45241

Amateur Radio

http://www.cq-amateur-radio.com

COMMUNICATIONS & TECHNOLOGY

OCTOBER 2006

CQ

- TI5N in the 2005 CQWW, p. 13
- Rock Star Price Guide, p. 18
- *CQ* Reviews: Gamma Research HPS-1a Power Supply, p. 26
- A Major New Mission for MARS, p. 52

On the Cover: Vintage radio collector (and rock 'n roll superstar) Joe Walsh,WB6ACU. Details on page 21.

KENWOOD

Listen to the Future

GET READY FOR KENWOOD'S SKYCOMMAND SYSTEM II+*

Work DX while walking around the neighborhood, driving to the local convenience store or relaxing by the pool. *Imagine the possibilities?*

TS-2000
KSS II+

TH-D7A(G)
KSS II+

TM-D700A
KSS II+

You can remote control your TS-2000 series transceiver with any of the above Kenwood Radios.

Download the TS-2000, TH-D7AG and TM-D700A Operators Manual from *www.kenwoodusa.com* and learn more about it.

* Pending FCC rule change.

KENWOOD U.S.A. CORPORATION
Communications Sector Headquarters
3975 Johns Creek Court, Suite 300, Suwanee, GA 30024-1265
Customer Support/Distribution
P.O. Box 22745, 2201 East Dominguez St., Long Beach, CA 90801-5745
Customer Support: (310) 639-4200 Fax: (310) 537-8235

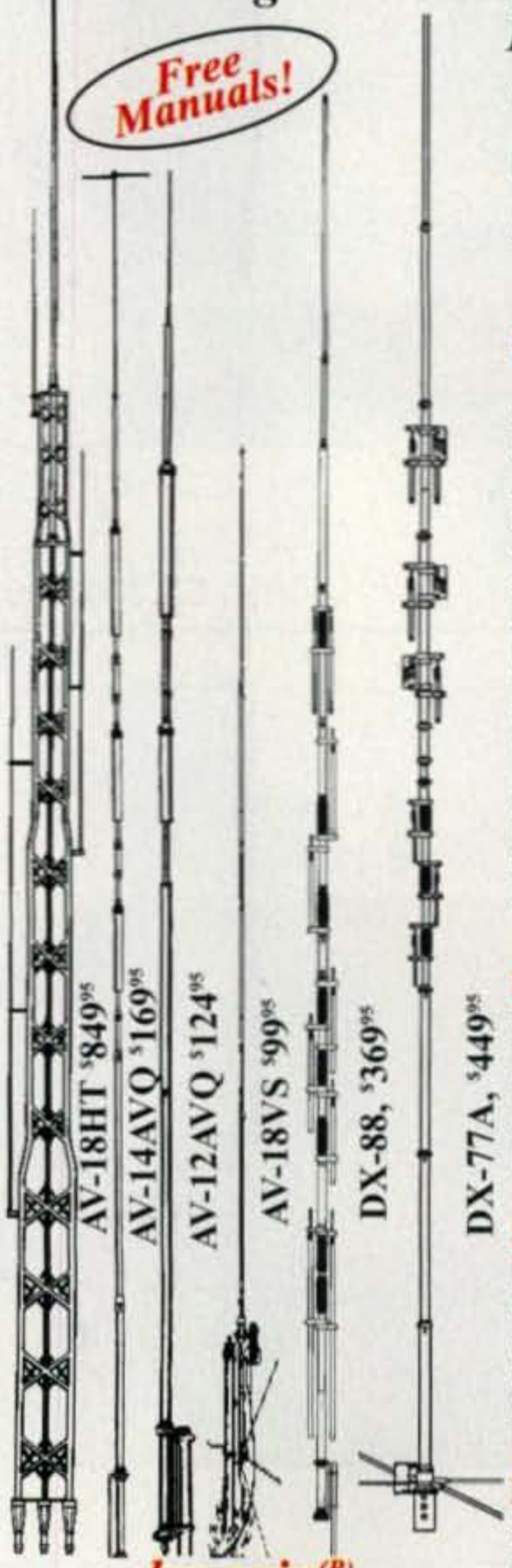
INTERNET
Kenwood News & Products
http://www.kenwoodusa.com

ADS#07806

JQA-1205 091-A
ISO9001 Registered

hy-gain® HF VERTICALS

Self-supporting -- no guys required . . . Remarkable DX performance -- low angle radiation, omnidirectional . . . Handles 1500 Watts . . . Low SWR . . . Automatic band switching . . . Aircraft quality aluminum tubing . . . Stainless steel hardware . . . Recessed SO-239 connector . . . Two year limited Warranty . . .



hy-gain(R) Classics

All hy-gain multi-band vertical antennas are entirely self supporting -- no guys required.

They offer remarkable DX performance with their extremely low angle of radiation and omnidirectional pattern.

All handle 1500 Watts PEP SSB, have low SWR, automatic bandswitching (except AV-18VS) and include a 12-inch heavy duty mast support bracket (except AV-18HT).

Heavy duty, slotted, tapered swaged, aircraft quality aluminum tubing with full circumference compression clamps is used for radiators. Includes all stainless steel hardware. Recessed SO-239 prevents moisture damage. Hy-gain verticals go up easily with just hand tools and their cost is surprisingly low. Two year limited warranty.

AV-18HT, $849.95. (10,12,15,20,40,80 M, 160, 17 Meters optional). 53 ft., 114 lbs.

Standing 53 feet tall, the famous *Hy-Gain HyTower* is the world's best performing vertical! The AV-18HT features automatic band selection achieved through a unique stub-decoupling system which effectively isolates various sections of the antenna so that an electrical 1/4 wavelength (or odd multiple of a 1/4 wavelength) exists on all bands. Approximately 250 kHz bandwidth at 2:1 VSWR on 80 Meters. The addition of a base loading coil (**LC-160Q, $109.95**), provides exceptional 160 Meter performance. **MK-17, $89.95**. Add-on 17 Meter kit. 24 foot tower is all rugged, hot-dip galvanized steel and all hardware is iridited for corrosion resistance. Special tilt-over hinged base for easy raising & lowering.

AV-14AVQ, $169.95. (10,15,20,40 Meters). 18 ft., 9 lbs. **The** Hy-Gain AV-14AVQ uses the same trap design as the famous Hy-Gain Thunderbird beams. Three separate air dielectric Hy-Q traps with oversize coils give superb stability and 1/4 wave resonance on all bands. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

AV-12AVQ, $124.95. (10, 15, 20 Meters). 13 ft., 9 lbs. **AV-12AVQ** also uses Thunderbird beam design air dielectric traps for extremely Hy-Q performance. This is the way to go for inexpensive tri-band performance in limited space. Roof mount with AV-14RMQ kit, $89.95.

AV-18VS, $99.95. (10,12,15,17,20,30,40,80 Meters). 18 ft., 4 lbs. **High** quality construction and low cost make the AV-18VS an exceptional value. Easily tuned to any band by adjusting feed point at the base loading coil. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

DX-88, $369.95. (10, 12, 15,17,20,30,40,80 Meters, 160 Meters optional). 25 ft., 18 lbs.

All bands are *easily* tuned with the DX-88's *exclusive* adjustable capacitors. 80 and 40 Meters can even be tuned from the ground without having to lower the antenna. Super heavy-duty construction. DX-88 OPTIONS: 160 Meter add-on kit, KIT-160-88, $189.95. Ground Radial System, GRK-88, $99.95. Roof Radial System, RRK-88, $99.95.

DX-77A, $449.95. (10, 12, 15, 17, 20, 30, 40 Meters). 29 ft., 25 lbs.

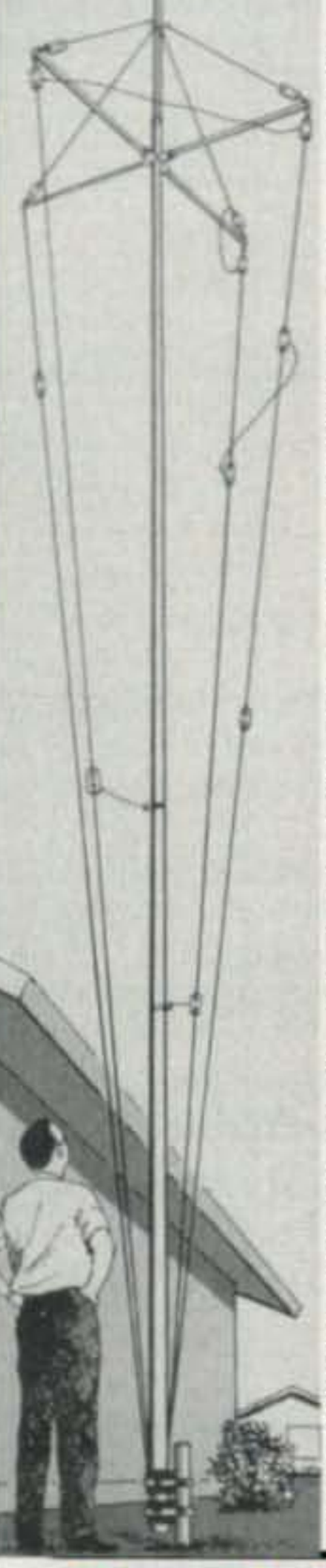
No ground radials required! Off-center-fed Windom has 55% greater bandwidth than competitive verticals. Heavy-duty tiltable base. Each band independently tunable.

Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$849.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$169.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$124.95	10,15,20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$99.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$369.95	10 - 40 M	1500 W PEP	25 feet	18 pounds	75 mph w/ guy	1.5-1.625"
DX-77A	**$449.95**	**10 - 80 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph w/o guy**	**1.5-1.625"**

Hy-Gain HyTower-Jr™

Stands 39 feet tall . . . Full 1/4 Wave on 40, 20, 15, 10 Meters . . . Cage loading on 80 Meters

New!



AV-18HT-Jr. **$349.95**

Standing a tall 39 feet with *full-size* elements and rated at 5 KW, the AV-18JR *Hy-gain HyTower-Jr.*™ is the world's *second best** performing vertical!

Stub-decoupling is used to give *full-size* quarter wave radiators on 40, 20, 15, 10 Meters with super efficient cage loading on 80 Meters.

The *HyTower-Jr*™ has almost no losses -- your ground system determines your efficiency.

It is automatic bandswitching, fed with 50 Ohm coax and has low SWR over an exceptionally wide bandwidth. SWR is less than 1.2 at resonance on all bands.

The main radiator is aircraft high-strength, heavy walled, 2-inch aluminum tubing swedged at the top. Self-supporting in winds up to 40 MPH (use guy wires for higher winds). Mounts on 1¼ inch plumber's pipe. Heavy duty components will give you years of trouble-free operating pleasure. UPS Shippable.

Requires good ground system for optimum performance.

***The** famous 53 foot *Hy-gain HyTower*™ is legendary. It's the premier, best performing vertical in the world -- bar none! At less than half the price with nearly the *same* performance and based on the *same* principles, the *HyTower-Jr*™ is the poor man's version of its father *HyTower*. Of course, *Junior*™ doesn't have its father's rugged hot-dipped galvanized steel tower and construction!

Free Hy-Gain Catalog
and Nearest Dealer . . . 800-973-6572
Call your dealer for your best price!

hy-gain®

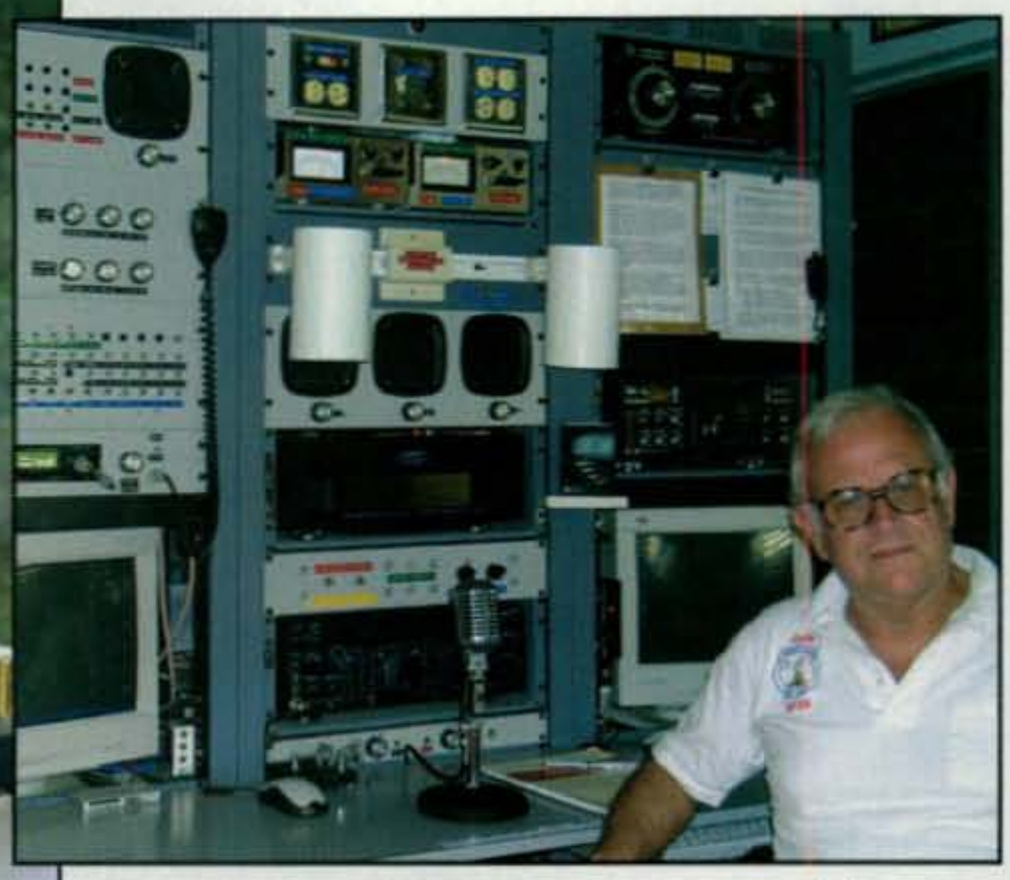
Antennas, Rotators & Towers

308 Industrial Park Road, Starkville, MS 39759 USA
Toll-free Customer Sales Hotline: 800-973-6572
• TECH: 662-323-9538 **• FAX:** 662-323-6551
http://www.hy-gain.com

CQ contents

OCTOBER 2006

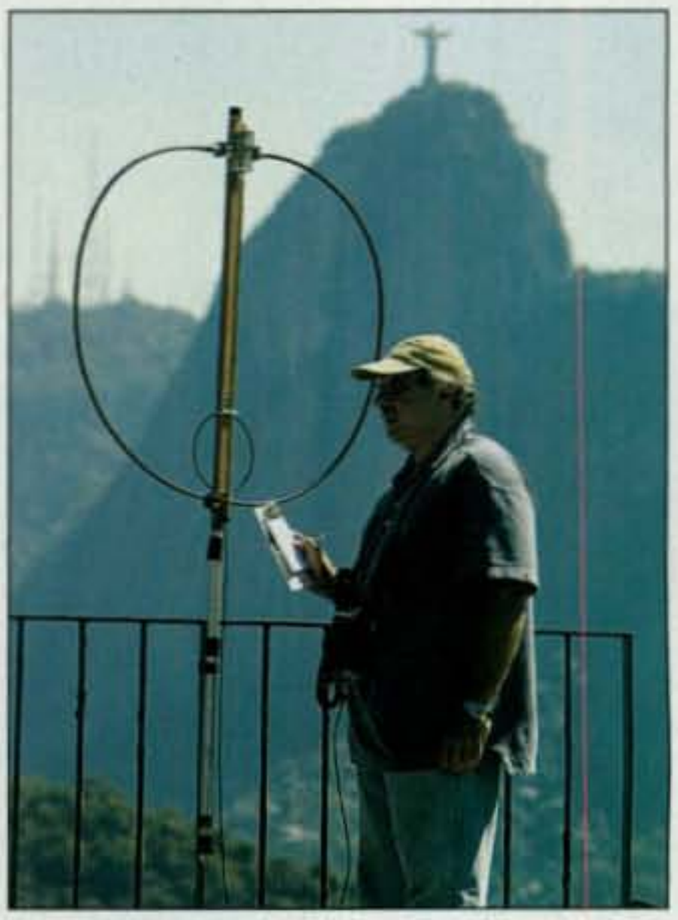
p. 22



p. 37

features

Vol. 62 No. 10



p. 74

p. 13

departments

NCG COMPANY

For a complete catalog, call or visit your local dealer. Or, contact NCG Company.
1275 N. Grove Street • Anaheim • California 92806
(714) 630-4541 • (800) 962-2611 • Fax: (714) 630-7024 • www.natcommgroup.com

NEW

COMET **NEW CHA-250B** • Broadband HF/6M Ground-Plane Antenna
A newly designed broadband vertical with NO GROUND RADIALS. EXTREMELY easy to assemble, requires no tuning or adjustments and VSWR is under 1.5:1 from 3.5-57MHz! • TX/RX: 3.5MHz – 57MHz, 2.0 – 90MHz • VSWR: 1.5:1 or less, continuous • **Max Power: 250W SSB/125W FM** • Impedance: 5 Ohm • Length: 23' 5" • Weight: 7 lbs. 1 oz. • Conn: SO-239 • Mast Req'd: 1" – 2" dia. • Max wind speed: 67MPH

COMET **GP-15** • Tri-band 52/146/446MHz Base Repeater Antenna
• Gain & Wave: 52MHz 3.0dBi 5/8 wave • 146MHz 6.2dBi 5/8 wave x 2 • 446MHz 8.6dBi 5/8 wave x 4 • Max Pwr: 150W • Length: 7'11" • Weight: 3lbs. 1oz. • Conn: Gold-plated SO-239
• 2MHz band-width after tuning (6M) • Construction: Single-piece fiberglass

COMET **CX-333** • Tri-band 146/220/446MHz Base Repeater Antenna
• Gain & Wave: 146MHz 6.5dBi 5/8 wave x 2 • 220MHz 7.8dBi 5/8 wave x 3
• 446MHz 9.0dBi 5/8 wave x 5 • Max Pwr: 120W • Length: 10'2" • Weight: 3lbs. 1oz.
• Conn: Gold-plated SO-239 • Construction: Fiberglass, 2 Sections

COMET **GP-3** • Dual-band 146/446MHz Base Repeater Antenna
• Gain & Wave: 146MHz 4.5dBi 6/8 wave • 446MHz 7.2dBi 5/8 wave x 3 • Max Pwr: 200W • Length: 5'11"
• Weight: 2lbs. 9ozs. • Conn: Gold-plated SO-239 • Construction: Single-piece fiberglass

COMET **GP-6** • Dual-band 146/446MHz Base Repeater Antenna
• Gain & Wave: 146MHz 6.5dBi 5/8 wave x 2 • 446MHz 9.0dBi 5/8 wave x 5 • Max Pwr: 200W • Length: 10'2"
• Weight: 3lbs. 8ozs. • Conn: Gold-plated SO-239 • Construction: Fiberglass, 2 Sections

NEW

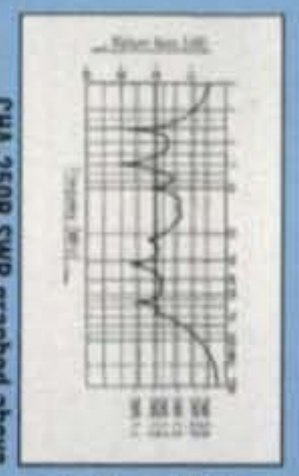
Maldol **NEW HVU-8** **Ultra-compact 8 band HF/VHF/UHF vertical antenna**
80/40/20/15/10/6/2M/70cm Only 1/2 the traditional size and weight of vertical HF antennas, and it includes 2M/70cm! Unique radial system rotates for balcony installations, the radials can all be rotated to one side. • HF and 6M: 1/4 wave-length • Gain 2M: 1/2 wave-length, 2.15dBi • Gain 70cm: Two 5/8 waves in phase, 5.5dBi • Impedance: 50 Ohm • Max Power: HF 200W SSB • 6M–70cm: 150W FM
• Conn: SO-239 • Height: Only 8'6" • Weight: 5lbs. 7ozs.

COMET **GP-9/GP-9N** • Dual-band 146/446MHz Base Repeater Antenna • BEST SELLER!
• Gain & Wave: 146MHz 8.5dBi 5/8 wave x 3 • 446MHz 11.9dBi 5/8 wave x 8 • Max Pwr: 200W
• Length: 17'8" • Weight: 5lbs. 11ozs. • Conn: GP-9 Gold-plated SO-239 • GP-9N Gold-plated N-type female • Construction: Fiberglass, 3 Sections

COMET **GP-24** The standard high gain 2.4GHz access point antenna for maximum range/signal strength. • 2400-2500MHz • Gain: 15.4dBi • Length: 5'10" • Weight: 2lbs. 9ozs. • Conn: Gold-plated N-female • Construction: Heavy-duty white fiberglass radome

COMET **GP-24-3** The same physical high gain 2.4GHz antenna as the GP-24, but with a 3-degree electrical downtilt to concentrate the signal to the horizon and below

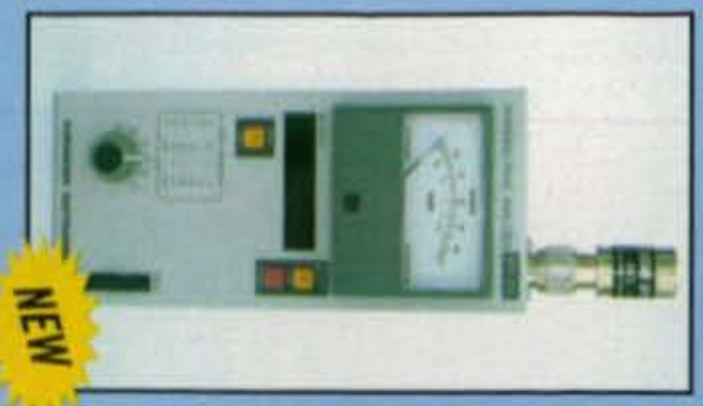
COMET **GP-24-S** Medium gain access point antenna for applications where maximum distance is not as important as a solid signal around and directly below the antenna. • Gain: 9.9dBi • Length: 3'9"
• Weight: 1lb. 14ozs. • Conn: Gold-plated N-female • Construction: Heavy-duty white fiberglass radome



CHA-250B SWR graphed above

"One person can effortlessly raise the antenna at night when no one can spot it, and take it down before daybreak. This antenna is also a great choice for portable operations, such as quick and easy mini-DXpedition to a campground or a nice tropical island! In short, the Comet CHA-250B is simple to assemble, painless to elevate and is easy on the eyes, while at the same time getting you on 6 meters thru 80 meters without the requirement of an antenna tuner and ground radials. You'll even be able to work some DX while you're at it!" — **Dan Dankert N6PEQ**

NEW



NEW from Kuranishi Instruments LTD, Japan
BR-210 Professional-Grade SWR/Antenna Analyzer

Perform SWR and impedance measurements with confidence! The BR-210 is a laboratory grade precision test instrument providing a wide-band RF signal source for analyzing antenna systems and other equipment without the need for a separate transmitter. • 1.8-170MHz • High precision meter • 500mW 50 Ohm dummy load included • Impedance measurements: 12.5 - 300 Ohm • Connector: SO-239

COMET & Maldol™

Dualband and Multiband Base Antennas

Wi-Fi/802.11b/LAN/HSMM Access Point Antennas

ham radio news

FCC Reaffirms BPL Ruling, Tells Mobile Operators to Change Course

The FCC in early August responded to 15 petitions for reconsideration of its 2004 ruling on Broadband over Power Lines (BPL), essentially reaffirming the initial decision and making only minor technical changes. Virtually all requests relating to amateur radio were denied, although the Commission did recognize "the historic and ongoing importance of the amateur radio service, including and especially in emergency situations," and said it "will not allow harmful interference to such users to persist." However, Commission enforcement action to date on reported BPL interference has been negligible, and in the case of interference to mobile operators, this ruling said that because mobile operators have the option of choosing a different route, BPL operators need take no action beyond notching offending frequencies in response to such complaints.

The FCC also said that consideration of the "public interest, convenience and necessity" trumps the rights of licensed vs. non-licensed spectrum users, and that widespread deployment of BPL is "sufficiently important and significant" to the public "so as to outweigh the limited potential for increased harmful interference (to licensed services) that may arise."

Multiple Satellite Launch Fails

An attempt to simultaneously launch 15 tiny "CubeSat" satellites —14 of them carrying amateur radio transmitters — failed on liftoff in late July and all of the satellites were presumed destroyed. The satellites were launched from Kazakhstan on a converted Russian SS-18 intercontinental ballistic missile. According to the CubeSat website, the Russian space agency's First Deputy Director General, Valdimir Mikhailov, said that the liftoff was successful, but that during the second minute of flight, the first stage motor shut down and the Dneper-1 rocket crashed. "As soon as the location of the debris area is definitely known," Mikhailov said in a preliminary statement the day after the launch, the recovery team "will proceed to recover all the hardware that may be found at the crash site," adding, "It's quite likely that nothing is left."

CalTech, one of the 11 universities involved in the project and the overall project coordinator, was devoting a previously scheduled CubeSat summer workshop in mid-August to "Looking Ahead." Sessions included "Dneper-1 Launch: Lessons Learned" and "Risk Management for Student-Run Satellites."

Swain's Island New DXCC / CQ DX Award "Entity"

Due to changes in its definitions of political vs. geographic entities in the rules for the DXCC award, the ARRL has announced that Swain's Island is now considered a separate DXCC entity. The island is part of American Samoa, but is more than 350 kilometers from the main island group, so it qualifies under the geographic separation rule. Contacts made with Swain's Island on or after July 22, 2006, will be counted for DXCC credit.

CQ DX Award Manager Billy Williams says Swain's Island is now considered a separate entity (#337) for the CQ DX Award as well, with an effective date of July 1, 2006. For those chasing the new CQ DX Field Award, Swain's Island is in grid locator field AH.

This is the second new "entity" added to the DXing award lists in two months, the first being the newly-independent nation of Montenegro. For more information, see this month's DX column on page XX.

BPL So Far Making Little Dent in Competition

The FCC's own figures show that the BPL industry needs all the help it can get from the Commission. Despite being promoted by FCC commissioners as "broadband nirvana" and touted by other promoters as the "third pipe" for high-speed internet access, broadband over power lines (BPL) so far lags in a distant 8th place among its competitors. FCC statistics on high speed lines for internet access, released in late July, show more than 25 million cable modem lines, 19.5 million ADSL lines, 3.8 million satellite and wireless "lines," 876,000 SDSL and traditional wirelines, nearly 450,000 fiber lines and fewer than 6,000 "power line and other" broadband connections.

Vanity Call Fee Drops to $20.80

The FCC fee for obtaining or renewing a vanity callsign dropped to $20.80 for a 10-year term, as of September 6. The FCC reviews its fees each year and makes adjustments as needed, usually each September. Generally, the fees for amateur vanity calls (the only amateur licensing fee there is) vary by less than a dollar. The 2005-06 fee was $20.90.

In a related matter, the ARRL says it will process vanity call renewals for both members and non-members. Members will be charged $5 in addition to the FCC's fee; the additional charge for non-members will be $14, the same fee charged for non-members to process a change in a vanity call or a non-vanity renewal (those services are free to ARRL members). W5YI-VEC has been offering a similar service for some time, with a fee of $8 in addition to any FCC charges.

Former Astronaut N4BQW Silent Key

Retired astronaut Chuck Brady, N4BQW, passed away in late July at age 54, following a lengthy illness. According to the ARRL, Brady, a physician and Navy Captain, was one of the pioneers of the SAREX (Shuttle Amateur Radio EXperiment, later Space Amateur Radio EXperiment) program, operating extensively from the shuttle Columbia during a 1996 mission. He later became chief of space station astronaut training for NASA. An active ham both before and after his space flight, Brady was also an avid DXpeditioner, operating from a variety of rare locations. Brady also had an asteroid named after him in 1998. (See this month's DX and VHF-Plus columns for personal remembrances from N4AA and N6CL.)

NASA's "Ham on the Ground" Honored

The ham responsible for NASA's end of setting up ham radio contacts between the International Space Station and schools around the world was honored recently for his work in helping former space station commander Bill McArthur, KC5ACR, make enough contacts from orbit to qualify for the Worked All States and Worked All Continents awards, and eventually DXCC. Kenneth Ransom, N5VHO, is the ISS Ham Radio Project Engineer, and he was presented in August with NASA's prestigious "Silver Snoopy" award for his efforts. According to the ARRL, Ransom was responsible for lining up many of McArthur's more than 1800 contacts, including 37 school group contacts. In addition to qualifying for WAS and WAC, McArthur also worked 130 DXCC "entities," but is still waiting — like many of us — for enough confirmations to qualify for the award.

Additional and updated news is available on the Ham Radio News page of the CQ website at <http://www.cq-amateur-radio.com>. For breaking news stories, plus info on additional items of interest, sign up for CQ's free online newsletter service. Just click on "CQ Newsletter" on the home page of our website.

hy-gain® ROTATORS

. . . the first choice of hams around the world!

HAM-IV

HAM-IV
$559.95

The most popular rotator in the world! For medium communications arrays up to 15 square feet wind load area. *New* 5-second brake delay! *New* Test/Calibrate function. *New* low temperature grease permits normal operation down to -30 degrees F. *New* alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. *New* indicator potentiometer. *New* ferrite beads reduce RF susceptibility. *New* Cinch plug plus 8-pin plug at control box. Dual 98 ball bearing race for load bearing strength and electric locking steel wedge brake prevents wind induced antenna movement. North or South center of rotation scale on meter, low voltage control, max mast size of $2^{1}/_{16}$ inches.

HAM IV and HAM V Rotator Specifications	
Wind Load capacity (inside tower)	15 square feet
Wind Load (w/mast adapter)	**7.5 square feet**
Turning Power	800 in.-lbs.
Brake Power	**5000 in.-lbs.**
Brake Construction	Electric Wedge
Bearing Assembly	**dual race/96 ball bearings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	26 lbs.
Effective Moment (in tower)	**2800 ft.-lbs.**

TAILTWISTER SERIES II

T-2X
$649.95

T-2XD
$1029.95
with DCU-1

For large medium antenna arrays up to 20 sq. ft. wind load. Available with *DCU-1 Pathfinder* digital control (T2XD) or standard analog control box (T2X) with *new* 5-second brake delay and *new* Test/Calibrate function. Low temperature grease, alloy ring gear, indicator potentiometer, ferrite beads on potentiometer wires, *new* weatherproof AMP connectors plus 8-pin plug at control box, triple bearing race with 138 ball bearings for large load bearing strength, electric locking steel wedge brake, North or South center of rotation scale on meter, low voltage control, $2^{1}/_{16}$ inch max. mast.

TAILTWISTER Rotator Specifications	
Wind load capacity (inside tower)	20 square feet
Wind Load (w/ mast adapter)	**10 square feet**
Turning Power	1000 in.-lbs.
Brake Power	**9000** in.-lbs.
Brake Construction	Electric Wedge
Bearing Assembly	**Triple race/138 ball brngs**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	31 lbs.
Effective Moment (in tower)	**3400 ft.-lbs.**

CD-45II

CD-45II
$389.95

For antenna arrays up to 8.5 sq. feet mounted inside tower or 5 sq. ft. with mast adapter. Low temperature grease good to -30 F degrees. *New* Test/Calibrate function. Bell rotator design gives total weather protection, dual 58 ball bearing race gives proven support. Die-cast ring gear, stamped steel gear drive, heavy duty, trouble free gear train, North center scale, lighted directional indicator, 8-pin plug/socket on control unit, snap-action control switches, low voltage control, safe operation, takes maximum mast size to $2^{1}/_{16}$ inches. MSLD light duty lower mast support included.

CD-45II Rotator Specifications	
Wind load capacity (inside tower)	8.5 square feet
Wind Load (w/ mast adapter)	**5.0 square feet**
Turning Power	600 in.-lbs.
Brake Power	**800 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/48 ball brings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	22 lbs.
Effective Moment (in tower)	**1200 ft.-lbs.**

HAM-V

HAM-V
$949.95
with DCU-1

For medium antenna arrays up to 15 square feet wind load area. Similar to the HAM IV, but includes *DCU-1 Pathfinder* digital control unit with gas plasma display. Provides automatic operation of brake and rotor, compatible with many logging/contest programs, 6 presets for beam headings, 1 degree accuracy, auto 8-second brake delay, 360 degree choice for center location, *more!*

ROTATOR OPTIONS

MSHD, $99.95. Heavy duty mast support for T2X, HAM-IV and HAM-V.
MSLD, $39.95. Light duty mast support for CD-45II and AR-40.
TSP-1, $34.95. Lower spacer plate for HAM-IV and HAM-V.

AR-40

AR-40
$289.95

For compact antenna arrays and large FM/TV up to 3.0 square feet wind load area. Dual 12 ball bearing race. Automatic position sensor never needs resetting. Fully automatic control -- just dial and touch for any desired location. Solid state, low voltage control, safe and silent operation. $2^{1}/_{16}$ inch maximum mast size. MSLD light duty lower mast support included.

AR-40 Rotator Specifications	
Wind load capacity (inside tower)	3.0 square feet
Wind Load (w/ mast adapter)	**1.5 square feet**
Turning Power	350 in.-lbs.
Brake Power	**450 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/12 ball bearings**
Mounting Hardware	Clamp plate/steel bolts
Control Cable Conductors	**5**
Shipping Weight	14 lbs.
Effective Moment (in tower)	**300 ft.-lbs.**

HDR-300A

HDR-300A
$1379.95

For ***king-sized*** antenna arrays up to 25 sq.ft. wind load area. Control cable connector, *new* hardened stainless steel output shaft, *new* North or South centered calibration, *new* ferrite beads on potentiometer wires reduce RF susceptibility, *new* longer output shaft keyway adds reliability. Heavy-duty self-centering steel clamp and hardware. Display accurate to 1°. Machined steel output.

HDR-300A Rotator Specifications	
Wind load capacity (inside tower)	25 square feet
Wind Load (w/ mast adapter)	**not applicable**
Turning Power	5000 in.-lbs.
Brake Power	**7500 in.-lbs.**
Brake Construction	solenoid operated locking
Bearing Assembly	**bronze sleeve w/rollers**
Mounting Hardware	stainless steel bolts
Control Cable Conductors	**7**
Shipping Weight	61 lbs.
Effective Moment (in tower)	**5000 ft.-lbs.**

Digital Automatic Controller

DCU-1
$649.95

Automatically controls T2X, HAM-IV, V rotators. 6 presets for favorite headings, 1 degree accuracy, 8-sec. brake delay, choice for center of rotation, crisp *plasma* display. Computer controlled with many logging/contest programs.

AR-35 Rotator/Controller

AR-35
$69.95

For UHF, VHF, 6-Meter, TV/FM antennas. Includes automatic controller, rotator, mounting clamps, mounting hardware. 110 VAC. One Year Warranty.

NEW! Automatic Rotator Brake Delay

RBD-5
$34.95

Provides automatic 5-second brake delay -- insures your rotator is fully stopped before brake is engaged. Prevents accidentally engaging brake while rotator is moving. Use with HAM II, III, IV, V, T2Xs. Easy-to-install. Includes pre-assembled PCB, hardware.

http://www.hy-gain.com
Nearest Dealer, Free catalog, To Order . . .
800-973-6572
Voice: 662-323-9538 **Fax:** 662-323-6551

hy-gain®

Antennas, Rotators & Towers
308 Industrial Park Road,Starkville, MS 39759, USA

The Hottest Field Gear Anywhere!

HF/VHF/UHF Portable Operation Just Got a Lot More Powerful!

FT-897D
HF/50/144/430 MHz
100 W All Mode Transceiver
(144 MHz 50 W/430 MHz 20 W)

TCXO DSP 60 m Band

HF/VHF/UHF Multimode Mobile Transceiver, now Including Built-in DSP and 60-Meter Coverage!

FT-857D
HF/50/144/430 MHz
100 W All Mode Transceiver
(144 MHz 50 W/430 MHz 20 W)

DSP 60 m Band

REAL PERFORMANCE, REALLY PORTABLE

FT-817ND
HF/50/144/430 MHz
5 W All Mode Transceiver (AM 1.5 W)

60 m Band

Automatic Matching for FT-897/857 Series Transceivers

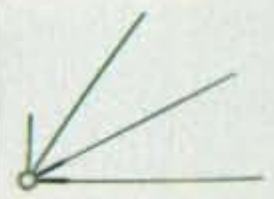
FC-40
Automatic-Matching
200-Memory
Antenna Tuner

- Operational on 1.8 ~ 54 MHz when used with 66' (or longer) wire, or 7~ 54 MHz with standard 8.2' whip antenna (wire/whip antenna not supplied).
- Required Drive Power: 4 ~ 60 Watts. Maximum TX Power: 100 Watts.

Mobile Auto-Resonating 7~430 MHz for FT-897/857 Series Transceivers

ATAS-120A
Active Tuning
Antenna System
(no separate tuner required)

VHF/UHF Base RadialKit
ATBK-100 for ATAS-120A.



ATAS-25

Manually-Tuned Portable Antenna

ATAS MICRO

YAESU
Choice of the World's top DX'ers℠

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

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

A TOUGH RADIO FOR A TOUGH WORLD!

The ruggedly-built new FT-1802M brings you Yaesu's legendary mechanical toughness, along with outstanding receiver performance and crisp, clean audio that will get your message through!

- 50 Watts of RF Power Output.
- Extended Receive: 136 – 174 MHz.
- Keyboard entry of frequencies directly from microphone.
- Illuminated front panel keys for nighttime use.
- 221 Memory Channels with Alpha-numeric labeling.
- Eight Memory Banks for organizing Memory Channels.
- Dedicated 10-channel NOAA Weather Broadcast Channel Bank (U.S. version).
- Adjustable Mic Gain, and Wide/Narrow Deviation & Receiver Bandwidth.
- Built-in CTCSS and DCS Encoder/Decoder circuits.
- Four user-programmable "Soft" keys on microphone, for access to Menu items or front panel key functions.
- Automatic Repeater Shift (ARS), Automatic Power-Off (APO), and Busy Channel Lock-Out (BCLO) features.
- CW Trainer: Practice Morse Code between QSOs!
- Security Password to help prevent unauthorized use.
- One-touch access to Yaesu's renowned WiRES-II™ Internet Linking System.

Ultra Rugged 50 W VHF FM Transceiver

FT-1802M

Actual Size

YAESU

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

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

CQ editorial — zero bias — a

BY RICH MOSESON,* W2VU

Hamparks: An Escape from Antenna Bans?

In this month's "World of Ideas" column, Contributing Editor Dave Ingram, K4TWJ, presents the second part of his series on low-profile or "stealth" antennas, a subject that is becoming more important as more housing units are covered by homeowner association (HOA) rules and "CC&Rs" (Covenants, Conditions and Restrictions) that generally ban or severely limit outdoor antennas.

The FCC's 20-year-old "PRB-1" ruling, now codified into Part 97 [Section 97.15(b)], requires state and local governments to "reasonably accommodate" amateur radio operation, but never set minimum standards for antennas to be permitted, and the rule does not apply to private contracts, under which HOA rules and CC&Rs fall. The FCC has rejected repeated attempts by the ARRL to broaden the scope of the limited federal pre-emption set out in PRB-1. In the past couple of years, while the ARRL has been focusing significant energy on fighting interference from Broadband over Power Lines (BPL), the number of communities that restrict or ban outdoor antennas has continued to mushroom. In our view, these restrictions now pose a far greater threat to the future of amateur radio than does BPL.[1]

What is the Answer?

As with most things in life, there is no one simple solution that will satisfy everyone. The best option, in our opinion, is to put a much higher priority on working for passage of H.R. 3876 by Congress[2]. This bill would put residents of HOA-controlled communities on an equal footing with others and would require homeowners' associations, like state and municipal governments, to sit down with hams and work out what constitutes "reasonable accommodation" of amateur operations. As of late July, however, the bill was still in committee in the House, and there was no companion bill introduced in the Senate. The League supports this bill, but it has not been as high a priority in Newington as BPL. It should become a much higher priority for the ARRL, at least on a par with the BPL battle; and individual amateurs need to write to their representatives in Congress, urging them to support/co-sponsor the bill. It's unlikely, though, with Congressional elections coming up in November, that it will move in this session. So a big push will be needed to get it reintroduced early next year, with as many co-sponsors as possible.

In the absence of legislation, however, what are the alternatives? One, which is totally unacceptable, is to leave the air. This not only deprives individual hams of their hobby but also deprives their communities of ham radio's emergency communications capabilities in disasters.

Another option, which Dave is promoting in his columns, is the use of stealth antennas. The biggest risk here is that they may put you in the position of operating in violation of HOA rules and subject you to fines, legal action or eviction if you're caught. Operating mobile is another solution, one growing hugely in popularity. But it's not always practical to operate from your car, especially in bad weather, and with gas over $3 a gallon these days, driving around for hours just to operate or running the car while talking to keep the car battery charged are expensive and wasteful choices.

What About Our Own Developments?

A fourth option, which I've never seen discussed elsewhere, is the building of ham-friendly housing developments. There are precedents in both housing and society at large. If you go back to the first half of the 20th century, many members of religious and ethnic minorities were victims of discrimination, but the mood of the country was not yet ready for the anti-discrimination laws that came in the second half of the century. So some groups took matters into their own hands. For instance, Catholic and Jewish doctors who were refused privileges at established hospitals started their own. Today, many of these hospitals are among the leading medical centers in the country.

We hams are being discriminated against in housing on the basis of our antennas (a category somehow omitted from the civil rights laws of the 1960s). Why not build our own housing developments that permit, or even encourage, outdoor antennas? Maybe a tower in every yard wouldn't be practical, but what about smaller antennas in homelots and a big state-of-the-art club station with big antennas and emergency power to become a communications hub in an emergency or disaster? The possibilities are endless.

Private pilots, golfers and horse enthusiasts already do it. Pilots were the first to build a specialized planned community. According to David Sclair, co-founder of Living With Your Plane.com, and former publisher of *General Aviation News*, the first airpark in the U.S. was built in 1941, just before Pearl Harbor. Today, he says, there are over 500 housing developments built with airstrips and hangars as integral parts of the community.

According to the National Golf Foundation, there are some 3,000 golf communities in the U.S. While golfers have a much larger pool from which to draw (some 25 million Americans play golf, according to David Lott of GolfCourseHome.net), numbers for pilots are very similar to those for hams—some 610,000 licensed pilots in the U.S. in 2005 (along with 219,000 active private planes), according to the Aircraft Owners and Pilots Association, as compared with 662,000 licensed hams at the end of 2005.

I'll bet there's some developer out there who could do very well by sitting down with a bunch of interested hams and planning a development that would welcome and encourage ham radio operation, and benefit the broader community by being a communication center in times of need. If you build it, they will come.

The Learned Ham

Our reader survey results this month are very encouraging in most regards, but disturbing in one other. We asked about continuing education in ham radio. Virtually everyone who responded thinks it's important; and magazines and books are far and away their primary sources of new information. In addition, 2/3 feel they've learned most of what they know after getting on the air or starting a new activity, as opposed to when studying for a license exam, giving more credence to our long-held theory that a license exam should not be a comprehensive test of knowledge but rather a confirmation that you know the necessary basics for getting on the air and really starting to learn. The disturbing responses, though, were about mentoring. While the majority of respondents have both had and been mentors, 35% say they have never had a ham radio mentor, and 29% say they have never been one. Magazines and books cannot do it all. In a hobby where most people learn most of what they know after their formal training ends, it is vital that help is available to anyone who needs it and that everyone who wants help learning or trying something new knows where and how to find it.

Notes

1. New FCC statistics on high speed lines for internet access (see "Ham Radio News"), show there are fewer than 6000 BPL lines in the U.S., compared with more than 25 million cable modem lines and 19.5 million ADSL lines. Either the ARRL's battle against BPL systems that cause interference is succeeding beyond anyone's wildest dreams or utilities are realizing that BPL is an economic non-starter.

2 . H.R. 3876 reads, "For purposes of the Federal Communications Commission's regulation relating to station antenna structures in the amateur radio services (47 CFR 97.15), any private land use rules applicable to such structures shall be treated as a State or local regulation and shall be subject to the same requirements and limitations as a State or local regulation." Essentially, it would require private land use rules, like state and local laws, to "reasonably accommodate" amateur operation The bill was introduced by Reps. Steve Israel (D-NY) and Mike Ross (D-AR, WD5DVR), and is co-sponsored as of late July by Reps. Stephanie Herseth (D-SD), Mike McIntyre (D-NC), Michael McNulty (D-NY), Dennis Moore (D-KS), John Olver (D-MA), Todd Platts (R-PA), David Price (D-NC), and Rob Simmons (R-CT).

*e-mail: <w2vu@cq-amateur-radio.com>

MFJ Compact 200 Watt *IntelliTuners*™

Automatically tunes any unbalanced antenna . . . Ultra fast . . . 20,000 VirtualAntenna™ Memories . . . Antenna Switch . . . Efficient L-network . . . Matches 6-1600 Ohms at 200 Watts . . . 1.8-30 MHz . . . Digital SWR/Wattmeter . . . Audio SWR meter . . . Radio interface . . .

New! MFJ-929 **$219.95**

The MFJ-929 *IntelliTuner-Compact*™ lets you *automatically* tune any coax fed or random wire antenna 1.8-30 MHz at full 200 Watts SSB/CW. It can match 6-1600 Ohms (SWR up to 32:1) - - that's a 50% wider matching range at a higher power level than lesser competing products.

You get a *digital* SWR/Wattmeter with backlit LCD, antenna switch for 2 antennas, built-in radio interface and built-in internal BiasTee for remote tuner operation.

MFJ's exclusive *IntelliTune*™, *Adaptive Search*™ and *InstantRecall*™ algorithms give you ultra-fast automatic tuning with over 20,000 *VirtualAntenna*™ Memories.

MFJ VirtualAntenna™ Memory

MFJ new *VirtualAntenna*™ Memory system gives you 4 antenna memory banks for *each* of 2 antenna connectors. You can select up to 4 antennas on each antenna connector. Each antenna has 2500 memories.

4 Times the Solutions!

MFJ-929 gives you 256 values each of capacitance and inductances for 131,072 matching solutions. That's *4 times* the 32,768 matching solutions of competing products with only 128 L/C values each!

Highly intelligent, ultra-fast tuning!

Don't be fooled by competing products claiming fast search times -- if you have a *quarter* of the matching solutions, of course, it takes less time to search but it's *not* faster.

MFJ's much faster speed comes from advanced technology and software algorithms *not* from fewer matching solutions.

MFJ's *IntelliTuner-Compact*™ actually *measures* complex impedance -- *R* and *X* -- of your antenna, computes the L-network values needed and snaps in those components to give you an *instant* match.

If the load is out of measurement range, *AdaptiveSearch*™ determines the *smaller* subset from all solutions that can match a safe load -- and then searches *only* that subset -- others search through far more solutions.

Digital LCD SWR/Wattmeter

An easy-to-read, two-line, 16-character backlit LCD displays SWR, peak or average forward/reflected power, frequency, antenna 1 or 2, L/C tuner values, on/off indicators and other info. They are selected from easy-to-understand menus -- *not* complex combinations of buttons you can't remember.

A fast-response, high-resolution bargraph gives you an auto-ranging 20/200 Watt power meter. You get 60 segments each for forward and reflected power and 36 segments for SWR -- *try that with an 8 segment bargraph that makes you change power ranges and doesn't even give you reflected power!*

You can read inductance and capacitance *directly* in uH and pF. This turns you into an expert *L-network designer!* Match your load, read the resulting L/C values, then use them to build your fixed L-network.

Or, knowing the L/C values you can determine R and X of the load impedance.

Plus Much More!

StickyTune™ mode gives you one-hand tuning by locking the TUNE button -- just transmit to tune regardless of SWR.

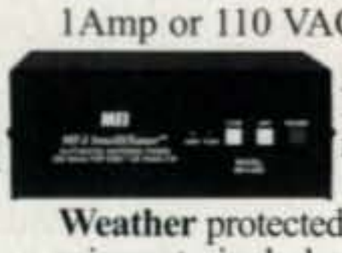
Has audio SWR meter and audio feed back. Competing products don't.

Built-in 50 MHz frequency counter.

Its built-in radio interface lets you use a simple wire cable to compatible rigs. Others require a cable with expensive electronics.

Binding post for random wire. Self-test.

Highly efficient L-network. 10 Amp/1000V relays, RF duty silver mica capacitors. 6½ Wx2¾Hx7½D in. 2.4 lbs. 12-15 VDC/1Amp or 110 VAC with MFJ-1316, $21.95.



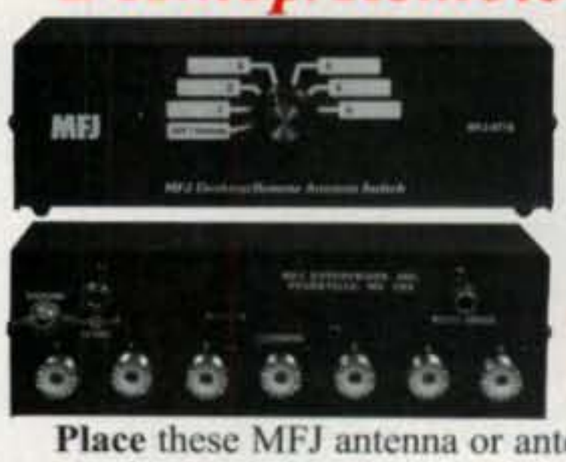
MFJ-928, $199.95. **Like** MFJ-929, less LCD, manual tune buttons.

MFJ-927, $259.95. **Weather** protected *remote* auto tuner for coax/wire ant., includes MFJ-4116 Power Injector. Most MFJ-929 features, no LCD/buttons.

MFJ-5114 K/Y/I/A, $19.95. Prewired Radio Interface cable for MFJ-929/928.

MFJ-4116, $24.95. Power Injector for remote MFJ-929/928 use. Sends DC/RF down coax.

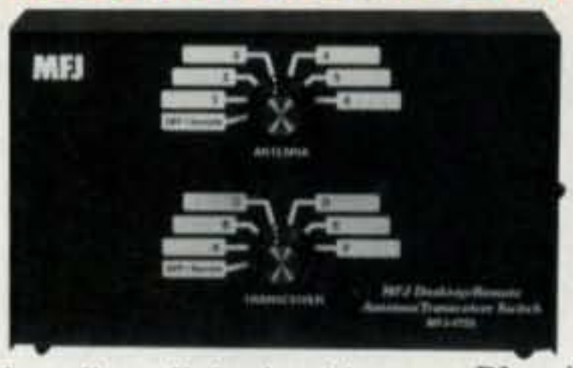
Desktop/Remote Antenna and Antenna/Transceiver Switches



MFJ-4716 **$89.95** 6-position *Antenna* Switch

MFJ-4726 **$159.95** 6-position *Antenna/Transceiver* Switch

New!



Place these MFJ antenna or antenna/transceiver switches on your *desk* or use them *remotely*. You can place them out-of-the-way under your desk, in your garage or closet -- saves cable, eliminates cable mess.

Super easy-to-use rotary switches -- no complicated computer buttons to learn or microprocessors to fail or generate RFI that covers up rare DX.

Select 1 of 6 antennas and/or 1 of 6 transceivers in any combination. All unused inputs are grounded. Automatically grounds all inputs when you turn off your transceiver -- simply connect a sense line to your transceiver. When rotary switches are in OFF position, all inputs are grounded or control is transferred to the optional remote control.

Ultra-fast gas discharge tube *lightning surge protector* protects transceiver and safely shunts static electricity and lightning induced surges safely to ground. Does not protect against direct lightning hit.

SO-239 connectors. 1500 Watts/50-75 Ohm load, 1-60 MHz. Useable to 150 MHz. Connects to remote control with common CAT 5 cable, not included (available from WalMart, etc.). Use 12 VDC or 110 VAC with MFJ-1312D, $14.95. For indoor use, not weather protected.

Antenna Switches - - 6 and 4 positions

• MFJ-4716, $89.95, *6-positions*; **• MFJ-4714, $79.95,** *4-positions*. 8Wx2¾Hx4¼D in.

Remote Controls:

• MFJ-4716RC, $39.95, *6-positions*; **• MFJ-4714RC, $39.95,** *4-positions*. 2¾Wx3¾Hx1D inches.

Antenna/Transceiver Switches - - 6 and 4 positions

Select one of 6 antennas *and* one of 6 transceivers in any combination with just two easy-to-use rotary switches.

Plug in antenna tuner, SWR/Wattmeter or other into its common ports, so it's always connected to the antenna and radio selected.

• MFJ-4726, $159.95, *6-positions*; **• MFJ-4724, $139.95,** *4-positions*. 8Wx5Hx4¼D"

Remote Controls: • MFJ-4726RC, $59.95, *6-positions*; **• MFJ-4724RC, $59.95,** *4-positions*. 2¾Wx3¾Hx1D"

Dealer/Catalog/Manuals

Visit: http://www.mfjenterprises.com or call toll-free 800-647-1800

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

MFJ ENTERPRISES, INC.
300 Industrial Pk Rd, Starkville, MS 39759 **PH:** (662) 323-5869
Tech Help: (662) 323-0549
FAX:(662)323-6551 8-4:30 CST, Mon.-Fri. ***Add shipping.***

MFJ . . . The World Leader in Ham Radio Accessories

announcements

The following special event stations are scheduled to be on the air in October:

NM5HD, from Albuquerque Balloon Fiesta 2006, Albuquerque, NM; High Desert ARC of New Mexico; 1300–0000Z Oct. 6–15 on 7.260, 14.275, 21.255 MHz. QSL to HDARC of NM, Inc., 4972 Turquoise Dr., Rio Rancho, NM 87124 (www.nm5hd.com).

N9Q, from a two or three county line in northwest Illinois during the Illinois QSO Party; 1700Z Oct. 22 to 0199Z Oct. 23 *(no frequencies given)*. QSL with SASE to N8XX.

W9L, from Sesquicentennial, Historic Downtown Days and Mississippi Queen Docking, La Crosse, WI; Mississippi Valley ARA; 1500–2300Z Oct. 15 on 7.280, 14.280, 28.450 MHz. For certificate send QSL and SASE to Terry Miller, KB9YXV, 1926 Loomis St., La Crosse, WI 54603-2061.

NØCWP, from 18th Annual Anamosa Pumpkinfest, Anamosa, IA; Jones County ARC; 1300–1700Z Oct. 7 on 14.260 ±QRM. For certificate send QSL and SASE to Jim McClintock, NØCWP, 301 Vine St., Morley, IA 52312 (www.ia.net/~anachamb/pumpkin.html or www.qsl.net/kc0lgb)

PA25FMF, from the 25th anniversary celebration of Omrop Fryslan, a broadcasting station in the north of The Netherlands. The station translates radio and television into the regional language of Frisian, the second language of The Netherlands. The Friese Radio Amateur Groep (PI4FRG) will be charged with the technical aspects from their club house, where the transmitters for all bands are located; the transmitters are also the link to the broadcast studio and will be provided with ATV. Operation will be only during October on HF, VHF, UHF, as well as CW, RTTY, and PSK31. Each contact will be confirmed by a unique QSL card designed for the event.

The following hamfests, etc., are scheduled for October:

Oct. 1, **Hall of Science Radio Club Hamfest**, Flushing Meadow Corona Park, Queens, NY. For information go to <www.hosarc.org>, or call at night only Stephen Greenbaum, WB2KDG, 718-898-5599, e-mail: <WB2KDG@arrl.net>. (Talk-in 444.200, PL 136.5, 146.52 simplex; exams 10 AM, info W2LJM, 718-835-1548)

Oct. 7, **HamEXPO 2006**, Bell County Expo Center, Belton, TX. Contact Mike LeFan, WA5EQQ, 254-773-3590 (10 AM to 9 PM Central Mon.–Sat.); e-mail: <hamexpo@tarc.org>; <www.beltonhamfest.org>. (Talk-in 146.820–, PL 123.0)

Oct. 15, **RF Hill ARC Hamfest**, Sellersville Firehouse, Sellersville, PA. Contact Charles Schmell, KB3CEZ, 267-261-3507; e-mail: <kb3cez@arrl.net>; <www.rfhill.ampr.org>. (Talk-in 145.31–, PL 131.8; exams 10 AM to noon)

Oct. 21, **Great Lakeshore Super Swap**, West Ottawa South Campus, Holland, MI. Contact John Hanse, 616-836-3737; e-mail: <Swap@HollandARC.org>; <www.HollandARC.org>. (talk-in 147.060, PL 94.8; exams)

Oct. 29, **Massillon ARC Hamfest & Auction**, Massillon Boys & Girls Club Complex, Massillon, OH. Contact Gary Kline, WC8W, 330-837-2927; <www.marcradio.org>. (Talk-in 147.18+; exams)

Oct. 29, **Utica Shelby Emergency Communications Assn. Ham Swap**, Polish-American Century Club, Sterling Heights, MI. Contact Tom Tincknell, KD8AVF, 586-651-7239; e-mail: <hamfest@k8uo.com>; <http://useca.rfc791.org/>. (Talk-in 147.180 +100 Hz PL; exams)

our readers say

"Dumbing Down of Amateur Radio"

Editor, *CQ*:

"Dumbing Down of Amateur Radio."I've come across this comment before but never saw the reality so plainly. In the July issue, "Technician Exams Feature New Question Pool," you compare an old question with the new version and say "The knowledge required to correctly answer either question (C in both cases, if you had any doubt) is the same."

Well, I couldn't pass the old test today, but I could sure pass the new test! Look at the old test: "Which list of emission types is in order from the narrowest bandwidth to the widest bandwidth?" The possible answers include RTTY, CW, SSB voice, and FM voice in various orders. Responses B, C, and D began with CW.

Now look at the new test: "Which emission type has the narrowest bandwidth? A. FM voice; B. SSB voice; C. CW; D. Slow-scan TV."

I know that CW is the narrowest but I don't know about those other modes. Okay, if you only want them to know about how narrow CW is, fine. But in the old test you *had* to know about the other modes. "The knowledge required to correctly answer" is

A publication of

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

Offices: 25 Newbridge Rd., Hicksville, NY 11801, Telephone 516-681-2922; Fax 516-681-2926. E-mail: cq@cq-amateur-radio.com. Web site: www.cq-amateur-radio.com. CQ (ISSN 0007-893X) is published monthly by CQ Communications, Inc. Periodical postage paid at Hicksville, NY 11801 and additional offices. Subscription prices (all in U.S. dollars): Domestic-one year $31.95, two years $57.95, three years $83.95; Canada/Mexico-one year $44.95, two years $83.95, three years $122.95; Foreign Air Post-one year $56.95, two years $107.95, three years $158.95. U.S. Government Agencies: Subscriptions to CQ are available to agencies of the United States government including military services, only on a cash with order basis. Requests for quotations, bids, contracts, etc., will be refused and will not be returned or processed. Entire contents copyrighted by CQ Communications, Inc. 2006. CQ does not assume responsibility for unsolicited manuscripts. Allow six weeks for change of address.

Printed in the U.S.A.

Postmaster: Please send change of address to:
CQ Amateur Radio, 25 Newbridge Rd., Hicksville, NY 11801

definitely different! I'm surprised to see you suggesting otherwise.

Gary Lee Williams, WB8MWR

W2VU responds:

Interesting points, Gary. But I still have to wonder WHY you needed to know the proper progression of bandwidths for the different modes. Particularly as a Technician, where the primary mode used is FM, with some SSB, little CW and virtually no SSTV. What you need to understand is the concept of bandwidth, that different types of signals occupy different bandwidths, and that a CW signal is the narrowest. More importantly, for the Technician, is knowing that an FM signal is the widest of the most commonly used modes, but that question wasn't asked.

What disturbs me, though, is your statement that you couldn't have passed the old exam. Judging by your callsign, I'd guess that you've had a ham license for at least 25–30 years. And if someone with that level of experience in amateur radio couldn't pass a beginner's exam, then there's something wrong with the exam! It's not really a beginner's exam, is it, if someone who's been a ham for 25 years or longer couldn't pass it? You (or I) should be able to pass an entry-level exam with our eyes closed. I'm glad we now have a test that meets that criterion. I'm also glad that we now have an exam that places more emphasis on proper operating techniques and emergency communications, and puts repeater operating in the mainstream, rather than classifying it as "special operations."

WB8MWR replies:

Rich,

Thank you for taking the time for such a thorough reply! Obviously, you are right. By the time I got to the part about the old and new exam questions I had lost sight of the purpose—to test prospective Technicians.

My point of passing the exam myself is that I've certainly forgotten a lot of the stuff I learned to take it. A few years ago I looked at upgrading. Golly, but there's a lot of stuff I would just have to memorize! So much of what is required now is completely irrelevant to my participation in the hobby. I was hoping to expand my operating bandwidth for my CW operation and I had to understand satellite modes? I *do* put a lot of my activity into VHF/UHF/repeater operation and lean toward emergency preparedness capability.

Porcupine Photo

Editor, *CQ*:

Suggestion for picture caption on page 55 of August *CQ*: "I was trying to get the number of antennas to match my license number, but I ran out of room."

William F. Bass, KI4NXL

Photo from page 55 of August CQ. →

ANAHEIM, CA
(Near Disneyland)
933 N. Euclid St., 92801
(714) 533-7373
(800) 854-6046
Janet, KL7MF, Mgr.
anaheim@hamradio.com

BURBANK, CA
1525 W. Magnolia Bl., 91506
(818) 842-1786
(800) 854-6046
Eric, KA6IHT, Mgr.
Magnolia between
S. Victory & Buena Vista
burbank@hamradio.com

OAKLAND, CA
2210 Livingston St., 94606
(510) 534-5757
(800) 854-6046
Mark, WI7YN, Mgr.
I-880 at 23rd Ave. ramp
oakland@hamradio.com

SAN DIEGO, CA
5375 Kearny Villa Rd., 92123
(858) 560-4900
(800) 854-6046
Tom, KM6K, Mgr.
Hwy. 163 & Claremont Mesa
sandiego@hamradio.com

SUNNYVALE, CA
510 Lawrence Exp. #102
94085
(408) 736-9496
(800) 854-6046
Dan, K6DN, Co-Mgr.
Howard, W6HOC, Co-Mgr.
So. from Hwy. 101
sunnyvale@hamradio.com

NEW CASTLE, DE
(Near Philadelphia)
1509 N. Dupont Hwy., 19720
(302) 322-7092
(800) 644-4476
Rick, K3TL, Mgr.
RT.13 1/4 mi., So. I-295
delaware@hamradio.com

PORTLAND, OR
11705 S.W. Pacific Hwy.
97223
(503) 598-0555
(800) 854-6046
Leon, W7AD, Mgr.
Tigard-99W exit
from Hwy. 5 & 217
portland@hamradio.com

DENVER, CO
8400 E. Iliff Ave. #9, 80231
(303) 745-7373
(800) 444-9476
Joe, KDØGA, Co-Mgr.
John N5EHP, Co-Mgr.
denver@hamradio.com

PHOENIX, AZ
1939 W. Dunlap Ave., 85021
(602) 242-3515
(800) 444-9476
Gary, N7GJ, Mgr.
1 mi. east of I-17
phoenix@hamradio.com

ATLANTA, GA
6071 Buford Hwy., 30340
(770) 263-0700
(800) 444-7927
Mark, KJ4VO, Mgr.
Doraville, 1 mi. no. of I-285
atlanta@hamradio.com

WOODBRIDGE, VA
(Near Washington D.C.)
14803 Build America Dr.
22191
(703) 643-1063
(800) 444-4799
Steve, W4SHG, Mgr.
Exit 161, I-95, So. to US 1
virginia@hamradio.com

SALEM, NH
(Near Boston)
224 N. Broadway, 03079
(603) 898-3750
(800) 444-0047
Chuck, N1UC, Mgr.
Exit 1, I-93;
28 mi. No. of Boston
salem@hamradio.com

12 STORE BUYING POWER

HAM RADIO OUTLET

SPECIAL SAVINGS THROUGHOUT SEPTEMBER

IC-706MKIIG All Mode Transceiver

• Proven Performance • 160-10M*/6M/2M/70CM • All mode w/DSP • HF/6M @ 100W, 2M @ 50W, 440 MHz @ 20W • CTCSS encode/decode w/tone scan • Auto repeater • 107 alphanumeric memories

IC-7800 All Mode Transceiver

• 160-6M @ 200W • Four 32 bit IF-DSPs+ 24 bit AD/DA converters • Two completely independent receivers • +40dBm 3rd order intercept point

IC-746PRO All Mode 160M-2M

• 160-2M* @ 100W • 32 bit IF-DSP+ 24 bit AD/DA converter • Selectable IF filter shapes for SSB & CW • Enhanced Rx performance

IC-7000

• IC-7000+RMK7000 = SAVE $70
• IC-7000+AH4 = SAVE $90
• IC-7000+AT180 = SAVE $100

IC-756PROIII All Mode Transceiver

• 160-6M • 100W • Adjustable SSB TX bandwidth • Digital voice recorder • Auto antenna tuner • RX: 30 kHz to 60 MHz • Quiet, triple-conversion receiver • 32 bit IF-DSP • Low IMD roofing filter • 8 Channel RTTY TX memory • Digital twin passband tuning • Auto or manual-adjust notch with 70 dB attenuation

IC-T90A Triple Band Transceiver

• 6M/2M/70CM @ 5W • Wide band RX 495kHz - 999.999MHz** • 500 alphanumeric memories • Dynamic Memory Scan (DMS) • Backlit keypad & display • CTCSS/DTCS encode/decode w/tone scan • Weather Alert

IC-718 HF Transceiver

• 160-10M* @ 100W • 12V Operation • Simple to Use • CW Keyer Built-in • One Touch Band Switching • Direct frequency input • VOX Built-in • Band stacking register • IF shift • 101 memories

IC-2720H Dual Band Mobile

• 2M/70CM • VV/UU/VU • Wide band RX inc. air & weather bands • Dynamic Memory Scan (DMS) • CTCSS/DTCS encode/decode w/tone scan • Independent controls for each band • DTMF Encode • 212 memory channels • Remote Mount Kit Inc.

IC-91AD Digital Dual Band Transceiver

• 2M & 70CM @ 5W • 1304 Memory channels • Independent (dual watch) wide band RX 495kHz - 999.999MHz** • Full dot matrix LCD • New "duplex scan" • Long-lasting Li-ion battery • D-STAR digital voice • Compliments the ID-800H mobile

IC-V8000 2M Mobile Transceiver

• 75 watts • Dynamic Memory Scan (DMS) • CTCSS/DCS encode/decode w/tone scan • Weather alert • Weather channel scan • 200 alphanumeric memories

IC-2200H 2M Mobile Transceiver

• 65W Output • Optional D-STAR format digital operation & NEMA Compatible GPS interface • CTCSS/DTCS encode/decode w/tone scan • 207 Alphanumeric Memories • Weather Alert

IC-T7H Dual Band Transceiver

• 2M/70CM • 70 memory channels • 6W output • CTCSS encode/decode w/tone scan • Auto repeater • Easy operation! • Mil spec 810, C/D/E*1

IC-V82 2M Transceiver

2M @ 7W • Optional D-STAR format digital operation features include callsign calling, up to 20 character text message, & position exchange*2 • CTCSS/DTCS encode/decode w/tone scan • Also available in a sport version and a 70CM version (IC-U82)

ICOM

*Except 60M Band. **Cellular blocked, unblocked OK to FCC approved users. ✪Offer ends 9/30/06. Check with HRO for details or restrictions. ◆Limited time only. Check with HRO for details or restrictions on any offers or promotions. *1For shock & vibration. *2When connected to an external GPS © 2006 Icom America Inc. CQ OCT 06. The Icom logo is a registered trademark of Icom Inc. 8762

CALL TOLL FREE

Phone Hours: 9:30 AM – 5:30 PM
Store Hours: 10:00 AM – 5:30 PM Closed Sun.

Toll free, incl. Hawaii, Alaska, Canada; call routed to nearest store; all HRO 800-lines can assist you. If the first line you call is busy, you may call another.

West	800-854-6046
Mountain	800-444-9476
Southeast	800-444-7927
Mid-Atlantic	800-444-4799
Northeast	800-644-4476
New England	800-444-0047

Look for the HRO Home Page on the World Wide Web
http://www.hamradio.com

AZ, CA, CO, GA, VA residents add sales tax. Prices, specifications, descriptions, subject to change without notice.

The 2006 CQ WW DX SSB Contest is this month. Last year a team of eight hams from the U.S. operated from Costa Rica at TI5N, the station of TI5KD, in the Multi-Operator, Two Transmitter category. It was a combination of seasoned contesters and those new to the sport, and their combined efforts earned them a winning score . . . plus the weekend had a special surprise in store for one of the ops.

Team TI5N in the 2005 CQ WW DX SSB Contest

BY DONALD DuBON,* N6JRL

The 2005 CQ WW DX SSB Contest TI5N team (left to right): front row, KF0FWC, KI0DN, TI2IY; back row, N0ZUQ, KA8LGS, N8JE, KC8WTG, N6JRL, TI5KD, KD4YHY. (Photos by the author)

During the 2005 Dayton Hamvention® most of the future TI5N team members were visiting at my home in Kettering, Ohio, a suburb of Dayton. We thought how great it would be to have our group participate in a contest from a big-gun DX station. Since I had been to TI5N before, I suggested that we should consider going to Costa Rica to the home of TI5KD, Carlos (Keko) Diez, and his lovely XYL, Sophia, TI2IY.

While discussing the possibility of the trip, the group decided to choose me as their leader and Elmer. My job was to also pick a few more team members. Thinking of whom else I could invite, I decided to contact Joe Walsh (guitarist with The Eagles), WB6ACU. Imagine my surprise when Joe e-mailed me and said he would love to go and be part of the team!

The last week of May I began the planning process by contacting Keko, TI5KD, to see if there was an opening at his station for a contest weekend in 2005. We found that the CQ WW DX SSB Contest weekend in October was wide open, and we could bring a team of eight operators. A price and deposit were agreed upon and the team was assembled.

Shortly after the members of the team had committed themselves to the plan, I was contacted by my good friend Jim

*441 Lewiston Rd., Kettering, OH 45429
e-mail: <N6JRL@aol.com>

Our host, Keko, TI5KD.

During the trip Jim, KIØDN, and Pam, KFØFWC, renewed their wedding vows on their 25th anniversary, with Father Jim officiating.

Hammock, KIØDN. He had an idea. Jim's XYL, Pam, KFØFWC, was also going as a team member, and as a surprise he wanted to have a small ceremony to renew their wedding vows. During the contest period it would be their 25th wedding anniversary! I contacted Keko and he said he would do what he could (we will return to that part of the story later).

Over the next several months I sent out dozens of e-mails to the team members and made countless phone calls to them, as well as to Costa Rica. We did not want to make our air travel arrangements too soon, nor did we want to wait too long and not get good deals. Finally, in late August, most of the team had their flight reservations at an average cost of $484 to $589 for a round-trip flight to San José, the capital city of Costa Rica. At that time all of the team members had to submit copies of their passports and U.S. amateur licenses in order to obtain written permission to operate in the country, at a cost of $20 each.

Along with obtaining travel and operating permission, we had to consider the logistics of equipment, logging programs, clothing, computers, etc. Since all of the antennas were already in place at TI5N, we only had to take with us some small rigs, laptops, headsets, and miscellaneous cables. Not having to transport antennas would make things a lot easier.

It seemed that everything was going smoothly, but something unexpected always seems to happen when planning a DXpedition and it happened to us. One of our team members, Ron Moorefield, W8ILC, was activated by FEMA to assist down in Louisiana with the aftermath of Hurricane Katrina. When we assembled the team, it was agreed that if anyone had to drop out for any reason, every attempt would be made to find a replacement. The new team member would then pay the deposit back to the person who had to drop out, so no one would be out his initial investment.

It was very easy to find an eager replacement for Ron, and that was Carl Patterson, KA8LGS. As our luck would have it, Joe, WB6ACU, had to cancel as well, due to concert commitments. Joe told me he wanted to make a contribution to keep the team together and asked how he could help. I discussed the possibility of Jim Ebner, N8JE, going in his place, but being on disability, Jim could not afford it. Joe asked me, "How much would it cost to bring Jim on board?" I told him, and his response was simple: "Tell Jim he's going." I discussed this with Jim's XYL, Cindy, K8CJE, and she was so happy she was moved to tears. Cindy and I conspired to make it a big surprise, so at a DX club meeting I presented Jim with his plane tickets. It was a wonderful experience for everyone.

Ready To Go

Finally, all of the team members were ready to go: five from Ohio, two from Minnesota, and one from Colorado. Early on the morning of Wednesday, October 26th, the five from Ohio met at the Dayton airport at 4:30 AM, and after checking in and having a great breakfast, we boarded our plane for Houston, Texas. After a 1-hour 55-minute flight, we were in Houston with just a few minutes to get to our connecting flight to San José, Costa Rica. This flight was just over 3 hours, and with the time change we arrived in time for lunch. About an hour behind us was the flight carrying Jim and Pam Hammock from Minnesota. Later that evening at about 8:30 PM the last team member, Cliff Mikkelson, NØZUQ, arrived from Denver.

The Surprise

We all woke up early on Thursday morning to a delicious breakfast prepared by Sophia, our wonderful hostess. This was also the day we had chosen for the surprise 25th anniversary ceremony for Jim and Pam. Everyone except Pam knew about the plan. When she was around, Keko and Sophia spoke freely in their own language so the surprise would not be spoiled. Jim had had to keep the secret since May, which was not an easy task. E-mails and phone calls about the plan were channeled through me to Keko. Keko and Sophia even found an English-speaking priest. He was an American studying in

W4PA & ORION II ARE #1

February 2006 was magic for Scott Robbins, W4PA. Most folks travel to Barbados to marvel in the Caribbean splendor. But, not Scott. Operating as 8P9PA in the ARRL DX CW contest, 5206 QSOs in 48 hours is what it took to win #1 World Single Op. Scott had reached a goal he set for himself decades earlier as a teenage ham.

Corner Scott at a hamfest, and ask him how he did it. Like any experienced contester, he'll tell you, "you can't work 'em if you can hear 'em!" He will also tell you his ORION II is the finest contest rig ever built. Believe him, he has personally used them all. To be fair, Scott is a bit prejudiced. His day job as TEN-TEC's Amateur Radio Product Manager gave him a pivotal role in the development of the ORION II. All the hams here at TEN-TEC join in congratulating Scott on two great achievements—his #1 World Single Op and for his invaluable contribution to the world's finest HF transceiver.

Call us today at (800) 833-7373 to put an ORION II in your shack. $3995* or $4295* with automatic antenna tuner.

Ask about our 4-month finance plan.

800-833-7373
www.tentec.com

In Stock
Limited Quantity
FACTORY RECONDITIONED ORION I'S!
Immediate Shipment!

TEN-TEC

1185 Dolly Parton Parkway • Sevierville, TN 37862
Sales Dept: 800-833-7373 or sales@tentec.com • M–F 8:00–5:30 Eastern
Service Dept: 865-428-0364 or service@tentec.com • M–F 8:00–5:00 Eastern
We accept VISA, Mastercard, Discover, and American Express
Office: (865) 453-7172 • FAX: (865) 428-4483
**Shipping is additional. TN residents add 9.5% TN sales tax.*

Carl, KA8LGS, working multipliers during the contest.

Costa Rica, Father Jim. The previous evening Jim, KIØDN, had spoken on the phone with him and given him information pertaining to their marriage, so a tailor-made ceremony was planned.

We all arrived at the church in the afternoon in our team hats and shirts so as not to give away the surprise. We stopped at the church under the guise that Jim liked the building and trees and wanted to take some photographs.

Jim coaxed Pam into entering the church for some photos, and Father Jim was waiting. Jim introduced Pam to him and then told her that they were there to renew their wedding vows of 25 years ago. Pam was shocked and did not believe it at first. Then Sophia handed her the bride's flowers and we began the ceremony.

With me as the best man and Sophia as the matron of honor, the ceremony was perfect and very personal. Father Jim had prepared very well for the event. We took photos and videos afterward and thanked the good Father and caretakers of the church. There was no charge, but Jim made a handsome donation to the church. We then returned to our cars and went to the city of Aleuhuela, where Jim bought his "new bride" a gift. Next it was back to Sophia and Keko's home for a wonderful meal followed by wine, cake, and a nice, small reception.

The Contest

The next day was Friday and the contest would start at 6 PM local time. We had a lot of things to do before that. We set up the rigs and amplifiers, loaded the logging software into the computers, and planned who would work the different shifts and who would operate with whom. Not all of the team members had participated in a contest or been on a DXpedition before this, so we made sure everyone was up to speed on the plan. As the starting time drew near, we began to make casual contacts to test out the equipment.

As luck would have it, I was working Steve Bolia, N8BJQ (past CQ WPX Contest Director and the new CQ WPX Award Manager), just as the contest began. Steve was the first one in the log. Jim Ebner, N8JE, Todd DuBon, KD4YHY, and I, being experienced contesters, quickly began running pile-ups on 15 and 20 meters and the multiplier station as the new operators looked on with overwhelmed stares. The rate was fairly good for the first two to three hours. Then we put the new operators on the air and helped them run pile-ups, which they all took to very rapidly and with quite a bit of enthusiasm. The QSOs added up and so did the multipliers and score. We were well on our way during the wee hours of the morning.

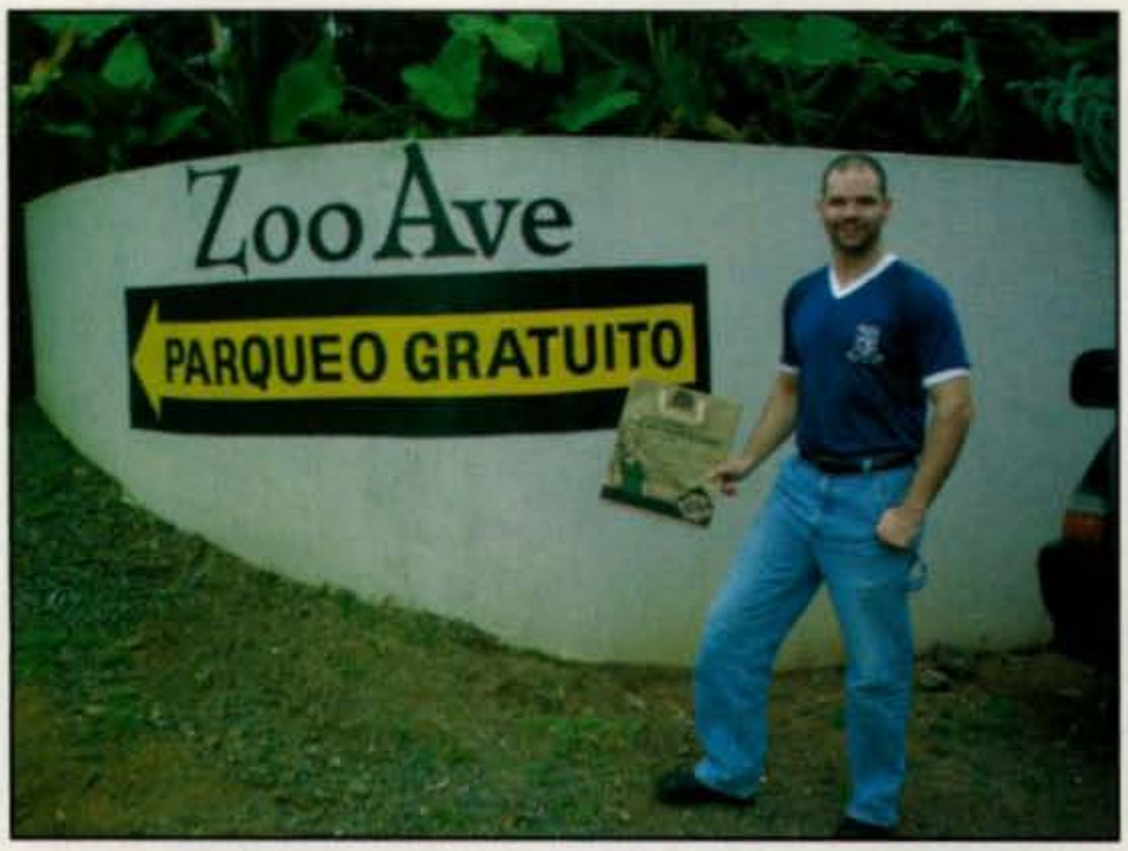
After breakfast on Saturday morning, Keko, TI5KD, Jim, N8JE, and I got on the bands, and by lunch time we had logged about 1200 Q's and several multipliers. By late Saturday evening, things started to slow down and the new operators were able to get on the air more, seeking out multipliers and stations not yet worked. Sophia kept the team going with midnight snacks and small meals she could put together to match the operators' schedules. Sunday morning she made everyone eat breakfast in shifts so we all could make it to the end of the contest. Sunday went by slowly with many dupes and few new multipliers, but we still found some stations to put in the log.

The end of the contest came at 6 PM local time, and everyone was happy and relieved. Forty-eight hours, even split into shifts, is a long time to sit in front of a radio! With the final contacts having been put in the log, everyone was able to

Operating the contest, left to right: Cliff, NØZUQ; Don, N6JRL; Todd, KD4YHY; and Keko, TI5KD (in the background).

Packing up the equipment after the contest (left to right): Jim, N8JE; Don, N6JRL; Carl, KA8LGS; and Cliff, NØZUQ.

Enjoying some well-deserved relaxation after the contest were Sophia, TI2IY; Pam, KFØFWC; Jim, KIØDN; and Cliff, NØZUQ.



Time for a little sightseeing post-contest, Todd, KD4YHY, is seen here at the entrance to the zoo.

Our contest effort is dedicated to the memory of our good friend Eric Roy, TI2NA, who became a silent key in July 2006.

relax. The contest was over for another year, and many of the operators new to contesting had risen to the challenge.

Post-Contest

Monday morning Keko had a private bus arrive at 8 AM to take us sightseeing and shopping.

First we stopped at the zoo, and then we went to San José. We saw the museum and the post office. The post office was interesting to Pam, as she is a postmaster back in Minnesota. Everyone bought hats, T-shirts, and trinkets to take home to their families. Arriving back at the house at about 8 PM, we had some snacks and started packing for our early departure the next morning.

Rising early the next morning at about 4 AM, we loaded our luggage into two cars and left for the airport. The five team members from Ohio were on a 7:45 AM flight, so we had to get to the airport at around 5:45. Pulling up in front of the airport and loading our luggage onto a cart, we said our goodbyes and hugged to our wonderful hosts and good friends, Keko and Sophia. We then went inside to check our bags and get our boarding passes. Those of us returning to Ohio were informed that the flight had been delayed for 2 1/2 hours and we would have to be rerouted through Houston, Cleveland, and then back finally to Dayton. Our expected time of arrival now was more like 10 PM. Finally, at about 10:30 AM, though, we were on our way home to Dayton.

Our 2005 contest effort is dedicated to the memory of Eric Roy, TI2NA, who became a silent key in July 2006. We will always remember Eric as our good friend, and a fellow ham, DXer, and contester, as well. ■

How do you put a price on a one-of-a-kind radio? For that matter, how do you figure out current values for gear that sold 50 years ago for "just" a few hundred dollars? Vintage-radio collector K8PSV did some digging and has some answers.

Rock Star Price Guide

or

"I Have a Radio – Forget the Price"

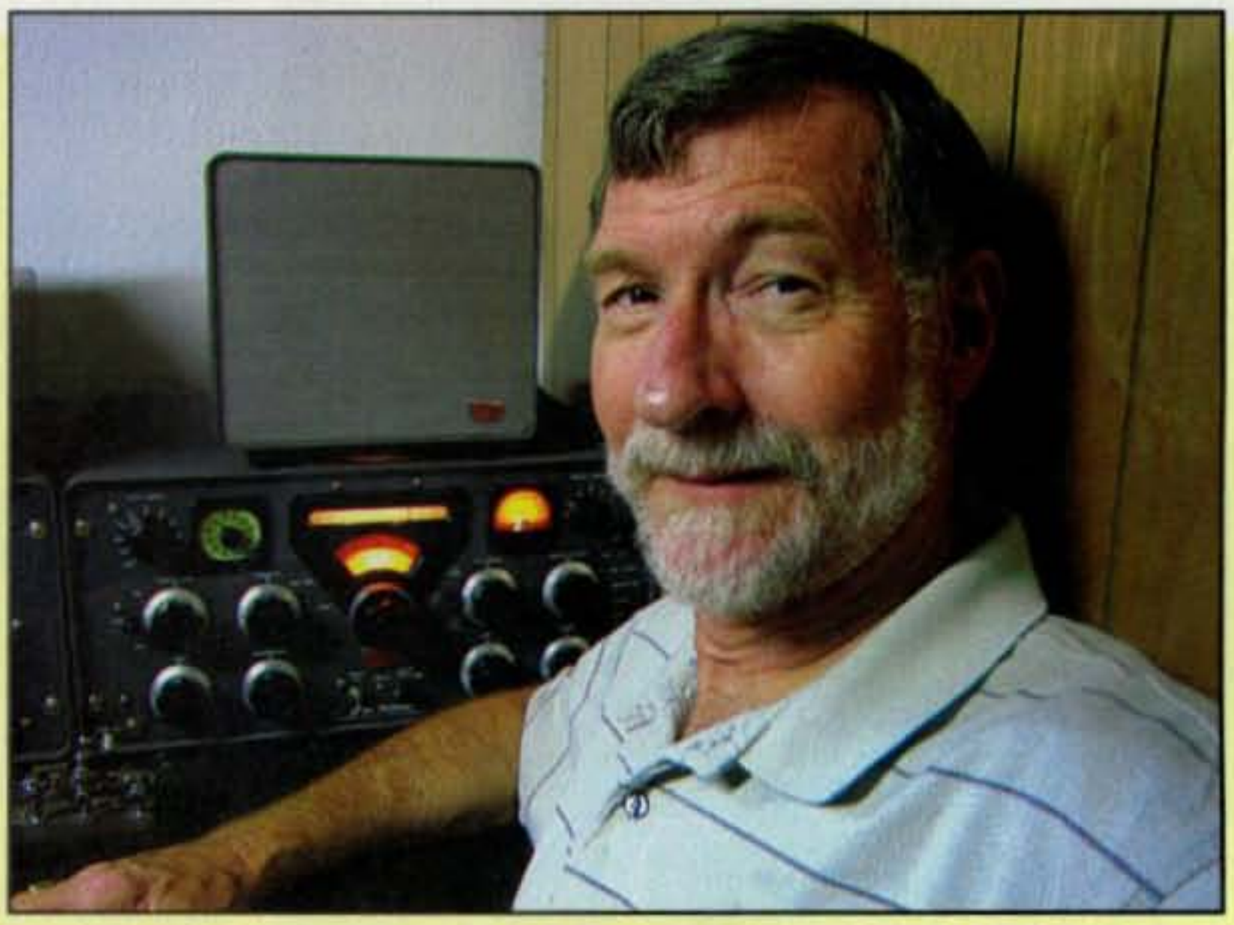
BY JOEL THURTELL,* K8PSV

The rock star's question made me ponder. . . . What, I wondered, are my old radios worth?

What sparked my latest run at the old-radio pricing conundrum was an e-mail from Joe Walsh, WB6ACU, guitarist with The Eagles. Joe wanted to know the price of my Central Electronics 100-R ham receiver.

My first reaction: Sorry, Joe, it ain't for sale. I mean, that's the crown jewel of my radio collection. The Central Electronics 100-R was featured in my April 1992 *Electric Radio* and November 1998 *QST* stories and in the 1999 CQ Radio Classics calendar. Scarce doesn't begin to describe the thing. Central only made one.

The 100-R represents the pinnacle of my collecting career. To sell it would be, well, unthinkable. However, if the 100-R *were* for sale, how much would I ask? I keep telling you it's *not* for sale!



The author with his one-of-a-kind Central Electronics 100-R receiver. It's not for sale. Well, maybe not . . . (Photo by Adam Thurtell)

Pricing the Priceless

Admittedly, Joe's 100-R query was a toughie. The radio never went to market, never had a price tag placed on it. It's a prototype of a receiver meant to match the renowned Central Electronics 100-V and 200-V transmitters. Before the company could gear up production, though, its parent company, Zenith, closed it down. With no price, there's no baseline from which to extrapolate even a guesstimate of its current worth, and even then, its very uniqueness makes it impossible to appraise.

Does this discussion seem arcane? Well, there are practical uses for present-day values of old gear. Consider this: After UPS mangled one of my radios some years ago, I tried to file an insurance claim. How much was the radio worth? That was easy. An old catalog told me that in 1955, my Heath DX-100 sold for $189.50. There was extensive damage. A transformer broke free and sliced through ranks of glass tubes. The complete rig at its 1955 value wasn't worth the $205 cost of a new Peter Dahl Co. high-voltage transformer for this rig. I needed to know how much that DX-100 was worth today.

Aside from the UPS problem, the question is interesting to me because I buy and sell old ham radios and need to price them. Since most of them need repair before I can ship them, it would be helpful to know how much money I could invest in a given rig before my costs of acquisition, labor, and parts for repair, advertising, warehouse rent, utilities, and local, state, and federal taxes add up to more than I could get for the radio. Oh yes . . . and I'd like a little room for profit.

A Paucity of Price Guides

True, I could track eBay prices, but they are one-time events representing the sale price of a radio of unknown quality and unknown cost during one short slice of time. To me it's useless information.

Authors of some amateur radio equipment books provide price guides, but I don't trust them. What is their data-

*11803 Priscilla Lane, Plymouth, MI 48170
e-mail: <joel_thurtell@hotmail.com>

All New!
LDG Electronics' Greatest Hits of 2006

This year we introduced three new products that shook the Ham World. All with a Two-Year Warranty!

IC-7000 Owners: Your Tuning Problems—Solved!

The AT-7000 is the ideal tuner for IC-7000, IC-706 & other ICOM Radios: Covers all frequencies from 1.8–54 MHz **(including 6 meters),** and will automatically match your antenna in a flash. Requires just 0.1 W for operation, but will handle up to 125 W (100 W on 6 m), making it suitable for everything from QRP (IC- 703Plus) to a typical 100 W ICOM transceiver.

Ready to go right out of the box! No extra cables to buy.

LDG ELECTRONICS 2 YEAR WARRANTY

The AT-7000 is just 6.5" long, 6.5" deep and 1.5" tall. It weighs only 1.5 pounds, and gets its DC power directly from the radio; **no separate power supply needed.**

List Price $169

Your Eye Strain Problems —Solved!

Yaesu's popular FT-857 and FT-897 transceivers are wonders of compact efficiency. These do-anything, go-anywhere transceivers were science fiction just a few years ago, but hams today are using them in shacks, mobiles and on expeditions from the back yard to the top of the world.

The FT-Meter presents a lush, highly readable 2.5" meter face with calibrated scales for signal strength and discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit. Each function is selectable from the radio's menu. Easily visible from anywhere on your desk or dash, the FT-Meter is illuminated by any external 12 vdc source.

The FT-Meter comes fully assembled and ready to go; just plug it into the radio and you're in the picture like never before.

List Price $49

AT-200PC

The First Automatic Tuner Designed Specifically for PC Rig Control

AT-200Pro

AT-200PC

Now you can have a state-of-the-art, high performance automatic tuner and still run your whole station right from your keyboard and mouse. LDG's AT-200PC is a special version of the popular AT-200Pro, designed for PC control. All of its functions are controlled entirely by a program running on your PC. The tuner itself can be installed out of the way, on the floor or even in another room, interfacing to your PC via a serial or USB cable.

List Price $249 AT-200Pro, $259 AT-200PC

Contact Your Favorite Dealer to Purchase LDG Products

LDG ELECTRONICS

LDG Electronics, Inc.
1445 Parran Road,
St. Leonard, MD 20685
Phone: 410-586-2177
Fax: 410-586-8475
E-mail: ldg@ldgelectronics.com

Visit the New LDG Web Site!

www.ldgelectronics.com

How much is this radio worth? Here's a hint: Central Electronics spent $250,000, in 1961 dollars, to develop it . . . and built only this one unit! (Photo by Adam Thurtell)

base? There is no good source for price information, and I don't sense that dealers have been asked. I was an active dealer in classic radios for a number of years, yet no author or compiler of a price guide ever asked me for a list of my selling prices.[1] Plus, I have another concern. Since authors often are collectors themselves, they might like to have prices appear low in hopes of keeping them that way. How can we objectively arrive at current price estimates for yesterday's radios?

Why not use the manufacturer's original price, adjusting it for inflation? The original price presumably reflected the cost of production plus some markup for profit. In the mid-1990s, when I first posted my <www.radiofinder.com> website, I compiled a list of present-day values for several old radios in my inventory based on a table of inflation factors I got from another collector. For each radio, I researched its year of manufacture and original price. My inflation-factor chart gave a number that I multiplied times the past price of the radio to arrive at the 1994 value.

Inflation Adjustment . . . A Click Away

That was okay in 1996. However, by 2003, when we redesigned the Radiofinder website, the numbers were way out of date. By then, though, the remedy was as easy as Google®. Call up the search engine (or whichever one is your favorite) and type "inflation calculator." Pages of websites will appear on your screen, and they let you plug in the year of manufacture and then current price. The website does the math and up pops your present price. The Bureau of Labor Statistics, which maintains the Consumer Price Index (CPI), has an inflation calculator at <http://data.bls. gov/cgi-bin/cpicalc.pl> which will convert prices from any year back to 1913 into its equivalent price in any other year up to 2006. Another site, <http://www.westegg.com/inflation/>, will do calculations based on the CPI from 1800–2005. (*Note:* Slight differences in the way these calculators work will give you slightly different results if you plug the same numbers into different ones. All are in the same ballpark, though.)

What an amazing tool. Now, thanks to BLS, I know that my old National HRO receiver, priced at $167.70 in 1935, is worth $2483.67 today. I also know that my 1955 DX-100's $189.50 original price would come in at $1434.68 in 2006 dollars. However, it would likely be worth considerably more than that. After all, the DX-100 was a kit. The buyer was expected to contribute his labor. Add in the value of labor and you have, well, a figure considerably more than $1435, although a little hard to determine.

You can get a more accurate present-day price reading by looking at a factory-made unit. Take the Collins 75A-4, popular in 1955 when it was introduced and still sought after today. It was priced at $495 in 1955. In 2006 dollars? It's $3747.59.

Even when looking at a relatively recent classic such as the Collins-Rockwell KWM-380, however, the effects of overall inflation are amazing. The KWM-380 came out in 1979 priced at $2995. Today, the same radio fresh from the factory would cost $8370!

Try this trick on the venerable Collins KW-1, price tag $3850 in 1953. In 2006? $29,257.12.

To anyone who thinks these calculations lead to outrageously high prices, consider that in 1955 not too many of us were buying 75A-4s. I dreamed of owning a 75A-4, but when I was in the market for a good ham-bands-only receiver in 1960, what did I settle for? An older 75A-2,

Basic Tools For Inflation Calculations

To figure out those elusive current values for old gear, you'll need some basic research tools in addition to the internet inflation calculator.

It wouldn't hurt to have a collection of old *QST* and maybe *CQ* magazines, because their advertisements often list prices and confirm date of manufacture.

The ARRL's *Radio Amateur's Handbook* during our classic period of roughly the 1930s to about 1970 had an advertisement section that gave prices.

You could also stock your library with a few handy reference works. Here are the ones I find most helpful:

The Pocket Guide to Collins Amateur Radio Equipment, 1946 to 1990, by Jay H. Miller, KK5IM, Trinity Graphic Systems, 1995.

Shortwave Receivers Past & Present; Communication Receivers 1942–1997, by Fred Osterman, Universal Radio Research, 1998.

Tube Type Transmitter Guide; Manufactured Pre-Builts and Kits from 1922 to 1970 Using All, or Mostly Tubes, by Eugene Rippen, Sound Values, 1995.

Communications Receivers; The Vacuum Tube Era: 1932–1981, by Raymond S. Moore, RSM Communications, 1987.

Radios by Hallicrafters With Price Guide, by Chuck Dachis, Schiffer Publishing, Ltd., 1996.

The Hallicrafters Story, 1933–1975, by Max de Henseler, Antique Radio Club of America, 1991.

Heathkit: A Guide to the Amateur Radio Products, by Chuck Penson, WA7ZZE, Electric Radio Press, 1995; 2nd edition, CQ Communications, Inc., 2003.

Rock Star Price Chart

Here are some samples of popular "boat anchors," listing their initial prices and how much they would sell for today after adjusting for inflation:

Manufacturer	Model	Built	Original Price	Price in 2006 Dollars*
Hammarlund	HQ-120	1938	$117.00	$1683.64
Hallicrafters	S-38	1946	$39.50	$411.00
Central Electronics	10-A	1953	$159.50	$1212.08
Hallicrafters	SX-88	1953	$595.00	$4521.55
Johnson	Ranger	1954	$329.50	$2485.34
Collins	KWS-1	1955	$1995.00	$15,103.94
Drake	1-A	1957	$299.00	$2158.97
Heath	DX-60	1962	$79.95	$537.15
National	NC-303	1963	$449.00	$2977.19
Heath	HW-101	1970	$399.95	$2091.49

**2006 Price Source: US Bureau of Labor Statistics*

which I could afford on my newspaper-carrier's earnings.

Indeed, one of the 75A-4s in my shack was homebrewed by a Collins technician who could not afford to buy an A-4 off the factory line.[2] In other words, for many hams, $495 was as insurmountable a price in 1955 as $3750 (rounded) is today.

Yet even that $3750 doesn't seem so outrageous when you consider the cost of a top-of-the-line new piece of equipment. In the 2006 Amateur Electronic Supply catalog, the Yaesu FTDX-9000MP was selling for an amazing $12,049.99. Yet even that price isn't as bad as it sounds. I know it's hard to imagine, but if such a rig had been made in 1955, it would have been priced at $1653.60—right in the ballpark with the costlier Collins rigs.

What About the 100-R?

But what about the 100-R? We still haven't figured out how much Joe Walsh ought to pay me for that gem.

We can work the math just as we did for the other rigs. The retired Zenith vice president who sold me the 100-R said Central-Zenith spent $250,000 developing that one radio—in 1961 dollars. Let's plug that number into our trusty inflation calculator.

The price, in 2006 dollars, is . . . stand back, please, one to a customer: one million, six hundred ninety-six thousand, four hundred eighty-eight smackers—$1,696,488! There's no point being greedy, so let's round it off: one point six million big ones.

Hey, Joe! I changed my mind. Got your checkbook?

Notes

1. Some years ago, CQ considered publishing a used equipment guide and made queries of several dealers. Not one was willing to share price information, feeling it would rob them of flexibility and put them at a competitive disadvantage. We scrapped the concept.—*ed.*

2. See *QST*, February 2000.

On the Cover

How can you say no to that big smile? Or that big bank account? "Rock Star Price Guide" author Joel Thurtell, K8PSV, has, so far, been able to resist overtures to buy his one-of-a-kind Central Electronics receiver by this fellow ham and classic radio collector, WB6ACU . . . better known to the rest of the world as Joe Walsh, the guitarist for the rock band, The Eagles (and the now-reconstituted James Gang). Joe has been collecting vintage gear for years and has nine complete operating positions at his California home.

Joe also figures prominently in another article in this issue, "Team TI5N in the 2005 CQ WW DX SSB Contest." Originally slated to be part of the team, Joe had to cancel due to concert obligations, but donated the full cost for a replacement operator, a ham on disability who otherwise never would have been able to make the trip. See N6JRL's story elsewhere in this issue.

In a 2002 interview with *CQ*, Joe credited ham radio with being particularly helpful in the recording side of his music career, and that operating really "took the edge off" of touring.

"When I get home and off the road, I love getting on the air and just talking to people," he explained. "It gives me a chance to get grounded and . . . to meet people that I would never meet in any other way . . . I'm just Joe on the radio, and that's important. I really, really like that." *(Cover photo by Larry Mulvehill, WB2ZPI)*

W9KNI's "Back to Basics" station, with which he's worked more than 230 countries in just over a year and a half.

If W2VU's editorials over the past couple of months haven't convinced you that there's still plenty of DX waiting to be worked, even though we're at the bottom of the sunspot cycle, here's more evidence, from the author of the The Complete DXer[1].

Revisiting My Roots

BY BOB LOCHER,* W9KNI

I started out in ham radio in 1956, 14 years old with a shiny new Novice license, which allowed 75 watts input and crystal control. Like most Novices, I used simple antennas—dipoles and verticals. I had little or no knowledge of esoteric things such as SWR, but it worked. I could get on the air on 40 or 15 meters and work people, lots of people. It was wildly exciting to work DX, and I did. CW DXing really hooked me. It was magic!

Fast forward to 1971. I was now 29 years old and married with two kids. We bought a house that allowed me to put up a 50-foot tower and a two-element quad. I built a linear, running a single 3-500Z capable of 600 watts output, essentially the maximum legal power back then. It was a huge step up from the 100-watt transmitter and trapped multiband vertical I had been using. I fancied that I was in the big leagues at last—okay, just barely, but the improvement in my DXing capabilities was significant. During that time the CW DXCC award was initiated, and having fancied myself a CW DXer, I jumped in with both feet. I was fortunate to attain a position on the first CW DXCC Honor Roll.

As the years went by, I moved several times, always getting the tower and antennas back up as soon as possible after the move. I went from a quad to Yagis, to higher towers, and to better locations for DXing, always maintaining a reasonably competitive signal. During that time we moved from Chicagoland to northern California, and then finally, about 18 months ago, to southwestern Oregon.

An interesting thing happened as the years passed. During that period, the thrill of a full-legal-limit station and the killer triband Skyhawk Yagi began to pale. Been there, done that. Eventually I solved that problem when I purchased and built

**P.O. Box 1985, Grants Pass, OR 97528*
e-mail: <idiom@idiompress.com>

an Elecraft K2 and began a whole new DX campaign running 12 watts (see "Musings on an Experiment in QRP," *CQ*, October 2002). In a period of about four years, I managed to log QSOs with 312 countries and had a ball doing so.

The move to Oregon and our new home ended up being more complex than anticipated. An aging relative's health problems required long absences by my wife, complicating matters. A smaller home with less storage room precipitated problems of where to put everything, problems being solved by additional construction. Therefore, getting back on the air was not the top priority. Also, getting a tower back up was going to be more of a problem than anticipated due to terrain issues, etc. The new shack was to be in the basement, but the basement was in need of considerable work before it would be suitable as a shack.

Back to Basics

However, I got the itch to be back on the air. As it became apparent that a full-scale installation was still a year or so away, I entered into delicate negotiations with my wife and secured permission to put a shack in a corner of the master bedroom. A little *quid pro quo* achieved success, so I assembled a simple station.

The transceiver was a simple matter. I used my K2, which has been my only rig since I completed its construction about five years ago, now with its 100-watt amplifier. For an antenna, I installed my ten-year-old Butternut HF9V. Due to physical constraints, the antenna had to be ground mounted, 12 feet from the house and 16 feet from the shack table, with at best an indifferent set of ground radials, again thanks to physical limitations. Well, short feedlines are good, right? Since the shack is on the second floor, I have a clear view of the middle of the antenna.

The shack table is a folding plastic-top table. A CMOS-4 keyer driven by my trusty Bencher BY-4 paddle, a SCAF-1 filter, a Daiwa cross-needle wattmeter, a 20-amp Astron supply, a 24-hour clock, and a pair of Sony Walkman-style headphones complete the shack.

Missing are the big Henry 3KA amp, the tower, and Yagis, not to mention the antenna rotor and control box. I am pretty much back to my roots—a 100-watt transceiver and a simple non-gain antenna.

As I was setting up the Butternut vertical, I was wondering how much DX I

"I am the knight errant, seeking the Holy Grail. I am the lonely hunter. I am the watcher of the night. I am the seeker. I am a DXer."

would be able to work with what assuredly was an adequate but modest station. Certainly, all my equipment was what I consider to be the best in its class, but the bottom line is still that it is 100 watts to a vertical and we are heading toward the bottom of the sunspot cycle. At least I would be back on the air again. But would I find the old magic?

I need not have worried. I got the antenna up one Saturday afternoon in late September 2004, got everything tied together, checked out the SWR on different bands, and was good to go. I started on 20 meters in the middle of one of the many disturbances we were having during that time. The band seemed mostly dead, but I unearthed one signal, CX3SR in Uruguay, and he came back to my call.

The next morning I was up before sunrise, eager to check out 40 meters. Again I met with success, first with 6K5RPZ in South Korea, then JAØPX in Japan. Within the next few days, even though conditions were compromised, I had QSOs with Indonesia, Taiwan, and Russia, shortly followed by two goodies—a 40-meter catch, FR5ZL on Reunion Island in the Indian Ocean, and EY8MM in Tajikistan, deep Central Asia, on 20-meter CW near sundown on what was probably a long-path opening (hard to tell with a vertical!). I won't bore you with the subsequent activities, save to report that as this article went to press, I have more than 230 DXCC countries in the log from the new QTH, all worked with the simple setup.

Dawn Patrol

The real bottom line of all this is that my little station has given me a huge amount of operating pleasure. I have had so much fun that my incentive to get the tower back up and the killer Skyhawk on top has been considerably diminished. With all the other things going on in my life, things I am slowly getting put behind me, the little station has been a real joy and has moved my plans for the killer installation to the back burner until other issues are dealt with.

I especially love Dawn Patrol. Rising in morning twilight, I get that first cup of coffee going, check the internet spotting network to see what bands are hot, and begin tuning, almost invariably starting with 40 meters.

Even with my modest station, 40 meters is special. There is DX to be had virtually every morning, but the period from October through March is especially exciting. From my West Coast location, all the Pacific is coming in, not to mention Asia and long-path openings into Africa, the middle East, and Europe. Heady stuff indeed!

Then, after the sun is well up and 40 fades away, I start climbing the bands, looking for the hot band and the good openings—and often I find them!

Am I competitive with this station? Heck no. On the bands I frequent, 40 meters and higher, there are very good stations actively on the air, stations running Yagis from hilltop locations, running full-legal-limit linears, and with excellent operators. But do I somehow manage to work DX? Yes—lots of it. I get into other stations' log books by regularly tuning the bands and examining each CQ I hear and each QSO to see whether there is DX involved. Frequently that leaves me in the lovely position of being the only caller for the DX station's next QSO. I don't always get good signal reports, but it's my call I hear coming back from the other station.

Tuning carefully, I sometimes find goodies outside the usual DX windows. Ffor example, more and more DX on 40 meters is to be found above 7.025, especially Asian stations.

I get beaten up in pileups—I surely do—but with skill and luck and a whole lot of patience, I often eventually get the QSO. It reminds me of the time-proven difference between a contester and a DXer: The contester wants to be the *first* station in every log; the DXer is content to be at least the *last* station in the DX log. The contest operator is not happy unless the QSO rate is at least 200 QSOs per hour; the DXer is content, indeed overjoyed, to get a 10-second exchange after six months or more of watching, waiting, and calling for that all-time new one.

With my modest setup there is a different feeling to tuning the bands. For one thing, packet/internet spots are certainly not to be ignored, but they are much less useful, since anything of any rarity spotted is very quickly buried in a pileup. However, the spotting nets still offer lots of useful information: an indication of what bands are open to where, what DX

stations are active, etc. And knowing a DX station that you might want is actively on the air is a big help toward running him down and getting into his log, even with modest equipment.

Working rare ones with weak signals on secondary propagation paths was a special pleasure with the big station that I miss with the little station, as well as regular DX ragchews. Especially near the bottom of the sunspot cycle, those are pleasures reserved for the big guns—at least bigger than my station.

However, there is still a lot of good DX that is perfectly workable with lesser setups. There is great satisfaction in hunting—and working—DX with my little station. I am the knight errant, seeking the Holy Grail. I am the lonely hunter. I am the watcher of the night. I am the seeker. I am a DXer.

One particularly pleasing aspect of my DX chasing is that a lot of the particularly juicy DX stations I work are running setups little different from mine—a 100-watt rig and a simple antenna. Whether they are on a small Pacific island, in an apartment in Singapore, or on a farm in East Africa, they are our DX brothers and sisters, and a QSO with one of them makes for a highlight any day. Also, to work them with equipment like theirs helps forge a special bond.

Every DX QSO with the simple station is relished. With the big equipment and high antennas, most DX QSOs are not terribly memorable. With the simpler setup, though, every QSO is a delight.

Having had a big station and antennas for many years, I had forgotten the possibilities of a lesser station. I really wondered if I could even hope to play the DX game with the 100-watt K2 and a Butternut vertical. To my absolute delight, the answer proved to be a resounding "Yes!" Clearly, the magic is back!

Afterthoughts

Will I go back to the big-station concept? Towers, Yagis, linears, the whole nine yards? Yes, I will. I am hoping to have a lot of it ready to go before year's end. At the same time, though, I will remember well the joy of the hunt with equipment little different from the station I started with 50 years ago.

Note

1. The 3rd edition of *The Complete DXer,* by W9KNI, is available from Idiom Press, P.O. Box 1985, Grants Pass, OR 97528 (phone: 541-474-0293; web: <www.idiompress.com>); or from the CQ Bookstore (phone: 800-853-9797; web: <www.cq-amateur-radio.com>).

It's definitely smaller than a breadbox, yet this tiny power supply is capable of running a typical 100-watt ham transceiver in normal use. AD5X looks "under the hood."

CQ Reviews:

The Gamma Research HPS-1a Power Supply

BY PHIL SALAS,* AD5X

I'm always looking for smaller and lighter equipment for my portable HF package, so when I saw Dave Ingram's comments on the compact HPS-1a power supply in the March 2006 issue of *CQ*, I decided to purchase one of these units. Four days later, UPS left a tiny box on my front porch. As I picked it up, I was trying to remember what small item I'd ordered. When I saw the "Gamma Research" return address on the box, I was stunned. The shipping box for this power supply is smaller than most switching power supplies currently available!

The Gamma HPS-1a Power Supply

Fred Graham, K3GQ, the designer of the HPS-1a, is a professional power-supply designer. He recognized that amateur radio operation is typically low duty cycle, and therefore a power supply only needs to handle high current during peak moments. Taking this into consideration, Fred designed the HPS-1a to be a tiny power supply which would handle normal QSOs when used with a typical 100-watt transceiver at the low duty cycles normally encountered in ham transmissions. Let's first look at the HPS-1a specs. They are quite impressive.

Input Voltage: 100–250 VAC, 50–60 Hz, 2 amps maximum
Output Voltage: 13.8 VDC ±5%
Output Current: 22 amps at 25% duty cycle, 5 amps continuous
Dimensions: 3.37"W × 1.55"H × 5.25"D
Weight: 1.25 pounds

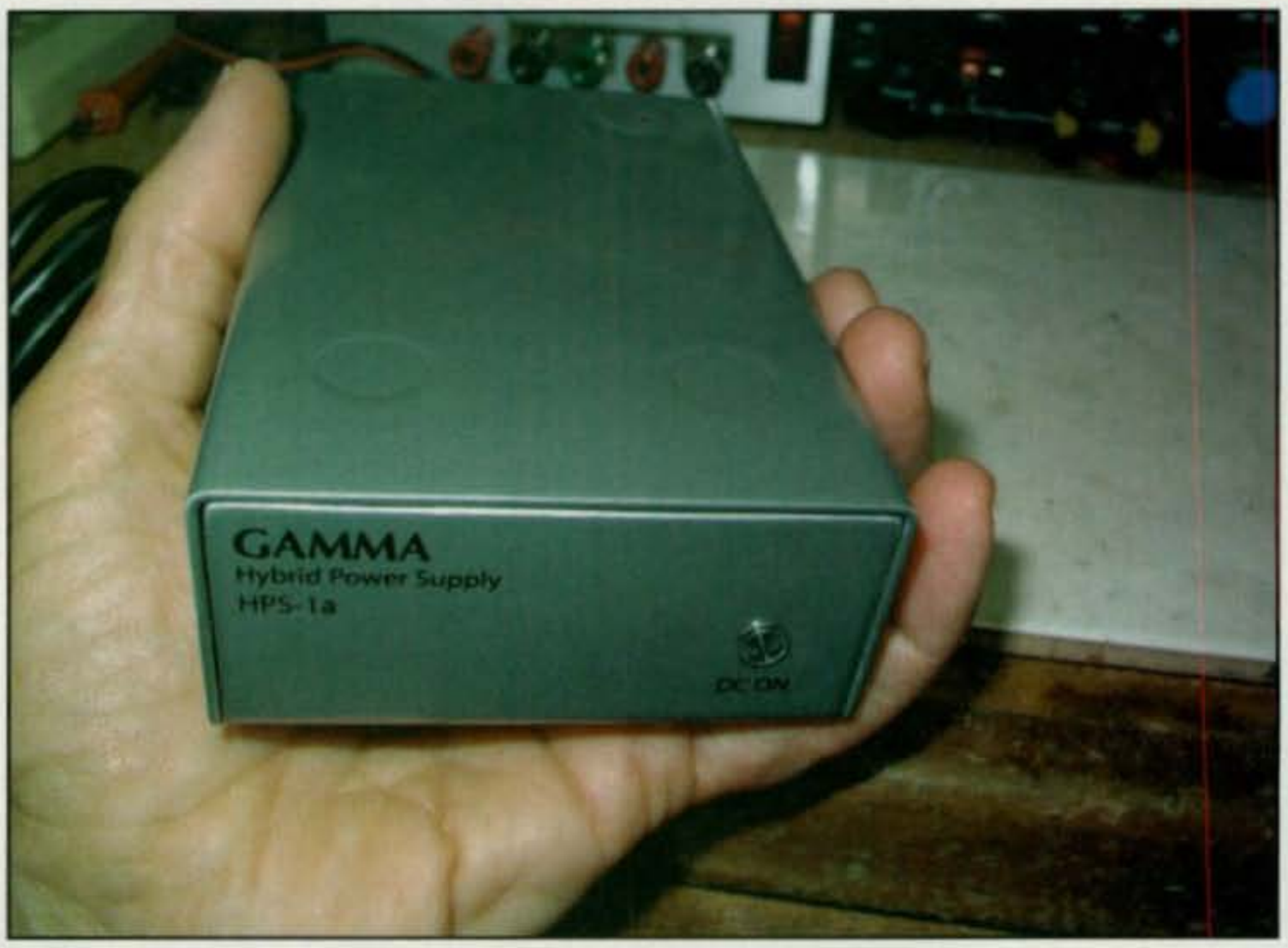


Photo A– Is this really a power supply for a 100-watt transceiver? You bet it is!

The HPS-1a is packaged very attractively. Gamma uses Pem nuts and flathead stainless-steel hardware to make the unit look good and to enhance its structural strength.

How does Gamma Research accomplish the high current at low duty cycles? They combined a 5-amp switching power supply with 5 Farads (you heard me right!) of output capacitance, consisting of five 25-Farad capacitors in series. Thus, the peak current required by your 100-watt radio is supplied by the 5-Farad capacitor bank, and the capacitor bank is recharged during the longer low-current duty-cycle time periods. Great idea! In fact, Gamma has a patent pending on the technology used.

Performance

How well does the HPS-1a actually perform? I ran a series of tests using my ICOM IC-706MKIIG transceiver. First let's discuss my measuring test setup and the operating parameters of my transceiver.

I first determined the peak current necessary for 100 watts output by connecting the transceiver to an MFJ-4225 power supply and watching the very fast-acting analog current meter. The

*Contributing Editor, CQ, 1517 Creekside Drive, Richardson, TX 75081
e-mail: <ad5x@arrl.net>*

Proud to be

"America's Most Reliable Amateur Radio Dealer"

Burghardt INC.
AMATEUR CENTER

www.burghardt-amateur.com

Featuring...

YAESU
Choice of the World's top DX'ers℠

FTDX 9000

A groundbreaking HF/50 MHz Elite Class Transceiver featuring unmatched close-in dynamic range, flexible selectivity choices due to its advanced 32-bit DSP filtering, a high-resolution TFT display, and high power: the 200-Watt "D" and "Contest" versions, as well as the 400-Watt "MP" version, are all available now!

FT 2000

The FT-2000 is the 2nd Generation in the proud lineage of the FTdx9000 Series! Featuring extensive DSP filtering, 100 Watts of power output, and a host of outstanding ergonomic and performance features, the FT-2000 is destined to be the centerpiece of your HF/50 MHz station!

FT-897D

The FT-897D is a rugged, innovative, multiband, multimode portable transceiver for the amateur radio MF/HF/VHF/UHF bands. Providing coverage of the 160-10 meter bands plus the 6 m, 2 m, and 70 cm bands, the FT-897 includes operation on the SSB, CW, AM, FM, and Digital modes.

Need a Connector? Order the PL-259 Our Hottest Selling COAX Plug!

FT-857D

The FT-857D, the world's smallest HF/VHF/UHF mobile transceiver, provides base station-type performance from an ultra-compact package that's ideal for mobile or external battery portable work. Wide frequency coverage, outstanding receiver performance, and convenient, optional remote-head operation.

Sales and Service – That IS Our Promise!

Remember, we are here to help. If you have any questions about products or require technical assistance, please feel free to call or fax.

— How to Reach Us —

Address
710 10th Street SW
PO Box 73
Watertown, SD 57201

Store Hours
Monday - Friday
9:00AM to 6:00PM
Central Time
Open on Saturday
9 AM to Noon
Central Time

Technical & Product Information
Phone: (605) 886-7314
Fax: (605) 886-3444

Sales/Ordering
(800) 927-4261

Email
sales@burghardt-amateur.com

Web
www.burghardt-amateur.com

Serving Amateur Radio Operators Since 1937

We offer TOP DOLLAR TRADE ALLOWANCES on late model HF, VHF, UHF and receiver equipment in good and clean condition.
Call or write today!

Photo B– Back side showing the 20-amp Molex DC output connector. Gamma provides a matching plug (also available from RadioShack).

peak current shown during CW operation matched the key-down current as indicated on both the MFJ-4225 current meter and an in-line West Mountain Radio Super-Whattmeter. For measuring transmit power, I used an MFJ-267 SWR/Power Meter/Dummy Load. The MFJ-267 power meter is a powered peak-reading power meter. Finally, I used a RadioShack digital voltmeter for measuring static voltages, and a Hitachi V-355 oscilloscope to measure instantaneous voltage drops during transceiver operation.

I determined that my IC-706MKIIG draws a peak current of 18 amps at 100 watts output. The receive current drain is typically 1.6 amps, and the key-up current drain when in the semi break-in mode is 3.4 amps. When operating QSK (full break-in), the key-up current drain is obviously the receive current drain of 1.6 amps. The idle current drain when operating SSB is 3.4 amps. This occurs when the PTT button is pushed, but you are not speaking. I found it interesting that the analog meter on the MFJ-4225 would kick up to 18 amps with every "dit" and "dah," but when using SSB, the analog current meter would generally indicate less than 10 amps. However, the MFJ-267 peak-reading power meter did show 100 watts output power, as did the IC-706MKIIG bar-graph output meter (speech processing was enabled). I could whistle into the microphone and get the analog power meter to indicate 18 amps.

Finally, I wanted to note that the operating voltage spec of the IC-706MKIIG is 13.8 volts ±15%, or 11.75–15.87 volts. I checked operation of my IC-706MKIIG and it worked fine down to 11 volts (0.75 volts below the low-voltage spec limit). Now knowing all the parameters, I substituted the HPS-1a power supply for the MFJ-4225 and started my tests.

First, I found that the nominal output voltage of my HPS-1a was 13.6 volts. This obviously is well within the ±5% spec of the HPS-1a. Next I did the SSB testing. With speech processing enabled, I observed a 1.2-volt maximum voltage drop during speech peaks. This put the lowest voltage available to the IC-706MKIIG at 12.4 volts during SSB operation.

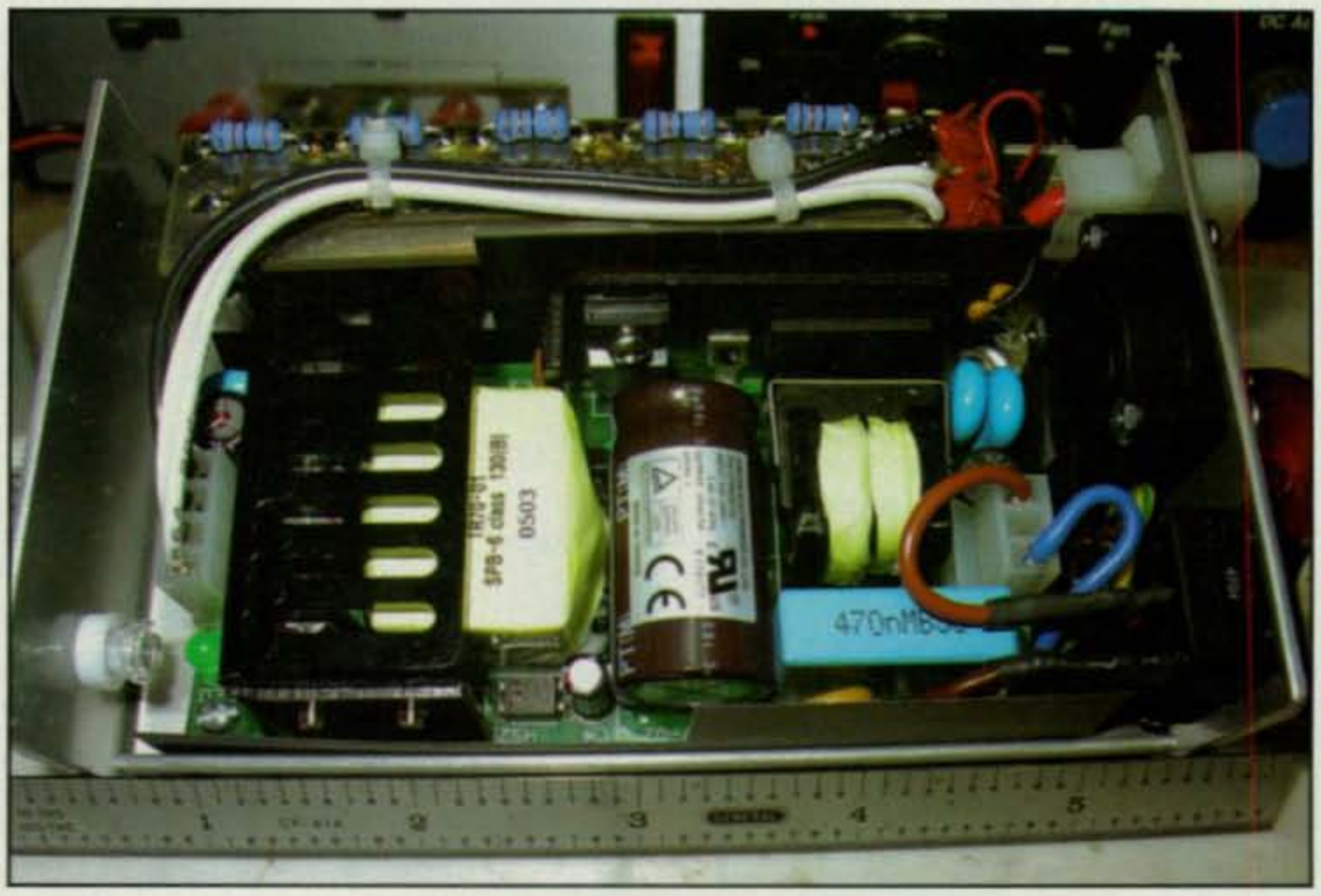


Photo C– Inside view showing the 5-amp switching power supply in the front and the capacitor bank assembly along the back.

Next came CW testing. For this testing, I sent about a minute of a typical QSO, starting with CQ. This produced some interesting results. Using semi break-in CW operation, I found myself with a 2-volt drop after a few seconds of operation. If I dropped my CW keying speed to less than about 15 wpm, the voltage drop increased to about 2.5 volts. In either case, the voltage drop is greater than the spec'd lower voltage range of the transceiver, although my IC-706MKIIG did work well at both levels. At around 10 wpm, however, the voltage drop increased to 3 volts, and my IC-706MKIIG began to have problems. The reason for the speed-dependent voltage drops is due to the length of the "dits" and "dahs" at lower speeds, which extends the discharge-before-recharge time of the output capacitor bank. However, there are two solutions to this problem.

First, I found that reducing my CW transmit power to 80 watts kept the voltage drop to below 2 volts for speeds of 10 wpm and higher. Second, if you operate QSK (full break-in), you will also keep the voltage drop to less than 2 volts above 10 wpm at the full 100-watt output level of the IC-706MKIIG. This is because the key-up current drain in QSK is almost 2 amps less than in semi break-in.

To summarize, when operating SSB (with or without speech processing) you can operate at the full 100-watt output level of the IC-706MKIIG. When operating CW, however, you need to keep

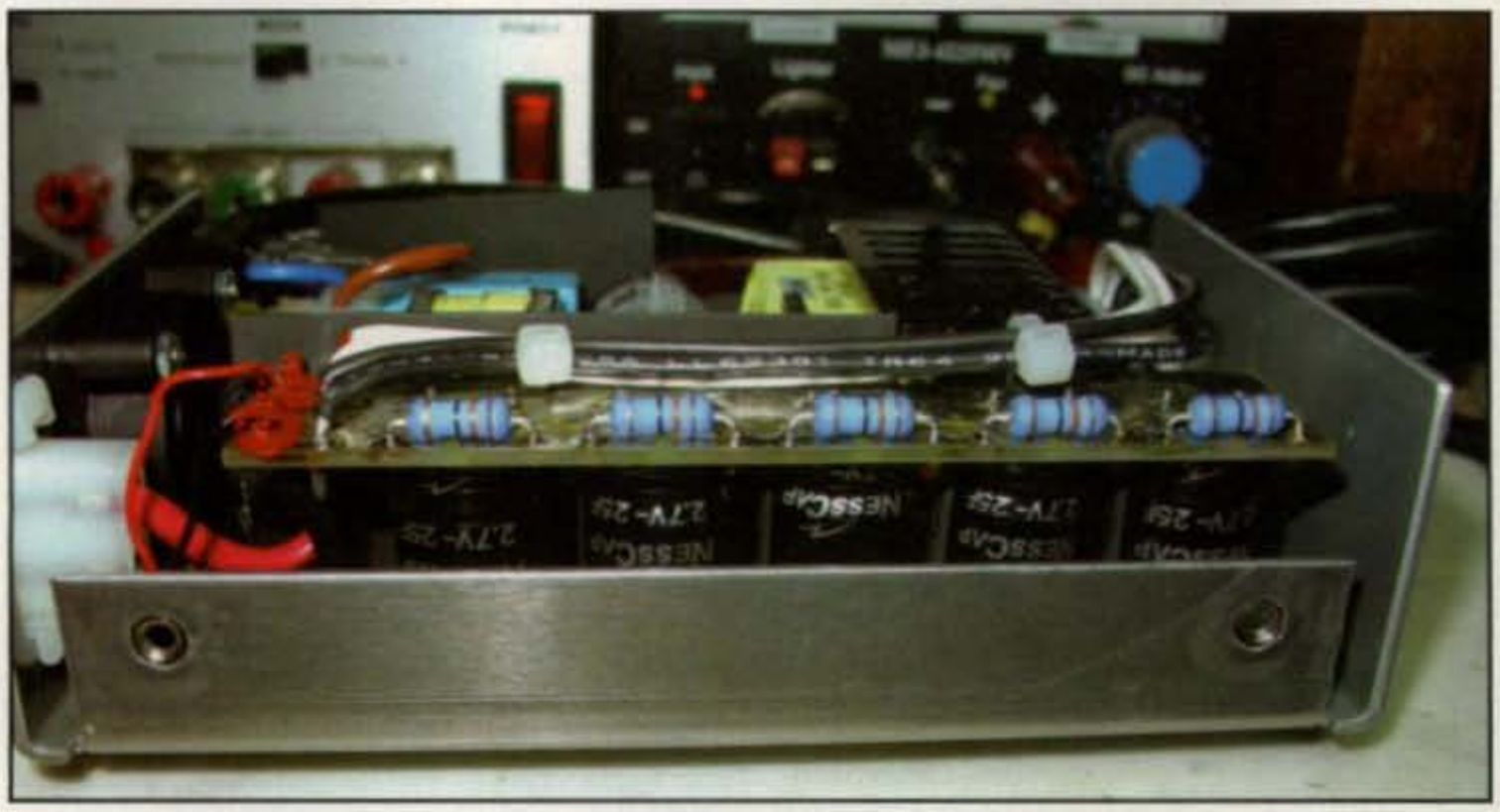


Photo D– Here you can see the five 25-Farad capacitors and their equalizing resistors.

your CW speed above 10 wpm and either operate QSK to achieve 100 watts output, or lower your transmit power to 80 watts if using semi break-in. Of course, your mileage may vary depending on the characteristics of your particular transceiver. According to Gamma, there are direct reports of the HPS-1a working perfectly with the TS-570, TS-2000, TS-870, and several of the Yaesu 100-watt radios. This makes this power supply attractive for permanent home installations as well, especially if you are driving an amplifier at something less than 100 watts.

Finally, I wanted to see how "quiet" the HPS-1a is. First, I saw less than 20 microvolts of noise and ripple on the DC output. This makes sense, as you wouldn't expect much AC ripple and noise to get by the 5-Farad capacitor bank! Next, I listened for any switching power-supply noise across the HF bands. I used a 20-foot long-wire antenna connected directly to the back of the IC-706MKIIG, which was located just a few inches from the HPS-1a. I could find no noticeable receive noise on any of the HF bands. Oh—and the internal fan, which runs continuously, generates virtually no audio noise. The bottom line is that this is one quiet power supply!

A Few Cautions and One Complaint

There are a couple of things you should keep in mind when using this power supply. First, since the HPS-1a output includes a 5-Farad capacitor bank, you could conceivably see currents in the hundreds of amps for a few milliseconds if you were to accidentally short circuit the output. This is why it is a good idea to use a fused set of DC cables between the HPS-1a and your transceiver, just as you should when connecting your radio to a high-capacity battery.

Another thing to be aware of is that it takes quite awhile for that huge capacitor bank to discharge. This means the "off" doesn't occur very quickly. There are equalizing resistors across the capacitors, which also act as bleeder resistors. Remember, however, we're talking about 5 Farads of capacitance! Therefore, make sure you disconnect the power supply from a radio if you are working on the radio, to ensure you don't accidentally short the power supply output.

My complaint? I wish the output connector was an Anderson Powerpole, but that's just me. Gamma does provide a matching Molex plug for you, and this plug is also available from any Radio-Shack store (RS274-151). Of course, the first thing I did was make a Powerpole adapter cable!

Conclusion

The HPS-1a is designed to be a small, lightweight power supply that is perfect for portable operation with your 100-watt transceiver. As such, the design involves tradeoffs among output power, capacitor charge, and overall weight and size of the package. If you pay attention to the issues and solutions discussed in this article, the HPS-1a will serve you quite well. Also, because this power supply is so small and light, it can become the universal power supply for both your QRO and QRP portable operations.

The HPS-1a is $149.00 plus $8.50 shipping UPS Ground in the U.S. Contact Gamma Research at P.O. Box 50885, Nashville, TN 37205 (e-mail: <sales@gammaresearch.net>; web: <http://www.gammaresearch.net>) ■

CQ World-Wide DX Contest All-Time Records BY FREDERICK CAPOSSELA, K6SSS

These records represent the pinnacle of achievement by the true champions of contesting. We congratulate them on their success. Number groups after calls are: year of operation, total score, contacts, zones and countries. All-Band and Multi-Operator records include a band-by-band breakdown of the world leader in each category.

Phone Single Operator/Single Band
WORLD RECORD HOLDERS

1.8	IG9/IV3TAN('96)	441,252	1,203	24	102
3.5	IG9T('95) (Opr. IV3TAN)	816,959	1,938	33	110
7.0	CN2R('05) (Opr. W7EJ)	1,590,675	3,271	35	122
14	PYØFM('94) (Opr. PY5CC)	3,202,242	5,109	38	175
21	ZD8Z('94) (Opr. N6TJ)	3,481,925	5,535	36	179
28	HC8A('01) (Opr. N6KT)	3,916,600	6,957	39	161

Single Operator/All Band

AF	EA8BH('99) (Opr. N5TJ)	25,646,796	10,253	176	692
AS	A61AJ('04) (Opr. S53R)	15,272,745	7,204	173	622
EU	GIØKOW('99)	10,457,664	6,375	155	589
NA	8P1A('04) (Opr. W2SC)	16,250,784	9,254	158	568
O	KH7R('00) (Opr. CT1BOH)	11,894,730	7,473	170	392
SA	HC8A('99) (Opr. N6KT)	18,607,050	8,638	175	595
QRP	P40W('00) (Opr. W2GD)	5,097,780	3,599	127	381
LowPwr.	D44TD('02) (Opr. IV3TAN)	11,199,793	6,097	141	508
Asst.	9Y4ZC('03) (Opr. DL6FBL)	14,979,055	8,114	137	500

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	150	13	54
EA8BH	3.5	547	18	80
(Opr. N5TJ)	7.0	682	27	97
(1999)	14.0	2,655	39	158
25,646,796	21.0	2,071	39	148
	28.0	4,148	40	155
	Total	10,253	176	692

Multi-Operator/Single Xmtr.

AF	D44TC('01)	22,978,944	9,638	178	694
AS	P3A('03)	20,196,420	9,210	167	656
EU	IQ4A('90)	17,255,700	7,253	183	717
NA	VP2E('03)	25,299,296	11,617	182	720
O	KHØAA('02)	12,599,064	6,872	158	490
SA	PJ1B('93)	22,596,570	9,386	164	646

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	128	13	47
VP2E	3.5	414	24	88
(2003)	7.0	1,162	32	130
25,299,296	14.0	2,763	39	147
	21.0	2,990	39	151
	28.0	4,160	35	157
	Total	11,617	182	720

Multi-Operator/Two Xmtr.

AF	IH9P('03)	29,447,379	11,831	171	688
AS	RT9W ('04)	11,399,373	5,453	162	661
EU	IR4X('04)	18,385,620	8,626	185	754
NA	VP2E('04)	40,907,104	16,868	188	804
O	KHØAA('03)	14,109,480	7,589	172	488
SA	PJ2T('02)	28,415,835	12,916	161	628

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	216	17	62
VP2E	3.5	945	23	102
(2004)	7.0	2,346	34	145
40,907,104	14.0	3,794	40	172
	21.0	4,771	39	163
	28.0	4,796	35	160
	Total	16,868	188	804

Multi-Operator/Multi-Xmtr.

AF	CN8WW('00)	78,170,508	25,711	199	854
AS	A61AJ('02)	33,377,700	13,376	186	784
EU	M6T('99)	29,338,624	14,655	188	836
NA	VP2E('01)	44,332,785	19,214	185	760
O	KHØAM('90)	35,730,600	16,309	179	565
SA	PJ4B('99)	59,127,810	20,618	188	834

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	923	17	77
CN8WW	3.5	1,818	25	106
(2000)	7.0	3,545	37	138
78,170,508	14.0	6,737	40	177
	21.0	5,754	40	175
	28.0	6,934	40	181
	Total	25,711	199	854

CW Single Operator/Single Band
WORLD RECORD HOLDERS

1.8	VY2ZM('05) (Opr. K1ZM)	497,152	1,664	28	100
3.5	CN2R('05) (Opr. W7EJ)	1,206,128	2,743	33	121
7.0	EA8EA('03) (Opr. OH2MM)	1,877,050	3,660	38	137
14	CN2KM('04) (Opr. SM2EKM)	2,023,740	3,899	38	142
21	ZD8Z('97) (Opr. N6TJ)	2,357,967	4,589	39	140
28	ZX5J('99) (Opr. N6TJ)	2,131,942	3,962	39	152

Single Operator/All Band

AF	EA8BH('00) (Opr. N5TJ)	18,010,765	7,555	183	634
AS	A45XR('03)	10,837,434	5,886	161	520
EU	CU2A('05) (Opr. OH2UA)	7,915,656	6,319	137	499
NA	KP3Z('03) (Opr. N5TJ)	11,440,230	6,675	174	536
O	KH7X('03)	7,673,314	5,256	170	347
SA	P4ØE('03) (Opr. CT1BOH)	15,943,070	7,828	169	546
QRP	P4ØW('99) (Opr. W2GD)	5,024,800	3,277	137	413
Low Pwr.	P4ØW('01) (Opr. W2GD)	10,198,792	5,723	151	475
Asst.	9Y4ZC('04) (Opr. DL6FBL)	14,581,665	6,576	169	596

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	197	17	60
EA8BH	3.5	541	20	82
(Opr. N5TJ)	7.0	1,091	33	95
(2000)	14.0	1,601	39	129
18,010,765	21.0	1,746	39	134
	28.0	2,375	35	133
	Total	7,555	183	634

Multi-Operator/Single Xmtr.

AF	3V5A('05)	14,026,738	7,137	163	564
AS	P3A('02)	19,470,528	8,432	176	702
EU	RU1A('00)	12,753,600	5,670	203	757
NA	8P9Z('99)	18,711,252	8,245	192	669
O	AH2R('04)	10,283,200	5,279	188	512
SA	P40L('05)	16,270,104	7,467	165	608

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	326	15	71
P3A	3.5	949	21	92
(2002)	7.0	1,797	31	134
19,470,528	14.0	1,661	39	134
	21.0	1,591	35	136
	28.0	2,108	35	135
	Total	8,432	176	702

Multi-Operator/Two Xmtr.

AF	CT9L('03)	24,874,181	10,942	175	636
AS	A61AJ('02)	24,384,292	10,505	194	704
EU	RU1A('03)	16,533,164	8,314	209	749
NA	VE3EJ('03)	14,545,882	7,457	184	622
O	AH2R('02)	11,311,266	6,390	171	482
SA	HC8N('04)	30,971,500	12,429	196	679

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	276	14	39
HC8N	3.5	1,114	28	94
(2004)	7.0	2,552	38	131
30,971,500	14.0	2,224	40	140
	21.0	2,493	39	143
	28.0	1,902	37	132
	Total	12,429	196	679

Multi-Operator/Multi-Xmtr.

AF	CN8WW('99)	70,713,270	23,068	219	843
AS	A61AJ('99)	38,789,751	15,812	213	788
EU	OH2U('99)	22,244,067	10,956	211	786
NA	6Y2A('98)	39,279,140	17,609	192	740
O	KHØAM('92)	23,951,385	11,253	190	527
SA	PJ4B('99)	47,516,600	17,889	208	757

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	1,694	24	100
CN8WW	3.5	3,248	35	121
(1999)	7.0	4,358	40	141
70,713,270	14.0	4,837	40	159
	21.0	4,319	40	161
	28.0	4,612	40	161
	Total	23,068	219	843

CQ World-Wide DX Contest All-Time U.S.A. Records

BY FREDERICK CAPOSSELA, K6SSS

Tabulated below are the record-high scores achieved by U.S. contesters in the CQ World-Wide DX Contest. Number groups following calls and bands are: year of operation, total score, contacts, zones, and countries.

PHONE

Single Operator/Single Band

1.8	K1ZM('95) 55,420	215	15	70
3.5	K1ZM/2('96) 292,100	952	27	100
7.0	KC7EM('95) 409,446	1,083	34	95
14	K1OX('85) (Opr. KC1F) 1,131,328	2,176	36	140
21	KQ2M/1('99) 1,327,139	2,624	39	148
28	W4ZV('01) 1,464,255	2,654	40	155

Single Operator/All Band

Station	Band	QSOs	Zones	Countries
	1.8	21	8	15
K1AR	3.5	154	16	59
(1999)	7.0	231	29	84
7,898,499	14.0	1,145	38	142
	21.0	1,150	36	123
	28.0	1,393	33	128
	Total	4,094	160	551

QRP

KR2Q('00) 1,507,506	1,181	104	358

Low Power

K1ZM/2('00) 3,368,010	1,907	151	504

Assisted

KI1G('01) 8,053,315	3,768	168	617

Multi-Operator/Single Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	32	12	30
K1AR	3.5	197	18	76
(1990)	7.0	154	26	95
11,193,606	14.0	1,370	39	167
	21.0	1,167	38	165
	28.0	1,517	37	170
	Total	4,437	170	703

Multi-Operator/Two Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	56	14	40
K3LR	3.5	439	27	89
(2004)	7.0	830	33	122
18,382,950	14.0	2,024	40	169
	21.0	2,899	40	166
	28.0	1,390	33	145
	Total	7,638	187	731

Multi-Operator/Multi-Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	197	16	36
KC1XX	3.5	699	24	102
(1999)	7.0	746	31	119
25,963,386	14.0	2,711	40	185
	21.0	3,245	40	170
	28.0	2,596	36	170
	Total	10,194	187	782

Club Record (Phone & CW Combined): Yankee Clipper Contest Club ('99) 702,296,971
Team Contesting: Phone – Neiger's Tigers Team #1 ('99) 66,546,582

CQ World-Wide DX Contest All-Time U.S.A. Records

BY FREDERICK CAPOSSELA, K6SSS

Tabulated below are the record-high scores achieved by U.S. contesters in the CQ World-Wide DX Contest. Number groups following calls and bands are: year of operation, total score, contacts, zones, and countries.

CW
Single Operator/Single Band

1.8	K1ZM('95)	142,358	470	23	83
3.5	W1MK('00)	417,240	1,273	26	96
7.0	K1ZM('90)	839,520	1,783	34	125
14	K2WK('98)	1,007,781	1,955	39	144
21	K2SS/1('00)	974,440	2,035	36	134
28	W4ZV('00)	965,874	1,984	37	137

Single Operator/All Band

Station	Band	QSOs	Zones	Countries
	1.8	104	14	40
K5ZD/1	3.5	384	19	73
(2000)	7.0	971	29	103
8,756,568	14.0	988	33	105
	21.0	848	33	104
	28.0	1,189	33	106
	Total	4,484	161	531

QRP

K3OO('00)	1,731,450	1,299	114	371

Low Power

K1TO/4('02)	4,141,188	2,276	140	526

Assisted

K3WW('00)	8,465,815	4,091	166	589

Multi-Operator/Single Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	49	13	46
K1AR	3.5	569	27	101
(1998)	7.0	1,384	35	136
12,063,114	14.0	991	38	151
	21.0	999	36	135
	28.0	1083	32	132
	Total	5,074	181	701

Multi-Operator/Two Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	79	18	56
K4JA	3.5	625	21	105
(2002)	7.0	1,480	36	133
14,084,994	14.0	911	38	146
	21.0	1,568	35	144
	28.0	1,085	34	137
	Total	5,748	182	721

Multi-Operator/Multi-Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	291	23	63
KC1XX	3.5	1,040	34	116
(1999)	7.0	2,119	40	138
24,602,524	14.0	2,155	40	155
	21.0	2,028	38	150
	28.0	1,947	38	148
	Total	9,580	213	770

Team Contesting: CW – Neiger's Tigers Team #1 ('03) 56,282,996

AMERITRON . . . 800 Watts . . . $849!

More hams use Ameritron AL-811/H amplifiers than any other amplifier in the world!

Only the Ameritron AL-811H gives you four *fully neutralized* 811A transmitting tubes. You get absolute stability and superb performance on higher bands that can't be matched by un-neutralized tubes.

AL-811H
$849
Suggested Retail
4-Tubes, 800 Watts

AL-811
$699
Suggested Retail
3-Tubes, 600 Watts

You get a quiet desktop linear that's so compact it'll slide right into your operating position -- you'll hardly know it's there . . . until QRM sets in. And you can conveniently plug it into your nearest 120 VAC outlet -- no special wiring needed.

You get all HF band coverage (with license) -- including WARC and most MARS bands at 100% rated output. Ameritron's *Adapt-A-Volt*™ hi-silicon core power transformer has a special buck-boost winding that lets you compensate for high/low power line voltages.

You also get efficient full size heavy duty tank coils, slug tuned input coils, operate/standby switch, transmit LED, ALC, dual illuminated meters, QSK with optional QSK-5, pressurized cooling that you can hardly hear, full height computer grade filter capacitors and more. 13¾Wx8Hx16D inches.

AL-811, $699. Like AL-811H, but has three 811A tubes and 600 Watts output.

AMERITRON *no tune* Solid State Amplifiers

ALS-500M 500 Watt Mobile Amp

ALS-500M
$849
Suggested Retail

500 Watts PEP/400W CW output, 1.5-22 MHz, instant bandswitching, no tuning, no warm-up. SWR, load fault, thermal overload protected. On/Off/Bypass switch. Remote on/off control. DC current meter. Extremely quiet fan. 13.8 VDC. 9Wx3½Hx15D in., 7 lbs. **ALS-500RC, $49,** Remote Head.

ALS-600 Station 600 Watt FET Amp

ALS-600
$1299
Suggested Retail

***No tuning**, no fuss, no worries -- just turn on and operate.* 600 Watts PEP/500W CW, 1.5-22 MHz, instant bandswitching, SWR protected, extremely quiet, SWR/Wattmeter, ALC control. 120/220 VAC. Inrush protected. 9½Wx6Hx12D in. **ALS-600S, $1428,** ALS-600 with 10 lb. switching power supply.

AL-80B . . . Desktop Kilowatt 3-500G Amp

AL-80B
$1399
Suggested Retail

AL-80B kilowatt output *desktop* linear amplifier doubles your average SSB power output with high level RF processing using our exclusive *Dynamic ALC*™!

You get cooler operation because the AL-80B's exclusive *Instantaneous RF Bias*™ completely turns off the 3-500G tube between words and dots and dashes. Saves hundreds of watts wasted as heat for cooler operation and longer component life.

You get a full kilowatt PEP output from a whisper quiet desktop linear. Compact 15½Wx8½Hx14D inches. Plugs into your nearest 120 VAC outlet. Covers 160 to 15 Meters, including WARC and MARS (user modified for 10/12 Meters w/license).

You get 850 Watts output on CW, 500 Watts output on RTTY, an extra heavy duty power supply, genuine 3-500G tube, nearly 70% efficiency, tuned input, Pi/Pi-L output, inrush current protection, multi-voltage transformer, dual Cross-Needle meters, QSK compatability, two-year warranty, plus much, much more! Made in U.S.A.

Near Legal Limit ™ Amplifier

AL-572
$1495
Suggested Retail

New class of *Near Legal Limit*™ amplifier gives you 1300 Watt PEP SSB power output for *60%* of price of a full legal limit amp! 4 rugged 572B tubes. Instant 3-second warm-up, plugs into 120 VAC. Compact 14½Wx 8½Hx15½D inches fits on desktop. 160-15 Meters. 1000 Watt CW output. Tuned input, instantaneous RF Bias, dynamic ALC, parasitic killer, inrush protection, two lighted cross-needle meters, multi-voltage transformer.

HF Amps with Eimac 3CX800A7

AL-800
$1825
Suggested Retail
1 tube, 1250 W

AL-800H
$2695
Suggested Retail
2 tubes, 1.5 kW *Plus*

These HF linears with *Eimac*® 3CX800A7 tubes cover 160-15 Meters including WARC bands. Adjustable slug tuned input circuit, grid protection, front panel ALC control, vernier reduction drives, heavy duty 32 lb. grain oriented silicone steel core transformer, high capacitance computer grade filter capacitors. Multi-voltage operation, dual lighted cross-needle meters.

AMERITRON *full legal limit* amplifiers

AMERITRON legal limit amps use a super heavy duty Peter Dahl Hypersil® power transformer capable of 2.5 kW!

Most powerful -- *3CX1500/8877*

AL-1500
$3095
Suggested Retail

Ameritron's *most powerful* amplifier uses the herculean *Eimac*® 3CX1500/8877 ceramic tube. It's so powerful that 65 watts drive gives you full legal output -- and it's just loafing because the power supply is capable of 2500 Watts PEP.

Toughest -- *3CX1200A7*

AL-1200
$2695
Suggested Retail

Get ham radio's *toughest* tube with the Ameritron AL-1200 -- the *Eimac*® 3CX1200A7. It has a 50 Watt control grid dissipation. What makes the Ameritron AL-1200 stand out from other legal limit amplifiers? The answer: A super heavy duty power supply that loafs at full legal power -- it can deliver the power of more than 2500 Watts PEP two tone output for a half hour.

Classic -- *Dual 3-500Gs*

AL-82
$2645
Suggested Retail

This linear gives you full legal output using a *pair* of *genuine* 3-500Gs. Competing linears using 3-500Gs *can't* give you 1500 Watts because their lightweight power supplies *can't* use these tubes to their full potential.

Call your dealer for your best price!

Free Catalog: 800-713-3550

Ameritron brings you the finest high power accessories!

ARB-704 amp-to-rig interface. . . $59.95

Protects rig from damage by keying line transients and makes hook-up to your rig easy!

ADL-1500 Dummy Load with oil . . . $74.95

Oil-cooled. 50 Ohms. 1500 Watts/5 minutes. SWR< 1.2 to 30 MHz. Low SWR to 400 MHz.

ADL-2500 fan-cooled Dry Dummy Load, $199.95

Whisper quiet fan, 2.5kW/1 minute on, ten off. 300W continuous. SWR< 1.25 to 30 MHz.<1.4 to 60 MHz.

ATP-100 Tuning Pulser . . . $59.95

Safely tune up for full power, best linearity. Prevents overheating, tube damage, power supply stress, component failure.

AMERITRON®

. . . the world's high power leader!

116 Willow Road, Starkville, MS 39759
TECH (662) 323-8211 • **FAX** (662) 323-6551
8 a.m. - 4:30 p.m. CST Monday - Friday
For power amplifier components call (662) 323-8211
http://www.ameritron.com

AMERITRON . . . the world's high power leader!

If you enjoyed "Antennas for Next to Nothing" in the July, 2005 CQ, WA8WTE is back with more ideas for getting your signals in the air while keeping your money in your wallet.

More Cheap Antenna Improv

BY GEORGE M. EWING,* WA8WTE

This is intended as a follow-up to my article in the July 2005 issue of *CQ*.[1] I'm attempting to provide more examples of how a beginning ham can improvise when building antennas, as well as a couple of things to watch out for. (There are no photos, because I wasn't thinking about writing articles when I built these antennas 30–40 years ago, and besides, the goal here is to get you thinking about what you might be able to do with materials you have on hand or can easily access.) Thanks to readers who provided encouraging cards and e-mails.

The Driftwood Special

In the spring of 1967, I was student teaching at the high school in Traverse City, Michigan and living in a log cabin in an old fishing resort north of town called Baker's Acres. Today that area is all upscale hotels, casinos, and marinas full of yachts, but in those days it was an inexpensive place to stay and an easy two-mile commute to the high school on my '57 Harley "Hummer" motorbike. I had a brand new Technician license, but no VHF ham gear other than a clunky surplus GE Pre-Prog FM rig. I soon found that there was no repeater or organized FM activity in the area yet. A local ham, Bill Martinek, loaned me an old Heathkit Twoer (a cheap, low-power, 2-meter AM rig of the time), and I picked up a Finco 10-element folding beam at a hamfest swap 'n shop for less than ten dollars.

In those days, the beaches of the northern Great Lakes often were littered with pulp logs that escaped from floating booms at paper mills during storms, especially the Abitibi plant at Sault, Ontario. I found three of the skinniest 8-footers I could among the dozens on the beach; they were fairly dry and light because they had been there for a while. I drilled matching holes in the ends with a brace-and-bit, cut connecting dowel pins from pieces of an old broomstick, and glued the logs together with Elmer's Glue, giving me a 24-foot mast.

I lashed a 6-foot piece of broken TV mast to the top with coat-hanger wire, clamped the beam to it, and mounted the whole works just outside the door of the log cabin. A lever made from the rest of the broomstick worked fine as an "armstrong" rotator, and I ran TV twinlead from a coax balun on the back of the Twoer up to the folded-dipole driven element on the Finco.

It worked great. I made scores of AM contacts as far south as Cadillac, Michigan and as far north as Petoskey and Harbor Springs. On the downside, although I heard a few distant stations, 2 watts was not enough power to work DX across Lake Michigan to Wisconsin, even with a beam, and I did have a bit of a QRN problem from the ignition systems of idling cars at a drive-in diner a half-mile down the road. I still remember long evening rag-chews with a group of older locals who hung out on AM just above 145 MHz, and who told great ham, motorcycle, and "wireless" stories going back to World War I.

*1163 Taylor Ave., Dunedin, FL 34698
email: <wa8wte@juno.com>

I Was A Teen-Age Altazimuth Mount!

In the mid-'60s my Novice ticket expired, and it would be a while until I got around to getting my Technician class license. I still remained a loyal member of the local radio club and helped out with hamfests, Field Day, and other activities. When they launched the OSCAR-III satellite, the first ham satellite with a repeater in it,[2] there was a huge upswing in club activity. Anything connected with space and satellites was very glamorous and hi-tech in the days before TVRO dishes and the modern AMSAT program. A group gathered at the home of Harvey Ball, W8FYX, determined to work the new OSCAR. As a husky guy and former high school band Sousaphone player, used to marching around with 30 pounds of metal on my shoulder, I was drafted to be the antenna "rotator."

I stood on the roof of W8FYX's garage in the snow with a pair of home-brew 10-element, 2-meter beams on a crossbar shoulder-harness mount and wearing headphones. Both the coax feedline and the audio line went through an elaborate arrangement of switches and relays to the 6146 rig in the basement. I could steer my array with a pistol grip from a child's toy tommygun, and switch my headphone audio from either the beacon frequency receiver or the translator downlink with a remote switch. Both receivers and the transmitter could also be independently switched from my array to Harvey's regular 2-meter antenna setup on a tower.

Receiving and tracking the CW "HiHi" beacon on the satellite was very easy, and with a little practice "dithering" the array, I could keep the main lobe centered on the satellite. After a minute or two, I could even anticipate the path in the sky for a few minutes with the headphones shut off. We recorded the telemetry bursts from a number of passes, and were able to decode the information encoded in the pulse PRF and duty cycle with a little effort. We heard lots of stations coming through the narrow downlink, actually a pile-up, but it turned out we only had one crystal in the uplink frequency range, and even with 70 watts or so on CW, we only made a few two-way contacts in the severe QRM, with a VE2 in Quebec and a station or two in upstate New York.

Gonzo TVI and The 100-foot Dummy Load

During my two-year stay as a beginning teacher in St. Ignace, Michigan, I was still just a Technician, and as that license was all VHF in those days, 6 meters seemed my only hope

to work any DX on the cheap. I scored a big bundle of surplus aluminum conduit at Crazy Dave's Army-Navy Surplus in Brimely, Michigan and built a wide-spaced, 5-element Yagi for 6 meters. I arranged things so the elements all unscrewed in the middle and made a Gamma match from leftover scrap tubing, a TV antenna element, and Teflon® plumbing tape. It worked great, but after about a week, I voluntarily went off the air. My hilltop QTH was only a mile from the cable TV tower *for the whole town* on the next hill, and my south-pointing beam was transmitting right "down the throat" of the cable company's channel-two antenna array pointed north to a far fringe station, CJIC-TV in Sault, Ontario, 50 miles away! Talk about the Mother of all TVI situations.[3]

Cute 10th-grade cheerleaders would accost me at lunch hour, asking things such as, "Mr. Ewing, you know about radio stuff. My dad wanted me to ask, what does the expression 'CQ Six Meters' mean?" Fortunately, the beam folded up into a compact package that was easy to hide and to move discretely in the back of my old station wagon.

The next year, I was teaching in the nearby town of Cheboygan, staying in another rented cottage. There was no space for a big tower, but I set up the very same 24-foot beam on the flat roof of the cottage, no boom at all, just elements laid out on waterproof cardboard banana boxes pointing south and a long run of surplus coax to my trusty Sixer down below.

Zilch, Nada . . . Like Nowheresville, Man! No contacts at all, despite a beautiful SWR ratio as measured in the shack. Finally, suspicious, I went up on the roof with the Sixer and a long AC extension cord. Disconnecting the coax, and patching into the driven element right at the Gamma match, everything was gang-busters, and I made several contacts. Hmmm . . . With the rig back in the shack switched on transmit, pumping several watts of RF into the feedline, I went up on the roof and connected a #47 dial lamp across the coax. Only the faintest of glimmers. . . . The 100-foot length of old coax, which appeared to work fine on HF, had a horrendous loss at 50 MHz—like 30 dB! Keep that in mind should you "inherit" someone's used coax.

Drop-Line QRP

My next residence in Cheboygan was another off-season resort cottage, this time on Mullet Lake. Cable TV was just coming into town, but this cottage was

eight miles out, far away from possible TVI worries. TV tower sections were suddenly available for next to nothing from new cable subscribers in town, and I got six 10-foot sections of heavy-duty triangular tower. At the township dump, I salvaged a 5-gallon pail of surplus U.S. Navy paint, battleship gray, which came with a big bag of zinc dust to mix in for rustproofing.

I put up four sections, 40 feet of tower, at the cottage. I now had my General ticket, and while I waited for a hamfest bargain to come along for a bigger low-band rig, I acquired a venerable Central Electronics 10-B exciter, which delivered a blistering 10 watts of either SSB or CW from a 6AG7 final. Not only that, it came with a homebrew VFO. No more rock-bound operating with crystals on HF! Whoopee!

The same township dump yielded hundreds of yards of Ma Bell telephone drop line, a heavy, rubber-covered twin lead made from two copper-plated steel conductors, stuff so strong you could actually tow a car with it—but that's another story. I put up a 128-foot dipole from the top of the tower configured as a droopy inverted-V which doubled as a pair of 64-foot insulated guy wires, each leg made of drop line, and another long section as a twin-lead transmission line from the center insulator down the tower to the shack. It looked like the drop line was probably about 85 ohms or so impedance, so I figured it was "close enough for low power," and plugged it right in the SO-239 on the back of the exciter, no balun or matching stub or anything.

Wow! Did I get out with 10 watts! On quiet winter evenings with no lightning crashes, I worked something like 37 states on 80-meter CW QRP in a few weeks, and had no trouble checking into SSB nets on 75, such as the venerable U.P. net on 3920 kHz. Summertime static made it more difficult, but I was going away to grad school summers, anyway. Eventually, I upgraded to an NCX-3 transceiver with a lot more power.

Cheap Rotors in Your Rear View Mirror

While I was at the St. Ignace QTH and off the air on 6 meters because of horrendous TVI, I still had the GE Pre-prog FM rig on 2 meters and a 40-foot TV tower that came with the cabin. One day at an American Legion charity flea market sale, I happened upon an Alliance TV antenna rotator with a little sign that said, "Does not work—only a dollar for a good cause!" What red-blooded ham could resist a challenge like that?

Upon getting it home, I found that the big non-polarized capacitor in the control box was DOA. This was expected, and a couple of regular junk TV electrolytics back to back with protective diodes fixed that. The motor was set up as a 1-RPM synchronous worm drive with plenty of torque, but the direction-indicating pot in the rotor casing was completely trashed.

The first order of business was to have something on the tower to rotate. I made four reverse-engineered copies of my trusty Finco 10-element beam out of 2×2's and scraps of CopperWeld™. I mounted a pair of these on a mast and crossbar, vertically polarized for FM, using the resurrected rotator and the thrust bearing from an old TV antenna. The antennas rotated 360 degrees in exactly one minute, so it was fairly easy at first to just look at the second hand of a clock and mentally keep track of where the array was pointed.

Later this setup was upgraded with a discarded 12-volt auto headlight bulb that was still good on high beam. I put the bulb in the bottom of the tower, shining straight up at the antennas with an old bicycle rear-view mirror clamped outside the shack window with a good view of the rotor. The final genius touch was a pair of red bicycle reflectors on the reflector ends of the two antennas, and green ones on the director ends. Now, day or night, I could see how the antenna was pointed and compare it with a compass rose drawn on the window with magic marker. Yagis are much more directive *in the plane* of the elements, and with this vertically polarized array I had no trouble tracking moving mobiles on an east-west highway 40 or 50 miles north of the tower. It worked great, and it looked really cool in the snow at night. I never bothered to upgrade to the four-Yagi array; two was plenty.

In Hindsight...

Looking back, a number of points come to mind. Splicing round wood posts together with dowels still works, although for heavier loads, it might be a good idea to use screws and metal straps, or maybe slit coffee cans with both ends cut out, to reinforce the outside of the joints. I recently built serviceable masts in Florida by splicing together discarded 4×4 square fence posts made of treated wood that had a rotten end cut off and the rest salvaged.

The OSCAR array at W8FYX's also worked even better for aurora scatter, as long as you stuck to CW, as the signals on the band were not crammed into a narrow translator passband. You could visually point the array at the brightest display in the sky. As with the OSCAR passes, the best DX was into Quebec and upstate New York.

I still have the six lengths of TV tower at my summer home in Michigan and have used them for years, both for antennas and as scaffolding for building things. After all this time they're still sound, although the 35-year-old battleship paint is about due for a new coat or two.

Later experience with QRP equipment brought home to me many times how much more effective it is to have a VFO or synthesizer and more spectrum to work with your few watts, rather than having ten times the power, but being rockbound in a narrow allocation like a 1960s Novice. ■

Notes

1. Ewing, WA8WTE, "Antennas for Next to Nothing," *CQ*, July 2005, p. 22.
2. OSCARs I and II were transmit, or "downlink"-only, satellites.
3. This was exacerbated by my attempts to run 6-meter FM with an old 100-watt Kaar Engineering rig with hand-ground crystals in the 160-meter range. The frequency multiplier chain generated lots of harmonics, and the FM audio was clearly audible on a TV set. Even the low-power Sixer with a low-pass filter at 52 MHz caused trouble, though.

How do you fit a kilowatt HF rig, backup HF transceiver, VHF transceiver, TNC, rotor controls, antenna tuner, speakers, uninterruptible power supply, 12VDC power supply, a comprehensive patch panel, and two computers in a small space on which you can work with relative ease—and make it look nice? Why, you "rack it," of course!

Rack Mount Your Station

BY JOHN J. ELLIS,* NP2B

The concept of rack-mounting electronic equipment has been around for a long time. It originated with the necessity of having to mount various pieces of equipment in a common enclosure to save space and facilitate ease of wiring and installation without having to do extra metalwork or fashion special mounting brackets. Building to standardized dimensions also allows for easy installation, removal, or replacement of equipment within an existing cabinet.

Originally developed for telephone service, which is where the term *relay rack* comes from, the concept quickly spread to the broadcast, professional sound, instrumentation, and computer industries as a way of combining various items into common enclosures. The rack-mount system is still very much in use today.

Rack-mounted equipment conforms to a set of E.I.A. (Electronic Industries Alliance) specifications. The specs define the width of the equipment front panel as being 19 inches wide and 1 3/4 inches (or multiples thereof) in height. Thus, the height of a standard rack-mount piece of equipment might be 1 3/4, 3 1/2, 5 1/4 inches, etc. Height is also referred to today as being the number of units of vertical space a piece of equipment occupies in the rack—i.e., a device that is "4U" in height would be 7.0 inches high. The EIA specification also defines where the mounting holes on the equipment are to be located, because all mounting rails within standard cabinets are drilled to accept specifically spaced mounting screws.

Rack-mount enclosures come in many shapes and sizes. There are table-top cabinets, floor-standing models, wall-mounted units, and even models with slanted panels and built-in desk tops. Most people have seen pictures on television of "Mission Control" at the Manned Spacecraft Center in Houston. Much of the equipment that you see in these consoles conforms to rack-mount standards, and many of the consoles are actually individual cabinets that have been bolted together to look like a single unit.

Photo A– The author at his rack-mounted station in the U.S. Virgin Islands. John shares the station with his wife, Jeannette, NP2C.

There are also floor-standing cabinets, which are open on the sides. Cabinets of this type are designed to be bolted together and only one set of side panels is used on the entire assembly. This is done to facilitate running wiring from one cabinet to another, as well to keep the entire assembly locked together as one unit. The amateur radio station seen in photo A is constructed in this manner.

Ham Shack Applications

Your equipment does not necessarily need to be designed for rack mounting in order to take advantage of the rack-mount concept. There are rack-mount shelves available which meet the EIA specifications and allow non-rack-mount equipment to be installed (see photo B). Also, you can fashion wooden or metal shelves within the rack to hold equipment that was never designed to be rack mounted (note the two computer monitors in photo A).

Floor-standing racks perhaps offer the ultimate flexibility for ham radio

*P.O. Box 24492, Gallows Bay Station, Christiansted, St. Croix, U.S. Virgin Islands 00824-0492
e-mail: <np2b@atthehelm.com>

Photo B– Special shelves may be installed to hold equipment that was not designed for rack mounting, such as the author's Yaesu gear and the two computer monitors seen in photo A.

Photo C– All AC power distribution is handled inside the center rack, with various switches easily accessible at the top of the unit.

equipment installation. AC power distribution can be built in (photo C), eliminating the need for multiple extension cords and power distribution strips which become tangled with the rest of the station's wiring. If you stand your rack(s) away from the back wall, it is a simple matter to get behind them to make changes or repairs without having to climb under the operating table or lean over the top of it and sort through myriad wires and cables (see photo D). You can also custom build special items that you can't buy commercially and mount them in the rack so that they not only look good, but fill your specific needs (see homebrew patch panels, line amp, phone patch, and speakers in photo E). You can even fit a desktop to the front of the rack(s), which provides a very convenient operating position. Finally, grounding all your equipment is much easier and more effective, because you are grounding to the cabinets, which are made of metal, and the cabinets themselves are easily grounded.

Finding Rack Cabinets

These cabinets occasionally turn up at hamfests. Often they may be filled with obsolete or useless equipment, any or all of which can easily be traded or pitched into the nearest dumpster. Racks obtained this way can be quite reasonably priced.

A good place to find specific rack cabinet(s) that best suit your requirements is through a local commercial sound contractor or on the internet. On the internet, use a good search engine and look for "relay rack cabinets." You will find a number of manufacturers and distributors, along with a wealth of information on what is available.

An interesting website can be found at <http://www.novexcomm.com>. These folks specialize in custom rack-mount

Rack-Mounting FAQs (Frequently Asked Questions)

Q: It must be awfully heavy. Can you move it?

A: Actually it is not that hard to move. The station is built in three cabinets and each cabinet is on four casters, so the whole thing will move around the room on 12 casters.

Q: If you had to transport it from one location to another, what would be required?

A: When I constructed the system, I had that in mind. All of the AC power is in conduit within the center rack. If it were necessary to break down the system into three distinct racks, the AC power would stay completely intact. The controls for the AC power are mounted to a panel near the top of the middle cabinet. Almost all of the wiring to and from the patch panels is in the left cabinet so that only two panels would have to be removed from the center rack and folded into the left rack for transport. The cabinets have 70 inches of rack space plus $2^1/_4$ inches on the top and the bottom. The casters raise the entire assembly another 2.0 inches, making the total height $76^1/_2$ inches. The racks are $25^1/_2$ inches deep, so they will fit through a conventional 30-inch wide by 80-inch tall door without removing the door or door frame (it is close, though!).

Q: What did you do about lighting?

A: Just above the three speakers in the center cabinet is a track-lighting strip which is mounted to a $5^1/_4$-inch panel. Two track-lighting fixtures snap into place, and there is an on/off switch along with a dimmer installed on that panel as well (see photos A and E). There is also a bypass switch that shorts across the dimmer switch in the event the dimmer generates any electrical interference. In addition, in the back of each rack I've installed a fluorescent light fixture that illuminates the inside of each cabinet.

Q: How did you handle the operating position/writing surface?

A: I purchased "desk adapters" that are designed for just this purpose. These particular ones occupy $3^1/_2$ inches of rack space and support a shelf that projects forward from the front of the rack. In my case, I used three such units in line across the front of the three cabinets and mounted one solid piece of Formica®-covered plywood across them to provide an operating desk that is $67^1/_2$ inches wide and 16.0 inches deep.

Q: Does the equipment in the racks get hot?

A: No. The racks are big enough and sufficiently ventilated so that heat is not a problem. As a precaution, though, I have auxiliary fans on the back of the transceivers and there are two high-capacity muffin fans located in the top of the center cabinet.

Q: How did you handle 12-volt distribution?

A: In various places within the cabinets I used barrier blocks which were fused and ultimately went to the station power supply. One could also use commercially available 12-volt DC power strips, which could easily be fitted into the racks if desired.

Q: Does it look better now than it did before you "racked it up"?

A: YES!!!

Photo D– Leaving space between the racks and the wall makes it easy to access the service doors at the rear for making changes or doing maintenance or repairs.

Photo E– Custom-built segments include patch panels, line amplifier, phone patch, and speakers. In addition, the track lighting discussed in the "FAQ" section is visible in the center rack.

assemblies for ICOM, Kenwood, and Collins radio equipment, and offer the rack-mount shelves and speaker panels as well. The site also has links to other suppliers of rack-mount equipment and accessories.

If it all still seems confusing, ask for some help from someone at your local radio club. You're bound to find someone familiar with the rack-mount concept. Again, your local commercial sound contractor will undoubtedly have a catalog with illustrations and descriptions. Perhaps he'll let you borrow it for an evening.

I have had our station in a rack-mount configuration for the past seven years, and in that time I have made numerous changes. I have found that although the initial investment in the cabinets and accessories was a bit expensive, rack mounting of the equipment has not only saved me hours of labor, but has made working on the station an enjoyable experience.

What You've Told Us...

Our July survey asked about your views on continuing education in amateur radio. First of all, virtually all the respondents feel it is important to continue learning about ham radio (46% extremely important, 35% very important, 16% important, 2% not too important, 0% not important).

You are holding in your hand the primary source of continuing education for most hams: 96% of respondents say they rely on magazines for learning more about ham radio, followed by 77% for books, 67% friends and other hams, 45% club meetings, 43% experimentation, 42% hamfests and conferences, 17% (each) formal courses and "other," and 12% videos.

The switching of teacher/learner hats in ham radio (see July "Zero Bias") is widespread, with 44% saying they are *mostly* learners in settings where information is being shared, 32% saying they teach about as much as they learn, 14% say they exclusively learn, 7% say they mostly teach, and 0% say they exclusively teach.

Our next two questions were about one-on-one mentoring—50% of respondents had a mentor as a new ham, 18% had mentors when starting some new ham radio activity, 13% got help when digging deeper into a particular area, and 35% have never had a mentor. On the flip side, 42% say they have been a mentor to a new ham, while 27% have helped others learning more about a particular aspect of ham radio, 23% have helped hams starting out in a new activity and 29% have never mentored anyone in ham radio.

Finally, we asked when *you* learned most of what you know about ham radio. By a 2-to-1 margin, the answer was "after getting on the air or starting a new activity" (66%), as opposed to "while studying for a license exam" (33%).

Our free subscription winner for this month is Ronald Erickson, KØIC, of Essex, Iowa.

Reader Survey
October 2006

We'd like to know more about you—about who you are, where you live, what kind(s) of work you do, and of course, what kinds of amateur radio activities you enjoy. Why? To help us serve you better.

Each time we run one of these surveys, we'll ask a few different questions and ask you to indicate your answers by circling numbers on the Survey Card and returning it to us. As a bit of an incentive, we'll pick one respondent each month and give that person a complimentary one-year subscription (or subscription extension) to *CQ*.

This month we'd like to ask about your logging and award-tracking practices.

Please answer by circling the appropriate numbers on the reply card.

1. It's been 30 years since the FCC dropped its requirement that hams routinely log every contact, yet many hams still keep logs for a variety of reasons. Do you keep a log?
- Yes 26
- No 27

2. Which contacts do you log? (Choose one)
- All contacts 28
- All contacts that may result in a QSL card 29
- All contacts that may be useful for awards 30
- All contacts made from home station 31
- Contest contacts only 32
- DX contacts only 33
- Contacts of interest only 34
- None 35

3. Why do you keep a log? (Circle all that apply)
- To keep track of stations I've contacted 36
- In case of complaints/questions about station operation 37
- To keep records of QSL cards sent and received 38
- To keep records of progress toward operating awards 39
- To keep records of contest contacts 40
- Other 41
- Do not keep a log 42

4. In what form do you keep your log?
- Paper log only 43
- Combination of paper and computer log 44
- Computer log only 45
- Do not keep a log 46

5. If you use computer logging, what sort of logging program do you use?
- Commercial logging software 47
- "Shareware" program 48
- Self-written program 49
- Combination of above 50
- No computer logging 51

6. Do you use different software for specialized logging?
- All logging on one program 52
- Separate contest logging program 53
- Separate VHF/UHF logging program 54
- Other specialized logging program 55
- No computer logging 56

7. How do you track qualified contacts for operating awards?
- General logging program 57
- Specialized award tracking program 58
- Paper record-keeping 59
- Do not "chase" operating awards 60

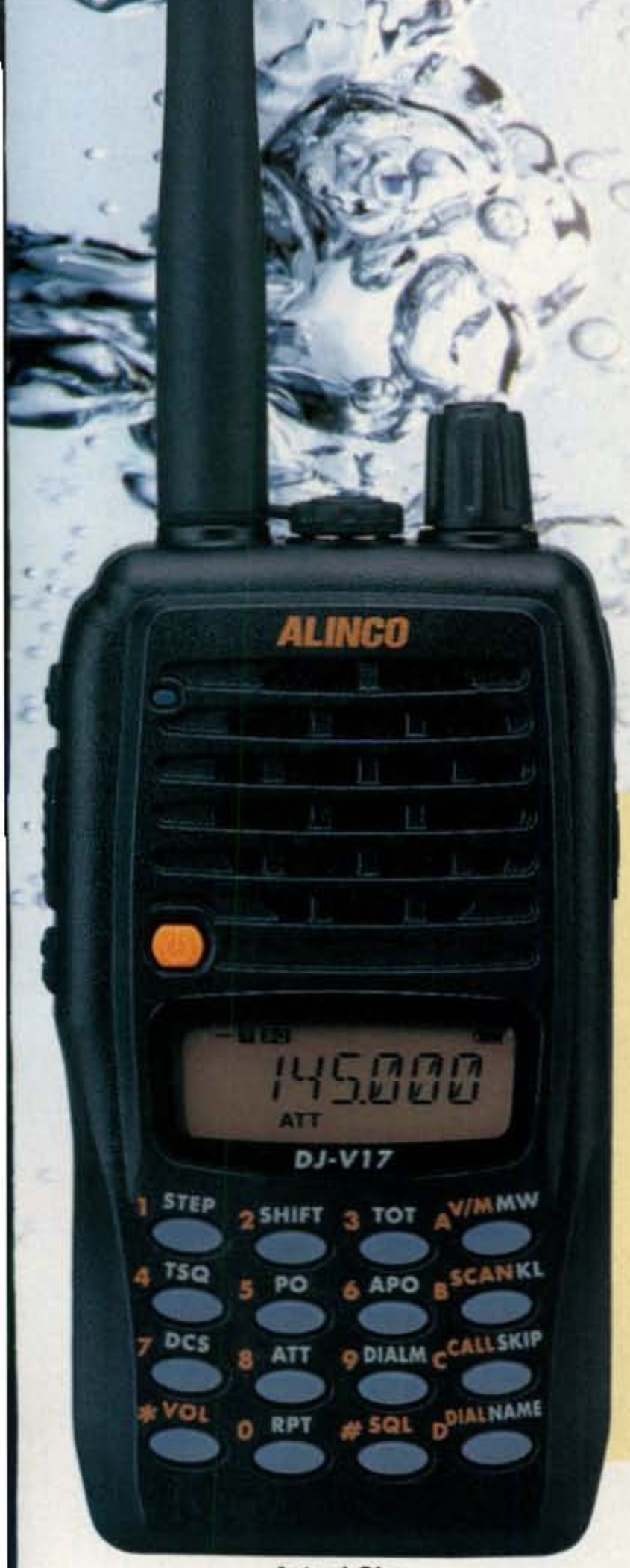
Thank you very much for your replies. We'll be back next month with more questions.

New DJ-V17 makes a SPLASH

with great audio and high grade waterproof design!

Alinco is proud to introduce a new 5-watt full power 2M HT that makes a perfect companion for outdoor activities like fishing, camping or snow-sports.

The rugged polycarbonate materials are compatible to IPX7* so it's submersible 1m/3ft. for 30 minutes! And unlike water-resistant radios you may have looked at before, the DJ-V17 has a large 40mm internal speaker so its audio is clean and crisp, not muffled. You can enjoy 500mW max audio-output, new two-touch repeater access, and over 200 memories. A special battery-drain function helps avoid battery memory-effect. Other features include an ergonomic design, ultra-flexible antenna with SMA connector, 39 CTCSS settings, split function, two-level attenuator and more. Whatever your idea of outdoor fun, Alinco's DJ-V17 is ready to take on the challenges of rain, dirt and dust and come back for more.



Actual Size

- New, two-touch repeater access
- High grade waterproof materials compatible to IPX7* (submersible 1m/3ft. for 30 min.)
- Rugged polycarbonate body resists dirt, dust and moisture
- Large 40mm internal speaker for great audio!
- Highly visible backlit alphanumeric display
- Direct frequency input through illuminated keypad
- 200 Memories, plus one call channel and one repeater access parameter memory
- VFO, Memory and Scan modes
- Ultra-flexible antenna with SMA connector avoids breakage
- 39 CTCSS tone squelch (encode+decode) settings
- Tone burst function (1,000, 1450, 1750 and 2100Hz)
- Battery-drain function avoids memory-effect
- Cloning feature
- Ni-MH standard also uses optional Lithium-ion and NiMH battery packs or AA dry cell case
- SMA antenna port
- 2-level attenuator
- Waterproof single mic/speaker jack

Alinco guarantees this feature for 1 year provided all jack covers are properly and securely closed.

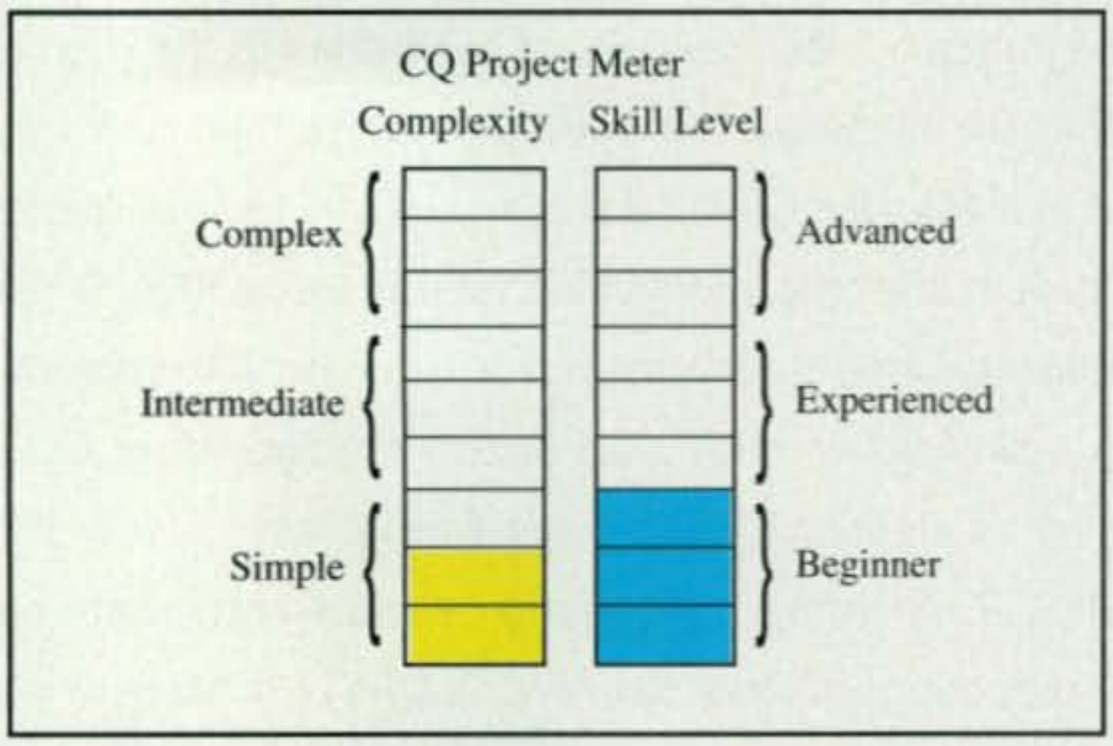
www.ALINCO.com

Distributed in North America by Ham Distributors, 1775 North Loop 336 East, Conroe, Texas 77301 • Phone: 866-396-9132 • Fax: 936-649-1303 • email: USRep@Alinco.com

Can coaxial cable carrying RF energy also be turned into a choke to block RF energy? Yes, and KA4LBE shows us how to design and build one to meet individual needs.

(Yes, You Can) Design and Build Your Own Coax RF Choke & Balun

BY BENSON SMITH,* KA4LBE



If you're new to antenna building, you might come across certain unfamiliar terms. For example, what is a *balanced feed*? What is a *balun*? Why is it that a balun may be required? What is a *current balun*?

It turns out that many antennas are balanced-feed types. Some balanced-feed types are quite evident. Draw or look at a schematic sketch of a center-fed dipole. Notice that from the center-feed terminals there are two sides that look like mirror images. This is a *balanced antenna,* which works best with a balanced feedline or transmission line, such as twinlead. However, a more typical transmission line is a length of coaxial cable. Coax is an *unbalanced* transmission line. To properly transfer the RF from the unbalanced coax to a balanced antenna, what is needed is a device called a *balun.* The term *balun* refers to a device used to connect a *balanced* load (antenna) to an *unbalanced* line. Fig. 1 shows how a balun is used to connect a balanced load, the antenna, with an unbalanced feedline, the coax.

Impedance Matching, Too

Baluns are sometimes made so that an additional transfer can be made. That transfer is from the source impedance to different impedance. When 50-ohm coax is to be connected to a 200-ohm antenna, the balun required is a 1:4 or 4:1 type.

**1324 Sunset Park Drive, Seymour, TN 37865*
e-mail: <ka4lbe@ix.netcom.com>

For this article, though, we will consider a 1:1 balun, used when the antenna has input impedance of about 50 ohms, very similar to that of the coax. That means a coax feed of 50 ohms directly matches the antenna as far as impedance is concerned.

If used correctly, coax is a great transmission line. It is easy to use and has easy connector systems. The RF current flows internally on the outer surface of the inner conductor and on the inner surface of the outer conductor or shield. *There is no reason for any RF current on the outside of the coax shield.* However, that is not an uncommon situation when things aren't just right. Some causes of these currents may be improper matching or feeding of transmission line to load or inductive coupling between the antenna and the transmission line.[1] These currents cause problems—some of which may not even have been noticed—and should be eliminated if possible.

If an RF choke could be inserted in the outer surface of the coax shield, the problem would be solved. At first glance it seems this is not possible. Or is it? By simply making a coil of a few turns of the coax feedline, an RF choke is made out of the outside of the shield braid itself.[2] This choke, properly designed, will reduce the RF current on the shield.

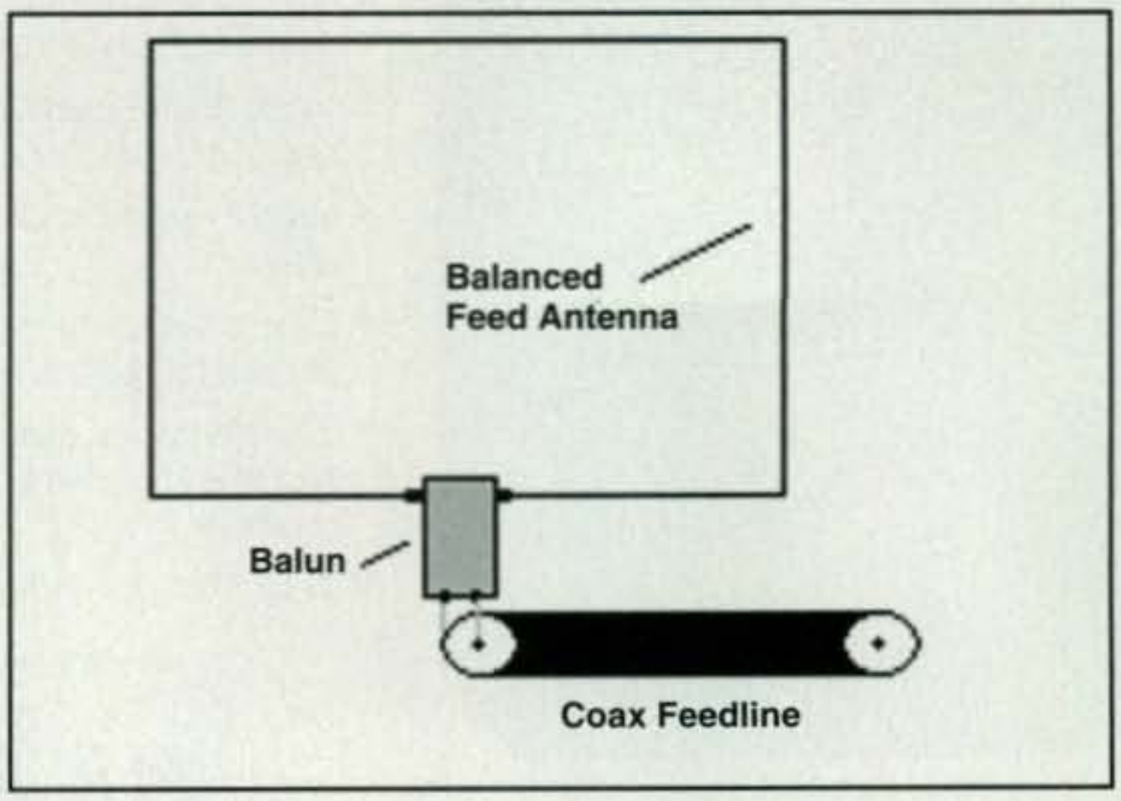


Fig. 1– The balun used to connect unbalanced feedline to a balanced antenna.

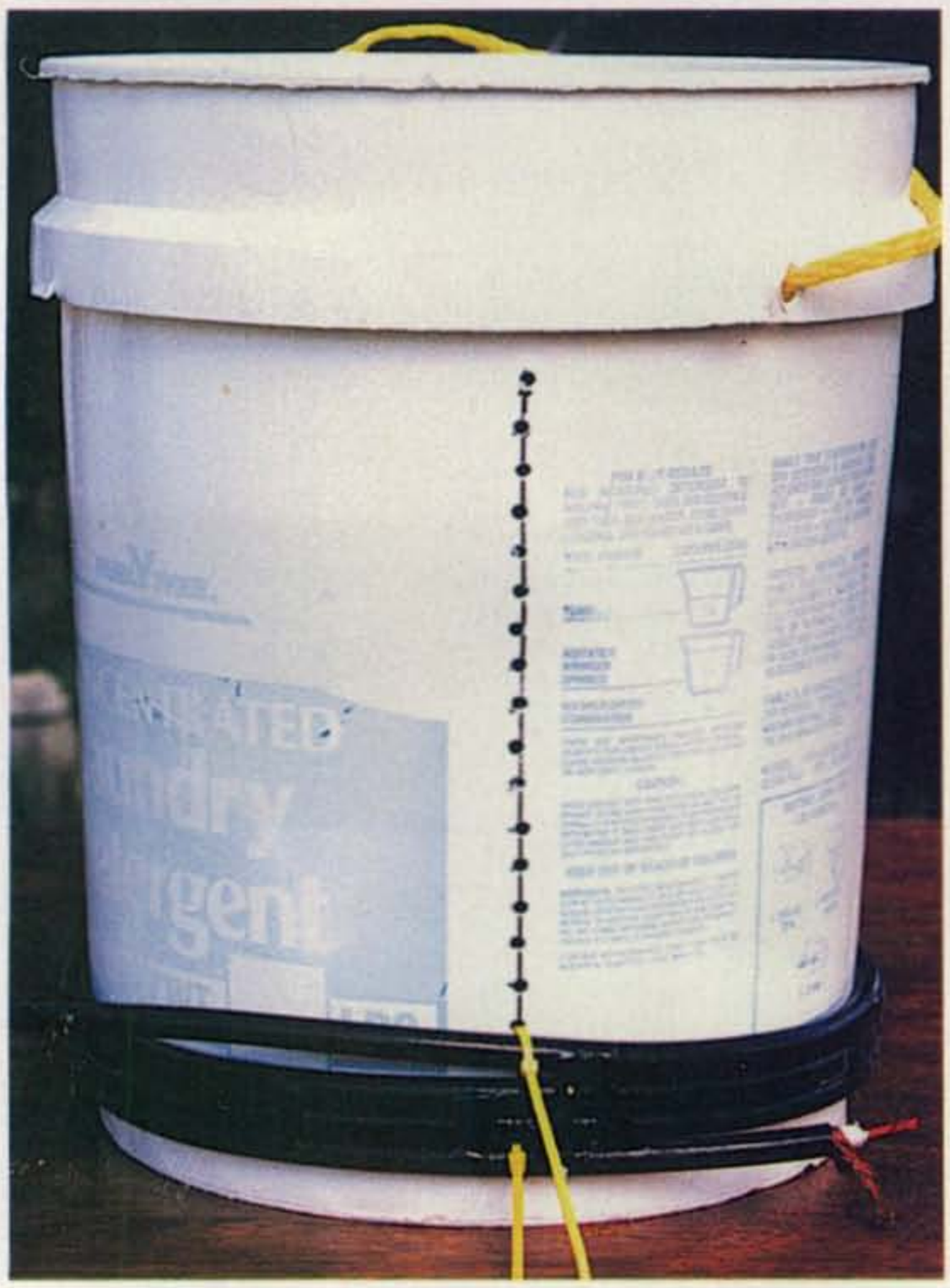


Photo A– Coaxial RF choke and balun being wound on a bucket with holes drilled to accommodate tie-wraps for the beginning and end of the coil. ←

Does making such a choke change the performance of the coax? It should not. The coax transmission-line function and characteristics are based on these parameters:

1. Diameter of the inner conductor.
2. The type of insulator (dielectric material) used between the inner conductor and the shield.
3. The distance between the inner conductor and the shield.

As long as the coax dimensions are not altered when the coax is bent or when it is wound into a coil, especially item 3 above, there is no change to the transmission-line characteristics.

Using the Coax as a Balun

By eliminating the outside shield currents, this RF choke acts exactly as a balun should.[3] Consider a coax-feedline RF choke made with coax having characteristic impedance the same in value as the feed impedance of an antenna. Now create that choke at the feed point of that antenna. With the antenna feed impedance the same as the characteristic impedance of the transmission-line coax, an RF choke added to the coax at the feed point becomes an effective 1:1 balun. Remember that to be a 1:1 match, the feedline impedance must be the same as the antenna input impedance.

The other term we introduced at the beginning of the article is *current balun*. A current balun is one that seems to force equal currents into the load (antenna). This balanced current

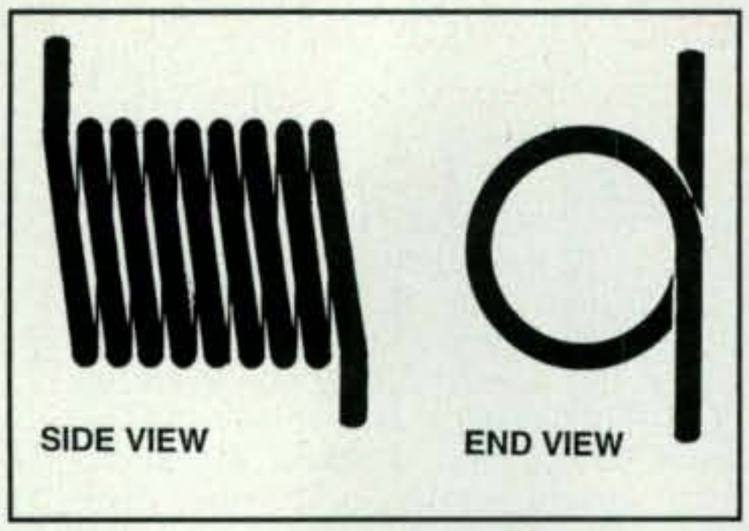


Fig. 2– Side and end views of what the finished choke/balun should look like.

feed is required by many antennas and is not necessarily furnished by all 1:1 baluns. A RF choke balun performs this function.

A coax RF choke has features including the following:

1. Once designed, it is rather **easy** to build.
2. **Very good performance.**
3. **Low loss.** Loss is that of the required coax.
4. It is a *current balun* since it furnishes **balanced feed current.**

Rolling Your Own

The proposed design of a coil is to wind it as a single-layer solenoid. This design allows the values of inductance, hence reactance of a coil, to accurately be predicted. A single-layer coil takes the form shown in fig. 2.[4]

The target of coil reactance is to set the reactance to be at or slightly greater than ten times the characteristic impedance of the coax. For example, if the coax is 50-ohm type, then the coil reactance should then be at least 500 ohms.

The formulas to use in solving our design problem can be found in chapter 4 of the 2005 edition of *The ARRL Handbook for Radio Amateurs.* [5]

The first formula is to determine reactance:

$$XL = 2\pi fL$$

Rearranging for inductance, we get:

$$L = XL / (2\pi fL) \qquad \text{eq. 1}$$

In the above, **XL** is inductive reactance (ohms), π is pi (3.1416), **f** is frequency (Hz), and **L** is inductance of the coil.

The second formula is to determine the coil inductance:

$$L = (d^2n^2) / (18d + 40lng)$$

Rearranging for the number of turns, we then get:

$$n^2 = (L \times (18d + 40lng)) / d^2$$

$$n = \sqrt{(L \times (18d + 40lng)) / d^2} \qquad \text{eq. 2}$$

In this formula, **L** is inductance in microHenrys, **d** is coil diameter (inches), **lng** is coil length (inches), and **n** is number of turns in the coil.

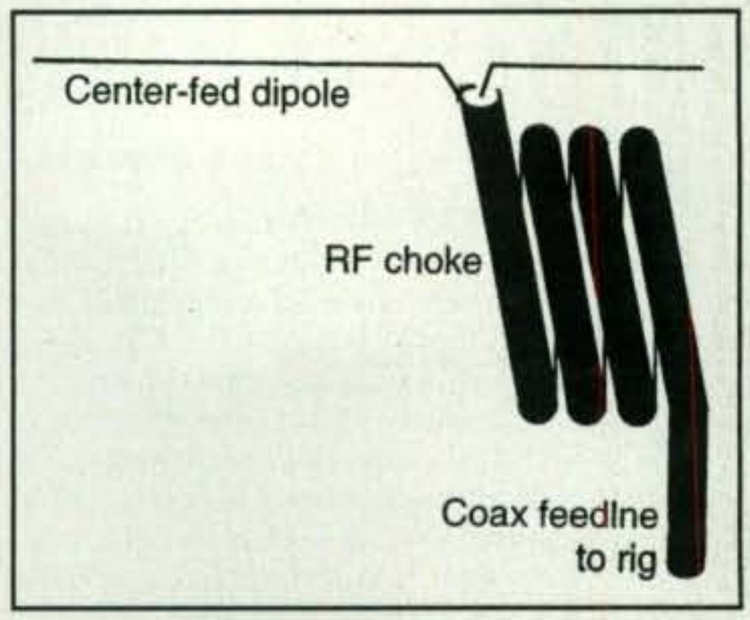


Fig. 3– Connection of the choke/balun to a typical dipole antenna.

The first step is to use equation 1 to determine the inductance required in the coil and then input the value of ten times our coax impedance as XL. Calculating this, the next step is to use equation 2 to determine the required number of turns in the coil. Here a problem is found. Note that the term **lng** is composed of diameter of the coax times the number of turns of coax (n × dc), giving the length. The finished coil length is required, but the number of

50-ohm Coax

Band (meters)	Freq. (MHz)	0.5 in. Diameter Coax Coil Diameter(s)		0.25 in. Diameter Coax Coil Diameter(s)	
		18 in. # turns	11.25 in.* # turns	9.5 in.* # turns	5 in. # turns
160	1.8	9	13	14	38
80–75	3.5	6	9	9	21
40	7	4	6	6	13
30	10	4	5	5	9
20	14	3	4	4	7
17	18	3	3	4	6
15	21	3	3	3	5
12	24	2	3	3	5
10	28	2	3	3	4
6	50	2	2	2	3

75-ohm Coax

Band (meters)	Freq. (MHz)	0.5 in. Diameter Coax Coil Diameter(s)		0.25 in. Diameter Coax Coil Diameter(s)	
		18 in. # turns	11.25 in.* # turns	9.5 in.* # turns	5 in. # turns
160	1.8	11	17	19	56
80–75	3.5	8	11	12	30
40	7	5	7	7	16
30	10	4	6	6	12
20	14	4	5	5	9
17	18	3	4	4	8
15	21	3	4	4	7
12	24	3	4	4	6
10	28	3	3	3	5
6	50	2	3	3	4

**Two "'standard size" plastic pails available in paint, hardware, and home-maintenance stores to use as winding forms. Dimensions given are average.The 11.25-inch unit is 12 inches at the top opening.The 9.5-inch unit is 10 inches at the top opening.*

Table I– Coax RF choke parameters.

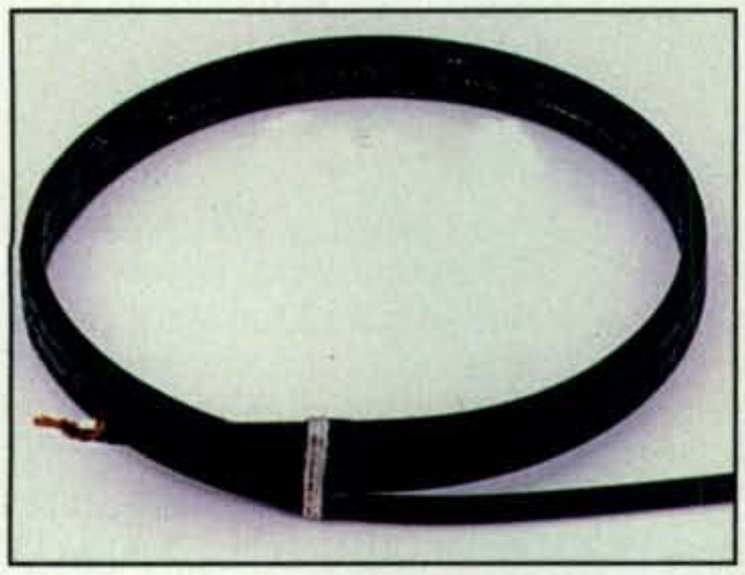


Photo B– Finished coil removed from the form. See Table I for numbers of turns needed for different bands, based on the size and impedance of the coax and the diameter of the coil form.

turns is unknown. One solution to this dilemma is to input a large dimension and repeatedly perform the calculation, narrowing down the answers until a logical value is achieved. The author has written a computer program that does this labor. It calculates required number of turns and adds any needed length to fill a partial winding. This also fulfills the requirement to have a minimum of ten times the impedance of the coax in use.

Fig. 3 is a simple sketch showing the addition of a coax RF choke to be a 1:1 balun. Notice that the choke is located at the antenna feedpoint. The choke is drawn considerably oversize and the number of turns shown is simply for example.

When winding coax, there are some potential problems that may result and they need to be considered. One is how to wind and give some permanence to the coil. Forms may be helpful during winding. These might include buckets or pipes, but no metallic conductor device should be included in the permanent structure. Once the coil is wound, strips of heavily varnished wood or electric-fence fiberglass rods can be attached using strong weatherproof glue. For small coils a simple reinforcement made of nylon cord at the feed/start area will be sufficient. When cured, the coil can be slid off the form.

The second and probably most important thing to consider is the coax itself. Various types of coax react differently to bending or winding. For each type there is a limit to how sharp the bend can be. Foam types have larger diameter limits than solid types. The problem is that the coax may flatten, or even worse, the inner conductor can migrate through the foam, permanently damaging the coax. In these cases the coax impedance is changed. It is best to err toward winding larger coil diameters than smaller ones. Be aware, understand, and control these parameters. They are easily accommodated.

In the application where a single feedline is used to feed two or more antennas in parallel, the RF choke should be designed for the lowest frequency-band antenna. An example of this application is one where multiple-band center-fed dipoles are fed by one coax feedline. A trap multi-band antenna, either vertical or horizontal, would be another. A choke designed for low frequencies becomes an even higher reactance device at higher frequencies.

As noted previously, designing a coax RF choke, especially calculating the number of turns of the coax feedline required, is a bit difficult and time consuming. A collection of calculated coax RF choke lengths is outlined in Table I. In this table are listed the two most common outer coax diameter types and the two most common coax characteristic impedance types. Notice that the design frequencies used were chosen from the lowest end of each band. The diameters of coax shields are somewhat smaller than the overall outer diameter. The overall diameter is the measurement that determines coil length. This is only for information, as actual variation is not too critical. It was accommodated in the noted computation program.

The coil diameters, 11.25 inches and 9.5 inches, were selected based on using common plastic buckets as forms on which to wind coils. Holes were drilled on the bucket sides to allow passage of tie-wraps for holding the start and finish turns to allow finishing of the coil. Photos A and B show the winding of a coil using the "bucket form" approach.

Start winding with the antenna feed end. Secure this end to the hole nearest the bottom of the bucket. Wind the required number of turns and then tightly secure the coil end. Apply cement to the coil and allow drying time. Cements used for boats and plumbing are a good choice. Do not allow the cement to flow onto the bucket. When dry, slide the coil from the form and apply cement to the inside of coil. When this is dry, tie a few turns of heavy nylon cord to the coil at the start and end areas. Apply cement to the cord and let all dry.

Protect the coax feed physically by adding a strain relief so that strain is not placed on the feed connection. A good installation might include the choke tied to the support beam or post. Weatherproof all open coax and connections if the choke is to be left outside.

A Step Beyond...

The previous discussion centered on a 1:1 balun. Certain "Q" (quarter-wave) sections of coax of different characteristic impedance can act as RF transformers.[6] For example, a quarter-wave section of 75-ohm coax added at the end of the 50-ohm feedline could produce a match between the 50-ohm feedline and an 80- to 160-ohm antenna. This would include certain quads. Another similar RF transformer can be made of two quarter-wave sections of 50-ohm coax that are connected in parallel. This produces a quarter-wave section of feedline having impedance of 25 ohms. This Q section will effect a good match to an antenna having 9 to 17 ohms input. This would include some Yagis and shortened antennas such as halos. These Q sections can be wound into the RF choke, producing a matching current balun. ■

References

1. *The ARRL Handbook for Radio Amateurs*, 2005 edition, chapters 21 & 22,"Balun," published by The American Radio Relay League, Newington, CT 06111.
2. See ref. 1.
3. See ref. 1.
4. *The ARRL Handbook for Radio Amateurs*, 2005 edition, chapter 4, "Inductance and Reactance."
5. See ref. 4.
6. *Radio Handbook*, by William I. Orr (W6SAI), "The Q-Section," Howard Sams, Indianapolis.

world of ideas

BY DAVE INGRAM,* K4TWJ

Hamming from the Shadows – Part II

Last month's column introduced a topic that is, or probably will soon become, of increased concern to a large number of radio amateurs: low-profile, or "undercover," hamming. We briefly discussed some general problems of Covenants, Conditions, and Restrictions (CC&Rs) and took a look at three easy-to-erect multiband antennas disguised as flagpoles.

This month we continue with more notes, suggestions, and alternate plans for happy hamming from areas with such restrictions. We will also highlight more secret, or semi-transparent, antennas for "treeless" locations. I encourage you to earmark this column, and last month's as well, for future reference, as almost any amateur can unexpectedly come face to face with antenna and rig restrictions in the unpredictable times ahead. Senior citizens residing in retirement communities are of particular concern, as staying on the air despite entanglements can become a real challenge. Numerous studies have confirmed, however, that keeping active in one's hobby—in this case amateur radio, including standing ready to assist during emergencies—helps one feel needed and increases lifespan.

As discussed last month, PRB-1 is the FCC docket calling for localities establishing ordinances regulating antenna placement, etc., to "reasonably accommodate" amateur radio antennas and communications. To-date, 23 states (AK, CA, ID, IN, LA, ME, MA, MI, MS, NV, NH, NM, OR, TN, TX, UT, VA, VT, WV, WI, and WY) have adopted state versions of PRB-1. With the communications assistance provided by amateur radio during Hurricane Katrina (getting through when all else failed) still in the news, there is no better time than right now for getting PRB-1 adopted by your state. Contact and support your state's ARRL Section Manager and other people who can make it happen. No state should be left behind in making radio amateurs and PRB-1 welcome—and appreciated! Remember, it is up to us.

We must also point out that while PRB-1 is a step in the right direction, it is not a direct order granting us the right to install a big beam or cause generate interference to others. Remember, too, land owners and/or homeowner committees can often find an unrelated reason to usher anyone deemed "undesirable" out of a community and rules restricting government ordinances do not necessarily apply to private contracts, such as CC&Rs. Also bear in mind that installing an almost invisible antenna is only one aspect of low-profile hamming. Use your amateur knowledge, experience, and savvy to avoid being discovered through RF overload or sheer induction field coupling into TV, telephone, and/or power lines. You may get only one chance to prove amateur radio is "clean." Don't blow it!

*3994 Long Leaf Drive, Gardendale, AL 35071
e-mail: <k4twj@cq-amateur-radio.com>

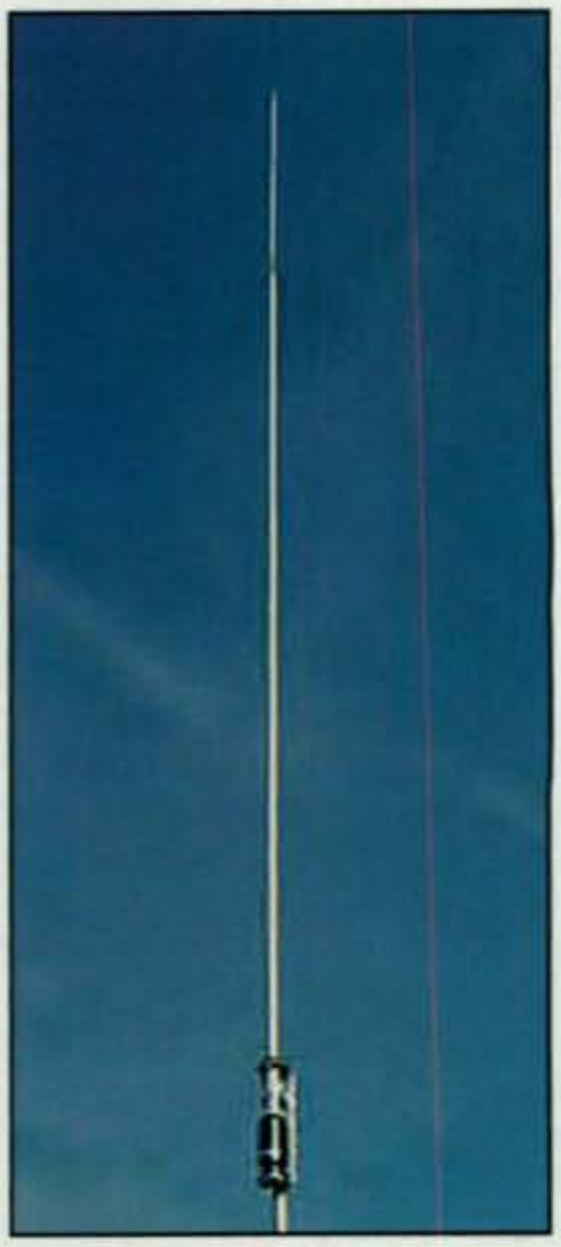


Photo 1– Limited as to the time, space, and sheer physical strength required to install a multiband HF antenna? Take a look at the new Comet CHA250B vertical. It is slim and trim, stands 23 feet tall, handles 250 watts, and works 80–6 meters with a low SWR. It is slightly pricey, but it is the easiest to install and remove "tall 'tenna" we have seen in many moons. (Photo courtesy of NCG Company, Inc.)

Avoid installing your antenna within a quarter wavelength of any utility lines. If your favorite band is 40 meters, a quarter wavelength is 33 feet. For 20 meters it is 16 feet. Also avoid installing your antenna parallel to utility lines, as the combination is akin to an open-air transformer that, again, couples your signal into undesired services. If no other options are possible, reduce your power to 15 or 20 watts and offer toroidal filters to anyone noticing interference. Just stay on the air, active, and do not get discouraged. More notes for happy hamming will be included in future columns. Now let's take a look at some more stealth antennas!

The Comet CHA250B

As mentioned in last month's column, the lack of tall trees in many restricted areas can make installing conventional wire antennas quite challenging. Verticals prove their worth in such cases. However, they usually must be disguised so they do not look like a vertical antenna, or they must be slim and trim enough such that one person can quickly and easily raise, lower, or hide them from view.

One of today's popular antennas filling that bill is the new "No Radials Required" CHA250B shown in photo 1. This vertical was reviewed in June 2005 *CQ* (check it out). It covers 80 through 6 meters with an SWR of 1.5:1 or less, handles up to 250 watts, stands 23 feet tall, weighs 7 pounds, and does not use traps, loading coils, or linear loading sections. A small matching network at the base is the key. If I were pressed for a technical description and evaluation, I would compare the

Photo 2– Shan Burns, XYL of Outbacker North America manager Jim, WB4ILP, shows us the versatile Outbacker Outreach made by Terlin Aerials and imported to the U.S. by Outbacker North America. It is 12 feet tall (less optional "outpost" mount), unscrews to 4-foot sections for quick storage, and works 160–10 meters. It could even double as a super mobile antenna for stationary operation. (Photo courtesy of Outbacker North America)

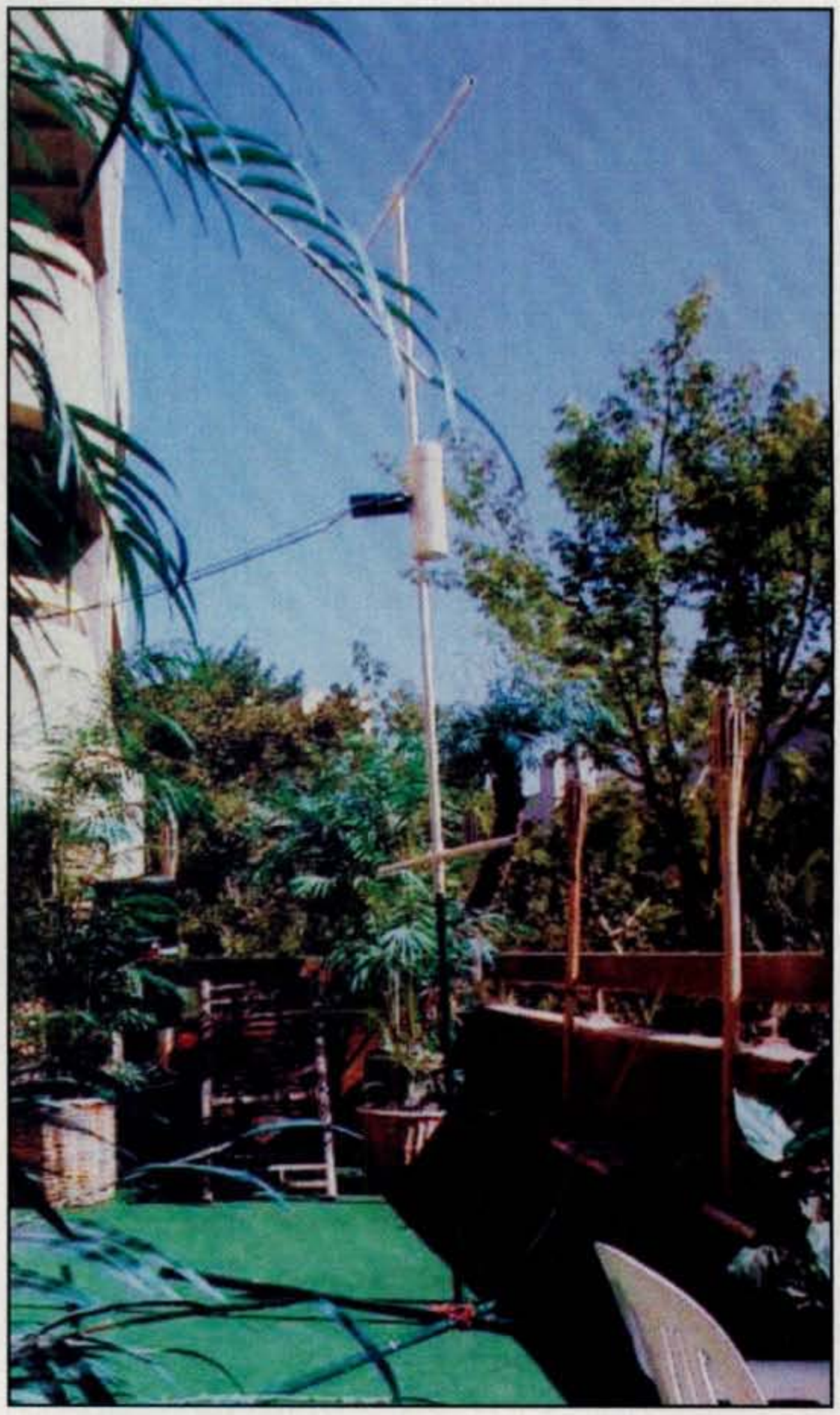


Photo 3– This clever installation of a Force 12 Sigma Five vertical dipole sitting on its optional garden trellis mount should inspire your creative ingenuity on disguised yard art-type antennas (Just tell the neighbors it is a night roost with foot warmer for migratory birds!) The antenna stands 9 feet tall (less mount) and works 20, 17, 15, 12, and 10 meters with a typical SWR below 1.5:1. Nice! (Photo courtesy of Force 12)

CHA250B to an impedance-matched 23-foot rod, and that's actually better than it sounds. The old "work the world" Gotham verticals of the 1950s were base-loaded 23-foot rods, and the two antennas are most likely close in performance—probably within two or maybe three S-units of a large vertical or a small triband beam. If you need a single whip antenna you can place on a deck corner and quickly take inside when you are not using it, the CHA250B may be the answer. For more information contact NCG Company, Inc., 1-800-962-2611 or visit <www.cometantenna.com>.

The Outbacker Outreach

Another easy to install, remove, and/or hide from view multiband antenna with a good track record of performance is the Outreach made by Terlin Aerials in Australia and imported to the U.S. by Outbacker North America (photo 2). The Outreach looks like a 12-foot version of Terlin's popular Outbacker mobile antenna. It has an 8-foot shaft that separates into two sections for storage, a 4-foot stinger that retracts into the upper section, and a standard 3/8-24 thread base. It is available in a 150-watt model covering 160 through 10 meters and a 500-watt model covering 75 through 6 meters. Band changing is accomplished by moving the Outreach Wanderlead between marked taps on its 8-foot shaft. When used with its optional 30-inch "Outpost" tripod mount and capacity ground coupler, typical SWR on each band is less than 1.5:1. Although a personal opinion, I would say performance is comparable to a very oversize mobile whip—and that is nothing to sneeze at. KI3O, for example, recently made 5 Band DXCC while using an Outreach and a barefoot transceiver.

This antenna is light enough (4 pounds) that an amateur could install or remove it in only a minute's time and enjoy HFing before it was even noticed. Details on the Outreach are at <www.outbackerantennas.com> or <www.outbackernorthamerica.com>. You can also get information by e-mailing: <jfburns@alltel.net> or by telephoning 1-888-302-8777.

Force 12 Sigma Five

If a low-profile antenna doesn't work for your particular situation, thinking in the opposite direction and disguising one

Photo 4– Paint this MFJ High Q Loop antenna green to match climbing vines, mount it a few feet above a walkway arbor, add some artificial flowers for decoration, and it too becomes yard art. The loop is 36 inches in diameter and works 30–10 meters. Band switching and fine-tuning are accomplished through a single coax feedline for quick and easy installation. (Photo courtesy of MFJ Enterprises)

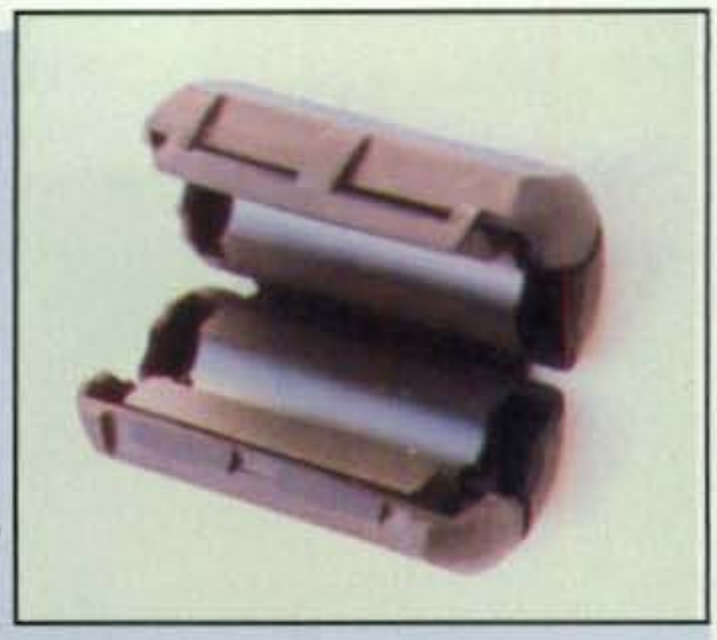


Photo 5– Snap-on toroidal cores are a quick, clean, and easy way to reduce or eliminate RF interference in all types of home electronics. Snapping one or two on all wires or cables connected to affected items usually does the trick. Toroid shown is available from The Radio Works. (Details in text.)

as yard art may be the answer. Consider, for example, the Force 12 Sigma Five vertical dipole shown on its optional green garden trellis mount in photo 3. The antenna stands approximately 9 feet tall (less mount), with 3-foot horizontal loading sections at its top and bottom. The Sigma Five is light yet strong, easily installed or removed in a couple of minutes, and does not require ground radials. It can also be painted to match or contrast with its surroundings. Add some artificial greenery and the thing becomes a conversation item everyone will enjoy studying.

A relay-switched loading coil in the center resonates the Sigma Five on 20, 17, 15, 12, and 10 meters, and SWR is usually less than 1.5:1. It weighs a scant 7 pounds, handles up to 700 watts key-down, and pumps out a respectable signal for its size. More details are available at <www.force12inc.com>, e-mail<force12manager@sbcglobal.net>, or telephone 1-800-248-1985.

MFJ High Q Loop

Continuing to think outside the box, so to speak, we see the MFJ-1786 High Q Loop antenna shown in photo 4 as another form of neat yard art. Once again, painting it—all of it—to complement or enhance its background and maybe mounting it above a rose trellis or walk arbor seems appealing. The High Q Loop measures 36 inches in diameter, operates 10 through 30 meters, and includes a remote-control box for changing bands and fine-tuning SWR. A single transmission line connects the loop to station gear, so it can be installed on or removed from an apartment patio or balcony in a minute, and it radiates a good signal to boot. More details are available at <www. mfjenterprises.com> or from amateur dealers nationwide.

Minimize Induction-Field RFI

Undercover hamming can work out fine, provided your activity does not produce telltale RF interference. Thanks to effective designs, shielding, and filtering in modern gear, old-style TVI has generally disappeared, unless outdoor antenna connections are corroded due to exposure to weather. Then diode action and generation of spurious frequencies is both possible and probable.

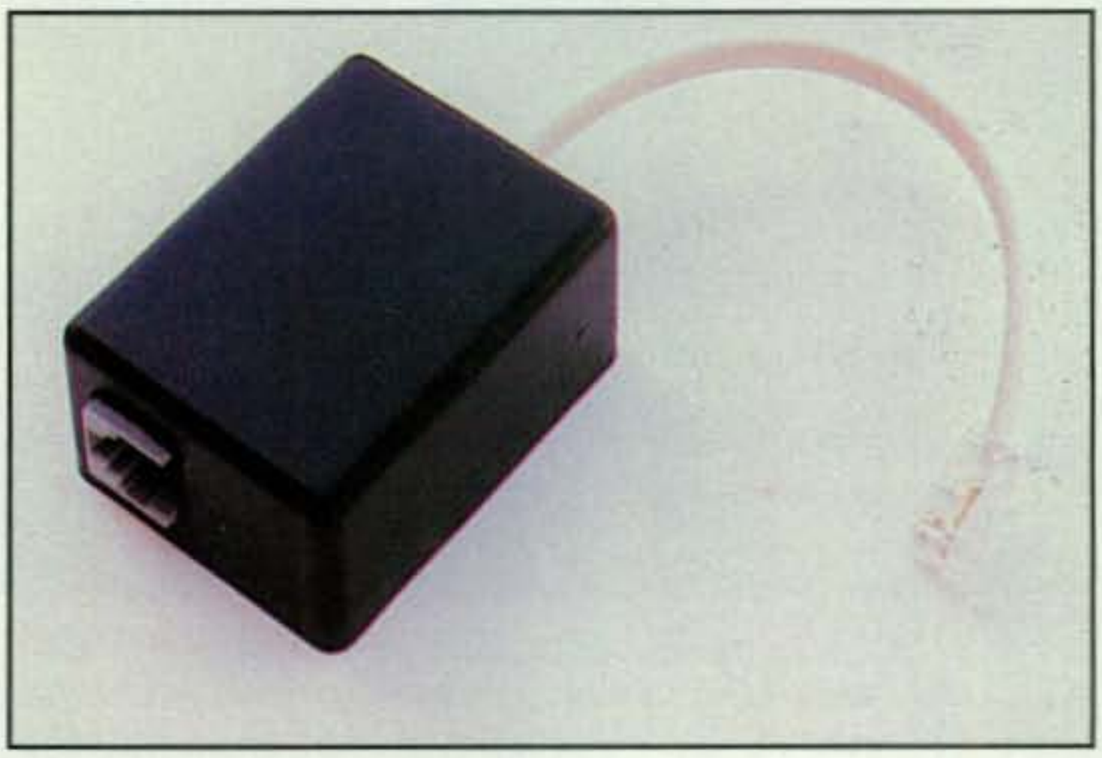


Photo 6– Telephone lines (which are unshielded wires in a plastic jacket) routed to and through houses or condos often act like a long RF-sensing antenna. Installing a plug-in KY Filter as shown here right at the back of an affected telephone usually eliminates the interference. (Details in text.)

Most problems today result from induction-field RF overloading. This happens when your transmitted signal is strong enough to direct-induce into telephone and television cables, central heating/AC system thermostats, and anything else the modern mind can conjure up. Fortunately, simple "solution solvers" in the form of snap-on toroids and plug-in telephone filters usually reduce or eliminate the interference (good to know if moving your antenna to avoid transformer action is not feasible). All toroids and filters are not equal, and the ones I found most effective for HF are available from The Radio Works (1-800-280-8327 or <www.radioworks.com>). The most effective telephone filters I have found are available from John Browne, KI6KY, telephone 1-530-757-6873 or <www.ky-filters.com>. You will also find some great tips for RFI reduction on John's website.

That fills available space for this month, friends. If you have a favorite antenna, filter, or other product or a good suggestion for hamming from unfriendly areas, drop us a note with the details and we will try to include it in a future "hamming from the shadows" column. Meanwhile, remember to stay active on the air and have a ball HFing to the max!

73, Dave, K4TWJ

MFJ *in-line* Calibrated *RF Ammeters*

. . . for tuning your antenna tuner/xmtr/amp for maximum radiated power … for determining antenna feedpoint impedance… for comparing antennas and tuners … for trouble shooting . . . checking for changes

MFJ-834 Coax In-Line Calibrated RF Ammeter

MFJ-834 **$69.95**

Connect the MFJ-834 *Coax In-Line* RF Ammeter between your antenna and tuner/transmitter/amplifier and measure antenna feedline current in 3 calibrated ranges.

Use it . . . for *tuning* your antenna tuner/transmitter/amplifier for maximum radiated power … for *determining* antenna feedpoint impedance… for *comparing* antennas and tuners … for *trouble shooting* . . . and for *checking* for changes.

Tuning for *maximum* feedline current for any given antenna *always* gives maximum radiated power!

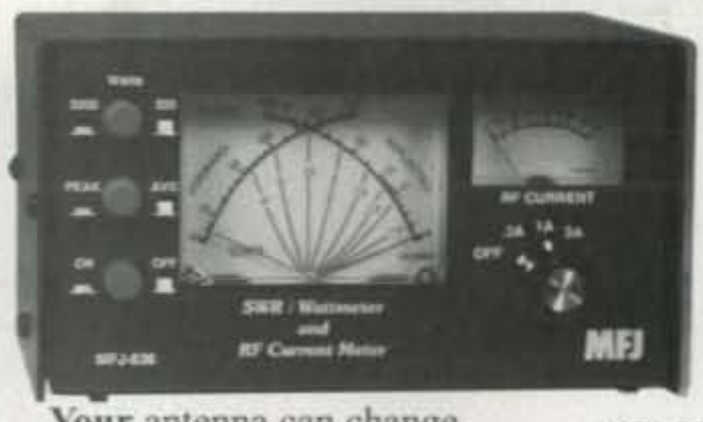
Any adjustment -- transceiver or amplifier tuning/loading controls, antenna tuner settings, whatever -- that increases feedline current improves power transfer and gives you a stronger radiated signal.

Radiated power increases rapidly because power increases as the square of the current.

Minimum SWR *does not* always mean maximum radiated power -- your tuner or lossy coax may be dissipating power -- and you may not get peak output power even if your tuner or amplifier is properly tuned.

Use the MFJ-834 to determine best antenna tuner settings and to compare various tuners.

Calculate your antenna *feedpoint impedance* by dividing your applied power by the square of the feedpoint current.



MFJ-836 **$129.95**

Your antenna can change when you apply power -- insulators break down, traps heat up, capacitors leak -- and your feedpoint impedance may be drastically different from your SWR Analyzer measurements.

MFJ RF ammeters are rugged, read accurately over 1-30MHz in three *linear* ranges (.3, 1, 3 Amps) and barely perturb the antenna.

Large 3-inch lighted meter. Use 12 VDC or 110 VAC with MFJ-1312D, $15.95. SO-239 connectors. 6Wx3½Hx4½D inches.

MFJ-834H. $79.95. Like MFJ-834, but 3, 10, 30 Amps *high current* ranges.

MFJ-836 all-in-one RF Ammeter/SWR/Wattmeter

The MFJ-836, $129.95 is an *all-in-one* RF Ammeter/SWR/Wattmeter! You can quickly determine feedpoint impedance and monitor antenna system for detrimental changes under power.

Read RF current in three calibrated ranges -- 1, 3, 10 Amperes. A large 3-inch lighted easy-to-read *Cross-Needle* meter lets you read SWR, forward (300/3000W) and reflected power (60/600W) *simultaneously*.

MFJ's exclusive *TrueActive*™ circuit gives you *true* peak or average power readings. SO-239 connectors. Use 9 Volt battery and/or 12 VDC or 110 VAC with MFJ-1312D, $15.95. 6Wx3½Hx4½D inches.

MFJ-836H, $139.95. Like MFJ-836 but 3, 10, 30 Amps *high current* ranges.

MFJ-835 Balanced Line RF Ammeter

MFJ-835 **$119.95**

***How** do you detect imbalance in open-wire or ladder line?* **By** measuring and comparing each feedline wire current -- your feedline is balanced if the currents are equal.

The MFJ-835, $119.95 *BalancedLine RF Ammeter*™ is *two* identical calibrated RF ammeters using an MFJ *Cross-Needle* meter.

Feedline currents are *simultaneously* displayed on separate calibrated scales in three ranges (.3, 1, 3 Amperes).

Balance is clearly revealed on MFJ's exclusive *BalancedBar*™ -- when currents are balanced, the dual needles *cross in the center* -- no matter the actual current.

If the needles cross within the vertical *BalancedBar*™ the balance is within 10%. If not, you know which line is unbalanced and by how much.

Equal currents in the feeder wires minimize feedline radiation and reduces pattern distortion, RFI, TVI and wasted power. You could lose up to 10% of your power.

Imbalance is due to feedline not being perpendicular to antenna, if one side runs close to metal or is shorter or closer to ground.

The MFJ-836 helps you solve all your unbalanced problems.

Heavy-duty 5-way binding posts for feedlines. Use 12 VDC or 110 VAC with MFJ-1312D, $15.95. 6Wx3½Hx4½D in.

Calibrated *Clamp-On* RF Ammeter

MFJ-854 **$109.95**

MFJ-854 *Clamp-On* RF Ammeter quickly snaps over wires and cables to measure RF currents flowing in antenna elements, radials, ground wires and on outside of coax.

Tune counterpoises, radials and ground systems. Balance your radials. See how much signal is radiating from your antenna, feedline or ground wire. Study/optimize your antennas for peak performance. Find current peaks/nulls on antennas/ feedlines. Plot current profile, measure and tweak current flow at each antenna element in phased arrays.

Determine your antenna feedpoint impedance, radiated power, power losses and efficiency. Track down RFI-causing currents on coax shield, rotator cable, guy wires, house wiring, telephone and television cables.

Has five *calibrated* ranges to 3 Amperes including sensitive 30 mA range with linearity compensation to assure accuracy at low currents. It's sensitive enough to use an MFJ SWR Analyzer as the source to drive your antennas.

Less than 1 mA on super-sensitive *Variable Range* yields usable meter deflection for tracking RFI on household wiring and cables.

1-30 MHz plus. ½ inch diameter cables. 2 ½ Wx5½Hx1½D in.

Calibrated *mini Clamp-On* RF Ammeter

New!

MFJ-853 **$49.95**

MFJ-853 calibrated *mini Clamp-On* RF ammeter accurately measures RF current in antenna elements, radials, ground wires, coax shield. *Non-metallic* lightweight case minimizes electric field disturbances for accurate readings -- clamp on mobile whip/ vertical. Adjust for maximum radiated current. Determine radiated power/losses. Profile its current distribution -- it's maximum at base and tapers to zero at end.

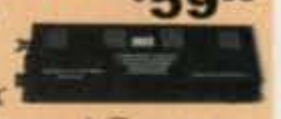
Use like MFJ-854 to do many of its tasks. 0.3, 1, 3 Ampere ranges. 2¼Wx3¾Hx1D".

MFJ-853H, $59.95. Like MFJ-853, but has 3, 10, 30 Ampere *high-current* ranges.

New!

AC Line RFI Filter

MFJ-1164 **$59.95**



Squash obnoxious power line computer hash/noise *six* S-units! Filters/reduces AC power line RFI, hash, noise, transients. Four 15 Amp, 120VAC outlets.

Dealer/Catalog/Manuals

Visit: http://www.mfjenterprises.com or call toll-free 800-647-1800

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

MFJ ENTERPRISES, INC.
300 Industrial Pk Rd, Starkville, MS 39759 **PH:** (662) 323-5869
Tech Help: (662) 323-0549
FAX:(662)323-6551 8-4:30 CST, Mon.-Fri. ***Add shipping.***

MFJ . . . the World Leader in Amateur Radio Accessories!

A Major New Mission for MARS

BY BOB JOSUWEIT,* WA3PZO

Several agencies had their eyes on amateur radio this summer. It seems that the word is spreading that when all else fails there is amateur radio. We'll take a look at the interest being taken and at some of the reasons that these organizations are turning to amateur radio.

MARS and Airport Protection

Airport protection during the current hurricane season will be the immediate focus of a recent agreement entered into by the Military Affiliate Radio System (MARS) and the Transportation Security Administration. Army MARS Chief Kathy Harrison said the new collaboration with the TSA "is likely to expand to other Department of Homeland Security (DHS) areas" in the future.

A Memorandum of Understanding (MOU) signed by the two agencies provides for use of MARS networks, manpower, and equipment to maintain communications during the initial 72 hours of incidents involving aircraft, mass transit, and pipelines. MARS is also tasked to provide interoperability with other communications systems.

"This is an extensive area and will require MARS member support across the continental United States," Chief Harrison said. "We will need many volunteers to man teams assigned to specific geographical areas, starting with airports throughout the hurricane corridor."

*c/o CQ magazine
e-mail: <wa3pzo@cq-amateur-radio.com>

The chiefs of the separate Air Force and Navy-Marine Corps MARS organizations immediately messaged their members signifying participation alongside Army MARS.

This MOU documents the most extensive support role MARS has signed up for since the development of the Essential Elements of Information (EEI) mission. That mission dates back to 1994 and the Northridge earthquake that devastated California's San Fernando Valley.

"I am very excited about this MOU because TSA has been able to provide such specific definitions of their needs," Harrison said. "This will be a fast-moving recruitment/development action and I request your support in filling these teams."

Don Poquette, Chief Air Force MARS, followed up with a message to his members pledging, "AF MARS will assist to accomplish this mission" as soon as logistical details and guidance can be worked out.

The MOU states, "A reliable backup solution is needed to ensure the continuity of TSA's command and control function during the first 72 hours following any incident interfering with normal communications channels and to provide local, regional, and nationwide TSA communications during that time." Seventy-two hours is considered the maximum time required for federal response organizations to deploy their internal emergency communications gear.

"This solution," the memorandum continues, "is immediately available at no cost to the TSA from NETCOM/9th ASC through the use of the existing

Scenes such as this one last year at the New Orleans airport after Hurricane Katrina may include MARS members in the future, under a new agreement signed by MARS and the Transportation Security Administration, giving MARS a major new mission of helping with airport protection in emergencies. (Photo courtesy of Michael Rieger/FEMA)

Army MARS emergency communications network."

Under the MOU, TSA agrees to provide MARS volunteers with access to its facilities and space for radio equipment as well as to integrate MARS capabilities into its emergency planning and exercises. The Army's commitment includes providing "volunteer MARS radio operators, equipment, and use of the MARS radio networks" and developing "alert procedures and a communications support plan" that "will identify specific frequencies, callsigns, and radio operator level duties."

A particular MARS responsibility is to "provide communications interoperability with local, state, and national communication networks (i.e., Radio Amateur Civil Emergency Service, Shared Resources.)" The latter refers to SHARES, a separate web of national and regional HF radio networks linking federal agencies under the DHS's National Communications System. MARS is already a primary participant in the NCS system. (See more on SHARES later in this column.)

Hams Included in Major EmComm Legislation

In July the U.S. House of Representatives passed, by a vote of 414-2, H.R. 5852, the 21st Century Emergency Communications Act of 2006, which is designed to improve the ability of emergency responders to communicate with each other. The bill requires the Department of Homeland Security to strengthen its efforts to improve emergency communications by establishing an Office of Emergency Communications, to be headed by a new Assistant Secretary for Emergency Communications.

The Assistant Secretary's responsibilities would include coordinating administration of the National Communications System (NCS), and facilitating creation of Regional Emergency Communications Coordination Working Groups. According to the ARRL, the NCS is responsible for coordinating the restoration of Federal government communications carried over the commercial carrier networks. Since more than 95% of the Federal government's communications are provided by commercial carriers, there is a national requirement to assist in the transmission of critical messages and in the restoration of government communications. The bill will require local emergency responders who receive federal grants to purchase equipment that meets national

voluntary standards for interoperability, meaning that the equipment can be used to communicate with a wide variety of other responders.

The Regional Emergency Communications Coordination (RECC) Working Groups would, by law, include amateur radio operators. These groups would be attached to each regional Department of Homeland Security office and advise federal and state homeland security officials. Other groups that would be members of the RECC include state and local government officials; police and fire departments; 911 centers; hospitals; ambulance services; communications equipment vendors, telephone, wireless satellite, broadband and cable service providers; public utilities; broadcasters; emergency evacuation transit services; state emergency managers, homeland security directors or representatives of state administrative agencies; local emergency managers or homeland security directors; and "other emergency response providers or emergency support providers as deemed appropriate." Federal agencies represented on the Working Group include the E-911 Implementation Coordination Office of the National Telecommunications and Information Administration and the National Highway Transportation Safety Administration.

According to the bill, the duties of each RECC Working Group will include assessing local emergency communications systems to meet the goals of the National Emergency Communications Strategy and reporting annually to the Assistant Secretary for Emergency Communications on the status of its region in building a robust and sustainable interoperable voice and data emergency communications network. It will also coordinate the establishment of an effective multijurisdictional, multi-agency emergency communications network for use during acts of terrorism, natural disasters, and other emergencies through the expanded use of emergency management and public safety communications mutual-aid agreements; and coordinate the establishment of federal, state, and local support services and networks designed to address the immediate and critical human needs in responding to acts of terrorism, natural disasters, and other emergencies.

As we went to press, the bill had been sent to the Senate, where it was referred

World Politics and Public Service

With military action occurring in Lebanon and Israel as we prepared this month's column, we attempted to learn what, if anything, amateur radio operators were doing in both countries to provide emergency communications.

A posting on a DX e-mail reflector from Hani, OD5TE, said, "In support of the current situation in Lebanon, the Arab Amateur Radio Emergency Service has been activated on 14.305 MHz in order to take Welfare and Emergency messages."

The information continued, "At the same time all local repeaters in Lebanon will have priority for Emergency use. OD5TE/R: 144.700– T88.5 (Covering Greater Beirut Area and Main Lebanese coastal road) and OD5RAK/R: 144.025+ T88.5 (Covering Northern Lebanon). Repeaters will be linked through Echolink at all times to allow maximum coverage." We contacted Hani shortly after the message was posted. He was in the process of evacuating and he didn't know when he would be able to get back to us.

The Radio Amateurs of Lebanon, the national association of amateur radio operators in Lebanon, was monitoring 14.305 MHz and using its website for updating conditions in the area. The website indicated that as of August 2, ninety percent of the stations were saying that they were out of fuel. "Transportation is only done when really needed." Electricity is generally on for eight hours per day. Most of the ham radio operators have their own generators and/or are running on batteries.

The webmaster made a plea to all Lebanese hams: "Take Your Handheld Radio to Work (if you're working). We are encouraging Lebanese radio hams to take their hand-helds to work after the events of July 12th and to keep monitoring 144.470 MHz OD5TE repeater." It concluded, "If you've been inactive for some time, remove the dust off your HF radios and erect your HF antennas."

We e-mailed several leaders of the Israel Amateur Radio Club, which also has an amateur radio emergency service. In our e-mail, we asked if Israeli hams were providing communications related to the conflict. We also indicated that we knew conditions were changing frequently and it might not be permissible or even safe to answer this reporter's question. As of early August we had no response from any of the Israeli hams.

As Americans were evacuated from Beirut and eventually flown to the United States, Army MARS members were on alert for possible deployment to airports along the east coast which were providing repatriation services (see related story). At an airport near Washington, D.C., many emergency medical technicians (EMTs) were on standby to provide assistance as needed. At least one of these EMTs was also a ham. He commented to *CQ* that he had his ham radio "go-kit" with him just in case.

Cuban Hams Off the Air?

The *Palm Beach Post* newspaper reported in early August that there appeared to be a "communication crackdown" in Cuba in light of President Fidel Castro's widely-reported illness, and that Cuban hams may have been ordered off the air. Several Florida ham radio operators reported that 40-meter Cuban amateur radio nets were not in operation and the Cuban hams were not being heard on the radio.

These reports were independently confirmed by *CQ*, with hams in South Florida, but four days after the initial reports were published, amateurs around the Caribbean began reporting normal contacts with Cuban stations, particularly on CW, RTTY and PSK-31. This is particularly important, since Tropical Storm Chris appeared to be heading for the island's north coast at the time, and hams have traditionally been a major part of Cuba's Civil Defense Network during hurricanes. The National Hurricane Center in Miami has maintained contact over the years with weather and civil defense officials in Havana. There are no known Echolink or IRLP amateur radio links between Cuba and the United States so all information has to come via the HF bands.

Amateur sadio may be included in regional Department of Homeland Security work groups if a bill passed by the House of Representatives is approved by the Senate and signed into law by the President.

InfraGard has taken an interest in amateur radio to possibly help protect the nation's infrastructure. (See text for details.)

to the Committee on Homeland Security and Governmental Affairs. It is important to note that this bill would become law only if and when it is passed by the Senate and signed by the President.

What, No Internet?

Since the early 1990s, growth in the use of the internet has revolutionized the way the world communicates and conducts business. While the internet originated as a U.S. government-sponsored research project, the vast majority of its infrastructure is currently owned and operated by the private sector.

A major disruption to the internet could be caused by a physical incident such as a natural disaster or an attack that affects key facilities, a cyber-incident such as a software malfunction or a malicious virus, or a combination of both. Hurricane Katrina caused regional disruptions but did not cause a catastrophic internet failure.

In July the Government Accountability Office (GAO) evaluated the Department of Homeland Security's (DHS) plan for facilitating recovery from internet disruptions and made recommendations to strengthen DHS's ability to respond to such disruptions.

The GAO report describes the Shared Resources High Frequency Radio Program (SHARES), which provides backup radio communications during an emergency. The purpose of the program is to provide a single, interagency emergency message-handling system by bringing together existing radio resources of federal, state, and industry organizations when normal communications are destroyed or unavailable for the transmission of national security and emergency preparedness information. It is known that many amateur radio operators participate in the SHARES program.

In addition, DHS operates the Critical Infrastructure Warning Information Network, a private communications network designed to serve as a reliable and survivable network capability with no logical dependency on the internet or the public-switched network. In the event of a significant cyber attack that disrupts telecommunications networks and/or the internet, this network is expected to provide a secure capability for interagency incident managers to communicate. DHS plans to extend the network to private-sector communications backbone providers.

InfraGard and Ham Radio

In 1998 President Bill Clinton said, "Critical infrastructures are those physical and cyber-based systems essential to the minimum operations of the economy and government. These systems are so vital, that their incapacity or destruction would have a debilitating impact on the defense or economic security of the United States."InfraGard is a government and private sector alliance developed by the Cleveland FBI office in 1996 to promote protection of critical information systems. InfraGard also provides formal and informal channels for the exchange of information about infrastructure threats and vulnerabilities.

According to the InfraGard website (www.infragard.net), the organization is needed for several reasons:

- Most infrastructure components are privately owned and operated;
- The government and the private sector have a wealth of information on threats to our systems, and this wealth needs to be shared and analyzed;
- Systems are often interconnected;
- Reliance on automation is increasing;
- Tools to do harm are widely available and do not require a high degree of technical skill;
- Globalization of infrastructures increases exposure to potential harm;
- Sophisticated communication systems in the hacker community; and
- Victims often do not report cyber intrusions (institutional concerns about the outcome and confusion about when/where to report the incident).

In July, the ARRL participated in a forum with the New York City Chapter of InfraGard on "Communications Interoperability and Ham Radios." ARRL Chief Development Officer Mary Hobart, K1MMH, said amateur radio came up on InfraGard's radar earlier this year, and got the nonprofit organization thinking of amateur radio as a possible partner, ally, and service provider in emergencies. "They understand that ham radio has 'been there' in terms of emergencies and disasters and is working to improve its ability to respond," Hobart said. According to reports from the ARRL, New York Metro InfraGard President Joe Concannon "expressed his deep interest in amateur radio as a partner and a desire to learn more about our capabilities."

According to Hobart, "This meeting presented the potential for an important relationship for amateur radio. We need to continue this dialogue regarding a partnership." She said Concannon envisions a model in New York City that other InfraGard chapters across the country could emulate. Hobart thinks "it's an opportunity for amateur radio to align itself with a high-profile group with key federal connections."

With Thanks...

It has been a busy summer covering the world of amateur radio public service communications. Amateur radio will continue to be looked upon as an answer to communication problems. However, it requires that we are all participate in some form of public service communications and that we are trained to work with other first responders. This month we want to thank the ARRL, Bill Sexton, N1IN, and amateurs who may be in harm's way around the world. Until next month . . .

73, Bob, WA3PZO

math's notes

BY IRWIN MATH,* WA2NDM

Potpourri

This month we thought we would catch up on some of the various new devices and applications that we have come across recently and that might be of interest to the experimenters in our midst.

Those of you who remember our May 2006 column, which discussed the use of white LEDs, may be interested in an interesting application for these unique devices presented by Texas Instruments. Since these LEDs emulate incandescent lighting, it would be nice to come up with a way to dim them, and TI has come up with a way to do exactly that. Fig. 1 is a schematic of a white LED driver with an adjustable brightness-control feature.

The TPS61040 is a switching regulator that can control the output current to a string of LEDs as a function of an analog control voltage. Although it comes in a tiny 5-pin SOT23 surface-mount package, it can be hand-wired if you are very careful. In the circuit shown, an input control voltage (at a minute current) from 0 to 3.3 volts is required. At 3.3 volts the LEDs are off, and dropping the input voltage to 0 volts provides a constant output current that varies smoothly to 20 ma. Therefore, any voltage in between 0 and 3.3 volts then inversely sets the LED current to some point between 0 and 20 ma. The potentiometer shown by dotted lines on the schematic makes a handy brightness control, or if you wish, you can simply apply an external control voltage directly to the 160K resistor. The 10 µH choke used in this circuit must be a low-resistance, high-quality unit designed for switching supplies, and many suitable ones are available from distributors such as Mouser Electronics and DigiKey, to name but two.

If you go to the Texas Instruments website at <www.ti.com> and download the data sheet for the TPS61040, you will see other useful ways to use this unique device. In all fairness, other manufacturers of white LED drivers also have various ways to control the brightness of these devices with their products, so if you have a favorite semiconductor vendor, be sure to examine its website and similar offerings as well.

Another similar switching regulator (also from TI) is the TPS61059DRC, which has another unique white LED application circuit on its data sheet. This time the use of the LED for a camera flash (or warning light) is described. Due to the increased use of video chips in a multitude of devices (cell phones, for example) the common xenon lamp usually used as a camera flash poses a voltage interface problem. As you may know, xenon lamps require hundreds of volts to operate, while white LEDs require less than 5 volts. In addition, the output spectrum of a white LED is wide enough to give good results

*c/o CQ magazine

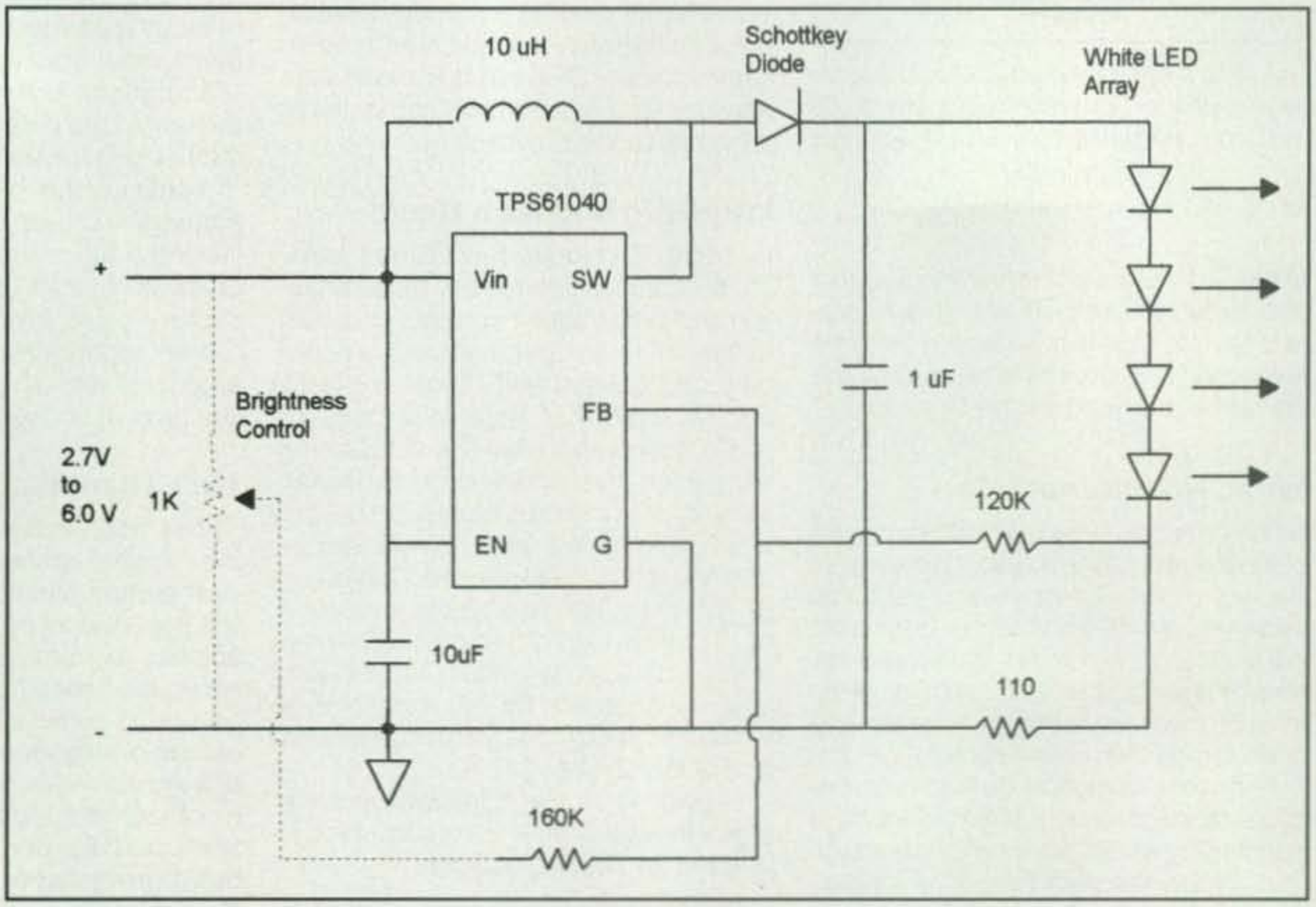


Fig. 1– Variable-brightness white LED circuit.

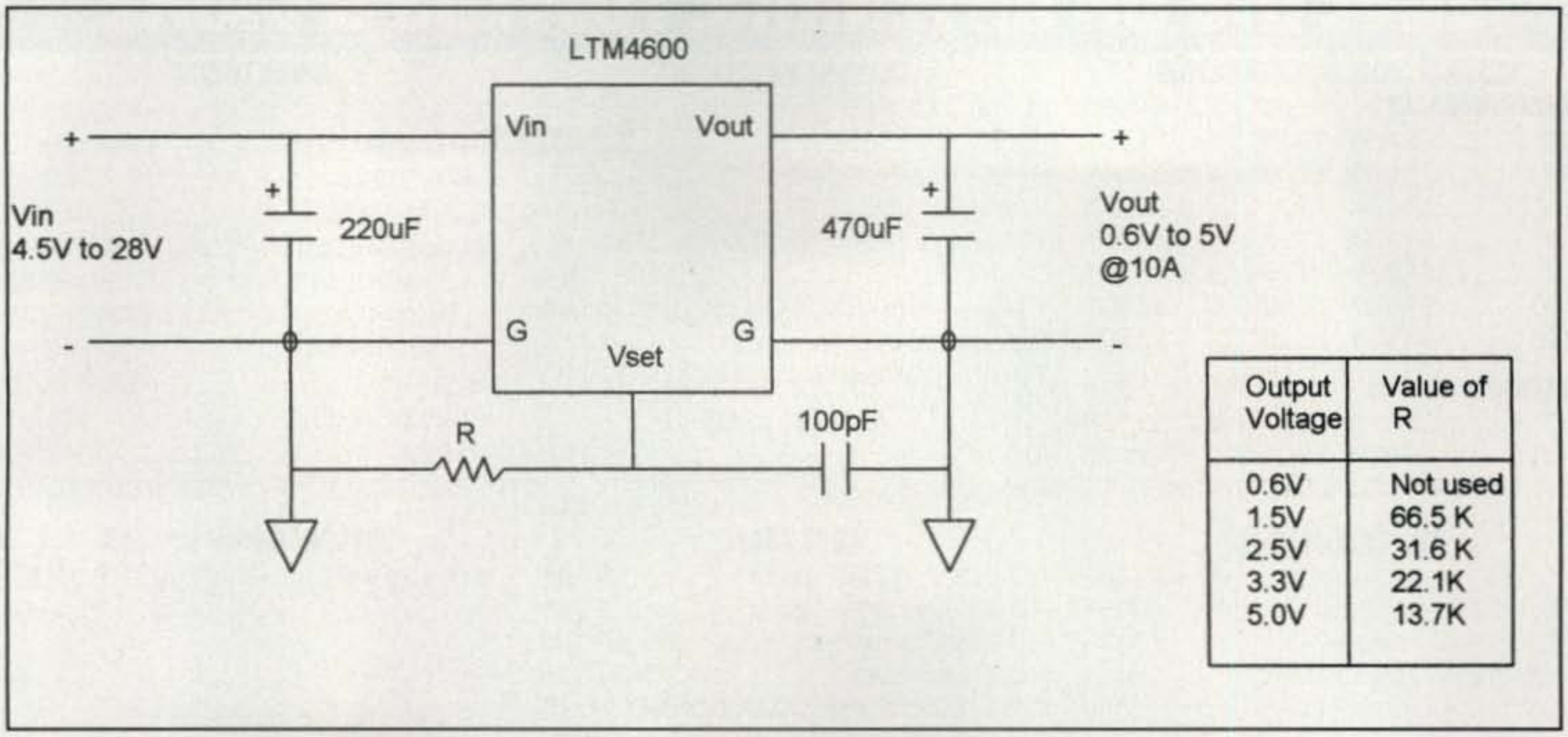


Fig. 2– Typical application for a 10-ampere switching supply.

in constant movie-light applications, as well as provide a reasonable simulation of a xenon flash lamp when "overdriven." As a result, when these are used (instead of the xenon lamp), the need for a source of high voltage is eliminated.

In the application circuit given in the TPS61059DRC data sheet, drive to the LED is provided at two different current levels from a 2.7 to 5.5 primary input volt source. For flash use, 700 ma is provided, while for constant light output use, 200 ma is provided. In the original application a high-power LED was used, hence the high currents. You can either find a similar LED if you wish or configure an array of white LEDs (series and parallel connected) that will operate at 200 ma. You can also vary the output current ranges if you wish to use other LEDs. Whatever choice you make, you will have a totally solid-state flash source. The only drawback of this chip that we can see is the lead-less "pure surface mount" package. If this does not bother you, download the data sheet and have fun experimenting.

While on the subject of power supplies, Linear Technology has introduced its LTM4600 DC/DC so-called "µModule." This device is a complete 10-ampere (yes, we said *ampere*) switching-mode power supply that only needs a couple of external capacitors and one resistor for operation. All other components (including the inductor) are completely contained within the 15 × 15 × 2.8 mm (0.6 × 0.6 × 0.12 inch) package. You can even parallel two devices for a 20-amp supply if you wish. The LTM4600 operates from a 4.5- to 28-volt DC input and produces anywhere from 0.6 to 5 volts output (at 10 amperes). Fig. 2 shows just how simple to use this device is. If you go to Linear's website at <www.linear.com>, you will find additional information on adjusting the output voltage, paralleling the devices, and suggested component styles and values.

The next offering is a new ultra-low-current operational amplifier. The MP8102 from Monolithic Power only requires 7.5 microamperes of operating current (not counting the load, of course) from a 1.8- to 5.5-volt power supply. The device is single-ended, unity gain stable, and rail-to-rail to boot. Although the bandwidth is only 600 kHz, such ultra-low-power requirements make it ideal for battery-operated audio circuits, instrumentation applications, and portable devices of all kinds. The MP8102 comes in a tiny SOT23 five-pin package, and further details can be found at <www.monolithicpower.com>.

In the non-semiconductor arena, Omron Electric has introduced an interesting line of relays that should be ideal for low-power and portable-equipment experimenters. These relays feature the normal, familiar high-current contact ratings but require very low currents to operate the coils. In the past higher power relays usually required high current in the coil for proper operation. The Omron G5LB and G5LB-25 series, however, only require 360 mw of power to the coil to switch a full 10 amperes at both 120 and 220 VAC or 8 amperes at 32 VDC. What this means is that a 12-volt relay will only require 33 ma of coil current, while a 5-volt version can be operated with as little as 70 ma. This makes these relays ideal for a variety of battery-powered circuits. More details can be found on Omron's website, <www.components. omron.com>.

For those of you using antennas with traps or loading coils, a common problem is a change in performance when the coils are either wet or dry as a function of the weather. We had this situation with a Cushcraft MA5V that (although it always worked perfectly) would change SWR readings when it rained, probably due to wear of the original coating on the loading coils. The solution (which, by the way, was graciously suggested by Cushcraft) consisted of simply spraying the traps with a healthy coating of Krylon® brand (or similar) clear satin polyurethane. Measurements of the antenna before and after three coats (during dry weather) only showed a very slight change in SWR (about 0.1) across its entire range, and the antenna still retained all of its original specifications, eliminating the worry (or job) of retuning. After being coated, the change was minimal after it rained. If you do this, be sure to also check the seal between the coax and the point where it enters the coax connectors. Here a liberal coating of waterproof silicone caulking will prevent moisture from seeping in.

That's about it for now and above all, have fun. See you all next month.

73, Irwin, WA2NDM

SAVE BIG ON ANTENNAS, TOWERS & CABLE

TELESCOPING ALUMINUM TUBING

DRAWN 6063-T832

.375"	$.80/ft	1.250"	$1.65/ft
.500"	$.90/ft	1.375"	$1.85/ft
.625"	$1.00/ft	1.500"	$2.05/ft
.750"	$1.10/ft	1.625"	$2.35/ft
.875"	$1.20/ft	1.750"	$2.60/ft
1.000	$1.30/ft	1.875"	$2.85/ft
1.125	$1.45/ft	2.000"	$3.10/ft
		2.125"	$3.60/ft

EXTRUDED 6061-T6

.250" rod	$.50/ft	.188" rod	$.35/ft
2"x.125"	$4.50/ft	4"x.375" bar	$6.50/ft
		2"x.250"	$8.00/ft

6' OR 12' LENGTHS. 6' LENGTHS SHIP UPS.

ANTENNA ROTATORS

M2 OR-2800PDX	$1379
Hygain HAM IV	$499
Hygain T2X Tailtwister	$569
Yaesu G-450A	$249
Yaesu G-800SA/G-800DXA	$329/409
G-1000DXA	$499
Yaesu G-2800SDX	$1089
Yaesu G-550	$299
Yaesu G-5500	$599

ROTATOR CABLE

R62 (#18), HD 6 conductor	$.49/ft.
R81/82/84, 8 cond.	$.49/ft./.69/ft./1.19/ft.

ROHN TOWER

25G/45G/55G	$99/209/259
25AG2/25AG3/25AG4	$149/199/139
45AG2/45AG4	$289/289
AS25G/AS455G	$55/115
BPC25G/BPC45G/BPC55G	$89/129/149
BPL25G/BPL45G/BPL55G	$109/189/399
GA25GD/GA45GD/GA55GD	$109/149/179
GAR30/GAS604	$39/49
SB25G/45/55	$65/119/169
SB25G5/SBH25G	$85/219
TB3/TB4	$149/169

PLEASE CALL FOR MORE ROHN ITEMS.

COMET ANTENNAS

GP3, 2m/70cm Vertical	$99
GP6, 2m/70cm Vertical	$159
GP9 2m/70cm Vertical	$199
GP15, 6m/2m/70cm Vertical	$159
GP98, 2m/70cm/23cm Vertical	$169

DIAMOND ANTENNAS

X50A, 2m/70cm Vertical	$109
X200A, 2m/70cm Vertical	$149
X510MA 2m/70cm Vertical	$195
X500HNA 2m/70cm Vertical	$259
X700HNA 2m/70cm Vertical	$399
V2000A 6m/2m/70cm Vertical	$172

COAX CABLE

RG-213/U, (#8267 Equiv.)	$.69/ft
RG-8X, Mini RG-8 Foam	$.35/ft
RG-213/U Jumpers	Please Call
RG-8X Jumpers	Please Call

CALL FOR MORE COAX/CONNECTORS.

TIMES MICROWAVE LMR® COAX

LMR-400	$.69/ft
LMR-400DB Direct Bury	$.99/ft
LMR-400 Ultraflex	$.99/ft
LMR-600	$1.39/ft
LMR600 Ultraflex	$2.19/ft

CALL FOR MORE SIZES & CONNECTORS.

TRYLON "TITAN" TOWERS

SELF-SUPPORTING STEEL TOWERS

T200-64	64', 15 square feet	$1489
T200-72	72', 15 square feet	$1819
T200-80	80', 15 square feet	$2169
T200-88	88', 15 square feet	$2529
T200-96	96', 15 square feet	$2969
T300-88	88', 22 square feet	$2869
T400-80	80', 34 square feet	$2759
T500-72	72', 45 square feet	$2629
T600-64	64', 60 square feet	$2499
T700-56	56', 80 square feet	$2349

MORE TRYLON TOWERS AVAILABLE.

M2 VHF/UHF ANTENNAS

6M5X/6M7JHV	$259/319
6M2WLC/6M9KHW	$549/589
2M4/2M7/2M9SSBFM	$119/129/149
2M12/2M5WL	$209/249
2M5-440XP, 2m/70cm	$219
440-470-5HD/420-50-11	$169/119
432-9WL/432-13WLA	$219/299
440-18/440-21ATV	$159/179

M2 SATELLITE ANTENNAS

2MCP14/2MCP22	$209/299
436CP30/436CP42UG	$299/349

CALL FOR MORE IN-STOCK M2 ITEMS.

TOWER HARDWARE

3/8"EE/EJ Turnbuckle	$15/16
1/2"x9"EE/EJ Turnbuckle	$21/23
1/2"x12"EE/EJ Turnbuckle	$24/26
3/16"/1/4" Big Grips	$5/6
3/16"EHS-500'/1/4"EHS-500'	$119/149

PLEASE CALL FOR MORE HARDWARE.

HIGH CARBON STEEL MASTS

5 FT x .12" / 5 FT x .18"	$45/59
11 FT x .12" / 11 FT x .25"	$80/199
12 FT x .18" / 17 FT x .12"	$159/149
20 FT x .18" / 22 FT x .12"	$249/199
23 FT x .25" / 24 FT x .18"	$369/299

UNIVERSAL ALUMINUM TOWERS

4-40'/50'/60'	$619/879/1249
7-50'/60'/70'	$1119/1599/2079
9-40'/50'/60'	$869/1249/1719
12-30'/40'	$659/1029
15-40'/50'	$1159/1629
16-60'/80'	$1529/3529
21-50'/60'/70'	$1849/2459/3059
23-30'/40'	$1029/1509
35-40'	$1739

BOLD IN PART NUMBER SHOWS WIND LOAD CAPACITY. SHIPS DIRECT FROM THE FACTORY TO SAVE YOU MONEY!

HYGAIN ANTENNAS

AV18HT Hightower	$739
DIS71/72	$269/569
TH3JRS/TH3MK4	$319/399
TH5MK2/TH2MK3	$659/319
TH7DX/TH11DX	$749/995

MFJ

259B/269, Analyzers	$259/339
948/949E, Tuners	$139/159
969, HF–6m Tuner	$189
986, 3kW Tuner	$319
989D, Deluxe 3kW Tuner	$339
991/993 Autotuners	$169/229

PHILLYSTRAN GUY CABLE

HPTG1200I	$.45/ft
1200 END KIT	$3.60
HPTG2100I	$.59/ft
PLP2738 Big Grip (2100)	$7.00
HPTG4000I	$.89/ft
PLP2739 Big Grip (4000)	$9.50
HPTG6700I	$1.29/ft
PLP2755 Big Grip (6700)	$13.50
HPTG11200	$1.89/ft
PLP2758 Big Grip (11200)	$16.00

PLEASE CALL FOR HELP SELECTING THE PHILLYSTRAN SIZE FOR YOUR PROJECT.

US TOWER CRANK-UPS

MA40/MA550	$1289/1999
MA770/MA850	$3279/5049
TMM433SS/HD	$1719/2089
TMM541SS	$2259
TX438, 38' Crankup Tower	$1619
TX455, 55' Crankup Tower	$2229
TX472, 72' Crankup Tower	$3689
TX489MDPL, 89' Motorized HD	$9599
HDX538, 38' Extra Heavy Duty	$1919
HDX555, 55' Extra Heavy Duty	$3379
HDX572MDPL 72' Motorized	$8769

SHIPPED DIRECT TO SAVE YOU MONEY!

WEEKDAY HOURS:
9 AM–5 PM CENTRAL

SATURDAY HOURS:
9 AM–12 NOON CENTRAL

CREDIT CARDS:
M/C, VISA, DISCOVER

TEXAS TOWERS

A Division of Texas RF Distributors, Inc. • 1108 Summit Avenue, Suite #4 • Plano, TX 75074

(800) 272-3467

LOCAL CALLS:
(972) 422-7306

EMAIL ADDRESS:
sales@texastowers.com

INTERNET ADDRESS:
www.texastowers.com

GREAT US TOWER CRANK-UP DEALS!

TX SERIES CRANK-UP TOWERS

- Handles 35 square feet of antenna load at 50 MPH, 14.75 square feet at 70 MPH.
- All models supllied with hinged T-base, anchor bolts, hand winch (except motor drive models), top plate, and rotor plate.
- MDP & MDPL models include motor drive
- Options include coax arms, raising fixtures, masts, motor drives, and more!

Now shipping from CA for west coast customers, and KS for east coast and mid-west customers, to reduce freight cost!

TX SERIES HEAVY DUTY CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
TX-438	38'	21'6"	355	$1,972	$1,619
TX-455	55'	22'	670	$2,727	$2,229
TX-472	72'	22'8"	1040	$4,481	$3,689
TX-472MDP	72'	22'8"	1210	$7,211	$5,929
TX-489MDPL	89'	23'4"	1800	$11,692	$9,599

HDX SERIES CRANK-UP TOWERS

- Heavy duty, handles 44.7 square feet of antenna load at 50 MPH, 35 square feet at 70 MPH.
- All models supllied with hinged T-base, anchor bolts, hand winch (except motor drive models), top plate, and rotor plate.
- MDPL models include motor drive
- Options include coax arms, raising fixtures, masts, motor drives, and more!

Now shipping from CA for west coast customers, and KS for east coast and mid-west customers, to reduce freight cost!

HDX SERIES HEAVY DUTY CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
HDX-538	38'	21'6"	600	$2,339	$1,919
HDX-555	55'	22'	870	$4,093	$3,379
HDX-572MDPL	72'	22'8"	1600	$10,719	$8,769
HDX-589MDPL	89'	23'8"	2440	$14,031	$11,499
HDX-689MDPL	89'	23'8"	3450	$27,104	$22,199
HDX-5106MDPL	106'	24'8"	3700	$29,495	$23,799

MA SERIES CRANK-UP MASTS

- Handles up to 22 square feet of antenna load. (See chart below)
- MDP models include motor drive.
- All models supllied with anchor bolts, load-actuated hand winch, and house bracket.
- Options include coax arms, raising fixtures, motor drives, self-supporting and rotator bases, remote control panel, and more!

Now shipping from CA for west coast customers, and KS for east coast and mid-west customers, to reduce freight cost!

MA SERIES CRANK-UP MASTS							
MAST MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	50 MPH (sq. ft.)	70 MPH (sq. ft.)	LIST PRICE	SALE PRICE
MA-40	40'	21'6"	242	16.5	6.8	$1,569	$1,289
MA-550	55'	22'1"	435	22	9	$2,427	$1,999
MA-550MDP	55'	22'1"	620	22	9	$4,639	$3,799
MA-770	71'	22'10"	645	15.5	5.5	$4,001	$3,279
MA-770MDP	71'	22'10"	830	15.5	5.5	$6,329	$5,149
MA-850MDP	85'	23'6"	1128	15.3	6.3	$8,531	$5,949

TMM SERIES COMPACT CRANK-UP TOWERS

- Handles 20 square feet of antenna load at 50 MPH, 8 square feet at 70 MPH.
- Compact design is great for areas with tower restrictions, or where a less intrusive installation is desirable.
- All models supllied with hinged T-base, anchor bolts, load-actuated hand winch, 8' steel mast, top plate, and rotor plate.
- Options include coax arms, raising fixtures, motor drives, thrust bearing, remote control panel, and more!

Now shipping from CA for west coast customers, and KS for east coast and mid-west customers, to reduce freight cost!

TMM SERIES COMPACT CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
TMM-433SS	33'	11'4"	315	$2,105	$1,719
TMM-433HD	33'	11'4"	400	$2,550	$2,089
TMM-541SS	41'	12'	430	$2,764	$2,259

WEEKDAY HOURS:
9 AM–5 PM CST

SATURDAY HOURS:
9 AM–12 NOON CST

CREDIT CARDS:
M/C, VISA, DISCOVER

TEXAS TOWERS

A Division of Texas RF Distributors, Inc. · 1108 Summit Avenue, Suite #4 · Plano, TX 75074

(800) 272-3467

LOCAL CALLS:
(972) 422-7306

EMAIL ADDRESS:
sales@texastowers.com

INTERNET ADDRESS:
www.texastowers.com

BY FREDERICK O. MAIA,* W5YI

UK Adopts New Approach to Ham Radio Licensing

"Ofcom intends to now press ahead and to make future Amateur Radio licenses free if applied for via the Internet. Current licensees holding valid licenses on October 1, 2006 will all get free replacement licenses. After that, future applicants applying other than by the Internet (e.g., by mail) will be asked to pay a £20 fee except applicants aged 75 years and over."

On July 4, 2006, the British Office of Communications (Ofcom, as it is called, regulates radio in the UK) released a policy statement on how amateur radio will be licensed and regulated in the future. It represents the most radical change ever to ham radio in Great Britain.

A year ago, Ofcom launched a three month "consultation" period (similar to our Notice of Proposed Rulemaking) in which it said it was its intention to:

1. Issue lifetime amateur radio licenses that will remain valid for as long as the information remains correct or until such time as the license is either revoked by Ofcom or surrendered by the licensee. The license would contain a beginning date but no expiration date.

2. Provide a low-cost, online, web-based, self-service licensing service. The current licensing program is carried out by the Radio Licensing Centre (RLC), a wholly owned subsidiary of Royal Mail Group (the UK postal service).

3. Discontinue mailing hard copy amateur radio licenses. Instead users would print out from the internet their "electronic PDF license document," which must be kept at the main station address. Paper licenses would still be available from Ofcom upon payment of an administrative cost which had yet to be determined.

4. Require licensees to validate their license information at least once every five years in order to maintain their lifetime license. Licensees who validate or amend their license details will not receive a five-year reminder/revocation notice from Ofcom. If the holder does not respond to the reminder notice, the license will be canceled.

The "consultation" (same as our comment period) closed on August 18, 2005 with the majority of those responding not being in favor of such a radical licensing change. Questionnaires mailed to 4500 license holders by a professional research firm, however, yielded different results and Ofcom is following through on its original proposal.

Reform of UK Amateur Radio

Effective October 1, 2006, all UK ham tickets will be processed and issued internally. The license is "issued" by posting to an online database. Ofcom believes the new user-friendly on-line system will be much quicker, simpler, and less costly than the existing paper-based system, and that the new approach to amateur radio will drastically reduce licensing costs and the "unnecessary bureaucracy" of the current system.

The UK approach to amateur radio licensing is completely different from that of any other country in the world! Although the license is called a lifetime license, it must be "validated" by the holder at least once every five years "...for spectrum management and administrative purposes."

It will be the licensee's responsibility to ensure that personal information in the licensee database is accurate. Ofcom will prompt license holders with an electronic (e-mail) reminder after five years of inactivity to ensure that the information is accessed and, if need be, updated. This validation process will enable Ofcom to determine that a license is still in use and the contact information is correct. All paper-based applicants will be reminded by mail.

Not all UK radio amateurs are in favor of the new system. Some thought Ofcom was trying to de-emphasize the importance of amateur radio and perhaps discontinue licensing altogether. However, Ofcom said that was not the case. It called amateur radio an "important hobby ... a key radio spectrum user group which it wishes to see prosper."

Ofcom added that Article 18 of the International Radio Regulations requires that users of the radio frequency spectrum be licensed. That's true, but individual licensing is not required by the ITU. Citizens Band licensees, for example, are authorized access to 27-MHz spectrum in the United States under a "blanket" licensing arrangement—that is, one "authorization" licenses all users. British radio amateurs wanted no part of that.

There will be no substantial changes to the current amateur radio legal framework in the UK other than the establishment of a lifetime amateur radio license. A paper license document will be made available for inspection by foreign administrations for radio amateurs who wish to operate overseas.

Lifetime licensing will have no effect on the radio enforcement. Ofcom will still take action against operators who cause interference by using improper equipment or operating without a license ... or outside the conditions of their license.

It will still be a requirement to pass an examination in order to obtain a specific license class, and Ofcom's licensing system will maintain a database of successful candidates. A license will not be issued unless the applicant is listed in the database. As of 2003, all UK amateur radio examinations are administered under the auspices of the Radio Society of Great Britain (RSGB).

There are three levels of amateur radio licensing in the UK: Foundation, Intermediate, and Full privilege. Applicants may choose one callsign from the

*1020 Byron Lane, Arlington, TX 76012
e-mail: <w5yi@cq-amateur-radio.com>

available callsign block for the license class. At present, there is an annual £15 licensing fee (about $22.50 USD) for holders between ages 21 and 75. Many licensees want the fee continued, since they believe it would guarantee them a certain level of service and secure them spectrum rights. Ofcom said it was considering the fee issue in a separate proceeding.

Additional Changes in UK Amateur Radio

The new rules include some other changes as well. Station identification is now required "at least once every 15 minutes during net operations." Current amateur practice in traditional round-robin nets is to identify your station when it is your turn to transmit.

Another change due to come into force on October 1st is a relaxation of the regulations on unattended operation and remote control. After that date, UK Full license class holders will be allowed to remotely control an unattended station for their personal use. For example, they could run a home station from elsewhere or operate a remote-base system located at another site (this previously had not been permitted in the UK). The remote-control link can be a simple radio system on permitted amateur frequencies, or it can use any publicly available system, including dial-up, ISDN, the internet or even Wi-Fi.

In addition, all UK licensed amateurs will be allowed to use 10 mW on any amateur band to remotely control their station within a range of 100 meters. Under the new license structure, this will not be regarded as unattended operation.

Current UK amateur radio rules are spelled out in three separate "BR-68" booklets, one for each license class. "Amateur Radio Terms, Conditions, and Limitations" (BR68) is the UK equivalent of our Part 97 rules. Effective October 1, 2006, the three different booklets are being combined into a single BR68, which has been rewritten in easier-to-understand language. BR68 is considered part of the license and must be kept at the main station address.

The new BR68 also removes the requirement that UK radio amateurs keep a radio station log. The new regulations require log-keeping only when specifically requested by Ofcom. In practice, however, most amateurs will probably continue to keep logs, especially for HF contacts.

Amateur radio "variations" (officially called a Notice of Variation), including authorizations for repeaters and internet gateway connections, will remain free.

Except for new access to the 10-meter band for entry-level Foundation licensees, the change from annual to lifetime licensing does not confer use of any additional frequencies. The new 10-meter (28.000–29.700 MHz) allocation for Foundation Class operators, with maximum 10 watts PEP, is also effective October 1, 2006.

Foundation license holders have access to all bands between 136 kHz and 440 MHz and all modes, but strangely were denied access to the Amateur Satellite Service. The UK is the only country to deny its entry-level license holders use of the Amateur Satellite Service. However, this may be coming to an end. It appears that Ofcom soon may permit Foundation licensees to access the Amateur Satellite Service.

UK License Fees

The decision on the separate license fee issue was released on July 19. Ofcom said it will distribute free lifetime paper licenses to all existing licensees

whose licenses are valid on October 1, 2006. License holders whose renewal date is before October 2006 will still have to pay for their license renewals in the usual way.

After considering public input, Ofcom said, "There continues to be a good case for providing free electronic lifetime licenses to amateur radio licensees who use an online web-based licensing system."

New licensees applying after this date must pay £20 (about $30 USD) for a paper lifetime license. Online amateur radio license applications made over the internet at the Ofcom website, however, will be free. Applicants wishing to take advantage of the "no fee" online system must first register their personal licensing information.

The majority of British radio amateurs were in favor of free, self-service internet licensing, but some expressed concern that the new system could lead to a further deregulation of the amateur radio hobby.

In its formal comments, the RSGB opposed Ofcom's proposal to charge a fee for a paper license but not for an application filed via the internet. They called that arrangement "discriminatory." RSGB said, "The license should be free for all applicants or a fee should be charged," adding, "It is the feeling of a great number of UK licensees that their efforts and achievements are being devalued by the proposed removal of fees."

Some respondents were particularly concerned about removing the current concessions for free licenses for amateur radio licensees under 21 or over 75 years of age. In compromising, Ofcom said it has now decided not to charge a fee for applicants age 75 years or over who apply for a license by mail. Applicants under age 21 will still be subject to a £20 paper-license fee.

Ofcom said research showed that 86% of UK amateur license holders have access to the internet, especially most younger applicants. The agency added that applications can also be filed free over the web at public libraries, internet cafes, or from a friend's or relative's computer.

"The advantage to Ofcom in receiving internet applications is that the whole process can be done on-line with minimal intervention from Ofcom staff. Postal applications are resource intensive to manage, and the purpose of levying the £20 charge is both to reflect the costs and to deter applications from being made this way."

There was also a fear that free licenses would ultimately lead to a reduction or elimination of service for amateur radio in terms of spectrum planning or enforcement. Ofcom said that was not the case and that there was no direct relationship between license fees and management of the Amateur Radio Service. The soon-to-be-discontinued license fees merely recovered the administrative cost incurred by the Radio Licensing Centre (RLC), which, effective in September, will no longer be used.

In an official statement, Ofcom said that the changes to the fees would "significantly benefit individuals, saving them time and money, reducing the administrative burden on spectrum users, and simplifying the application process." The agency is now in the process of implementing the new regulations, which will become effective October 1. 73, Fred, W5YI

ASTRON CORPORATION
9 Autry Irvine, CA 92618
(949) 458-7277 • (949) 458-0826
www.astroncorp.com

...POWER ON WITH ASTRON

SWITCHING POWER SUPPLIES...

E151765 E151765

MODEL SS-10TK

MODEL SS-12IF

SPECIAL FEATURES:

- HIGH EFFICIENCY SWITCHING TECHNOLOGY SPECIFICALLY FILTERED FOR USE WITH COMMUNICATIONS EQUIPMENT, FOR ALL FREQUENCIES INCLUDING HF
- HEAVY DUTY DESIGN
- LOW PROFILE, LIGHT WEIGHT PACKAGE
- EMI FILTER
- MEETS FCC CLASS B

PROTECTION FEATURES:

- CURRENT LIMITING
- OVERVOLTAGE PROTECTION
- FUSE PROTECTION.
- OVER TEMPERATURE SHUTDOWN

SPECIFICATIONS:

INPUT VOLTAGE: 115 VAC 50/60HZ OR 220 VAC 50/60HZ SWITCH SELECTABLE

OUTPUT VOLTAGE: 13.8VDC

AVAILABLE WITH THE FOLLOWING APPROVALS: UL, CUL, CE, TUV.

MODEL SS-18

DESKTOP SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1⅞ x 6 x 9	3.2
SS-12	10	12	1⅞ x 6 x 9	3.4
SS-18	15	18	1⅞ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅝	4.2
SS-30	25	30	3¾ x 7 x 9⅝	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9⅝	4.2
SS-30M*	25	30	3¾ x 7 x 9⅝	5.0

MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25	20	25	3½ x 19 x 9⅝	6.5
SRM-30	25	30	3½ x 19 x 9⅝	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅝	6.5
SRM-30M	25	30	3½ x 19 x 9⅝	7.0

MODEL SRM-30M-2

2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30-2	25	30	3½ x 19 x 9⅝	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅝	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

CUSTOM POWER SUPPLIES FOR RADIOS BELOW

EF JOHNSON AVENGER GX-MC41
EF JOHNSON AVENGER GX-MC42
EF JOHNSON GT-ML81
EF JOHNSON GT-ML83
EF JOHNSON 9800 SERIES
GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
UNIDEN SMH1525, SMU4525
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

CIRCLE 134 ON READER SERVICE CARD

NEW SWITCHING MODELS

SS-10GX, SS-12GX
SS-18GX
SS-12EFJ
SS-18EFJ
SS-10-EFJ-98, SS-12-EFJ-98, SS-18-EFJ-98
SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

the weekender

BY PHIL SALAS,* AD5X

Attenuators for HF Receiver Performance Measurements

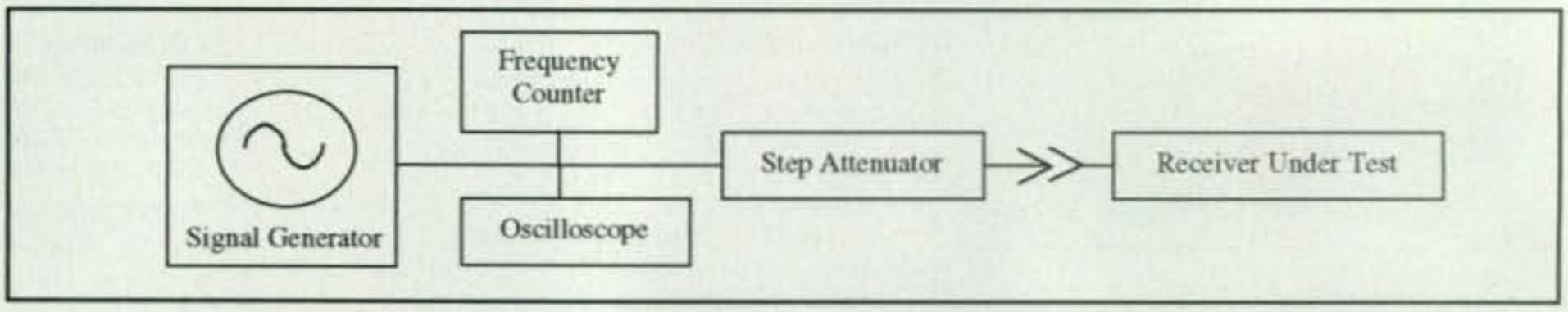


Fig. 1– The author's original receiver measuring setup.

How often have you wished that you could measure your transceiver's sensitivity, or at least check the S-meter readings? Well, it is not that difficult or expensive. This month we'll build two inexpensive attenuators that, along with an antenna analyzer, will let you check your transceiver's S-meter. Next month we'll extend this into a setup that will let you measure receiver S-meter tracking and receiver sensitivity, and make antenna gain comparisons.

A receiver measuring setup that I've used for quite awhile is shown in fig. 1. The oscilloscope is placed at the signal generator output, and then I rely on the attenuator accuracy to set the level. However, this setup is pretty pricey for most hams.

Like many hams, I own an antenna analyzer. In a moment of inspiration, I put my oscilloscope across the 50-ohm terminated output of my MFJ-259B and measured a constant 2-volt peak-to-peak output level across the 1.8–30-MHz HF range (my oscilloscope's 35-MHz bandwidth prevented me from accurately measuring the level above 30 MHz). I contacted MFJ and found that all MFJ antenna analyzers are designed to have a constant 2-volt p-p output level over their entire frequency range (antenna analyzers from other vendors may be different). This means that many of us already have a good broadband signal generator with an internal frequency counter and a constant RF output level. Also, with a constant known output level, we really no longer need an oscilloscope! Now let's see what we can do with this knowledge.

First, we'd like to inject a 50 µV rms (root mean square) signal into a receiver, which is the generally accepted S9 signal level. To do this, we'll begin with a little math. The 2-volt p-p signal from the MFJ-259B can first be converted to rms as follows:

$$V_{rms} = V_{p\text{-}p}/(2\sqrt{2}) = 2/(2\sqrt{2}) = 707 \text{ millivolts rms}$$

So to get a 50 µV (50×10^{-6} volts) signal, you need the following attenuation:

$$\text{Attenuation}_{dB} = 20\log(0.707/50\times10^{-6}) = 83 \text{ dB}$$

83 dB . . . Wow! How do we get this much attenuation? I did this by breaking the attenuation range into two steps: 52 dB and 30 dB. I know, this doesn't quite add up to 83 dB, but it actually turns out to be 82.3 dB using standard resistors, and being within

*1517 Creekside Drive, Richardson, TX 75081
e-mail: <ad5x@arrl.net>

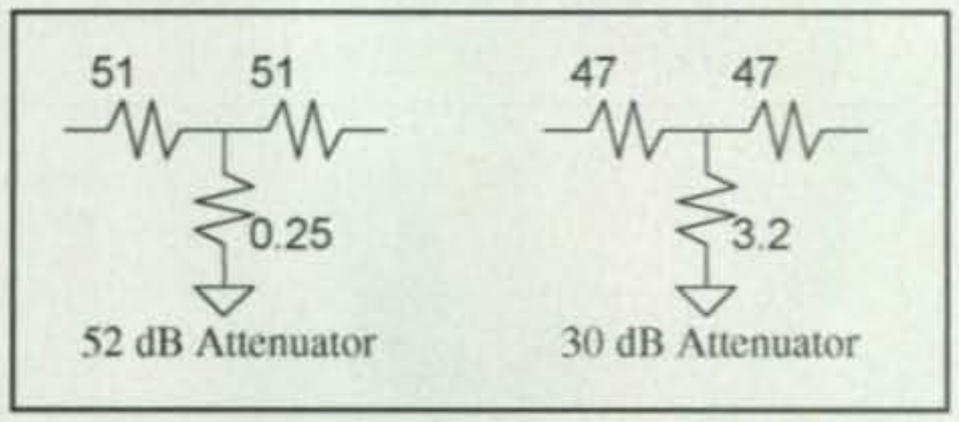


Fig. 2– 52-dB and 30-dB fixed attenuator schematics.

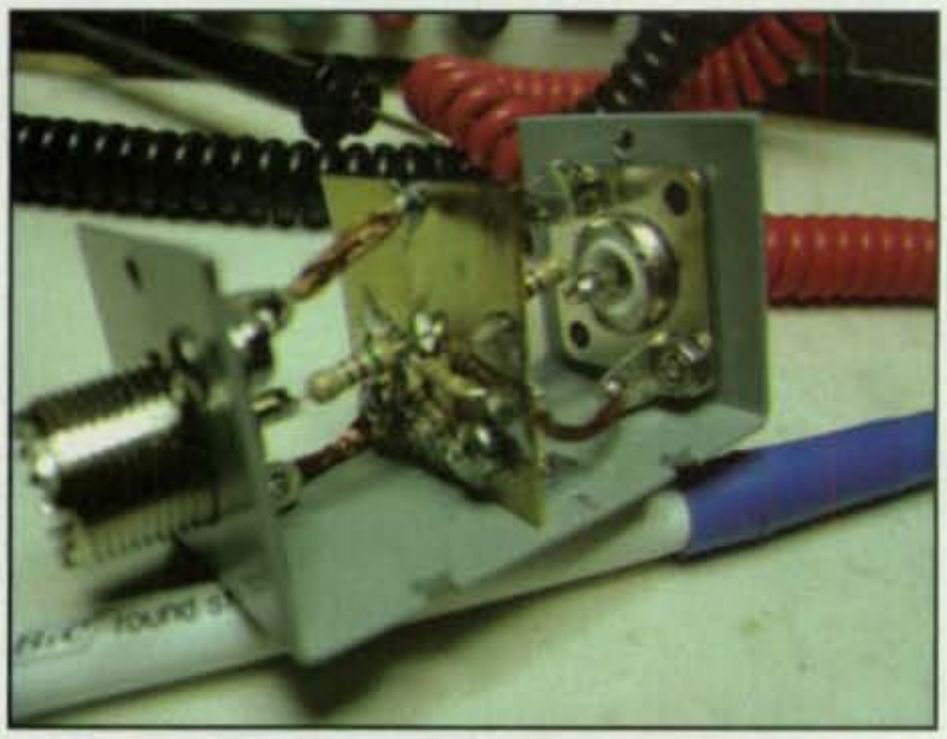


Photo A– 52-dB attenuator construction. Note the four parallel resistors to ground (four 1-ohm resistors giving 0.25 ohms).

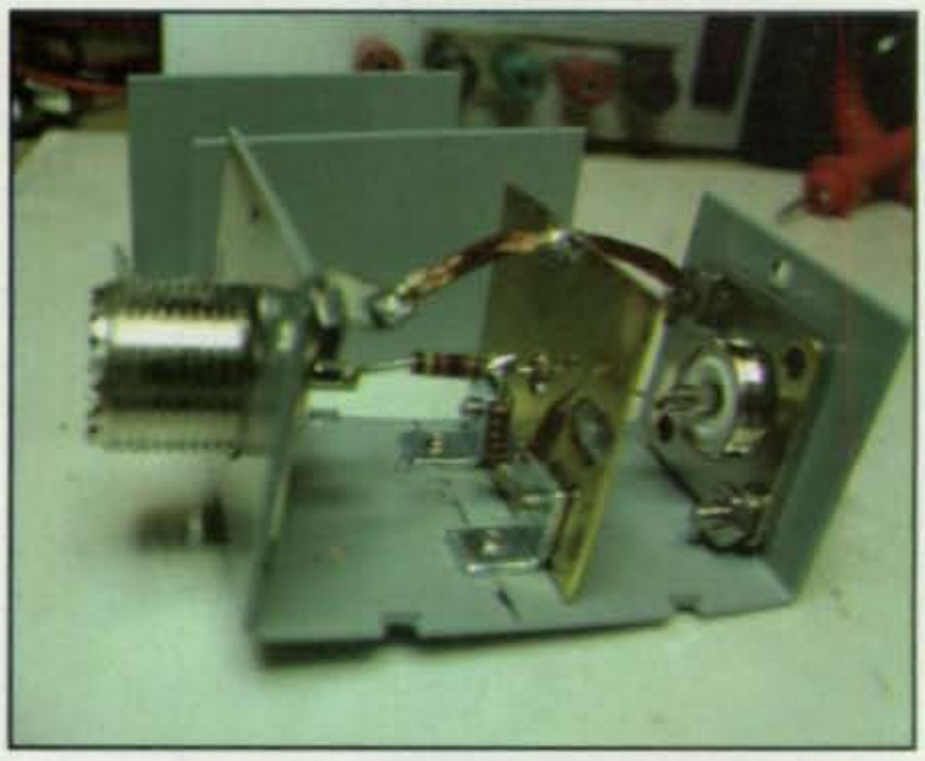


Photo B– 30-dB attenuator construction.

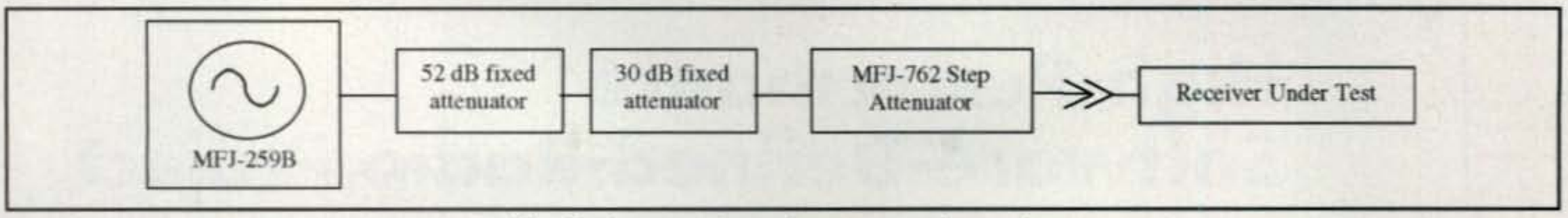


Fig. 3– Low-cost receiver measuring setup.

Quantity	Description	Source	Price Each
2	Small metal box	Mouser 537-M00-P	$3.63
4	1Ω 1/4-watt resistor	Mouser 30BJ250-1.0	$0.22
2	51Ω 1/4-watt resistor	Mouser 30BJ250-51	$0.22
1	3.2Ω 1/4-watt resistor	Mouser 30BJ250-3.2	$0.22
2	47Ω 1/4-watt resistor	Mouser 30BJ250-47	$0.22
4	Mounting bracket	Mouser 534-612	$0.23
4	SO-239 connector	Mouser 523-83-1R	$3.29
Misc.: #4 hardware, solder lugs, braid, brass plate			

Table I– Attenuator parts list (includes both 52- and 30-dB attenuator parts).

Photo C– Low-cost measuring test setup.

Photo D– IC-703 S-meter reading with 52-dB fixed attenuation in-line.

1 dB should be accurate enough for most of us. These levels of attenuation are easily achieved using standard leaded 1/4-watt resistors if your measurements are limited to 160 through 6 meters. For receiver measurements above 6 meters, you should consider getting a good wide-range step attenuator.

The very simple attenuator schematics are shown in fig. 2, and the parts list is shown in Table I. The 0.25-ohm resistor is made by paralleling four 1-ohm resistors.

I mounted a small brass plate to isolate the input and output of the attenuators, as can be seen in photos A and B. The brass sheet was purchased at my local ACE Hardware store and is mounted in the box with the brackets called out in the parts list. Using standard 5%-tolerance components, your attenuators will be within 1 dB of the desired value, assuming worst-case tolerance limits on the parts. Typically, you'll be within 1/2 dB.

As discussed earlier, these two fixed attenuators give you a 50-µV signal when used with the MFJ-259B (actually, 1 dB less, but 1 dB will not be discernable on most S-meters). To begin with, I made some 20-meter measurements on my IC-703. Of course, the S-meter on the IC-703 is a relatively coarse bargraph indication. I put the 52-dB and 30-dB attenuators in series as shown in fig. 3. The step attenuator shown was set to 0 dB and was not used in these tests.

I'll have to admit, I was stunned when the IC-703 S-meter showed S9—just what it should read! The setup and the IC-703 S-meter reading photos are shown in photos C and D.

That's it. For only about $10 worth of parts you can make attenuators that will permit you to start making some basic receiver measurements. Next month we'll look at extending this into measuring S-meter tracking, receiver minimum-discernable signal level (MDS), and antenna-gain comparison measurements. For those measurements, you will need a step attenuator with at least a 70-dB attenuation range. I use the MFJ-762. However, another alternative is a 111.5-dB step-attenuator kit from <N5SFX@aol.com>. This kit is $59, shipping included. Hmmm . . . another weekend project for you! Until next month . . . 73, Phil, AD5X

digital connection

BY DON ROTOLO,* N2IRZ

High-Performance Software-Defined-Radio Project

Software is everywhere today, even in our radios. In some cases, it *is* the radio, with software rather than circuitry defining all operating parameters, such as frequency and mode. I first wrote about *software-defined radios* (SDRs) back in October 2003, exactly three years ago. At the time, the SDR-1000 from Flex Radio Systems was in its infancy as one of the first SDRs available to amateurs.

One of the greatest advantages of the SDR-1000 can also be one of its greatest disadvantages: You need a computer equipped with a sound card to make it work. The advantage is that you probably have one already, and modern computers are quite powerful in relation to their cost. The disadvantage, of course, is that you need one, complicating things such as Field Day and mobile operations. Even if I could power it up, I would not enjoy lugging my multi-gigahertz mid-tower up to some mountaintop for backpack QRP fun. Plus, when you get into the high-performance realm, the bandwidth of the sound card also becomes a limiting factor.

Some amateurs interested in high-performance SDRs noticed that AMSAT was building an SDR for satellite use, which, if you consider it, is a great idea, since you can upload a new radio whenever necessary. Using that idea as a base, the HPSDR project was born. Some key members of that group include Phil Covington, N8VB, Lyle Johnson, KK7P[1], Bill Tracey, KD5TFD, and Phil Harman, VK6APH.

The High-Performance Software-Defined Radio (HPSDR) project is an all-volunteer venture, presently with some support from AMSAT-NA, to create a high-tech modular platform for a very flexible SDR. It was started as a full open-source project, including not only software, but hardware and FPGA (field programmable gate array)[2] logic as well, to encourage and facilitate involvement from the greater ham community.

How Open Source Works

A brief word about open source: The basic premise is that all of what would normally be secret information—source code, hardware details, PC board layouts, etc.—is made freely available to anyone who wants it. Not only are you allowed to make changes and improvements, but you are encouraged to do so, with the explicit understanding that you must release whatever you did back to the community. There is no such thing as "proprietary" or "secret" information.

Many hams are familiar with the GNU Public License for software. The HPSDR folks decided to also include the hardware and FPGA logic under the same provisions, something that's a unique and commendable action. It might not seem like a recipe for success, at least in the commercial world, but in fact, you get a much better product, since you attract a large number of qualified and interested developers whose motivation is not pecuniary, but instead an advancement of the art or personal recognition. It's also a really great way to learn about new technologies.

The HPSDR project is not only unique in its open-source approach, but also in its modular approach as well. Instead of a monolithic all-in-one design, a passive backplane (like a simple PC motherboard) was developed into which different functional modules can be plugged, kind of like a child's LEGO® set approach. Since this backplane module will literally and figuratively be "supporting" all of the other modules, it was named **Atlas**, after the Greek god who carries the world on his shoulders.

Depending upon the different modules you connect to the backplane, the HPSDR hypothetically can support many different functions beyond radio, such as spectrum analysis. I say hypothetically, because someone still has to design and produce those modules. While the HPSDR is much more than mere vaporware (a term meaning it's only in someone's imagination), it's also not quite ready or complete either. Development of the major modules is currently under way around the world, with many more ideas very near the horizon.

Of course, to facilitate the first prototype steps, Atlas was the first board to be completed, especially since it required no software. It is merely a power source, communications path, and mechanical support for future modules. Designed by Phil Covington, N8VB, it has provision for six active modules of a standardized size (100 × 160 mm) and connector type (DIN 41612). One really nice thing is that it uses the ubiquitous and readily available personal computer power supply (AT or ATX style) as its power source. Recycling at its finest, it sure beats dropping old power supplies into a landfill.

Before I discuss some of the other boards being developed, just a note on the basic design process: Unlike a commercial design, where management selects a project leader and lets marketing specify the functionality, in the open-source world it's a bit different. Basically, it starts when someone proposes an idea and is named the project leader. He/she then develops something and presents it to the community, which offers con-

*P.O. Box 114, Park Ridge, NJ 07656
e-mail: <n2irz@cq-amateur-radio.com>

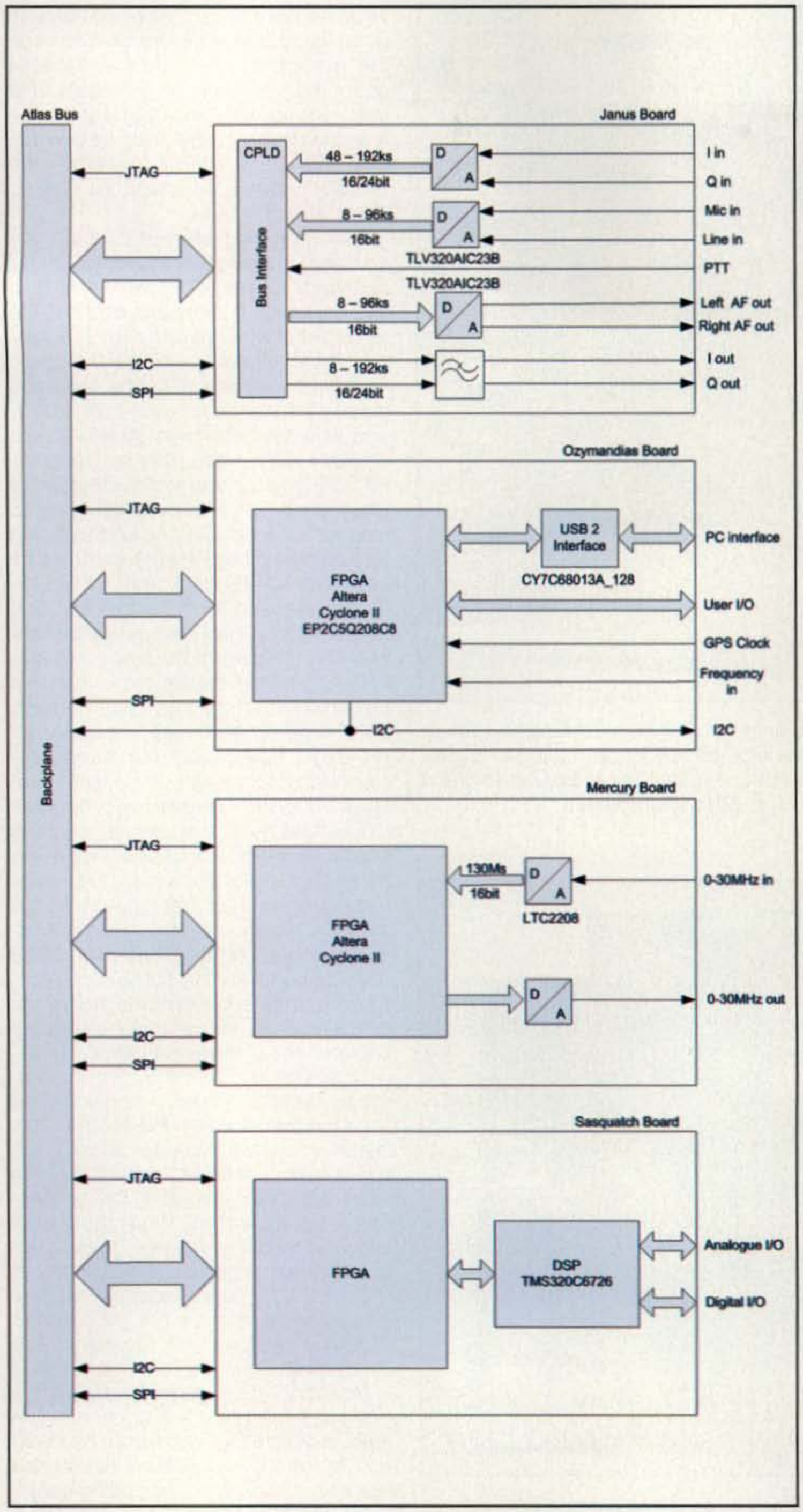


Fig. 1– The block diagram of the HPSDR project. The Atlas backplane carries the signals between the Janus, Ozymandias, Mercury, and Sasquatch boards. A flexible and modular architecture allows for modifications, upgrades, and experimentation. See text for more info. (Diagram courtesy of VK6APH)

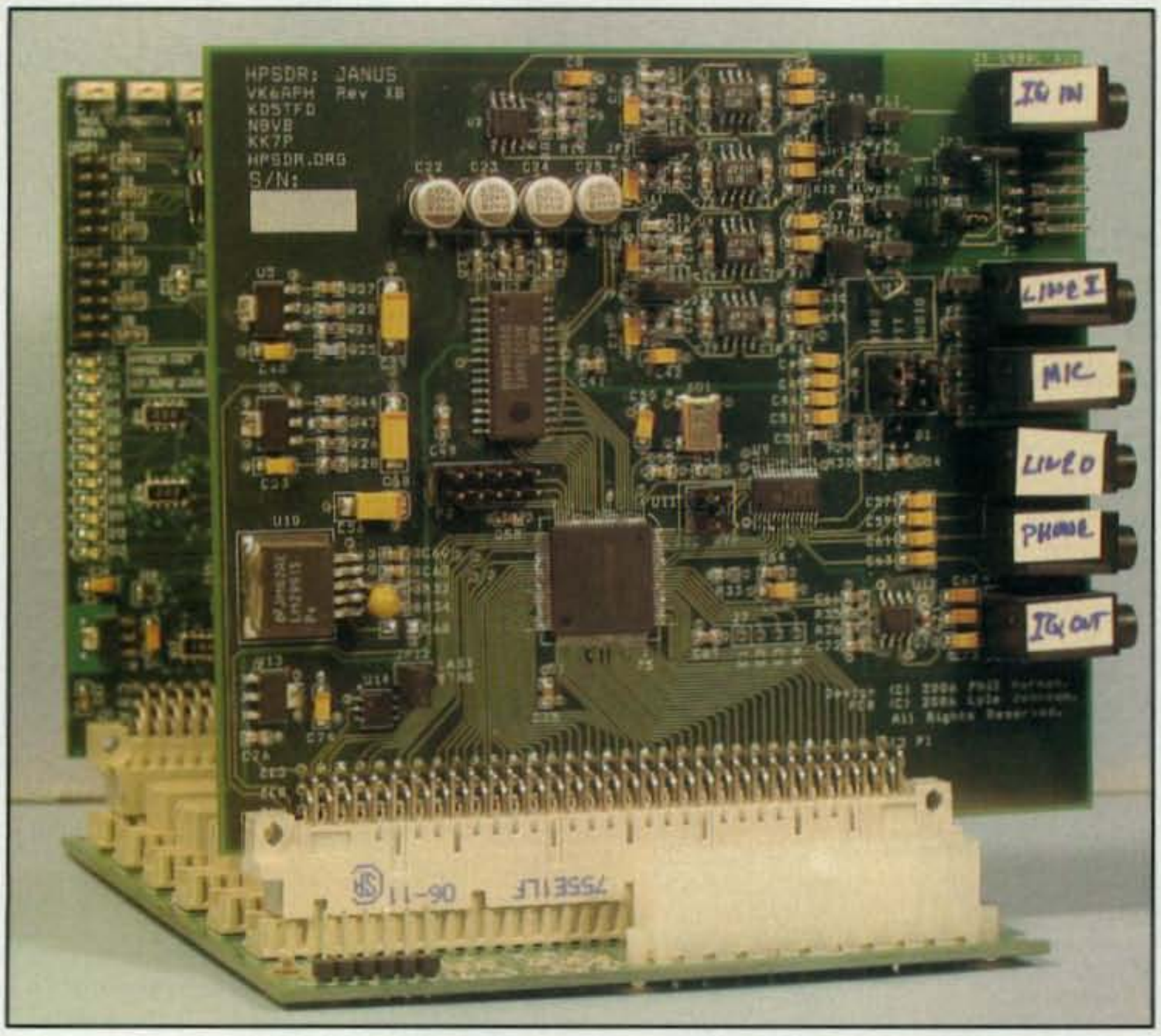


Photo A– A view of the Janus board connected to the Atlas backplane, with an Ozy board in the background. Janus is the high-performance Analog-to-Digital and Digital-to-Analog board, while Ozy is the controller. These boards form the heart of the HPDSR system. (KT5TFD photo)

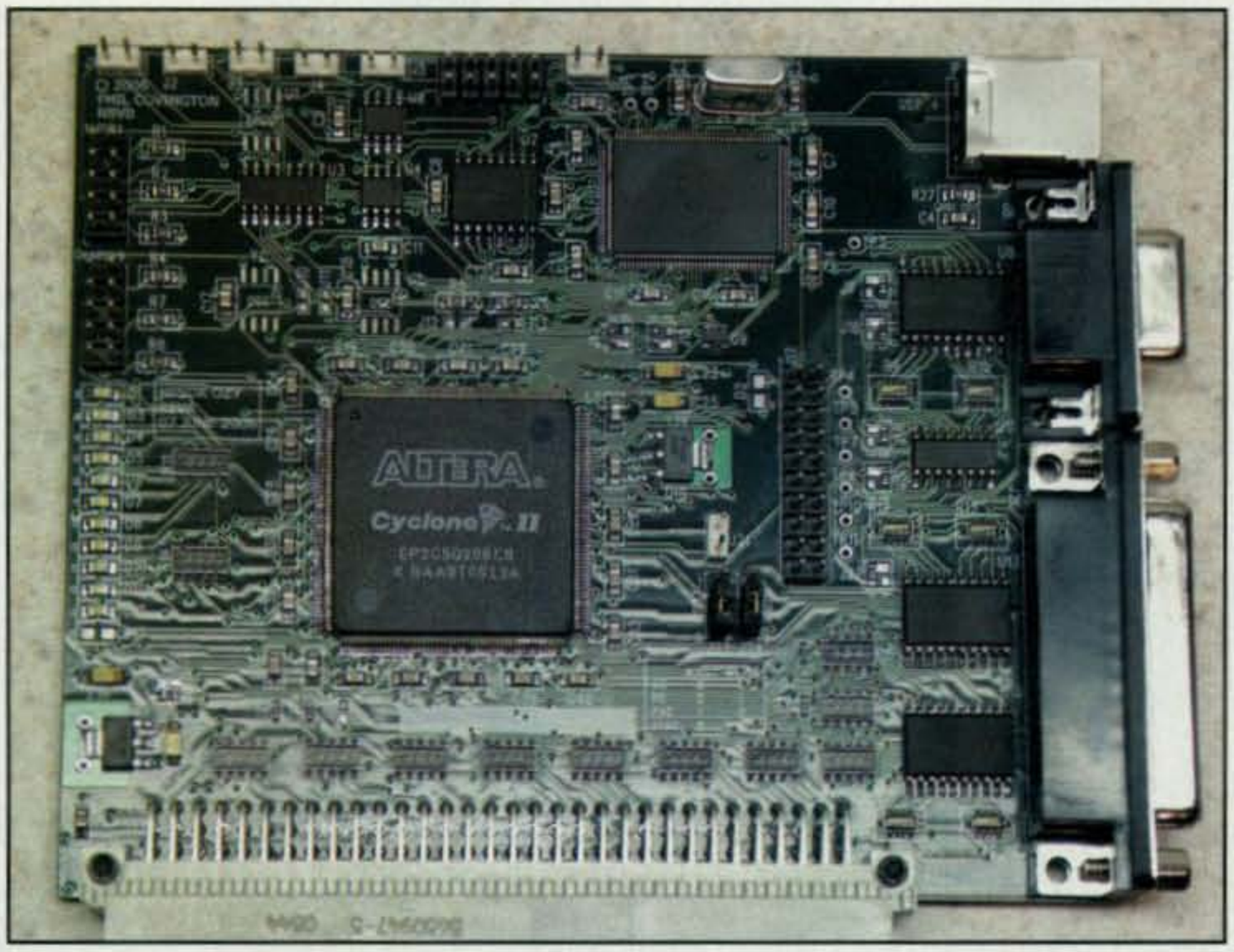


Photo B– A close-up view of the Ozymandias board, the "king" and controller of the HPSDR, as well as the interface to the "real world." The Altera Cyclone FPGA dominates the Ozy board; the other large IC is the Cypress USB 2.0 interface with an integrated 8051 processor. Also visible are the USB, serial, and parallel ports to the right, and the Atlas connector at the bottom. (N8VB photo)

structive feedback and helps identify potential pitfalls. The designer revises the design and repeats the cycle of gathering feedback. This repeats until everyone agrees the design is absolutely perfect (rare), or the designer decides that enough is enough (usually) and actually builds a prototype for testing. Thus, a card is born.

Following the Greek God theme, the next card in line is **Ozymandias**, or Ozy for short. Ozymandias was a king in ancient times, and the Ozy board is the module that will control the HPSDR system. It can interface with a PC through a USB 2.0 interface, supports serial and parallel interfaces for user-defined I/O, and was also designed by N8VB. Essentially, Ozy is the path between the HPSDR and the real world. One particularly important feature is its ability to measure the various crystal oscillators used within other HPSDR modules by using the 1 PPS clock from a GPS receiver, allowing for the correction and stabilization of radio frequencies with a very high degree of accuracy and stability, of which microwave operators will be particularly fond. The design centers on a *field-programmable gate array* (FPGA)[2], specifically the Altera Cyclone II, which greatly simplifies management of the complex logic required.

The next module is **Janus**, who has two faces and thus looks both ways. As we know, the real world is analog (quantum physics notwithstanding), while our software works in a digital world. High-performance Analog-to-Digital (A/D) and Digital-to-Analog (D/A) converters running in full-duplex are the main point of this module. Janus serves as the link between the analog and digital worlds.

Once Ozy and Janus were in the prototype stage, the need was discovered for a special module—**Pinocchio**. This is a passive board extender, allowing the board module to extend farther from the Atlas backplane, allowing the connection of test equipment. When the boards are connected normally, there isn't enough room for an oscilloscope probe!

Some other boards that are starting development, but are not yet past the proposal stage, are **Mercury** and **Sasquatch** . . .

Mercury: The god of speed, this board is a full 16-bit A/D converter running at 130 MHz. Those familiar with A/D technology will realize that means this board is close to the cutting edge.

Sasquatch: Not a Greek god, but a mythical creature nonetheless, also known as Bigfoot or the Abominable Snowman. This module is envisioned as a high-performance digital signal

processing board, replacing the functions performed by the personal computer in sound-card-based SDR designs. Based on a TMS320 core, it also uses an FPGA for logic, and has its own on-board flash memory and a CAN Bus channel.

Some other proposed boards, which are still in the discussion stage, are:

Horton, the Dr. Seuss character with large ears, is a receiver module. (You have to read the story.)

Gibraltar, a model of stability, is a system reference oscillator which uses GPS to discipline its internal oscillator.

Casmir is a transmitter board which takes the data from Janus and sends it as RF. Based on the Analog Devices AD834X modulators, this board will come in four versions, covering different parts of the radio spectrum from DC to 2.5 GHz.

Finally, there is **Proteus**, the prototype board. Possibly the most exciting module of all, this is envisioned as an essentially empty board with some basic power supply hardware having the right size, shape, and connector to interface with the Atlas board. Designed specifically to encourage experimentation, it's a perfect platform for prototypes.

That's the basic idea of the HPSDR project: getting lots of people involved, being on the cutting edge of the Radio Art, and having a ton of fun doing it. As I wrote this (late July 2006), TAPR (Tucson Amateur Packet Radio) was making bare Atlas boards and component kits available at <www.tapr.org> and has committed to do the same (and perhaps more) for the other boards as they get ready for kitting. Of course, you are welcome (and encouraged!) to download the PC-board designs and have boards made for yourself. Remember, everything's open source.

To learn more about HPSDR, and to get involved, visit <http://hpsdr.org>. The HPSDR "wiki" (reachable from the hspdr.org page) is where the designers post the latest news, successes and ideas.[3] As mentioned earlier, this project is getting some support from AMSAT under its Eagle project and will be considered by the AMSAT Board for inclusion in the 2007 budget. TAPR is also providing support as the storefront for the hardware and kitting.

As many readers already know, I am a long-time member of TAPR, and I encourage others to also support this group. For all the good TAPR does for the amateur community—not just digital—I feel that my membership dues are the least I can do.

On the other hand, while I believe in

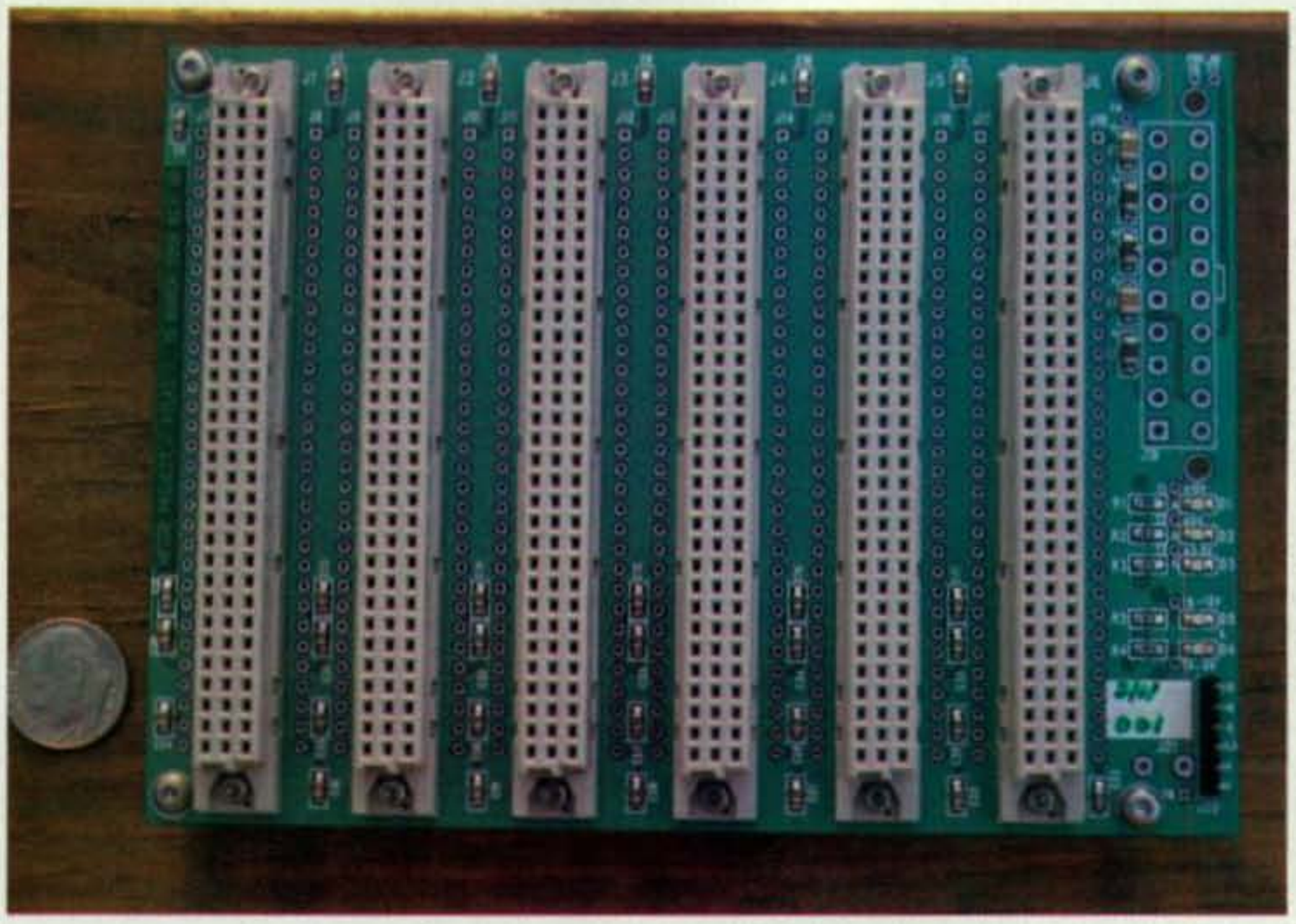


Photo C– A view of the Atlas board (Serial No. 001) without the power-supply connector mounted. As a passive backplane, its job is to provide a signal path between modules, along with power distribution and mechanical connection. The board was designed to (re)use a computer power supply (AT or ATX), which is an environmentally (and wallet) friendly choice. (N8VB photo)

AMSAT's mission, I have not been a member—until now. Although the idea of satellites for hams is great, it was an aspect of our hobby that carried little interest for me. Oh sure, I supported AMSAT in its quest to get APRS moved off 145.79 many years ago, but that was then, and this is now. Because I strongly believe in the HPDSR project (and have always been a fan of AMSAT), I became a member online this week. I encourage you to join AMSAT and support its work as well. Even if you don't become a member, a small donation in support of its work (such as HPSDR) would be most welcomed. Visit <www.amsat. org> and click on the membership link today.

Encryption Revisited

After August's column on the legality of encryption in amateur radio, I decided to stick to a low-controversy topic this month. Some of the comments received were, let's say, emotional. Believe me, I was just as skeptical as anyone, perhaps even more so, but I am convinced after the conversations I had that the information is accurate. Precisely because no official statement has been issued yet, I cannot name names, but rest assured that *CQ* magazine would not have printed it if I didn't have darn good proof of my assertions. Although only time will tell how it all works out, with the aforementioned APRS switch (for which I received a large number of "emotional" messages) it turned out just as I reported it then, and I think it will end up that way again.

Until next time, when we have a look at some books I've been reading . . .

73, Don, N2IRZ

Notes

1. Lyle Johnson, KK7P, gave a talk on HPSDR at Dayton 2006. It may be viewed or listened to at the HPSDR website, <http://hpsdr.org>.

2. FPGA is an abbreviation for a *field programmable gate array,* which is a small lump of silicon with a lot of connecting pins. In the old days, we'd develop a logic diagram and implement it in a large pile of discrete 74xx TTL logic chips. A modern FPGA has all kinds of logic functions embedded within it, and using some design tools you can select these functions, connect them as necessary, and create a very powerful, yet simple and cost-effective custom logic chip.

3. For those unfamiliar with the term, a "wiki" (which is nothing like a "wookie"), is defined by webopedia.com as "A collaborative Web site compris(ing) the perpetual collective work of many authors. Similar to a blog in structure and logic, a wiki allows anyone to edit, delete or modify content that has been placed on the Web site using a browser interface, including the work of previous authors."

CQ Books, Videos & CDs

HR Anthologies

$19.95 ea.

Buy all 4 for only $75

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

Homebrewing Techniques ..... *Order # AHOME*
Test Eqpt & Repair Techniques...*Order # ATEST*
Antennas - 1968 - 1972 ... .*Order # ANTS1*
Antennas - 1973 - 1975 ....*Order # ANTS 2*
All 4 for $75 and FREE Shipping ...*Order # ASET*

W6SAI HF Antenna Handbook

by Bill Orr, W6SAI

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

Order No. W6SAI **$19.95**

Blow Out SALE! videos

~~$12.95~~
NOW ONLY $9.95 ea.

Buy all 7 for your Club for only $59.95

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

The NEW Shortwave Propagation Handbook

Now Available!

by W3ASK, N4XX & K6GKU
A comprehensive source of HF propagation principles, sunspots, ionospheric predictions, contains photographys, charts and tables galore!

Order No. SWP **$19.95**

Heathkit - A Guide to the AR Products

by Chuck Penson, WA7ZZE
This greatly expanded Second Edition is a must for collectors and Ham history buffs! Pick up this 328-page volume and you won't be able to put it down!

Order No. HEATHKIT **$29.95**

The Short Vertical Antenna and Ground Radial

by Jerry Sevick, W2FMI
This small but solid guide walks you through the design and installation of inexpensive, yet effective short HF vertical antennas. Antenna restrictions a problem? This book could keep you on the air!

Order No. SVERT **$10.00**

MIL SPEC Radio Gear

KOREAN WAR TO PRESENT DAY
by Mark Francis, KIØPF

Detailed write-ups for many familiar sets: PRC-25/-77, RT-68, PRC-1099, GRC-106, GRR-5, R-392 and more.

Over 230 pages of operation, modification, and maintenance tips and info,including 200+ illustrations.

Ancillary equipment, useful hints and mods, how to find surplus, and much, much more!

Order No. MILSPEC **$27.95**

2007/08 NOW on SALE!

CQ's 2007/08 Calendars

This year's calendars are better than ever! Choose one or both of these great 15 month calendars!

January 2007 through March 2008

Still only $10.95 each!
Calendars will ship 10/09/06

Ham Radio Operators Calendar
15 spectacular color images of some of the hobby's biggest, most photogenic shacks, antennas, scenics & personalities.
Order No. HRCAL

Classic Radio Calendar
Features 15 all-new, magnificent, full-color vintage radio images you're sure to enjoy!
Order No. CCAL

Understanding, Building & Using Baluns & Ununs

by Jerry Sevick, W2FMI

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

Now Available!

Order No. 2BU **$19.95**

Ham Radio Magazine on CD

Brought to you by CQ & ARRL

Enjoy quick and easy access to every issue of this popular magazine, broken down by years!

Three sets, each containing 4 CDs -

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

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

FREE Shipping & Handling with every $75 purchase!

Name _____ Callsign _____

Street Address _____

City _____ State _____ Zip _____

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

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

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

Popular Communications, 25 Newbridge Rd., Hicksville, NY 11801/516-681-2922; Fax 516-681-2926

Order Toll-Free 800-853-9797

magic in the sky

BY JEFF REINHARDT,* AA6JR

Behind The Scenes at Dayton

As a ham, now and again you may get to attend a big regional hamfest or maybe even the Dayton HamVention®. As you make your way through the entrance, you are ready to be dazzled by the many displays of new equipment, the vendors large and small who are ready to show you the latest wonders, and the retailers who are slugging it out to make the sale. Then it hits you . . . "Wow! I wonder what it would be like to be in the ham industry? To travel from show to show in distant cities and meet folks in every town?"

As one who's "been there, done that" I can share a few insights and give you a glimpse of what's "behind the curtain."

Fun? Well, Kinda . . .

My trip to Dayton 2006 started after a full day of "regular" work on Wednesday. I then packed, tossed the travel bags into the car, and drove 35 miles to Los Angeles International Airport to catch the "redeye" to Chicago. Arriving suitably early for check in, I was amused to see '70s rock & roller Edgar Winter also checking in for a flight, while members of his entourage handled all the details. Not so for the ham roadie!

After a longer than usual wait to clear security, it was up to the waiting area, where I was joined by a few hundred others hoping to nap their way to Chicago. While reading a magazine, I was greeted by Eric, a store manager for a major ham retail chain who was making the same flight to also work at Dayton. We chatted and passed the time, swapping gossip and wondering if the Dayton weather would be favorable, if the higher gasoline prices would keep some folks away, and whether or not those in attendance would be in the mood to buy products at this year's show.

After the interminable boarding process, it was time to settle in, and after getting airborne, slip on the noise-canceling headphones, hoping they were effective in nulling out the requisite cranky infant. I'm one who just dozes on airplanes, and this night was no different.

We arrived in Chicago after about an hour of some mild turbulence and waited for the connecting flight over a roll and coffee. Eric was going directly to Dayton, while my next flight was to Indianapolis, where I would do some business, rent a car, and drive two hours to Dayton through a frightful thunder and hail storm, with the broadcast radio barking out tornado watches and warnings for communities that I had no clue as to their location. At one point I pulled off the road, fearing the two-inch hail would damage the rental car's windshield.

Arriving at Dayton in the early afternoon, it was time to pick up the pre-shipped goodies at the hotel and transport them to Hara Arena, where I also had to pick up vendor credentials and then move the needed items to the booth, which only had a few tables and chairs. The next few hours were devoted to setup; fortunately, the folks at our booth are experienced and knew the drill. Around the arena, vendors big and small were doing the same. The huge corporate displays required fork lifts and large crews; the retail vendors were stacking boxes of expensive radios, hoping most would be carried out by eager buyers. There is almost always the challenge of a forgotten item, something damaged in shipment, or some type of malfunction. Somehow it all got sorted out, and then it was time to return to the hotel to get cleaned up and head out for dinner, followed by an early encounter with the pillow in anticipation of a busy weekend ahead.

After a long day on the Hara Arena sales floor, the crew from Ham Test Online relaxes at an industry reception. (Photos by author)

Showtime!

Opening day at Dayton is a mixed bag, as bad weather can force most folks inside the arena to the detriment of the outside "flea market" vendors who have paid their money but will make few sales. On the other hand, nice weather means a slower start for the arena dwellers. This year the outside vendors lucked out and the arena was off to a slower start, which was okay in that it allowed for more "quality time" with prospective customers.

There was ebb and flow throughout the day, answering questions, doing demonstrations, and keeping the booth tidy. At some point there was a gulp of water and time for a quick bite of lunch, but that is not always the case. With Murphy usually lurking about, there's sure to be a glut of customers the moment you take a bite of that slice of pizza or barbecue sandwich. This year, as in other years, there was the occasional chance to renew an old

*5904 Lake Lindero Drive, Agoura Hills, CA 91301
e-mail: <aa6jr@cq-amateur-radio.com>

Big vendors, small vendors, they all work hard, and a smile goes a long way!

The Dayton Hamvention® few get to see—time to pack up and head home. Only 361 days until we come back!

friendship, but quite often the need to speak with a prospective customer trumped the personal chit-chat. Good old friends understand and move on.

Folks from our booth[1] checked with dealers selling our gear to make sure we had the correct "street" prices for those who asked, and we also needed to be sure the retailers had adequate supplies. Sometimes retailers change prices during the show. Sometimes you get an unexpected response to a product. Each year Friday gives us a very narrow window in which to air-freight in hot-selling items to be sure Saturday's anticipated demand is met. This year we were okay; last year we had to use the expensive air shipment option.

At the close of business Friday, our feet were sore and our bodies were tired. Then the second part of Dayton began—the mixing and mingling. For the large retailers, the big manufacturers often host gatherings where new product information is sometimes shared, along with the opportunity to relax a bit and socialize. Other folks may congregate at various watering holes and catch up on industry gossip.

Our crew waited 90 minutes for a table at the Lone Star, after which I headed back to the hotel for a stop in the lounge to chat. You can't party too hearty, however, as Saturday at Hara is a long one!

Day Two

In the morning it was up early, get dressed, and try to get a decent breakfast, because there was no telling when or if there would be a mid-day meal. Saturday at Hara is "the big show" and it's "make it or break it" for the vendors. This year in addition to sales presentations, there were contacts to make with members of the ham media who wanted to see what was new. Then we were off to do an interview on the low-power AM radio station that was broadcasting at the arena. On the way there and back we said hello to some of the other vendors we have come to know. At that point, most seemed to be happy with the turnout and buying patterns.

Working a show booth is a study in people. Most folks you meet are great. They are there to learn and have fun. Some are grumpy. Some are downright strange, like the person who popped his dentures while I was explaining a product to him. Some folks are looking for give-away goodies. Others want to study the product literature. This year one person had a product he had purchased seven years ago and wanted to know if it was still covered under warranty. "Why not?" Another wanted to buy one of our demonstration products, which we couldn't sell (we just show 'em; the dealers sell 'em).

In a lull, I took a break for a "pit stop" and then tried to get over to the CQ booth to represent this fine publication for a bit. Unfortunately, editor Rich Moseson, W2VU, was also out and about and we didn't hook up.

The day was long but went well. The crew was tired, but we had been invited to a reception Saturday night and it was a good one for food, people, and a chance to relax. Cinderella had until midnight, but this prince only made it to 11 PM.

Sunday

After a shower, we packed our bags and checked out of the hotel. We had a quick breakfast from a drive-up window and it was off to the show to tidy the booth and hope that the day would be busy. It started out okay but fell off quickly as folks headed for the drawings in the main arena or got an early start on the trip home. As the show wound to a close, as always there were some last-minute stragglers who seemed to be determined to be the very last person to visit a booth before security did its sweep.

It was then time for serious physical work, dismantling the display, carefully packing the demo goods, and getting all the boxes over to the UPS folks. It took several hours and was demanding. Everyone pitched in, and at last, it was done. The next task was getting on the road back home.

We returned the rental car, found the airline tickets, and hoped there were no weather delays, which is always a factor in the Midwest. After one show last year, we sat on a runway for over three hours, which is sure to mess up your connecting flight. Fortunately, this year the weather gods smiled on us and we were back in Los Angeles on time, home at around 11 PM, which was really 2 AM Dayton time and how my body felt as well! Monday morning, I would be at work, hoping to make it through the day without a yawn.

This time it was Dayton. The year may also involve trips to Dallas, Huntsville, Orlando, San Diego, Shelby, or who knows where else?

The point of all this is not to evoke sympathy; people who work trade shows for a living know what they signed on for. I pass it along so that when you visit the next show, you may have a bit more appreciation for the folks who work hard, hoping that you might enjoy using their products to put some Magic in the Sky.

73, Jeff, AA6JR

Notes

1. AA6JR attends Dayton as a manufacturer's representative; the bulk of his time is spent at that manufacturer's booth.

qrp

BY DAVE INGRAM,* K4TWJ

A Low-Power Fantasy Land

I have said it before, friends, but some things still warrant repeating. Spanning long distances with low power is a thrill of the best kind! Indeed, the skill of precisely timing calls/transmissions and the expertise of copying weak signals amidst QRM and QRN is a supreme accomplishment for operators on both ends of a QRP QSO.

A shining example of that fact is the recent unplanned and unscheduled 20-meter contact between Wayne Ginther, NM3B, in St. Mary's, Pennsylvania and Dennis Meech, G4PBK, in Plymouth, England. Wayne called CQ using a classic Tuna Tin II transmitter running only 200 mw (photo A), and Dennis answered him while running 5 watts and using a G5RV antenna. The resultant QSO was also more than a short exchange of signal reports; it continued on for seven minutes.

If that doesn't blip your key, consider the remarkable QSO success of Bill Parker, W8QZA (photo B). After several years of inactivity, Bill returned to the airwaves in 1989 running a vintage Heathkit AT-1 and VFO at 5 watts. One year later, he had worked 168 countries—on 20 meters—with an AT-1. Since that time, Bill has used an Argonaut 509, Index Labs QRP Plus, and (presently) a Yaesu FT-817. He has never even owned a 100-watt transceiver (serious QRP for sure!). Bill's antennas are a three-element beam at 32 feet, an inverted-Vee at 30 feet, and a 30-meter dipole at 25 feet. He has now worked 318 countries, all on QRP, and during most of that time he was busy with a full-time practice as an ophthalmologist specializing in cataract surgery.

In reflecting on the past, Bill especially remembers contacting the first-ever DXpedition to the Penguin Islands, located off the coast of Namibia. He worked them during a confused lull of an unruly pile-up the first night the group was on 20 meters CW. The next day he heard big guns discussing how difficult working the expedition would be and the odds of success.

More recently, Bill worked FT5XO, the DXpedition to Kerguelen Island, on 30 meters, an "oppo-

*3994 Long Leaf Drive, Gardendale, AL 35071
e-mail: <k4twj@cq-amateur-radio.com>

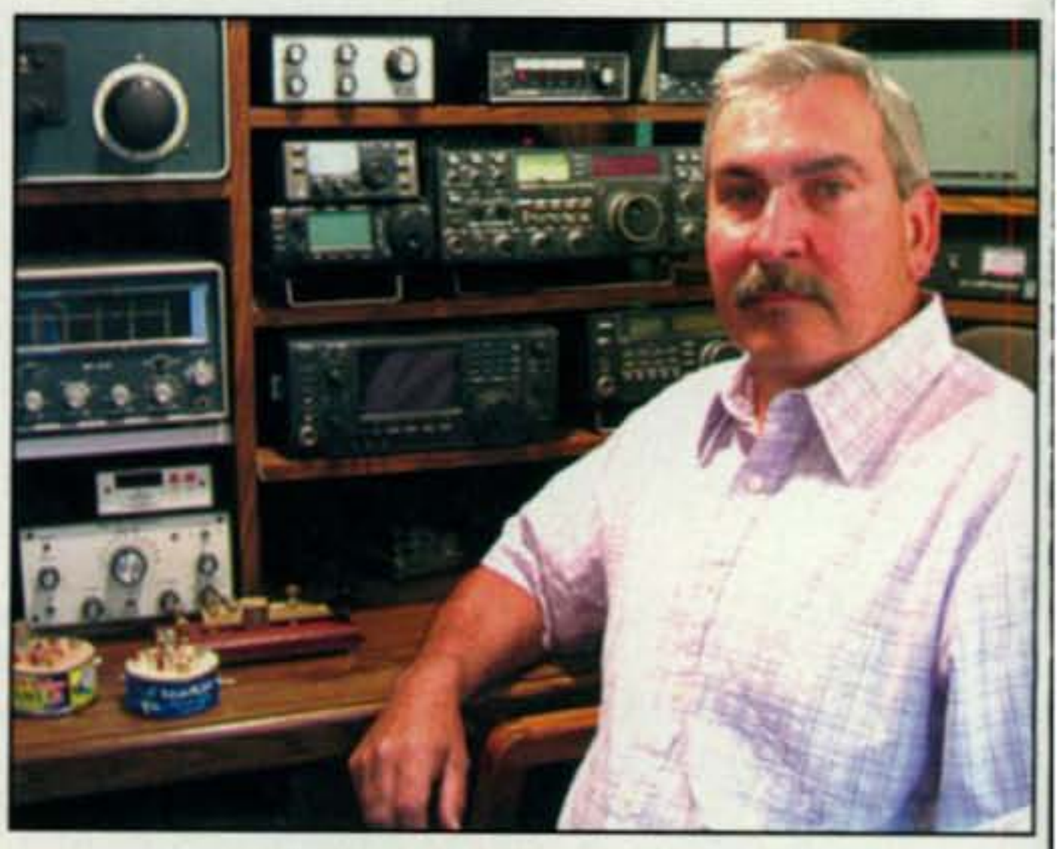


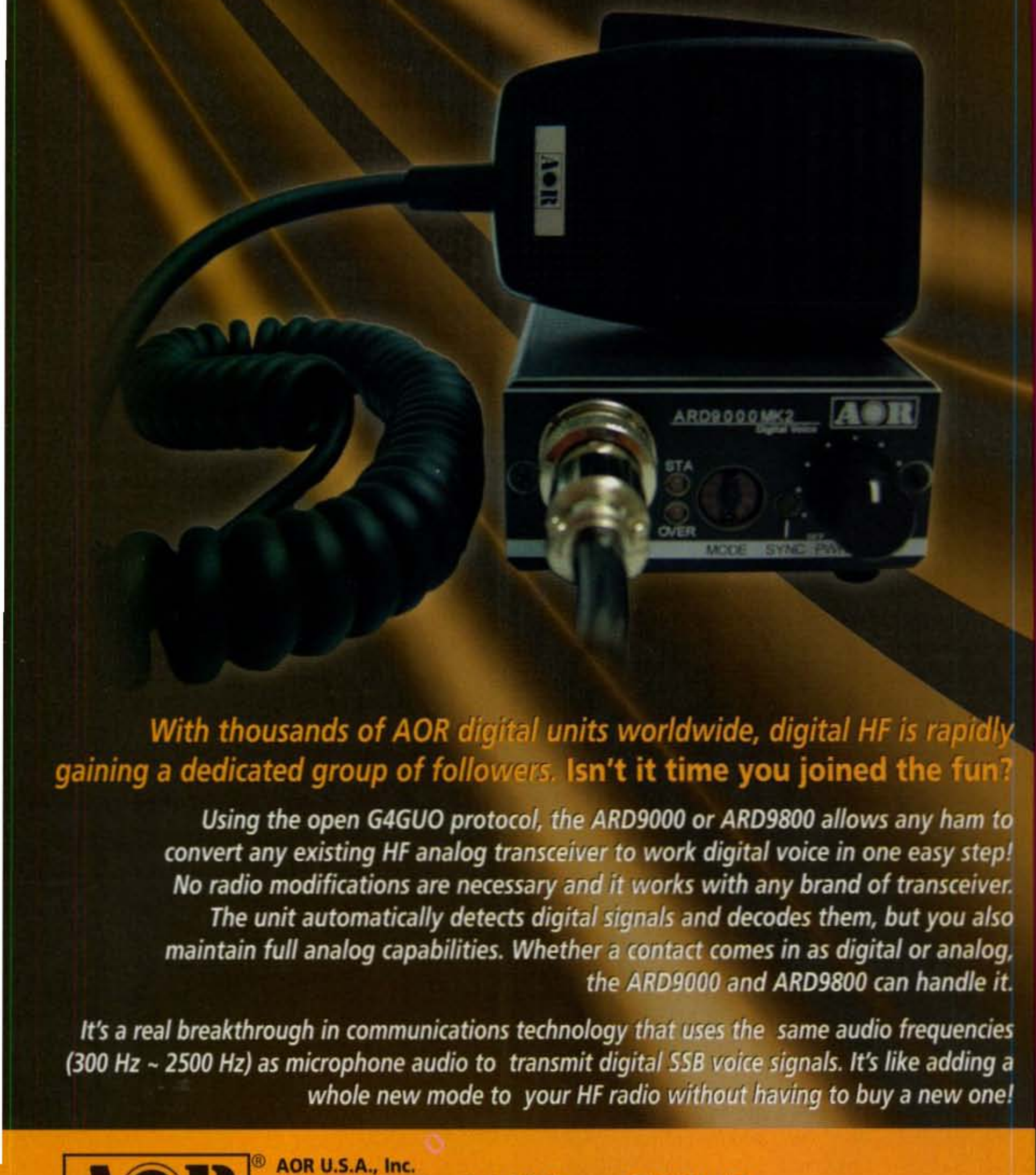
Photo A– The main items of interest/focus in this photo from Wayne Ginther, NM3B, are not the fancy big rigs, but the two little 200-mw Tuna Tin II transmitters on the desk. Wayne recently called CQ with one of them on 14.060 MHz and was answered by G4PBK in England who was running 5 watts and a G5RV antenna. It's true, friends: QRP romps! (Photo courtesy of NM3B)

Photo B– Meet long-time QRPer supreme Bill Parker, W8QZA. He has worked 302 countries on SSB, 297 countries on CW, and 92 countries on RTTY—all while using 5 watts or less and a modest antenna system. He has never even owned a 100-watt t ransceiver. Now that's what we call serious QRP! (Photo courtesy of W8QZA)

New ARD9000 MK2 steps up to the mike!

When you add digital capabilities to your existing HF rig with a new ARD9000 MK2, the advantages will come through LOUD and CLEAR.

AOR digital voice operators around the world are amazed at the audio quality delivered by the ARD9000 and ARD9800. Now AOR has improved the ARD9000 by adding a high quality speaker microphone with a traditional 8-pin round connector that lets you "go digital" with just a mike click. Its compact size makes the ARD9000 a favorite for backpackers who want to go HF digital while hiking or climbing. Of course, you don't have to leave home to enjoy the fun of clear DIGITAL contacts.



With thousands of AOR digital units worldwide, digital HF is rapidly gaining a dedicated group of followers. **Isn't it time you joined the fun?**

Using the open G4GUO protocol, the ARD9000 or ARD9800 allows any ham to convert any existing HF analog transceiver to work digital voice in one easy step! No radio modifications are necessary and it works with any brand of transceiver. The unit automatically detects digital signals and decodes them, but you also maintain full analog capabilities. Whether a contact comes in as digital or analog, the ARD9000 and ARD9800 can handle it.

It's a real breakthrough in communications technology that uses the same audio frequencies (300 Hz ~ 2500 Hz) as microphone audio to transmit digital SSB voice signals. It's like adding a whole new mode to your HF radio without having to buy a new one!

- ARD9000 MK2 for "voice only" operations
- 12V DC only operation
- Use the provided speaker-mic or your own high-quality audio mic. (rewiring mic input may be required)
- NO transceiver modifications necessary
- Digital voice communications using existing analog transceivers
- Works on Single Side Band (SSB) mode.
- Automatic digital receive
- Optional interface cables for most popular transceivers
- Built-in high grade Vocoder (AMBE)
- Built-in FEC
- Compact unit. Easy to operate.
- Utilizes a uniquely designed high performance DSP engine
- Uses the established G4GUO open protocol

Be sure to check the website at www.aorusa.com for FAQs, links to user groups and more!

Special Purchase Discounts Available for Ham Radio Clubs!

AOR®
Authority on Radio Communications

AOR U.S.A., Inc.
20655 S. Western Ave., Suite 112, Torrance, CA 90501, USA
Tel: 310-787-8615 Fax: 310-787-8619
info@aorusa.com http://www.aorusa.com

Photo C– Alex Grimberg, PY1AHD, has made over 500 DX contacts while operating personal portable with a Yaesu FT-817 and his water-tuned loop antenna shown here and described in the text. Notice the background, friends: That is a 38-meter tall statue of Christ overlooking Rio de Janeiro from atop Corcovado Mountain, which is the tallest point in the area. It is a world-famous landmark comparable to the Statue of Liberty in New York City, the Eiffel Tower, etc. (Photo courtesy of PY1AHD)

site side of the world" QSO. Bill called, but FT5XO went silent. No other stations called, but Bill sensed FT5XO was still listening. He continued calling and listening for a reply. After 15 or 20 calls, he heard "W6QZ." He sent his call six more times, then heard "W8QZ." After six more call repeats, FT5XO replied with "W8QZA." Bill says that QSO is a true example of the commitment required for serious QRP work by operators at both ends of the contact, and we fully agree. The operator(s) rather than the rig(s) makes the big difference with QRP! That's enough operating news and notes for this month. Now let's discuss gear and goodies!

PY1AHD Water-Tuned Antenna

One of the most unique portable antennas we have seen in many years is the small water-tuned loop devised by Alexandre Grimberg, PY1AHD (photos C, D, E, and F and fig. 1). Alex uses the loop with his Yaesu FT-817 for HF Pack, or "walk and talk" QRPing, and he has made over 500 DX QSOs with the antenna over the last four years. That is an impressive achievement!

What are the special attractions of a loop antenna? It is quite compact, works well at low heights, is tunable over a wide frequency range (such as 10–40 meters), and does not require a counterpoise. Many QRPers surely will want to study or homebrew a copy of the PY1AHD loop antenna. Alex agreed to share its general details with readers of this column. I should also point out the PY1AHD loop is open to a number of mods or variations, so feel free to make changes as desired to fit your needs.

The loop is 31.8 inches in diameter and comprised of a 100-inch length of RG-213 coax cable with its center conductor and shield connected together at both ends. This produces a nice highly conductive loop without the weight and expense of aluminum tubing or copper strapping as used in commercial loops. The loop can be tuned from 10–20 meters with an approximate 5–50 pFd "butterfly"-type variable capacitor connected to the "pigtail leads" from each end of the RG-213 cable's braid. A 180–pFd fixed capacitor is clip-lead-added in parallel with the variable capacitor for 40-meter operation. The tuning capacitor is the heart of this antenna's design, so more details on it follow our general overview.

The main (large) loop acquires RF energy from, or is RF excited by, a small interloop approximately one fifth the size of the main loop, or 6.3 inches diameter. Any large-size wire capable of supporting itself or holding its shape (such as a 19.75-inch length of #12 or #14 solid-copper wire) works fine here. A plastic pipe or tube approximately 35 to 40 inches long and 1 inch in diameter serves as a support for the loops and the tuning capacitor. Three plastic cable

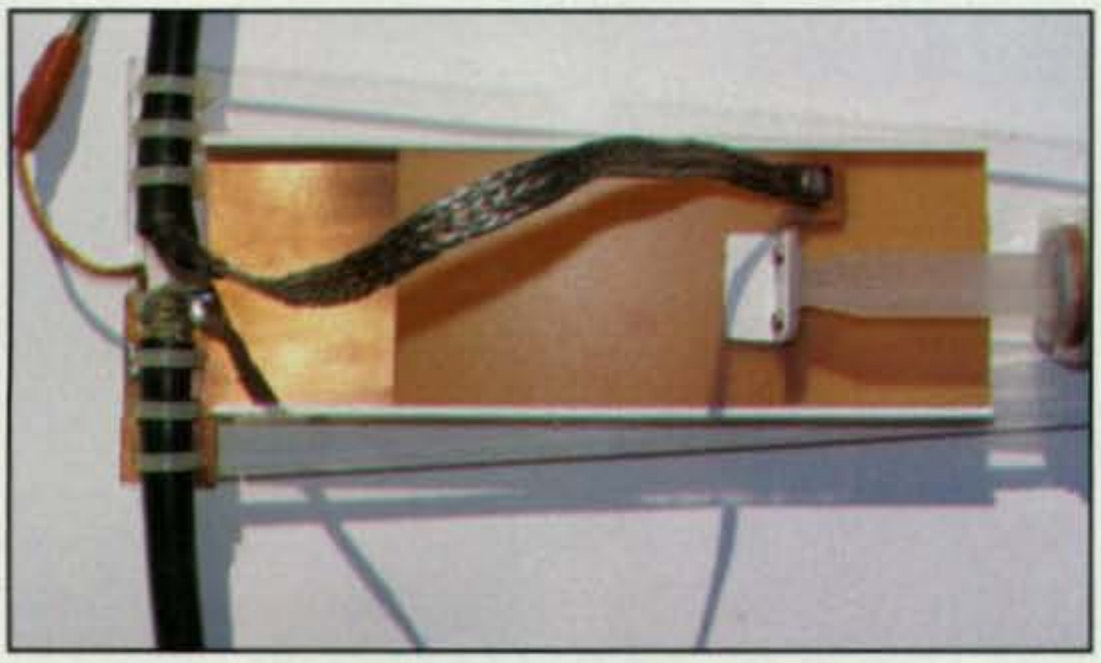


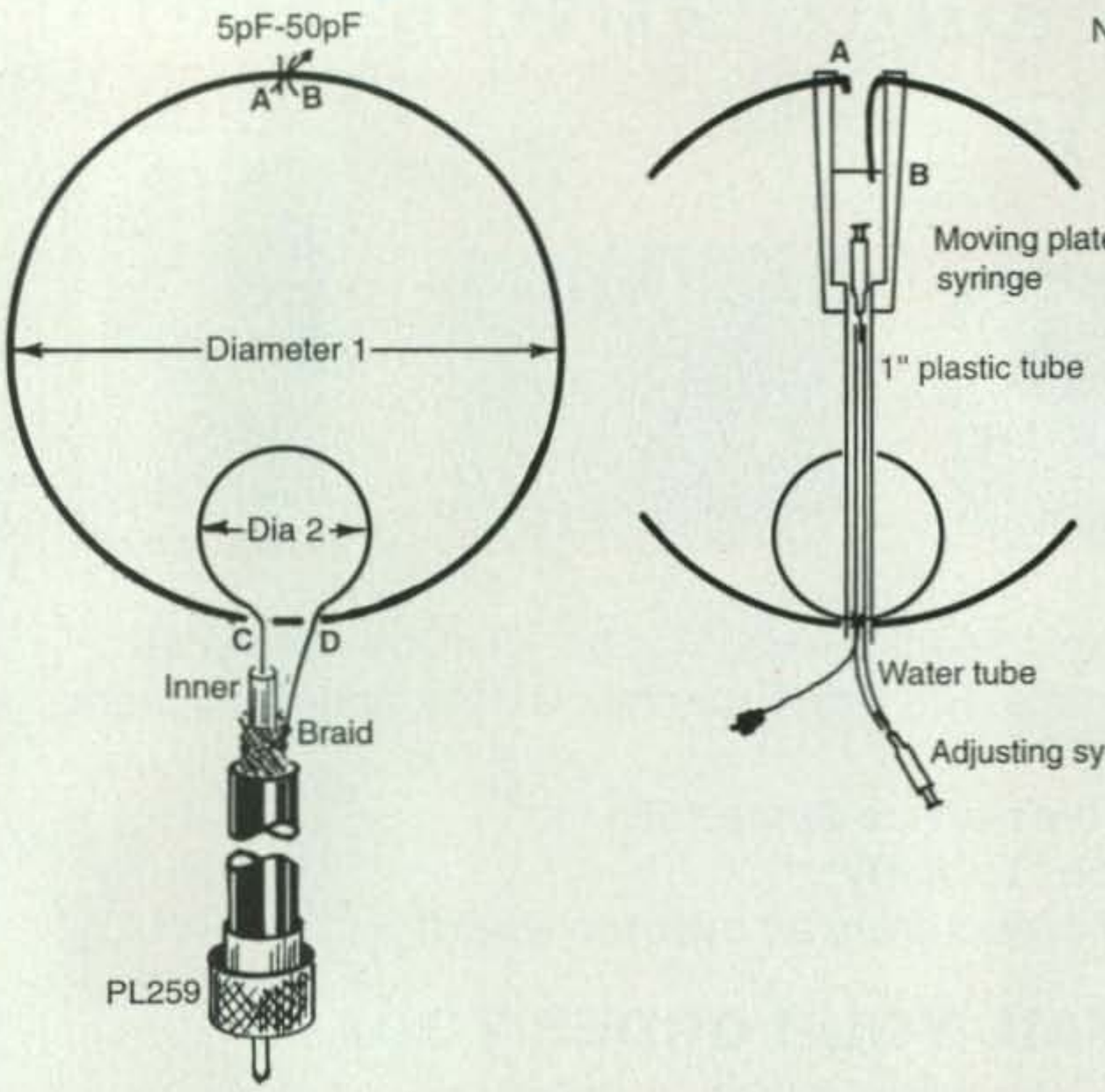
Photo D– The homebrew 5–50 pFd tuning capacitor at the top of the loop antenna is made by sandwiching two pieces of copper-clad PC-board material in plastic "U"-channel guides available from hobby stores nationwide. The shield from each end of the loop connects to each piece of PC-board material. The bottom piece is stationary; the top piece slides/remote-tunes according to the position of the syringe, as discussed in the text. (Photo courtesy of PY1AHD)

Photo E– A second syringe marked in megahertz is fitted with a belt clip and connected to the loop-mounted syringe via a plastic tube filled with water. This is the view looking down from Alex's shoulder. (Photo courtesy of PY1AHD)

ties secure the loops in place on the mast. In exchanging notes with Alex, I learned that he has made more than 30 different types of magnetic loops (he obviously has good insight to what works and what doesn't), and this one is the best of the pack.

As previously mentioned, the main loop is tuned to frequency (and minimum SWR) with a variable capacitor connected between pigtail leads from each end of the main loop. A regular, but large, tuning capacitor might be pressed into service here, but bear in mind that electrical losses will be present at the rotor's friction-fit contact point, and a capacitor with two fixed plates and no "friction-fit" point (such as a butterfly type) sidesteps that loss. Creative-minded and mechanically inclined amateurs might devise their own butterfly by using two identical 50- or 100-pFd variables with only the stator plates removed from one and mounted above the stator plates of the other. Then when the (common) rotor is moved or rotated out of mesh with one stator, it goes into mesh with the other stator by an equal amount. There is one other small hitch here: Hand capacity can affect capacitor tuning, so a remote plastic cable, a pair of selsyn motors, etc., should be included in this arrangement. PY1AHD went a couple of steps further here by fabricating his own low-loss variable capacitor with remote tuning to boot.

Details of the PY1AHD water-adjusted capacitor are included in photo D and fig. 1. It is comprised of two pieces of copper-clad PC-board material. The fixed plate is 58 mm by 180 mm, or 2.28 inche by 7.0 inches, with a short (approximately .5 inch) strip for soldering the loop's braid/shield to the end. The moving plate is 58 mm by 70 mm, or 2.8 inches by 2.75 inches, with a similar short solder strip at its back area. Two pieces of plastic "U" channel guide (Plastruct #90583 available at most hobby stores) are super-glued to each side of the fixed capacitor plate, and then the sliding/tuning plate is inserted in the U channel. An L-shaped acrylic support is also glued to the sliding plate, and the plunger end of a 20-milliliter syringe fitted onto the loop's support mast/pipe. A similar syringe with home-fabricated belt clip serves as a remote tuning aid. After the setup is filled with water, moving the belt-clipped syringe moves the remote syringe, which in turn



NOTE:

There are no electric joints between the main loop and the inner loop, only proximity (inductive coupling).

Outer loop:

Conductor length (point **A** to **B**): 100" (254 cm)

Diameter 1: 31 7/8" (80.8 cm)

Inner loop:

Conductor length (point **C** to **D**): 19 3/4" (50.2 cm)

Diameter 2: 6 5/16" (16 cm)

Fig. 1– Diagram of the physical assembly and precise dimensions of PY1AHD's loop. The homebrewed tuning capacitor has one 2.28-inch by 7-inch fixed plate and one 2.28-inch by 2.75-inch sliding plate.

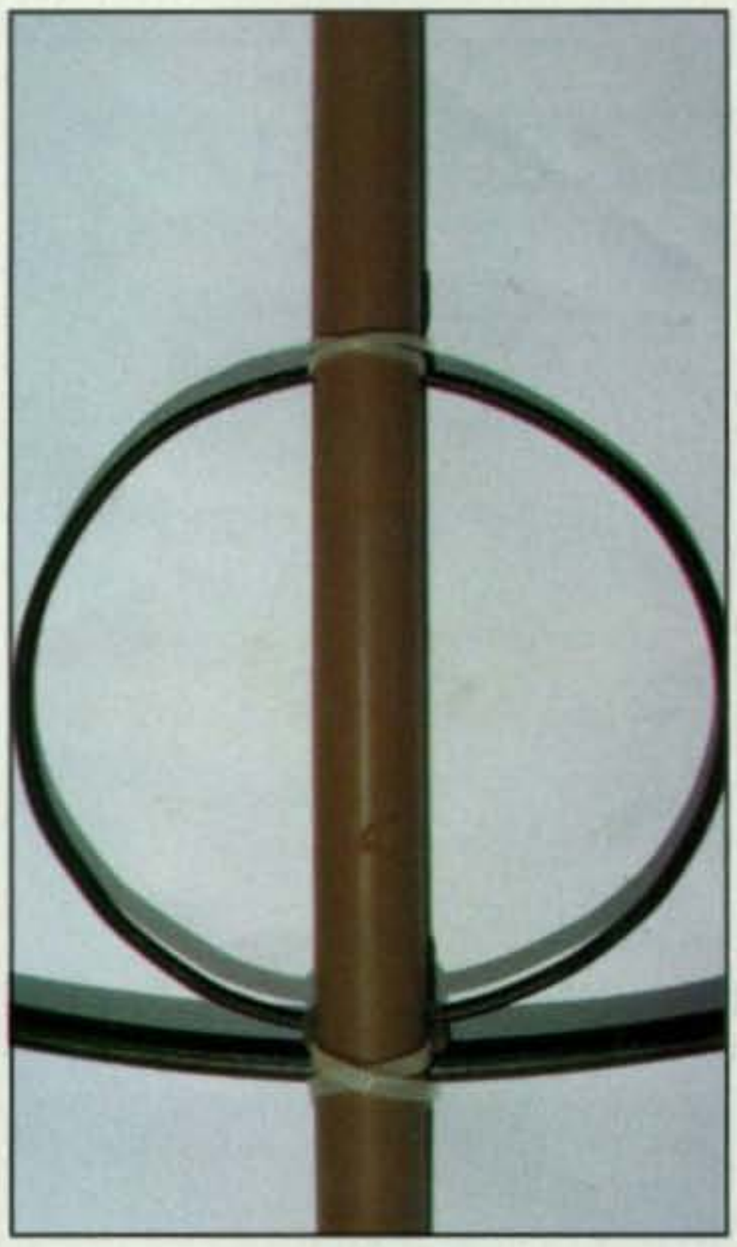


Photo F– This view shows how the small loop is secured inside the large loop with cable ties to a plastic support mast. There is no electrical connection between the loops; only inductive coupling is used. (Photo courtesy of PY1AHD)

Photo G– Some of the neat mini rigs Dennis Payton, N9JXY, built and installed in Altoids® tins. Included in this view are: the famous W7ZOI Micro Mountaineer transceiver (second from top on left), a WE6W Pixie transceiver (bottom center), an 80-meter transceiver, a 40-meter Rockmite above it, and a digitally tuned transceiver (upper right). (Photo courtesy of N9JXY)

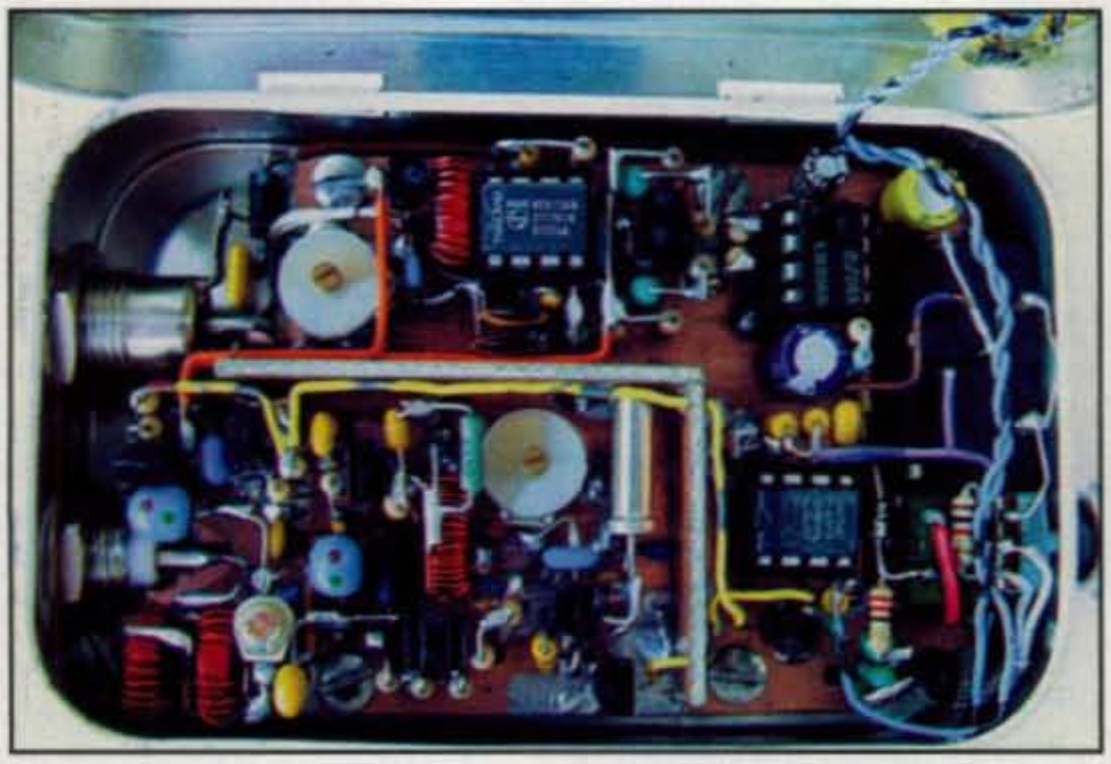


Photo H– Close-up view of N9JXY's Micro Mountaineer. Notice how every wire is precisely formed and every solder joint is perfect. It's sheer electronic art for sure,and the little rig works well to boot. (Photo courtesy of N9JXY)

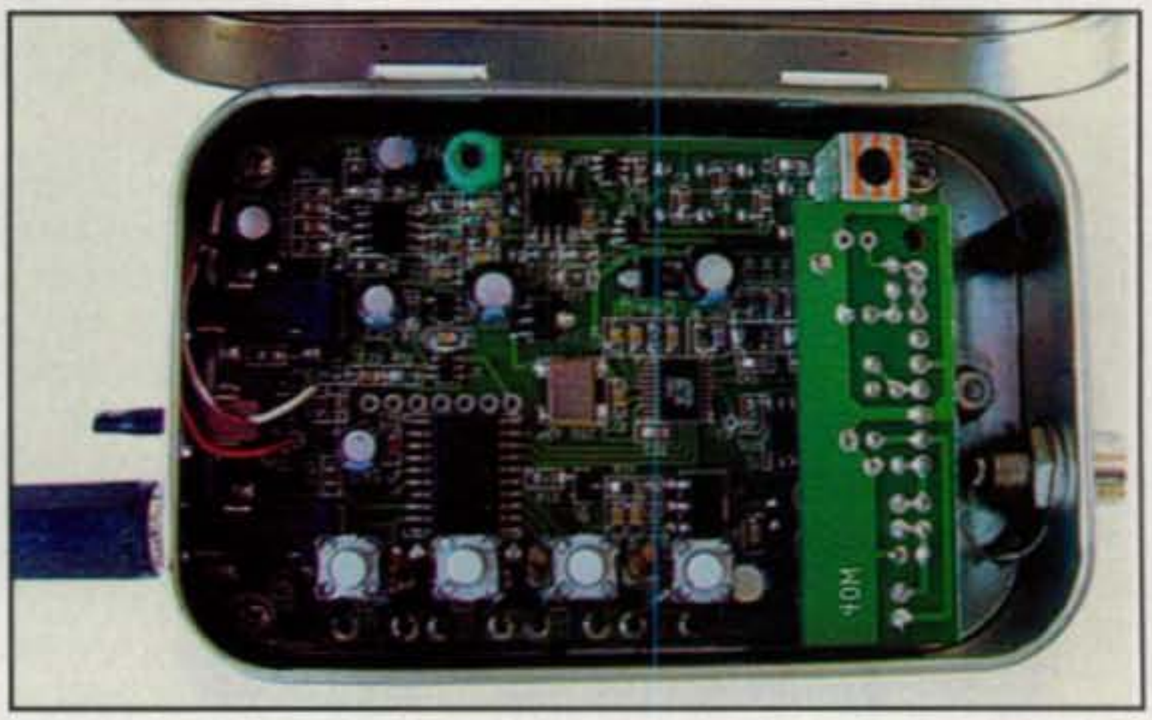


Photo I– Interior view of the digitally tuned and band-selectable transceiver shown in photo G. The four pushbuttons in the lower area are up/down tuning, RIT, and menu selections. Have you ever seen such a remarkable example of home brewing in surface mount? (Photo courtesy of N9JXY)

moves the capacitor's plate for frequency tuning. Clever!

Finally, we should point out that small magnetic loops are sharp-tuned with quite narrow bandwidth. They thus require retuning for highest receive sensitivity and lowest transmit SWR with each frequency change. On the good side, they also act like a front-end filter and preselector to reduce electrical noise and improve rejection of adjacent-frequency QRM. If you have questions or comments on this neat loop, incidentally, you can e-mail Alex at <py1ahd@ig.com.br>. We are sure he will enjoy hearing from you.

Dazzling Homebrew

One of the most popular enclosures for homebrew projects among QRPers near and far is Altoids® tins, and no one recognizes that fact more than Dennis Payton, N9JXY (photos G, H, and I). This chap has squeezed at least a dozen different mini-transceivers, keyers, antenna tuners, and SWR monitors into the little red-and-white boxes, and his handiwork is amazing. Consider, for example, the classic Micro Mountaineer Mini Transceiver shown in photo H. The original Micro Mountaineer was housed in a box as large as two Altoids tins, but Dennis shoehorned it to fit in one and even included a Jackson Harbor keyer to boot. Using the keyer's beacon mode, Dennis can operate the rig—call CQ, shift frequencies, etc.—with a single pushbutton he mounted on the tin's top. The Micro Mountaineer, as you may recall, was designed by W7ZOI, and versions for 40 and 10 meters have been featured in issues of *QST*. The rig runs 500 mw on one of two switch-selected frequencies. Dennis liked the Micro Mountaineer so much that he made four of them. The other three are enclosed in tiny black boxes and are works of art we will feature in future columns.

Another Altoids special from N9JXY is a surface-mount mini-transceiver that can be set for operation on 80, 40, 30, or 20 meters (photo I). Notice the four white-tipped pushbuttons along the circuit board's lower edge. They extend through holes in the tin's top and permit up/down frequency tuning, RIT operation, and access to the rig's menu set. My gosh, but it sounds as if we are describing a fancy new "big rig" rather than a homebrew item in an Altoids tin!

That brings us right to the closing wire, friends, but watch for views of more N9JXY delights plus details on a couple of easy homebrew treats in our December column. Meanwhile, here's hoping we meet one night soon on 30 meters. I am easy to spot. I am the one running QRP!

73, Dave, K4TWJ

Late Flash: A Halloween Bash!

Heads up, Tuna Tin 2 owners: The Black Cat operating event/party of the past is returning, and everyone can be a winner! Call or listen (closely!) for Tuna Tinners calling "CQ TT" around 7040 kHz between 6 PM and midnight EST on October 31. Make one good QSO of 300 miles or more with your TT2 and you qualify for the ARCI's (QRP Amateur Radio Club International) famous 1000 Mile Per Watt award. Another Zombie Shuffle is also scheduled for Halloween this year! Go to <www.megalink.net/~w1rex/QRPme> for Tuna Tin 2s, <www.zianet.com/QRP> for Zombie info, and <www.qrparci.org> for 1000 MPW award info. Milliwatt Magic peaks on Halloween!

beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

Saying Goodbye

This happens to all of us, whether talking on our ham radio sets, talking on the telephone, or talking face-to-face at work or at a social activity. I am talking about how to say "goodbye."

This seemingly easy thing is not always so simple, just like anything in everyday life. It is sometimes even more complicated while operating the radio, since you are not able to see the other person for visual cues, when a casual wave can mean goodbye.

Here is a typical example from my office. I usually work until several hours after 5 PM, and one of my co-workers has the same habit. One night, as I tried to beat my deadline a little early, I finally looked at the clock, and it was well after 7 PM. Mia was still at her computer, too, working on a project.

As usual, as I left for the day I said goodbye to Mia. However, we somehow got involved in a discussion about something work related and then continued with some home and family things. I kept looking at my watch, politely trying to figure out what I would have for dinner at that late hour.

Finally, at around 9 PM I said that I needed to go home and get some dinner, and I said my goodbye so abruptly that it sounded like one word; it came out as "see-ya-bye."

The next day I apologized and said that I always enjoy our parting conversations and I was not trying to be rude, but it was getting late. I told her that I invented "see-ya-bye" to provide the discipline to not venture into other topics and to move along. She agreed, since her husband wondered why she was always so late coming home from the office. Now we both try to use this funny phrase when we are leaving for the day.

Sometimes we also must understand that our radio conversations (QSOs) can intrude into other projects or obligations of life. We must try to remember that although some of us have hours to spend on a ham radio QSO, others may not have that luxury. We should respect their needs by letting them go when they decide to end the conversation. Try not to stretch a simple "so-long" into another multiple-minute exchange.

When Hams Make a Call, New Friendships Begin

The term "CQ" is the name of this magazine, of course, but it also has a very deep meaning in the ham radio world: It is a general call from one ham to another, seeking contact. Think of this as dialing a random telephone number into a universe where there are no "do not call lists" and anyone in the world who is listening is willing to take the call.

When we are looking for someone to talk to on the radio, we are looking for one or several things: We may want to just "kill time" and relieve boredom, we may want to find some useful information or advice, we may want to achieve a goal such as contacting a new country or grid square, or we may want to be entertained in some way.

Unless you call a specific individual by his or her callsign, you must realize your responsibility for keeping "your end" of the "transaction" we call a QSO when someone responds to your call. You must also understand that since you made a general call to anyone, you are now obligated to entertain or enlighten the other party—no matter who ends up answering your call. This means that just like meeting someone for the first time, you use common courtesy and introduce yourself to "the stranger," and in return he or she returns the favor. After a very short time, you will become friends, with ham radio being at least one common interest.

Your goal should be to get to know the person behind the microphone or key, or whatever communication method is being used.[1] You will discover that most hams all over the world have mul-

*16428 Camino Canada Lane, Huntington Beach, CA 92649
e-mail: <kh6wz@cq-amateur-radio.com>

Operating the ham radio set is a lot like fishing. Often you do not know what you are going to catch and sometimes you catch nothing at all, but it is always better than a day at work! (Photo courtesy of Chip Angle, N6CA)

tiple interests and hobbies. There will always be something else besides life behind the ham radio set. If you both discover that you have more in common than sharing a frequency, you may want to talk again. In other words, you have just made a new friend.

On the Other Hand . . .

On the other hand, and this happens to many of us all the time, in the ham radio world as well as in the everyday world, you may discover that you do not have anything at all in common with the person on the other end of the QSO besides the frequency and mode on which you are operating, and you may or may not want to continue the conversation.

This is the challenging part. If you are a nice guy, like I tend to be, you will try your hardest to find something worthwhile in making a conversation. Maybe the person on the other side of the QSO is involved in music, or building electronic projects, or he is working on a home-improvement project of some sort. Maybe she is struggling with a child-care issue with her youngsters, or maybe needs to talk about problems with her teenagers in school.

I do not mean that you have to explore and pry into the personal lives of your contacts, but sometimes an open-ended question will reveal something that excites both of you. By the same token, you need to reveal something, too. For example, I recently learned that a frequent radio contact person is an avid numismatist (coin collector). This expanded the range of topics we talk about on the radio, making each contact more enjoyable than before. In another instance, I found out that a RACES friend of mine is interested in trains and railroads. He got so excited when I said that I wanted to know more about trains that our conversations are now more interesting.

Be careful, though. I am not suggesting that you should try to "force" a commonality. You do not want to be perceived as a "phony" or insincere person.

When all else fails and you feel like you are on a bad date, or the conversation starts to become uncomfortable, you can say something like, "I will let you go now." This was the line one of my early mentors, Bob Maxwell, WB6LHO, used quite often when he was on the radio. It works pretty well, and no feelings are hurt in the process.

Giving and Receiving . . . Err, Transmitting and Receiving

Now for the people listening to the radio and hearing a general call for a conversation, there are also some things you should know. Again, a lot of these suggestions are common sense or common courtesy things we sometimes tend to forget.

Remember, as the listener to the radio, you have a choice. You can choose to ignore the call and not reply, or you can return the call and start a conversation. This is important, and you should know that ignoring a call as well as responding to a call is perfectly okay. (However, this does not apply if the call is for an emergency situation! Use your judgment and common sense when this comes up.)

One of the advantages of listening for someone to talk to is that you have a choice: You can decide to take the call, or you can ignore it and take the radio equivalent of moving on by tuning to a different frequency or clicking the memory-channel knob—or even use that other knob, the "power off" switch.

If you are the station seeking a contact, you must also remember that when placing a call to anyone, there are times when you may not get an answer. Quite often on repeater or simplex channels, it could be that no one has his radio on at that moment, or that whomever is listening is busy/distracted and can't talk on the radio. On 6 meters and the HF bands, propagation might not be in your favor and no stations are hearing your signals. You should not take this as a personal rejection in any way.

I like to think that ham radio is a lot like fishing in unknown waters. You cast your line "out there," and you never know what you are going to catch. It might be nothing, it might be one you decide to throw back ("I'll let you go now..."), or it might be a prize catch you'll remember for years to come. In that respect, operating ham radio is a lot like the bumper sticker I have seen so many times: "A bad day of fishing beats any day in the office." In our case, a bad day of hamming beats any day in the office!

73, Wayne, KH6WZ

Note

1. Not every contact presents an opportunity for a lengthy chat or "ragchew." During a contest or a band opening when distant stations are coming in that many people want to work, there may only be time for a quick exchange of basic information, such as callsign and grid square. Take your cue from the other station. If he/she is making a quick succession of short contacts, this may not be the right time for an extended QSO.

what's new

BY KARL T. THURBER, JR.,* W8FX

Code Practice Oscillator, Spectrum Analyzer, Vertical Antenna, and more

This month, we again shine *CQ*'s bright product spotlight on a wide variety of accessories for the radio shack, antennas and antenna accessories, software, and radio books for your bookshelf, taking a close look at "what's new" in our hobby.

Accessories for the Radio Shack

Morse Express T-Tone Code Practice Oscillator Kit. The T-Tone CPO kit offered by Morse Express (fig. 1) uses a twin-T oscillator circuit to provide a pleasant-sounding shaped sinewave tone. Designed by N1FN and WB9KZY, the T-Tone CPO kit is easy to build and is said to be powerful enough to use with a classroom full of students.

The classic Twin-T oscillator circuit feeds an LM-386 audio amplifier to provide plenty of audio power to drive a small speaker, which is included. The kit includes a high-quality printed circuit board, all necessary parts and controls, and detailed, illustrated instructions.

The tone frequency is variable via an onboard trim-pot. A second trim-pot helps to shape the wave train, providing for a pleasant, easily copied tone—and it works well with electronic keyers at high speeds. Off-board parts include a 9-volt battery connector, an RCA jack for key input, an audio-taper pot for volume control, a power switch, a speaker, and hookup wire.

The MX T-Tone Code Practice Oscillator kit is $18.95. For more information, contact Morse Express, 10691 E. Bethany Dr., Suite 800, Aurora, CO 80014 (1-800-238-8205; e-mail: <info@MorseX.com>; web: <http://www.MorseX.com>).

*289 Poplar Drive, Millbrook, AL 35054-1674
e-mail: <w8fx@cq-amateur-radio.com>

Fig. 1– Check out the Morse Express website for more details on the T-Tone Code Practice Oscillator kit. The kit is easy to build and powerful enough to use with a classroom full of students. Visit <http://www.MorseX.com>. (Image from the Morse Express website)

New MFJ-1164 AC Line RFI Filter Squashes Computer Hash. The super-fast MFJ-1164 AC Line RFI Filter (photo A) reduces AC power-line RFI, hash, noise, transients, surges generated by computers, motors, RF transmitters, and static/lightning, reportedly by 30 dB, and up to 60–80 dB with a good earth ground. It provides inductive isolation, capacitive decoupling, RFI rejection, and over-voltage protection of both common-mode and differential signals, shunting undesired signals to ground.

The $59.95 MFJ-1164 has four three-wire, 15-amp, 120-VAC outlets that are spaced for large adapters. The fused unit handles 25 amps and 3000 watts, has a wing nut for ground and mounting holes, and features a rugged all-aluminum case.

The MFJ-1164 is protected by MFJ's No Matter What™ one-year limited warranty. MFJ will repair or replace (at its option) your MFJ products no matter what for one complete year. For more information, to place an order, to get a free catalog, or to find your nearest dealer, contact MFJ Enterprises, Inc., 300 Industrial Park Rd., Starkville, MS 39759 (1-800-6471800; e-mail: <mfj@mfjenterprises.com>; on the web: <http://www.mfjenterprises.com>).

Photo A– The new MFJ-1164 AC Line RFI Filter reduces AC power-line RFI, hash, noise, transients, surges generated by computers, motors, RF transmitters, and static/lightning. (Photo courtesy of MFJ)

World's Smallest 2.4-GHz Spectrum Analyzer. Are you "into" Wi-Fi and all its complications? MetaGeek, LLC has successfully created the world's smallest 2.4-GHz spectrum analyzer, the WiSpy™ (see photo B), selling for a very modest $99, as opposed to considerably more for traditional spectrum analyzers. According to the manufacturer, this revolutionary device will become an excellent resource in troubleshooting Wi-Fi networks.

The performance of wireless devices is commonly inhibited by radio waves from other wireless networks, cordless phones, microwaves ovens, and

Photo B– Professionals have found MetaGeek's Wi-Spy™ powerful for its size and price. As a handy USB key device, the Wi-Spy is comparable to the size of a small flash drive. (Photo courtesy of MetaGeek, LLC)

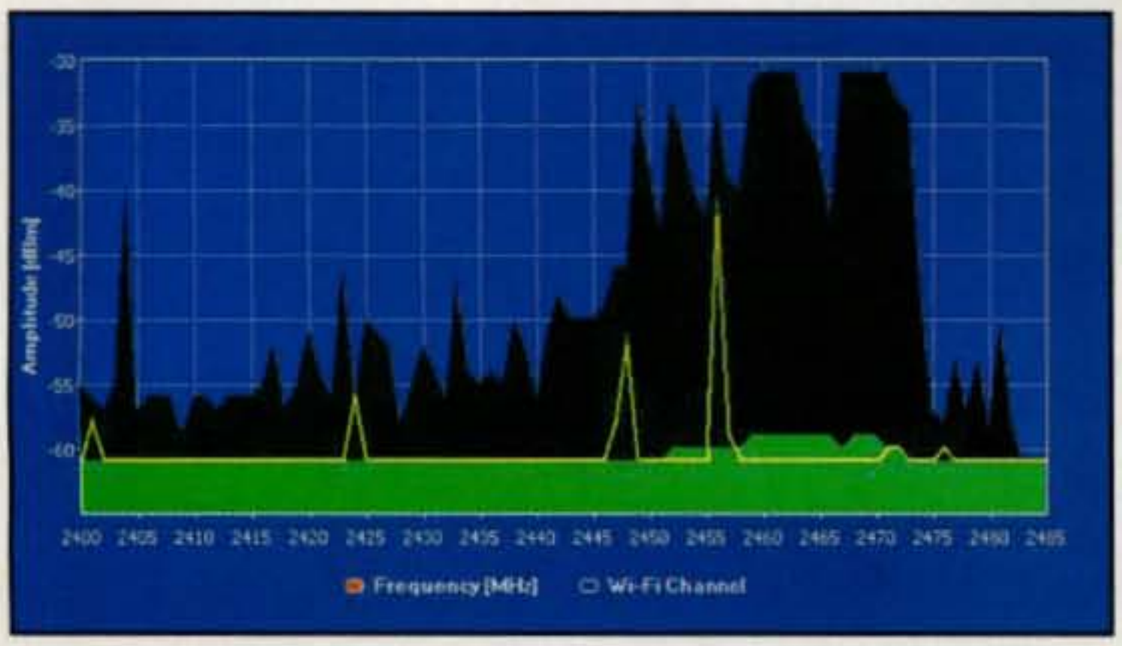


Fig. 2– Wireless-device performance is commonly inhibited by radio waves from a variety of other devices, even a microwave oven's signal, shown here. Many users achieve optimum equipment performance by using a spectrum analyzer, such as MetaGeek's WiSpy™, to troubleshoot interference. (Image courtesy of MetaGeek, LLC.)

similar devices (see fig. 2). Even a microwave oven can interfere with the best wireless equipment, significantly reducing productivity. However, many users achieve optimum performance from their equipment by using a spectrum analyzer, a device that tracks and records different wave frequencies possibly interfering with a wireless network.

With Wi-Spy, MetaGeek has provided an extremely affordable spectrum analyzer. The Wi-Spy software can visually display many wave types and is capable of storing real-time data for later reference, making it an excellent tool for anyone troubleshooting wireless networks or optimizing WLAN signal strengths.

Professionals have found MetaGeek's Wi-Spy very powerful for its size and price. At $99, it is significantly more affordable than other spectrum analyzers, and as a USB key device, the Wi-Spy is comparable to the size of a small flash drive. Product reviewers are also impressed with the user friendly software and portability of the product. The Wi-Spy is available for consumer purchase through the firm's website.

For more information, contact MetaGeek, LLC, 11819 W. Flintlock Dr., Boise, ID 83713 (208-284-4080; e-mail: <info @metageek.net>; on the web: <http://www.metageek.net>).

Antennas and Antenna Accessories

LDG Electronics AT-7000 Automatic Tuner. LDG Electronics has announced a new automatic tuner, the AT-7000 (photo C), which is designed specifically for use with the new ICOM IC-7000 radio.

Photo C– The LDG Electronics AT-7000 Automatic Tuner is said to be a perfect "match" for the IC-7000 transceiver. It fits under the radio and comes with everything you need for plug-and-play operation. (Photo courtesy of LDG)

The AT-7000 is said to be the ideal tuner for the IC-7000. It matches up to 10:1 SWR (3:1 on 6 meters) and will handle virtually any antenna, including Yagis, dipoles, inverted-Vees, slopers, and loops. "The IC-7000 is a state-of-the-art transceiver," said Dwayne Kincaid, LDG's Chief Engineer. "When the radio came out, we immediately got calls from our customers asking for an auto tuner to use with this hot, new radio."

LDG immediately started work on the tuner, putting it on the fast track. "The AT-7000 is a perfect 'match' for the IC-7000," added Kincaid. "It fits perfectly under the radio and comes with

everything you need for complete plug-and-play operation." The AT-7000 is just 6.5 inches long, 6.5 inches deep, and 1.5 inches tall. It weighs only 1.5 pounds and gets its DC power directly from the radio; no separate power supply is needed. The AT-7000 works with any ICOM radio that supports AH-3 or AH-4 ICOM antennas. This currently includes the IC-7000, IC-706MkIIG, IC-703Plus, IC-718, IC-746, and IC-756Pro III.

The AT-7000 comes fully assembled, aligned, and ready to use. The package includes a 14-inch radio interface cable and a 14-inch coax jumper and is ready to operate right out of the box. The AT-7000 automatic tuner lists for $169 and is available at ham radio equipment retailers. Of special note, all LDG products include the new two-year warranty on parts and labor.

Contact LDG Electronics, 1445 Parran Road, St. Leonard, MD 20685 (telephone 410-586-2177; e-mail: <ldg@ldgelectronics.com>; on the web: <http://www.ldgelectronics.com>).

SteppIR Antennas BiggIR MkII 40M–6M Vertical Antenna with 80 Meter Coil Option. SteppIR Antennas has announced an upgrade to its BiggIR Tunable 40M–6M Vertical Antenna, a patented SteppIR antenna that is tunable from the operating position with a frequency-selectable controller. The new version incorporates an upgraded motor and shaft assembly to allow operation with the new 80M coil option at full legal power.

The upgraded unit is called the BiggIR MkII. When used with original BiggIRs, operation on 80 meters with the new coil will be limited to 500 watts. SteppIR plans to eventually offer a factory upgrade service for existing BiggIRs.

Introductory BiggIR MkII pricing is $663, and the 80M coil option is $295. Contact SteppIR Antennas, 23831 SE Tiger Mt. Rd., Issaquah, WA 98027 (1-866-783-7747; e-mail: <sales@steppir.com>; web: <http://www.steppir.com>).

MFJ-1775 6-Band Rotatable Mini-Dipole. The new MFJ-1775 6-Band Rotatable Mini-Dipole (photo D), at $239.95, is a versatile, low-profile, 14-ft. antenna with a 7-ft. turning radius that covers 40, 20, 15, 10, 6, and 2 meters and handles 1500 watts. Its directivity focuses your signal and reduces QRM and noise.

MFJ reports that you can hardly see this mini-rotatable dipole across the street! Its tiny, 7-ft. turning radius fits on the smallest roof, said to be perfect for townhouses, apartments, and condos. The MFJ-1775 is inconspicuous, has a low profile, and can easily be turned by a lightweight TV rotator.

The easy-to-put-together, sturdy MFJ-1775 features automatic band-switching and uses efficient end-loading with its entire length always radiating. Each HF band uses a separate, efficient end-loading coil wound on fiberglass forms with Teflon™ wire and capacitance hats at each end—there are no lossy traps.

Also available is the MFJ-1775W, at the same price, a WARC-band version for 12, 17, 30, and 60 meters only. (MFJ also offers WARC-band versions of two other popular MFJ verticals. These are the MFJ-1796W, at $219.95, a WARC-band version for 12, 17, 30, and 60 meters only; and the MFJ-1795W, at $159.95, a WARC-band version for 12, 17, 30, and 60 meters only.)

MFJ's antennas are protected by MFJ's No Matter What™ one-year limited warranty. Contact MFJ Enterprises, Inc., 300 Industrial Park Rd., Starkville, MS 39759 (1-800-647-1800; e-mail: <mfj@mfjenterprises.com>; web: <http://www.mfjenterprises.com>).

Software and Computers

The ARRL Software Library for Hams. The ARRL Software Library for Hams, Version 1.0, is available on CD-ROM (fig. 3). The handy new software collection offers quick access to utilities, applications, and information. Included are book excerpts and a selection of articles from *QST* magazine; contesting software, including the N1MM Logger; a CW decoder; WinDRM (Digital Radio Mondial) digital voice software as well as HF digital software for a wide range of modes; WSJT software for meteor scatter and moonbounce; and more.

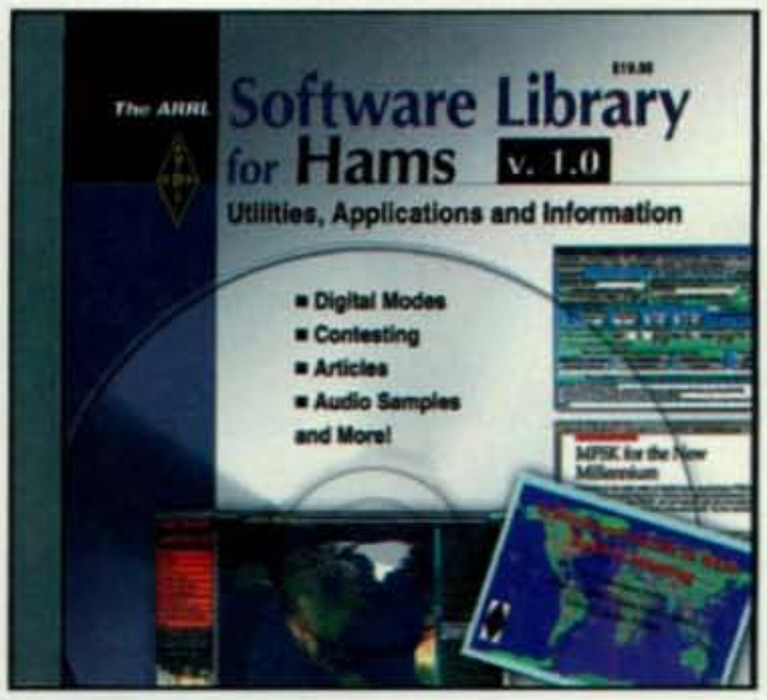


Fig. 3– The ARRL Software Library for Hams, Version 1.0, is now available on CD-ROM. The software collection offers quick access to utilities, applications, and information. Details are in the text of this month's column. (Image courtesy of the ARRL)

The $19.95 CD-ROM's content is divided into folders that contain software for a variety of applications. You'll also find programs for the APRS™ multifaceted system for packet radio; Winlink 2000 for enhanced digital messaging; packet radio; and satellite tracking. Plus, there are handy software tools for calculating transmission-line loss, creating custom DSP audio filters, and more. Bonus files include ARRL screensavers, audio samples, video files, and PowerPoint™ presentations.

For more information, to check PC system requirements, or to order, contact the American Radio Relay League, 225 Main Street, Newington, CT 06111-1494 (phone 1-888-277-5289; e-mail: <pubsales@arrl.org>; on the web: <http://www.arrl.org/shop>). You may place orders online, and the paper-based ARRL Publications Catalog is available upon request.

The ARRL TravelPlus CD-ROM. The ARRL TravelPlus CD-ROM, 2006-2007 Edition, Version 10.0, is now available. With TravelPlus for Repeaters™ (fig. 4) you have the power of *The ARRL Repeater Directory®* on your computer. You can make TravelPlus for Repeaters your traveling companion, and as a result you'll never be alone on the road. With it, you can easily and precisely

Photo D– The new MFJ-1775 6-Band Rotatable Mini-Dipole is a low-profile antenna with a 7-ft. turning radius that covers 40, 20, 15, 10, 6, and 2 meters and handles 1500 watts. (Photo courtesy of MFJ)

locate ham radio repeaters along U.S. and Canadian travel routes using this convenient, map-based software.

The $39.95 (plus s/h) TravelPlus software supports GPS (with separate external hardware). It lets you view and print maps and repeater lists; access the ARRL Repeater DataBase; see global internet-linked nodes; find AM/FM radio, broadcast television, and NOAA weather stations; export data; transfer to Palm™ or Pocket PC; and more. Also available are the TravelPlus CD-ROM Upgrade ($19.95) for previous customers; the $10.95 *ARRL Repeater Directory* (Pocket-Size Edition); and the *ARRL Repeater Directory (Desktop Edition)*, at $15.95.

Contact the American Radio Relay League, 225 Main Street, Newington, CT 06111-1494 (1-888-277-5289; e-mail: <pubsales@arrl.org>; on the web: <http://www.arrl.org/shop>).

NEC-Win Pro Available from antenneX. NEC-Win Pro, Version 1.6, is now available from antenneX, and is said to be the next step up from NEC-Win Plus+. The new software is designed to provide an easy-to-use tool for antenna designers to facilitate the design and analysis process. Indeed, the intuitive nature of the graphical interface helps you produce outstanding results fast. This highly sophisticated application includes polar plots, Smith Charts, tubular data, and nine rectangular plots. The software includes and supports the full NEC2 command set.

The new V1.6 offers the full array of features found in NECWin Pro. V1.6 new features include a full 32-bit interface that supports long paths and filenames; average gain test; ability to run jobs in batch mode; the NEC-Win Plus Insert and NEC-Win Synth Light; a new tabular list for input impedance and VSWR; a new TX line command dialog; 27 predefined ground constants; a new GW (Generate Wire) dialog; a file history list; and much more.

Included with NEC-Win Pro is a modified NEC2 core optimized for the 32-bit operating system. AntenneX has the software now on CD or for direct download, complete with all manuals.

For pricing, contact antenneX Online Magazine, P.O. Box 271229, Corpus Christi, TX 78427-1229 (361-855-0250; e-mail: <info@antennex.com>; on the web: <http://www.antennex.com>).

From the Bookshelf

New Pasternack Coaxial & Fiber Optics Catalog. The latest printed (paper)

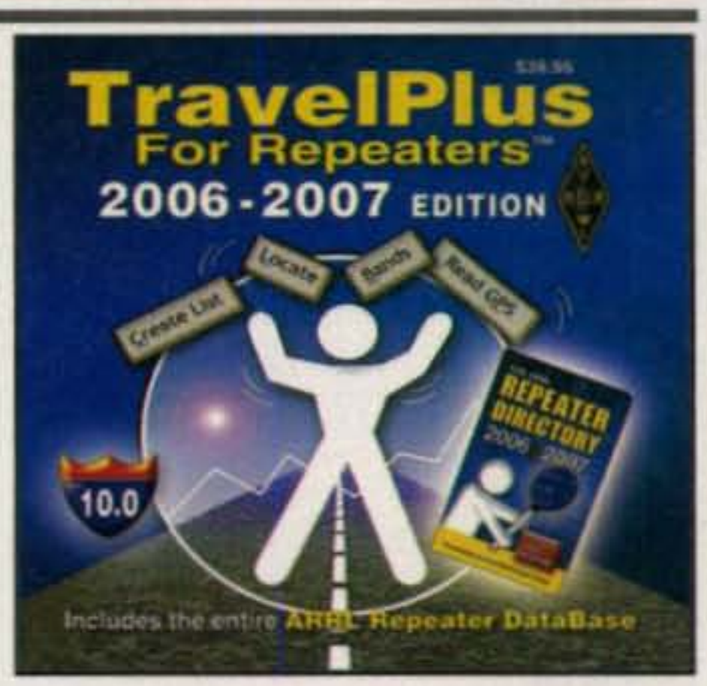


Fig. 4– With TravelPlus for Repeaters™ you have the power of the ARRL Repeater Directory® *on your computer. You can make TravelPlus for Repeaters your traveling companion, and as a result you'll never be alone on the road. (Image courtesy of the ARRL)*

2006 Pasternack Enterprises Coaxial & Fiber Optics Catalog (fig. 5) we received is, once again, a very thick one at well over 200 pages, and for good reason.

The thick, comprehensive paper catalog includes thousands of coaxial and fiber-optics related products, many of which Pasternack manufactures, along with detailed technical data. The new catalog describes and depicts an im-

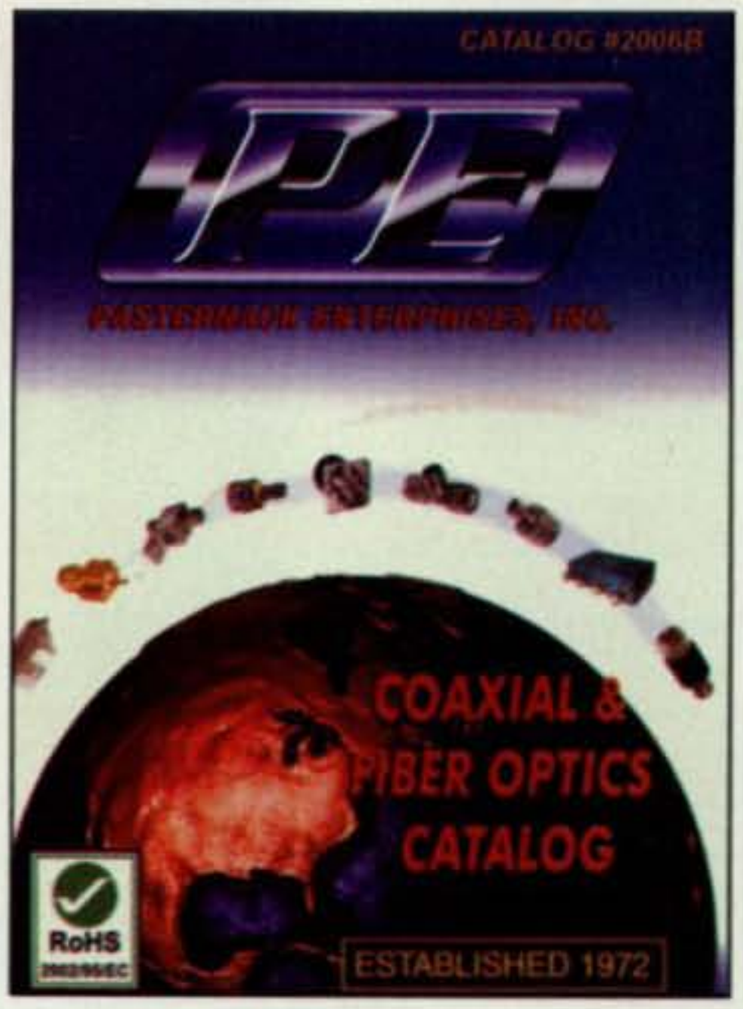


Fig. 5– The 2006 Pasternack Enterprises Coaxial and Fiber Optics Catalog is a very thick one. The paper catalog includes thousands of different coaxial and fiber-optics related products, many of which Pasternack manufactures. Check out the column for details. (Cover art courtesy of Pasternack Enterprises)

pressively large selection of adapters, attenuators, bias "tee" devices, matching pads, phase shifters, coax and coax assemblies, ferrite isolators, amplifiers, connectors, switches, power dividers, terminations, tools, directional couplers, and more.

The Pasternack paper catalog is easy to use, especially with its up-front catalog section index to help you find product categories quickly. The company offers its catalog online. The easy-to-use website assists you in specifying, identifying, and ordering parts and lets you look up any part in the inventory if you know the Pasternack number. Same-day shipping and free UPS Ground service are offered.

For a free catalog, contact Pasternack Enterprises, Inc., P.O. Box 16759, Irvine, CA 92623-6759 (1-866-727-8376; e-mail: <sales@pasternack.com>; and on the web: <http://www.pasternack.com>). Also, be sure to bookmark the enhanced Pasternack website. The company says it now has the ability to for customers to order in local currencies, view order status and tracking numbers, view past orders, reorder with just one click, and more.

Short Bursts

***CQ* Advertisers and Column Contributors, Please Take Note.** Are you a *CQ* advertiser who is trying to get your advertising budget to stretch just a little further, particularly by way of some free advertising? Perhaps you are a reader of this column who is about to market a new product you would really like to tell us about, but don't know how to do it? Well, whether you're an advertiser or a reader with a new product to offer, we encourage you to let the "What's New" column and our readers know what you're up to. The good news is that the products highlighted in this monthly column are showcased here free of charge, with the expectation that they will help you promote and sell your new product and hopefully become a regular *CQ* advertiser.

While a professionally prepared new product announcement or a formal press release would certainly be welcome, one isn't necessary for an announcement of your product to appear in this column. We can help you along the way. You can contact the "What's New" column by e-mailing your columnist at <w8fx@cq-amateur-radio.com>. Contact us, and we'll help.

Just be sure to carefully note our disclaimer, which you'll find at the end of this and every column, just after the "WrapUp." The disclaimer tells you that the column listings are not product reviews and don't constitute a product endorsement by *CQ* or your column editor. Thus, we report on new products, but we don't review them in the column.

Of course, if you think your new product might be a good candidate for an advertisement in *CQ*, be sure to also contact *CQ*'s Advertising Manager, Don Allen, W9CW. It's easy to advertise in *CQ*, and Don can help you develop a successful ad for your product. Contact Don at telephone 217-344-4570, fax 217-344-4575, or by e-mail at <ads@cq-amateur-radio.com>.

Wrap-Up

That's all for this time, gang. Next time, more "What's New." See you then.

Overheard: I have found that whoever said that "you can't take it with you" obviously has never seen hams pack for a DXpedition! 73, Karl, W8FX

***Note:** Listings in "What's New" are not product reviews and do not constitute a product endorsement by CQ or the column editor. Information in this column is primarily provided by manufacturers/vendors and has not necessarily been independently verified. The purpose of this column is to inform readers about new products in the marketplace. We encourage you to do additional research on products of interest to you.*

RSGB Books available from CQ

Antenna Topics

byPat Hawker, G3VA

RSGB. 2002 Ed. 384 pages.
This book is a chronological collection of selections of G3VA's words over the years. Hundreds of areas and subjects are covered and many a good idea is included.

Order No. RSAT **$29.00**

HF Antenna Collection

RSGB, 1st Ed., 1992. 233 pages.
A collection of outstanding articles and short pieces which were published in Radio Communication magazine during the period 1968-89. Includes ingenious designs for single element, beam and miniature antennas, as well providing comprehensive information about feeders, tuners, baluns, testing, modeling, and how to erect your antenna safely.

Order: RSHFAC **$16.00**

IOTA Directory - 11th Edition

Edited by Roger Balister, G3KMA.
RSGB, 2002 Ed., 128 pages
This book is an essential guide to participating in the IOTA (Islands on the Air) program. It contains everything a newcomer needs to know to enjoy collecting or operating from islands for this popular worldwide program.

Order: RSIOTA **$15.00**

Antenna Toolkit 2

By Joe Carr, K4IPV
RSGB & Newnes, 2002 Ed.
256 pages.A definitive design guide for sending and receiving radio signals. Together with the powerful suite of CD software included with this book, the reader will have a complete solution for constructing or using an antenna; everything but the actual hardware!

Order: RSANTKIT2 **$40.00**

Practical Projects

Edited by Dr. George Brown, M5ACN
RSGB 2002 Ed, 224 pages
Packed with around 50 "weekend projects," Practical Projects is a book of simple construction projects for the radio amateur and others interested in electronics. Features a wide variety of radio ideas plus other simple electronic designs and a handy "now that I've built it, what do I do with it?" section. Excellent for newcomers or anyone just looking for interesting projects to build.

Order: RSPP **$19.00**

Low Power Scrapbook

RSGB. © 2001, 320 pages.
Choose from dozens of simple transmitter and receiver projects for the HF bands and 6m, including the tiny Oner transmitter and the White Rose Receiver. Ideal for the experimenter or someone who likes the fun of building and operating their own radio equipment.

Order: RSLPS **$19.00**

The Antenna File

RSGB. ©2001. 288 pages. **$34.95.**
Order: **RSTAF**
50 HF antennas, 14 VHF/UHF/SHF antennas, 3 receiving antennas, 6 articles on masts and supports, 9 articles on tuning and measuring, 4 on antenna construction, 5 on design and theory, and 9 Peter Hart antenna reviews. Every band from 73kHz to 2.3GHz!

Order: RSTAF **$32.00**

The Antenna Experimenter's Guide

RSGB. 2nd Ed, 1996. 160 pages.
Takes the guesswork out of adjusting any antenna, home-made or commercial, and makes sure that it's working with maximum efficiency. Describes RF measuring equipment and its use, constructing your own antenna test range, computer modeling antennas. An invaluable companion for all those who wish to get the best results from antennas!

Order: RSTAEG **$28.00**

HF Amateur Radio

RSGB. 2002 Ed.
The HF or short wave bands are one of the most interesting areas of amateur radio. This book takes the reader through setting up an efficient amateur radio station, which equipment to choose, installation, and the best antenna for your location and MUCH more.

Order: RSHFAR **$21.00**

Amateur Radio Mobile Handbook

RSGB. 2002 Ed., 128 pages.
The Amateur Radio Mobile Handbook covers all aspects of this popular part of the hobby. It includes operating techniques, installing equipment in a vehicle and antennas, as well as maritime and even bicycle mobile. This is essential reading if you want to get the most out of your mobile station.

Order: RSARMH **$21.00**

RSGB Prefix Guide

By Fred Handscombe, G4BWP.
RSGB. 6th Ed., 2003. 48 pages.
This book is an excellent tool for the beginner and the experienced hand alike. Designed with a "lay flat" wire binding for ease of use the new "Prefix Guide" is a must for every shack.

Order: RSPFXG **$13.50**

VHF/UHF Antennas

By Ian Poole, G3YWX

RSGB, 2002 Ed, 128 pages
This great new book investigates the exciting area of VHF and UHF antennas. VHF and UHF bands provide an exciting opportunity for those wishing to experiment, while the antenna sizes at these frequencies do not occupy great amounts of space.

Order No. RSVUANT **$23.00**

Order Toll-Free
800-853-9797

Visit Our Web Site
www.cq-amateur-radio.com

Name _____ Callsign _____

Street Address _____

City _____ State _____ Zip _____

Qty	Item #	Description	Price	Total Price
Shipping and Handling: US and Possessions - Add $5.00 for the first book, $2.50 for the second, and $1 for each additional book. **FREE SHIPPING ON ORDERS OVER $75.00** (merchandise only). Foreign - Calculated by order weight and destination and added to your credit card charge. ALLOW 3 TO 4 WEEKS FOR DELIVERY			**Total**	

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

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

CQ Communications Inc., 25 Newbridge Rd., Hicksville, NY 11801/516-681-2922; Fax 516-681-2926

dx

BY CARL SMITH,* N4AA

Two New Ones

I am writing this at the very beginning of August, and July was an interesting month for DXers. We got not just one, but *two* new entities added to the DXCC list. The DXCC Rules were changed effective June 15, 2006 and here is the actual wording of that change:

DXCC Rules Change

Upon request of the Programs and Services Committee (PSC), the DXAC has studied the impact of a change to the DXCC Rules. The DXAC, the Awards Committee and the PSC have concurred in this rule change, which will become effective June 15, 2006 at 0001Z. New text replaces the previously removed DXCC Rule, Section II, 1. Political Entities, Paragraph (c). The new text shall read:

c) The entity contains a permanent population, is administered by a local government, and is located at least 800 km from its parent. To satisfy the "permanent population" and "administered by a local government" criteria of this sub-section, an entity must be listed on either (a) the U.S. Department of State's list of "Dependencies and Areas of Special Sovereignty" as having a local "Administrative Center," or (b) the United Nations list of "Non-Self-Governing Territories."

Rule 1(c) is intended to recognize entities that are sufficiently separate from their parent for DXCC purposes but do not qualify under Rule 1(a) or 1(b). The new rule will cause a change to Point 1 status for certain entities. This in turn will reduce the mileage for a first separation for these entities from 800 km to 350 km.

The lists referenced in the text of the rule can be viewed at the following websites: the DOS list of Dependencies and Areas of Special Sovereignty at <http://www.state.gov/s/inr/rls/10543.htm>, and the U.N. list of Non-Self-Governing Territories at <http://www.un.org/depts/dpi/decolonization/trust3.htm>.

QSOs with any new entity resulting from this rule change will count for credit for the new entity only if the QSOs are made on or after the Start Date for the entity. In no case will QSOs made prior to the date of this notice be considered for credit for any new entity created under this rule. Applications for DXCC award credits resulting from this change will be accepted on or after October 1, 2006. *(Text courtesy of the ARRL)*

Montenegro was added to the DXCC list effective June 28, 2006 by its being accepted as a member of the UN. Swain's Island (KH8SI) was also added to the list, effective July 22, 2006. The reason for adding Swain's Island was explained in an announcement dated July 22, 2006. Here's what it said:

With the addition of Section II, Criteria Rule 1(c) to the Political Entity criteria, certain former separation entities may now qualify as Political Entities. One such entity has been determined to be American Samoa. American Samoa is now a Political Entity for DXCC purposes.

As a result of the reclassification of American Samoa, and upon the filing of a request and substantiating evidence, and with the concurrence of the DXAC and the Awards Committee, *Swain's Island* has been added to the DXCC List.

Swain's Island, entity number 337, qualifies as the first separation entity from American Samoa, now a Political Entity. The distance between American Samoa and Swain's Island has been determined to be in excess of 350 km as required by DXCC Rules Section II, Paragraph 2, Section (b). QSOs made with Swain's Island on or after 0001Z, July 22, 2006 will count for DXCC credit.

For additional information, including the DXCC Reference Number for Swain's Island, contact Bill Moore at the DXCC Desk, dxcc@arrl.org.

Both entities were also added to the CQ DX Awards list, although with different start dates. For the purposes of the CQ DX Awards, contacts with Montenegro count as of its independence day, June 3, 2006; Swain's Island contacts count as of July 1, 2006.

Almost immediately after the above announcements were made, a team announced that they would be on Swain's Island the following week. As it turned out, due to transportation difficulties the team arrived on the island on Friday, July 28 and stayed until the following Wednesday, August 2. As of this writing, they are still there and it is not known how many contacts they will make. Activity was on 80 through 17 meters, mostly SSB, some CW, and none on the digital modes. The QSL manager will be the team leader Kan, JA1BK.

One of the operating sites of 4O3T in Montenegro. (Photo courtesy of Martti, OH2BH)

*P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>

5 Band WAZ

As of August 1, 2006, 705 stations have attained the 200 zone level and 1510 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:

LU2FA F6CKH

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)	WØPGI, 199 (26)
W4LI, 199 (26)	HA5AGS, 199 (1)
K7UR, 199 (34)	EA8AYV, 199 (27)
W2YY, 199 (26)	VE3XN, 199 (26)
VE7AHA, 199 (34)	W6XK, 198 (17, 34)
IK8BQE, 199 (31)	EA5BCX, 198 (27, 39)
JA2IVK, 199 (34 on 40m)	G3KDB, 198 (1, 12)
IK1AOD, 199 (1)	KG9N, 198 (18, 22)
DF3CB, 199 (1)	JA1DM, 198 (2, 40)
GM3YOR, 199 (31)	9A5I, 198 (1, 16)
VO1FB, 199 (19)	K5PC, 198 (18, 23)
KZ4V, 199 (26)	K4CN, 198 (23, 26)
W6DN, 199 (17)	G3KMQ, 198 (1, 27)
W3NO, 199 (26)	N2QT, 198 (23, 24)
HB9DDZ, 199 (31)	OK1DWC, 198 (6, 31)
RU3FM, 199 (1)	W4UM, 198 (18, 23)
HB9BGV, 199 (31)	US7MM,198 (2, 6)
N3UN, 199 (18)	K2TK, 198 (23, 24)
OH2VZ, 199 (31)	K3JGJ, 198 (24, 26)
W1JZ, 199 (24)	W4DC, 198 (24, 26)
W1FZ, 199 (26)	F5NBU, 198 (19, 31)
SM7BIP, 199 (31)	OE2LCM, 198 (1, 31)
SP5DVP, 199 (31 on 40)	HA1RW, 198 (1, 31)
N4NX, 199 (26)	WK3N, 198 (23, 24)
N4MM, 199 (26)	W9XY, 198 (22, 26)
EA7GF, 199 (1)	KZ2I, 198 (24, 26)
N6HR/7, 199 (37)	WA5VGI, 198 (34)
JA5IU, 199 (2)	K7BG, 198 (17, 22)
CT3DL, 199 (26)	W7VJ, 198 (34, 37)
NØIJ, 199 (21)	WØCP, 198 (18, 40)
RU3DX, 199 (6)	K9MIE (18, 21)
N4XR, 199 (27)	

The following have qualified for the basic 5 Band WAZ Award:

VE7SMP (155 zones)

****Please note: Cost of the 5 Band WAZ Plaque is $100 ($120 if airmail shipping is requested).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

As for Montenegro, two major operations took place beginning in late July—4O3T and YU6AO. The 4O3T operation was a multi-national operation with operators rotating in and out over a period of three weeks or so. The YU6AO operation had primarily operators with YU callsigns. After a few weeks of heavy activity by both of these groups, each was reporting over 50,000 QSOs on all bands from 160 through 6 meters, operating CW/SSB and the digital modes. There were some individual stations, such as YU6DZ, active as well, making it a very interesting time for DXers. Openings on 10 and 12 meters only added to the chase and the fun of working this new one. QSLing for 4O3T is via YT6A and YU6AO is via YU6AO. Each one had an on-line log search, making it easy to check your individual progress in working the various bands/modes.

I also have to get on my soapbox again after listening to the KH8SI pile-ups. The unruly activities of some people (I won't even call them DXers) made this operation very difficult. The absolutely useless and uncalled for

Hisato, JA1DOT/J56DOT, at his station in Guinea Bissau in April/May 2006. (Photo courtesy of Franz, DJ9ZB)

The WAZ Program

15 Meter SSB

630 ..... 7M2VAP

20 Meter SSB

1149 ..... F6CKH

80 Meter SSB

86 ..... LU2FA

20 Meter CW

565 ..... ISØIGV

80 Meter CW

72 ..... HB9BGV

160 Meters

235 ..... RA6AX

All Band WAZ SSB

5001 ..... F5MSB
5002 ..... DL1DTC
5003 ..... K7ABV
5004 ..... SV1EML

Mixed

8418 ..... KF5ER
8419 ..... DL1MBI
8420 ..... UR9IDX

CW

488 ..... VE7SMP
489 ..... DL1DTC
490 ..... K7ABV

RTTY

168 ..... VE3XN

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

"commentary" on their transmitting frequency was disgusting. The "band cops" generated more QRM than those who were calling on the wrong VFO. I never cease to be amazed at the number of folks who don't seem to know how to operate their radios in the split mode. It is a very simple thing to do and yet time after time we have to listen to some people yelling their lungs out on the wrong frequency. It does no good to yell at them, as they have thrown the wrong switch and are no doubt "listening" where they should be "transmitting" and will never hear you no matter how loud you yell "Up Up Up!" at them. Just forget it; they will get the message soon enough without the "cops" adding to the problem.

Chuck Brady, N4BQW, SK

I don't like to make Silent Key announcements, but I will make an exception in this case. I knew Chuck Brady, N4BQW, and I feel the need to share my story with you. He passed away on July 29.

Chuck was a retired Shuttle Astronaut, having been on the STS-78 shuttle mission in 1996. He was also a well-known DXpeditioner, operating from places such as Bouvet, Kure, Palmyra, Midway, Wake, Baker & Howland, and Kingman Reef. Probably the most memorable operation was from Bouvet in 2001. I remember it well, since I worked him on 10 meters SSB. I had known Chuck for many years, and when I commented that I sure would like to work him on CW, he said, "OK, how about now?" I just about fell out of my chair when he started giving my call on CW, right there on frequency. I quickly switched to CW and answered him for probably the most memorable contact in my 52 years of DXing. Not many would do anything like that, even for a friend.

I had the honor of meeting Chuck in person at one of the New Orleans DX Conventions several years ago. He and I sat down and had one of the most interesting conversations I can ever recall. He talked about his experience in space

CQ DX Awards Program

SSB Endorsements

330	W2FKF/333	310	W6NW/314
320	KE4SCY/325	250	VE6MRT/250

CW Endorsements

330	W7CNL/334	330	N5ZM/330
330	K7LAY/332		

RTTY Endorsements

320 ..... N5ZM/330

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 335 active countries. Please make all checks payable to the award manager.

The CQ DX Field Award Program

Mixed

76 ..... K3MJW 77 ..... KA4RRU

SSB

44 ..... VE3ESE 45 ..... VE3RGG

CW

46 ..... OK2JOW 47 ..... OK2PO

Endorsements

Mixed

225	HAØDU/225	28 MHz	ON4CAS
175	N4MM/196	3.5/7 MHz	SM5INC
150	SM5INC/153		

SSB

175	N4MM	Mobile	N4MM
100	VE3ESE/143		

CW

175	OK2PO/184	SM5INC/151	
175	N4MM/177	3.5/7 MHz	SM5INC
150		Mobile	N4MM

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio. com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Please make all checks payable to the award manager.

CQ DX Field Award Honor Roll

The CQ DX Field Award Honor Roll recognizes those DXers who have submitted proof of confirmation with 175 or more grid fields. Honor Roll lisiting is automatic upon approval of an application for 175 or more grid fields. To remain on the CQ DX Field Award Honor Roll, annual updates are required. Updates must be accompanied by an SASE if confirmation is desired. The fee for endorsement stickers is $1.00 each plus SASE. Please make all checks payable to the Award Manager, Billy F. Williams. Mail all updates to P.O. Box 9673, Jacksonville, FL 32208.

Mixed

K2TQC	229	N4MM	194	OK1AOV	181
VE3XN	217	W4UM	193	W5ODD	177
HAØDU	217	BA4DW	188	K2AU	177
KØDEQ	207	F6HMJ	182	NØFW	176
N8PR	200	K2SHZ	182	ON4CAS	175
HA1RW	197	N4NX	182	K8OOK	175
JN3SAC	194	KØCA	181		

SSB

VE7SMP	182	NØFW	176	DL3DXX	175
KØDEQ	180	N4MM	176		
W4ABW	177	W4UM	176		

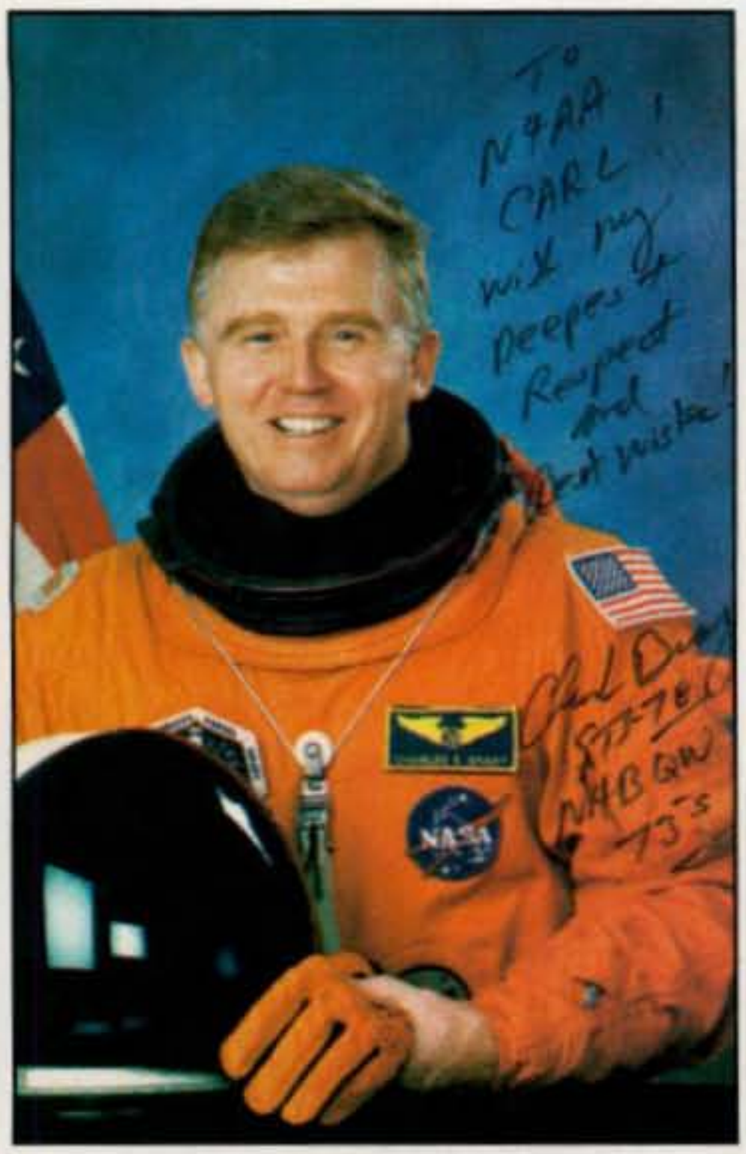
CW

DL3DXX	203	OK2PO	184	N4MM	175
KØDEQ	198	JN3SAC	181		
W4UM	184	KØCA	175		

QSL Information

4X17I via 4Z4TL	**5B4XX** via 4Z4DX	**5Z4/OM2DX** via OM3JW
4X17M via 4Z4TL	**5H1C** via F5TVG	**5Z4DZ** via PA1AW
4X17MG via 4Z4TL	**5H1CM** via DL7CM	**6OØCW** via M5AAV
4X411A via 4Z4BS	**5H1DN** via S57DX	**6OØG** via M5AAV
4X4DX via 4Z4DX	**5H1JCH** via DJ8NK	**6O1Z** via DJ9ZB
4X7AZ via 4Z5LA	**5H2AG** via EA5RM	**6V7A** via F1BCS
4Z17A via 4Z4TL	**5H9KR** via KF9TC	**6V7B** via F1BCS
4Z17B via 4Z4TL	**5J1W** via NN1N	**6V7C** via F1BCS
4Z17C via 4Z4TL	**5K2ØA** via HK3SGP	**6W/G4WFQ** via G3SWH
4Z17H via 4Z4TL	**5R8HL** via SM1ALH	**6W/HA3AUI** via HA3AUI
4Z17I via 4Z4TL	**5TØCW** via G3SWH	**6W/HA7TM** via HA7TM
4Z17M via 4Z4TL	**5T6BT** via EA4URE	**6W1RW** via F6BEE
4Z17MG via 4Z4TL	**5U7Z** via DJ9ZB	**6W1RY** via F5VHJ
4Z5DX via 4Z4DX	**5WØDW** via KT8X	**6W8CK** via DH7WW
4Z5J via WØMM	**5WØHY** via AH6HY	
4Z5KJ via WØMM	**5WØJB** via KT8X	
5A29 via 5A1A	**5WØTR** via KT8X	
5B/OO5S via ON4ON	**5W1HA** via DJ9ZB	
5B/OQ1C via ON4ON	**5W1HX** via DJ9ZB	
5B/WB2REM via WB2REM	**5X1RI** via WD4ELG	
5B4AHA via ZC4LI	**5Z1A** via PA1AW	

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," 106 Dogwood Dr., Paris, TN 38242; phone 731-641-4354; e-mail: <golist@golist.net>.)



Chuck Brady, N4BQW (SK), well-known DXpeditioner and Shuttle Astronaut.

and how it made him feel in relation to his life and the world. I was able to ask him questions about that experience and found Chuck to be one of the most honest and friendly people I have ever met. In spite of all his achievements, Chuck was a very "down-to-earth" guy who could make you feel comfortable in his presence.

I have a few personally autographed photos of Chuck that I will cherish for many years to come. God bless and rest in peace, Chuck. We will miss, you my friend.

New LIDXA Officers

The Long Island DX Association, Inc. (LIDXA) elected new club officers for the 2006–2008 term. They are:

President, Marty P. Miller, NN2C
Vice President, Pat Masterson, KE2LJ
Secretary, Ed Whitman, K2MFY
Treasurer, John Reiser, W2GW
Directors, Tom Provost, AG2A; Lew Reinberg, W2BIE; and Andy Cola, W2VZQ

The CQ WPX Award manager transition continues as of this writing, as Steve, N8BJQ, receives material from former manager Norm, WN5N, and gets his own systems up and running. Next month should see the return of the WPX information in this column.

Until next time, enjoy the chase and Have Fun! 73, Carl, N4AA

awards

BY TED MELINOSKY,* K1BV

Visiting All Counties

The core of the USA-CA program is making a contact with each of the counties of the United States. A much smaller group has actually operated an amateur radio station and made contacts from each of the counties. The fascination with contacting and operating from counties is not limited to our fellow hams, either. William Leggat, K3YQD, sent in a clipping from the April 1, 2006 issue of the *Times-Tribune* of Scranton, Pennsylvania. The article featured a story about David Bingham of Stansbury Park, Utah who began his quest for counties when gasoline cost 20 cents a gallon! He drove into his last county (Lackawanna, PA) in 2006 feeling a mixture of fulfillment and loss after completion of a quest that began in 1963. I suspect that most, if not all, of the 1141 USA-CA All Counties award recipients can relate to those feelings.

Applicants who had recently completed USA-CA All Counties lined up at the MARAC National Convention in Appleton, Wisconsin on July 14, 2006. Left to right are: NN9K USA-CA All Counties #1131, AB7RW #1132, WØJAR #1133, and K8ZZ #1134.

USA-CA Special Honor Roll

James L. Funk, N9JF
USA-CA All Counties #1136
June 26, 2006

UA2 Contest Club (Victor Loginov), RK2FWA
USA-CA All Counties #1137
June 27, 2006

Bruce Barber, KL7D
USA-CA All Counties #1138
June 29, 2006

Peter Zbinden, HB9BYZ
USA-CA All Counties #1139
July 20, 2006

Mark A. Burgess, KO1U
USA-CA All Counties #1140
July 21, 2006

Jonas Paskauskas, LY2ZZ
USA-CA All Counties #1141
July 22, 2006

USA-CA Honor Roll

500

N9JF	3378
RK2FWA	3379
KL7D	3380
KO1U	3381

1000

N9JF	1714
RK2FWA	1715
KL7D	1716
KB9AIT	1717
KO1U	1718

1500

N9JF	1437
RK2FWA	1438
KL7D	1439
KB9AIT	1440
KO1U	1441

2000

N9JF	1332
RK2FWA	1333
KL7D	1334
KO1U	1335

2500

N9JF	1250
RK2FWA	1251
KL7D	1252
KO1U	1253

3000

N9JF	1159
RK2FWA	1160
KL7D	1161
HB9BYZ	1162
KO1U	1163
LY2ZZ	1164

The total number of counties for credit for the United States of America Counties Award is 3077. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 1, 2000. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 12 Wells Woods Road, Columbia, CT 06237 USA. DX stations must include extra postage for airmail reply.

DX Awards

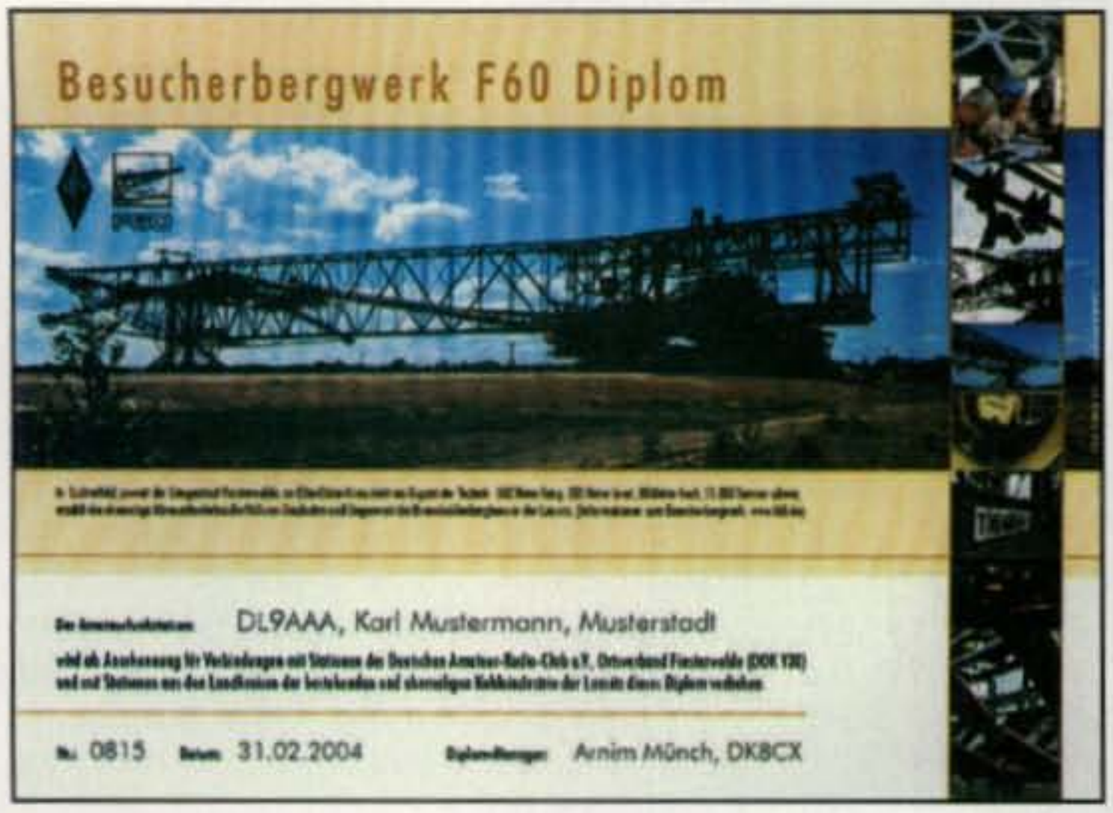
Germany's Besucherbergwerk F60 Diplom. Many awards feature industries that are very important in parts of the world. In that sense, awards act as teaching devices and broaden our understanding of other peoples and cultures. Here's one that will appeal to those who like big, rugged machines.

Lignite is a form of soft coal which is deposited in vast beds only a relatively small distance below the surface. It has been mined in the Lower Lusatia section of Germany for over 150 years. In order to get at the thick beds of this coal, tunneling is not practical, so the cover has to be removed in a big way. Germans solved this problem by developing gigantic movable cutting machines and conveyer belts to continuously strip away earth and rock lying over the coal. The machine shown on the award is the sixth in a series of ever-larger machines dating back to the 1920s. It is 502 meters (1620 feet) long and weighs over 11,000 tons. Entire villages have had to be moved as the valuable coal beds were mined.

Most German awards require you to contact DOKs, which are a club designation. When the rules specify DOK Y38, this designation will be printed on the QSL card. German stations include their DOKs on over 99% of their QSLs.

Contacts with stations from the DARC-Ortsverbandes Finsterwalde, DOK Y38, and stations from

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>



The Besucherbergwerk F60 Diplom is issued for confirmed contacts with DOK Y38 and DOKs from Niederlausitz, both in Germany.

the cities of the former coal industry area of Niederlausitz after January 1, 2004 count for the award. SWL okay. A contact with club station DKØFIW or DLØPPC is mandatory and can be substituted as a "Joker" for a station in Niederlausitz.

DL stations need six contacts with stations from DOK Y38 and four contacts with different DOKs from Niederlausitz; EU stations need four and two contacts and DX stations need two and one, respectively.

All bands and modes except packet radio okay. Each station may be worked only once. Send a GCR list and fee of 5 Euros or $US7 to: Arnim Munch, DK8CX, Am Spring 31, D-03205 Calau, Germany. Internet: <http://www.f60-diplom.de/>.

Cities and DOKs of Niederlausitz:

1. Landkreis Elbe-Elster: Y38, Y43.
2. Landkreis Oberspreewald-Lausitz: Y25, Y28, Y39.
3. Landkreis Spree-Neiae: Y26, Y27, Y3, Y33.
4. City of Cottbus: Y24.

Kaliningrad Diploma 750 Years of Konigsberg/Kaliningrad. Kaliningrad is a small part of Russia, technically an "enclave," surrounded by Lithuania and Poland. Fierce battles in early 1945 caused heavy destruction of the lovely city, which also went by the name of Konigsberg. Today it functions as Russia's only seaport on the Baltic.

This part of the Baltic has long been known as a source of amber, the fossilized sap of pine trees which is used in jewelry. Tiny pieces of amber decorate this handsome award and the certificate is framed in wood, so the award fee seems quite reasonable.

The following rules are for all stations outside of the Russian Federation. The diploma is awarded by the Russian UA2-Radio Club Kaliningrad to a maximum of 100 amateur radio stations worldwide to celebrate the 750th anniversary of foundation of this city. As of this writing there are still about 40 of the original awards available. Revised rules require you to make contact with only three different UA2/RK2 stations on or after January 1, 2003. SWL okay on the same basis as licensed amateurs. All modes and bands accepted.

Award fee: For European applicants $US15 or 15 Euros; for stations outside of Europe the fee is $US20 or 20 Euros If you supply your e-mail address with the application, you will receive an acknowledgment of receipt of application and fee. Send application and log extract (no QSL cards required)

The Kaliningrad Diploma 750 Years of Konigsberg/Kaliningrad is awarded by the Russian UA2-Radio Club Kaliningrad to a maximum of 100 amateur radio stations worldwide to celebrate the 750th anniversary of foundation of this city in Russia.

to: Lutz Radloff, DL5KUA, Gronwohlder Str. 10a, D-22952 Lutjensee, Germany (e-mail: <DL5KUA@DARC.de>).

SP9PRO Community On The Air Award. Coal mining is also a long-established industry in Poland. The award is issued by SP9PRO Club Station of Poland, established at RYBNIK Division of Mining Engineers and Technicians Association SITG. The award requires working members of the association. Applicants are required to have made confirmed contacts with 15 regular/associate members after November 26, 1972 as follows (SWL okay):

	Regular	Associate
SP Stations	10	5
Europeans	7	8
All Others*	5	10

**May be any 3Z, HF, SN, SP, or SQ stations.*

Regular Members: SP9PRO, SP9PT, SP9RU, SP9AHB, SP9AID, SP9AKW, SP9BQJ, SP9CTW, SP9EBQ, SP9ERV, SP9EWO, SP9EYX, SP9FTJ, SP9FUU, SP9HTU, SP9IJU, SP9LJD, SP9MDO, SP9MQH, SP9QMP, SP9QZZ, SP9REP, SP9UON, SP9WZJ, SQ9MZ, SQ9NJ, SN9K (only1995), HF70A, 3Z9IARU, 3Z0SITG, SP9PT/VE8, 3A/SP9PT, VK2JBR, VK9KNE, 9M6APT, CE0Y/SP9PT, CE1/SP9PT, J3/SP9PT, J3/SP9BQJ, S5/SP9BQJ, PP1ZKA, DL/SP9ERV, OK8/SP9CTW. Also portable activity, above stations (/p, /m, 1–9, etc.).

Associate Members: SP7AID, SP9CXX, SP9DTR, SP9EIJ, SP9EVP, SP9FKQ, SP9FOW, SP9FRZ, SP9FUC, SP9HZF, SP9IKF, SP9JDP, SP9LIP, SP9LJH, SP9MDY, SP9MQA, SP9NLB, SP9NLG, SP9NLK, SP9QMH, SP9QZI, SP9QZT, SP9RCF, SP9RCL, SP9TPB, SP9UNX, SP9UPK, SP9UOP, SP9WAN, SQ9ACH, SQ9ACK, SQ9ANT, SQ9HZM, SQ9JKS, SQ9JKW, DJ0MCZ, DL3NDP, OK2BIQ, VE6CDO.

Send GCR list and fee of 3 IRCs to: Klub Krotkofalow Sitg, SP9PRO, P.O. Box 131, 44-200 Rybnik, Poland. (Internet: <http://www.sp9pro.cad.pl/award.html>)

Worked All Ukraine Award. A great time to contact some of the rarer provinces/oblasts in the Ukraine is during the annual Ukranian DX Contest held in early November each year. Your box of QSLs from Ukrainian stations may already provide most of the contacts needed for this award.

The WAU award is issued by *RadioAmator* magazine for contacts with amateur radio stations in all regions of the Ukraine and the cities of Kiev and Sevastopol made after January 1, 1993. A total of 27 QSOs is required. All contacts may be on one band using the same mode. Stickers are available for specific bands and modes. A VHF sticker is for contacts on 144 MHz and up, not limited as to mode. there is an honor roll list and a special prize for reaching 10 stickers.

Autonomous Republic: Crimea or Avtonomna Respublika Krym (Simferopol).

Municipalities: Kiev (Kyyiv), Sevastopol.

Provinces/Oblasts: Cherkasy, Chernihiv, Chernivtsi, Dnipropetrovs'k, Donets'k, Ivano-Frankivs'k, Kharkiv, Kherson, Khmel'nyts'kyy, Kiev, Kirovohrad, Luhans'k, L'viv, Mykolayiv, Odesa, Poltava, Rivne, Sumy, Ternopil, Vinnytsya, Zakarpattya (Uzhhorod), Zaporizhzhya, Zhytomyr.

Send GCR list and fee of 7 IRCs for the basic award and 2 IRCs for endorsement stickers. SWL okay. Apply to: Anatoly Perevertaylo, UT4UM, P.O. Box 7, Kiev-91, 02091 Ukraine (e-mail: <ut4um@hotmail.com>).

Looking for some help in publicizing your group or club's award? *CQ* magazine can help. Please send details and samples to me at the address at the beginning of this column.

73, Ted, K1BV

Sponsored by the SP9PRO Club Station of Poland, established at RYBNIK Division of Mining Engineers and Technicians Association SITG, the SP9PRO Community On The Air Award requires working members of the association.

The Worked All Ukraine award is issued by RadioAmator *magazine for contacts with amateur radio stations in all regions of the Ukraine and the cities of Kiev and Sevastopol.*

BY JOE LYNCH,* N6CL

Great Plains Super Launch 2006

This year's Great Plains Super Launch (GPSL 2006, the sixth such event) started in Hutchinson, Kansas, launched in Lyons, Kansas, and ended with a surprise lunch in Geneseo, Kansas. In the end more than 40 amateur radio and balloon enthusiasts participated in the activities.

The two-day event formally began on Friday, August 4, at the Grand Prairie Hotel and Convention Center. More than 30 of the balloonists attended the all-day events, which included presentations by the following individuals on the following topics: BalloonSats in High Schools by Paul Verhage, KD4STH; Fast Burst Sensing Balloon Release by Mike Manes, W5VSI; Online Flight Prediction by Troy Campbell, KCØMIC; Balloon Launches for Effective Nanosatellite Training, Development, Testing and Flight Operation by Jeff Dailey; GridCalcPlus Tracking Software by Nick Hanks, NØLP; Long Duration Flight Techniques by Bill Brown, WB8ELK; Balloon LAN: Inter-Payload Wireless Data Communications Environment by Stephen Meer, KØSCC; and Solid State Attitude Gyros by Zack Clobes, WØZC.

On Saturday everyone headed about 35 miles north to Lyons for the planned simultaneous launching of seven different balloons. As nearly always happens, not everyone launched simultaneously. Most of the balloons launched at the scheduled time of 8:30 AM, followed by a couple of stragglers, the last of whom was Bill Brown, WB8ELK, and his crew, launching at around 9:15 AM. The wind conditions were such that for the most part the balloons made a leisurely zigzag flight to the north, with all of them landing around 5–10 miles southeast of Geneseo.

As the crew and chase teams of Edge of Space Science (EOSS) were wrapping up the recovery of their balloon, a member of the Geneseo United Methodist Church happened to drive by the cars and SUVs. Surprised to see this many vehicles on one of the back roads of Kansas near her home, her curiosity got the best of her and she asked the group what they were doing, which provided the opportunity for those assembled to explain the hobby and the morning's activities.

After listening to their explanations, she then asked the group, "Are you hungry?" All replied yes,

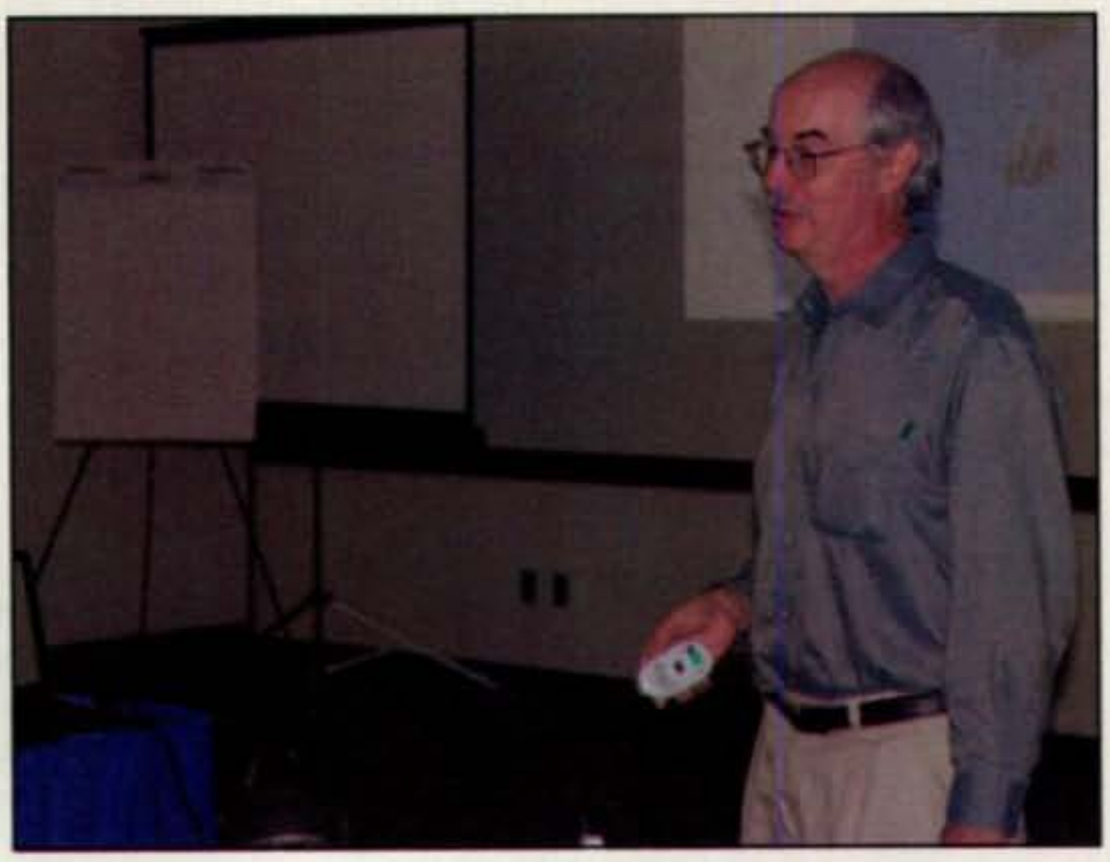
*e-mail: <n6cl@sbcglobal.net>

VHF Plus Calendar

Oct. 1	Very poor EME conditions
Oct. 4	432 MHz Fall Sprint (See text for details.)
Oct. 5–10	AMSAT-NA Space Symposium and Annual Meeting (See text for details.)
Oct. 6	Moon Perigee
Oct. 7	Full Moon
Oct. 8	Good EME conditions
Oct. 14	Last Quarter Moon. Microwave Fall Sprint (See text for details.)
Oct. 14–15	First weekend of the ARRL 50 MHz to 1296 MHz EME Contest (See text for details.)
Oct. 15	Good EME conditions
Oct. 19	Moon Apogee
Oct. 19–22	Microwave Update (See text for details.)
Oct. 21	Delaware Valley VHF-FM Simplex Sprint Contest (See text for details.)
Oct. 21–22	Orionids Meteor Shower Peak. 50 MHz Fall Sprint (See text for details.)
Oct. 22	New Moon; Poor EME conditions
Oct. 29	First Quarter Moon; Poor EME conditions

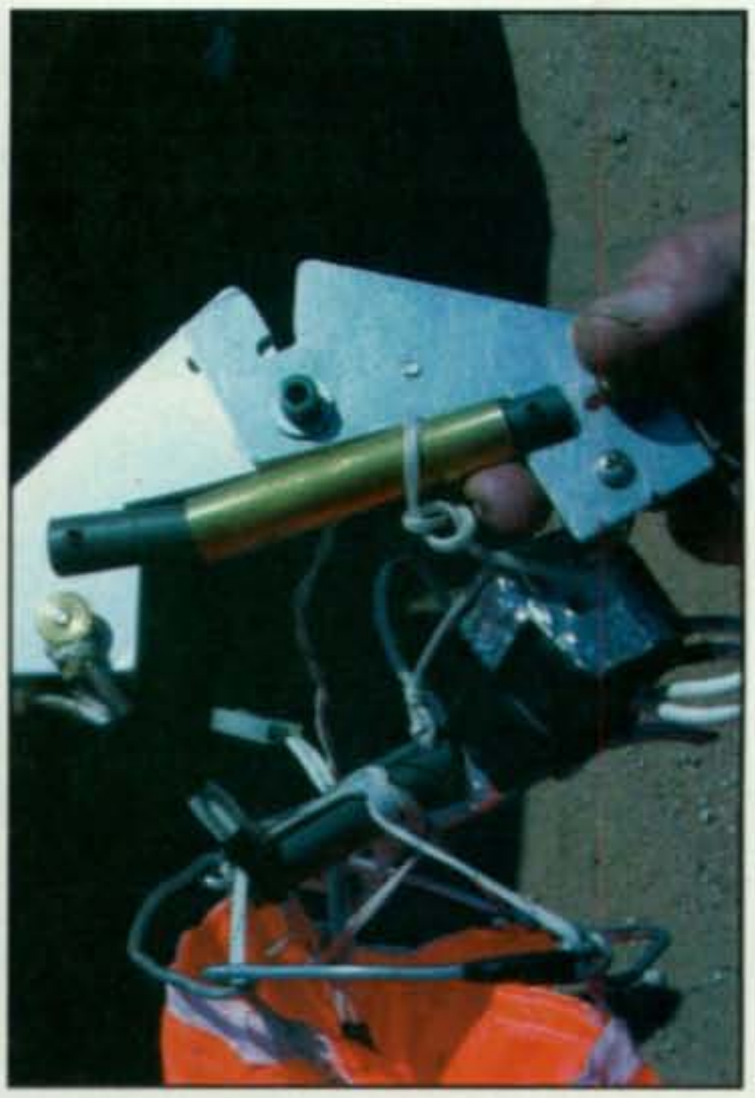
—EME conditions courtesy of W5LUU

Zack Clobes, WØZC, hosted this year's Great Plains Super Launch (GPSL 2006). He also moderated the presentations and gave one of his own. (Photo courtesy of NØKKZ)



Bill, WB8ELK, the dean of ballooning, gave a talk on long-duration flight techniques on Friday. (Photo courtesy of NØKKZ)

Most of the more than a half-dozen balloons were launched almost simultaneously at 8:30 AM on Saturday from the grounds of the Lyons, Kansas airport. (N6CL photo)



Mike Manes, W5VSI, demonstrated how his recovered homebrew cutdown device worked in releasing the exploded balloon from the payload. This device was the subject of Mike's presentation on Friday. (N6CL photo)

with much enthusiasm. She then surprised the crew by stating that members of her church, in anticipation of around 300 bikers driving through Geneseo, had prepared enough food for all of the riders. When very few of those bikers came through the town, the church members realized that they had a problem: What to do with all of that food? The balloonists suddenly became the solution to the problem!

With the encouragement of this parishioner, word was spread on the air that lunch would be served in the fellowship hall at the United Methodist Church in Geneseo. It turned out to be a great place to gather, eat, and talk about the flights.

In the end, all payloads were recovered. However, speaking of food, Bill Brown's payload almost became lunch for a couple of horses that got to it a bit before he did!

The AvMap G4T and GPSL 2006

One of the many programs during this past Dayton Hamvention® was on the AvMap G4T. Don Arnold, W6GPS, who is responsible for this product's introduction to U.S. hams, and Gordon West, WB6NOA, who is always on the lookout for new gadgets, did a dual presentation on the features of the G4T when it is connected to one of Kenwood's two TNC-equipped radios, the TH-D7AG handheld and the TM-D700A mobile. Being nearly as curious about new gadgets as Gordo is, your editor acquired the G4T and the TH-D7AG.

My first real test of this combination came during GPSL 2006. I must say that at this point I am at the very back side of the learning curve on how to use both units—especially together. Nevertheless, I managed to get both of them connected properly and working. This was my first exposure to APRS beaconing, and I was absolutely delighted to watch the screens of the radio and the G4T as the beacon transmitters on the balloons transmitted their data stream, as well as a few of the radios in some of the chase vehicles. As each beacon transmitted its data, its assigned callsign appeared on the screen of the TH-D7AG and a triangle waypoint appeared on the G4T screen that noted its approximate location on the map. It proved almost too much to watch all of these waypoints simultaneously.

I decided to follow one of the EOSS chase teams. At one point during the chase I became separated from the team. Knowing that they were one of the teams that was beaconing made it easy for me to find them. Seeing where they were on the map enabled me to drive up to where they were parked, which was good for me, because I arrived at about the same time as the woman from the church who was extending the lunch invitation.

When the festivities were over, again the G4T proved its usefulness. Leaving Geneseo, I was a bit bewildered as to how I would efficiently return to I-135 to drive back to Tulsa. No problem. I simply drove down the roads that appeared on the screen and soon I was on the interstate headed back home.

I have just scratched the surface of all of the G4T's features. As I learn more about it, I will include my findings in future columns. In the meantime, for more about this product please see Gordo's article entitled "A Hot Spot GPS Finder," which appears in the Summer 2006 issue of *CQ VHF* magazine.

CubeSat Launch Failure

The following is from the *ARRL Letter*, July 27, 2006:

A much-heralded attempt to launch 15 CubeSats built by 11 universities and one private company failed this week. Fourteen of the tiny spacecraft carried amateur radio transmit-only payloads. All of the satellites appear to have been lost.

The Dnepr-1LV rocket lifted off from Russia's Baikonur Cosmodrome in Kazakhstan at 1943 UTC on July 26. Various accounts indicate that the mission went awry less than two minutes after liftoff when the first stage failed to separate on time, causing an emergency shutdown of the rocket's main engine. Reports vary on how far downrange—and just where—the vehicle fell. One said the

A couple of horses surveyed Bill, WB8ELK's recovered payload, probably wondering if it was a lunch treat. (WB8ELK photo)

Dnepr dropped to Earth some 15 km from the launch site, while another put the distance at 190 km. A third account said the Dnepr dropped into the Indian Ocean.

Originally set for June 28, the launch had been postponed until July 26. The CubeSat project was a collaboration between California Polytechnic State University–San Luis Obispo and Stanford University's Space Systems Development Laboratory. All of the CubeSats were designed and built by students at various universities in the US and elsewhere in the world. The CubeSat roster included AeroCube-1, CP-1, CP-2, ICE Cube-1, ICE Cube-2, ION, HAUSAT-1, KUTESat, MEROPE, nCube-1, RINCON, SACRED, SEEDS, PiCPoT, and Voyager.

Thirteen of the satellites were to have downlinks in the amateur radio satellite allocation between 435 and 438 MHz, and one was to operate on 145.980 MHz. None of the spacecraft carried a transponder. Transmitter power outputs ranged from 10 mW to 2 W.

While this launch failure represents a tremendous setback for the CubeSat program, it is hoped that those involved can regroup and once again make an attempt at a similar launch in the next coming months or year or so.

The JT65 Debate

The following is from Wolfgang Schlaffer, DL5MAE, who shares with us his views of Joe Taylor, K1JT's software:

Dear Joe Lynch, N6CL

With great interest I have read your June VHF column in *CQ* magazine. My congratulations for keeping us updated. Being active for many years on 2m CW EME, with DXCC long time ago, and having done dozens of EME and MS DXpeditions around the world, I must say I totally agree with the points Peter, SM2CEW, has raised.

It is indeed important that your column is open and welcomes such impartial and objective views, so as for public opinion to know what is really happening. Following up on the JT65 issue I would like to share my own thoughts as well as brief your readers on what is taking place with credible publications, contest organizers, and forums lately on the subject.

My Thoughts:

1. Beyond any doubt, it is evident that JT65 transfers only 1/7 of the required information for EME QSOs under Deep Search Decoder. This is roughly 10–12 bits, instead of 72 that it should be. Equivalent as a "bits" analogy to 2.5 characters instead of full callsigns. Stranger callsign is not copied in its entirety but matched from a List (calls3.txt file). It is impossible to work any unknown callsign (not in the List and new to EME) at random. Station's own callsign is considered known, and therefore software requires no need to copy it at all.

2. Beyond any doubt it is evident that reports and confirmation are considered trivial messages by JT44, JT65, and K1JT. As such, he has chosen not to transfer them as plain, unknown text. Instead, he created the Shorthand Messages which exist in JT 44 & JT65 since their inception, and instead of copying unknown text, they detect on/off tones which confirm presence of those "trivial messages."

It must be noted that in Digital MS under WSJT's FSK441, for example, shorthand messages do exist as an option, but of course not a single MS operator uses them. The reason is because MS operators do follow IARU MS QSO procedures, which require copy of reports and confirmation in full.

As far as EME is concerned, in cases 1+2 above, nowhere does JT44 or JT65 meet long established QSO guidelines, which have been set for years and voted on at various EME conferences in past decades. Those speak of Copy in full of both callsigns, reports and confirmation. Not of: familiarity of own or stranger callsigns, identification of

Approximately 30 balloonists enjoyed the hospitality and food unexpectedly provided by the members of the Geneseo United Methodist Church. (N6CL photo)

The members of the Geneseo United Methodist Church served lunch to a hungry and grateful group of balloonists following recovery of their payloads. (N6CL photo)

presence, partial reception, and trivial messages which are substituted by Shorthand instead of unknown plain text. Therefore, JT65 EME QSOs taking place for years must not count as valid for awards, contests, etc.

What Has Followed:

Being responsive to recent findings as discussed by the DJ5HG article in *DUBUS* 1/2006 and the SM2CEW webpage, credible contest organizers, long admired VHF/UHF/SHF publications, and International Toplists have decided not to abide by such improper QSO practices.

More Specifically:

a. The very well known EU EME Contest organized by (DUBUS-REF) has decided for 2007 in section "QSO Points," "Digital," to award all JT65 QSOs done by Deep Search Decoder 10 times lower score (similar to skeds) versus random QSOs which count for 100 points. Complete EME Contest rules can be seen at: <http://www.marsport. org.uk/dubus/EMEcont2007.pdf>.

b. *DUBUS* 2/2006 issue discusses no compliance of JT65 QSOs under Deep Decoder Search versus long established QSO guidelines in its editorial.

c. The biggest ham radio International Toplist of DF6NA on the web has excluded all JT65 EME QSOs made with Deep Search Decoder. More information can be found at: <http://www.vhf-dx.net/top.html> and <http://www.vhf-dx.net/dl_first.htm>.

I think it would be very useful and educational for your readers to know all this information.

Best Regards,
Wolfgang Schlaffer, DL5MAE

P.S.: By the way, it's a shame that most (2m) EME nowadays takes place through chatrooms (such as <www.chris.org/cgi-bin/jt65eme>).

As differences of opinion will continue for quite some time to come, I welcome other input concerning this issue.

Silent Keys

The following two amateur radio operators have become Silent Keys: Dr. Chuck Brady, N4BQW, and Dick Ballou, K3MQH.

Regarding Chuck, the following appeared in the ARRL special bulletin, ARLX004: "Retired space shuttle astronaut and DXer Chuck Brady, N4BQW, of Oak Harbor, Washington, died July 23 following a lengthy illness. He was 54. During his years as an active astronaut in the 1990s, Brady was among the pioneers of SAREX (Shuttle Amateur Radio EXperiment). An ARRL member, he was active on ham radio during the 16-day STS-78 shuttle mission in 1996, then the longest ever."

Dick's friend Bob Riese, K3DJC, reported the following to the VHF reflector: "Sad news, Dick, K3MQH, who organized the South Mountain VHF Contest Group, passed away this week [early August]. Dick sold his site several years ago and moved to Florida and was getting active in ARES/RACES. He was a friend and will be missed. He was active from 6 through 24 GHz from Big Flat and always had a loud signal." Steve Rutledge, N4JQQ, added the following: "I am very sad to hear this about Dick. I knew Dick when I lived in the DC area. In fact, I sold him a 222 radio years ago. I knew he had gone to FL and recall his e-mail telling me so. He was a very nice fellow and great competitor."

CQ VHF Contest

Regarding this past summer's CQ VHF Contest, Herb Kumrich, K2LNS, wrote to me the following:

What makes ham radio so much fun is the unknown factor. I have been asked so many times, why not just use a cell phone. The answer is just like fishing, you never know what or who will take your bait.

Two weeks ago I thought I would give out some points in the CQ VHF Contest. The contest is very interesting, since you can only operate 6 and 2 meters. I turned on the radio on Saturday morning and heard a lot of CW activity. It turned out the band was open to Europe. I fired up my amp and worked about 20 stations before I had to head to work. This was many hours before the contest started. I got home about supper time and refired up the 6-meter system. The contest was in full swing by then. What I heard was unreal. There were stations from the Caribbean coming through to the south. Then stations all the way west to California and north to the state of Washington—and everything in between. I found a frequency to call a CQ on and created a monster. My rate of contacts was in excess of 100 per hour. I kept checking 2 meters for *E* skip while fighting the pile-ups.

All of a sudden I started working many stations on short skip to Ohio and Michigan. That was a sure sign to start making noise on 144.200 MHz. I made a few calls and bingo, the 2 meter band opened to the Kansas and Iowa area. I worked about 15 stations before the band closed down. The neat thing was working three new grids for a total of 252 on 144 MHz.

The next morning I fired up 6 meters and Italy and the Canary Islands were worked. I only had a short time to operate due to other activities.

Before I shut down, I heard a very faint CW signal and I had problems copying his callsign. He started building up and don't you know, it was a station in Greece coming through at 559. I sent my call three times at a very slow speed to break the pile-up. Wow! He came back to me and we made a quick contact. Perhaps I could have called him on the telephone, but I don't think the experience would have been as extraordinary.

I only operated the contest for a total of seven hours, but I enjoyed every minute. The amazing thing was working 130 grids in a very short period. I worked 20 new grids on 6 meters to bring me to 420.

So where does this ham radio hobby rate? It's on the top of my list. DX to all.

Current Contests

The **432 MHz Fall Sprint** is October 4, 7 PM to 11 PM local time. The **Microwave (902 MHz and above) Fall Sprint** is October 14, 6 AM to 1 PM local time. Note: You are to operate no more than five hours, in one-hour blocks, during this contest time slot. The **ARRL 50 MHz to 1296 MHz EME Contest** is October 14–15. The **Delaware Valley VHF FM Simplex Sprint Contest** is October 21, from 10 AM to 2 PM

local time; for more information go to: <http://www.harcnet.org/contest.htm>. The **50 MHz Fall Sprint** is October 21, 2300 UTC to October 22, 0300 UTC.

For ARRL contest rules, see the issue of *QST* prior to the month of the contest or <http://www.arrl.org>. For Fall Sprint contest rules, see the Southeast VHF Society URL: <http://www.svhfs.org>.

Current Conferences and Conventions

The 2006 **AMSAT-NA Space Symposium and Annual Meeting** will be held October 5–10 in San Francisco, California at the Crowne Plaza Hotel San Francisco Mid-Peninsula Hotel. For more information, see the AMSAT URL: <http://www.amsat.org/amsat-new/symposium/>.

The annual **Microwave Update** conference dates are October 19–22, and it is to be held at the Dayton, Ohio Holiday Inn North Hotel, Wagner Ford Rd.. For more information, go to: <http://www.microwaveupdate.org/>.

Current Meteor Showers

The *Draconids* is predicted to peak somewhere around 1430 UTC on October 8, then again at around 2220 UTC on October 9. The *Orionids* is predicted to peak on October 21. For more information on the above meteor shower predictions, see NW7US's Propagation column elsewhere in this issue. Also visit the International Meteor Organization's website: <http://www.imo.net/calendar/2006/>.

And Finally . . .

Life's priorities have a way of changing one's plans. This past July and August I had scheduled my two-week vacation to coincide with the Central States VHF Society conference in Bloomington, Minnesota and the GPSL in Hutchinson, Kansas. As it turned out, a break-in at my church which occurred in the early hours of the morning on which I was scheduled to leave changed all of my plans. For the next two weeks my focus was on my church and my parishioners and how we would deal with the aftermath of the break-in.

As it turned out, we were among ten churches that were targeted by a short-lived gang of four thieves who were eventually caught inside one of the churches thanks to an alert neighbor calling the police. Even so, it took those of us at my church the better part of two weeks to put everything back together and to get estimates from alarm companies for installing a new alarm system.

It wasn't until Thursday, August 3 that I felt any freedom to leave for what was left of my planned trip. Unfortunately, I was unable to attend the conference and the GPSL presentations. Even so, as you read earlier in this column, I was able to witness the balloon launches and accompany a few of the chase teams as they tracked their respective balloons.

As a United Methodist minister, I was most delighted to be on the receiving end of one of my fellow congregation's outreaches to its community in the form of the food we shared at GPSL 2006. We in the amateur radio fraternity find ourselves interconnected by our common interests in the hobby and the friendships we form over the years. So it is with church members of a connectional denomination such as mine. Therefore, it was all the more special to me to learn that it was one of my own denomination's congregations that had made an effort to reach out to its community. What was even more heartening was that when those for whom the food had been prepared failed to show, the people of the congregation found others to feed, that being we balloonists and amateur radio operators who just happened to be there.

In the end, this whole incident reminded me of an ancient story of the king who had a wedding feast and invited hundreds of guests—only to have all of them beg off their invitations. When the king learned of this, he told his servants to go out on the highways and invite whomever they saw to come to the feast. As it turned out for the members of the Geneseo United Methodist Church, when they were faced with a similar dilemma they took it upon themselves to go out on the back roads of Kansas and invite to the feast whomever they saw. We hams were the very fortunate recipients of the wonderfully prepared food.

Thanks to the caring and sensitivity of the members of this small town congregation we all learned something of value. For the members of the congregation, they learned a bit more about our hobby. For us ham radio operators, we learned a bit more about selflessness and caring. Finally, for me it was a wonderful way to experience—this time as a recipient—the outreach of members of my denomination.

If you have a tale to tell regarding your experiences in our wonderful hobby, please write to me or e-mail me about it and I will endeavor to get it published in a future column. Until next month...

73 de Joe, N6CL

contesting

BY JOHN DORR,* K1AR

Using Packet Spotting – Its Cause and Effect

October's Contest Tip

Try entering the next contest with one specific operating improvement in mind. For example, it may be doing a better job working multipliers, or you may want to set a personal best in total QSOs, highest rate, or DXCC on a given band. As I often say, part of the allure of contesting is to have fun, and using the sport to improve your operating skills and personal satisfaction is a big part of that. At the end, you'll be a better contester by setting personal goals for yourself. Think about it!

Calendar of Events

All year	**CQ DX Marathon**
Sept. 23–24	**CQ WW RTTY Contest**
Sept. 23–24	Scandinavian SSB Activity Contest
Sept. 23–24	Texas QSO Party
Sept. 30–Oct. 1	Arkansas QSO Party
Sept. 30–Oct. 1	CIS DX Contest
Oct. 1	RSGB 21/28 MHz Contest
Oct. 3–5	YLRL CW Anniversary Party
Oct. 7–8	TARA PSK Rumble Contest
Oct. 7–8	Oceania SSB Contest
Oct. 7–8	California QSO Party
Oct. 10–12	YLRL SSB Anniversary Party
Oct. 14–15	Oceania CW Contest
Oct. 14–15	Pennsylvania QSO Party
Oct. 15	Asia-Pacific Fall CW Sprint
Oct. 15	North American RTTY Sprint
Oct. 21–22	JARTS WW RTTY Contest
Oct. 21–22	ARCI Fall QSO Party
Oct. 21–22	Worked All Germany Contest
Oct. 21–22	W/VE Islands QSO Party
Oct. 21–22	Illinois QSO Party
Oct. 28–29	**CQ WW DX SSB Contest**
Nov. 25–26	**CQ WW DX CW Contest**

The subject of packet spotting has been widely discussed over the years, yet it seems that the contest community still doesn't get it. Some operators (new and old alike) consider spotting to be a tool more important than their antennas. Others, to be blunt, use spotting to cheat while claiming single operator status.

I'd like to go on record this month with some straight talk about packet spotting usage, not as a self-proclaimed expert, but as a contester who cares about the future of the sport. If you're a new contester read on; if you've been around the block, I suggest you read this as well.

The fact is that contesters have always been known as innovators in communications technology. Packet radio and its application to DX spotting and communications is great proof of that. This month I'd like to focus your attention on packet's impact on contesting. Has it all been positive? Where is it heading? Should contest sponsors take preemptive steps? These are the questions we should be thinking about.

A sports report I watched on television recently had a segment that highlighted the escalating salaries among players. Contract terms such as $140 million for 8 years and $240 for 10 years with $13 million signing bonuses boggle the mind. For many, sports compensation has grown completely out of control. The question to consider in our terms is has packet spotting in contesting gotten out of control.

Packet radio applications began years ago as an innovative way to allow multiple users to connect to a centralized "node" for the messaging and transmission of data traffic. When Dick Newell, AK1A, came on the scene, he had a vision that this could be extended as a tool to notify users of DX on the bands. In its infancy, the tool was very rustic, to say the least. I recall many times when Dick would put his node on the air and I would spend evenings with him trying to "break it." Much to Dick's chagrin, I was often successful. However, that success quickly translated into proliferation of the concept. Once node providers figured out a way to fund the technology, the availability of PacketCluster™ became nearly ubiquitous in ham radio. In fact, there are literally thousands of packet spotting nodes around the world, with new and improved versions of packet software coming to market at an amazing rate.

Since those early days, the internet has created more access to packet, as you can now TELNET your way into hundreds of packet nodes around the world without even owning a radio. This rapid growth has led to widespread adoption by tens of thousands of users in hundreds of countries around the world. To say that the cat's out of the bag is a huge understatement.

Well, I think we all can identify the benefits that have come from this revolution, so I'm not going to spend much time on that area this month. It, of course, ranges from newfound enthusiasm for DXing and contesting in general to increased use of computers in ham radio—and those are factors that can't be ignored.

However, there also has been a flourishing downside from packet use, and a significant one at that. Some of you may view this as taking the half-empty-glass approach to the debate, but I prefer to describe it as calling a spade a spade in this case. Here are some of the realities:

- Packet radio spotting has a potentially negative impact on contesters' own basic operating skills. We can become lazy by being dependent on what shows up on our computer screen at the expense of good old-fashioned tuning.
- Logging inaccuracies abound as operators simply enter the callsign on the screen rather than actually copying the ID of the station they're working.
- Some of us have become so dependent on packet spotting that we won't even bother to enter

*2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

a contest if we temporarily "lose our connection." It's as if there's an emerging need for Packet Spotting Anonymous!

• A new opportunity for cheating using packet spotting surfaced when packet monitoring by single operators became possible. In fact, there's a disturbing trend of some who consider the use of packet by single operators to be acceptable as long as it's in operating events that are outside of the "big" contests, especially if it's a part-time operation or the score is "non-competitive." The CQ WW Contest Committee has taken a leadership role in finding entrants who have used packet inappropriately for their stated category. Frankly, the log-checking tools are becoming so sophisticated these days that anyone who plans to cheat in this way will do so at the expense of their own personal reputation.

• If you've ever been on the DX end of a contest (or represented a rare contest multiplier), you are all too familiar with the concept of a packet pile-up. With packet spotting, we move around in herds from one DX spot to the next, creating havoc, especially for the casual and/or inexperienced operator on the other end who wonders what happened as his pile-up grows from two stations to dozens in a matter of seconds. In fact, this effect is now taking place while operating from nearly anywhere as the desire to fill up band maps becomes more and more pervasive.

When considering the factors I've outlined above (and others), some very strong opinions are held by many high-profile contesters. There is a growing movement that says packet spotting should be totally eliminated in contesting. The view is that the benefits are significantly overshadowed by the negative factors. Even if you buy into that argument, as stated above, there's just too much momentum and acceptance of packet use by mainstream contesters to make that bold a move. After all, this is not the 1920s when prohibition was decreed. And just as prohibition would not work in the 21st century, neither would the elimination of packet radio at this point.

So what should we do? Peer pressure has always been our best tool in improving contest operation. Here are some suggestions:

• The rules are clear on packet use. If you're a single operator, be a single operator—period! There should be no exception for *any* contest. Anything else is unfair and wrong. If you suspect someone has violated this rule, challenge them on it. Casual operating using packet while claiming single operator is still cheating; the rules don't apply exclusively to major contests or only the ones in which you are operating seriously. A few of you may have noticed that I've entered the single operator assisted category is some recent contests. The fact is that I'm not endorsing spotting; I am entering the category required by the rules.

• Take pride in your logging accuracy by not falling into the trap of logging the badly copied calls that appear in the packet scheme.

• Don't become one of those obnoxious endless callers in packet pile-ups.

• Be a contributor to packet spotting as opposed to mostly a consumer. Never let your tuning skills become a neglected part of your operating portfolio.

Well, there's certainly more that can be said on the topic, and I'm certain I'll get some mail with comments. Packet spotting is here to stay. The very least we can do is make it an asset of contesting. It's your choice!

Final Comments

It's October and most of you know what that means: The CQ WW DX SSB Contest is almost upon us, with the CW section to follow in November. Yes, ham radio's biggest contest is about to run for the 58th time! I wonder if there is anyone out there who has operated in all of them, or perhaps you experienced the first one. If so, I'd like to hear from you.

Best of luck to all as we enter this year's contest season! 73, John, K1AR

BY TOMAS HOOD,* NW7US

Is HF Signal Propagation Reciprocal? plus CQ WW DX SSB Contest Predictions

A Quick Look at Current Cycle 23 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, July 2006: 12
Twelve-month smoothed, January 2006: 21

10.7 cm Flux
Observed Monthly, July 2006: 76
Twelve-month smoothed, January 2006: 84

***Ap* Index**
Observed Monthly, July 2006: 7
Twelve-month smoothed, January 2006: 10

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for October 2006

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 4-17, 19-20, 23-27, 30-31	A	A	B	C
High Normal: 3, 21-22	A	B	C	C-D
Low Normal: 18, 29	B	C-B	C-D	D-E
Below Normal: 2	C	C-D	D-E	E
Disturbed: 1, 28	C-D	D	E	E

Where expected signal quality is:
A—Excellent opening, exceptionally strong, steady signals greater than S9.
B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.
C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.
D—Poor opening, with weak signals varying between S1 and S3, with considerable fading and noise.
E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.
2. With the *propagation index,* use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 2 will be nearly nonexistent on Oct. 1st and 28th, fair (C) on the 3rd, and then remain Good (B) from the 4th through the 17th, etc.

I live in the Seattle area, but my QTH is out in the boonies near Olympic National Park. Although the country is beautiful (and wet!), the cell-phone service varies from marginal to lousy. When I look at the phone's "S-meter," I sometimes see one or two bars, so I make the call. However, all too often the signal drops and the service is lost. If it were analog, I probably could hear the person I call, but he might not hear me. How frustrating. I am a ham radio operator, though, so I should be able to figure this out.

Cell-phone frequencies are in the 850- and 1900-MHz bands, and although I am no cell-phone expert, the principles should be the same as those we use in ham radio. Obviously, the antenna gain of my little handheld is less than that of the big directional antennas on the cell towers, and their transmit power must certainly be higher than mine. Hmmm . . . maybe if I just move around, or hold my phone at a different angle. *"Can you hear me now?"*

It seems clear that the two sides of a cell-phone circuit are not the same. All that made me wonder about HF radio reception. I know from experience that sometimes my ham radio contacts cannot hear me, although I can hear them quite well. It's time to investigate this interesting phenomenon.

*P.O. Box 213, Brinnon, WA 98320-0213
e-mail: <cq-prop-man@hfradio.org>

HF Signal Reciprocity

One would think that ionospheric radio propagation would be reciprocal. That is, the signal strength in one direction should be the same as in the reverse, or reciprocal, direction. In HF ray-trace theory, the distance is the same and the ionospheric control points—the points where the wave is reflected (or more properly, refracted) back to the ground—should be the same. However, I decided

Fig. 1 – Forty-meter signal strength for a circuit to the south. (Source of all figures: NW7US/ACE-HF PRO, Version 2.05)

Hour	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	AVG
N to S Sig.	15	30	37	41	42	42	42	42	42	41	41	41	40	40	37	31	17	—
S to N Sig.	15	31	37	42	43	42	42	42	41	41	40	40	39	39	37	31	18	—
Difference	0	1	0	1	1	0	0	0	–1	0	–1	–1	–1	–1	0	0	1	–0.6

Fig. 2– Reciprocal 40-meter signal strengths for N-S and S-N paths.

Hour	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	AVG
N to S Sig.	28	31	37	41	42	42	42	42	42	41	41	41	40	40	37	31	17	—
S to N Sig.	27	30	37	42	43	42	42	42	41	41	40	40	39	39	37	31	18	—
Difference	–1	–1	0	0	0	0	0	0	3	3	–1	0	0	1	0	1	1	–0.4

Fig. 3– Reciprocal 40-meter signal strengths for W-E and E-W paths.

to run some test circuits using the ACE-HF System Simulation & Visualization software to see if signal predictions *were* the same in both directions. (See my review of the new ACE-HF V2.05 model in the May 2006 issue.)

ACE-HF <http://www.acehf.com> permits one to predict both signal strength and signal-to-noise ratio (SNR), and I started with signal strength. I set up a couple of sample circuits from my station using north-south and east-west directions. I used default isotropic antennas with +6 dBi gain at each end, set the transmit power at 1000 watts, and assumed SSB communications with a Required SNR (RSN) of 48 dB-Hz and a 50% Required Reliability. The *Normal* absorption model setting was selected (see my review of ACE-HF's new Absorption Model in the July 2006 issue.)

I used the month of August for the analysis, because in the Northern Hemisphere summertime atmospheric noise is higher, and I found that the predicted smoothed sunspot number (SSN) for July 2006 was about 18. After quickly reviewing several ham-band predictions, I settled on the 40-meter band for this analysis. Man-made noise was set at the default *Rural* level for all the tests.

For a north-south path, I specified a 3634-km circuit from Brinnon to a maritime station at 15° N latitude, south of my location. Fig. 1 shows the predicted signal strength. As expected, the signal is highest at night and decreases as daylight approaches.

By using the new ACE-HF User Mode switch, I then changed from the *Ham* mode to the *Shortwave Listener* mode, which simply reversed the circuit so that my station became the receiver. I then repeated the prediction and found the chart to be nearly the same. To be sure, however, I used the ACE-HF *Bands* display to find exact hourly values, as shown in the table, fig. 2. These values show agreement within 1 dB as the

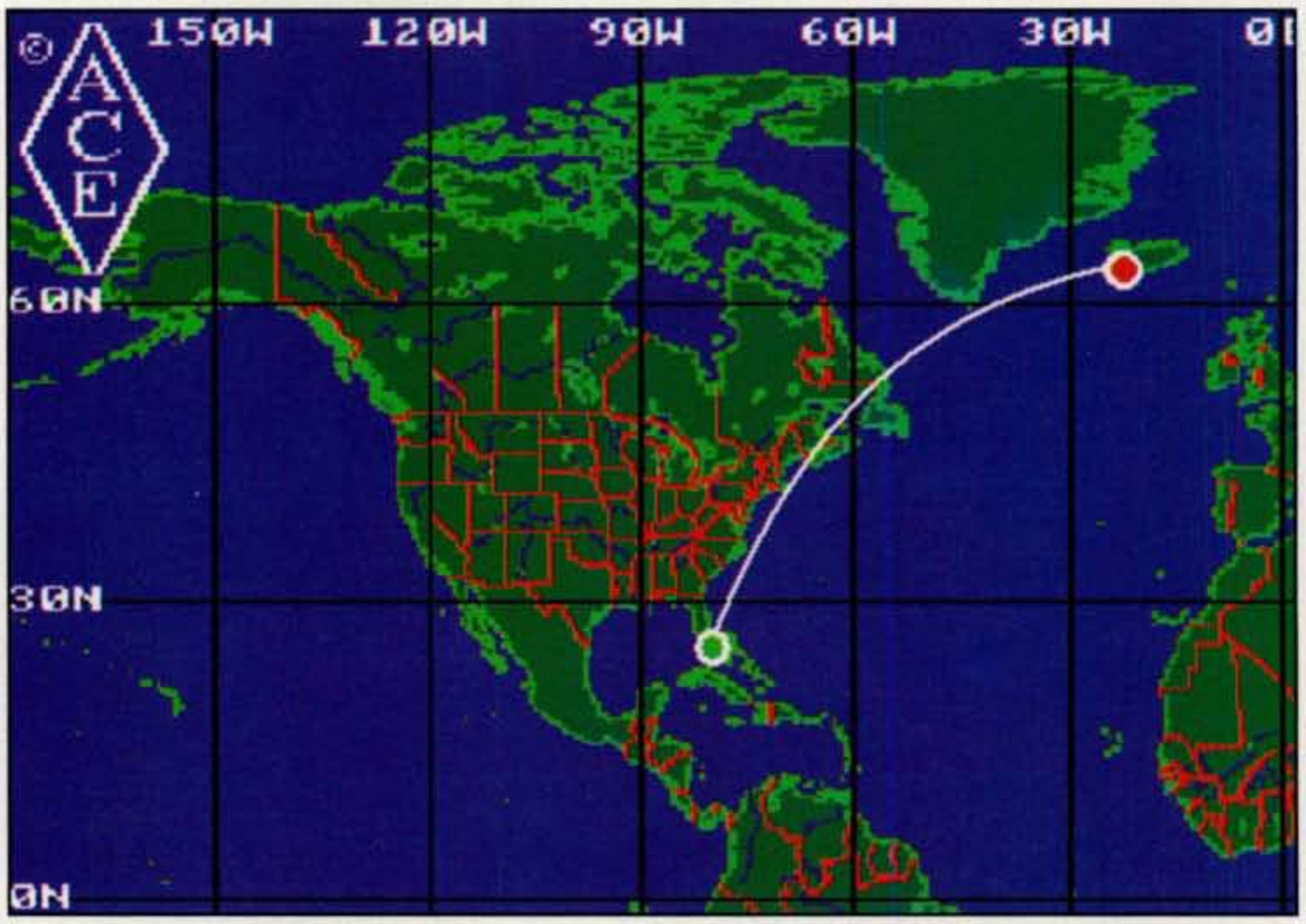


Fig. 4 – Keflavik to Miami circuit.

direction of transmission was changed, so I concluded that for this circuit, 40-meter signal propagation was indeed reciprocal (and the differences were probably round-off errors).

Next I tried a circuit from Brinnon, WA to Bathurst, New Brunswick—a city at about the same latitude as that of Brinnon. This east-west path was expected to show signal-strength differences with direction, because at most times of day the terminator in August was sweeping through the path and the control points were slightly varied. The results of this comparison are shown in fig. 3, where the average difference was less than one-half dB over the 17-hour time period. Again, signal strength was judged to be essentially reciprocal.

I knew that one shouldn't judge signal reciprocity by only two examples, as results will vary with frequency and by path characteristics. It doesn't matter anyway, because signal strength is not what determines circuit connectivity. Instead, it is the received SNR (signal-to-noise ratio) level that controls our ability to make solid contacts.

Circuit Reciprocity

Think of it this way: Imagine sitting in a crowded hall waiting for the concert to start. You can easily hear a conversation between people a few rows behind you and you can speak to your neighbor in a whisper. The ambient noise in the hall is very low. The curtain rises, the conductor appears, and the audience begins to applaud; the noise level has risen considerably. You must raise your voice—raise your signal level—to be heard by your neighbor. The noise part of the SNR equation has gone up, so your signal level must also be higher.

The same thing happens when we listen to our radio. A distant signal that we heard at S7 yesterday can't be heard today even though we had scheduled a QSO, because now we are in the mid-

dle of a thunder and lightning storm. The noise has risen—but not the distant signal—so the SNR has gone down. In radio communications, SNR is the name of the game, not signal alone.

Unless you are in the middle of an industrial area where high man-made noise levels exist, the principal limitation on received SNR is atmospheric noise that comes from lightning flashes. When you are very near a thunderstorm, your receiver may be almost blocked by interference from lightning. We can illustrate this by again using ACE-HF to simulate a circuit. This time, I specified a circuit from a ham in Keflavik, Iceland to a station in Miami, Florida, as shown in fig. 4. I chose this circuit purposely because August thunderstorms concentrate in the Caribbean and in central North and South America. Thus, as one approaches the polar regions, atmospheric noise levels diminish and noise at Keflavik should be lower than at Miami.

Let's see what ACE-HF has to say about reciprocal SNR predictions. Figs. 5 and 6 show comparative SNR vs. TOD (time of day) charts for this circuit. The first is for the transmitter at Keflavik and the second reverses the circuit. Reception at Miami is marginal, but when the circuit is reversed, a significant SNR increase is predicted. The only thing we have changed is the receiver's location. The better SNR is due to the lower atmospheric noise level at Keflavik.

To quantify this effect, we will again use a table, as seen in fig. 7. The SNR difference is striking! For the 13 hours examined, where the predicted SNR was above the "red" chart areas, the average SNR difference at Keflavik was nearly 15 dB. To put this in perspective, to achieve a comparable SNR at Miami would require raising the Keflavik transmit power from 1000 to about 32,000 watts! The effect of atmospheric noise on connectivity is indeed powerful, and for this circuit at least, connectivity is certainly not reciprocal!

Of course, not all HF circuits have such large reciprocity differences. Those where their terminals are in equivalent noise regions would enjoy similar SNR levels, other conditions being equal. To examine this effect more completely, I set up an ACE-HF Circuit Group chart, as shown in fig. 9.

The Circuit Group chart permits you to see simultaneous predictions for as many as 18 circuits and is a favored ACE-HF tool for use in contesting and DXing. For example, to achieve the Worked All Zones award, you might set up 18 circuits from your station to the missing areas. ACE-HF will then compute all 18 circuits for all ten ham bands and all 24 times-of-day. You can then watch the chart—it advances automatically every hour—to see when various bands will be open, or you can advance the time setting in order to plan your next call.

In my case, however, I wanted to use the chart to test SNR reciprocity, so I used the chart to specify nine circuits from my station in Brinnon. Then, for each circuit I used the ACE-HF Ham/SWL user mode to reverse each circuit. The results for each station are shown one after the other in the chart. To get

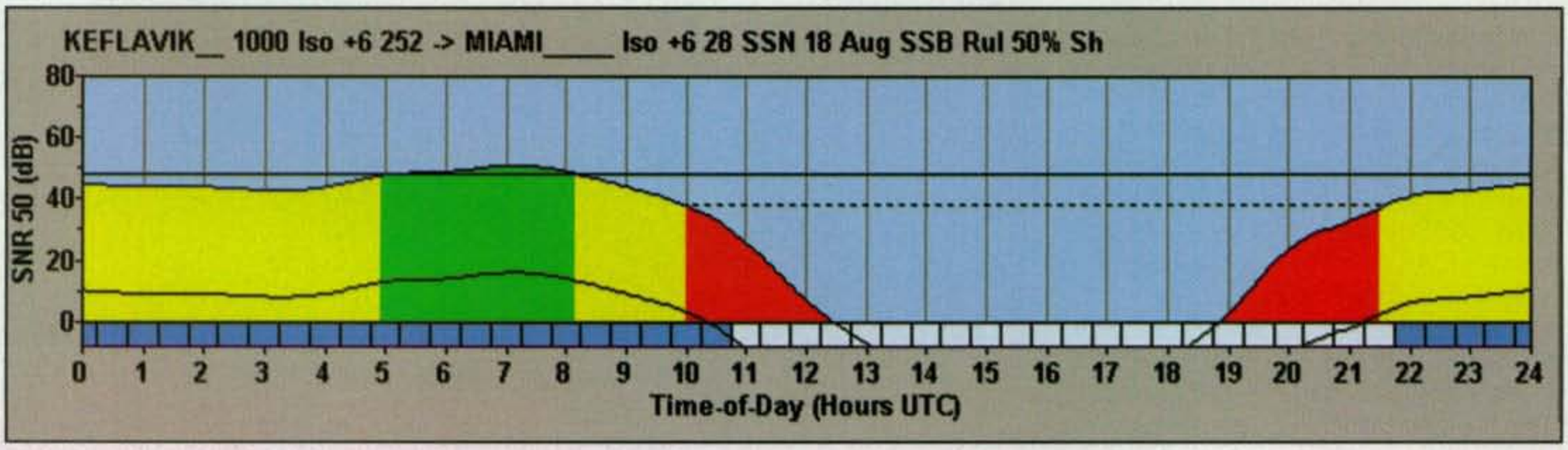


Fig. 5 – Keflavik to Miami 40-meter SNR vs. TOD.

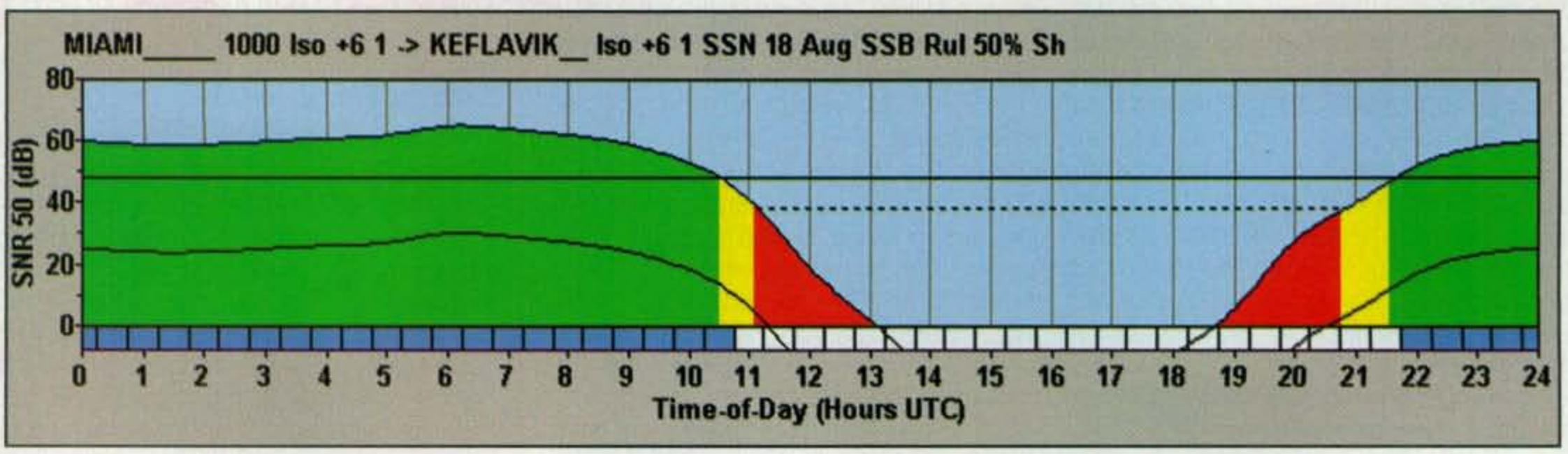


Fig. 6 – Miami to Keflavik 40-meter SNR vs. TOD.

Hour	1	2	3	4	5	6	7	8	9	10	—	22	23	24	AVG
SNT at Miami	44	44	43	44	48	49	51	49	44	38	—	41	43	45	—
SNR at Keflavik	59	59	60	61	62	65	64	62	59	53	—	52	58	60	—
Difference	15	15	17	17	14	16	13	13	15	15	—	11	15	15	14.7

Fig. 7– Forty-meter SNR for Keflavik and Miami reception.

uniform results around my QTH, I first ran ACE-HF area coverage maps to find the best hour for uniform coverage on 40 meters around my station. That coverage at 08 UTC is shown in fig. 8.

Returning to fig. 9, the Circuit Group chart shows the SNR values for the nine circuit pairs. The green cells show SNRs that are above the RSN, the yellow cells are for values within 10 dB of RSN, and the red cells show SNRs below that level. The best frequencies for each circuit are shown by the blue-colored cells.

Focusing on the 40-meter values (Ch 04), the circuit to Bathurst is reciprocal within about 2 dB as expected. However, the circuit to Barrow on the north coast of Alaska shows a difference of 10 dB! Honolulu is quieter than Brinnon by 4 dB, which is to be expected, because the Pacific Ocean is more "peaceful," I suppose.

Comparing the other circuit pairs reveals other reciprocity differences that can be explained by the expected location of thunderstorm centers around the world. At 08 UTC it is nighttime over North and South America and that is when thunderstorms usually occur. For example, reception at Caracas, Venezuela is expected to be noisy, and the chart shows that the 40-meter predicted SNR is 8 dB worse than at Brinnon, WA at that time.

System Factors Affecting HF Reception

There are many system factors that affect HF reception, and all must be understood and evaluated if we are to make accurate simulations. As we have seen, software such as ACE-HF will sort out the signal strength and SNR predictions automatically, but it is up to us to properly specify the system if our predictions are to match our on-the-air experiences.

A brief checklist of system factors that will affect reception is given in fig. 10. As you review the list, think of how you can determine those factors for both ends of your circuits. Of course, you can most easily characterize your own station. Distant terminals represent unknowns, so it's good if you can at least ask your frequent contacts about their transmit power and antenna gains. When you simply call CQ, simulating the system is more difficult. For simulating the unknown stations, which I do when I make ACE-HF area coverage maps, I usually specify isotropic antennas at the receive stations, and to be conservative I assume their transmit powers to be 100 watts or less.

Given all these constraints, we are almost assured of having different conditions at each end of the circuit. So is HF reciprocal? Almost definitely not. Every station will have a different set of equipment and different antennas, depending on the interests and pocketbooks of the station owners. Also, as we have seen, even one's location and the weather close to the station will affect reception—and we sure can't control the weather!

That doesn't mean that ham radio operation is impossible or even difficult. System simulation models such as ACE-HF help us sort out the differences and keep us from becoming discouraged when we hear a cool station but he can't hear us. Remember my cell-phone experience. Ham radio and shortwave listening are really the same thing, and once we understand that each circuit is likely to be different, we can work smarter and optimize our time on the air.

You can hear me now!

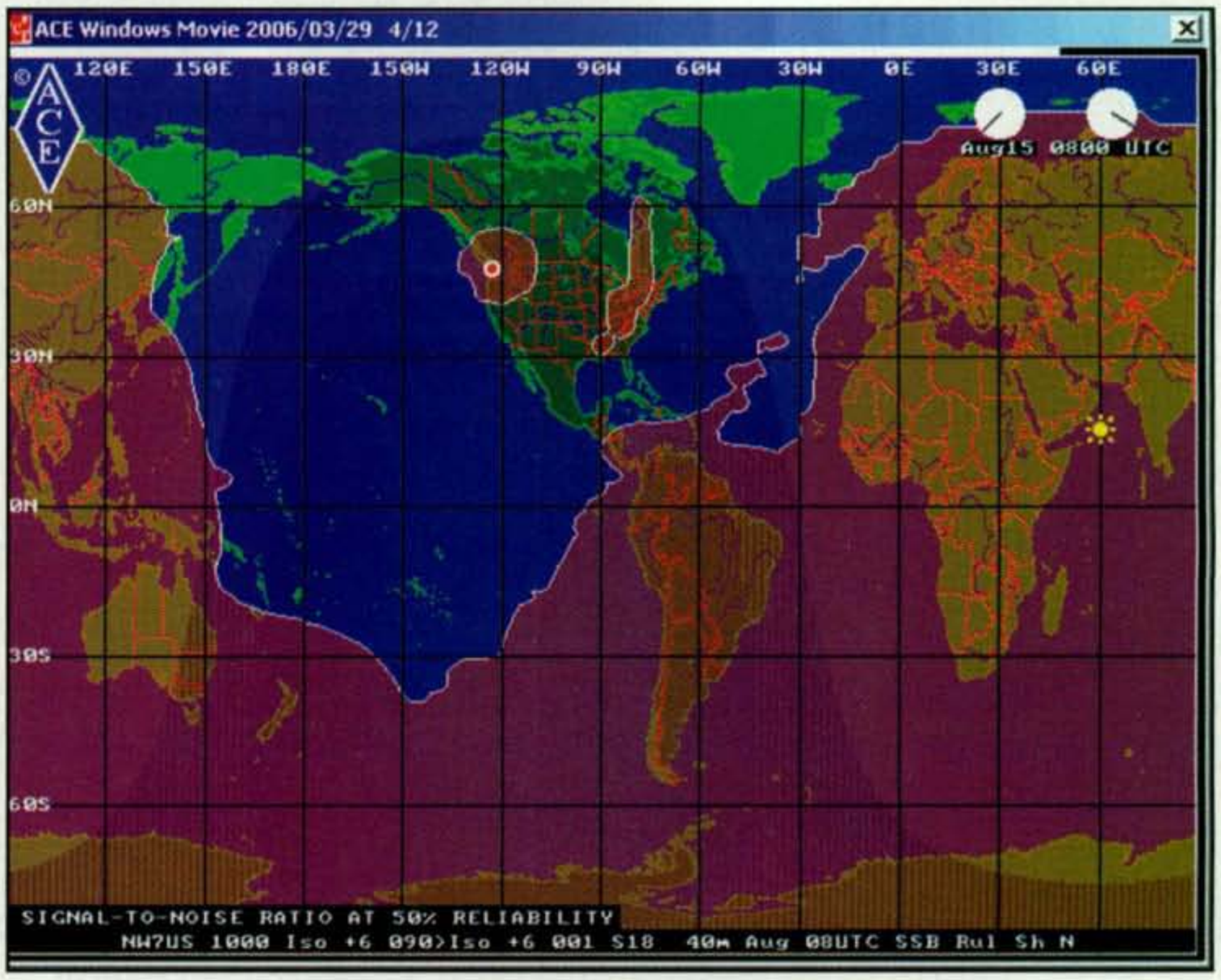


Fig. 8– NW7US 40-meter coverage at 08 UTC.

Rough Conditions Predicted for CQ WW DX SSB Contest 2006

HF radio enthusiasts celebrate the arrival of the winter DX season. From October through November 2006 we will see a steady improvement in the DX bands. During the CQ WW contests taking place in both months, we should experience fairly good success.

The 2006 CQ WW DX SSB Contest will start at 0000 UTC, Saturday, October 28, and run through 2400 UTC Sunday, October 29. Looking at the 27-day rotation of the sun, taking into consideration the current solar activity at the time of writing this column, propagation may be very poor. This may occur if the recurring coronal-hole activity causes an increase in the geomagnetic conditions, causing degradation in ionospheric density and energy. We are at the period in the current solar cycle where large coronal holes dominate.

Predictions for one 27-day rotational period are far more accurate than for three 27-day rotational periods. Be sure to carefully check conditions on September 30 and October 1, since this would be one rotational period before the SSB contest weekend. There is a better than 90-percent chance that conditions observed on those days will recur during the October contest weekend.

See the "Last-Minute Forecast" for expected day-to-day conditions for the entire month of October. An updated day-to-day forecast for the SSB contest weekend will appear as a bulletin at the beginning of next month's column. November's issue should reach most subscribers before the SSB contest begins. You can also see an up-to-the-day "Last-Minute Forecast" on my propagation resource center, at <http://prop.hfradio.org/>.

Table I tabulates the observed sunspot count during previous WW DX Contest periods since 1995 and includes predictions for the 2006 contest. Contest conditions could be somewhat like those of 1995 and 1996. Low to middle latitude propagation paths should be poor to fair on lower frequencies, while it might be a struggle to find propagation on the higher HF frequencies. It is expected that the bands will have a lot of fluctuation in performance, although the lower frequency bands will be much quieter than the past few years.

The DX Propagation Charts and other information in this month's column are designed to help you to make the most of propagation conditions during the contest, if you participate. Even if you are not a dedicated contester, you should give it a try. If you are trying for your DXCC or other paper, the CQ WW is the contest of choice, especially during more active solar years. Sure, conditions may not be as hot as during the years of the solar cycle maximum, but with the improvement in propagation on lower HF bands, such as 40 meters, there's a lot of opportunity to make a good score.

Try out propagation modeling and forecasting software programs to see how those programs model the contest conditions based parameters such as your antenna properties, geographical location, power levels, and operating times. You can work out an operation plan using tools such as the Animated Coverage Maps found in ACE-HF Pro, or the ACE-HF Pro's band-opening

	1995	'96	'97	'98	'99	2000	'01	'02	'03	'04	'05	'06
Oct.	12	9	32	71	108	115	114	91	58	36	26	10*
Nov.	11	10	35	73	111	113	116	85	57	35	25	8*

**Predicted values expected during the 2006 contest.*

Table I– Smoothed sunspot numbers recorded during CQ World-Wide DX Contests since 1995 (Oct. SSB, Nov. CW).

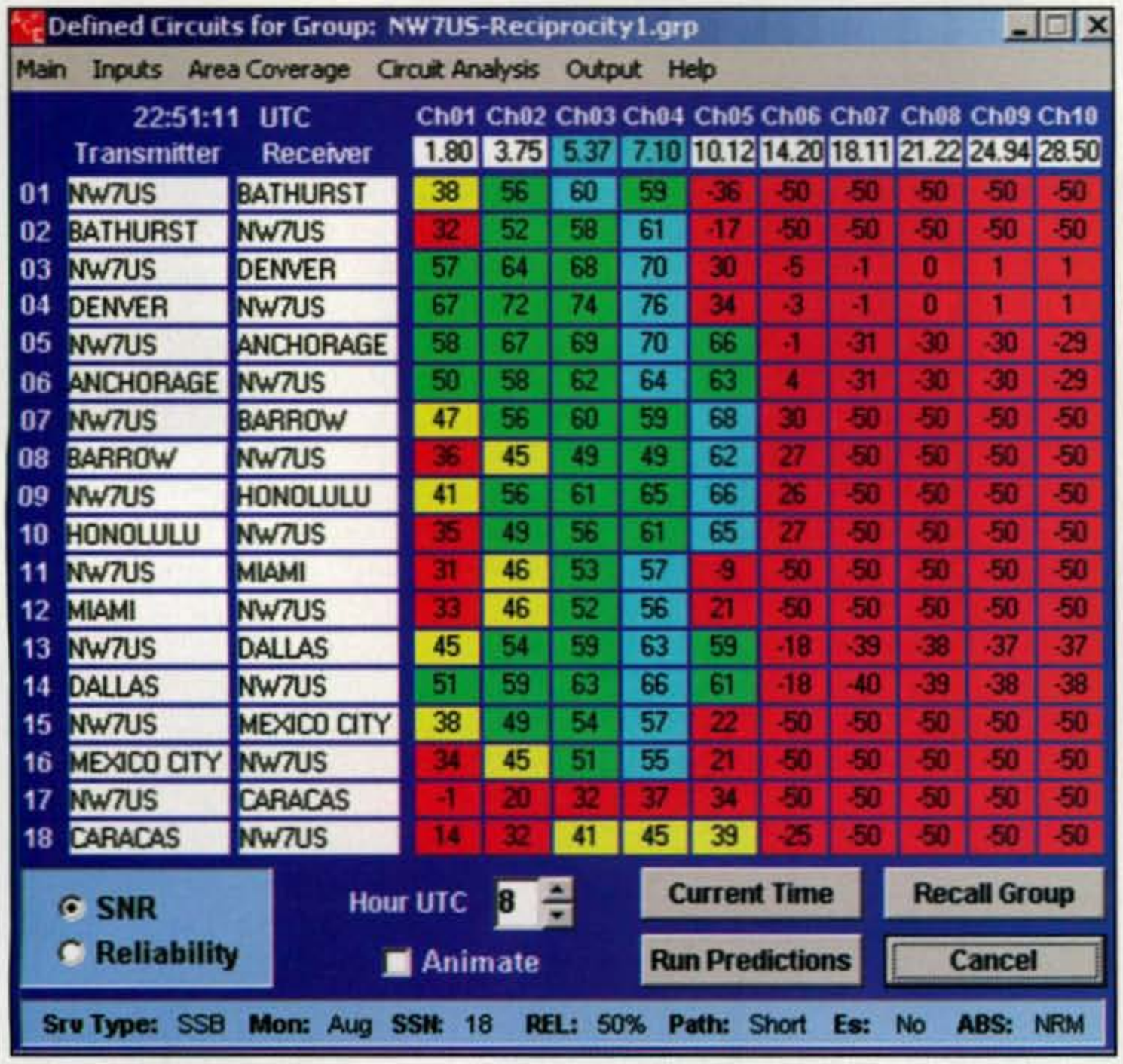


Fig. 9– NW7US circuit SNR for reciprocity test group at 08 UTC.

HF System Factors Affecting Reception

1. Trasmit Power Level.
2. Transmission Line and Coupler Loss.
3. Antenna gain as a Function of Frequency.
4. Antenna Directionality.
5. Atmospheric Noise Level (computed by the model).
6. Man-Made Noise Level at Receive Station (estimated by the user).
7. Are Common Antennas used for both Transmit and Receive?
8. Is Cross-Band or Offset-Frequency Operation Employed?

Fig. 10 – HF system factors affecting reception.

charts for the various propagation paths you wish to target to get those extra contest points.

VHF Conditions

Sporadic-*E* activity is very rare during October in the northern temperate zone (where much of the U.S. is located). While the contest weekend looks like it will be a quiet period, there are a few days forecast with high geomagnetic activity and possible radio storms. It is possible to have a few aurora-mode (*Au*) propagation events during October. Remember that digital modes and CW are the best way to go with aurora, particularly on 144 MHz through 432 MHz, as the voice modes become extremely distorted and often unrecognizable due to the effects of the aurora. The best times to check for VHF aurora openings are when conditions are expected to be Below Normal or Disturbed, as shown in the "Last-Minute Forecast" at the beginning of this column.

There is some possibility of extended tropospheric conditions during October because of the changing weather patterns. Two meters is the best band to watch for this.

October does have the *Draconids* meteor shower, active between October 7 and 11. The shower could reach a very high rate of hourly meteors. As with the *Leonids*, the best time to check for radio propagation would be from about midnight onward until dawn.

The *Draconids* is primarily a periodic shower that twice has produced spec-

tacular, brief meteor storms in the last century—in 1933 and 1946. In 1999 a wholly unexpected minor outburst was witnessed from the Far East. *Draconid* meteors are exceptionally slow moving, a characteristic that helps separate genuine shower meteors. This shower could produce meteor-scatter (Ms) mode propagation openings on VHF and UHF.

The *Orionids*, active from October 2 through the early part of November, is expected to peak on October 21 and has an expected visual rate of 20 meteors per hour. This shower could also provide a few strong ionized trails, making strong, stable, and lengthy meteor-shower propagation possible.

Current Solar Cycle Progress

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 75.8 for July 2006. The 12-month smoothed 10.7-cm flux centered on January 2006 is 84.0, just down from 85.4 of December 2005. The predicted smoothed 10.7-cm solar flux for October 2006 is 73, give or take about 14 points.

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for July 2006 is 12.2, while for June it is 13.9. The lowest daily sunspot value recorded was zero (0), on July 13 and July 21. The highest daily sunspot count was 21 on July 1. The 12-month running smoothed sunspot number centered on January 2006 is 20.8. A smoothed sunspot count of 10, give or take about 12 points, is expected for October 2006.

The observed monthly mean planetary *A*-index (*Ap*) for July 2006 is 7, and the adjusted *Ap* for June is 9. The 12-month smoothed *Ap*-index centered on January 2006 is 9.9. Expect the overall geomagnetic activity to vary greatly between quiet and active during most days in October. Refer to the Last-Minute Forecast for the outlook on conditions during October.

I invite you to visit my online propagation resource at <http://propagation.hfradio.org/>, where you can get the latest space data, forecasts, and more, all in an organized manner. If you have a cell phone with internet capabilities, try <http://wap.hfradio.org/>.

Drop me an e-mail or send me a letter if you have questions or topics you would like to see me explore in this column. I'd also love to hear any feedback you might have on what I have written. Until next month . . .73, Tomas, NW7US

HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *daylight* time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

October 15–December 15, 2006
Time Zone: EDT (24-Hour Time)
EASTERN USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	09-11 (1)	08-09 (1) 09-11 (3) 11-12 (2) 12-13 (1)	06-07 (1) 07-08 (2) 08-09 (4) 09-11 (3) 11-13 (4) 13-14 (3) 14-15 (2) 15-17 (1)	16-17 (1) 17-18 (2) 18-20 (3) 20-02 (2) 02-03 (3) 03-04 (2) 04-05 (1) 19-21 (1)* 21-23 (2)* 23-02 (3)* 02-03 (2)* 03-04 (1)*
Northern Europe & CIS	09-11 (1)	08-09 (1) 09-10 (2) 10-11 (1)	06-07 (1) 07-10 (3) 10-13 (2) 13-15 (1)	17-19 (1) 19-22 (2) 22-01 (1) 01-03 (2) 03-04 (1) 19-21 (1)* 21-01 (2)* 01-03 (1)*
Eastern Mediter-ranean & Middle East	08-10 (1)	08-09 (1) 09-11 (2) 11-12 (1)	06-10 (1) 10-12 (2) 12-15 (3) 15-16 (2) 16-18 (1)	18-20 (1) 20-00 (2) 00-02 (1) 20-22 (1)* 22-00 (2)* 00-01 (1)*
Western Africa	11-14 (1)	08-10 (1) 10-12 (2) 12-13 (3) 13-15 (4) 15-16 (2) 16-17 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-16 (3) 16-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	18-20 (1) 20-02 (2) 02-03 (1) 20-22 (1)* 22-01 (3)* 01-02 (1)*
Eastern & Central Africa	10-13 (1)	08-12 (1) 12-14 (2) 14-15 (1)	07-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	20-01 (1) 22-00 (1)*
Southern Africa	10-12 (1)	08-10 (1) 10-11 (2) 11-13 (3) 13-14 (2) 14-15 (1)	07-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1) 22-00 (1)	18-19 (1) 19-22 (2) 22-23 (1) 19-22 (1)*
Central & South Asia	*Nil*	09-11 (1) 17-19 (1)	07-08 (1) 08-10 (2) 10-12 (1) 19-21 (1)	05-07 (1) 18-21 (1) 05-07 (1)* 18-20 (1)*
Southeast Asia	*Nil*	17-19 (1)	07-08 (1) 08-10 (2) 10-13 (1) 18-21 (1)	05-07 (1) 18-20 (1) 05-07 (1)*
Far East	*Nil*	16-17 (1) 17-18 (2) 18-19 (1)	07-08 (1) 08-10 (2) 10-11 (1) 16-19 (1) 19-21 (2) 21-22 (1)	04-08 (1) 17-19 (1) 05-07 (1)* 17-18 (1)*
South Pacific & New Zealand	12-16 (1)	12-14 (1) 14-15 (2) 15-16 (3) 16-18 (2) 18-19 (1)	06-07 (1) 07-08 (2) 08-09 (3) 09-11 (2) 11-17 (1) 17-18 (2) 18-20 (3) 20-22 (2) 22-01 (1)	23-00 (1) 00-02 (2) 02-06 (3) 06-08 (2) 08-09 (1) 02-04 (1)* 04-06 (2)* 06-07 (1)*
Australasia	14-16 (1)	10-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-20 (1) 20-23 (2) 23-01 (1)	02-05 (1) 05-07 (2) 07-08 (1) 04-05 (1)* 05-07 (2)* 07-08 (1)*
Caribbean, Central America & Northern Countries of South America	08-09 (1) 09-13 (2) 13-15 (1)	07-08 (1) 08-09 (2) 09-14 (3) 14-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	00-06 (1) 06-07 (2) 07-09 (4) 09-11 (3) 11-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2)	18-19 (1) 19-21 (3) 21-03 (4) 03-05 (3) 05-06 (2) 06-07 (1) 19-21 (1)* 21-01 (2)* 01-04 (3)* 04-05 (2)* 05-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	10-15 (1)	07-08 (1) 08-10 (2) 10-13 (1) 13-14 (2) 14-16 (4) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (3) 09-10 (2) 10-14 (1) 14-16 (2) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2) 00-02 (1)	20-22 (1) 22-04 (2) 04-06 (1) 21-23 (1)* 23-03 (2)* 03-04 (1)*
McMurdo Sound, Antarctica	*Nil*	08-10 (1) 13-15 (1) 15-16 (2) 16-17 (1)	16-18 (1) 18-19 (2) 19-21 (3) 21-23 (2) 23-00 (1) 06-08 (1)	03-06 (1)

Time Zones: CST & MST
(24-Hour Time)
CENTRAL USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	08-10 (1)	08-09 (1) 09-12 (2) 12-13 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-12 (2) 12-14 (3) 14-16 (2) 16-17 (1)	17-18 (1) 18-20 (3) 20-22 (2) 22-00 (1) 00-02 (2) 02-03 (1) 18-20 (1)* 20-00 (2)* 00-02 (1)*
Northern Europe & CIS	08-10 (1)	08-11 (1)	06-07 (1) 07-12 (2) 12-14 (1)	18-19 (1) 19-21 (2) 21-23 (1) 23-00 (2) 00-01 (1) 19-00 (1)*
Eastern Mediter-ranean & Middle East	08-10 (1)	09-11 (1)	06-10 (1) 10-12 (2) 12-14 (3) 14-15 (2) 15-17 (1)	18-20 (1) 20-23 (2) 23-00 (1) 20-23 (1)*
Western Africa	10-13 (1)	07-10 (1) 10-11 (2) 11-13 (3) 13-14 (2) 14-15 (1)	06-12 (1) 12-14 (2) 14-15 (3) 15-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	18-19 (1) 19-23 (2) 23-00 (1) 19-23 (1)*
Eastern & Central Africa	09-12 (1)	08-11 (1) 11-13 (2) 13-14 (1)	07-14 (1) 14-15 (2) 15-17 (3)	20-00 (1) 21-23 (1)*

			17-18 (2) 18-19 (1)	
Southern Africa	09-12 (1)	07-10 (1) 10-11 (2) 11-12 (3) 12-13 (2) 13-14 (1)	21-23 (1) 07-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	18-19 (1) 19-22 (2) 22-23 (1) 19-22 (1)*
Central & South Asia	*Nil*	17-19 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-18 (1) 18-20 (2) 20-21 (1)	05-08 (1) 18-20 (1) 05-07 (1)* 18-20 (1)*
Southeast Asia	*Nil*	14-16 (1) 16-18 (2) 18-19 (1)	07-08 (1) 08-10 (2) 10-14 (1) 18-19 (1) 19-21 (2) 21-22 (1)	04-07 (1) 17-19 (1) 05-07 (1)*
Far East	16-18 (1)	15-16 (1) 16-18 (2) 18-19 (1)	07-08 (1) 08-10 (3) 10-11 (2) 11-12 (1) 16-18 (1) 18-20 (2) 20-22 (1)	01-02 (1) 02-04 (2) 04-06 (1) 06-08 (2) 08-09 (1) 02-03 (1)* 03-05 (2)* 05-07 (1)*
South Pacific & New Zealand	12-17 (1)	10-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	06-07 (1) 07-09 (3) 09-12 (2) 12-17 (1) 17-18 (2) 18-20 (3) 20-22 (2) 22-00 (1)	23-01 (1) 01-02 (2) 02-07 (3) 07-08 (2) 08-09 (1) 00-02 (1)* 02-07 (2)* 07-08 (1)*
Australasia	14-17 (1)	10-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	05-07 (1) 07-08 (2) 08-10 (2) 10-11 (2) 11-15 (1) 15-17 (2) 17-19 (1) 19-20 (2) 20-22 (3) 22-00 (2) 00-02 (1)	02-04 (1) 04-08 (2) 08-09 (1) 03-04 (1)* 04-07 (2)* 07-08 (1)*
Caribbean, Central America & Northern Countries of South America	08-09 (1) 09-14 (2) 14-16 (1)	07-08 (1) 08-09 (2) 09-14 (3) 14-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	00-06 (1) 06-07 (2) 07-09 (4) 09-11 (3) 11-13 (2) 13-15 (3) 15-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2)	18-19 (1) 19-20 (2) 20-21 (3) 21-03 (4) 03-05 (3) 05-07 (2) 07-08 (1) 19-21 (1)* 21-00 (2)* 00-03 (3)* 03-05 (2)* 05-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	09-15 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-15 (3) 15-16 (4) 16-17 (2) 17-18 (1)	00-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2)	19-21 (1) 21-01 (2) 01-03 (1) 03-05 (2) 05-06 (1) 21-23 (1)* 23-01 (2)* 01-03 (1)*
McMurdo Sound, Antarctica	*Nil*	07-09 (1) 13-15 (1) 15-17 (2) 17-18 (1)	06-08 (1) 15-17 (1) 17-19 (2) 19-22 (3) 22-00 (2) 00-01 (1)	03-06 (1)

Time Zone: PST
(24-Hour Time)
WESTERN USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	08-10 (1)	07-08 (1) 08-10 (2) 10-12 (1)	06-07 (1) 07-09 (2) 09-10 (1) 10-14 (2) 14-16 (1) 23-01 (1)	18-20 (1) 20-22 (2) 22-00 (1) 19-23 (1)*
Northern Europe & CIS	*Nil*	07-10 (1)	06-07 (1) 07-11 (2) 11-13 (1) 23-01 (1)	21-00 (1) 21-23 (1)*
Eastern Mediter-ranean & Middle East	*Nil*	07-10 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-13 (2) 13-15 (1) 21-23 (1)	18-22 (1) 06-08 (1)
Western Africa	09-11 (1)	08-10 (1) 10-11 (2) 11-12 (3) 12-13 (2) 13-14 (1)	07-10 (1) 10-14 (2) 14-16 (3) 16-17 (2) 17-18 (1) 22-00 (1)	18-23 (1) 19-22 (1)*
Eastern & Central Africa	*Nil*	09-12 (1)	06-09 (1) 11-13 (1) 13-16 (2) 16-18 (1) 21-23 (1)	18-21 (1) 06-08 (1)
Southern Africa	08-12 (1)	08-10 (1) 10-13 (2) 13-14 (1)	07-09 (1) 11-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1) 23-01 (1)	18-19 (1) 19-20 (2) 20-21 (1) 06-08 (1) 18-20 (1)*
Central & South Asia	*Nil*	17-19 (1)	07-08 (1) 08-09 (2) 09-11 (1) 16-17 (1) 17-18 (2) 18-19 (1)	04-06 (1) 06-08 (2) 08-09 (1) 05-07 (1)*
Southeast Asia	15-17 (1)	14-15 (1) 15-17 (2) 17-18 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-20 (2) 20-22 (1)	02-03 (1) 03-06 (2) 06-08 (1) 03-07 (1)*
Far East	14-16 (1)	13-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-08 (1) 08-10 (3) 10-12 (2) 12-16 (1) 16-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	22-00 (1) 00-02 (2) 02-07 (3) 07-08 (2) 08-09 (1) 23-01 (1)* 01-05 (2)* 05-07 (1)*
South Pacific & New Zealand	12-14 (1) 14-16 (2) 16-17 (1)	09-12 (1) 12-15 (2) 15-17 (4) 17-18 (2) 18-19 (1)	04-07 (1) 07-09 (3) 09-12 (2) 12-16 (1) 16-17 (2) 17-18 (3) 18-20 (4) 20-22 (2) 22-02 (1) 02-04 (2)	21-22 (1) 22-05 (3) 05-08 (2) 08-09 (1) 22-00 (1)* 00-06 (2)* 06-07 (1)*
Australasia	15-17 (1)	11-12 (1) 12-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	12-17 (1) 17-19 (2) 19-21 (3) 21-22 (2) 22-03 (1) 03-05 (2) 05-07 (1) 07-10 (3) 10-12 (2)	02-03 (1) 03-04 (2) 04-07 (3) 07-08 (2) 08-09 (1) 03-04 (1)* 04-07 (2)* 07-08 (1)*
Caribbean, Central America & Northern Countries of South America	08-10 (1) 10-14 (2) 14-15 (1)	07-08 (1) 08-11 (2) 11-13 (3) 13-15 (4) 15-16 (2) 16-17 (1)	00-05 (1) 05-06 (2) 06-08 (3) 08-09 (4) 09-10 (3) 10-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-22 (1) 22-00 (2)	18-19 (1) 19-20 (2) 20-03 (3) 03-04 (2) 04-06 (1) 19-22 (1)* 22-02 (2)* 02-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	09-14 (1)	07-08 (1) 08-09 (2) 09-13 (1) 13-14 (2) 14-15 (4) 15-16 (3) 16-17 (1)	01-06 (1) 06-09 (2) 09-13 (1) 13-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-01 (2)	19-21 (1) 21-03 (2) 03-05 (1) 20-23 (1)* 23-01 (2)* 01-02 (1)*
McMurdo Sound, Antarctica	Nil	08-10 (1) 13-15 (1) 15-16 (2) 16-18 (1)	07-09 (1) 17-19 (1) 19-20 (2) 20-22 (3) 22-00 (2) 00-02 (1)	23-02 (1) 02-05 (2) 05-06 (1) 02-05 (1)*

* Indicates best time for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.
For 12 meter openings interpolate between 10 and 15 meter openings.
For 17 meter openings interpolate between 15 and 20 meter openings.
For 30 meter openings interpolate between 40 and 20 meter openings.

Propagation charts prepared by George Jacobs, W3ASK.

Looking Ahead in CQ

Here's a look at articles we're working on for upcoming issues of *CQ*:

"TZ1A: The Voodoo Contest Group in Mali," by Lee Finkel, KY7M

"*CQ* Reviews: ICOM IC-7000 HF/VHF/UHF Transceiver," by Phil Salas, AD5X

"Why 'Top Band' is a Good Bet for the Bottom of the Sunspot Cycle," by Carl Luetzelschwab, K9LA

Do you have a ham radio story to tell? See our writers' guidelines on the CQ website at <http://www.cq-amateur-radio.com/guide.html>.

ham shop

Advertising Rates: Non-commercial ads are 20 cents per word including abbreviations and addresses. Commercial and organization ads are $1.00 per word. Boldface words are $1.50 each (specify which words). Minimum charge $2.00. No ad will be printed unless accompanied by full remittance. All ads must be typewritten double-spaced.
Closing Date: The 10th day in the third month preceding date of publication (example: Jan. 10th for the March issue). Because the advertisers and equipment contained in Ham Shop have not been investigated, the Publisher of *CQ* cannot vouch for the merchandise listed therein. The publisher reserves the right to reject any advertisement. Direct all correspondence and ad copy to: CQ Ham Shop, 25 Newbridge Road, Hicksville, NY 11801 (fax: 516-681-2926; e-mail: <hamshop @cq-amateur-radio.com>.

CB-TO-10M CONVERSIONS: Frequency modifications, FM, books, plans, kits, high-performance CB accessories. Catalog $3. CBCI, Box 30655CQ, Tucson, AZ 85751. <www.cbcintl.com>

QSLing SUPPLIES. e-mail: <plumdx@msn.com>.

QSLs FOR DX STATIONS: Our new "International Division" was established to handle QSL needs of DX hams. We understand the problems of packaging, shipping, and dealing with the customs problems. You can trust us to deliver a quality QSL, usually much cheaper than you can find locally. Write, call, or FAX for free samples and ordering information. "The QSL Man—W4MPY," 682 Mount Pleasant Road, Monetta, SC 29105 USA. Phone or FAX 803-685-7117.

"QRZ DX"—since 1979: Available as an **Adobe PDF file** each Wednesday or by regular mail. Your best source for weekly DX information. Send #10 SASE for sample/rates. **"The DX Magazine"—since 1989:** Bi-monthly – Full of DXpedition reports, QSL Information, Awards, DX news, technical articles, and more. Send $3.00 for sample/rates. DX Publishing, Inc., P.O. Box DX, Leicester, NC 28748-0249. Phone/Fax: 828-683-0709; e-mail: <DX@dxpub.com>; WEB PAGE: <http://www.dxpub.com>.

CERTIFICATE for proven contacts with all ten American districts. SASE to W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

TRYLON SELF-SUPPORTING TOWERS: Delivered **ANYWHERE** in the US for **ONLY** $261.00. This is the **BEST** tower value around – 96 feet for only $2451.00 **DELIVERED TO YOUR QTH!** Go to <www.championradio.com> or call 888-833-3104 for more information.

MAUI, HAWAII: vacation with a ham. Since 1990. <www.seaqmaui.com>, telephone 808-572-7914, or <kh6sq@seaqmaui.com>.

ALUMINUM CHASSIS AND CABINET KITS, UHF-VHF Antenna Parts, Catalog. E-mail: <k3iwk@flash.net> or <http://www.flash.net/~k3iwk>.

NAME BADGES BY GENE: In full color, our artwork or yours. See our web page for samples and prices. **www.hampubs.com** Harlan Technologies 815-398-2683.

REAL HAMS DO CODE: Move up to CW with **CW Mental Block Buster III.** Succeed with hypnosis and NLP. Includes two (2) CDs and Manual. Only $29.95 plus $5.00 s/h US. FL add $2.14 tax. Success Easy, 160 West Camino Real #128, Boca Raton, FL 33432, 800-425-2552, <www.success-is-easy.com>.

NEAT STUFF! DWM Communications — <http://qth.com/dwm>

FOR SALE: DRAKE TR-7/TR-7A/R-7/R-7A Service Kit. Includes 13 Extender Boards and Digital Jumper card. $64.05 includes postage. See <http://pweb.amerion.com/~w7avk>. Bob, W7AVK, 807 Westshore J28, Moses Lake, WA 98837, <w7avk@arrl.net>, 509-766-7277.

WANTED: HAM EQUIPMENT AND RELATED ITEMS. Donate your excess gear—new, old, in any condition—to the Radio Club of Junior High School 22, the Nation's only full time non-profit organization working to get Ham Radio into schools around the country as a teaching tool using our EDUCOM—Education Thru Communication—program. Send your radio to school. Your donated material will be picked up ANYWHERE or shipping arranged, and this means a tax deduction to the full extent of the law for you as we are an IRS 501(c)(3) charity in our 26th year of service. It is always easier to donate and usually more financially rewarding, BUT MOST IMPORTANT your gift will mean a whole new world of educational opportunity for children nationwide. Radios you can write off; kids you can't. Make 2006 the year to help a child and yourself. Write, phone, or FAX the WB2JKJ "22 Crew" today: The RC of JHS 22, P.O. Box 1052, New York, NY 10002. Twenty-four hours call 516-674-4072; fax 516-674-9600; or e-mail <crew@wb2jkj. org>. Join us on the WB2JKJ Classroom Net, 7.238 MHz, 1200–1330 UTC daily and 21.395 MHz from 1400 to 2000 UTC.

CALL-MASTER CALLSIGN DATABASE $25.00 SHIPPED. Complete US/VE/DX listings. Use with our Prolog2K Logger or stand-alone. Secure order on our website at <www.prolog2k.com> or call toll free 1-800-373-6564. DataMatrix

HALLICRAFTERS SERVICE MANUALS: Ham, SWL, Commercial. Send model number and e-mail or write for prices: **ARDCO Electronics,** P.O. Box 24 Dept. C, Palos Park, IL 60464; <wa9gob@aol. com>; <www.ardcoelectronics.com>.

WANTED: KIM's, SYM's, AIM's, SOL's, OSI's, UNIMATs & RAD LAB BOOK. John Rawley, 1923 Susquehanna Rd., Abington, PA 19001; e-mail: <johnr750@aol.com>; phone 215-884-9220.

VAN BUREN, ARKANSAS. Electronic parts and components. Ham accessories, books, and magazines. Dave's Hobby Shop, 600 Main Street; phone 479-471-0750; <www.daveswebshop.com>.

WWW.PEIDXLODGE.COM

NEAT STUFF! DWM Communications — <http://qth.com/dwm>

MicroLog by WAØH
Free download . . . www.wa0h.com

SMART BATTERY CHARGERS Kits & Assemblies, Surplus Parts, and more. <www.a-aengineering.com>

OVERSEAS AIRMAIL POSTAGE plus complete line of airmail envelopes. Order directly from our web site – James E. Mackey, proprietor.
www.net1plus.com/users/ryoung/index.htm

VERTICAL ANTENNAS AND DIRECTIONAL ARRAYS BOOK. <www.broadcastbooks.com>

HESTON SUPPLY: Coax, Connectors and more. Quality Components at Low Prices. <www.hestonsupply.com>

advertiser's index

now including websites

A & A Engineering	109	www.a-aengineering.com
AOR U.S.A., Inc.	77	www.aorusa.com
Advanced Specialties Inc.	88	www.advancedspecialties.net
Alan Broadband Co.	113	www.zapchecker.com
Alinco	43	www.alinco.com
Alpha Radio Products, LLC.	83	www.alpharadioproducts.com
Aluma Towers	83	www.alumatower.com
Ameritron	33	www.ameritron.com
Amidon Associates	79	www.amidon-inductive.com
Antique Radio Classified	70	www.antiqueradio.com
Astron Corporation	63	www.astroncorp.com
Atomic Time, Inc.	53	www.atomictime.com
BATTERIES AMERICA/Mr. Nicd.	115	www.batteriesamerica.com
Bilal Co./Isotron Antennas	113	www.isotronantennas.com
Bosque Communications, Inc.	35	www.w5ncd.com
Burghardt Amateur Center	27	www.burghardt-amateur.com
Butternut Antennas	29	www.bencher.com
C.A.T.S.	83	www.rotor-doc.com
CQ Books	71,85	www.cq-amateur-radio.com
Cable X-PERTS, Inc.	87	www.cablexperts.com
CheapHam.com	107	www.CheapHam.com
Comet Antennas/NCG	3	www.natcommgroup.com
Command Productions	91	www.LicenseTraining.com
Communication Concepts, Inc	69	www.communication-concepts.com
ComTek Systems	111	www.comteksystems.com
Cutting Edge Enterprises	35,79,103	www.powerportstore.com
DX Engineering	113	www.dxengineering.com
DX4WIN (Rapidan Data Systems)	101	www.dx4win.com
Davis Instruments Corp.	35	www.davisnet.com
Elecraft	93	www.elecraft.com
Electric Radio Magazine	113	www.ermag.com
Force 12, Inc.	39	www.force12inc.com
GAP Antenna Products, Inc.	17	www.gapantenna.com
Gamma Research, Inc.	35	www.gammaresearch.net
Ham Radio Outlet	12,116	www.hamradio.com
HamTestOnline	61	www.hamtestonline.com
Hi-Q-Antennas	109	www.hiqantennas.com
Hy-Gain	1,5	www.hy-gain.com
ICOM America, Inc	23,25,Cov IV	www.icomamerica.com
Idiom Press	67	www.idiompress.com
K-Y Filter	113	www.ky-filters.com/cq.htm
KJI Electronics, Inc.	109	www.kjielectronics.com
KU4AB.com	101	www.ku4ab.com
Kanga US	70	www.bright.net/~kanga/kanga/
Kenwood U.S.A. Corp..	Cov. II	www.kenwood.net

RSGB Books from CQ

HF Antenna Collection

RSGB, 1st Ed., 1992. 233 pages.
A collection of outstanding articles and short pieces which were published in Radio Communication magazine during the period 1968-89. Includes ingenious designs for single element, beam and miniature antennas, as well providing comprehensive information about feeders, tuners, baluns, testing, modeling, and how to erect your antenna safely.

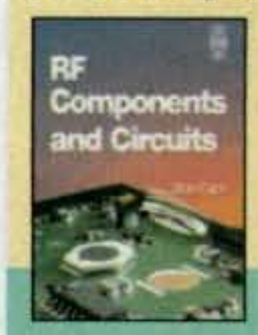
Order: RSHFAC **$16.00**

Packet Radio Primer

By Dave Coomber, G8UYZ & Martin Croft, G8NZU
RSGB, 2nd Ed., 1995, 266 pages
Detailed practical advise for beginners. Completely revised and greatly expanded to cover developments in this field and beyond bare basics into advanced areas such as satellite operations.

Order: RSPRP **$16.00**

RF Components & Circuits



By Joe Carr, G3YWX
RSGB, 2002 Ed, 416 pages.
A complete self-study course in RF technology, with conscise reference text to dip into in a readable and straightforward format.

Order: RSRFCC **$36.00**

Digital Modes for All Occasion

By Murray Greenman, ZL1PBPU
RSGB, 2002 Ed., 208 pages.
Simply the most "complete" book on Digital Modes available. Over 100 illustrations!

Order: RSDMFAC **$27.50**

VHF/UHF Handbook

Edited by Dick Biddulph, M0CGN

RSGB, printed 2002., 317 pages.
One of the most complete guides on the theory and practice of reception and transmission on VHF/UHF band. Hundreds of illustrations and photos.

Order: RXVUH **$35.00**

Practical Receivers for Beginners

By John Case, GW4HWR
RSGB, 1996 Ed., 165 pages
Selection of easy-to-build receiver designs suitable for amateur bands (including microwaves) and simple fun projects and test equipment.

Order: RSPRN **$24.00**

Practical Antennas for Novices

By John Heys, G3BDQ
RSGB, 1st Ed., 1994, 52 pages.
How to build simple but efficient antennas for each of the Noivce bands up to 434MHz plus ancillary equipment to ensure they're working!

Order: RSPAN **$12.50**

Radio & Electronics Cookbook

By George Brown, M5ACN
RSGB. 2001 Ed.
A collection of the very best weekend projects from D-I-Y RADIO magazine. Step-by-step instructions make this book ideal for hams wanting to build their skills and knowledge.

Order: RSREC **$28.00**

View more RSGB Books on our web site www.cq-amateur-radio.com

Name _____ **Callsign** _____

Street Address _____

City _____ **State** _____ **Zip** _____

Qty	Item #	Description	Price	Total Price
Shipping and Handling: US and Possessions - $5.00 for the first book, $2.50 for the second, and $1 for each additional book. FREE SHIPPING ON ORDERS OVER $75.00 (merchandise only). Foreign - Shipping will be calculated by order weight and destination and will be added to your credit card charge. ALLOW 3 TO 4 WEEKS FOR DELIVERY				
			Total	

Method of payment ☐ **Check** ☐ **Visa** ☐ **MasterCard** ☐ **Discover** ☐ **AmerExpress**

Credit Card No. _____ **Exp. date** _____

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

IMRA-International Mission Radio Assn. helps missioners—equipment loaned; weekday net, 14.280 MHz, 1:00–3:00 PM Eastern. Sr. Noreen Perelli, KE2LT, 2755 Woodhull Ave., Bronx, NY 10469.

PHASED ARRAY NETWORKS by COMTEK SYSTEMS deliver gain and front to back. Call 704-542-4808; fax 704-542-9652. COMTEK SYSTEMS, P.O. Box 470565, Charlotte, NC 28247.

HF VERTICAL COMPARISON REPORT: K7LXC and NØAX test Cushcraft, Butternut, MFJ, Force 12, Hustler, Gap, and Diamond verticals. 64-page report includes protocol, data sets, and summaries. $17 plus $4 s/h. <www.championradio.com>, 888-833-3104.

3200+ DIFFERENT AWARDS from 128 DXCC countries. Complete data online at <http://www.dxawards.com>. One year full access just $6. Ted Melinosky, K1BV, 12 Wells Wood Road, Columbia, CT 06237-1525.

CASH FOR COLLINS, HALLICRAFTERS SX-88, & DRAKE TR-6. Buy any Collins equipment. Leo, KJ6HI, phone/fax 310-670-6969, e-mail: <radioleo@earthlink.net>.

IT'S NEW AND HOT! "Keys III" features highly detailed views and photos of keys, bugs, and paddles like few people have ever seen! It's awesome and it's available on CD ($16 + $2.50 post) or as a full-size book ($18 + $4.05 Priority Mail). Also still available, "Keys II" ($16 + $2.50 post) and "QRP NOW!" ($16 + $2.50 post). Order direct from Dave Ingram, K4TWJ, 3994 Long Leaf Drive, Gardendale, AL 35071.

PACKET RADIO AND MORE! Join TAPR, connect with the largest amateur radio digital group in the U.S. Creators of the TNC-2 standard, working on Software Defined Radio technology. Benefits: newsletter, software, discounts on kits and publications. For membership prices see the TAPR website: <http://www.tapr.org>).

BUX COMM: Have you seen the New RASCAL GLX (see it at <www.packetradio.com>), PSK31, and SSTV sound card interface? Antennas, Accessories, and HAM Radio Goodies at DISCOUNT PRICES. Toll-free orderline, Monday–Friday, 8 AM to 4 PM, 1-800-726-2919. On the web visit <www.BUXcomm. com>.

TRIBANDER COMPARISON REPORT: Find out the real story on tribander performance. K7LXC and NØAX test more than a dozen antennas, including Force 12, Hy-Gain, Mosley, Bencher, and Cushcraft. 84-page report includes protocol, data sets, and summaries. $17 plus $4 s/h. <www.championradio.com> or 888-833-3104.

FOR SALE: CQ/Ham Radio/QST/73 magazines and binders. SASE brings data sheet. W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

TOWER HARDWARE, SAFETY EQUIPMENT, weatherproofing, T-shirts, and **MORE**. Champion Radio Products, telephone 888-833-3104, or <www.championradio.com>.

WANTED: VACUUM TUBES – Commercial, industrial, amateur. Radio Daze, LLC, 7620 Omnitech Place, Victor, NY 14506 USA (phone 585-742-2020; fax 800-456-6494; e-mail: <info@radiodaze.com>).

QSLs and Eyeball Cards: High quality, small quantities, beautiful wax ink. Vertical and custom designs, the best report forms! <http://stores.ebay.com/QSLs-Etcetera>

WANTED: Manuals/schematic for Pearce-Simpson "Catalina" VHF marine band radio. JR Linden, K7PUR, Cave Creek, AZ; 480-502-6396; <k7pur@arrl.net>.

CATV BENCH TECH: Repair of CATV, MATV, amplifiers, and preamplifiers. Relocate to Laurel, Maryland. Experience a must. E-mail: <sales@naval.com>.

QSLs—Samples—The Ebbert Printing Company D4, Post Office Box 2335, Westerville, Ohio 43086.

advertiser's index

now including websites

LDG Electronics, Inc.	19	www.ldgelectronics.com
Log Window from SCO, Inc.	62	www.logwindow.com
MFJ Enterprises, Inc.	9,51	www.mfjenterprises.com
Microsec R&D Inc.	101	http://rattailantenna.com
Morse Express	79	www.MorseX.com
Nemal Electronics International, Inc.	54	www.nemal.com
New Communications Solutions	31	www.ncsradio.com
Nifty! Ham Accessories	109	www.niftyaccessories.com
Penny's Stitch n' Print	70	www.pennystitch.com
PowerPort	35,79,103	www.powerportstore.com
QCWA	111	www.qcwa.org
QSLs by W4MPY	103	www.qslman.com
R.F. Connection	62	www.therfc.com
RF Parts Company	21	www.rfparts.com
RSGB	89,114	www.cq-amateur-radio.com
RT Systems	36	www.cloningsoftware.com
Radio Club of J.H.S. 22	24	www.wb2jkj.org
Radio Daze	70	www.radiodaze.com
Radio Works	103	www.radioworks.com
Rapidan Data Systems (DX4WIN)	101	www.dx4win.com
RatTail Antenna	101	http://rattailantenna.com
RigExpert	69	www.rigexpert.com
Ross Distributing Company	88	http://rossdistri.com
SteppIR Antenna Systems	32	www.steppir.com
Surplus Sales of Nebraska	88	www.surplussales.com
T.G.M. Communications	88	www3.sympatico.ca/tgmc/
TEN-TEC, Inc.	15	www.tentec.com
Tarheel Antennas	81	www.tarheelantennas.com
Texas Towers	58,59	www.texastowers.com
Timewave Technology Inc.	69	www.timewave.com
Traffie Technology	113	www.hexbeam.com
Universal Radio, Inc.	91	www.universal-radio.com
Vibroplex	47	www.vibroplex.com
W2IHY Technologies	93	www.w2ihy.com
W3FF Antennas	53	www.buddipole.com
W4RT Electronics	107	www.W4RT.com
W5YI Group	45	www.w5yi.org
West Mountain Radio	11	www.westmountainradio.com
Wireman, The	111	www.thewireman.com
Yaesu	6,7,Cov III	www.vxstdusa.com

It's easy to advertise in CQ.
Let me know what I can do to help.
Don Allen, W9CW
(217) 344-4570 or FAX (217) 344-4575
e-mail:ads@cq-amateur-radio.com

12 STORE BUYING POWER

HAM RADIO OUTLET

WORLDWIDE DISTRIBUTION

ANAHEIM, CA
(Near Disneyland)
933 N. Euclid St., 92801
(714) 533-7373
(800) 854-6046
Janet, KL7MF, Mgr.
anaheim@hamradio.com

BURBANK, CA
1525 W. Magnolia Blvd, 91506
(818) 842-1786
(800) 854-6046
Eric, KA6IHT, Mgr.
Magnolia between
S. Victory & Buena Vista
burbank@hamradio.com

OAKLAND, CA
2210 Livingston St., 94606
(510) 534-5757
(800) 854-6046
Mark, WI7YN, Mgr.
I-880 at 23rd Ave. ramp
oakland@hamradio.com

SAN DIEGO, CA
5375 Kearny Villa Rd., 92123
(858) 560-4900
(800) 854-6046
Tom, KM6K, Mgr.
Hwy. 163 & Claremont Mesa
sandiego@hamradio.com

SUNNYVALE, CA
510 Lawrence Exp. #102, 94085
(408) 736-9496
(800) 854-6046
Dan K6DN, Co-Mgr.
Howard, W6HOC, Co-Mgr.
So. from Hwy. 101
sunnyvale@hamradio.com

NEW CASTLE, DE
(Near Philadelphia)
1509 N. Dupont Hwy., 19720
(302) 322-7092
(800) 644-4476
Rick, K3TL, Mgr.
RT.13 1/4 mi., So. I-295
newcastle@hamradio.com

PORTLAND, OR
11705 S.W. Pacific Hwy.
97223
(503) 598-0555
(800) 854-6046
Leon, W7AD, Mgr.
Tigard-99W exit
from Hwy. 5 & 217
portland@hamradio.com

DENVER, CO
8400 E. Iliff Ave. #9, 80231
(303) 745-7373
(800) 444-9476
Joe, KDØGA, Co-Mgr.
John, N5EHP, Co-Mgr.
denver@hamradio.com

PHOENIX, AZ
1939 W. Dunlap Ave., 85021
(602) 242-3515
(800) 444-9476
Gary, N7GJ, Mgr.
1 mi. east of I-17
phoenix@hamradio.com

ATLANTA, GA
6071 Buford Hwy., 30340
(770) 263-0700
(800) 444-7927
Mark, KJ4VO, Mgr.
Doraville, 1 mi. no. of I-285
atlanta@hamradio.com

WOODBRIDGE, VA
(Near Washington D.C.)
14803 Build America Dr. 22191
(703) 643-1063
(800) 444-4799
Steve, W4SHG, Mgr.
Exit 161, I-95, So. to US 1
woodbridge@hamradio.com

SALEM, NH
(Near Boston)
224 N. Broadway, 03079
(603) 898-3750
(800) 444-0047
Chuck, N1UC, Mgr.
sales@hamradio.com
Exit 1, I-93;
28 mi. No. of Boston
salem@hamradio.com

Call for other YAESU Hot Summer Specials through 9-30-06

YAESU

FT-897D VHF/UHF/HF Transceiver

- HF/6M/2M/70CM • DSP Built-in
- HF 100W (20W battery)
- Optional P.S. + Tuner • TCXO Built-in

Call Now For Our Low Pricing!

FT-817ND HF/VHF/UHF TCVR

- 5W @13.8V ext DC • USB, LSB, CW, AM, FM
- Packet (1200/9600 Baud FM) • 200 mems
- built in CTCSS/DCS • TX 160-10M, 6M, 2M, 440
- Compact 5.3" x 1.5" x 6.5", 2.6 lbs
- FNB-85 NiMH battery + NC-72B included

Call Now For Low Pricing!

FT-8800R 2M/440 Mobile

- V+U/V+V/U+U operation
- V+U full duplex • Cross Band repeater function
- 50W 2M 35W UHF
- 1000+ Memory channels
- WIRES ready

Call Now For Low Pricing!

VX-2R 2M/440 HT

- World's smallest Dual-band HT w/ wide RX
- 1.5 W RF output
- WiRES compatible
- 1300 Memory channels

Call For Low Price!

FT-60R

- 2m/440 HT
- 5W Wide-band receive
- CTCSS/DCS Built-in
- Emergency Auto ID

Low Price!

VX-7R/VX-7R Black

50/2M/220/440 HT

- Wideband RX - 900 Memories
- 5W TX (300mw 220Mhz)
- Li-Ion Battery
- Fully Submersible to 3 ft.
- Built-in CTCSS/DCS
- Internet WIRES compatible

Now available in Black!

VX-6R

2M/220/440HT

- wideband RX – 900 memories
- 5W 2/440 , 1.5W 220 MHz TX
- LI-ION Battery - EAI system
- Fully submersible to 3 ft.
- CW trainer built-in

NEW Low Price!

VX-150

2M Handheld

- Direct Keypad Entry
- 5w output
- 209 memories
- Ultra Rugged

Call Now For Special Pricing!

FT-857D

Ultra compact HF, VHF, UHF

- 100w HF/6M, 50w 2M, 20w UHF
- DSP included • 32 color display
- 200 mems • Detachable front panel (YSK-857 required)

Call for Low Price!

FT-7800R 2M/440 Mobile

- 50w 2m, 40w on 440mHz
- Weather Alert
- 1000+ Mems
- WIRES Capability
- Wideband Receiver (Cell Blocked)

Call Now For Your Low Price!

FT-2800M 2M Mobile

- 65w • Ruggedly Built
- Alpha Numeric Memory System
- Direct Keypad Frequency Entry
- Bullet-proof Front End

Call Now For Low Pricing!

FT-8900R Quadband Transceiver

- 10M/6M/2M/70CM • Wires capable
- 800+ memories • Built-in CTCSS/DCS
- Remotable w/optional YSK-8900

Call Now For Special Pricing

AZ, CA, CO, GA, VA residents add sales tax. Prices, specifications, descriptions, subject to change without notice.

Look for the HRO Home Page on the World Wide Web
http://www.hamradio.com

COAST TO COAST FREE SHIPPING
UPS - Most Items Over $100
Rapid Deliveries From The Store Nearest To You!

The radio... YAESU
Choice of the World's top DX'ers

Unlock the Secrets of the Low Bands!

YAESU's Exclusive, Fully-Automatic μ -Tuning Preselector System!

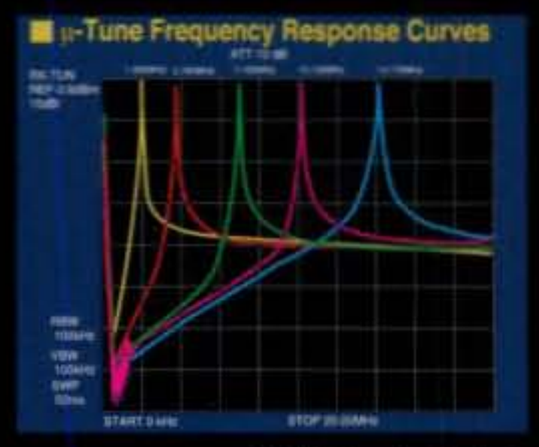
Now you can configure your FT-2000 series transceiver with the same ultra-sharp μ -Tuning RF preselector modules as are available for the FT DX 9000 series! Fully automatic in operation, the μ -Tuning preselectors utilize a stack of high-density ferrite cores driven through a large-diameter (1.1"/28 mm) coil by a belt drive powered by a precision hybrid stepper motor. This results in a typical "Q" of greater than 300, providing roll-off of RF energy in the first few dozen kHz either side of your operating frequency! Responding instantly as you rotate the VFO dial, the μ -Tuning system is totally transparent during operation. . . all you'll notice is the wonderful lack of "junk" on the band that your previous rig couldn't filter out!

μ TUNE 1.8M
RF μ-Tuning Kit A
(160 m Band / MTU-160)

μ TUNE 3.5/7M
RF μ-Tuning Kit B
(80/40 m Band / MTU-80/40)

μ TUNE 10/14M
RF μ-Tuning Kit C
(30/20 m Band / MTU-30/20)

(Separate optional μ-Tuning Kits are required for the 160, 80/40, and 30/20 Meter Amateur bands)



10dB/Div•2MHz/Div

HF/50 MHz Transceiver

FT-2000D 200 W Version (External Power Supply)

FT-2000 100 W Version (Internal Power Supply)

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

Specifications subject to change without notice. Some accessories and/or options may be standard in some areas. Frequency coverage may differ in some countries. Check with your local Yaesu dealer for specific details.

YAESU
Choice of the World's top DX'ers

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

Save Big.

$100 Instant Savings and a Free PS-125

Instant savings when you buy an IC-756PROIII!*

$200 Instant Savings and a Free PS-125

Instant savings when you buy an IC-756PROIII along with an IC-PW1!*

$500 Instant Savings

Instant savings when you buy an IC-7800 along with an IC-PW1!

ICOM

Save Biggest.

*The PS-125 power supply is a mail-in rebate. Limited time offers. Visit your authorized Icom dealer for details.

Limit 10 units of each product per address for the duration of the program. Allow 4-6 weeks for delivery. U.S. residents only.