 0307. (MacKenzie, CA)

GUINEA—Radio Guinee, Conakry at 2255-2353 with FF and vernacular talk. Some ham splatter. (Alexander, PA)

HUNGARY—Radio Budapest, 6150 heard at 0142–0200* with two women in HH, brief instl music at 0155, IS alternating with ID in several languages. (D'Angelo, PA)

INDIA—All India Radio, 5010-Thiruvananthapuram with talk (p) Hindi at 1250 and 7410-Delhi in Hindi at 2140. (Ng, Malaysia) 6155-Bangaluru in Urdu at 0020. (Montgomery, PA) 9445 in Hindi at 2140. (Padazopulos, Greece) 9870-Bangaluru in Hindi at 1310. (Brossell, WI) 11985-Bangaluru in (l) Kannada at 0232. (Strawman, IA)

INDONESIA—Radio Republik Indonesia, 3325-Palangkaraya (Kalimantan) with II phone-in pgm at 1245. (Ng, Malaysia) 9680-Jakarta (Jawa), in II at 1336. (Brossell, WI)

Voice of Indonesia, 9525 at 0953 in unid language with local pops. Into EE at 1000. (Alexander, PA) 1305 with *Indonesia Wonders* at 1340. (Ng, Malaysia) 1340 with EE commentary and music. (Strawman, IA)

IRAN—Islamic Republic of Iran Broadcasting, 9790 with Koran at 1308. (Brossell, WI) 11645 at 2340 with W and CC talk. (Ng, Malaysia) 11925 in RR at 0317. Off the air at 0328. (MacKenzie, CA) 15085 closing in GG at 0729. (Padazopulos, Greece) 17670 in CC at 1225. (Ng, Malaysia)

JAPAN—NHK World Radio Japan, 5960 via Canada in JJ at 0248, 9835 in JJ at 1715, 11665 in JJ closing at 2159, 11910 in JJ at 2217, 13640 in JJ at 2124, 13650 in Thai at 2310, 15265 in JJ at 2310, 17605 in JJ at 2215 and 17810 in JJ at 0259. (MacKenzie, CA) 6175 in JJ monitored at 0425 and 17690 opening at 1228. (Padazopulos, Greece)

In Times Past...

Here's your "blast from the past" for this month:

Opposition—The Voice of Unity (clandestine), 17540 on July 6, 1989, in Pashto/Dari at 0140 with transmitter believed to be in Egypt. (Dexter, WI)

Pirate Radio XXP sent Rich D'Angelo this QSL.

6195 via Bonaire in SS at 0418. (Brossell, WI) 9605-Yamata with news at 1000. (Barton, AZ) 11740 via Singapore in CC on the Japanese space agency. (Ng, Malaysia) 9825 heard at 0905 with news, 9890 at 0905 on school children in Okinawa and 11705 via Canada at 1420. (Maxant, WV) 11705 at 1400. (Linonis, PA)

LAOS—Lao National Radio, 7145 monitored at 1320 with an FF talk by W. (Ng, Malaysia)

MADAGASCAR—Radio Madagasikara, 5010 at *0253 sign on with pop, choral anthem at 0256, talk in Malagasy, religious music at 0303. (Alexander, PA)

MALI—RTV Malienne, 9635 at *0800 with FF ID and flute IS, local African music and vernacular talk at 0809. (Alexander, PA) 0830 in FF with AA-type music. (Linonis, PA)

MAURITANIA—Radio Mauritanie, 4845 monitored at 2352 with string instrument and AA talk with occasional EE, sometimes FF. Still going past 0000. (Montgomery, PA)

MEXICO—Radio Transcontinental, Mexico City, 4800 in SS heard at 0410. (Maxant, WV)

Radio Mil, Mexico City, 6010 with SS vocals at 0830. (Maxant, WV) 2106 with SS talks. (Brossell, WI)

Radio Universidad, San Luis de Potosi, 6045 at 0435 with SS talks and music. (Maxant, WV)

Candela FM, Merida, 6105 with SS pops and anmts. Weak, with deep fades in noise. (Alexander, PA)

Radio Educacion, Mexico City, 6185 with SS songs at 0417. (Brossell, WI)

MOLDOVA—Radio PMR, 6240 heard at 2320 with news in domestic language. (Maxant, WV)

MONACO—Trans World Radio, 9800 with religious sermon at 0825. (Maxant, WV)

MYANMAR—Radio Myanmar, 5915 at 1340 with an EE lesson in its minority service. (Ng, Malaysia)

NETHERLANDS—Radio Nederland, 5910 via Russia in DD at 1300. (Ng, Malaysia) 5955 in DD at 1240. Unsure of the site. (Wood, Germany) 6165 with sports in DD at 0418. (Padazopulos, Greece) 11655 (p) via Madagascar in EE to North Africa at 1820-1845. (Linonis, PA)

NEW ZEALAND—Radio New Zealand Intl, 6170 at 0822 with classical music, then old pops and a big band number. (Montgomery, PA) 9655 with EE news at 1100. (Ng, Malaysia) 9765 on insurance heard at 0930. (Linonis, PA) 0840 and 11725 at 0530. (Maxant, WV) 13730 at 0317 and 17765 at 2210. (MacKenzie, CA)

NIGER—La Voix du Sahel, Niamey, 9705 at 2115 with vernacular talk, local tribal music with flutes and vocals, Europops, Koran at 2253, short flute IS and NA, quick test tone and off at 2301. (Alexander, PA)

NIGERIA—Voice of Nigeria, 9690 with news items at 1440. (Maxant, WV)

Radio Nigeria, Kaduna, 6090 at 2135 in (p) Hausa with local tribal vocals. Good until covered by Anguilla at 2207. (Alexander, PA)

NORTH KOREA—Voice of Korea, 9335 with Burmese service at 1345. (Barton, AZ) 11735 in FF at 1140. (Ng, Malaysia) 13650 in CC at 0326, 15100 in CC at 0346 and 15180 in FF at 0336. (MacKenzie, CA)

Korean Central Broadcasting Station, 13760 in KK at 2344 with comments and martial music. (MacKenzie, CA)

NORTHERN MARIANAS—KFBS, Saipan, 11580 in CC at 1030. (Ng, Malaysia) 12090 in VV at 2243. (Brossell, WI) 2247. (MacKenzie, CA)

OPPOSITION—Voix de Djibouti, 15165, via France (?) at *1530–1630* with NA at sign on, Koran, talk in (p) Somali and later FF. Best after 1600. This is Thursdays only. (Alexander, PA)

Radio Darbanga (to Sudan), 5915 via Vatican heard at 0330–0357* with local music and vernacular talk. 13730 via Wertachtal at 1545 to 1726 close with IDs, AA talk, short local music breaks, ID jingles. Weak to threshold signal on 11500 via Madagascar. (Alexander, PA)

Denge Mesopotamia (to Iraq), 7540 via Ukraine at 2018 in (l) Kurdish. (Brossell, WI) 2053 with various vocal numbers to time pips at 2058, ID and more music until carrier was cut at 2101. (D'Angelo, PA)

Shiokaze "Sea Breeze" (to North Korea), 5910 at 1415 with W reading from a list over soft piano music to apparent close at 1430. (Barton, AZ)

Radio Voice of the People (to Zimbabwe), 9895 via Madagascar at 0405 with vernacular talk, IDs, short music breaks. In EE but difficult to understand. Also, 11610 via Madagascar at *0400 with EE and vernacular open. (Alexander, PA)

Radio Free Chosun (to North Korea), 11560 via Armenia at 1225 with W in KK talk. (Ng, Malaysia)

PAKISTAN—Radio Pakistan, 9375 at 1020 with talk by M in Nepali. (Ng, Malaysia)

PALAU—T8WH, 9965 in EE with W/M talk. (MacKenzie, CA)

PAPUA NEW GUINEA—Radio Manus (Admiralty Islands), 3315 with soft vocals through TOH and sudden close at 1312, 12 minutes late. (Barton, AZ)

PERU—Unid, 5485.5 at 0141–0203 with OA vocals, flutes and M host in SS. Off with apparent closedown anmt and no NA. (D'Angelo, PA)

Radio Victoria, Lima, 9720 at 0715 with usual emotional SS talk. Very weak, and only fair on //6020. (Alexander, PA)

PHILIPPINES—Far East Broadcasting Corp. 9435 in Indonesian at 2240 with EE Bible verses and M repeating them in II. (MacKenzie, CA) 2305 with II talk. (Ng, Malaysia) 15450 with CC talk by W at 0605. (Barton, AZ)

Radio Veritas Asia, 11730 with comments in Sinhala and choir at 0017. (MacKenzie, CA) 11850 with VV talk by W at 1035 and 11870 with M in Hindi at 1350. (Ng, Malaysia)

PIRATES—The Crystal Ship, 6876 heard at 2249–0058 close. "You are listing to the

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!

The winner this month is **Jack Linonis of Hermitage, Pennsylvania**, who will now don a Universal Radio T-shirt. Universal is the place to count on for all your radio wants—from receivers, transmitters, and transceivers, right on out to the antenna. If you're not on the company's mailing list already, contact the good folks there by emailing dx@universal-radio.com, phoning (614) 866-4267, or dropping a postcard to them at 6830 Americana Parkway, Reynoldsburg, OH 43068 to receive their big free catalog. Please mention *Pop'Comm* and the "Global Information Guide" when you do.

Paul Gager in Austria got this QSL from Polish Radio.

Crystal Ship, broadcasting to North America on 6876 MHz shortwave." Also mentioned "in glorious AM." Email to tcsshortwave@gmail.com. (Balint, OH) 2254–0055+, and 2203–2333 with "Voice of the blue states republic" slogan. (Zeller, OH) 2355. (Hassig, IL) 2332–2351. (Wood, TN) 0040–0055. (Alexander, PA) 2332–2342. (D'Angelo, PA)

Outhouse Radio, 6925 0009–0105 with IDs for "Outhouse Radio" and outhouseradio@gmail.com. Other times at 0053–0110, 0120–0221 and 0228–0304. (Balint, OH) 0100–0135 and 0210–0307. (Zeller, OH) 2230 with sudden shift to 6923 at 2249. (Hassig, IL) 0408-0425. (D'Angelo, PA)

MAC Shortwave, 6850.7 at 0024–0054 with "Ultraman" and "Paul Starr" "This is MAC" and macshortwaveradio@gmail.com. Also 6925 at 1410–1454. (Balint, OH) 6850 at 2231–2240. (Alexander, PA)

WBNY, 6925u at 2124–2223 with Ragnar, *Pirates Week* pgm, "This is the WBNY relay service." Also 6930 at 1503–1535 with lots of Commander Bunny and bunny stuff. "This is WBNY Radio—Radio Bunny the voice of free rabbits everywhere." Also noted from 2245–2311. (Balint, OH) 6925u at 2329–2330. (Alexander, PA)

Radio GaGa, 6925u at 0056–0215 mostly rock, digital SSTV at close, IDs at open and close. (Zeller, OH) 2215–2232. Closed with "This is Radio Gaga. Buenos noches." (Balint, OH)

WHYP 6925 at 0038–0110 on various Winterfest personalities; whypradio@ gmail.com. Also noted at 1812–1957. (Balint, OH) 0110 with new age/new wave things. (Hassig, IL) 6955 at 2333. (Bates, NY)

Voice of Next Thursday, 6925.5 at 2104–2151 rock and folk, mention of Bunny News Network, mentions of Winterfest. (Zeller, OH) 6950u at 2136–2145 relayed by WBNY. (Alexander, PA)

WEAK Radio, 6940 at 2210–0203 with varied numbers and skits. "You are listening to WEAK Radio," This is WEAK, Weak Radio" and "We are going crazy at Weak Radio." weakradio@gmail.com. (Balint, OH) 2050–2105. (Alexander, PA)

Radio Ronin, 6925 at 2340, 0018 with ID as "This is Radio Ronin, coming to you via the planetary ionosphere" and "This is Radio Ronin Shortwave." radioroninshortwave@gmail.com. (Balint, OH) 2145–2150 and 6950.7 at 2145–2200. (Alexander, PA)

WLDJ, with host Crystal ?? with IS and "You've found your way, you've got the frequency right, where I can relax and play, you are tuned to WLDJ, the Voice of the last DJ." Slow scan TV at 2339. (Balint, OH) 6930u monitored at 2155–2214 with woman ancr. (Alexander, PA) 6935u at *2332–0007 with multiple IDs, rock. (Zeller, OH) 6950u at 0140–0146* with W ancr, off with SSTV transmission. (Alexander, PA)

Wolverine Radio, 6925u monitored at 0138–0410 with big band/swing and vocals. SSTV monitored at 0330–0333. (Balint, OH) 0112 with W doing blues. (Hassig, IL) 6950u with variety of rock. (Alexander, PA)

Captain Morgan, 6923.8 at 2220–2244 with blues, possible close at 2244. ID as "Captain Morgan Shortwave." (Balint, OH) 0215 with blues. Email as captainmorganshortwave@gmail.com. (Hassig, IL) 6975.4 at 2048–2257. (Zeller, OH)

Voice of the Robots, 6925u monitored at 0007–0018. Lots of IDs. Email as voiceoftherobots@gmail.com. (Balint, OH) 2155–0018 with rock and IDs. (Zeller, OH)

Radio Free Mars, 6924.2u at 0051–0120 with Elton John, Dylan-type things, numerous IDs for "Radio Free Mars." Off at 0120. (Balint, OH) 0055 with DJ calling himself Mitchell, some news from "Animal Liberation Front." Off at 0119 with "Rocket Man." (Thomas, FL)

Radio Mushroom, 6925u 0040–0052* with oldies pops and email address. (Alexander, PA) *2345–0009* with rock oldies, said the station is powered by a nuclear reactor. Email: radiomushroom@gmail.com. (Zeller, OH)

Family Friendly Radio, 6940u heard at 0045–0134 with spoof of WYFR with host "Hal, your pal, Hal buddy, all about the "Book of Jay" and other comments, including a plea for money at 0134 close. (Balint, OH)

Radio Jamba International, 6925 monitored at 2341–0027 with and April fools pirate bust, lots of commentary by Kraker, numerous rock things, many IDs. (Balint, OH)

XXP, 6925u at 0020 with hard rock. (Hassig, IL) 0021–0044* with classic rock, radiostationxxp@gmail.com for reports saying they have a new QSL available. (Zeller, OH)

Magnetar Radio, 6930u at 0040–0050 with odd techno-electronic things and IDs. (Alexander, PA)

Radio Romana, 6932.5 monitored at 0205–0224 with rock-pop, "Radio Romana just for you...pop songs from all over the world." (Balint, OH)

Radio Peek-a-Chew, 6925u at *2313–2317 with a couple of rock things. ID is phonetic and the spelling is approximate. (Zeller, OH)

Thinking Man Radio, 6925u heard at 0042–0108 with pop/rock; thinkingman radio@gmail.com. (Hassig, IL)

Northwoods Radio, 6925 monitored at 2340–2350 with rock and IDs. (Alexander, PA)

Radio Amica (Euro), 7610 at 2325–2340 with Europop dance and ID anmts in Italian. (Alexander, PA)

POLAND—Polish Radio, 11675 via Austria in EE at 1345 with *Studio 15* pgm, //11860 via Wooferton. (Fraser, ME)

PORTUGAL—RDP Intl, 7360 with commentary in PP at 0535. Also, 21655 with vocals at 1650. (Padazopulos, Greece)

ROMANIA—Radio Romania International, 5955 with news in Romanian at 0415, 7350 in Romanian at 0435. (Padazopulos, Greece) 7310 on travel in Romania at 0410. (Maxant, WV) 9755 in SS at 2130 15340 with *Inside Romania* at 0305 (Ng, Malaysia) 15205 with letters pgm at 1223. (Wood, TN)

RUSSIA—Voice of Russia, 6240 via Moldova with operatic music at 0420, 7295-Novosibirsk in Mandarin at 1300 and 9900 in (l) Pashto at 1325. (Brossell, WI) 7250 with *Music and Musicians* at 0040. (Fraser, ME) 2335 on energy from Siberia. (Maxant, WV) 9665 via Moldova at 0346, 9890 via Tajikistan at 2208 and 15425-Petropavlovsk at 0327. (MacKenzie, CA) 9665 via Moldova at 0223 with *News and Views* pgm. (D'Angelo, PA) 9890 in EE at 2317. (Montgomery, PA) 15170 on Russian foods at 1020 and 15585-Vladivostok at 0320. (Ng, Malaysia) 15565 and 17575 in RR at 1220. (Padazopulos, Greece)

Yakutsk Radio, 7200 with Radio Rossi programming at 0405. (Brossell, WI)

Murmansk Radio, 5930 in RR at 1320. (Brossell, WI)

Radio Rossii, 12070 in RR at 0412. (MacKenzie, CA)

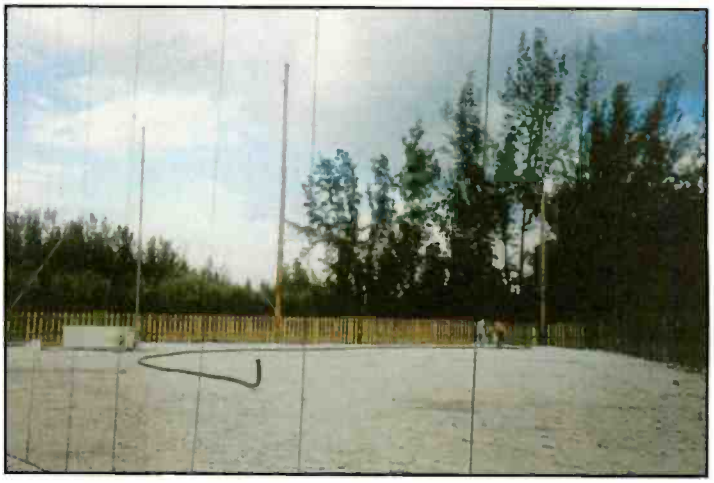
SAO TOME—Voice of America Relay, Pinheira, 4960 at 0419 with *On the Line* financial pgm. (Wood, TN) 9780 at 2030 and 11975 with Afropops at 2002. (Brossell, WI)

SAUDI ARABIA—Broadcasting Service of the Kingdom, 15380 in AA at 1313. (Brossell, WI)

SOLOMON ISLANDS—Solomon Islands Broadcasting Corp., 5020 at 1140. (Maxant, WV)

SLOVAKIA—Radio Slovakia Intl, 7345-Rimavaska-Sobota at

Doug Brown received this QSL marking Radio Moscow's 70th year.



The "south" antenna at WRMI. (Thanks Charles Maxant)

1940 on the economic crisis. (Fraser, ME) 2000 with talks in Slovak with Tunisia in AA underneath. (Brossell, WI)

SOUTH AFRICA—Channel Africa, 7230-Meyerton with African headlines at 0408. (Brossell, WI) 0420 on Mandela's failing health. (Maxant, WV) 5235 with *African Digest* at 1745. (Fraser, ME)

Radio Sondergrense, 3320-Meyerton in Afrikaans at 0338. (Brossell, WI)

SOUTH KOREA—KBS World Radio, 9650 at 1200 on joint SK-US military exercises. (Linonis, PA)

SPAIN—Radio Exterior de Espana, 6125 in SS at 0417, 11895 and 12035 in SS at 0540 and 15585, 17595, 21450, 21570 and 21610 in SS at 1410. (Padazopulos, Greece) 9620 in SS at 0315, 9765 in SS at 2220, 15110 in SS at 2115 and 17850 in SS at 2042. (MacKenzie, CA) 9665 with news at 1913. (Fraser, ME) 9765 at 2130 with futbol in SS. (Barton, AZ)

SUDAN—Miraya FM, 15710 via Slovakia at 1428 to 1645 with AA talk jingles, some local music, and EE news at 1631. (Alexander, PA)

SURINAME—Radio Apinte, Paramaribo, 4990 heard at 0429 with pops, some in EE. (Wood, TN)

SWAZILAND—TWR, Manzini, 3200 at 0305 with long religious talk in (p) Ndebele, seemingly gone at 0326, either off early or lost in noise. 3240 at 0316 in (p) Shona. Opened pgm in (l) Ndau at 0325. (D'Angelo, PA) 3200//3240 at 0301 in (p) Hausa. (Brossell, WI) 4775 at 0358 with EE/GG ID, a couple of minutes of dead air, f/by GG music. (Wood, TN)

SWEDEN—Radio Sweden, 6010 via Canada on royal palace in Stockholm. Also 7245 on weapons sold to the armed services. (Maxant, WV) 15735 with news at 1330. (Ng, Malaysia)

SYRIA—Radio Damascus, 9330 at *2101 with NA, opening EE ID, local music, news at 2107. As usual, poor with weak audio. 12085 unheard. (Alexander, PA) 2140 with *Syria Today* (Ng, Malaysia) 12085 at 2120 with AA vocals, low modulation. (Maxant, WV) 2125 with M and EE talk features, music fanfare and local vocals. Fair with //9330 poor. (D'Angelo, PA)

TAIWAN—Radio Taiwan Intl, 5950 via Okeechobee at 0243, //9680. (MacKenzie, CA) 0355 on bees. (Maxant, WV) 11625 in II at 1235. (Ng, Malaysia) 15190 via Florida in SS at 2314. (MacKenzie, CA)

Sound of Hope, 7280 in CC at 1257. Off at 1300. (Brossell, WI)

THAILAND—Radio Thailand 7365 in JJ monitored at 1302. (Brossell, WI) 9575 at 1401 in EE with presumed news. Faded to nothing by 1429. (Strawman, IA) 9680 at 2030 with gongs. EE opening and news at 2031. Also 15275 at 0007 with EE news but barely audible by 0030 when they switched to WCNA beam. (Alexander, PA)

TUNISIA—RT Tunisienne, 7275 in AA monitored at 0410. (Brossell, WI) 0445. (MacKenzie, CA)

TURKEY—Voice of Turkey, 6020 via Canada with news items at 0415 and 9610 with news items at 2135. (Maxant, WV) 6040 with press review at 0412. (Brossell, WI)

Reader Survey Questions—August 2010

This month, we'd like to ask about your more "sentimental" leanings toward the hobby. Please use the Reader Survey Card and circle all appropriate numbers. We'll pick one respondent at random for a free one-year subscription, or extension, to *Pop'Comm*, so don't forget your address. Thanks for participating.

How important is the nostalgic aspect of radio for you?

Very important, it makes me misty-eyed 1
I find it quite interesting and informative 2
I'll give the historical pieces a quick read 3
Not for me, I'm all about the cutting edge 4

What specific historical topics interest you?

Station histories 5
Stories about radio personalities 6
Programming of yesteryear 7
Vintage gear 8
History of technological developments 9
As records of major events 10

April Survey Highlights

Our April survey concerning pirate radio listening habits drew a big response from readers, many of whom were inspired to write their fervent opinions where they could fit them on the reply card (which we heartily encourage). Fifty-three percent of respondents said they are either extremely or quite interested in pirate broadcasts; 29 percent expressed some interest; and 20 percent just aren't tuning in. Interestingly, close to a third said that they're more interested in pirate radio than they used to be—perhaps a result of all the publicity lately (no such thing as bad press). A large majority (over 70 percent) seek the bad boys out on shortwave, while AM, FM, and the Internet each constituted about 10 percent of our pirate stalkers' territory. About half those tuning listen for a bit and then move on; the rest take some action (recording, requesting a QSL, and sending a log garnered between 12 and 20 percent of the responses). But it will gladden the hearts of the broadcasters who would flout FCC regulations to know that only .08 percent are reporting them. Fewer still wanted them hanged.

The winner of a free subscription or extension to *Pop'Comm* for sending in a response that month is **Jim Fritz of Walworth, Wisconsin**. Congratulations, Jim!

Swedish Telecom operates moribund Radio Sweden; these are mediumwave towers at Solvesborg.

UGANDA—UBC Radio, 4976 with group vocals and brief anmts at 0239. (Brossell, WI) 0315 with vocals and drums. (Maxant, WV) 0332 with continuous soft pop vocals, ID by M at 0401 f/by W with news. (D'Angelo, PA)

UKRAINE—Radio Ukraine Intl, 7440 at 0255 with ID and into news. (Maxant, WV) 0335 with vocals, M with comments and into EE at 0400. (MacKenzie, CA)

UNITED STATES—Voice of America, 6040 Philippines Relay in CC at 1252. (Brossell, WI) 6080 via Ascension on human rights at 0320. (Maxant, WV) 9365 Kuwait Relay with pops and "VOA" mentions. (Barton, AZ) 9760 Philippines at 1350 with *Jazz America*. (Strawman, IA) 11805 in II at 2212, 13755 Thailand Relay in Special English at 2342, 15145 Philippines at 2318, and 17765 Philippines in CC at 0255. (MacKenzie, CA) 13579 at 1542, 15130 in Kurdish at 1418 and 15330 with sports at 1424. (Padazopulos, Greece)

Radio Free Asia, 7495 Northern Marianas in (l) Mandarin at 2103. (Brossell, WI) 9540 Northern Marianas in CC at 1703, 11980 via Irkutsk in CC at 0312, 13740 Tinian (NM), in Khmer at 2336, 15550 Northern Marianas in CC at 2330 and 17615 Saipan (NM) at 0312 in CC. (Mackenzie, CA) 11500 Northern Marianas at 1524 (*language?—gld*) and 11590 Kuwait in Tibetan at 1354. (Yohnicki, ON)

Radio Sawa, Botswana Relay 9745 in AA at 1924. (Brossell, WI)

Radio Farda, 7280 in Farsi at 0433 and 13580 in Farsi at 1422. (Padazopulos, Greece) (*sites?—gld*) 7520 Sri Lanka Relay in Farsi at 2105. (Brossell, WI)

Radio Liberty, 15285 Thailand Relay in RR at 0750. (Ng, Malaysia)

Radio Marti, 5980 in SS to Cuba at 1100. (Linonis, PA) 6030 in SS at 0519. (Padazopulos, Greece)

Radio Free Europe, 15470 Thailand Relay in RR at 0323. (MacKenzie, CA)

Radio Free Afghanistan, 9990 Sri Lanka Relay in (l) Pashto at 1314. (Brossell, WI)

AFRTS, 12155.5u Key West, at 0333 with coverage of NBA games. (MacKenzie, CA)

Family Radio/WYFR, 5995 via Petropavlovsk-Kamchatka with Bible readings at 1249, 6240 via Moldova in FF at 2048, 7560 via Kazakhstan in (l) Burmese at 1317. (Brossell, WI)

TWR, 6105 via Nauen from *0658 with IS, opening EE pgm and into pgm called *Rendezvous*. (D'Angelo, PA) 9510 via Novosibirsk in (l) Hindi at 1327. (Brossell, WI)

Adventist World Radio, 11750 via South Africa with hymns heard at 1940 and 11845 in (l) Yoruba at 2040. (Brossell, WI)

WTJC, North Carolina, 9370 at 2241. (Mackenzie, CA)

WINB, Pennsylvania, 9265 at 2158. (MacKenzie, CA)

WRNO, Louisiana, 7505 heard at 0332. (MacKenzie, CA) 0345. (Maxant, WV)

WTWW, Tennessee, 5080 heard at 0006. (D'Angelo, PA) 5755 at 0250. (Maxant, WV)

WJHR, Florida, 15550u at 2025. (Alexander, PA)

WWCR, Tennessee, 5890 at 0247, 5935 at 0252, 7465 at 2313, 9350 at 2250 and 9980 at 2200. (MacKenzie, CA) 5890 heard at 0423. (Wood, TN)

WEWN, Alabama, 11520 at 0505 and 13835 heard at 1410. (Maxant, WV)

VATICAN CITY—Vatican Radio, 5885 in PP at 2115 and 7305 at 0255. (Maxant, WV) 6185 in Romanian at 0526 and 7335 in Romanian at 0434. (Padazopulos, Greece) 7365 with *African News Panorama*. (Brossell, WI) 9610 in SS at 0145. (Linonis, PA) 9645 at 1245. (Wood, TN) 9660 at 0310. (MacKenzie, CA) 13765 at 1745. (Fraser, ME)

VENEZUELA—Radio Nacional, 6150 in SS at 0845. (Maxant, WV) 11670 in SS at 2201, 15250 in SS at 2312, 13680 in SS at 2259 and 17705 in SS at 2050. (MacKenzie, CA)

VIETNAM—Voice of Vietnam, 6175 via Canada at 0245 on training doctors there. (Maxant, WV)

And that does it for this time. Thanks and high-fives to all who contributed this month: Joe Wood, Greenback, TN; Robert Montgomery, Levittown, PA; Peter Ng, Johor Bahru, Malaysia; Stewart Mackenzie, Huntington Beach, CA; William Hassig, Mt. Pleasant, IL; Fotos Padazopulos, Athens, Greece; Brian Alexander, Mechanicsburg, PA; Rich D'Angelo, Wyomissing, PA; Dave Balint, Wooster, OH; Michael Thomas, Jacksonville, FL; Rick Barton, Phoenix, AZ; George Zeller, Cleveland, OH; Charles Maxant, Hinton, WV; Robert Brossell, Pewaukee, WI; Michael Yohnicki, London, ON; Jerry Strawman, Des Moines, IA; Robert Fraser, Belfast, ME; David Baltes, Buffalo, NY; and Jack Linonis, Hermitage, PA. Thanks to each of you!

Until next month, good listening!

AR-ALPHA

Professional Grade Communications Receiver

With New I/Q Control Software!

AOR proudly presents the AR-ALPHA, the first in a new class of professional monitoring receivers! Designed to cover 10KHz to 3.3GHz continuous, with no interruptions, this receiver features sophisticated I/Q control software that enables it to perform unattended datalogging for extended periods. It boasts a 6-inch color TFT display, five VFOs, 2000 alphanumeric memories that can be computer programmed as 40 banks of 50 channels, 40 search banks, a "select memory" bank of 100 frequencies, and a user designated priority channel. It also includes APCO-25 digital capability and a DVR with six channels that can record up to a total of 52 minutes of audio. Monitoring professionals will appreciate the world class engineering and attention to detail that makes the AR-ALPHA such an amazing instrument.*

- Multi-mode unit capable of rece ving AM (synchronous), ISB, RZ-SSB, USB, LSB, CW, WFM including FM stereo, NFM, APCO-25 digital, and TV in both NTSC and PAL formats
- Up to 1MHz of bandwidth can be recorded for later playback and review
- 6-inch TFT color panel can display received video signals or depict spectrum activity over a wide choice of bandwidths including a "waterfall" function to show signal activity over a specified time period
- Composite video output on the rear panel of the unit
- Selectable IF bandwidths:200 Hz, 500 Hz, 1 KHz, 3 KHz, 6 KHz, 15 KHz, 30 KHz, 100 KHz, 200 KHz and 300 KHz along with the ability to shift the IF
- CTCSS and DCS selectable squelch functions; DTMF tone decode
- Built-in voice-inversion descrambling**
- CW pitch control, AGC, AFC
- Auto-notch feature
- User selectable spectrum display function from 250 KHz through 10 MHz in 1 KHz increments. Above 10 MHz bandwidth, it can display 20 MHz, 50 MHz, 100 MHz or 1 GHz, but above 20 MHz bandwidth, no audio will be available
- Resolution bandwidth is also user-selectable in increments of 1 KHz, 4 KHz, 32 KHz, 64 KHz, and 128 KHz
- Fast Fourier Transform (FFT)
- Rear panel connections include 12 VDC power, RS-232C, USB 2.0, I/Q output with 1 MHz bandwidth, two antenna ports (one SO-239 and one Type N) and up to four antennas may be selected through the receiver's controls with the optional AS5000 antenna relay selector
- Use desktop or with 19" rack mount

The AR-ALPHA redefines excellence in professional monitoring receivers. No wonder so many monitoring professionals including government, newsrooms, laboratories, military users and more, rely on AOR.

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Authority On Radio Communications

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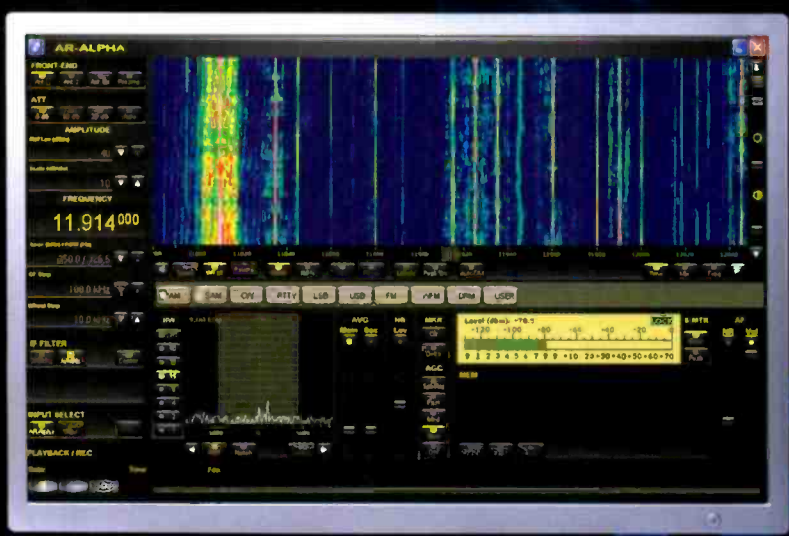
Specifications subject to change without notice or obligation.
*Documentation required for qualified purchasers in the USA.
**Not available on US consumer version.*

Advanced AR-IQ Software Allows High Speed I/Q Recording Up to 1MHz Bandwidth!

Signal searching is easy with playback capabilities through a PC

*AOR has brought a new level of receiver control to the AR-ALPHA with the addition of AR-IQ software. This free software enables the AR-ALPHA to store and playback a full 1MHz of bandwidth activity without any loss of quality. Raw data can be easily transferred from the AR-ALPHA to the hard drive of almost any computer*** for later analysis and review. It is even possible to listen to a frequency off-line by recording data and storing it on a PC. Operators can also create loops to cover a particular time frame so that no signal is missed. Signal bursts are easily seen with the full color waterfall display function.*



PC screen displays waterfall function to capture signal bursts

Using the control panel of the AR-ALPHA through a PC monitor, operators are able to enjoy added capabilities. You can perform unattended datalogging for extended periods of time depending on storage capacity. So, for hours, days or even weeks, you can capture up to 1MHz bandwidth between 10kHz and 3.3 GHz for later playback and analysis. You can even listen repeatedly to a loop in time to decode a transmission received in difficult conditions.

AR-IQ software can be uploaded to multiple PCs so that you can transfer data from a PC connected to the AR-ALPHA over to another PC for playback and review.

- Up to 1MHz bandwidth can be recorded for later evaluation
- High recovered audio quality with no deterioration of recorded data
- Can be used to perform unattended datalogging
- Spectrum display, full color waterfall and averaging functions support signal evaluation and analysis
- Easy to use. No training required.

The AR-ALPHA with AR-IQ software sets a new standard for professional grade multimode monitoring receivers! To order, contact your AOR dealer today.

****AR-IQ software can be used with any dual core class PC operating Windows® XP or Vista with 2.GHz CPU and 1GB RAM.*

Reasons For Keeping That Older Scanner

by Ken Reiss
radioken@earthlink.net

"Not only does having an extra radio sitting on your desk allow you to do some pretty amazing things, these days it's becoming almost necessary to hang onto an older radio for the extra capabilities."

A frequent topic in the emails and letters I get from readers concerns what to do with an older radio when they're getting ready to upgrade to a new one. The best answer may not be as cut and dry as it seems.

If you've got some gear you figure you no longer need, you can of course sell it as used, but the market for older scanners isn't what it once was, and often there isn't a ready buyer. If you can find someone offering a reasonable amount for your older radio, you might want to part with it. The money from that older radio can help defray the cost of the new one—or at least convince your significant other that what you're doing isn't as expensive as it seems. As I mentioned, however, the used market ain't what it used to be...

Electronics in general, and radios in particular, could hardly be recommended as "solid investments," and they don't hold their value well. A recent search on eBay for scanners for sale showed some good deals for people in the market to buy. Very few listed for over $100, and there was pretty much nothing over $200. The exception was for some of the more recent trunktrackers and digital scanners, which were listed for very near the retail price. I found one group of three handhelds that went for $39 (that's $39 for about $500 worth of scanners—ouch!).

Of course, my brief survey doesn't take into account how old these receivers are or what condition they're in. I'm sure that's all over the board, so "buyer beware" if you decide to acquire someone else's older radio via eBay (or anywhere else).

An Alternative Approach

So if selling your extra rig is not the answer, what is? Well, I bet with a little thought, you'd be able to find a new use for that older scanner yourself, giving you an excuse...um...reason to hang onto it. Most people who have shacks brimming with multiple radios didn't acquire them all at once, but rather kept the old ones as they added new equipment. Perhaps it's time for you to start your own collection.

Not only does having an extra radio sitting on your desk allow you to do some pretty amazing things, these days it's becoming almost necessary to hang onto an older radio for the extra capabil-

This Bearcat programmable was one of the first with enough channels to offer serious banks. Ten channels per bank and five banks gave you a 50-channel scanner that didn't need crystals! Considering crystals were about $6 each, that was a huge deal when it came out. Think about trying to fill up a 500-channel radio with crystals today.

ities. A good example of the type of radio you'd want to keep is a trunktracker. If you live near a trunking system that those radios can follow, you'll want to keep one, regardless of what other equipment you have or intend to get.

Trunking will tie up a scanner pretty well. Trunked radio operators seem to think that since they have unlimited channel capacity (or nearly so) that they should use as many as possible and create special channels for things that simply didn't have them before (like a car-to-car gabbing channel for road crews or one specifically for supervisors). Extra channels can mean more things you need to track in order to keep up with what's happening, and while your scanner is outside the trunked system checking other things, you're missing all the action. Having a dedicated trunker is a great solution.

Spreading Out

Most radio enthusiasts I know tend to collect all their equipment in one room (sometimes by choice, sometimes to maintain domestic tranquility). That works well as you start to acquire multiple radios because you can listen to them all at once, but at some point you might want to spread out a bit, too.

When activity breaks out, having a scanner at the ready where you are at a given moment is a lot better than having to dash into another room when you hear sirens wailing. You'll catch more and save yourself the frustration of missing out on the action. Put an older radio in another room where you often spend time, or if it's handheld, keep it as a portable for anywhere around the house when you're doing other things.

You could also dedicate one to the car if that's legal in your area. Be sure to check local laws for the areas you travel in, as there are many states that have some restrictions. Some of those same states have exemptions for licensed ham operators, while some only exempt the actual ham radios. But if it's permitted, having a dedicated scanner in the car is a great way to pass the time while sitting in traffic.

If you do put one in the car, give some extra thought as to what to program into it. You may not want to listen to the same groupings of channels when you're on the road as you do at home. You may not even care about listening to the same agencies, depending on where your travels take you.

There's no such thing as too many radios. Even if you just use it for some specialized task, like listening to aircraft or weather emergencies, a spare radio is a great thing to have.

Loaners

Sometimes people hang on to an extra radio to use as a loaner. Particularly if you're involved in other types of radio or in a local radio club, you might find this useful—plus it can be a good way to promote the hobby. Beginners are often reluctant to jump in with both feet until they've had some experience with an actual radio. Being able to lend a friend or new acquaintance a pre-programmed scanner that's ready to go is a big plus to people just getting started. Just be careful about whose hands you place your scanner in, or you may never see it again if someone *really* gets hooked.

More Banks

Another big reason to have an extra radio—or two or three—around is the availability of more banks. As you continue monitoring, you'll start to find groups of channels that make sense to you, things that just go together. For instance, you might want to monitor both the local precinct dispatch channel and the car-to-car channel any time you're listening in a given area. If it's local and of interest for that reason, you might also want the local fire, point-to-point channels, and any other things you want to have on all the time to stay informed.

There may be other times when you *don't* want to hear local channels. If something's happening in the next precinct or town, the local chatter may be distracting. Putting things together into logical banks can help you sort it all out

Mystery Antenna

In April's column, I commented that I wasn't sure what the "mystery antenna" was on the right side of the tower shown in the photo on page 32 (reproduced here). Many of you sent in and informed me that it was an FM broadcast antenna and I thank you for that information. I'm not quite sure how I've missed those all these years, but I have. One of the most detailed explanations came from Rick Callebs of Wellston, Ohio. Rick provided the following information:

What you are looking at is a circularly polarized FM broadcast station antenna. They are actually very common, because they (in theory) transmit a signal in both horizontal and vertical polarization. This reduces multi-path and "picket fencing" radio reception and gives a better signal to clock radios and small portable radios that may not have a vertically oriented antenna.

Back in the beginning of FM broadcast radio, stations used horizontal polarization almost exclusively, like television stations do. But the introduction of FM radios in automobiles and the telescoping whip antenna used on cars back in the day created the need for circular polarization.

Those funny-looking antennas earned the nickname "rototillers" in broadcast engineering lingo. The ERI Company trademarked that name for a broadcast antenna product line. Here is a link for more info about that antenna: http://www.eriinc.com/pubs/20090405001_AEN01w.pdf

Rick, we appreciate your taking the time to write in and explain. Many thanks.

efficiently. Banks can be switched off on most scanners with the push of one or two buttons, so it's quick and easy to reach over and turn off the local stuff or the next town over when it starts to interfere with something else. Keeping extra radios gives you the extra banks for storing those "not very often" frequencies that you enjoy occasionally but simply don't have room for in your main radio.

The down side of grouping channels into banks for this purpose is that you're quite likely to have some banks that aren't quite full, while others may contain duplicate information. It takes a little while to get your banks organized into groups that really work, but the results can be well worth the effort. (Speaking of organizing, some possible ways to group things are listed in the sidebar below.)

If you don't have any interest in what the highway department is doing, you won't want to include them in your lineup, obviously. But what about during a hurricane? All of a sudden those boring highway department guys become very interesting. A bank in an extra radio set up for severe weather events might be just the ticket. I like to have a bank in at least one handheld that's always set up for weather-related traffic (including the local SKYWARN repeater and National Weather Service—locked out, of course) as my area is subject to both winter storms and spring/fall thunderstorms.

Trunked Banks

If you have a trunking system, you may have an additional complication, however. Most scanners store the trunking system in its own bank of channels. Once the trunking system is activated, that takes priority while the radio is decoding the trunked messages. You probably have the ability to store trunking IDs (the trunked systems' equivalent of channels) for later listening, and those likely have groups or banks of channels. Here again, you'll want to organize those groups of favorite IDs into banks that make sense. Depending on the radio, you may

Bank Suggestions For Your Extra Scanner

Service
Police
Fire
Medical
Media
Aviation
Military
Ham
Business
Malls
Casinos
Unknown or Experimental
Schools
Railroads
Busses/Taxis
Time stuff
Mutual Aid/Shared Frequencies
Maritime, Lake, River

Geographic
City
County
Local
North, South, East, West
Out of State
Your City
Neighboring City
Precinct or District

Special Banks
Airport Problems
Parade/Fair
Rail Accident
Major Vehicle Accident
River/Lake/Ocean Incident
Industrial Incident
VIP Visit
Jail or Prison Incident
Major Media Event
Sports Event
Severe Weather
Natural Disaster
Major Fire
Riot or Other Civil Disturbance
Concert or Theatre Event

This handheld ham transceiver also can be used as a receiver for the public safety frequencies. Unfortunately, they don't make great scanners, but it does make an excellent second receiver if you're already a ham or thinking of getting licensed.

A base receiver can be put anywhere in the house. Most can receive local traffic quite well with just a built-in antenna.

not have as many groups of IDs available, so you may have to get creative.

Having an extra radio around to listen to the trunked system while you listen to other things on the older radio is a real help. If you happen to have a second trunk-tracker, you can use it to enter the same system and have extra ID channel groups for listening when things are happening.

Set Up A Travel Or Other Special-Purpose Radio

If you frequently travel, especially to the same area repeatedly, an extra radio set up for trips makes a lot of sense. That way you can leave your regular scanner alone and programmed for home use, while the extra one is ready and waiting for your next trip. Business travelers find this a real timesaving convenience.

You may also be interested in certain events for which a dedicated scanner would be perfect. If you're a NASCAR fan, you probably already have a fair portion of your radio dedicated to racing frequencies. How about dedicating a radio to the races so each group has its own bank and be switched in and out as desired?

There are myriad other reasons you might want a dedicated scanner. For instance, here in St. Louis, the local airport used to have an observation lot off the end of the two main runways. I really enjoyed spending time there watching the planes, and I set up a dedicated handheld to monitor the air traffic channels. I had banks for ground, tower, approach and departure, and depending on which runway was in use, I could quickly focus on what was of interest.

"What If...?"

You can also play some fun and productive "what if" games with your extra banks, and you may want to dedicate a scanner to just such experimentation.

What would happen, for instance, if a major accident occurred on a nearby highway? What agencies might be involved that would use the radio? Police, fire, and emergency medical services are a given for an accident. There might also be some traffic on point-to-point channels if a highway patrol or local sheriff has jurisdiction, or it may come down to who has a car closer to the scene.

If the accident involved a truck carrying cargo, there might be other agencies needed for the cleanup. Depending on what was spilled, it could be very interesting if you can hit the right channels.

You can play this kind of "what if" planning for almost any kind of event you can think of. Hopefully, you'll never get the chance to test most of them out, but it's a good mental exercise just the same and can really help you better enjoy the hobby by giving some insight into the local operation of various agencies. What if the President came to town? What if there were a mass transit accident? Are there things in your neighborhood that might cause an industrial or hazardous incident? You might be surprised if you start looking around!

By hanging onto that trusty older scanner dedicated to the purpose, it's that much easier to look—and it's much less likely you'll be saying "what if" about a missed transmission.

Frequency Of The Month

Each month we ask our readers to let us know what they're hearing on our "Frequency Of The Month." Give it a listen and report your findings to me here at "ScanTech." We'll pick a name at random from the entries we receive and give that lucky winner a free one-year subscription, or extension, to *Pop'Comm*. Remember to include your address in case it's your name that's drawn! Good luck!

Our frequency this month is **456.550**. Check it out and see what you hear, or don't. Let me know and we'll enter your name into the monthly drawing. Send your entries, as well as suggestions and questions, to radioken@earthlink.net or via more traditional methods to Ken Reiss, 9051 Watson Rd. #309, St. Louis, MO 63126. Please note frequency of the month entries with the frequency on the envelope or subject line for correct routing. And don't forget that address!

Our most recent winner is **Mike Wilkinson** of **Mineral Ridge, Ohio**, who wrote: "On 158.725 I am hearing Youngstown, Ohio Police. They are on 158.730 MHz. The frequency is bleeding over."

Thanks for sending that in and enjoy the subscription, Mike.

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
0000	9640	Radio Canada International	SS
0000	6155	All India Radio	
0000	11730	Radio Veritas Asia, Philippines	Sinala
0000	15275	Radio Thailand	
0000	5080	WTWW, Tennessee	
0100	11780	Radio Nacional Amazonas, Brazil	PP
0100	11750	Voz Missionaria, Brazil	PP
0100	5040	Radio Havana Cuba	SS
0130	6150	Radio Budapest, Hungary	HH
0130	9610	Vatican Radio	SS
0200	4950	Radio Nacional, Angola	PP
0200	5025	Radio Rebelde, Cuba	SS
0200	6035	La Voz del Guaviare, Colombia	SS
0200	9690	China Radio International, via Spain	
0200	9610	BBC, England	FF
0200	5960	Radio Japan, via Canada	JJ
0200	13730	Radio New Zealand International	
0200	9665	Voice of Russia, via Moldova	
0200	6175	Voice of Vietnam, via Canada	
0230	6130	Radio Tirana, Albania	
0230	6010	Radio Sweden International, via Canada	
0300	7400	Radio Bulgaria	
0300	5045	Radio Cultura do Para, Brazil	PP
0300	7345	Voice of Croatia, via Germany	
0300	6070	CFRX, Canada	
0300	6010	La Voz de tu Concencia, Colombia	SS
0300	6090	Amhara State Radio, Ethiopia	Amharic
0300	4780	Radio Djibouti	AA
0300	11925	Islamic Republic of Iran Broadcasting	RR
0300	5010	Radio Madagasikara, Madagascar	Malagasy
0300	13650	Voice of Korea, North Korea	AA
0300	15180	Voice of Korea, North Korea	SS
0300	15425	Voice of Russia	
0300	15340	Radio Romania International	
0300	3240	TWR, Swaziland	vern
0300	3320	Radio Sondergrense, South Africa	Afrikaans
0300	5950	Radio Taiwan International, via Florida	
0300	17615	Radio Free Asia, Saipan Relay	CC
0300	15470	Radio Free Europe, Thailand Relay	RR
0300	4976	UBC Radio, Uganda	
0300	7440	Radio Ukraine International	
0300	7505	WRNO, Louisiana	
0300	12133	AFRTS, Florida	usb
0330	9790	China Radio International, via Cuba	
0330	4775	TWR, Swaziland	GG
0400	4885	Radio Clube do Para, Brazil	PP
0400	3915	Radio Nacional Macapa, Brazil	PP
0400	6200	Radio Bulgaria	BB
0400	6190	China Radio International, via Cuba	
0400	7345	Radio Prague, Czech Republic	
0400	6165	Radio Nationale Tchadienne, Chad	FF
0400	6120	Radio Havana Cuba	
0400	7310	BBC, South Africa Relay	
0400	9410	BBC, England	
0400	7215	Radio France International	FF
0400	9805	Radio France International	
0400	9420	Voice of Greece	Greek
0400	6195	Radio Japan, via Bonaire	SS
0400	6165	Radio Nederland, via Bonaire	DD
0400	6240	Voice of Russia, via Moldova	
0400	7310	Voice of Russia	
0400	12070	Radio Romania International	RR
0400	7230	Channel Africa, South Africa	
0400	6125	Radio Exterior de Espana, Spain	SS
0400	4990	Radio Apinte, Suriname	DD
0400	4960	VOA Relay, Sao Tome	
0400	7275	RT Tunisienne, Tunisia	AA
0400	6010	Voice of Turkey, via Canada	
0400	6040	Voice of Turkey	
0400	11610	Radio Voice of the People (to Zimbabwe)	EE/vern
0405	7200	Radio Rossii, Russia	RR
0430	7355	Vatican Radio	Romanian
0500	9660	Radio Australia	
0500	7325	BBC, England	AA
0500	12095	BBC, England	
0500	6185	Radio Educacion, Mexico	SS
0500	6030	Radio Marti, USA	SS
0700	7125	Radio Guinee, Guinea	FF
0700	6105	Candella FM, Mexico	SS
0700	9720	Radio Victoria, Peru	SS
0700	6105	TWR, England, via Germany	
0800	9800	TWR, Monaco	
0800	9635	RTV du Mali	FF

UTC	Freq.	Station/Country	Notes
0800	9765	Radio New Zealand International	
0800	6170	Radio New Zealand International	
0800	6150	Radio Nacional Venezuela, via Cuba	SS
0830	6010	Radio Mil, Mexico	SS
0900	9710	Radio Australia	
0900	5990	Radio Senado, Brazil	PP
0900	11840	KTWR, Guam	
1000	6135	Radio Santa Cruz, Bolivia	SS
1000	9525	Voice of Indonesia	
1100	9795	KNLS, Alaska	RR
1100	11735	Voice of Korea, North Korea	FF
1100	5020	Solomon Is. Broadcasting Corp.	
1100	5980	Radio Marti, USA	SS
1200	13655	China Radio International, via Albania	
1200	7145	Lao National Radio, Laos	FF
1200	5915	Radio Myanmar	Burmese
1200	11560	Radio Free Chosun (to North Korea)	KK
1200	3315	Radio Manus, Papua New Guinea	Tok Pisin
1200	11870	Radio Veritas Asia, Philippines	Hindi
1200	15205	Radio Romania International	
1200	9650	KBS World Radio, South Korea	
1200	7280	Sound of Hope, Taiwan	CC
1200	6040	Voice of America, Thailand Relay	CC
1230	9645	Vatican Radio	
1300	9790	Islamic Republic of Iran Broadcasting	
1300	9870	All India Radio	Hindi
1300	9335	Voice of Korea, North Korea	Burmese
1300	9965	T8WH, Palau	
1300	11675	Polish Radio, via Austria	
1300	5930	Murmansk Radio, Russia	RR
1300	7295	Voice of Russia	Mandarin
1300	9900	Voice of Russia	Pashto
1300	15380	Broadcasting Service of the Kingdom, Saudi Arabia	AA
1300	7365	Radio Thailand	JJ
1300	11590	Radio Free Asia, Kuwait Relay	Tibetan
1300	9990	Radio Free Afghanistan, Sri Lanka Relay	Pashto
1300	11500	Firedrake music jammer, China	
1300	9510	TWR, USA, via Russia	Hindi
1330	15725	Radio Sweden International	
1400	7240	Radio Australia	
1400	9740	BBC, Singapore Relay	
1400	15630	Voice of Greece	Greek
1400	15300	Radio France International	FF
1400	705	Radio Japan, via Canada	
1400	5910	Shiokaze (to North Korea)	JJ
1400	13580	Radio Farda, USA	AA
1530	15165	La Voix Djibouti (clandestine)	FF, Thursdays
1600	17605	Radio France International	
1600	21655	RDP International, Portugal	PP
1700	9695	China Radio International	CC
1700	13765	Vatican Radio	
1700	15550	WJHR, Florida	
1800	11655	Radio Nederland, via Madagascar	
1900	11810	BBC, Ascension Island Relay	
1900	15190	Radio Africa, Equatorial Guinea	
1900	13780	Deutsche Welle, Germany, Sri lanka Relay	
1900	9745	Radio Sawa, Botswana Relay	AA
2000	12080	VOA, Botswana Relay	FF
2000	17724	Radio Canada International	
2000	7450	RS Makedonias, Greece	Greek
2000	7540	Denge Mesopotamia, to Iraq, via Ukraine	Kurdish
2000	7345	Radio Slovakia International	Slovak
2000	17850	Radio Exterior de Espana, Spain	SS
2000	7365	Vatican Radio	
2000	11845	Adventist World Radio, via South Africa	Yoruba
2030	9680	Radio Thailand	
2100	13630	Radio Australia	
2100	12095	BBC, Ascension Island Relay	
2100	15515	Radio Australia	
2100	9830	Adventist World Radio, Austria	
2100	7430	Radio Tirana, Albania	
2100	9500	China Radio International	
2100	17680	CVC-La Voz, Chile	SS
2100	5930	Radio Prague, Czech Republic	
2100	13760	Radio Havana Cuba	SS
2100	6270	Radio Cairo, Egypt	
2100	9580	Africa Number One, Gabon	FF
2100	11865	Deutsche Welle, Germany, Rwanda Relay	
2100	9445	All India Radio	Hindi
2100	11665	Radio Japan	JJ
2100	9330	Radio Damascus, Syria	
2100	15110	Radio Exterior Espana, Spain	SS
2100	5855	Vatican Radio	PP
2100	7520	Radio Farda, Sri Lanka Relay	Farsi
2100	7495	Radio Free Asia, Northern Marianas Relay	Mandarin
2200	11990	Radio Canada International	SS
2200	11850	Adventist World Radio, Guam	unknown
2200	17605	Radio Japan, via Bonaire	JJ
2200	4845	Radio Mauritanie, Mauritania	AA/FF
2200	9705	La Voix du Sahel, Niger	FF
2200	17675	Radio New Zealand International	
2200	6090	Radio Nigeria	Hausa
2200	13680	Radio Nacional Venezuela, via Cuba	
2200	11670	Radio Nacional Venezuela, via Cuba	SS
2200	12090	FEBC, Philippines	VV
2200	12090	KFBS, Saipan	VV
2300	15560	Radio Australia	
2300	15345	Radio Argentina Exterior	SS
2300	11700	Radio Bulgaria	
2300	4985	Radio Brazil Central	PP
2300	11765	Super Radio Deus e Amor, Brazil	PP
2300	11840	China Radio International, via Canada	
2300	11790	China Radio International	
2300	11665	CVC-La Voz, Chile	SS
2300	6160	CKZN, Canada	
2300	11830	Deutsche Welle, Germany, via Russia	CC
2300	11645	Islamic Republic of Iran Broadcasting	CC
2300	15265	Radio Japan, via Bonaire	JJ
2300	6240	Radio PMR, Pridnestrovie (Moldova)	
2300	9435	Far East Broadcasting Co., Philippines	II
2300	7250	Voice of Russia	
2300	15190	Radio Taiwan International, via Florida	SS
2300	15250	Radio Nacional Venezuela, via Cuba	SS
2300	9370	WTJC, North Carolina	
2300	9265	WINB, Pennsylvania	

Recognizing A Heroic Response

Airman's Actions On The Ground Earn Him REACT Radio Hero Award

by Ron McCracken

Exemplifying the Air Forces' three core values—Integrity first, Service before self, and Excellence in all we do—Air Force Staff Sergeant Daniel Gordon used quick-thinking and a radio to come to the aid of a badly injured police officer. For his possibly life-saving response, Oklahoma County REACT and REACT International recently honored Gordon with the REACT Radio Hero Award.

A resident of Oklahoma County, Oklahoma, Gordon took action after coming upon a serious traffic accident on August 20, 2009. The multi-vehicle collision had trapped Oklahoma City police officer Keith Locklear in his cruiser. Gordon discovered an incoherent Locklear holding his police radio's microphone but unable to call for assistance. Taking the mic from the officer's hand, Gordon called for help, saying, "I'm with an officer. There has been an accident." Oklahoma City Police dispatch realized that one of their own had been injured and launched emergency services to the location Gordon had provided. His effective use of an available radio and his quick response in the situation expedited the arrival of needed emergency services, and quite possibly saved Locklear's life.

Oklahoma County REACT President Robert Kaster, REACT Region 7, Director Charlie Land, and REACT International Secretary Lee Besing presented the Radio Hero Award during a ceremony held April 13, 2010, in the Oklahoma City Police Department Memorial Room. Members of the local REACT Team, the Oklahoma City Police Dept, Gordon's military unit, 552 ACNS, along with the airman's family, attended the award presentation and a reception that followed.

Staff Sgt. Daniel Gordon (USAF) displays his Radio Hero Award flanked by Oklahoma County REACT members (left to right: Harry McQuown, Bob Kaster, Team President, Gordon, Dale Ellis). It is only the third such award to be presented. Gordon used radio to help save a police officer's life. (Photo by Charles Land)

But the highlight of the day was the meeting of Gordon and Officer Locklear, who was also able to attend and offer his thanks in person. Gordon also received congratulations and warm appreciation from the officer's supervisor, the Deputy Chief, and many other colleagues.

In addition to a plaque from REACT International, Gordon received a top-of-the-line, newly released, CB mobile radio from Cobra Electronics and a gift subscription to *Popular Communications* magazine, both sponsors of the award.

The REACT Radio Hero Award recognizes exceptional use of two-way radio to preserve life or protect property and has only been bestowed three times since its introduction in 1995. The two previous recipients were an Indiana State Trooper and a nine-year-old boy. If you learn of a deserving individual who you think should be considered for the Radio Hero Award, send documentation to REACT@REACTintl.org.

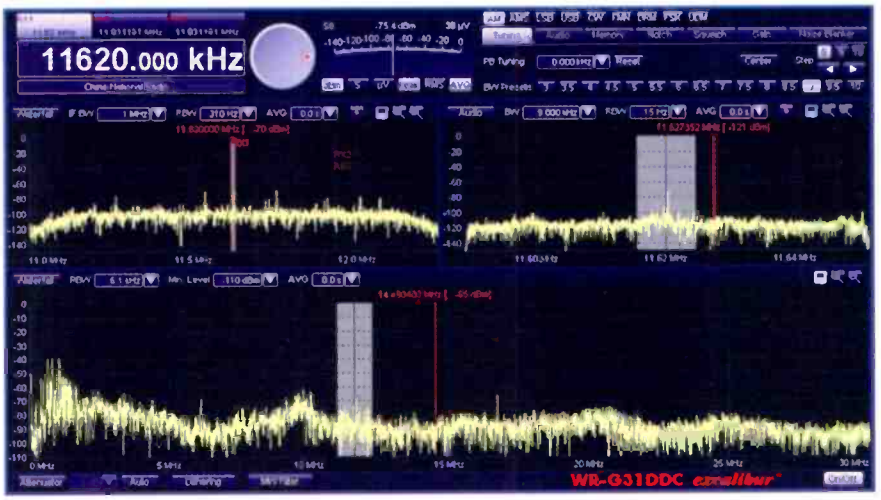
Ron McCracken is a freelance journalist and past Chairman and CEO of REACT International, Inc.

by Staff

New, Interesting, And Useful Communications Products

WiNRADiO's Excalibur Software-Defined Receiver

WiNRADiO has introduced the WR-G31DDC "Excalibur," a high-performance, low-cost, direct-sampling, software-defined shortwave receiver. The Excalibur offers a frequency range from 9 kHz to 50 MHz and includes a real-time 50 MHz-wide spectrum analyzer and 2 MHz-wide instantaneous bandwidth available for recording, demodulation, and further digital processing. This means you can record the entire AM broadcast band, for example, all night long for later playback.



WiNRADiO's Excalibur software-defined shortwave receiver breaks new ground by offering highly advanced DSP capability at a price point well below $1000.

The Excalibur is distinguished by advanced capabilities and high-end specifications at a price point considerably below its closest competition. According to the company's website, "The receiver's superior performance results from its innovative, direct-sampling, digital down-converter architecture along with the use of leading-edge components and design concepts. These all result in a very high IP3, wide dynamic range, high sensitivity, and tuning accuracy."

The street price of the WiNRADiO WR-G31DDC Excalibur is approximately $850 to $899. For additional information, visit www.winradio.com.

Alinco DJ-X11E/T Wideband Communications Receiver

Alinco has announced the DJ-X11E/T, a pocketsize receiver with the advanced features of a desktop. Offering 0.05 to 1,299.99995 MHz all-mode AM/FM/WFM/SSB/CW coverage (main band), it also boasts an IQ signal output and IF discriminator output so it can be connected via third-party software to a laptop or other computer for demodulating and recording all kinds of modes, such as digital shortwave (DRM) and other advanced digital signals. An internal ferrite bar antenna provides AM reception; an external antenna is required for practical HF monitoring.

Other features of the DJ-X11E/T include: two VFOs for simultaneous receive; subband coverage, VHF: 118~171 MHz/UHF: 336~470 MHz in AM/NFM; voice-guidance that reads the entering/entered frequencies in English. Easy-to-read set-mode parameters appear on the full-dot matrix LCD display, enabling you to customize the radio to suit your monitoring preferences. Free control software lets you operate the basic functions of DJ-X11 through your PC using an optional ERW-8 cable. Alinco's free utility software makes it easy to catch up with most updated memory-channel editing and function settings. You can also use an optional EDS-12 remote-cable controller to operate it like a portable stereo player.

For additional information, dealer locations, and pricing, visit www.alinco.com.

The Four 'Tennas: Making The Best Even Better

by Bruce A. Conti
contiba@gmail.com

"Today, the terminated broadband loop is the go-to antenna of choice for hard-core AM DXers...Here's an overview of four proven designs and the latest experimental configurations."

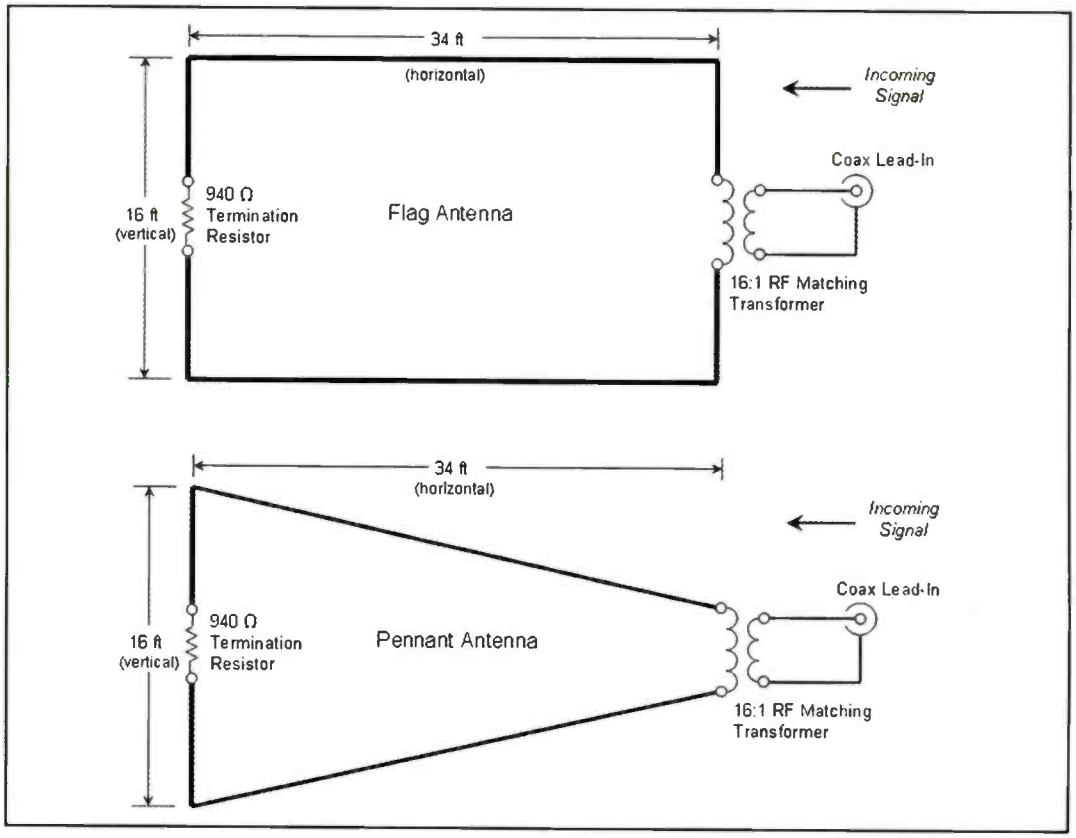
Once upon a time, the classic Beverage antenna was the only way to go for serious AM broadcast band DXing, but this tried and true horizontal waveguide antenna requires more than a 1,000 feet of real estate to cover the long wavelengths of mediumwave frequencies. Unfortunately, not all that many of us are lucky enough to have that kind of space available for an antenna. The days of simply tossing a random length of wire out the window or operating an indoor loop antenna are long gone for most of us, too, thanks to the ever increasing noise radiated from AC wiring and home electronics.

So what's a DXer to do? Today, the terminated broadband loop is the go-to antenna of choice for hard-core AM DXers. We've covered this topic in previous columns, but this month we bring you some tweaks to these antennas that make them better than ever. Here's an overview of four proven designs and the latest experimental configurations.

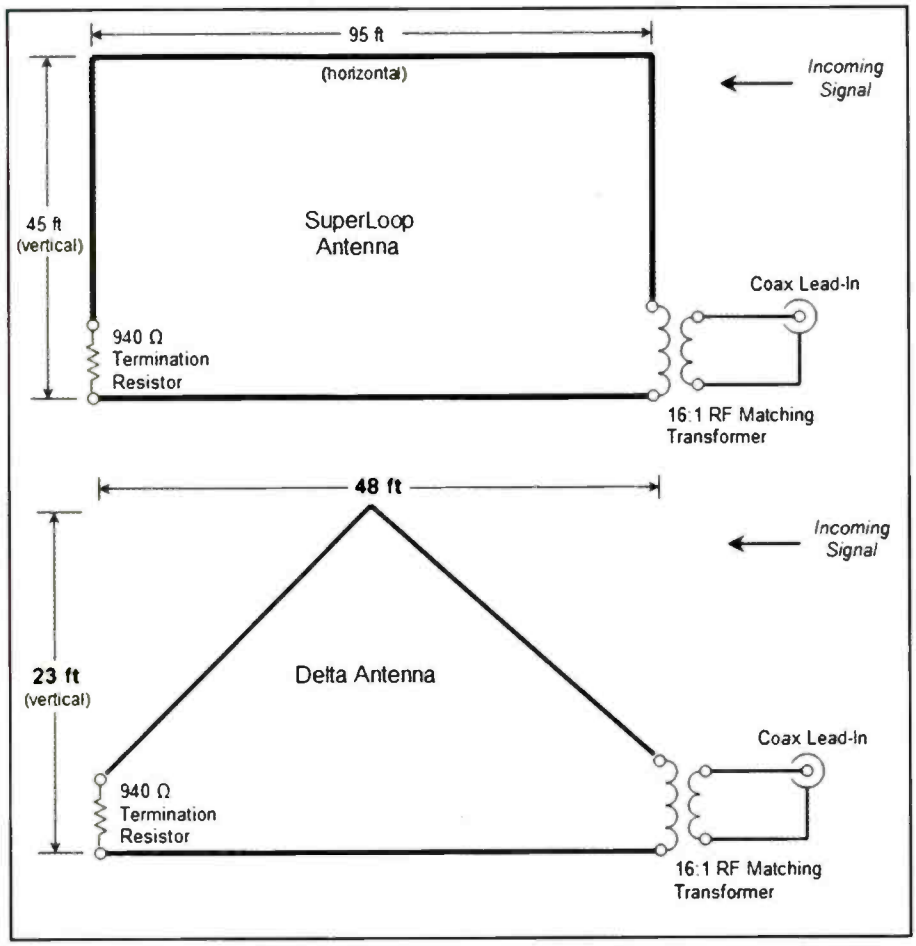
The Delta, Flag, Pennant, And SuperLoop

There are four basic configurations of terminated broadband loop antennas: the Delta, Flag, Pennant, and SuperLoop. All four of these provide comparable levels of performance. The primary advantages of a terminated broadband loop antenna over other types of mediumwave antennas are, coincidentally, also four-fold:

1. *Low-noise performance*. A loop antenna is inherently low noise because it doesn't need a ground reference. Longwire and vertical anten-



The Flag and Pennant—the original two members of the "Four 'Tennas" terminated broadband loops.



The basic Delta and SuperLoop configurations of terminated broadband loop antennas.

nas require a good ground plane or reference. A loop "floats" and therefore can be installed practically anywhere.

2. *Broadband performance*. As the name implies, a broadband loop is a single loop of wire that can cover a wide range of frequencies, over long, medium, and short waves, without an antenna tuner. The standard AM loop antenna constructed of multiple turns of wire requires pre-tuning to the desired frequency.

3. *Unidirectional beam*. A terminated broadband loop provides a unidirectional "cardioid" or heart-shaped beam with a deep backside null and high-gain reception in a desired direction while killing interference from the opposite direction. The standard non-terminated loop produces a bidirectional "figure-8" beam.

4. *Compact size*. A terminated broadband loop provides performance comparable to longwire antennas measuring hundreds of feet. The typical maximum dimension of a terminated broadband loop is 16 to 25 feet. Loops with a largest dimension of six feet have been implemented successfully.

Terminated broadband loop antennas were first popularized by low-band amateur radio operators. The Flag and Pennant were under development as far back as 1995 by Hideho Yamamura, JF1DMQ, and later refined by Jose Mata Garriga, EA3VY, and Earl Cunningham, K6SE, for 160 meters. Then AM broadcast band DXers discovered the usefulness of these loops for directional reception at mediumwave frequencies. The terminated broadband loop concept was applied in new configurations leading to the development of the Delta, by acclaimed mediumwave DXer Neil Kazaross, and the SuperLoop, which I had devised as an alternative form factor.

The construction of all four of these basic configurations is essentially the same: A single loop of wire with a series termination resistance and an RF matching transformer. The series resistance varies between 800 to 1200 ohms based upon the type of loop configuration and environment; 940 ohms is typical. The RF matching transformer couples the loop to the receiver lead-in. It's most important that the transformer does not have a common ground connection between the primary and secondary windings to maintain the "floating" ground independence of the loop. Though a loop is a low-noise antenna, it should be located as far away from buildings and utilities as possible, at least 20 feet as a rule of thumb, to prevent low-level radiated noise pick-up.

The Latest Developments

In a report to the Cape DX group of broadcast DXers, Delta inventor Kazaross recently took note of a new configuration implemented by amateur radio operators, including principle developer George Wallner, AA7JV. "It looks to me to be an improved version of a Flag-type antenna, the Double Half Delta Loop (DHDL)," said Kazaross. He continued:

> This represents an improvement versus conventional Flag-type patterns since the beam width is more narrow, front to side ratio is about 4 dB better, and there's less signal in the rear 180 degrees when not directly in the wide null. Also the forward beam angle of the DHDL is lower than [that] from a Flag. I'm not exactly sure why the DHDL is clearly better than a Flag, but its pattern looks somewhat like a closely spaced end-fire array of two Flags despite having only one termination resistor.

The DHDL concept led to a multitude of design activities investigating alternative configurations. The primary innovation of the DHDL in comparison to the basic four configurations appeared to be the flipping or twisting of one end of the loop antenna by 180 degrees with wires crossing at a midpoint. Alternative configurations were modeled using EZNEC antenna design software.

Among the variants under consideration was my proposal of a Split Delta configuration that would require only one support structure, as in the basic Delta design. A distinct advantage of the Delta is this simplicity of only one support, whereas the Flag, Pennant, and SuperLoop all require two support points. In the Split Delta, one half of the basic Delta loop is flipped 180 degrees to form two "half-Delta" triangles with vertical wires crossing at the one support tower. Through EZNEC modeling I obtained results comparable to a single DHDL, but I wasn't completely convinced that the performance would really be any better than a standard Delta.

Kazaross also modeled the Split Delta on EZNEC. In describing the design, he offers the following:

The Split Delta clearly represents an advancement of the state-of-the-art for Flag-type antennas since, like the DHDL, the pattern is superior to a single cardioid. When compared to a Flag, the beam width is more narrow, the back null wider, and side nulls superior. The DHDL has better patterns; i.e. more narrow beam width and wider back nulls, but not drastically so.

A notable deficiency of the DHDL and Split Delta configurations was broadband performance in comparison to the basic Delta loop. Both Kazaross and I had determined that the backside nulling at the low frequency end of the broadcast band was below the Delta standard.

"I still am not entirely pleased with the broadbandedness of the DHDL as I'd prefer it to be a little better for 530 kHz," reported Kazaross. "The DHDL seems to need to be longer to work well for the low end. The DHDL I built has a 34-m base (111.8 ft) whereas my modeled Split Delta has only an 80-ft base and works fine at 530 kHz. I need to do a bit more modeling work to get a DHDL just right for 530 to 1700 kHz."

"Broadcast Technology" columnist Bruce Conti stands by his Delta antenna supported by a 23-foot collapsible painter's pole.

Upon further investigation I determined that the overall performance over the entire AM band is best when following the 2.1 to 1 ratio rule of thumb for antenna height versus width. (This rule applies to all four basic terminated broadband loop antennas.) Using the rule of thumb, the standard 23-foot-tall Delta has a calculated base dimension of 48 feet (23 X 2.1 = 48.3). Therefore, a 23-foot-tall Split Delta should have two split horizontal wires at the base of the antenna measuring 24 feet each.

Longer and shorter horizontals appeared to compromise broadband performance to some degree. For a Split Delta at ground level (or as close to ground as EZNEC would allow) a termination resistance of 620 ohms provided the best performance across the band, although the maximum null at the back (180 degrees) still lost about 15 dB at 550 kHz. This was the best I was able to get in terms of "broadbandedness" of the null. Of course, the null at lower frequencies could be improved by adjusting the termination resistance, but then the null at 1500 kHz suffered. In comparison a basic Delta achieved 30 to 35 dB back null across the band without adjusting the termination resistance (900 ohms typical), but the max null width is narrow.

End-Fired Delta Array

Highly directional phased arrays of terminated broadband loop antennas have proven to emulate, and in some instances outperform, the classic Beverage antenna. DX antenna experimenter Dallas Lankford was the first to design and successfully implement an end-fire array of four Delta antennas, which became known as the Quad Delta Flag Array (QDFA). The superior array performance was recently field tested during DXpeditions at Grayland, Washington, and Kongsfjord, Norway.

An end-fire array consists of multiple loop antennas arranged in a straight line aimed toward a specific target, firing a very narrow beam off the end of the array, thus the end-fire terminology. However such a phased array can be rather tedious to construct and fine tune. A complicated set of electronic phasing circuitry, amplification, and grounding schemes have been required to achieve optimal performance. This has inspired the investigation of simpler designs.

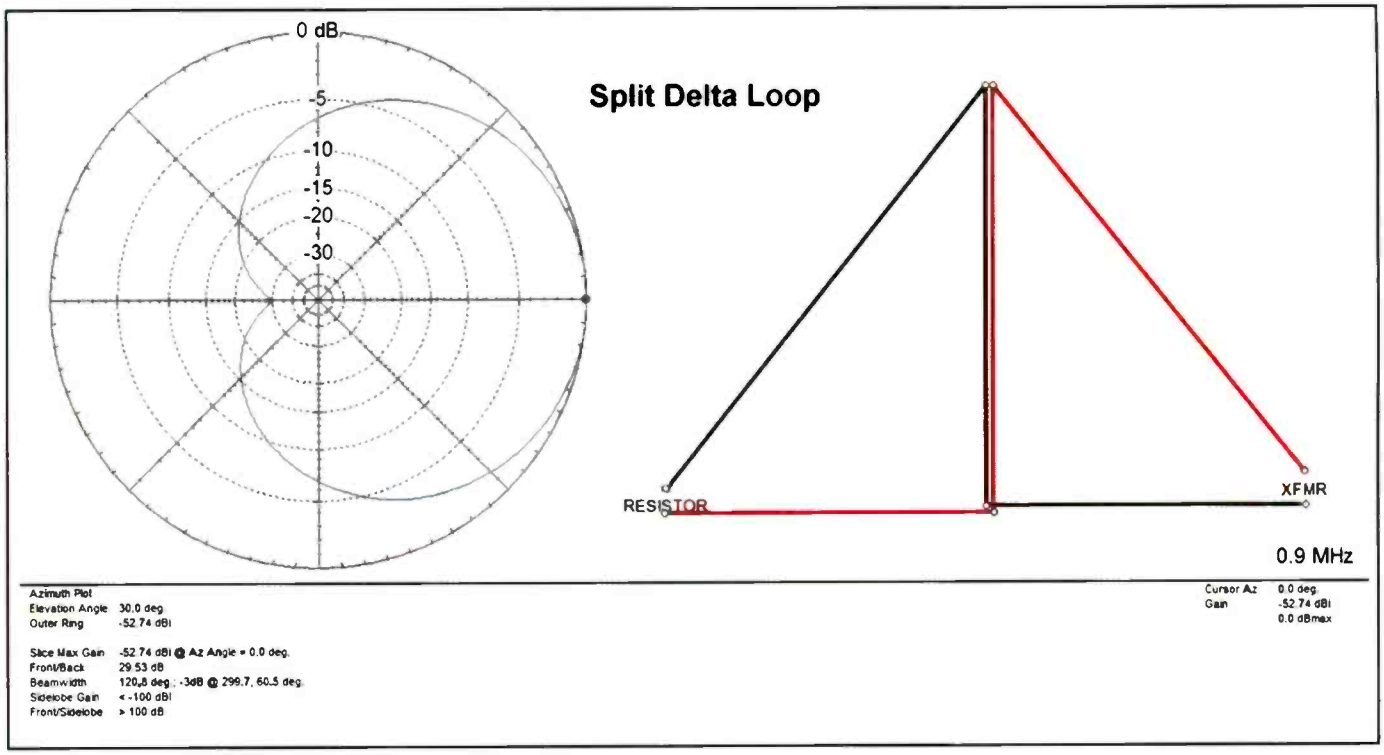
"An end-fire array of two DHDL antennas produces stunning model results," concluded Kazaross from his initial

This Month In Broadcast History

75 Years Ago (1935)—The Magnetophon magnetic tape recorder using reel-to-reel ribbon developed at BASF in Germany was introduced at the Berlin Radio Fair.

50 Years Ago (1960)—A plan for the first-ever televised debate between presidential candidates was being formulated. CBS was the first to announce opposition to sponsorship of the debates. "The Twist" by Chubby Checker topped the 77 WABC New York music survey.

25 Years Ago (1985)—The BBC World Service was silenced for the first time in its history due to a workers' strike protesting the decision not to broadcast an interview with Sinn Féin politician and former IRA leader Martin McGuinness.



Preliminary EZNEC model of the antenna pattern for the proposed Split Delta with a 620-ohm termination resistance at 900 kHz.

research. "A similar array of two Split Deltas is nearly as good when modeled 100-ft apart center to center."

Conclusions And Recommendations

The original four 'tennas and the new "split loop" configurations should be evaluated based upon real estate constraints, desired directions of reception, and form factors. First consider the physical aspects when selecting a configuration. The Delta is best if limited to only one support, such as a single flagpole or tree. A SuperLoop is easy to conceal in an antenna restrictive neighborhood with vertical sections tacked to tree trunks or the frame of an outbuilding. Amateur radio operators have constructed Flag and Pennant antennas with a wooden frame installed on a rotating antenna mast for an adjustable beam direction. Use your imagination in deciding which configuration is an ideal fit for your situation.

Next, consider how the antenna will be used. If a deep and narrow null width is desired to reduce interference from a specific direction, then one of the basic four configurations might be the best choice. For wider nulling capability in a general direction, the DHDL and Split Delta are worth consideration. On a basic 23-foot-tall Delta, the deepest back null is easily 35 dB typical. The best I could get with the 23-foot Split Delta is -30 dB typical. On a standard 23-foot-tall Delta, the side nulls (+/- 90 degrees) are -5 dB typical. On a 23-foot Split Delta, the sides are -7 dB typical but can be adjusted to slightly deeper side nulls at the expense of some of the back null deepness.

For More Info...

To learn more about the basic four terminated broadband loop antennas, please consult "Broadcast Technology" in the August 2008 and October 2009 editions of *Popular Communications* magazine where construction was covered in greater detail. Further info can be found online at www.bamlog.com in the antenna section, or by googling "Flag antenna," etc., specifically for additional resources. Initial reports about DHDL construction and performance are available online from the inaugural implementation of the antenna at the TX3A DXpedition. Google "TX3A DHDL" to find the links. EZNEC antenna modeling software by Roy Lewallen, W7EL, is available for download at www.eznec.com. More experimentation with various split loop configurations is sure to follow as the concept of the DHDL has really opened the door to some interesting possibilities. Stay tuned right here for further developments.

Until next time, 73 and Good DX!

Little Rock Air Force Base—The Largest Host Of C-130 Hercules Aircraft

by Mark Meece, N8ICW
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"All services in the Department of Defense, including the Coast Guard and 34 allied nations, have their C-130 aircrews trained by the 48th and 62nd squadrons using their fleet of 33 C-130s."

In times past, there was a rocky outcropping on the south bank of the Arkansas River that was used by river traffic of the day to mark what became a well-known river crossing. It was given the French name "la petite roche," meaning "little rock" in English. That name was also given to the nearby population center that grew over the years to become the capital and largest city in the state of Arkansas. Located 17 miles north and east of Little Rock, up US Route 167 near Jacksonville, is Little Rock Air Force Base.

It was early September of 1952 when the United States Air Force announced its plans to build a $31 million medium bomber base near the town of Jacksonville, Arkansas. Construction of the base began on December 8, 1953. By the following August the Strategic Air Command (SAC) assigned the 384th Bombardment Wing (BMW) and 70th Reconnaissance Wing to take up residence at the base. The base's first commander, Colonel Joseph A. Thomas, while overseeing the construction of the base was tragically killed in the crash of the base's only aircraft, a C-54 being used for administrative duty.

The base opened for air traffic on September 10, 1955, and for 15 years Little Rock Air Force Base would fall under the auspices of SAC. The base was officially transferred to the command of the Tactical Air Command (TAC) on April 1, 1970. Just over a year later Little Rock would begin its long affair with the C-130 Hercules aircraft. The first C-130 arrived at the base on March 4, 1970, and immediately began tactical airlift training operations. The 314th Tactical Airlift Wing (TAW) transferred to Little Rock on May 31, 1971, where it remains today, now under the Air Education and Training Command.

Air Education And Training Command

The 314th AW is the largest and only training airlift wing for the C-130 in the Department of Defense. Four groups comprise the 314th: operations, logistics, support, and medical. There is also a headquarters element, two subordinate squadrons—the 48th AS and 62nd AS—and the 314th Operations Support Squadron. These units, along with a flight simulator contractor, create the primary mission of training crews for the C-130. Each student is trained in all five crew positions of the C-130 airframe: pilot, co-pilot, navigator, flight engineer, and loadmaster.

All services in the Department of Defense, including the Coast Guard and 34 allied nations, have their C-130 aircrews trained by the 48th and

Panoramic view of the Arkansas River showing downtown Little Rock, Arkansas.

62nd squadrons using their fleet of 33 C-130s. The 48th AS provides training on the C-130J while the 62nd flies and trains on the C-103E. The 314th AW also hosts the 463rd Airlift Group, which provides worldwide tactical airlift for the Air Mobility Command (AMC). The 314th has the added responsibility of training pilots for the C-21 with a fleet of three C-21 aircraft through the 45th Airlift Squadron at Keesler Air Force Base, Mississippi.

Today the host unit at Little Rock AFB is the 19th Airlift Wing, which is assigned to the Air Mobility Command, Eighteenth Air Force. The 19th AW avails the largest C-130 Hercules fleet in the world to the Department of Defense, offering it the ability to provide humanitarian airlift relief to victims of disasters as well as airdrop supplies and personnel into hostile theaters of operations.

The 19th AW, formerly a refueling wing based at Robbins AFB in Georgia, was deactivated in June 2008 as part of the Base Realignment and Closure Act of 2005. It was reactivated as the 19th Airlift wing and assigned to Little Rock AFB in October 2008. The 19th is also the sponsor unit of Cadet Squadron 19 "Wolverines" at the United States Air Force Academy.

Lockheed C-130 Hercules in flight.

Main entrance of Little Rock Air Force Base.

Headquarters of the 19th Airlift Wing.

Also stationed at Little Rock Air Force Base is Arkansas Air National Guard's 189th Airlift Wing. The primary mission of the 189th AW is to provide aircrew training for students from each branch of the military that flies the C-130 as well as from various allied nations. The C-130 Tactical Airlift Instructor School at Little Rock is operated by the 189th AW and offers initial qualification and upgrade training for pilots, navigators, flight engineers, and loadmasters. Here the 189th AW also operates the Air National Guard Enlisted Aircrew Academic School, which provides entry-level training for C-130 loadmasters before they are sent on to the 314th Airlift Wing for mission qualification training. The 189th AW is currently converting to the C-130H aircraft.

Little Rock Air Force Base operates one runway (7/25) with an adjacent 3,500-foot assault strip (70/250). See the "Listening In" sidebar for information on the units and frequencies in use at Little Rock AFB.

Camp Robinson

Just a few miles to the east of Little Rock AFB in North Little Rock is the 33,000-acre Camp Robinson, named for Arkansas statesman Joseph Taylor Robinson. The camp originally opened in 1937 under the name Camp Pike. It was renamed to Camp Robinson during World War II when it was expanded for basic training and to house German Prisoners of War. After World War II it was declared military surplus and 32,884 acres were conveyed to the State of Arkansas in August of 1950. Today it used as training area for the Arkansas National Guard and has one 5,000-foot runway (4/22). Here you'll also find the Arkansas National Guard Museum, located in historic Lloyd England Hall within Camp Robinson.

Operational frequencies for Camp Robinson are also given in the "Listening In" sidebar.

The Sounds Of "The Rock"

Boasting daily operations of the busiest C-130 base as well as the Arkansas National Guard Museum, the Little Rock, Arkansas, area is a great place to visit. When you do, make sure to take your scanner and listen in on the non-stop action provided by "the Heavies." Be sure to let us know what you hear.

Military Loggings

In this issue regular contributor Doug Bell of Ontario, Canada, shares some of his HF military intercepts. We appreciate loggings from all of our readers, and invite you to report your catches on HF, VHF, or UHF. You can send them to the email address listed in the column header. Please try to follow the format you see here, and we will include your submissions in a future column.


C-130s line up for take off from Little Rock AFB.

3476: USB 0112Z REACH 306 (KC-10A/305th AMW, McGuire AFB, NJ) wkg Gander Radio with a position of 49N 040W with fl 270.

5550: USB 0218Z CAMPA 28 (E-6B/VQ-4, NAS Patuxent River, MD) wkg New York Radio with a request for higher. Flight report that it tried to contact New York Center on 133.5, with no response.

0134Z REACH 495A (C-17A/437th AW, Charleston AFB, SC) wkg New York Radio with routing data passed.

5598: USB 0338Z REACH 403 (C-5A/105th AW, 137th AS, Stewart ANGB, NY) wkg Santa Maria Radio with a position of 38N 020W.

5616: USB 0137Z COPE 72 (KC-135R/319th ARW, Grand Forks AFB, ND) wkg Gander Radio with a position of 48N 040W with fl 320.

0155Z SHADOW 01 (E-6B/VQ-4,

Little Rock Air Force Base

Unit	Name	Aircraft	Tail Color
314th Airlift Wing (AETC)			
48th AS		C-130J	Gold/Black
62nd AS	BLUE BARONS	C-130E	Blue/White
463rd Airlift Group (AMC)			
41st AS	BLACK CATS	C-130J	Green/Black
50th AS	RED DEVILS	C-130H	Red/Black
53rd AS	BLACK BARONS	C-130J	Black/White
61st AS	GREEN HORNETS	C-130E	Green/Black
189th Airlift Wing (AR-ANG/AETC)			
154th TS	RAZORBACKS	C-130E	Red/White

Little Rock AFB (KRLF) Frequencies

Aeronautical Operations

119.175	ATIS
119.500	Approach/Departure
120.600	Tower
132.800	Ground
138.600	189th Command Post
143.800	154th TS Air Tactical
225.450	189th Command Post
239.800	METRO
251.100	ATIS
253.500	Clearance Delivery
257.100	154th TS Air Tactical
269.075	Tower
271.300	ATIS Arrival
275.800	Ground
306.200	Approach/Departure
341.650	Dispatcher
349.400	AMC Command Post

C-130 Operations

125.350	Air Collision Avoidance
138.050	C-130 Interplane
138.125	C-130 Interplane
138.300	Aerial Refueling
138.475	C-130 Interplane
138.875	C-130 Interplane
138.950	C-130J Ops
139.600	Black Jack Drop Zone Ops
139.625	C130 Interplane
139.700	Air-to-Air Tactical
139.725	C-130 Interplane
139.925	C-130 Interplane
139.975	C-130 Interplane
141.800	All American Drop Zone
142.200	C-130 Interplane
142.235	Air Combat Maneuvers
143.920	Air-to-Air Training
148.200	Air-to-Air Tactical
232.150	C-130 Interplane
236.375	C-130 Interplane
246.050	Air-to-Air Tactical
267.250	C-130 Interplane
285.975	C-130 Interplane
293.400	C-130 Interplane
311.000	Airborne Command Post (Primary)
321.000	Airborne Command Post (Secondary)
342.300	All American Drop Zone
342.400	Black Jack Drop Zone
346.600	Weather
372.200	Dispatcher
381.150	Black Jack Ops

Support Operations

148.0750	Command Post	AM
148.1000	Transient Services	AM
150.3150	Motor Pool	FM
165.1125	Command Net	FM
173.1000	Fire/Crash	FM
173.4400	Base Police	P25
173.5625	Medical Net	FM
173.5875	Fire/Crash	FM

Little Rock Air Force Base utilizes a Motorola Type II Smartnet trunked radio system that uses a mix of analog and digital voice for some operations.

SYSTEM:	Little Rock Air Force Base
TYPE:	Motorola Type II Smartnet
SYSID:	4628
VOICE:	Analog and APCO-25 Common Air Interface
BASE:	406.000
SPACING:	12.5 kHz
OFFSET:	380

Frequencies

406.96250c 407.16250 407.96250 409.76250

There is no known talkgroup information for this system. Reader input is requested.

Camp Robinson (KRBM)

Aeronautical Operations

38.350	Air Tactical
41.500	Tower
126.200	Tower
139.200	NG Ops
139.200	NG Ops
241.000	Tower
242.400	Air Tactical

Support Operations

38.450	Security/Fire F1
38.500	Range Control
38.600	Security/Fire F2
46.900	Range Control
46.900	Range Control

NAS Patuxent River, MD) wkg New York Radio with a position of 50N 040W with fl 350.

0207Z REACH 401 (C-5B/60th AMW, Travis AFB, CA) wkg Gander Radio with a 050W position report.

5696: USB 1530Z USCG 2005 (HC-130J/CGAS Elizabeth City) wkg CAMSLANT with a flight operations report.

2344Z USCG 2002 (HC-130J/CGAS Elizabeth City) wkg CAMSLANT with a position of 36N 075W.

5717: USB 1937Z RESCUE 328 (CC-130E/8 WG, 436 SQN, CFB Trenton, Ontario) wkg HALIFAX MILITARY with SAR Mission data passed.

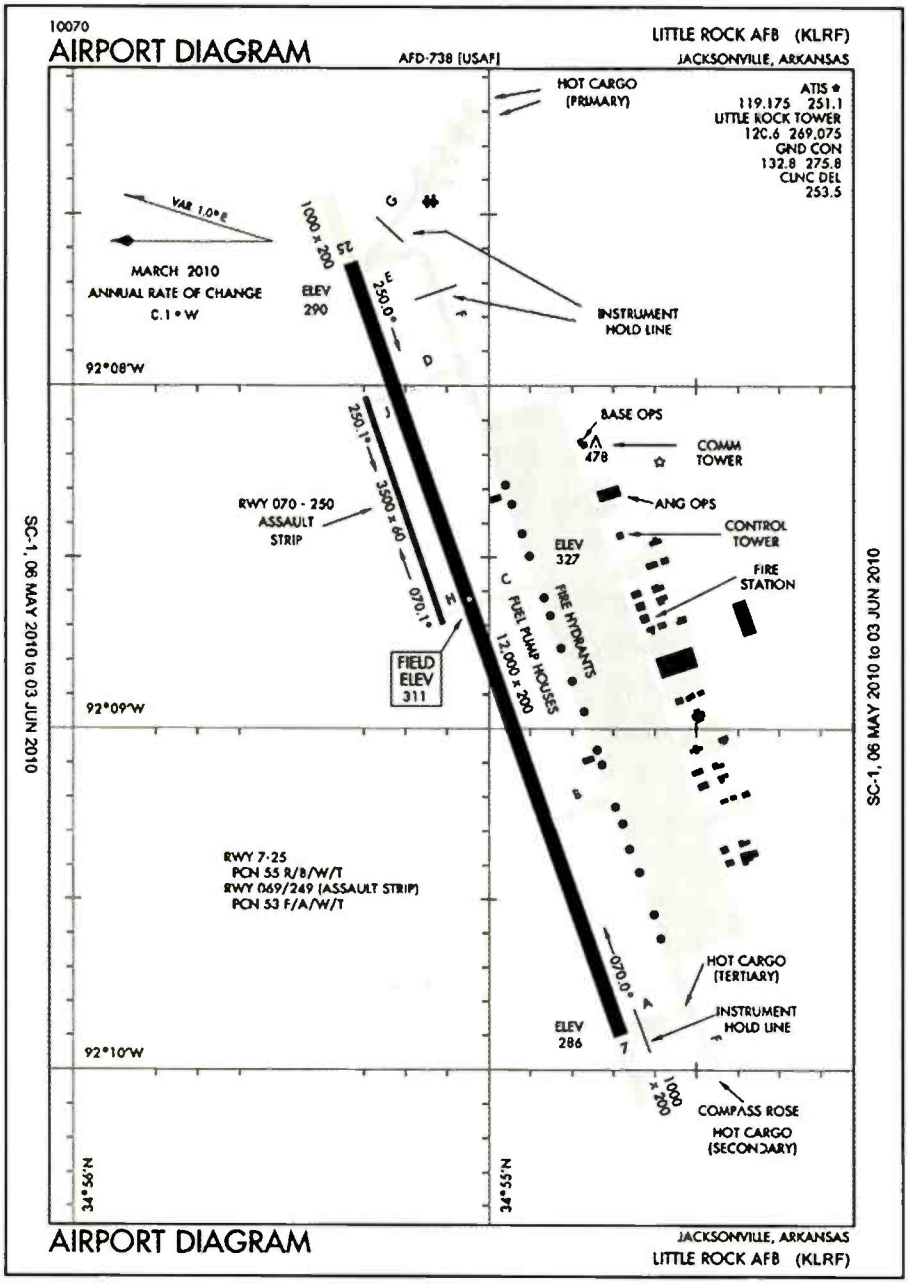
8864: USB 1305Z REACH 246 (C-17A/62nd AW, McChord AFB, WA) wkg Gander Radio with a 040W position report. Flight performed a CFPR SELCAL check.

1335Z REACH 565 (C-17A/437th AW, Charleston AFB, SC) wkg Gander Radio with a 050W position report.

1346Z REACH 999 (C-130H/153rd AW, 187th AS, Cheyenne MAP, WY) wkg Gander Radio with a 040W position report with fl 260.

1358Z SPAR 13 (C-40C/932nd AW, Scott AFB, IL) wkg Gander Radio with a 050W position report with fl 350.

1440Z RANGER 75 (KC-130T/VMGR-234, NAS Fort Worth, TX) wkg Gander Radio with a request for higher.



Airport diagram of Little Rock, AFB. (Courtesy FAA)

8918: USB 1522Z CANFORCE 3264 (CC-150/8 WG, 437th SQN, CFB Trenton, Ontario) wkg New York Radio with a full position report and ASACP SELCAL check.

8992: USB 0018Z REACH 339 (C-5M #69-0024/436th AW, Dover AFB, DE) wkg HF-GCS Station SIGONELLA with a phone patch to HILDA METRO. Weather passed for Dover AFB.

9016: USB 0139Z EVAC 827 (C-130H/908th AW, 357th AS, AFRC, Maxwell AFB, AL) wkg HF-GCS Station MCCLELLAN with a phone patch and flight data passed.

11175: USB 1401Z REACH 158 (C-130H/153rd AW, 187th AS, Cheyenne MAP, WY) wkg HF-GCS Station LAJES with a phone patch and flight data passed.

1645Z HOIST 93 (KC-10A/305th AMW, McGuire AFN, NJ) wkg HF-GCS Station OFFUTT with a phone patch and flight and load data passed.

1750Z HF-GCS Station ANDREWS repeatedly calling KING 21 (HC-130N/106th RQW, 102nd RQS, NY-ANG) on all frequencies and "in the blind" with a freezing rain warning for St. John's, Newfoundland.

1923Z NAVY LL 93 (P-3C/"The Pro's Nest," VP-30, NAS Jacksonville, FL) wkg HF-GCS Station OFFUTT with a HF radio check.

0004Z HAZARD 73 (C-130H/317trh AG, 40th AS, Dyess AFB, TX) wkg HF-GCS Station OFFUTT with a failed phone patch.

0037Z FOXY 44 (C-37A/86th AW, 309th AS, Chievres AB, Belgium) calling "MAINSAIL" with no response.

0100Z TUFF 44 (B-52H/2nd BW, Barksdale AFB, LA) repeatedly calling "MAINSAIL" with no response.

0105Z CHILL 43 (B-52H/5th BW, Minot AFB, ND) wkg HF-GCS Station OFFUTT with a phone patch to FOXTROT with flight data passed.

0207Z BUST 43 (E-4B/55th WG, Offutt AFB, NE) wkg HF-GCS Station OFFUTT with a phone patch and mission data passed.

0210Z DOOM 13 (B-52H/2nd BW, Barksdale AFB, LA) repeatedly calling "any station" with no response.

11232: USB 2244Z CANFORCE 3641 (CC-177/8 WG, 429 SQN, CFB Trenton, Ontario) wkg TRENTON MILITARY with flight data passed.

0201Z CANFORCE 3678 (CC-177/8 WG, 429 SQN, CFB Trenton, Ontario) wkg TRENTON MILITARY with flight data passed.

The Antennas Of August—More On Electronic Warfare

by Kent Britain, WA5VJB
wa5vjb@cq-amateur-radio.com

This month we will again cover some of the equipment and tactics used in Electronic Warfare, and how, in some respects, it has changed very little. We've got a lot of material to cover, so let's dive right in.

Spitfires And Radar Transponders

Going back to 1940 and the Battle of Britain, the English had their "Chain Home" Radar network using 30 to 80 MHz for their long-range radars. Often the ground controllers had trouble figuring out if a group of planes was made up of good guys or bad buys. The first IFF (Identify Friend Foe) system was just two antennas and an amplifier, like the setup shown in **Figure 1**. It really didn't matter which antenna was used as the input and which as the output. The ground controller would call to the flight leader and tell him to identify. He'd flipped on the amp and his radar echo got much brighter.

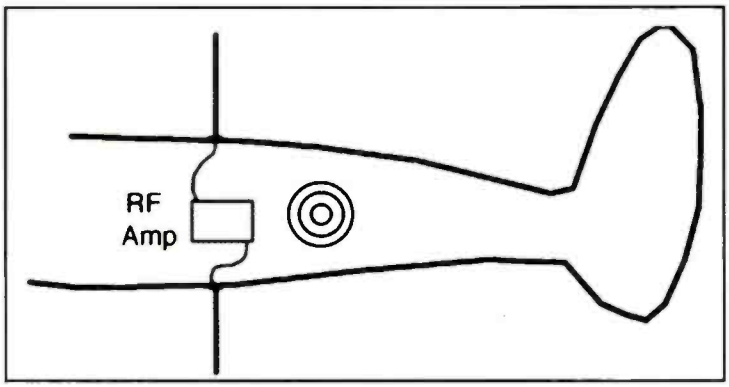


Figure 1. A 1940 radar transponder.

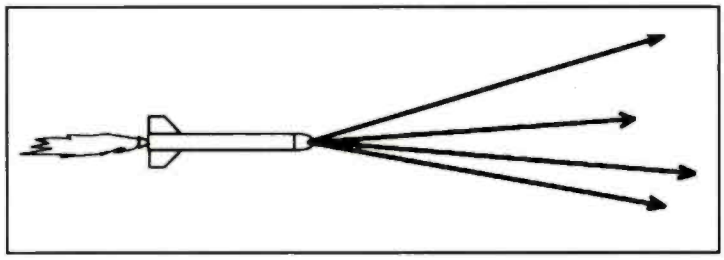


Figure 2. The four beams from a Monopulse radar.

"Perhaps you've heard the advice that you should always have a dive buddy with you when you're in shark-infested waters, that way you don't have to outswim the shark, just your bubby. It's a similar situation with a Monopulse Decoy."

Well, it didn't take the Luftwaffe long to figure this one out, and by the end of the war IFF systems were very complex and changed on a daily basis. But it shows how early in radar development these simple systems were used to enhance radar returns.

Monopulse Radar Basics

Monopulse is a simple and very effective radar seeker used on many missile radars. The antenna is designed to transmit four beams, say one high, one low, one to the left, and one to the right like you see in **Figure 2**. The radar pulse goes out all four antennas and bounces off the aircraft or ship, and four receivers compare the strength of the return echo.

The four beams overlap slightly as shown in **Figure 3**, and it is from this comparison that the seeker now knows the distance to the target and the vector angle, or direction, to the target. The missile turns on that angle, the beam with the strongest signal, and pulses again. It turns, pulses, turns, pulses, until all four receivers have the same signal strength. Now the missile is heading right at the target. This is much simpler, much faster, and a much more deadly seeker than a radar that has to search the entire sky and then "remember" where the target was.

Now, the target turns on a jamming signal to confuse the radar seeker in the missile. This can interfere with the circuitry that is computing the distance to the target, but the angle information now sees a stronger signal to work with and homes in on this new stronger signal. In short, Monopulse Seekers just *love* jammers and zero right in on them.

Perhaps you've heard the advice that you should always have a dive buddy with you when you're in shark-infested waters, that way you

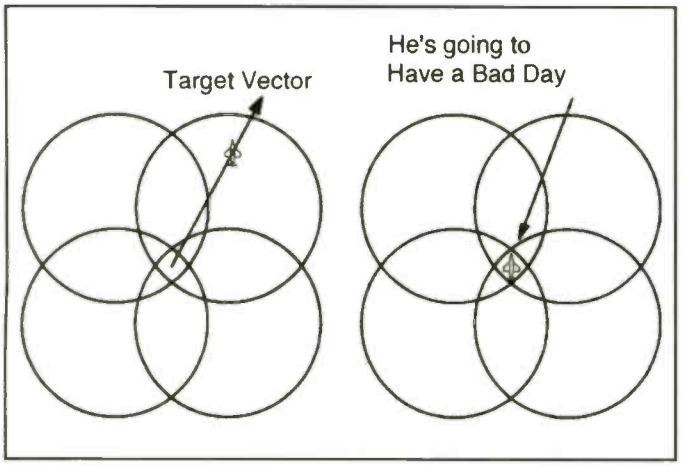


Figure 3. The four-lobe pattern received by the Monopulse seeker.

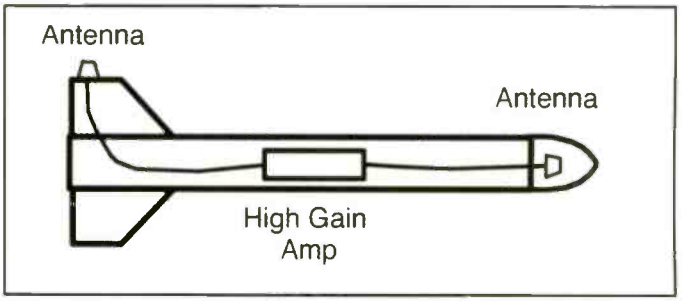


Figure 4. A simple Monopulse Decoy.

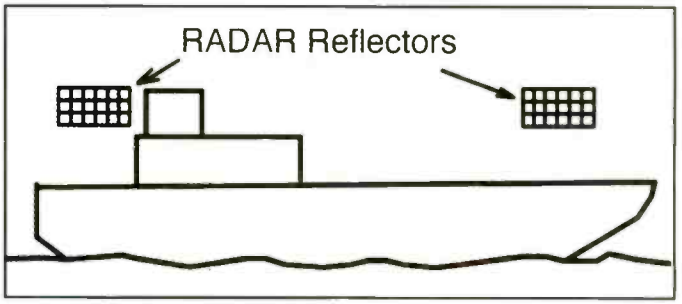


Figure 5. Two radar reflectors to protect a ship from Monopulse seekers.

don't have to outswim the shark, just your bubby. It's a similar situation with a Monopulse Decoy.

The Decoy has an antenna in the nose, an antenna on the fin, and a high-gain amplifier between the two. A radar pulse hits the nose antenna, gets amplified several thousand times, and is retransmitted out the back antenna. Now that little decoy looks like a 747, on radar and you hope the seeker goes for the decoy instead of you. There are small decoys you can eject out the back of the plane, and there are larger ones that are towed behind the plane on a L-O-N-G rope. And, yes, keeping the whole thing from oscillating is a problem.

Photo A shows a Monopulse Decoy I've been developing the antennas for. Note that there's one antenna on the top fin and a spiral antenna in the nose cone. The SMA connectors were used for the antenna-to antenna-isolation measurements. If the antennas have 50 dB of isolation, then you can only run about 40 dB of gain in the amplifier, as shown in **Figure 4**.

There are other ways to decoy or confuse a monopulse radar seeker, one of which is a radar reflector. These are in many ways very similar to the red reflectors often found on a bicycle, as shown in **Photo B** (those reflectors really light up when you have a flash on the camera!). To help you visualize how this works, imagine throwing a ball so that it hits the ground, then the wall, and then comes right back to you. Throw a ball into a corner such that it hits both walls and the floor, and it is theoretically returned in any direction in free space. Now you know why the backside of that bicycle reflector is made up of lots of three-sided cones.

Now let's make a larger version for radar use. Like that reflector, this can look very bright on a radar. Say that you place two of them on a ship; one on a mast about 30 feet over the bow and a second about 30 feet over the stern, as in **Figure 5**. Sometimes the bridge of the ship gets a light coating of RAM (Radar Absorbing Material) to make the reflectors appear even brighter.

The monopulse seeker will see both of these strong signals and try to split the difference. With luck it will pass between the two reflectors; with bad luck and it takes out one of the reflectors instead of the ship. But usually the seeker on a sea-skimming missile sees the two strong reflections for left/right angle information, but only gets noise for its up/down information.

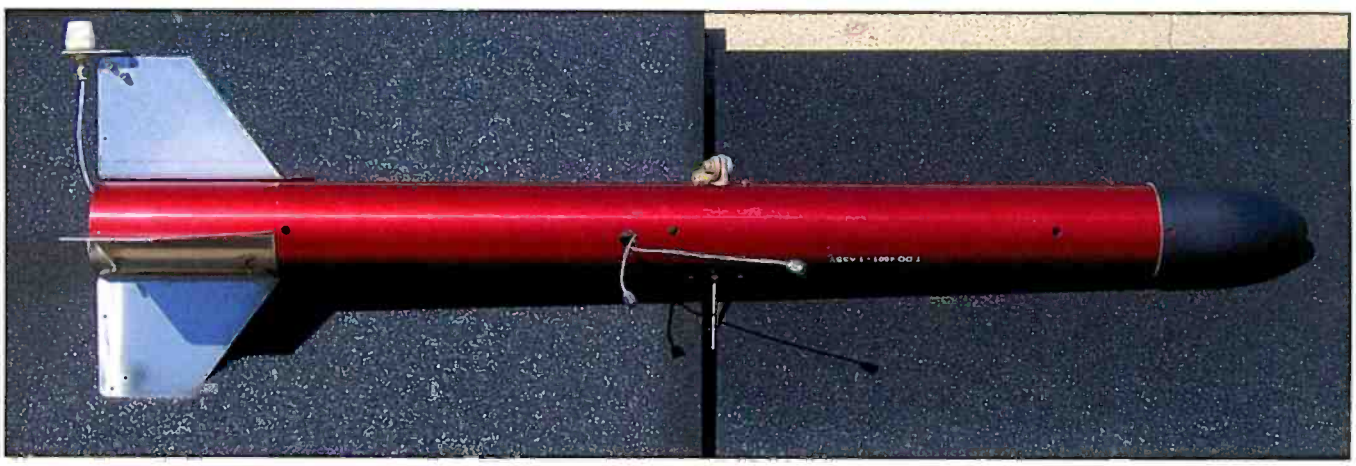
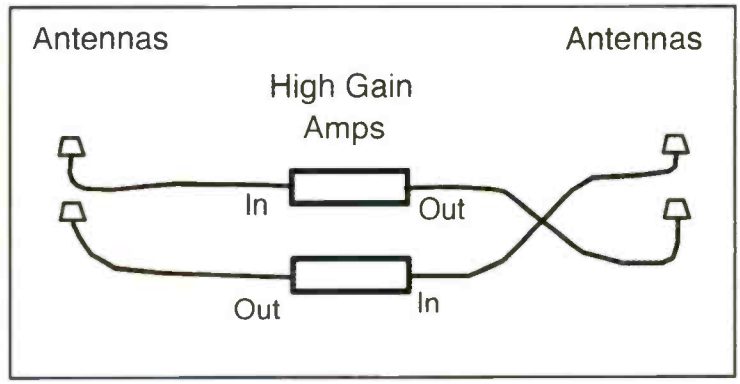


Photo A. Decoy for Monopulse seekers.

← Photo B. Reflectors.

Figure 6. Crosseye Monopulse confuser. ↓



Now there's a good chance the missile will do an up/down wiggle or a porpoise maneuver and hit the water on one of the down swings.

Another way to confuse a Monopulse seeker also goes back nearly 50 years and for many decades used TWT (Traveling Wave Tube) amplifiers. GaAs FET amplifiers are used for this purpose today.

In **Figure 6** I show the basis of a monopulse confusing system known as Crosseye. This is similar to the Monopulse Decoys, but in this case we have two of them and the receive and transmit antennas are crossed. Crosseye can really give a monopulse seeker an epileptic seizure, but only if you can get the antennas far enough apart. So Crosseye works on a B-52, but only improves the chances of the seeker getting you on a smaller airplane.

Radar Detectors And Fighter Planes

For the past half-century, most military planes have carried radar-warning receivers. These display in the cockpit the type, approximate range, and direction of all the radars heard. In the early days, the receivers had simple diode detectors and audio filters. If the receiver heard a 40-Hz tone, then it knew it was picking up a SAM-2 tracking system—the radars were identified by their pulse rate frequency, or PRF.

After the Top Gun and Aggressor Squadrons came along, the F14 crews quickly found a CW doppler mode that the older warning receivers never identified as a threat radar. The students were winning too often! Well, the old timers realized that in this mode the F14 radars were very similar in signal modulation and frequency to police radars. Soon instructors starting mounting "Fuzzbusters" looking aft in their cockpits, and then the kill ratios changed back (**Photo C**).

Many of the new Low Probability of Intercept (LPI) radars designed for use on Stealth aircraft are also based on a good knowledge of the opponents' Radar Warning Receivers (RWRs). This way pulses and modulations can be designed such that the opponent's RWR doesn't detect the signals in the first place, or thinks the signal is just a harmless television sync pulse or a WiFi card.

Photo C. Radar Warning Receivers on the cheap.

Coming Up

We have a few more antenna projects in the works, as well as a lot more Electronic Warfare stories for upcoming columns. As always we like to hear from our readers, so please send in your antenna questions or suggestions for future topics. Email them to www.WA5VJB@cq-vhf.com/. You can also visit my website, at www.WA5VJB.com, where you'll find additional antenna articles in the "Reference" section.

When Young People Dreamed Radio

by Shannon Huniwell
melodyfm@yahoo.com

"...Wheeler was only 23 and barely out of military service when he'd sought an FM authorization from the FCC in 1945."

In its September 1985 issue, *Popular Communications* ran an article about a 30-something couple who, after years of wishing and planning, built an 800-watt FM radio station in their tiny home. Shortly thereafter, editor Tom Kneitel fielded a surprisingly robust number of letters related to the brief exposé. Representative of the mail was a response from a Metairie, Louisiana, reader who wanted Kneitel to know that the couple's story had truly "inspired" him.

"I see that the American dream is still capable of being realized," his letter began. "It's people like that young husband and wife who are the backbone of American broadcasting; those who can visualize their concept of service and attain it through determination and purpose."

The writer concluded by praising the "unsung" small town radio station operators as "people who really give a damn about what they're doing" on the air in little-known places where their modest facilities must be programmed to satisfy everyone in their coverage area. He saluted *Pop'Comm* and the subjects of the "One-Room Broadcaster" piece as revealing "the stuff dreams are made of."


POPCOMM Visits
A One-Room Broadcaster
Mom-And-Pop FM Station Fills The Airwaves
WHRC FM

When *Pop'Comm* heard about a young couple who started an 800-watt FM radio station in a spare room of their 20- by 24-foot-home, its founding editor knew that covering the story would capture the imaginations of many of our favorite magazine's commercial radio-loving readers.

When I read that heartfelt correspondence from a quarter century ago, it made me wonder if many of today's young folks dream about radio. I really don't think so. Perhaps my teenaged nephew serves as an example of contemporary youth. He tells me the only time radio enters his life is when his school bus driver gets particularly aggravated by 60 noisy passengers and in retaliation blares "some mad dumb talk station" into the bus speakers. Apparently this tactic causes the kids to protest and the driver to offer radio silence in exchange for their promise of improved behavior.

No doubt some teens still voluntarily dial a radio station, or are at least more passive than those bus riders when exposed to an adult's car radio selection. But surveys reveal that an ever increasing portion of the under-30 crowd seldom listens to radio, can't differentiate between AM and FM, or name a specific frequency or a single set of call letters in their media market. Instead, they use an iPod, cellphone, or "regular" computer and download music from the Internet, the same source they also tap if they ever find themselves interested in current events.

When I asked if he thought it'd be fun to own and program a radio station, my nephew just shrugged. "Not really," he said. "Maybe back in the days when there were no choices that might have made sense, but who wants to be forced to hear what some stupid DJ thinks is good music when you can pick your own tunes from a website that gives *only* the type of songs you like?"

When I described to my young relative the laudable public service aspect as well as the entrepreneurial opportunities traditionally available to those running a local radio station, especially in small towns, he remained unmoved, saying "the Government is now taking over and providing all the service people need." He then identified entrepreneurs as those most responsible for wrecking the economy by being "overly competitive and using tax loopholes."

Needless to say, we were both quite relieved when I ended my interview, and he retreated to the blind solitude of the *play* button on his iPod.

Realistically, I can't blame teens and 20-somethings for not being into broadcast radio—they simply didn't grow up with its charm the way we older folks did. Moreover, during the past 15 years or so, the radio industry hasn't helped matters much by cutting localism and turning many a station into a pre-programmed jukebox void of live personality. The downsizing has eliminated on-air positions that used to put eager novices behind the microphone on hometown stations from Florida to Alaska. The consequence has been a shrinking of the "farm team" that once supplied the talent for outlets in larger localities. Of course, many medium market facilities were also adopting national programming from nationwide satellite services, so few noticed that the localized excitement that characterized compelling radio was evaporating just when teens could easily replace it with content on their cellphones.

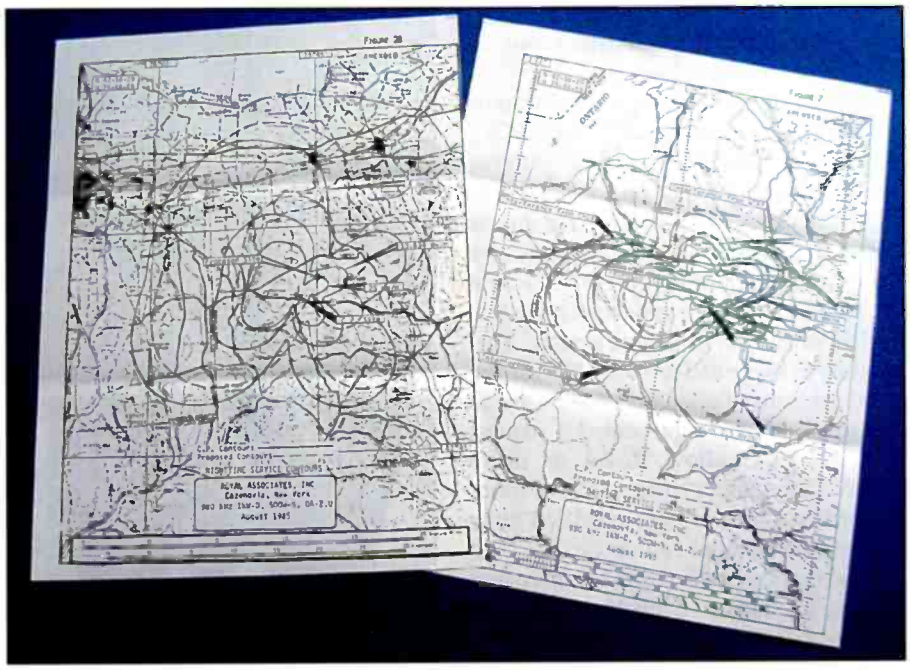
To me it's reminiscent in its poignancy of the once-mighty transcontinental railroads, which in the 1950s began to sharply reduce passenger service when faced with a spreading suburbia, a new interstate highway system, and increased car sales. Today, how many people consider traveling by rail unless it's for some leisurely specialty excursion?

Not Every Radio Dream Got Very Far Down The Tracks

With his uncanny knack for producing obscure documentation for this column, my dad again amazed me with a late spring 1983 clipping from a quaint local newspaper. On the front page of Speculator, New York-based *Hamilton County News* was a story titled, "Radio Station Eyed For County." The author indicated that this Adirondack county was the only one in the Empire State without a commercial radio station. Several officials there admitted that a county with only 5,000 inhabitants and few businesses might be difficult ground for an advertiser-supported medium to cultivate, but they offered hope.

"If we had a local station," the piece quoted the County personnel officer as saying, "I think everyone would listen. It's just what we need." Her boss, the chairman of the Board of Supervisors, echoed the welcome by declaring, "A station would be great for the county. I don't know how it'd do in the winter, but we have a lot of seasonal businesses and they do alright."

Others interviewed by the tiny paper's sole reporter also sincerely hoped for a radio station to be established in their community. It didn't matter that the person whose dream was captured in print planned the station as a daytime-only AM in the 250- to 1000-watt range which would be cobbled together from second-hand, tube-driven hardware from big city radio operations. People said they were "flattered" by the idea.



"O.K., O.K.," my father admitted, "so they're copies of copies and a little tough to decipher." Here are images of WJIW's day and night predicted coverage areas anyway, as the pair of pages represents a mighty rare glimpse of a complicated Central New York AM that never left its paper stage.

To my delighted surprise, the article then presented me with a remarkable coincidence: The *One-Room Broadcasters* lauded in the letter to Kneitel turned out to be the same folks who dreamed of providing a modest commercial radio voice in Hamilton County. A survey of FCC filings doesn't uncover anything further regarding their daytimer idea, and unfortunately to this day, no standard broadcast band signal emanates from that pine-lined pocket of New York.

The Almost AM

Also springing from my dad's fabulous file cabinet is another example of a radio station dream. Sadly again, I can find no historical trace that this dream came any closer to reality than our aspiring couple's Hamilton County wish. It, too, is the story of someone hoping to offer coverage in a slice of the Empire State—specifically, an upscale, lakeside, rural college community called Cazenovia, not far from the city of Syracuse.

While motivation speculation is idle, I will venture a guess that most people who try dropping radio stations into communities within 20 miles of a good-sized city are really dreaming about becoming a player in that larger marketplace and are using the secondary locale to get a foot in the door. In fact, the guy who hired an engineering firm to find an available frequency in Cazenovia (a village of about 3,000) lived in much busier North Syracuse and probably would have been happier if some unused spectrum space could be excavated there.

Judging from the resulting "proposed coverage map" prepared for his fledgling Royal Associates, Inc., the 980-kHz spot on the AM dial that the consulting engineer squeezed into Cazenovia was shoehorned indeed! Even on paper, its dual directional patterns (one for daytime and the other to activate after sunset) barely touched Syracuse with an anemic 0.5 millivolt per meter during daytime operation and completely missed it at night. The map demonstrates that in addition to being fringy in Syracuse, the proposed Cazenovia facility would—at its 0.5 mv/m borders—take on daytime interference from co-channel neighbors CHEX in Peterborough, Ontario; WTRY in Troy, New York; and WILK in Wilkes-Barre, Pennsylvania. Additionally, the anticipated AM's southeastern border was tightly reigned in, to approximately 10

miles, so that it would only kiss the adjacent (970 kHz) 0.5 mv/m contour of WCHN at Norwich, New York.

Despite all these handicaps, the proposal was approved by the FCC. Stipulating that the antenna patterns would have to be spot-on for the 1000-watt daytime and 1/2-kW nighttime power to pass muster when activated, the Commission authorized Royal Associates to try and assigned call letters WJIW to the construction permit. This must have happened around 1984, as the documents my father found were dated August 1985 and represented a request that the FCC allow Royal to move WJIW's transmitter site a couple of miles northeast of the pinpoint specified in its original/earlier application.

Dad can't recall a reason for this paper change, but thinks it likely had something to do with Royal having lost an option on the first site or (in a tactic often employed to buy time on an unbuilt CP that's in danger of expiration) using the shift to keep the dream alive until financing or a buyer materialized. Our guess is that the latter came into play. On the back of one map, someone apparently considering the situation jotted down the following notes, which would certainly jolt would-be broadcasters into reality:

Seller asking $20,000 for CP. Time running out in about a year. Probably take less.

Needs 4 tower array and day/night phasors...possibly $125,000–$150,000 just for antenna system. Add cost of land/building. Community is an historic district...might not be easy to get zoning approval for towers.

Array looks really tight and tough to make work without getting/giving interference. Could be FCC nightmare!

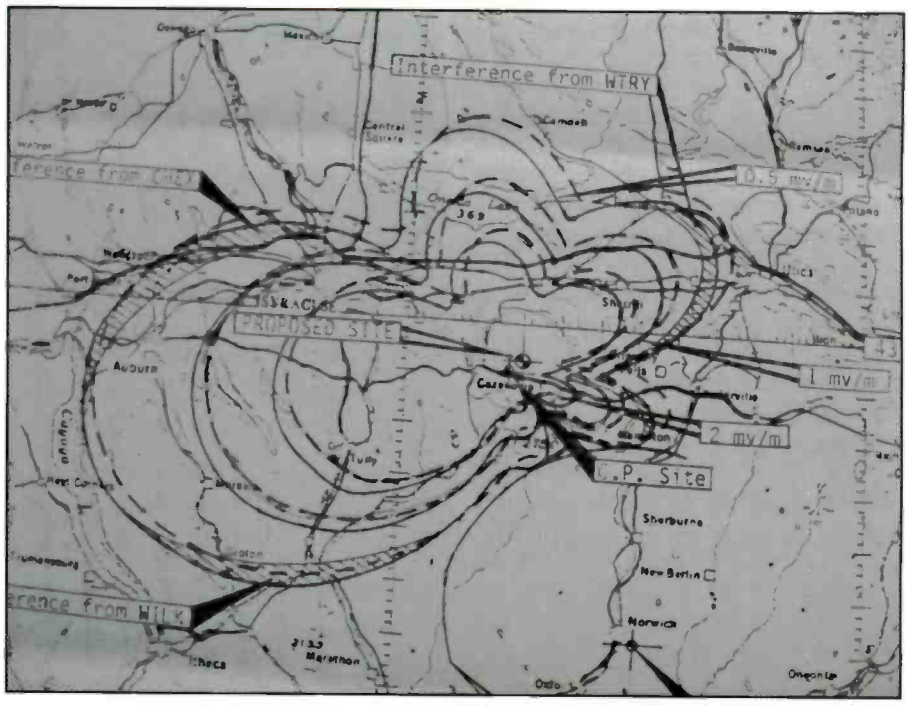
Cazenovia is upscale and gentrified, probably more amenable to FM as opposed to local AM listener loyalty.

Business district is small, quaint, and "gifty." Doesn't appear to have much appetite for radio advertising.

Syracuse coverage is a pipe dream!!!

Sounds like whoever was thinking about buying a chance to build WJIW Cazenovia, New York, ticked off a lot of reasons not to do so. Chief among them, of course, was the paper station's expensive directional antenna system, an array that would have to perform exactly as proposed or risk even more costly "redux" orders from Washington.

In any event, nobody pursued Royal Associates' dream. But at least WJIW had a callsign and lived long enough, in print, to get several brief listings in *Broadcasting Yearbook*. "Not on air yet. Target date unknown," stated the entries through the late 1980s. After its dreamers gave up, the FCC cancelled its CP and identity. WJIW 980 faded from the realm of audio possibilities and joined a legion of other unfulfilled radio aspirations envisioned in places from coast coast.



A close-up of unbuilt WJIW's daytime directional antenna pattern shows how very tightly the coverage is woven into contour boundaries of its active co-channel and adjacent-frequency neighbors. Note areas of expected interference from them. And check out all of those squiggly lines indicating sharp signal nulls. Maintaining such an intricate transmission system would be like having to hit a hole in one every time you play golf!

FM Imagined Too Early

Frequency modulation was barely out of the crib when the next station dream in our short survey actually did materialize. WPTL-FM Providence, Rhode Island, had its germ in the mind of a dear friend of a Christian college president there, one Dr. Howard Ferrin. The educator's friend worked for Schenectady, New York-based General Electric, a corporation completely on board the early FM bandwagon.

According to a March 19, 1986, letter (found in my dad's magic archives, of course) from the former president of what had been known as The Providence Bible Institute, Ferrin remembered that his friend's "responsibility [at GE circa 1945] was to make known the fact that FM radio was being produced." The GE fellow had apparently admitted that every time he tried promoting this new way of broadcasting his spiel was met "with little excitement." Perhaps springing from Christian compassion, PBI's Ferrin gave his pal some good news to report back to Schenectady HQ.

"My friend kept urging me to ask the FCC for a license to operate an FM station on the basis that we were an educational institution...[He said] there would be no cost to it." This was in the mid-1940s when the Commission was so anxious to get its new static-free radio service off the ground—especially in the then virtually vacant 88.1 to 91.9 megacycle educational slice of the band—that a simple application letter for such an FM authorization pretty much did the trick. Ferrin verified that not long after his secretary mailed PBI's request, "we received the license [more accurately, the Construction Permit dated 7/12/46] and put up the tower on the campus right behind the State Capitol building" in Providence.

According to Ferrin, this self-supporting stick caused quite a bit of conversation around the state as to what this new thing—educational FM radio—was all about. In fact, as the most iconic portion of WPTL (calls denoting the Christian school's exclamation, *Praise The Lord*) took shape, no other broadcast organization in America's smallest state had made as much progress toward frequency modulation.

Unless someone has managed to salvage some late 1940s era equipment from the old Providence Bible Institute radio venture or maybe something from the gear's reported early 1950s sale to Brown University, this RCA mic is all that remains of WPTL(FM) Providence, RI. The mic's owner was heartsick when the classic item fell off a shelf in his workshop and broke its stand bracket upon impact.

To be sure, around 1947, "Little Rhody" was home to several other FM CPs: an unnamed 20-kilowatter at 101.5 mc in Pawtucket, as well as Providence's WEAN-FM (94.1 with 16.5 kW), WJAR-FM 95.5 planning 20,000 watts, WLIV 107.7 at 20 kW, and WPRO-FM 92.3 using 20,000 watts. These were all commercial authorizations, however, whose owners were not particularly anxious to be the first to jump into the unknown local FM waters. So, non-commercial WPTL took the first step; reportedly, in early 1947 it signed on as Rhode Island's first FM.

Broadcasting Yearbook from that time period shows it as being on 90.9 mc (an FCC snippet says 88.1) with 1.45 kW of effective radiated power with an antenna at 200 feet above the average terrain. The 1948 edition lists WPTL as having 2.5 kW on 91.5 mc. Ferrin fairly beamed in his letter: "I can say that the highest acknowledgment of it [being the area's pioneer FM] for the Providence Bible Institute taking this important forward step was given by the governor of the state who conducted the dedication opening ceremonies, and he did it with joy."

Jumping ahead a bit, past the end of this FM's story, let me just note that very little remains of WPTL Providence. Other than old people's foggy memories of the venture, some directory listings, a black & white photo of what looks to be its "performance" studio, and one of the two RCA ribbon microphones seen in that picture, the station has pretty much evaporated into thin air.

Dr. Ferrin's correspondence clearly states that he and his radio proponents "entered upon the project with fear and trembling, but with faith God would provide [a way to get on the air] because we had little money." Indeed funds did arrive to erect the tower and equip the station with—presumably—whatever FM gear Ferrin's friend could manage on an educational discount from General Electric. GE wasn't known for mics, hence the RCA units.

One can't claim to decipher definitive detail from that glossy photograph, but it

General Electric had broadcast equipment factories (and stations) in several upstate New York cities, including Syracuse. Consequently, the region was particularly flush with GE professional broadcast goods. Shown here is a late 1940s GE FM transmitter installation at one of GE's Syracuse competitor facilities. Key to our story is the 250-watt transmitter at left (with door ajar). The cabinet to its right is an RF amplifier capable of jumping its companion's output to 3 kW. GE FM transmitters in the 250-watt denomination helped start WPTL(FM) and WEAW(FM).

does depict WPTL as having a professional-looking studio with grand piano, large air-lock studio windows, and sand-cast metal lettered WPTL microphone flag. "We got going sometime in 1947 and broadcast every day," Ferrin said, and admitted running into another challenge. "I did my best to arouse action of churches [to partner in producing programming and promote listenership], but they seemed almost blinded and felt the operation would be short." After all, during the 1940s, FM had almost no measurable audience. This didn't deter PBI's students who enthusiastically continued to volunteer handling any job, from announcing to sweeping the station lobby.

How long did WPTL last? "It turned out to be about six years," Ferrin indicated, "and then, unfortunately, we ran behind about $24,000 [paid to engineering and other required professional personnel] and the Board of Trustees said we had to sell it." He struggled to find a buyer because there was no "stick" value, or intrinsic radio real estate worth anything, in an FM station bobbing around in an empty megacycle sea back then. Since the 1970s, though, even the most moribund big city FM outlet can command a quick sale price in today's jam-packed band.

One of the many logos WBRU(FM) has used since its 1966 beginnings as a self-sustaining Brown University student-operated commercial over-the-air radio outlet. Thirty years earlier, radio buffs at Brown were among the world's first to organize a student-run news and entertainment radio service, though it was then funneled to dormitory residents via AM carrier current radiating through the University's heating system, and was sometimes dubbed the Gas Pipe Network.

Ferrin said that eventually "some students at Brown University became interested and formed an organization which bought WPTL's assets and moved the tower to the Brown campus." The records I found are rather hazy on how this equipment morphed into Brown's well-known commercial band WBRU(FM), which went into operation in 1966. WBRU(FM) has long occupied 95.5 MHz, a spot vacated in the early 1950s by defunct WJAR-FM Providence and then used by WPFM(FM) Providence. The latter facility took to the air in 1955 and sold (for $30,000) to Brown after having gone dark the following decade.

Reportedly, in the early 1960s, a Brown alum who'd made a name for himself in Rhode Island radio suggested that University officials should snap up the Providence area's then only remaining FM allocation, 93.3 MHz at nearby Taunton, Massachusetts, but officials dragged their feet and a husband/wife radio team successfully applied for the frequency.

I can't find any evidence that, in the meantime, Brown University's radio organization had made use of WPTL's educational dial position or fired up any of the pioneer FM's RF generating gear. Prior to WBRU's debut, "broadcasting" from Brown University's young radio buffs was conveyed to campus residents via short-range AM carrier current.

Dr. Ferrin didn't want to give the impression that WPTL transmitted shattered dreams. So he signed off his letter saying, "the one big result that gladdens my heart is that some of the WPTL staff were faculty and students who have since gone out into radio [professionally, including] eleven into Christian radio."

As several PBI grads established careers with influential Trans World Radio and others on stations from New England to California, their collective broadcasting dreams were realized through coverage over most every mile of the globe. Add those of the visionary Brown University radio alumni who decided on a broadcast career and that's a pretty impressive footprint.

A Youthful Broadcaster Dreaming Of Giving Old Radio The Boot!

"This is the story of a seven month old station that has a young staff with ideas," wrote *Broadcasting* magazine's John W. Osbon in the periodical's August 11, 1947 issue. The featured station was WEAW(FM), just north of Chicago, in Evanston, Illinois. "Staffed largely by World War Two veterans," Osbon said, WEAW(FM)'s president and general manager is 25 year old Edward Wheeler, and ex-marine, formerly of Pasadena, California, and a Stanford University graduate."

Jan Lowry's "Station Histories" shows that Wheeler was only 23 and barely out of military service when he'd sought an FM authorization from the FCC in 1945. No doubt, he spent many hours during the war dreaming about getting airborne with his own radio station. Wheeler became excited about FM, the new type of broadcasting that promised to displace static-ridden AM. And he figured established radio executives' stubborn attitude towards such a shift would provide him an unimpeded opportunity to sneak into the clearer medium.

On June 3, 1946, officials granted the young man's request for 250 watts at 104.3 megacycles. Lowry reports Edward A. Wheeler was glad to discover that call letters signifying his initials were available, so reserved the W*EAW* nomenclature. By the end of the year, Wheeler had a 295-foot, self-supported Ideco tower erected on a site located on the Northwestern University Campus, Main and McDaniel Streets in southwest Evanston. Interestingly, *Broadcasting* says Wheeler bought property rather than renting and risking having to relocate if a landlord shifted to unfavorable terms, and a one-story studio building at 2425 Main Street was completed on December 15, 1946.

Wheeler and his youthful crew debuted WEAW(FM) on the first day of February 1947. *Broadcasting* quoted Wheeler as only "hoping that by the end of its first full year of operation WEAW would be 50% commercial [or be considered *halfway* profitable]. But a few days before the station went on the air, Mr. Wheeler reported an unusual response from advertisers [many of whom had never heard FM] to its published rate card. The Evanston FM-er began operations with 25 sponsors who were willing to take a chance."

Charges for advertising on the upstart facility seem cheap today, but with a monthly operating cost of only $1,700, Wheeler was able to satisfy his expenses plus chip away $10,000 from his North Shore Broadcasting Company's $50,000 equipment and building investment. For studio-originated programs between 5 and 10 p.m., he charged $30 for a 60-minute sponsorship, down to just $3 for 50 words of ad copy. Prior to these prime-time evening hours, rates ranged from $20 to $2 dollars. Its 65-hour-per-week "block schedule" during the early years was Mondays through Fridays, 3 to 10:30 p.m.; Saturdays 12:30 to 10:30 p.m.; and Sundays from 10 a.m. (to accommodate church broadcasts) to 10:30 nighttime sign-off. "Popular music prevails during afternoon hours," noted *Broadcasting's* Osbon, "while classical and semi-classical is aired between 6 and 10 p.m."

Wheeler knew that specialty shows were the best way to get listeners to sample his FM station, or any newcomer station for that matter. Osbon was particularly taken with WEAW's diversified offerings, among them, "*Boy on the Street*, which features interviews with grade school boys [*Now that's a way to get doting parents and grandparents to spring for a new-fangled FM radio in the house!—sh]; The Flying Reporters*, devoted to information about private aviation in the Chicago area; *H.J. Jaro Presents*, a cultural program by a European commentator; and *Club Downbeat*, a disc M.C. show highlighting Bill Branch, Negro announcer, and sold to the colored merchants."

Wheeler also made sure that educa-

tional fare flowed from WEAW's 250-watt GE transmitter and two-bay antenna, yielding some 310 watts of effected radiated power. "Under working arrangements with Northwestern University," said Osbon, "three evening half-hour periods a week are given to programs which emanate from the University's Department of Speech and Journalism." That also put a lot of young people on the air and familiarized them with the station and FM.

Where could Wheeler's diversified programming vision be heard? Osbon cited the young owner as saying "the station covers the Chicago and suburban area, with consistent reception having been reported up to 135 miles away." This mapping certainly paints a picture of how incredibly free and clear the FM airwaves were circa 1947!

Wheeler kept dreaming of ways to reach a greater audience and more sponsors. By mid-June 1947, the FCC helped him out with a power increase to 665 watts and dial shift to 96.7 megacycles. He got the Commission's O.K. to really boost WEAW, up to 36,000 watts at 105.1 mc in September 1948. Five years later the station changed its calls from WEAW (FM) to WEAW-FM so that the WEAW handle could be assigned to a daytime AM sister at 1330 kilocycles Wheeler had been authorized to construct at Evanston for service to greater Chicago's north side.

This AM originally formatted "good music" programming, much of which, by the early 1950s, was also played on the then bigger incarnation of WEAW-FM in a "storecast" mode which allowed FMs to charge retailers for transmitting to their stores' specially equipped radio/public address systems, which provided background music and customized announcements or brief silent periods (in place of the station's regular commercials), all triggered by sub-audible tones.

Dreams of super-power for WEAW-FM began to take shape in March 1960 when the FCC told Wheeler he could jump his station's output to 192 kW! For some reason, officials shaved 12,000 watts off this grant, but after installing a heftier antenna on the original WEAW(FM) tower, by early 1964, Wheeler was able to throw the switch lighting up 180 kW worth of coverage. That must have turned the newly humongous FM's little Main Street headquarters into a giant microwave oven! A 1960 studio relocation to 1700 Central Street in Evanston, however, prevented sensitive employees from getting nuked.

At decade's end, the FCC let Wheeler do something he'd long hoped for -turn WEAW-FM into a de-facto Chicago station. Washington gave the green light on Wheeler's plan to move his station's transmitter to the top of "Big John," the 100-story John Hancock Center in the Windy City's prestigious business district. With a new antenna height of nearly 1,200 feet above average terrain, however, WEAW-FM's power level was required to match the output of the city's Class B brethren (the equivalent of 50 kW at 500-feet above the average terrain). To compensate for roof structure weight restrictions and any height over 500 feet, this meant constructing a multi-station master antenna system and throttling back to 6.2 kW. Wheeler foresaw opportunity in the 1971 transmission consolidation, so he installed the antenna and leased access to it to his competitors.

In keeping with his specialized programming tradition, Wheeler recognized a serious market in Spanish Language programming. In 1973, he dropped the WEAW-FM calls for WOJO(FM) an identity that signifies *ojo*, "eye" or perhaps "vision" in Spanish. This language became WOJO(FM)'s mother tongue in 1974. October 1977 saw the FM and its younger AM sibling move their studios to a newly completed building on the Evanston street corner where the once modest FM had been born 30 years earlier. Sadly, in November, Wheeler passed away "after an extended illness."

Though the stations of his youth were subsequently sold and have now long been in others' hands, those who've listened to the Evanston outlets—as is the case for *anybody* who has ever heard an AM or FM founded by an energetic but modestly funded broadcaster—have touched a dream.

And so ends another day of broadcast history in *Pop'Comm*...

Morse Code: No Longer Required, But Still Gaining Ground

by Kirk Kleinschmidt, NTØZ
kirk@cloudnet.com

"In five short years [Milt Coleman, Sr., K4OSO] went from newly licensed ham to membership in the ARRL's A-1 Operator Club and the UK-based First Class CW Operators' Club (FOC)."

It's been more than three years since the FCC pulled the plug on the Morse code requirement for amateur radio licensing in the U.S. and its territories, and I think more than a few hams are surprised that our beloved service hasn't collapsed outright.

Beginning hams may not have a sense of the history and the controversy that led to the decision. Let's just say that passions ran hot on both (or all) sides of the issue. Some hams thought that the Morse code requirement kept the riffraff out of the hobby, while others—riffraff and worthy supplicants alike—thought that the code presented an "unrealistic and anachronistic barrier to admission."

Whatever the reasons, pro or con, demonstrating Morse code proficiency is no longer required to become a ham operator, but that doesn't mean that the revered code is going away any time soon (or at all). All indicators point to the fact that Morse code is alive and well—and even growing.

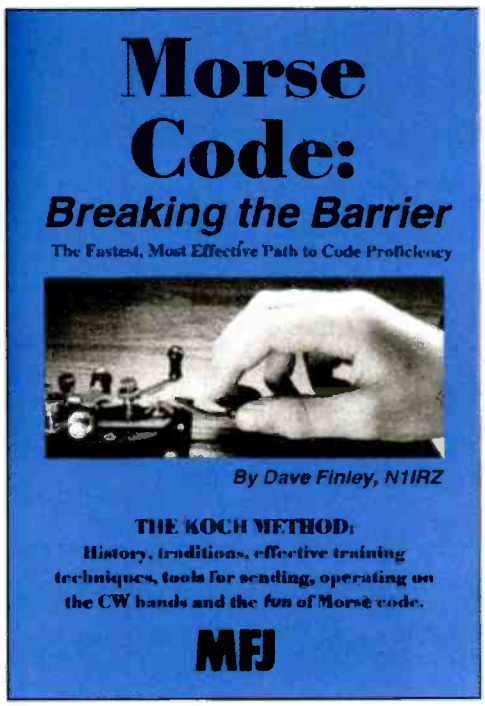
The CW subbands are as crowded as they ever were (more crowded now that digital-mode ops are moving ever downward on bands such as 40 meters), the number of CW-mode logs submitted in a variety of contests is growing or holding steady, and so on.

The point is this: Just because you don't *have* to learn the code, doesn't mean you *shouldn't* learn it. Using the code on the air is still a thrill, it still has tremendous advantages over voice modes, and it's still the simplest and least expensive way to communicate via radio.

For some, learning the code is a lot like taking piano lessons as a kid. At the time it may have been dreadful, but later in life you were darn glad you were *forced* to learn. (For me, the code came easily. Touch-typing, however, is another matter...we all have our burdens.)

Having a hard time working mic-mode DX? Morse code *blows away* SSB when conditions are poor, you're running low power, you have a crappy antenna, you're operating in the field, you just *have to* work the DX station, etc.

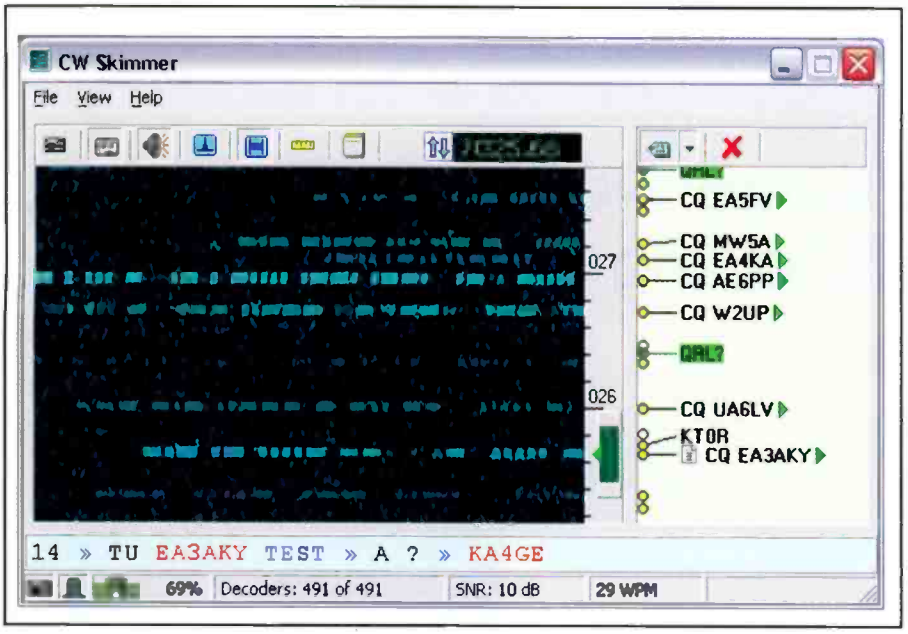
Morse code isn't for everyone, but most of the frustration seems to come from not really knowing how to use it effectively or not actually using it enough to become proficient. As with the piano, practice makes perfect, but practicing the correct techniques right from the start can reduce the time it takes you to perfect your Morse code skills and reduce the time it takes to actually *enjoy* the experience



Morse Code: Breaking the Barrier, by CW enthusiast David Finley, N1IRZ, is billed as the first book to detail the Koch method of learning the code and emphasizes the training techniques that are the fastest and most effective for code proficiency. Finley, once frustrated by the code-learning process, discovered this simple method and used it to overcome the barrier and upgrade to Extra class. The book is available at www.amazon.com, from www.mfjenterprises.com, or from your favorite amateur radio bookseller.

What Would Milt Do?

Despite the fact that Milt Coleman, Sr., K4OSO, of Rockville, Virginia, has been a ham for only five years, he's a Morse code rock star of sorts. In five short years he went from newly licensed ham to membership in the ARRL's A-1 Operator Club and the UK-based First Class CW



Just can't get the hang of the code? Need to copy 700 CW stations at once on your wideband software-defined radio? Want a PSK-like waterfall program that copies Morse code? *CW Skimmer* 1.6 by Alex Shovkoplyas, VE3NEA, can do all that and a whole lot more. It's free to try, but a licensed version costs $75, so it's not exactly casual. The program does a great job at decoding Morse code signals for SWLs and raw recruits, but it's also used by DXers and contesters, where its adoption has become quite controversial! Check it out for yourself at the Afreet Software website, www.dxatlas.com/CwSkimmer.

Operators' Club (FOC). Membership in each organization is "by invitation only," and is intended to honor exemplary on-air Morse code operating skills and overall operating excellence.

Who better to encourage new hams to learn and use the code?

Milt's "8 Good Reasons for Not Getting on the Air" are listed below, with permission:

1. *I can't copy very well.* Copy skills get better with time and practice. Nerves are certainly a factor at first. The answer to nerves is exposure. Get on the air and practice your skills. After all, you're not copying vectors for exploratory brain surgery, just fun stuff. What if you *do* miss a few words? Eh?

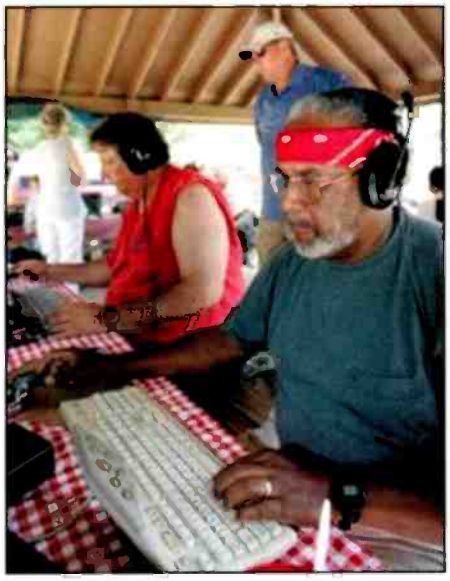
2. *I make mistakes when sending.* Who cares? Everyone makes mistakes when sending! If you show me an op who sends flawless CW, I'll eat my hat. Even keyboarders make mistakes. It's what you do when you make a mistake that is the measure of an op. A good op corrects his mistakes. When you glide past mistakes it leaves the other guy guessing.

3. *My CW is very slow.* Accuracy transcends speed! Accuracy is absolute, while speed will increase/improve over time. What you *don't* want is to get faster at sending poorly. Fast and poor are an awful twosome. Practice sending well, at a speed that is comfortable for you. You *will* make mistakes. Simply correct them and move on.

4. *I get lost in QSOs.* As many have suggested, by writing down the parts of a typical exchange you will be better able to get through a QSO. It's funny to realize how few comments are directed to spelling. Spelling slows us down and trips us up in many QSO situations. When you practice sending CW off-air it's fine to use a sheet of text, but I find that sending as if you're in an actual QSO is much more helpful. Practice this by sending out of your head. You'll get used to sending off the cuff and your spelling will improve tremendously.

If rag-chewing is your goal, keep your exchanges short. Don't try to say too much in one exchange. That way you'll have time to think about what you'll say next. The short exchanges will slow the other op as well, making his transmissions easier to copy. Keep it casual, and don't let it become hard work.

5. *My palms sweat.* Keep a hand towel at your operating desk. My palms were sweaty on my first date, too, but it didn't stop me. Remember, no one can see you!



Milt Coleman Sr., K4OSO, an A1-Op and FOC member, this month's guest contributor and Morse code mentor, is shown here slinging dits from his Mercury paddle on Field Day. Milt can also be found on the Maryland Slow Net (a 10-wpm CW traffic and training net that meets daily at 7:30 p.m. EST on 3563 kHz) or the Hit and Bounce nets (daily at 1130, 1230 and 1330 UTC on 3.576, 7.114 and 7.042 MHz, respectively).

Try pretending you're as calm as a cucumber. Think of yourself as a "take charge" op who can handle any situation. As an op thinkest, so shall he be on the air.

One activity that improved my confidence and ability to handle most situations was learning traffic handling on the Maryland Slow Net. Net speed was a maximum 10 wpm, and the instructors were patient and considerate. That training gave me the confidence I desperately needed. I'm now an Instructor and Net Control Station on that net and get to watch the new participants transform from tentative and unsure to ops who would be welcomed on any NTS traffic net throughout the country. Slow-speed CW nets are easy and painless, and new ops proceed at their own pace. Even if you don't become an active traffic handler, the training is invaluable for learning general operating practices.

6. *Other ops will think poorly of me.* No way! Everyone expects new and inexperienced CW ops to be somewhat tentative, make a few mistakes and miss some copy. They expect it because *they performed the same way when they were new and inexperienced.* Some well-meaning ops will suggest that "no one will notice your mistakes," but of course, they *will* notice them! They'd have to be idiots not to. The thing is, no one cares about your mistakes. This is a hobby, a means of having fun. It *will* be fun if you stop agonizing over it. The amount of fun you have when working CW is inversely proportional to the amount you worry about it.

7. *I'll do it when I get better.* That's fine if you like procrastinating. "He was gonna get on the air tomorrow" would make an unfortunate epitaph. "He really enjoyed his ham radio hobby and his CW" would be a much nicer one. I waited until I was over 60 to finally get started in ham radio. I often think of how much fun I could have had over the years if I had just bitten the bullet and jumped in sooner. Now, I'm trying to make up for lost time. But, we all know that's impossible.

8. *I have problems with this key or that key.* It's simple: Use whatever key or keyer you're good with, and develop your skills on other keys at your own pace. Whatever you do, don't force yourself to use a key that frustrates you. Learning new skills, while not always easy, should be fun. Measure your progress in small chunks. Don't set your goals too far ahead. You must be able to see progress. If speed improvement is your goal, measure it one word per minute at a time. Don't try to go from 5 wpm to 10 wpm. That's doubling your speed! It would be like me trying to go from 35 wpm to 70 wpm! It's never gonna happen. Go from 5 to 6, then to 7, and so on.

One Big Name Or Another

In a nutshell, learning the code correctly sort of comes down to choosing between two big names: Farnsworth or Koch. Each developed an excellent system for effectively learning Morse code and using it fluently *after* mastering the basics. Choose one system, or both, but don't learn the code like a Boy Scout or you'll pay the price down the line.

Farnsworth and Koch teach the code at full speed, adjusting the spacing between full-speed letters and words or limiting the number of characters learned (at full speed) before adding another. Each system is *way better* than learning the code at slow speed or by visually learning the dot and dash patterns from a book or printed page (such as the *Boy Scouts Handbook*). Morse code is an auditory skill, and if you learn it visually you'll have to add an extra layer of translation when you try to use it on the air at typical day-to-day speeds. *Don't do t that way!*

There are lots of Morse code learning resources available on the Internet. One of my favorites happens to be hosted by *Pop'Comm*'s propagation editor, Tomas Hood, NW7US, at http://cw.hfradio.org. By the time you've read the material there and followed a few links you'll know all you need to know about Farnsworth or Koch.

Get Coding

Since I started in radio in the 1970s, about 90 percent of my hamming has been done via Morse code. As a long-time QRP operator, using Morse is almost a prerequisite for success. Despite 30-plus years behind the key(er), I wish I had known about either of the two aforementioned code gurus when I was learning Morse. I'm sure it would have dramatically increased my facility and enjoyment.

So, now that you know the secret names, what are you waiting for?

Has Cycle 24 Started Yet? Is It *Over*?

by Tomas Hood,
NW7US, nw7us@arrl.net

From December 2009, through the beginning of April 2010, there were very few days where the sun went spotless. This caused quite a lot of excitement. But, during April and May, spotless days returned, though not like the very quiet months of the years of sunspot cycle minimum. However, because the overall activity level fell after March, many speculate that the new Sunspot Cycle 24 has not really begun, or worse, that Cycle 24 will not amount to anything like what we've seen for decades. There are alarmists who think that these less active months prove that we're going to see a Maunder Minimum-like prolonged minimum and that Cycle 24 is a dud.

Is it unusual that the start of a sunspot cycle should have such a drop in activity after seeing months of increase? Has this cycle died?

"Is it unusual that the start of a sunspot cycle should have such a drop in activity after seeing months of increase? Has this cycle died?"

At press time, solar scientists who do the math to calculate the very end and start of sunspot cycles have determined that December 2008 is the mathematical start of Solar Cycle 24. This is based on smoothed sunspot numbers and also the magnetic polarity of the sunspots observed.

If we take a look at Sunspot Cycle 23, which began in May 1996 and ended in December 2008, we can see that the monthly count varied greatly during the entire cycle (**Figure 1**). This is typical of any cycle we've recorded.

Let's compare the first months of Cycle 23 and

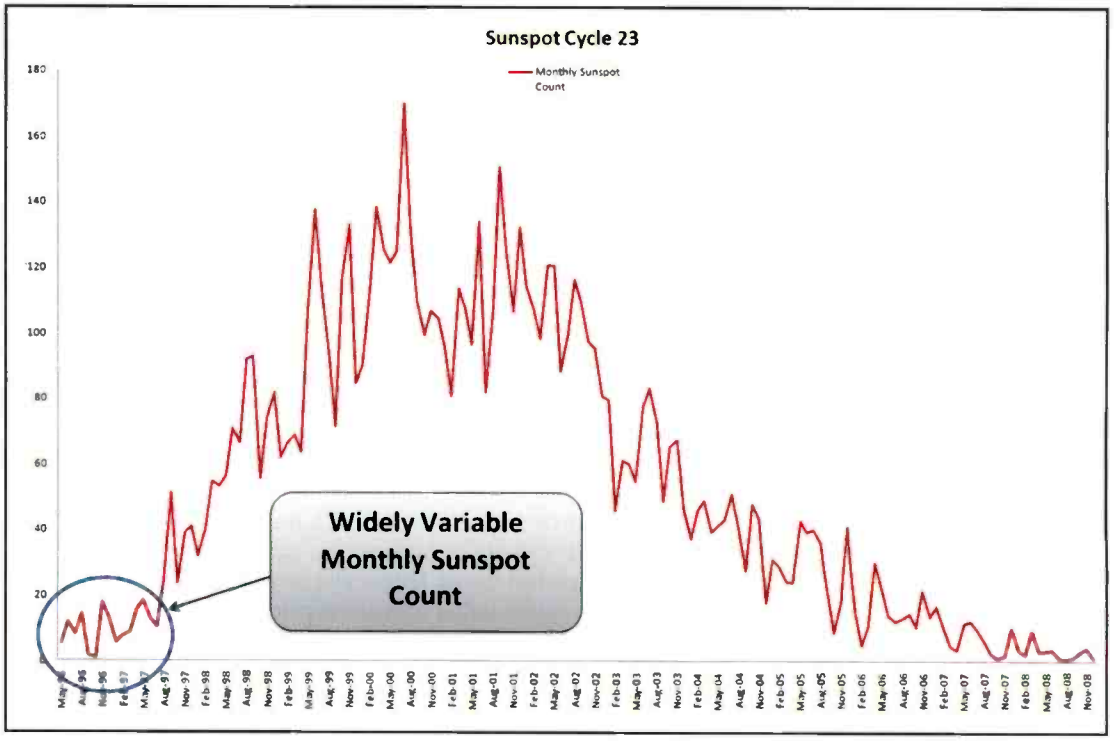


Figure 1. As we look at the duration of Sunspot Cycle 23, and for that matter, the first months of the cycle, we can see that there is a wide variation from month to month. What we're witnessing right now—a few months where activity was excitingly high, and then some months with fewer sunspots—is a normal progression of sunspot activity. (Source: NW7US, using official Solar Influences Data Center, Royal Observatory of Belgium, sunspot records)

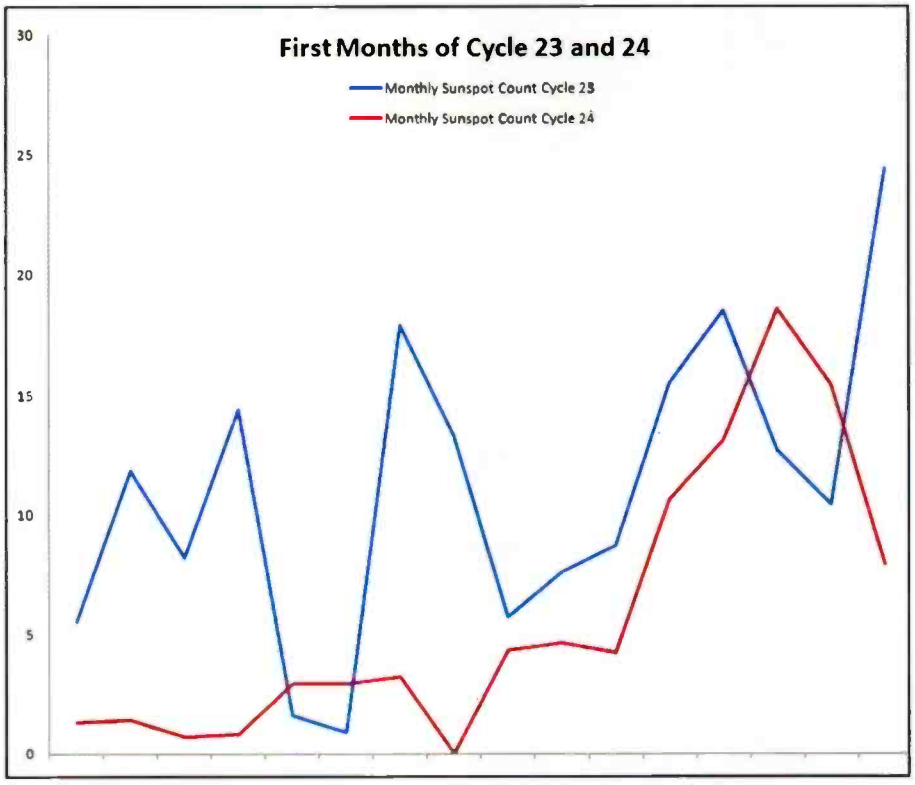


Figure 2. This is a plot of the first months of both Sunspot Cycle 23 and 24, comparing the monthly sunspot counts. You can see with each cycle the wide variation between months. Such variations are typical of all cycles we've recorded since the 1700s. (Source: NW7US, using official Solar Influences Data Center, Royal Observatory of Belgium, sunspot records)

24 (**Figure 2**). While it's true that the general level of activity during most months of Cycle 24 (since January 2009) is somewhat lower than the same months at the start of Cycle 23, the trend has been, generally, upward. In other words, Cycle 24 seems to be quite normal in that there is an upward trend and that the monthly counts vary greatly. The dips we see are expected. They do not indicate that Cycle 24 has died.

Remember, a full sunspot cycle is approximately 11 years in duration. In the past—not in our lifetime—there have been long drawn-out minimums, such as we've seen between Cycle 23 and 24. It's not that unusual, in the larger recorded history. But, because it is *unusual* from the perspective of our lifetime, mainly the last two or three cycles, we think it's strange. This perspective fuels the speculation that Cycle 24 is a dud. But, as we can see in the comparisons with other cycles, and when we take the longer history of the sun's cycles, this current solar activity is not that out of the ordinary.

Unlike the long periods (at times, as long as a month) when we saw no sunspots, April and May did see sunspot activity. At times, the activity was record breaking. For instance, on May 5, 2010, the daily sunspot count reached 77, the highest yet in Sunspot Cycle 24. By May 9, however, the sun grew quiet again, until new active region 1072 emerged on May 20. This particular sunspot group was interesting because the leading sunspot in the group was very well defined, showing a classic, round sunspot with a pronounced penumbra and umbra.

A sunspot appears darker than the rest of the solar disc, because it is cooler than the surrounding area. Within the sunspot, there is a dark center, called the umbra, and a lighter area wrapped around the umbra, called the penumbra. This sunspot in group 1072 was well formed (**Figures 3** and **4**) and provided proof that the cycle is underway.

August Propagation

Late August and Early September are a difficult time of year for which to make accurate band predictions because conditions can change drastically from day to day. On many days typical summertime conditions will continue much as they

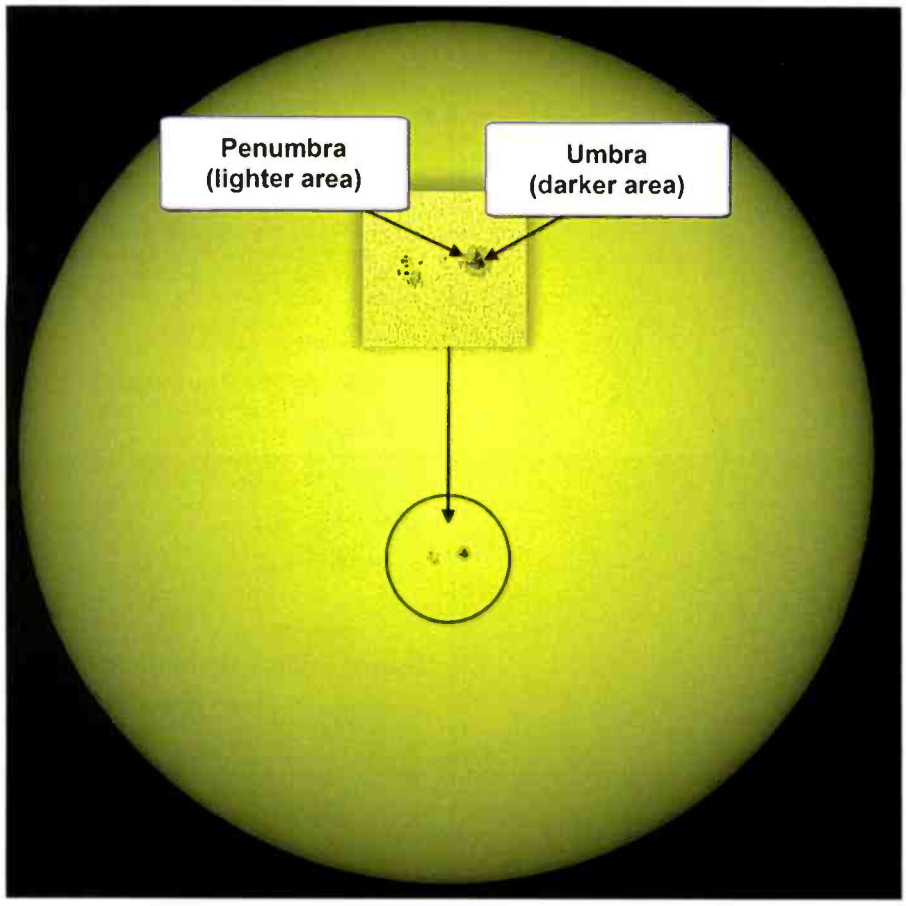


Figure 3. During the middle of May, a new sunspot region emerged, numbered by NOAA as Active Region 11072 (short number, 1072). In this view of the sun, taken by the Solar Dynamics Observatory (SDO), the sunspot region featured a very well-defined sunspot in the leading (right) side. Notice in the enlargement the dark Umbra and the lighter Penumbra. These areas appear darker than the rest of the sun's "surface" because they are coolor regions.

were during June and July. On the other days conditions may appear typically fall-like, with somewhat higher daytime usable frequencies and somewhat lower nighttime usable frequencies. When you add equinoctial conditions that can begin as early as late August, we often experience optimum openings between the Northern and Southern Hemispheres, but also periods of active to stormy conditions.

Despite being at the very beginning of Solar Cycle 24 with low solar activity, during the daylight hours good DX conditions should be possible on 17 and 20 meters. Expect signals on these bands to peak approximately during the two-hour window immediately following sunrise and again during the late afternoon. These two bands will see openings for DX throughout the daylight hours. Fairly good DX openings should occur along an arc extending across central Africa, Latin America, and into the far Pacific area. Peak conditions should occur during the afternoon hours, but an increasing number of earlier openings should be possible by early September.

Between sundown and sunrise 20 meters is expected to be the best DX band. Openings might be possible to many areas of the world, some with surprisingly strong signal levels, especially when using digital and CW modes. Until midnight good DX conditions should be found for openings toward Latin America, the far Pacific, and into Asia. You might even catch some activity on 17 or even 15. Fairly good conditions are also expected on 30, 40, 60, and 80 meters despite the high static level at times. Openings should be possible before midnight along an arc extending from northern Europe, through Africa, and into Latin America, the far Pacific, and Asia after midnight.

By late August it should be possible to work some DX on 160 meters during the hours of darkness. Conditions on this band, as well as on 40, 60, and 80 meters, will tend to peak just as the sun begins to *rise* on the light, or easternmost, terminal of a path.

For short-skip openings during August and early September, try 80 meters during the day for distances less than 250 miles, with 60 and 40 meters also usable. During the hours of darkness both 80 and 160 meters should provide excellent communications over this distance. For openings between 250 and 750 miles use 30 and 40 meters during the day for distances up to 500 miles, and 20 and 17

Optimum Working Frequencies (MHz) - For August 2010 - Flux = 91, Created by NW7US

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

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

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

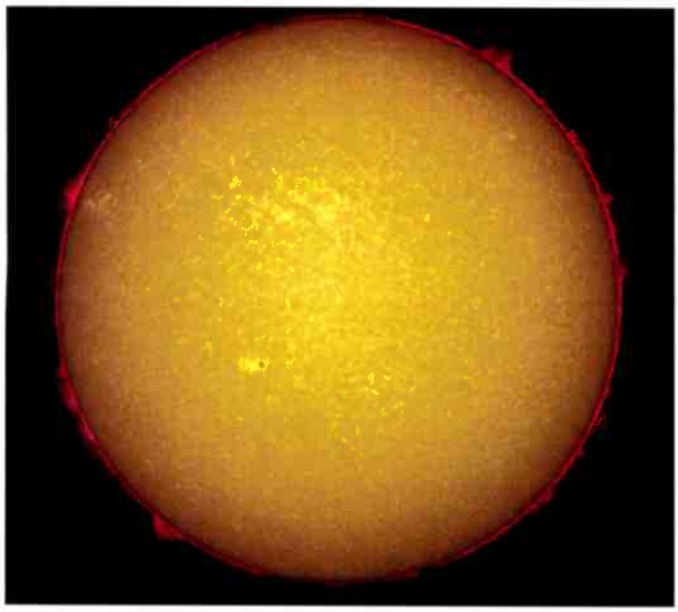

Figure 4. A view of the sun seen in several different filtered lights was capture by the Solar Dynamics Observatory (SDO) on May 21, 2010. You can see the very well-defined active sunspot region, 1072. SDO is providing stunning high-definition views of our local star.

meters between 500 and 750 miles. At night, 40 and 30 meters should be the best bands for this distance until midnight, with 80 meters optimum from midnight to sunrise. Try 60 meters, as well.

For openings between 750 and 1,300 miles, try 20 and 17 meters, as they should provide optimum propagation during the hours of daylight. Optimum conditions should continue on these bands for this distance range after sundown and until midnight. Between midnight and sunrise the best band should be 40 meters, but check 60 meters, too. For openings between 1,300 miles and the one-hop short-skip limit of approximately 2,300 miles try 20 and 17 meters during the day, with 15 meters also usable. After sundown try 30, 40 and 60 meters, with 80 meters also providing good propagation conditions for this distance range.

VHF Conditions

Sporadic-*E* (E_s) propagation usually begins to taper off during August, but it should continue to occur fairly frequently. Some 6-meter E_s openings are expected during the month over distances of approximately 750 to 1,300 miles. During periods of intense and widespread E_s ionization, two-hop openings may be possible considerably beyond this range. Also check the 2-meter band for an occasional E_s short-skip opening between approximately 1,200 to 1,400 miles. While E_s short-skip openings may occur at any time, there is a tendency for them to peak between 8 a.m. and noon, and again between 6 p.m. and 9 p.m. local daylight time.

The Perseids meteor shower covers the period of late July to late August. The peak is expected to occur mid-August and will be most observable in the Northern Hemisphere. The maximum hourly visual rate should reach 100.

Aurora? You would think that aurora would not be a frequent player at this point in the lull between Cycle 23 and Cycle 24, but, with the continued expulsion by the sun of coronal mass into the solar wind, we have been observing occasional moderate auroral activity in the highest latitudes. Auroral-scatter-type openings, on both 6 and 2 meters, can range from a few hundred up to about 1,000 miles, and they are usually characterized by very rapid flutter and Doppler shift on SSB signals.

The very patient can check the 6-meter band for possible trans-equatorial (TE) openings between 8 and 11 p.m. local daylight time. This type of propagation favors openings from the southern tier states into deep South America, with the signal path crossing the magnetic equator at a right angle. TE openings during August are rare, but they can occur. Very weak signals and severe flutter fading usually characterize them.

Current Solar Cycle Progress

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 76 for April 2010, down from March's 83.3. The 12-month smoothed 10.7-cm flux centered on October 2009 is 74.1, up from September's 73.3. The predicted smoothed 10.7-cm solar flux for August 2010 is approximately 91, give or take about 8 points.

The Royal Observatory of Belgium reports that the mean monthly observed sunspot number for April 2010 is 7.9, down from March's 15.4. Don't fear, though, because in every sunspot cycle we've recorded, it is typical for wide swings from month to month, as the activity level increases until solar cycle maximum is reached. The lowest daily sunspot value during April 2010 was zero (0) on April 14–20, 23–24, 26–27, and 29. While that is a longer string of "zero" days, it is not unusual during the ramping up of a new sunspot cycle. The highest daily sunspot count for April was 25 on April 4. The 12-month running smoothed sunspot number centered on October 2009 is 7.0. A smoothed sunspot count of 33 is expected for August 2010, give or take about 8 points.

The observed monthly mean planetary A-Index (A_p) for April 2010 was 10, significantly higher than we've seen in years; the last time the planetary A-index was 10 was in December, 2005! This is significant as another sign that the new solar cycle is gaining in intensity. As we move closer and closer to the new sunspot cycle maximum, we're going to see a lot of geomagnetic storms and generally higher geomagnetic activity. The 12-month smoothed A_p index centered on October 2009 is 4.0. Expect the overall geomagnetic activity to be unsettled to stormy during July.

At the time of writing, the forecast holds that August will see great variation between quiet periods and days with strong geomagnetic storminess due to recurring coronal holes, and possible coronal mass ejections (if flaring continues to increase with the expected rise in solar activity).

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 (P.O. Box 9, Stevensville, Montana 59870), or catch me on the HF amateur bands. Please come and participate in my online propagation discussion forum at http://hfradio.org/forums/. If you're on Facebook, check out http://tinyurl.com/fbswx and http://tinyurl.com/fb-nw7us. Speaking of Facebook—check out the *Popular Communications* fan page at http://tinyurl.com/fb-popcomm.

Until next month, 73 de NW7US, Tomas Hood

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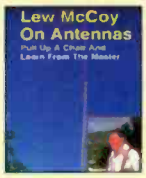

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The Night Hawk Spreads Its Wings Once Again

by Peter J. Bertini
radioconnection@juno.com

This month we pick up where we left off in June's column, where we revisited a "Radio Connection" classic. Let's finalize our foray into column nostalgia with more details on improving John Haught's "Night Hawk" regenerative receiver project, which first appeared in our January 2001 column.

To briefly recap, David Green's *One-Tube All-Bander* receiver, featured in the January 1967 issue of *Electronics Illustrated* magazine, was the inspiration that guided John's Night Hawk receiver project. Recently reader Richard Yingling suggested several improvements that he has successfully adapted to the one-tube design.

Quite simply, what we're doing is adding a second 12AT7 twin triode, which upgrades the receiver to two stages of audio amplification, and also adds an untuned RF amplifier stage. *Please note, however, that this project is for more advanced builders. To safely construct this receiver you'll need some knowledge of how to and design a power supply to run the receiver, and you should also have experience with RF and working with the voltages encountered in tube circuits.*

If you're going to upgrade an existing one-tube receiver, you must make sure that the power supply transformer is rated for the additional filament current. You'll need between 100 and 150 volts DC to power the B+, and 6 volts AC at 2 amps for the filaments. This receiver design is for use with high-impedance headphones; otherwise, a matching transformer will be required.

One other change in this update is that C2 is now a fixed 47-pF capacitor. I'd suggest experimenting with this value; ideally use the lowest capacitance that provides adequate signal coupling to the detector. Consider using a 47-pF trimmer in this location, and then fine tuning the value to find the optimum sweet spot for each band coil.

I suspect that it might be a bit easier to build a new version of the updated design from scratch, rather than trying to adapt these changes to an existing One-Tube All-Bander or Night Hawk receiver. The receiver layout is easier and neater if the dual triodes in one 12AT7 are used for the RF amplifier and regenerative detector, and the dual triodes in the second 12AT7 are used exclusively for the two-stage audio amplifier. If you're upgrading an existing design, refer to the column in the June 2010 issue. If you're starting from scratch, the schematic for the Twin-Tube Night Hawk is shown in **Figure 1**.

"Like all good things, I suspect the Twin-Tube Night Hawk will, like the legendary Phoenix of myth, arise from the ashes in a few years' time for a new rebirth."

The Coil Set

Note that **Figure 1** doesn't show the tuned antenna circuit in detail, as Richard's approach was a bit different than the plug-in coil system championed by David Green.

Figure 2A shows Richard's ham receiver antenna tuning system. Richard uses a single tapped 10-µH coil, with a band setting tuning capacitor that's in parallel with a smaller range fine tuning variable capacitor (this is the receiver that was shown last time). Since I'm unfortunately lacking a lot of the details behind Richard's single-fixed-coil design, other than that it was used mainly on the 40-meter amateur radio band, I suggest staying with the original plug-in coil system outlined by Green back in 1967. Besides, a plug-in coil set can offer the opportunity to wind new coils to explore the WARC (World Administrative Radio Conference) amateur bands.

Figure 2B shows the details of Green's coil system. The coil forms are eight-pin Bakelite bases salvaged from defective octal glass radio or TV tubes. Now take a look at **Photos A** and **B**. This is a second version of the Twin-Tube Night Hawk that Richard assembled. Note that this receiver uses the original One-Tube All-Bander coil set. As with his other receiver, Richard has again made use of a defective piece of test equipment to house and power his project. Good stuff!

Coil Winding Data

Coil winding details are shown in **Table 1**. Removing a few turns from the winding on coil

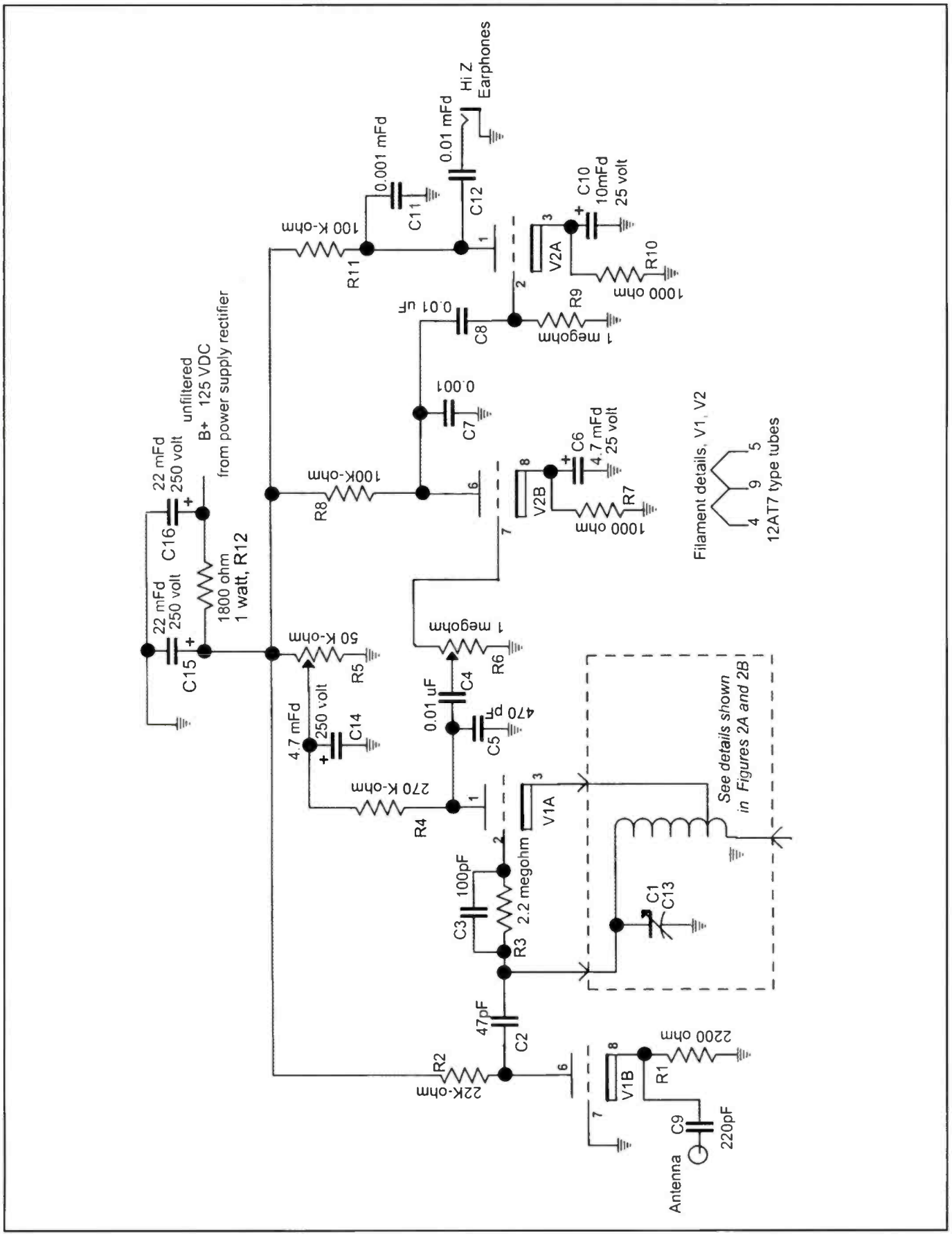


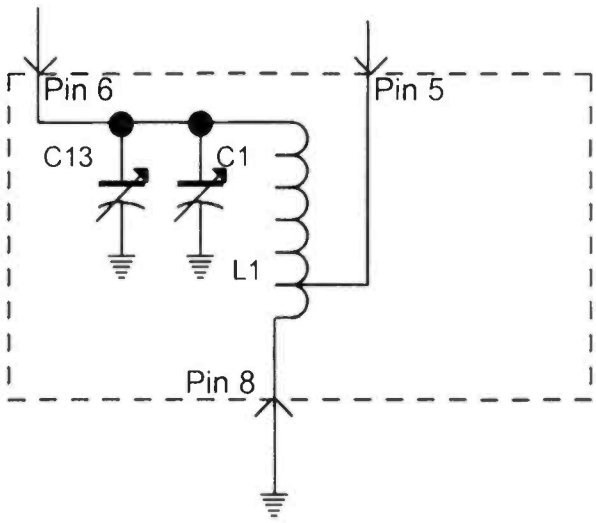
Figure 1. The schematic for the Twin-Tube Night Hawk.

L5 should yield coverage over the new 30-meter amateur band. All coils are wound with 28-gauge enameled wire. The exact gauge is not overly critical. The windings can overlap, especially for the lower frequency coils.

The pictorial drawing at the bottom of Table shows the mounting details for the fixed band-spread capacitor that's used for coils L2 through L5. Use a good-quality ceramic (NPO) or silver mica capacitor here. The tuning capacitor for the coil set is the standard 365-pF type, and you can salvage one from old tube table radios. A good vernier dial drive is needed to reduce the tuning rate; it might be possible to salvage the tuning system used in the donor chassis for this purpose.

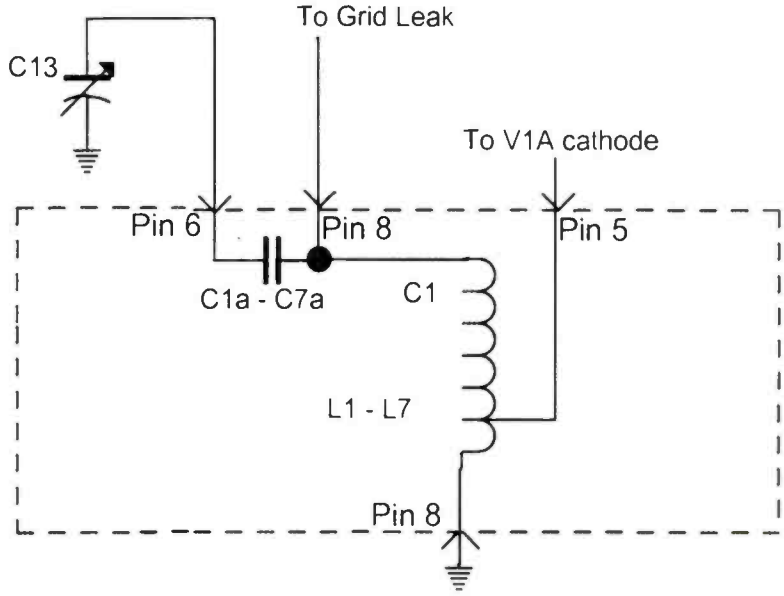
Finding The Parts

A few readers have taken me to task in the past for not providing parts lists. Alas, this is not always practical or even possible, since the builder has many options when choosing how to house or power a project. Likewise, one's budget and the contents of the shop's (or a good ham friend's) junk box are often factors in determining what works best for any one



L1 10 uH
C13 60pF bandset variable
C1 fine tuning variable

Figure 2A. Richard's ham band version of the Two-Tube Night Hawk used a fixed tuning coil, along with a band set variable capacitor and a fine tuning variable capacitor. This set was featured in our June 2010 column.



C13 365 pF variable
C1a - C7a See Table 1
L1 - L7 See Table 1

Figure 2B. The tuning circuit shown in Figure 2B is more faithful to the original David Green design. I suggest using the original coil set.

builder. Many items, such as vernier dial drives, are no longer manufactured. Nonetheless, in this instance, I'm going to include a list of the resistors and capacitors (see **Tables 2** and **3**).

As is with the coil gauge, the specifics of these parts are not overly critical, but I *do* find that how well things work usually has a direct correlation to the amount of time and care that's spent in construction. Using ceramic sockets for the RF stages (first 12AT7 and the coil socket) is good design practice. The capacitors in the RF path (C9, C2, C3, and the bandspread caps in the coil sets, C2A through C7A) should be good-quality ceramic or silver mica parts. Likewise, use good-quality, low-loss, tuning capacitors.

Photo A. Here's another one of Richard's Night Hawk efforts. Like the receiver shown last time, it is housed in a defunct test equipment enclosure. This set uses the One-Tube All-Bander plug-in coil set.

Photo B. An inside peak at what's lurking behind the dials. Note how Richard was able to make good use of many of the original components, such as the power supply, in this version of the Twin-Tube Night Hawk receiver.

Parts Kits

Richard has put together kits for the fixed resistors and capacitors; below is brief rundown of what he has to offer. Note that I'm passing this along as a courtesy for our readers—neither CQ Communications nor myself endorse this offer.

Standard One-Tube All-Bander Kit

Resistor Kit: 1000 ohms, 100K-ohm, 270K-ohm, 2.2 megohm, and 1800 ohms @ 1 watt. Price is $2.00.

Capacitor Kit: Discs – 10 pF (2 ea.), 27 pF, 47 pF (3) 100 pF, 0.001 µFd, 0.005 µFd (2), and 0.01 µFd. Electrolytic types – 10 µFd @ 50 volt, 4.7 @ 250 volt, 22 @ 250 volt (2). Price is $7.00. (Note that the 0.005-µFd caps are the two AC line bypass capacitors shown in the *Electronics Illustrated* article; they are not shown in my schematics.)

Modified Kits For The Twin-Tube Night Hawk

Resistor Kit: 1000 ohms (2), 2200 ohms, 22,000 ohms, 100 K-ohm (2), 270 K-ohm, 1 megohm, 2.2 megohm, and 1800 ohm, @ 1 watt. Price is $4.00.

Capacitor Kit: Discs – 10 pF (2), 27 pF, 47 pF (4), 100 pF, 0.001 µFd (2), 0.005 mFd (2), .01 mFd (2). Electrolytic types –

Table 1. Coil Data

All coils wound with #28 enamel coated wire

Coil L1	.55 to 1.5 MHz BCB	80 turns, tap 20 turns from ground end	Capacitor C1a Wire jumper
Coil L2	1.65 to 2 MHz 160 meters	75 turns, tap 20 turns from ground end	Capacitor C2a 47 pF disc or silver mica
Coil L3	3.5 to 4.2 MHz 80, 75 meters	29 turns, tap 8 turns from ground end	Capacitor C3a 47 pF disc or silver mica
Coil L4	6.5 to 8.5 MHz 40 meters	13 turns, tap 3 turns from ground end	Capacitor C4a 47 pFf disc or silver mica
Coil L5	9.5 to 9.7 MHz 31 meters	12 turns, tap 4 turns from ground end	Capacitor C5a 27 pF disc or silver mica
Coil L6	14 to 14.5 MHz 20 meters	8 turns, tap 4 turns from ground end	Capacitor C6a 10 pF disc or silver mica
Coil L7	21 to 22 MHz 15 meters	5 turns, tap 2 turns from ground end	Capacitor C7a 10 pF disc or silver mica

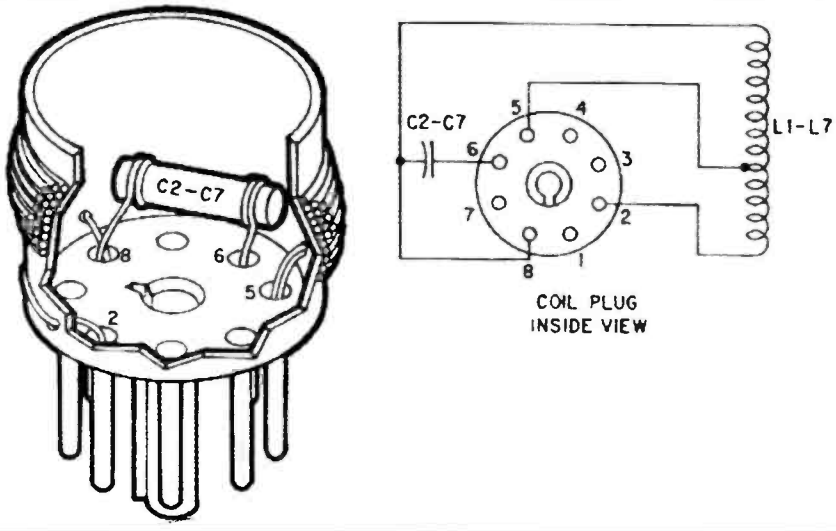


Table 1. Data and parts values for winding David Green's One-Tube All-Bander coil set.

Table 2. Resistor Values

R1	2200 ohm, 1/2 watt
R2	22 K-ohm, 1/2 watt
R3	2.2 megohm, 1/2 watt
R4	270 K-ohm, 1/2 watt
R5	50 K-ohm, linear taper potentiometer
R6	1 megohm, audio taper potentiometer
R7	1000 ohm, 1/2 watt
R8	100 K-ohm, 1/2 watt
R9	1 megohm, 1/2 watt
R10	1000 ohm, 1/2 watt
R 11	100 K-ohm, 1/2 watt
R 12	1800 ohm, 1 watt

Table 3. Capacitor Values

C1	Variable, refer to Figures 2A, 2B and coil data tables
C2	47 pF, disc or silver mica, 500 volt
C3	100 pF, disc or silver mica, 500 volt
C4	.01 µFd disc or Mylar, 500 volt
C5	470 pF disc ceramic, 500 volt
C6	10 µFd @ 25 volt electrolytic
C7	.001 µFd disc or Mylar, 500 volt
C8	.01 µFd, disc or Mylar, 500 volt
C9	220 pF, silver mica or disc
C10	10 µFd, @ 25 volt electrolytic
C11	.001 µFd, disc or Mylar, 500 volt
C12	.01 µFd, disc or Mylar, 500 volt
C13	Variable, refer to Figures 2A, 2B and coil data tables
C14	4.7 µFd @ 250 volt electrolytic
C15	22 µFd @ 250 volt electrolytic
C16	22 µFd @ 250 volt electrolytic

C1a-C7a see coil data table

Tables 2 and 3 list the resistor and capacitor values used in the Two-Tube Night Hawk receiver.

10 µFd @ 50 volt (2), 4.7 µFd @ 250 volt, 22 µFd @250 volt (2). Price is $8.75. (Again, the 0.005-µFd caps were the line bypass capacitors in the original *Electronic Illustrated* article and are not shown on my schematics.)

The prices given include first class U.S. postage to the lower 48 states only; postage to Alaska, Hawaii, and Puerto Rico or Canada will be additional, via Priority or Express Mail, per the current postal rates to your address. Richard can be reached at Yingling Electronics and Engineering, 85 Prince Street, Reedsville, PA 17084.

Where To From Here?

Like all good things, I suspect the Twin-Tube Night Hawk will, like the legendary Phoenix bird of myth, arise from the ashes in a few years' time for a new rebirth. I envision a matching 12AT7 Jones-type QRP transmitter, and perhaps a simple audio CW filter to make the Night Hawk evolve into a fully self-contained CW transceiver package. Stay tuned.

In the mean time, keep those soldering irons warm and those old tubes glowing!

Trivia And Toons

by R.B. Sturtevant, AD7IL

Q. What were the rules to operate the old spark-gap stations aboard oceangoing ships around the time of the *Titanic*'s sinking?

A. Before the *Titanic* went down, there weren't many rules to speak of. After that tragic incident, however, things did start to become more organized—but not a whole lot. The following guidelines for operation were current in Britain in 1914:

The transmitter and receiver had to be capable of sending and receiving code at 20 words per minute, but the operator was only required to be able to send at 12 wpm.

Frequencies in use were 150 meters, 300 meters, 600 meters, and "exceeding 1600 meters." The 600- and 300-meter frequencies were considered primary and secondary, with 150 reserved for stations solely concerned with determining ship positions. Communications above 1600 meters needed to be "of a special kind," although that wasn't defined too well. Communications between two ships had to use the same frequency. (Remember, in the days of spark-gap transmitters, only one transmitter could be on any frequency because the signal was so wide.)

Q. Can you recommend any games people can play with the radio?

A. Absolutely. My family enjoys the following radio game when driving around the country: One person tunes the dial to a station he or she likes and then waits for a time check or station ID. The location of the station is noted. The next person changes the dial and again waits for the station to ID. The winner is the person who finds the station that is farthest away.

My dad, while on a fishing trip in the Colorado Rockies, once tuned in his old hometown, located a great distance away. My son and I, on another occasion, where driving through the Columbia River Gorge at night and he got one from Mississippi. (I think he was cheating *somehow*, but I could never prove it.)

Do any readers have family games to play using radio? Let's hear about them.

Q. I recently ran across the term degaussing. What is it and what does it have to do with ships?

A. At some time you have probably done the classic experiment of rubbing a piece of iron or steel over a magnet. If you do it long enough the iron will pick up some magnetism from the magnet. You probably also know that the Earth itself has a magnetic field and is in fact itself a giant magnet. Ships usually, when reduced to their most common denominator, are pretty much pieces of iron or steel floating over the face of the Earth. (With me so far?) This means that over time ships build up a magnetic field that will vary from that of the Earth and surrounding ocean.

This is also the key to how a magnetic torpedo or mine works: They pick up the increase in the magnetic signature and explode when a ship comes too near. During World War II, the Germans invented a magnetic exploder and started using the technology to wreak havoc on British shipping. The Germans adopted the term "gauss" as a measurement of the strength of a magnetic field to honor Carl Friedrich Gauss, an early researcher in magnetism. "Degauss" is a British word for removing or changing a magnetic signature of a vessel.

To counteract the magnetic buildup that made the ships vulnerable to exploding mines, the British put coils in the hulls of their largest vessels. These coils would continually regulate the bias or magnetic signature using powerful equipment. Smaller ships that did not have the expensive equipment installed had to "wipe" the ship by dragging along its sides a long wire that had a current of 2000 amps flowing through it. This process had to be repeated at regular intervals, and the practice continues to this day.

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Tempus Fugit

by Bill Price, N3AVY
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"I'd love to hear some communication and radio 'war stories' from those readers who have served, whether in war or peacetime."

Yes, time flies. How could I possibly remember such forgettable words for some 45 years? Our highly intelligent, but less-than-exciting, class valedictorian uttered those words as we practiced sweating under caps and gowns in the bleachers of our beloved high school stadium on a too-hot June night so many years ago. And tempus *has* been fugiting, or whatever it does, for one person who has spent lots of tempus here on Earth.

I've been diligently looking for a way to communicate with radio friends on the Internet using Morse code. You'd think that with all the magical transition in electronics, communications, information technology, texting, sexting (whoops—not in *this* magazine), greenberries, gooseberries, 15 ways to communicate with one's PDA, at least *someone* would care enough to give us CWOIP (yes, that's CW over Internet protocol).

How hard could it be? (Actually, I have no idea how hard it could be. All that stuff completely evades me, but with everything I've seen so far, sending a 1-kHz tone back and forth between one or more interested parties couldn't be *that* hard.)

Software exists for people to back up their computers automatically whenever they're on line, or to access one computer from another, or to show your monitor to anyone you choose. If we were to discuss the "less than honest" software, I'm sure there's stuff out there that probably lets someone contemplate someone *else's* navel from halfway around the world, without his or her consent.

This CWOIP business sounds like something right up the alley of our friends at MFJ (not to play favorites). It looks like something we should see advertised along with their other computer-based gadgetry for a less-than bank-breaking price. Just throwing that out there.

Meanwhile, Norm has been in the warm cycle of his snowbirding, I understand. That's not to be confused with snowboarding, which is *not* something you're likely to see Norm doing. He has been skiing, square dancing, skeet-shooting, DXing, teaching and mentoring hams, and [*author knocks on wood*] has not recently tried to get me to put up an antenna in the past year or so.

Friend Beezer (also from that company which shall not be named) has visited once or twice while passing through or near Cowfield County, and has at least once tried to get me on the air, which is why this CWOIP business is becoming so important to me. Both Norm and Beezer *know* that I'll never use a microphone (even on VOIP), but they do maintain a base level of trying to get me on the air with at least CW, which is why I'm hoping that someone will soon develop such an animal.

Beezer (for those of you who don't remember) was a tech support cohort at that company which shall not be named. He had been working with a bunch of opticians and their machinery, but fell into a lens-grinding machine, and (are you ready for this?) made a spectacle of himself. Unseemly corporate attempts to avoid responsibility, financial and otherwise, ensued. Beezer now finds himself involved with orchestra instruments—a field in which I always wanted to find myself. For years, I thought that I'd been playing the fool, but Mrs. N3AVY assures me that for as long as she's known me, I've been in the reed section, playing the *buffoon*. Beezer says he can get me a deal on an English horn, which is good, because I can't play in French.

On a serious note, I am writing these words on Memorial Day—a day that has come to have much more meaning for me as I spend more days here on Earth. My dad served in Italy during World War II, and his father served in Europe during World War I; my godfather, whom I never met, was a glider pilot who gave his life in the events which would be described in the book and movie, *A Bridge Too Far*. I came very close to being sent to Southeast Asia, but as luck would have it I am not a combat vet. I have the utmost respect for those who are.

The anonymous "they" tell us that we're losing our World War II vets at the rate of over 1,000 every day, and our Korean War vets won't be far behind. I'd love to hear some communication and radio "war stories" from those readers who have served, whether in war or peacetime. In fact, if you just feel like passing along some war stories, I'll be glad to get them—and you never know what might make for some good reading on this page.

And if I can be so sentimental today, let me say, Bless you all who served and who serve today, and never forget those who gave it all for us.

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