

ICD 08241

# Amateur Radio

SERVING AMATEUR RADIO SINCE 1945  
FEBRUARY 1996

# CQ

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- **Can An 11-Year-Old FCC Ruling Help To Get Your Antenna Approved?**
- **Should Seborga Be A New Country?**
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- **CQ Reviews: Cushcraft's ARX-270 Dual-Band Ringo**

U.S. \$2.95 CANADIAN \$3.95



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Photo by Mike Fulcher, KC7V, Cave Creek, AZ

THE RADIO AMATEUR'S JOURNAL

# Best Dual-Banders on Wheels

SEE AUTHORIZED KENWOOD DEALER FOR YOUR SPECIAL SAVINGS!



## TM-733A FM DUAL BANDER

**ISO 9002** Meets ISO Manufacturing Quality System



### 144MHz/440MHz Dual-Band Operation

Kenwood's TM-733A is a versatile FM dual-bander with sophistication and power (144MHz; 50W/440MHz; 35W) for high performance mobile communications. As well as receiving simultaneously on VHF and UHF bands, it can receive two frequencies on the same band.

### Six-In-One Programmable Memory

Six entire operating profiles—including everything from the frequency range to the dimmer level can be stored in the programmable memory for recall at the press of a button. It's like having six transceivers in one.

### Data Connector for 1200/9600 bps Packet

Using the 6-pin mini DIN connector on the front panel, you can hook up a TNC to the TM-733A for either 1200 or 9600 bps packet communications.



9600 bps packet compatible

\* permits required for MARS and CAP use. Specifications guaranteed for Amateur bands only.

### Theft-Deterrent Features

For the added safety, you can choose the quick-release detachable front panel kit (option). The transceiver unit can be concealed under a seat or in the trunk.



### Other Features

■ 72 multi-function memory channels ■ AIP (Advanced Intercept Point) ■ Built-in DTSS with page ■ Cross-band repeater ■ Wireless clone function ■ Wireless remote

function ■ Auto simplex checker ■ Built-in CTCSS encoder & optional TSU-8 decoder ■ Key function display ■ Modifiable for MARS/CAP\*

### 144MHz/440MHz & 144MHz/220MHz Operation

The TM-742A (144MHz; 50W/440MHz; 35W) and TM-642A (144MHz; 50W/220MHz; 25W) dual-band mobile transceivers can be converted into tri-banders with the addition of an optional FM band unit: 28MHz (50W), 50MHz (50W), 220MHz (25W; TM-742A only), 440MHz (35W; TM-642A only), or

1200MHz (10W). The transceiver can display and even receive three bands simultaneously.

### 101 Memory Channels

For each band, there are 100 memory channels plus 1 call channel. Each channel can store transmit and receive frequencies independently or odd split repeaters.

### Separate Control & Display Units

The display and controls can be mounted separately on either side of the steering wheel, for example — while the main unit is concealed in the trunk.



TM-742A



TM-642A

### Other Features

■ Built-in DTSS selective calling with page ■ Independent SQL & VOL controls for each band ■ Built-in CTCSS encoder & optional TSU-7 decoder ■ Wireless remote control function ■ High-visibility illuminated panel keys ■ Wide-band VHF/UHF receive coverage (including Air

Band) ■ Date & time display, stopwatch, alarm, on/off timer ■ Cross-band repeater function ■ Modifiable for MARS/CAP\*

\*Permits required for MARS and CAP use. Specifications guaranteed for Amateur bands only. Kenwood follows a policy of continuous advancement in development. For this reason specifications may be changed without notice.



## TM-742A/642A FM MULTI BANDER

**ISO 9002** Meets ISO Manufacturing Quality System

# KENWOOD

KENWOOD COMMUNICATIONS CORPORATION  
AMATEUR RADIO PRODUCTS GROUP  
P.O. Box 22745, 2201 E. Dominguez St., Long Beach, California 90801-5745  
Customer support/Brochures (310) 639-5300  
Repair Locations/Parts (800) KENWOOD Bulletin Board Service (BBS) (310) 761-8284  
INTERNET <http://www.kenwood.net>

KENWOOD ELECTRONICS CANADA INC.  
6070 Kestrel Road, Mississauga, Ontario, Canada L5T 1S8

95ARD-1354

# Mini-Mobility Super Simplicity

## Powerful Portability

Kenwood's popular TS-50S is an extra-compact HF transceiver that's perfectly sized for mounting in a vehicle or taking on a DXpedition. Yet it's powerful too, offering spectacular TX/RX performance that's on a par with the big rigs. Maximum RF output is 100 watts (25W on AM), and all modes — LSB, USB, CW, AM and FM — are supported. The new ultra-light PS-40 compact switching power supply (option) is great for travel.

## Intuitive Menu System

When time's at a premium, the user-friendly menu system allows you to rapidly adjust just about any setting with a minimum of fuss. The menus are also accessible via the supplied microphone.

## TS-50S HF TRANSCEIVER



Operating ease is further enhanced by 100 memory channels and extensive scan functions.

## DDS with Fuzzy Logic Control

The fuzzy logic control circuitry allows for slow or fast tuning of the band.

## AIP (Advanced Intercept Point)

Kenwood's renowned AIP system raises dynamic range to 105dB, giving the TS-50S first-class receiver performance.



## 6-Meter All-Mode Performance

Confidently holding its own against much larger rigs is the TS-60S 50MHz all-mode transceiver. Thanks to a pair of MRF492 final transistors, it delivers an impressive 90 watts in SSB, CW and FM modes (23W in AM).

## First-Rate Interference Reduction

In addition to Kenwood's AIP circuitry, the TS-60S is equipped with IF shift (SSB & CW), a 20dB attenuator, CW reverse mode, and a pulse noise blanker. A 500Hz CW filter is optional.

## 100 Memory Channels

The TS-60S may be small in size but it's big on memory: 100 channels store transmit and receive parameters such as frequency, mode, and filter settings. Memory shift transfers data directly to the VFOs.

## Multi-Function Microphone

The supplied MC-47 remote-control microphone has 4 programmable function keys that provide rapid access to chosen menu functions — perfect for mobile operation.



See Authorized  
Kenwood Dealer For Your  
TS-50S Special Savings!

## Other Features

- RF output power control (100W, 50W, 10W)
- Large LCD panel with digital bar meter
- Auto-mode capability
- Dual VFOs (A and B)
- TF-SET
- Carrier-operated scan stop mode
- Switchable AGC circuit (SLOW/FAST)
- All-mode squelch
- CW reverse mode
- 20dB attenuator
- IF shift ■ Noise blanker
- Multi-function microphone supplied
- Optional YK-107C 500Hz CW filter
- Optional AT-50 external antenna tuner
- Optional PS-40 switching power supply
- Optional TC-50 travel case



## TS-60S 50 MHz ALL-MODE TRANSCEIVER

## Other Features

- DDS (Direct Digital Synthesizer) with fuzzy logic control
- Large LCD panel with digital bar meter
- Auto-mode capability ■ Dual VFOs (A&B)
- Dual-menu system ■ All-mode squelch
- Switchable AGC circuit (SLOW/FAST)
- Full break-in and semi break-in
- TF-SET ■ TO and CO scan stop modes
- Relay & ext. ALC terminals
- 3-position RF output power control
- Dimmer control ■ Auto power-off
- Optional PS-40 switching power supply
- Optional TC-50 travel case

**ISO 9002** Meets ISO Manufacturing Quality System

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AMATEUR RADIO PRODUCTS GROUP  
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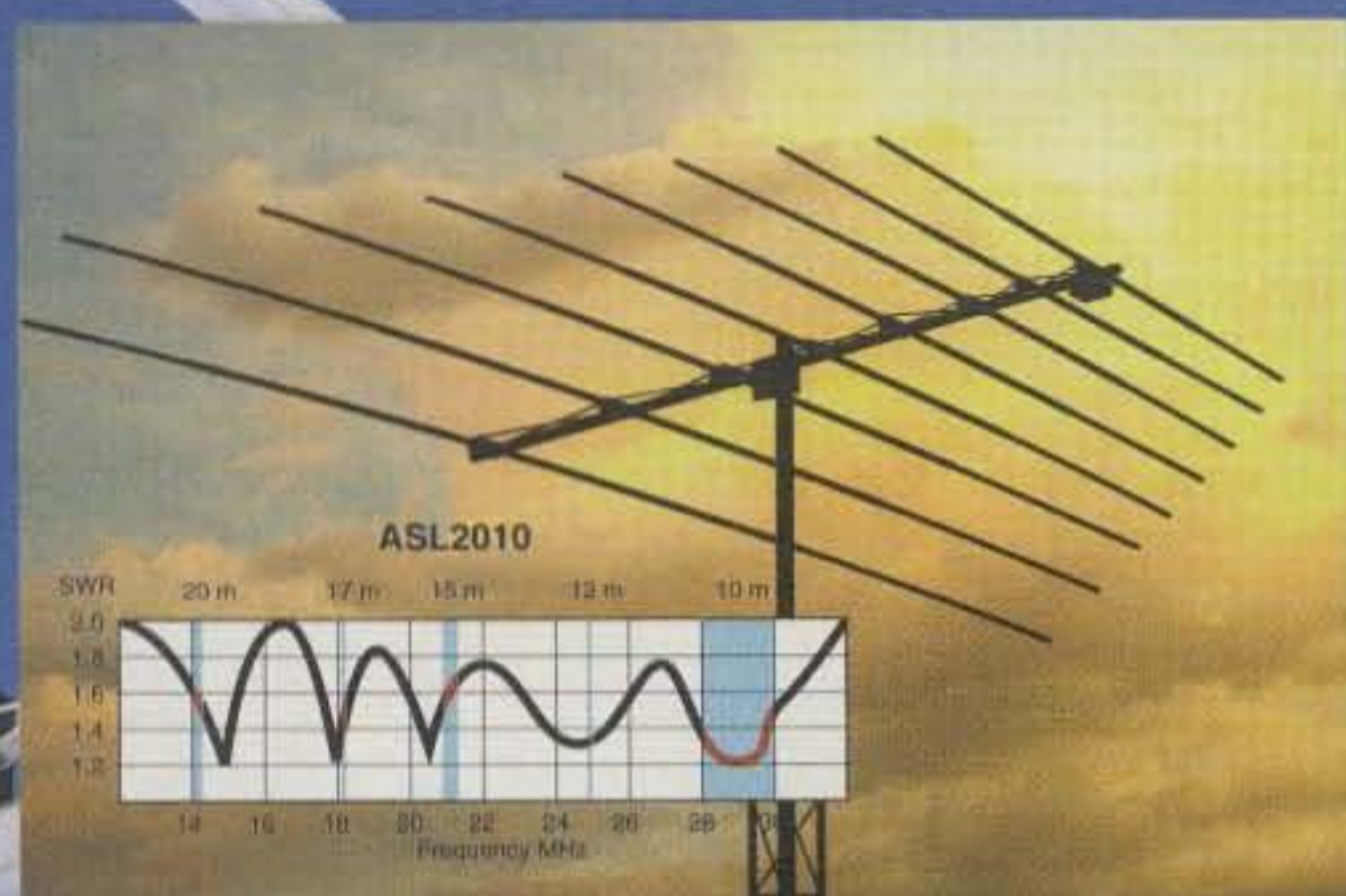
# ASL2010 **Log Periodic**

## 5 Bands On A Boom You Can Manage

This all new log periodic antenna is the most cost effective, high gain, five band antenna on the market today. Skylog offers continuous operation from 13.5 to 32 MHz. Antenna gain and beamwidth are constant for uniform coverage from 10 through 20 meters. The ASL2010 is rated for continuous duty at full legal power.

Skylog is designed for maximum gain on a manageable 18 foot boom with only 10.1 square feet of wind surface area. All stainless steel hardware and rugged element design are only some of the many features that provide years of superior antenna performance.

Skylog ASL2010 is the smart choice for multiband HF operation.



- **Continuous five band coverage from 13.5 to 32 MHz**
- **Constant gain over entire frequency range**
- **6.4 dBd gain, 65 degree beamwidth**
- **20, 17, 15, 12 and 10 meters with one antenna**
- **18 foot boom and 19.25 foot turning radius**

MODEL	ASL2010
Frequency, MHz	13.5-32
No. Elements	8
Forward Gain, dBd	6.4
Front to Back Ratio, dB	15-20
SWR 1.2:1 Typical	
2:1 Bandwidth	18.5 MHz
Power Rating, Watts	2000
3 dB Beam Width, Deg. E Plane	65
Boom Length, ft (m)	18 (5.48)
Boom Diameter, in (cm)	2.0 (5.08)
Longest Element, ft (m)	38 (11.58)
Element Center Dia, in (cm)	1.25 (3.18)
Turning Radius, ft (m)	19.25 (5.86)
Mast Size Range, in (cm)	1.5-2 (3.18-5.08)
Wind Load, ft <sup>2</sup> (m <sup>2</sup> )	10.1 (.93)
Weight, lb (kg)	55 (25.5)

AVAILABLE THROUGH DEALERS WORLDWIDE



# cushcraft

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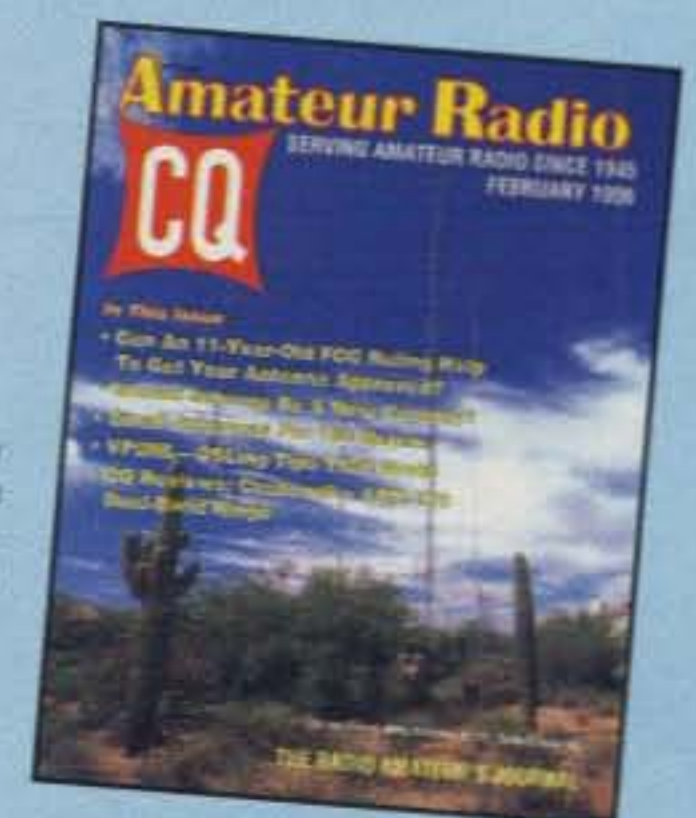
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**ON THE COVER:** You never know where you're going to find a ham's antenna farm. Mike Fulcher, KC7V, no stranger to African contest DXpeditions, has managed to "nestle" his huge towers and beams among the cactus plants at his Cave Creek, Arizona, home location. (Photo by Larry Mulvehill, WB2ZPI)



# IC-738

"The IC-738 is a very nice piece of equipment, and on a scale of one to ten, it easily gets a ten... 'I tried to find something negative to report about this unit, but it was all positive — and then some.'" — *CQ*, December 1995



Don't let your contest results depend on "previous generation" technology. Get the Dxer's advantage with the "Next Generation" IC-738.

## FEATURES

- New DDS Technology
- 100W (SSB, CW, FM) 40W AM Standard
- AT-170 High Speed Automatic Antenna Tuner (160-10 Meters)
- Two Antenna Connectors (Front Panel Switchable)
- 4 Function Meter (SWR/ALC/PO/S)
- VOX
- RF Gain
- Pass Band Tuning
- Notch Filter
- 10 Electronic Scratch Pad Memories
- 101 Memory Channels (10 split, 2 scan edge)
- RIT/ $\Delta$ Tx Functions
- Quick Split w/Simultaneous Display
- Speech Compressor
- Attenuator (20 db)
- Pre Amplifier (20 db)
- Double Band Stacking Registers
- Set Mode Menu to Customize Operation
- Menu Selectable CW Filters
- Noise Blanker
- Fast/Slow AGC
- High Dynamic Range/Low Distortion
- Built-in Electronic Keyer
- Direct Keyboard Entry
- Hand Microphone Included (HM-36)
- Computer Control Port (CI-V)

## NEXT GENERATION TECHNOLOGY

### Next Generation Circuitry

**DDS (Direct Digital Synthesis)** ICOM's unique DDS IC is used for the LPL Circuit. High tech and compact, the PLL unit improves frequency resolution to 1 Hz step. You'll experience an analog feeling of the tuning, faster PLL lockup times, improved phase noise blocking and high dynamic range.

### Next Generation Tuner

**AT-170 Advanced Tuner** Preset memories, in 100kHz steps, provide very high speed tuning. "Automatic re-tune" turns the AT-170 on, and tunes, when SWR exceeds 1.5:1 "Through inhibit" permits tuning at SWR conditions up to 3:1 (when your antenna can't be tuned to 1.5:1). "Sensitive/Normal" gives you the choice of minimum possible SWR or 1.5:1. This eliminates tuning each time you transmit, unless desired.

### Next Generation Duty Cycle

**100% Full Duty** The final power amplifier outputs a stable 100 W in SSB, CW and FM modes. The aluminum die cast frame, large heatsink and innovative twin cooling fan system stabilize the PA circuit to ensure 100% duty cycle operation.

### Next Generation Frequency Management

**Quick Split Operation** Pre-programmable offsets, simultaneous display of Tx and Rx frequencies and XFC (Transmit Frequency Change) give you a competitive edge when calling Dx stations operating split frequencies. "Split Lock" permits changes in your transmit frequency while protecting your receive frequency against accidental changes.

### Next Generation CW Operation

**CW Contest Package** Our built-in electronic keyer with separate key jack, full break-in (QSK) and separate jacks for an extended CW key or memory keyer, make a competitive package for CW contesting. For example, use a memory keyer (or TNC with CW capability) to make contacts easily, then use your paddle for normal operation.

\*See your dealer for details

# PRICE REDUCED!

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# NEW DX77

Advanced Vertical Windom from

**hy-gain**  
by Telex

- 7 Band Vertical
- 10-12-15-17-20-30-40 Meters
- No ground radials required
- Tilt Mount

**Height:** 29'

**Power Handling:** Legal Limit

**Preliminary Bandwidth at Less Than 2.1 VSWR**

- 10 meters—1.7 MHz
- 12 meters—100 KHz
- 15 meters—500 KHz
- 17 meters—100 KHz
- 20 meters—250 KHz
- 30 meters—100 KHz
- 40 meters—150 KHz



Industrial Grade  
Construction



*"I worked 50 countries the very first month I had my DX77."*

**WA0QJK**  
**Edwin E. Woerner**

Your Performance Advantage

**hy-gain**  
by Telex

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**CH-32**  
 Miracle Baby  
 146/446MHz  
 HT Antenna  
 Gain: 0dBi  
 Length: 1.75'  
 Conn: BNC

 **NEW Z750** • Dual-band 146/446MHz w/fold-over • Includes COMET exclusive theft-resistant lock!  
 Gain & Wave: 146MHz 2.15dBi 1/2 wave • 446MHz 5.5dBi 5/8 wave x 2 • Length: 39" • Conn: Gold-plated PL-259 • Max Pwr: 200W

 **NEW Z780** • Dual-band 146/446MHz w/fold-over • Includes COMET exclusive theft-resistant lock!  
 146MHz 6/8 wave 4.5dBi • 446MHz 5/8 wave x 3 7.2dBi • Length: 62" • Conn: Gold-plated PL-259 • Max Pwr: 150W

**NEW SBB-15** • Tri-band 52/146/446MHz w/fold-over  
 Gain & Wave: 52MHz 0dBi 1/4 wave • 146MHz 4.5 dBi 6/8 wave • 446MHz 7.2dBi 5/8 wave x 3 • Length: 58" • Conn: PL-259 • Max Pwr: 120W

**NEW BLACK COLOR**

**NEW SBB-7/SBB-7NMO** • Dual-band 146/446MHz w/fold-over  
 Gain & Wave: 146MHz 4.5dBi 6/8 wave • 446MHz 7.2dBi 5/8 wave x 3 • Length: 58" • Conn: SBB-7 PL-259/SBB-7NMO NMO • Max Pwr: 70W

**NEW BLACK COLOR**

**NEW SBB-5/SBB-5NMO** • Dual-band 146/446MHz w/fold-over  
 Gain & Wave: 146MHz 2.5dBi 1/2 wave • 446MHz 5.5dBi 5/8 wave x 3 • Length: 39" • Conn: SBB-5 PL-259/SBB-5NMO NMO • Max Pwr: 120W

**NEW BLACK COLOR**

**CX-224/CX-224NMO** • Tri-band 146/220/446MHz w/fold-over  
 Gain & Wave: 146MHz 2.15dBi 1/2 wave • 220MHz 3.5dBi 5/8 wave • 446MHz 6.0dBi 5/8 wave x 2 • Length: 36" • Conn: CX-224 PL-259, CX-224NMO NMO • Max Pwr: 100W

**B-20/B-20NMO** • Dual-band 146/446MHz w/fold-over  
 Gain & Wave: 146MHz 2.15dBi 1/2 wave • 446MHz 5.0dBi 5/8 wave x 2 • Length: 30" • Conn: B-20 PL-259/B-20NMO NMO • Max Pwr: 50W

**SH-55** • Super Flexible 146/446MHz HT Antenna  
 Gain: 146MHz 1.5dBi • 446MHz 3.2dBi • Length: 15.5" • Conn: BNC • Max Pwr: 10W

**B-10/B-10NMO** • Dual-band 146/446MHz cellular look-a-like • Gain & Wave: 146MHz 0dBi 1/4 wave • 446MHz 2.15dBi 1/2 wave • Length: 12" • Conn: B-10 PL-259/B-10NMO NMO • Max Pwr: 50W

- Gold-plated Connectors
- High-Quality Craftsmanship
- Unique Fold-Over Feature



**COMET** Specializes in a wide assortment of Mobile Mounting Systems that require NO HOLES. A variety of trunk lid, hatch-back, rain gutter, roof rack and window mounts are available along with low loss coax cable assemblies, for the ultimate mobile station!

For a complete catalog of **COMET** Antenna products call or visit your local dealer. Or, contact **NCB Company** at 800/962-2611. Use **COMET** products, and enjoy amateur radio to it's fullest!

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# ANNOUNCEMENTS

• **The following Special Events are scheduled for February:**

**W1ORS**, from Stratford, Connecticut; the Stratford ARC; to commemorate the 50th anniversary of the club; 1700Z Feb. 10 to 2400Z Feb. 16; operation in the lower 25 kHz of General SSB and CW 80, 40, 20, 15 meters, plus 160 meters, 6 meters SSB and RTTY. For a certificate, send 9 x 12 SASE and QSL to May Blakely, WA1EHK, 17 Coram Road, 4F, Shelton, CT 06484.

**W2SEX**, from The ARA of the Tonawandas

Clubhouse Station, Tonawanda, New York; The ARATS; to celebrate Valentine's Day; Feb. 10 from 1200-2200Z; on 3.940, 7.045, 7.290, 14.045, 7.290, 14.045, 14.290, 146.550. For QSL send SASE to ARATS, P.O. Box 430, N. Tonawanda, NY 14120.

**N4BV**, Alexandria, Virginia; The Mount Vernon ARC; to commemorate George Washington's Birthday; Feb. 17-18. For certificate, send QSL and a 9 x 12 SASE to MVARC, P.O. Box 7234, Alexandria, VA 22307.

**KB8YUV**, from The L'Anse Creuse ARC

Amateur Radio Open House; Macomb Mall, Roseville, Michigan; to introduce ham radio to the public; Feb. 17 from 1500 to 2100 UTC; operation on both phone and CW in the General portion of the 80 through 10 meter bands. For more information, contact Dave Herrington, N8NLK at 810-465-2797; or e-mail at dharring@macomb.lib.mi.us.

**8-land**, from Special Event stations in the greater Cleveland, Ohio area; The Cleveland Bicentennial ARC; to celebrate Cleveland's Bicentennial throughout 1996; all bands included on CW, SSB and digital modes on HF; certificates awarded to contacts signing /200 in 1996. Submissions must include a GCR list and \$4.00 (US). Award levels: in North America two-way contacts with 10, 20, or 50 stations; DX only need work 5, 10, or 25 stations. Calls on new bands count as new stations. QSL via WA8MEM, Dwaine Modock, 28265 Gardena Drive, North Olmsted, OH 44070.

**KØZWG**, from the downtown Civic Center, Centennial Hall, Fargo, North Dakota; The Red River RAC and the Kiwanis Club of Fargo; to celebrate the 14th anniversary of their cooperative Handi-Ham Project on the occasion of the 38th Annual Kiwanis Pancake Carnival; Feb. 10; 8 AM-5 PM CST (1440-2300Z); operation in the lower 25 kHz of the General 20 and 15 meter bands. For QSL, send QSL and SASE to Jim Mowery, KØZWG, Horizons Manor, 2500 Broadway, #710, Fargo, ND 58102.

• **The following hamfests, etc., are slated for February:**

Feb. 3 & 17, **The Shortwave Club, SP9KRT and Polish Shortwave Society, SP9PEY Flea Market and Hams Carnival Ball**, at the Municipal Cultural Centre, Slaskic, Poland. For more information, contact the Municipal Cultural Centre, ul. Bytomaka 73 41-940 Piekary Slaskic, Poland; phone: 048(32)1872880.

Feb. 3, **Niagara Peninsula ARC Big Event #18**, Canadian Auto Workers Hall, St. Catharines, Ontario, Canada. For information contact Marg Swewll, VE3HOX, NPARC, P.O. Box 20036, Grantham Postal Outlet, St. Catharines, ON L2M 7W7; or phone 905-680-1211.

Feb. 3, **First Annual Amarillo ARES/RACES Hamfest/Severe Weather-Emergency Communications Expo.**, Texas Army National Guard Armory, Amarillo, Texas. Contact Ben Pollard, WS5R at 806-381-8810; or write ARES, P.O. Box 5378, Amarillo, TX 79117. (Exams.)

Feb. 3, **Kerbela Hamfest**, Kerbela Shrine Temple, Knoxville, Tennessee. For information, contact Paul Baird, KY4A, 1500 Coulter Shoals Circle, Lenoir City, TN 37772 (423-986-9562). (Exams.)

Feb. 4, **NOARS Winterfest '96**, Gargus Hall, Lorain, Ohio. Call Stan Zupan, AA8IN, at 216-933-4261 (before 9:30 PM).

Feb. 5, **West Valley ARC Radio Equipment Auction**, St. Clement of Rome Church Social Hall, Phoenix, Arizona. Contact WVARC, P.O. Box 1573, Sun City, AZ 85372 (602-546-2119).

Feb. 10, **23rd Annual Charleston Hamfest**

(Continued on p.126)

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# SEBORGA—New One or Tax Deduction?

*Sounding more like the Duchy of Grand Fenwick, from the late Peter Sellers movie "The Mouse That Roared," Seborga comes across as the thinking, erudite, and somewhat hedonistic amateur's choice of the ideal DXpedition and vacation spot.*

BY LAURIE MARGOLIS\*, G3UML

---

*About thirty years ago, a very young and precocious British amateur submitted to CQ a rather long, rather definitive article on a proposed DXpedition site with questionable new country status—Rockall Island.<sup>1</sup> Rockall Island had been quickly claimed and annexed by Britain some twelve years earlier, and was given the prefix GR. There had been some passing interest in mounting a DXpedition to the island. Young Laurie took it as his task to write an impassioned article chronicling every bit of historical and physical fact about Rockall. Probably deep in his heart he hoped to discourage anyone from going there before he could. When you're that young and a relatively new amateur, Rockall would seem like the ultimate adventure and challenge. Physical hardship and personal danger would mean very little.*

*Well, move the clock ahead about thirty years, add a few pounds, a wife, and two children, and the concept of leaping from a helicopter to a small, barren rock in the middle of the Atlantic quickly loses its primitive charm in favor of a potential "new one" offering old-world charm and comfortable amenities. I can identify with that.—K2EEK*

---

**T**here are those who'll do anything to activate a new one. They'll sail stormy seas, endure snake-ridden jungles, freeze on Antarctic ice fields, risk pirate attacks to get to the Spratlys, dunking in shark-infested oceans to land on Conway Reef. Good adventurous stuff, and no doubt were I twenty years younger and several pounds lighter, I might yet be game for such derring-do.

The money that's needed for the big DXpeditions these days! The cost of two weeks on South Sandwich would seem to equal the GNP of a small African republic. Operators sink tens of thousands of dollars of their own money, plus as much again from sponsorship and contributions, all for the pleasure of telling me I'm five-nine-QSL from some distant sandbank. I appreciate their trouble and would love to be part of it, but with a wife and children who insist on being housed, fed, and clothed, it's all a bit beyond the domesticated forty-something.

I therefore have viewed with considerable interest the emergence of the Principality of Seborga as a possible new one. Far from demanding the navigational skills of Vasco de Gama and the endurance of Lewis and Clark, Seborga can be reached in a morning from anywhere in Europe—a short flight to Nice/ Cote D'Azur airport; fifteen minutes irritation at one of the world's less friendly Hertz desks; and an hour's drive up one of Europe's finer highways, the French A8 autoroute, which pursues a dramatic course through the mountains behind the playground of the French Riviera. At the Italian frontier it turns into one of that country's superb autostradas, or Interstates. Leave London at 9 AM, and you could be there by lunchtime.

Be exactly *where* by lunchtime? What is Seborga? Why has it suddenly emerged as a proposed DXCC country? It would seem to be hard to hide an entire country just a short drive from one of the world's most visited regions. On a recent vacation in the south of France I went to take a look.

Europe is full of quaint little nation-states that over the years have achieved country status, both for amateur radio and the wider world. Some, such as Luxembourg, deserve the status "country," with their own currency, stamps, parliament, and full membership of the European Community. Others are more Ruritanian; in my own dear United Kingdom the separate status of Wales and Scotland, the Isle of Man,



*Nestled in the hills of northwest Italy is the Principality of Seborga.*

Jersey, and Guernsey is more emotional than supported by much in the way of fact. Whisper it not on a Saturday night as the pubs close in Glasgow, but there's nothing that merits the term "separate country" about Scotland—no distinct army, parliament, telecommunications authority, currency, or dealings with the outside world.

Likewise Monaco, to all intents and purposes, is just another wealthy city in the south of France, well deserving Noel Coward's description of a "sunny place for shady people." Liechtenstein is barely distinguishable from Switzerland, and neither Market Reef nor Malyj Visotkji, products of fertile Finnish imaginations, bear too close an examination.

Italy is particularly fertile ground for "countries" that raise the odd eyebrow. San Marino is certainly impressive as it rears out of the Italian plain, but it is extremely Italian. Their soccer team plays in the Italian second division. The Vatican City is worth going a long way to see, but it is basically a fine church in a large compound in the center of Rome,

---

\*32 Park View Gardens, Hendon NW4 2PN, England

<sup>1</sup>"Let's Clear The Air About Rockall," CQ, May 1967, p. 64



▲ While it was quite apparent that the Seborgan Defense Forces were not massed at the frontier, G3UML literally took over the border sentry box with no opposition.

◀ In a Declaration of Independence, Seborgan nationalists opted for removal from the local association of communities.

guarded by soldiers in funny uniforms. The status of the Sovereign Military Order of the Knights of Malta, SMOM, defies belief. The supporters of Seborga would like it added to T77, 1A0, and HV.

Seborga really is very easy to reach. It's in the northwest of Italy, close to the French coast and the Mediterranean. The aforementioned autostrada is close; you take the turn off for the pleasantly old-fashioned seaside resort of Bordighera. Seborga is marked on the highway exit sign, and a few miles up a twisting mountain road takes you to it. According to the Italians, you are in any small Piedmontese village. According to the Seborgan citizens, you are in a completely separate state, the Principato di Seborga.

There are differences as you drive up the mountain. The sign delineating the boundaries of Seborga looks like any Italian town sign—big, white letters on a blue background. But right next to it is a sentry box made out of old packing cases and painted blue and white. According to the Seborgans, this is the frontier. The sentry was busy elsewhere when we passed by.

The pale blue and white Seborgan emblem is painted all over the road. There's an ornate welcome sign in German, French, and English. There's a rather droopy attempt at a flag.

Past all this, which again looks terribly Italian, enter the hilltop village and there are other differences. The cars have licence plates beginning with the letters IM, issued by the Italian province of Imperia, but many proudly carry an international indicator—not the Italian "I," but "SB" for Seborga.

The village is tiny, quaint, and, someone clearly thinks, a good investment target. The medieval alleyways are being resurfaced. Buildings are being restored. Everywhere there is building, decorating, and small-scale construction. A lot of money is being spent in Seborga, and on the cool and misty day we were there it all had the feel of a developing movie set. There are two churches, an exquisite thirteenth century chapel on the outskirts and a seventeenth century building on a tiny square in the center of the village. The fine frescos decorating the exterior are marred, jarringly, by gunshot damage, a legacy of battles between Italian partisans and fleeing German troops in the final days of World War II. Turn with your back to the church, and in a confusion of the centuries there is a five-element tribander towering over another gem-like village building!

The economy looks to be in good shape, judging by the busy restoration work. Flower cultivation is one industry. They're trying to encourage tourism, and the curiosity of separation won't hurt that among the "been there, done that" brigade. It has financial benefits too, and therein lies the sudden interest in Seborga.

There are small signs of cheeky subversion all around. The municipal buildings (such as they are), the post office, and the council chamber are covered with the usual bureaucratic notices seen anywhere in Italy or elsewhere in Europe. Voters are summoned to the polls for regional elections. There are road and street signs, all exactly the same as in any ancient Italian village. One big example lists several local villages, all part of a local association of communities. The Seborga name, between Sanremo and Ventimiglia, has been carefully scratched out and replaced with the Seborgan emblem.

Back into the village center, and a door, locked the day we were there, announces the "Principato di Seborga, Direzione Generale delle Telecomunicazioni." The tribander is on top of this building. Next door is a small souvenir shop, where a charming girl agrees that "Yes, the radio is up there, but there's no one there today." She sells my wife Jacky a thing to hang keys on, some postcards, and some porcelain flowers woven into the shape of a heart. An older woman shrugs and smiles when I ask her if she's Italian or Seborgan. It's clearly all a bit of a joke.

Seborga's claim to separateness for its 350 citizens is intriguing and probably no sillier than others in Europe. It argues that far from wanting to leave Italy, it was never part of Italy and has always been a different entity. From the year 954, when it first appeared in history books, to 1729, it was ruled by princes, descended from monks, the last of whom sold it to the House of Savoy. This royal household dominated what is now the French/Italian border region until the foundation of the Italian state, which happened as recently as 1861. Bear in mind that Italy is a very new creation.

It's claimed that this sale was never registered, and at the Congress of Vienna, which ended the Napoleonic Wars in the early nineteenth century, Seborga was not made part of the Kingdom of Piedmont. Crucially, neither was it made part of Italy when the state, which included Piedmont, was created.

Seborga's leader is Prince Giorgio I. His adviser and Seborga's

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Consul-General to Piedmont is Gian Carlo Bavassano, who is quoted as saying he wants to turn Seborga into a tax haven, complete with a huge hotel and conference center. As far as my research can show (a quick glance in the callbook), Mr Bavassano appears to share the same identity as the well-known DXer I1RBJ, the prime mover in getting Seborga declared a new country! Suddenly, and bearing in mind the Italians' extreme dislike of paying taxes (Okay, none of us are all that enthusiastic.), a picture emerges here—a picturesque ancient hilltop village turned into a tax-free zone, very close to the tourist honeypots of the Mediterranean, promoted by a well-known DXer and with DXCC status thrown in as well!

The attempt at financial separation is well advanced. Seborga now has its own currency, the Luigino, convertible at six to the US dollar. Many such conversions are earnestly wished. There are stamps too, but these don't cut much ice outside of Seborga, and certainly not with the Italian post office. None of Seborga's independence ambitions impress the rest of Italy very much. Even the local policeman is quoted as saying that statehood is nonsense, and that the Prince, a cheerful fellow happy to be videoed with tourists, doesn't exist.

As far as amateur radio is concerned, Seborga has been activated several times by I1RBJ and others with a selection of callsigns. The prefix seems to change almost monthly. Last heard of, it was T88, which is unofficial but sounds good. The location is spectacular, high in the mountains with fine views in every direction. I didn't get the chance to operate, but with the good site and fancy callsign it must be fun.

Separate country status may be some way off and could well be no more than a dream for Consul-General Bavassano and his associates. In my view, country status for Seborga would not be any more ridiculous than many entities that count on the DXCC list and produce crazed pile-ups. It seems as deserving as any of the European examples I mentioned earlier.

Personally, I think I'd probably support it. Weird medieval throwbacks are fun and should be preserved. The DXCC list needs injections of new



The office of the Director General of Communications and the Consul General to Piedmont also sports the antenna used for their amateur radio operations. The offices were closed during our visit.

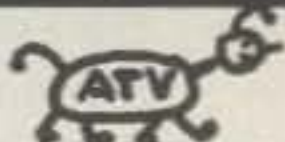


Unlike Scarborough Reef, Seborga does boast a well-stocked souvenir store. Here one can buy (in dollars, lire, or local Luiginos) stamps; stickers for your car; pictures of the Monarch, Prince Giorgio; film to record your visit; and great things on which to hang your keys.

blood, and Seborga can be reached without hazarding bank balance or life, unless the French and Italian drivers are in a particularly venal mood. Even if it doesn't make the DXCC list, take a morning out of your next European vacation to stop by, and then amaze your friends by boasting of your visit to the Principality of Seborga. They also sell very fine things on which to hang your keys.

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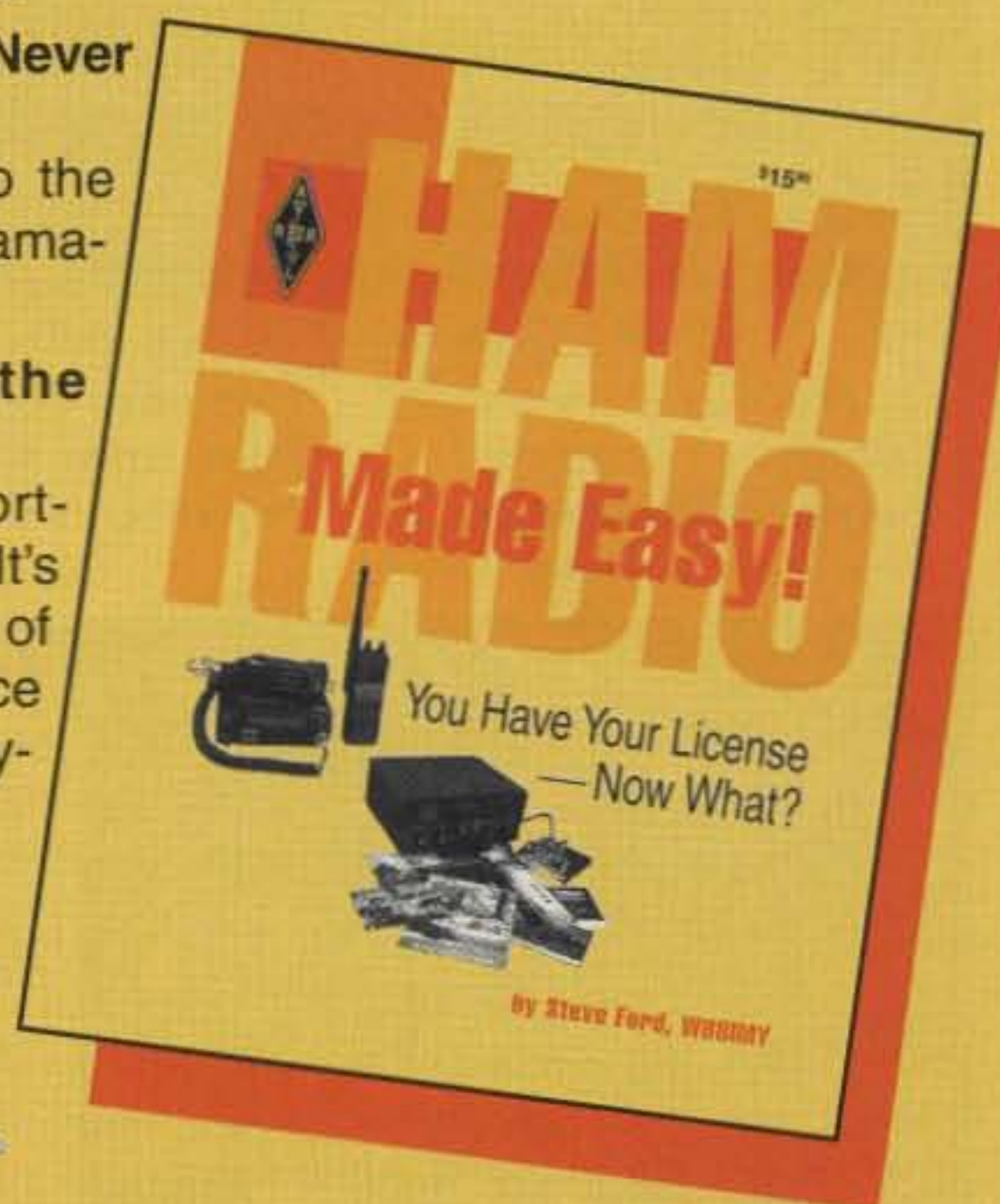
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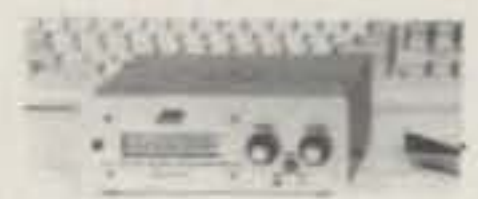
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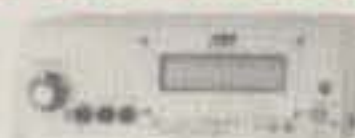
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# Ten Years of PRB-1

## The Federal Preemption of Radio Antenna Restrictions

*As we begin a new year, WK3U helps us review the past ten years with respect to PRB-1. There has been a lot of litigation, a lot of questions have been raised, not too many answers have been given, and still there is no definitive case law.*

BY J. LEE BAKER\*, WK3U

**A** little over ten years ago the Federal Communications Commission came to the aid of the amateur radio community by creating PRB-1, a regulatory tool intended to protect amateur radio operators from overly restrictive zoning ordinances. During those ten years amateurs have both won and lost legal battles using PRB-1, but for the most part that rule has been a major benefit to amateur radio.

PRB-1 is a regulatory action by the FCC that partially preempts local governments' abilities to control, through zoning regulations, the height of amateur radio antennas.<sup>1</sup> In summary, PRB-1 performs two functions for the amateur radio operator: (1) it overrides any local laws or zoning which directly prohibits, or prohibits-in-effect, local radio amateurs from operating their stations, and (2) it requires that local governments make reasonable accommodations for amateur operators to construct their radio antennas.<sup>2</sup>

One area that the FCC expressly refused to address with PRB-1 was that of restrictive covenants. Restrictive covenants are considered to be a form of contract between the landowner and the developer or other benefiting parties that have an interest in that covenant. The FCC decided that they did not want to interfere in private agreements that were voluntary in nature. They stated that PRB-1, "does not reach restrictive covenants in private contractual agreements. Such agreements are voluntarily entered into by the buyer or tenant when the agreement is executed and do not usually concern [the FCC]."<sup>3</sup> As a result, those amateur radio operators prevented from erecting antennas due to restrictive covenants will find no relief from PRB-1.

PRB-1 initially resulted in a string of very successful challenges in Federal court to local antenna restriction ordinances. Those early successes may partially be due to the lack of case precedence on the subject, as

well as the local communities' initial failures to modify zoning ordinances in compliance with PRB-1.

### Legal Battles

The first case to apply PRB-1 was *Thernes v. City of Lakeside Park*.<sup>4</sup> Prior to the establishment of PRB-1, the City of Lakeside Park, Kentucky disapproved Thernes' request to construct an amateur radio antenna since local zoning regulations outright prohibited amateur radio stations. Thernes sued the city in Federal District Court, but lost his case. He appealed to the Federal Circuit Court, and while awaiting his hearing, PRB-1 was created. The Circuit Court held that in light of the newly enacted PRB-1, the city's ban on amateur radio stations was preempted, and directed the city to reevaluate Thernes' application and make reasonable accommodations for his amateur radio station.

This success was followed shortly thereafter by *Bulchis v. City of Edmonds*<sup>5</sup> in Washington state. In that case, Bulchis, an amateur radio operator living in Edmonds, Washington, applied to the city for a permit to erect a 21.5 foot telescoping antenna tower that could extend to 70 feet in height. The city reviewed the antenna tower request with respect to local zoning regulations and PRB-1, but denied the application, as it did not meet the zoning requirements. Bulchis appealed that decision to the city, emphasizing PRB-1, but was again denied. He then filed suit in Federal District Court, claiming as one of his arguments that the city was not in compliance with PRB-1. The Court used a two-part approach in reviewing Bulchis's case. They first reviewed the local zoning regulations to determine their validity. Because the zoning ordinances of Edmonds did have the flexibility which *could* allow approval for construction of a tower in excess of the 25 foot limit, it was considered valid. Second, after determining the validity of the ordinances, the court looked to see if the city reasonably accommodated the amateur radio operator in this case. After reviewing the details of Bulchis's request,

the court found that the City did not take into account the specific needs, circumstances, or technical details necessary to make an educated decision as to what would constitute reasonable accommodation of Bulchis's amateur radio station. The court decided in favor of Bulchis and ordered the city to reevaluate his application.

The next year, the California case *Howard v. City of Burlingame*<sup>6</sup> was tried in the District Court for the Northern District of California. In that case, Vernon Howard, an Extra Class amateur radio operator, requested a variance from the local zoning ordinance which restricted antenna height to a maximum of 25 feet. His application to erect a 51 foot tower was initially approved by the city. However, after local residents objected to the proposed antenna, the city reversed its decision and refused the variance and permit. Howard filed suit in the Federal District Court, which decided in Howard's favor based on PRB-1, but ruled against Howard on other issues such as his right to free speech through amateur radio.<sup>7</sup> The city gave him his desired permit. However, Howard decided to appeal the part of the decision that he lost in an apparent effort to recover attorney's fees. During the appeal at the Federal Circuit Court, the justices commented in dicta that PRB-1 "leaves a city free to deny an antenna permit as long as it has considered the application, made factual findings, and attempted to negotiate a satisfactory compromise with the applicant."<sup>8</sup> Nonetheless, the Circuit Court affirmed all issues decided in the District Court.

Despite these early successes, the amateur radio community received a dire setback with the case *Williams v. City of Columbia*. In 1987 John Williams, a licensed amateur radio operator, applied to the Columbia, South Carolina Zoning Board of Adjustment for a special exception to erect an antenna tower in excess of the 17 foot limit imposed by local zoning ordinance. Williams planned to put up a tower with antenna that was 28 feet tall when lowered, and 55 to 65 feet tall when fully extended. The zoning board denied his request. Williams

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filed a law suit in Federal District Court claiming that the denial of his request was in violation of PRB-1 (among other claims). The District Court concluded that PRB-1 was not addressed by either party at the zoning board hearing; therefore the court ordered the zoning board to re-evaluate Williams's application under the guidelines of PRB-1.<sup>9</sup> The court kept the case open for 60 days to allow the city time to comply with the order. The city again reviewed Williams's application. The zoning board investigated Williams's use of his amateur radio station and determined that he participated in neither Defense Department (MARS) nor emergency communication services; therefore his radio use was deemed to be primarily a hobby. They then weighed this use against the interests of the city, such as aesthetics and public safety, and concluded that the needs of the city outbalanced Williams's hobby. They did suggest that they may allow such an antenna if, for aesthetic reasons, Williams limited his operating hours (times that the antenna would be fully extended) to hours of darkness. Williams refused such a compromise and the application was again denied. Once more Williams challenged the denial in the still-open case in District Court. The court granted the city's motion for summary judgment and upheld their denial of Williams's request. The court decided that the city had properly balanced Williams's "hobby" needs against the safety and aesthetic needs of the city when they reviewed the variance application.<sup>10</sup>

Williams appealed this decision to the U.S. Court of Appeals for the Fourth Circuit, which heard arguments in May 1990.<sup>11</sup> Williams

claimed "that the zoning ordinance should be invalidated pursuant to PRB-1 because it operates to preclude amateur radio communications and it does not represent the minimum practicable regulation to accomplish the City's legitimate purpose." The Circuit Court reviewed PRB-1 and recognized that the FCC expressly refrained from specifying minimum antenna standards and promoted the cooperation between local communities and amateur operators to achieve a balance between federal interests and local zoning issues. It appears that the Circuit Court construed this goal to be the strict law under PRB-1, for they commented that "[t]he law requires only that the City balance the federally recognized interest in amateur radio communications with local zoning regulations"<sup>12</sup> (emphasis added). Nowhere did they address that PRB-1 requires that local regulations "must be crafted to accommodate reasonably amateur communications. . . ." <sup>13</sup> Other cases have held that this requirement applies not only to the drafting of zoning regulations, but also requires that the city actually reasonably accommodate the needs of the amateur radio operator (see, e.g., *Bodony v. Sands Point*, 681 F.Supp. 1009, 1013 (E.D.N.Y. 1987); *Bulchis v. City of Edmonds*, 671 F.Supp. 1270, 1274 (W.D.Wash. 1987); *Howard v. City of Burlingame*, 937 F.2d 1376 (9th Cir. 1991)). Here, the court held that the zoning board did balance the city's concerns with the federal government's interest in amateur radio and had complied with PRB-1. Even though the city made a token alternative offer (operating with a telescoping antenna only during hours of darkness), the Appeals Court's decision seems to address only the

balancing requirement of PRB-1. In ominous comments, the justices also affirmed the zoning board's review of whether Williams actually participated in emergency service or Department of Defense activities, when they reviewed his application. Since he participated in none of those services, they concluded that his amateur radio practices were primarily a hobby, which weighed against him in "balancing" federal interests with the local zoning concerns.<sup>14</sup> Williams lost his case.

Another case that was decided against an amateur radio operator was *Evans v. Board of County Commissioners*. Evans was an amateur radio operator who lived in the scenic city of Boulder, Colorado, in an area zoned to limit antennas to a height of 35 feet. Evans applied to the county for a building permit to erect a 125 foot antenna tower. The county denied the request and Evans filed suit in Federal District Court, using PRB-1 as his claim for a cause of action. The District Court decided in favor of the county, explaining in an unpublished decision that the county complied with PRB-1. Evans appealed to the Federal Circuit Court, but again lost his case.<sup>15</sup> In 1988 the county modified its zoning regulations to create a limited impact special use review process to consider amateur radio antenna construction applications. Evans again applied to the county for a special use permit, offering four different variations of antenna construction ranging from 60 feet to 100 feet in height. He suggested that the county select the antenna configuration that they considered most acceptable. The designs were reviewed, but the county claimed that all four antenna variations lacked the necessary criteria for special-use approval. Evans again filed suit in Federal District Court, claiming the special-use review regulation was preempted by PRB-1. This time the court agreed with Evans, finding that the county's regulation still restricted all antennas to a maximum of 35 feet regardless of their special use and did not reasonably accommodate the amateur radio operator.<sup>16</sup> The county went back to the drawing board and again modified its zoning regulations, this time to make accommodations that would allow the board to approve amateur radio antenna requests that exceed 35 feet in height. Evans once more submitted for a permit to erect his antenna in excess of 35 feet. The county again reviewed the application and recommended several alternatives, including a 60 foot crank-up tower. Evans refused the county's suggestions. Consequently his application was once more denied. Back in Federal District Court, Evans again challenged the county's application denial. The District Court decided in an unpublished summary judgment that the regulations were invalid as applied based on three points: "(1) the Zoning Resolution initially was preempted by federal law; (2) the Board failed to adequately consider Evans's needs for a greater antenna height in violation of PRB-1; and (3) the county based its denial of Evans's application upon inconsistent grounds." The court picked one of the four antenna variations submitted by Evans (an 80 foot tower) and directed the county to approve the application. This time the county appealed the District Court's decision.<sup>17</sup> The Tenth Circuit Court of Appeals applied the two-part test established in the *Bulchis* case. Since the District Court found the county's latest version of zoning regulation was consistent with PRB-1, and neither

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Evans nor the county appealed that decision, the Circuit Court considered the first part of the test to be satisfied. They then looked to see if the county's application of that regulation was preempted by PRB-1. After reviewing all the details leading up to the appeal, the Circuit Court held that since the county had suggested a number of acceptable variations, including a crank-up 60 foot tower, the county complied with the requirements of PRB-1. The court commented that since the FCC explicitly refrained from establishing specific antenna height requirements in PRB-1, local authorities did have the latitude to determine antenna height based on health, safety, or aesthetic considerations, as long as they reasonably accommodate amateur communications with the minimal regulation necessary. The court distinguished this case in that Boulder, Colorado is a city with a unique, spectacular view of the Rocky Mountains which may be found in few other locales. Residents purchase homes in that area specifically for the view and antenna towers would detract from that view and lower property values in the immediate vicinity. The Circuit Court felt that by weighing the needs of the amateur radio operator against the other residents' enjoyment of the unique panorama of Boulder, and by suggesting other alternatives, the county complied with the intent of PRB-1. Evans's application was denied.

Despite these apparent setbacks to amateur radio, courts are still favorably applying PRB-1 in amateur radio antenna disputes. One such case was that of *Pentel v. City of Mendota Heights*. In that case, Sylvia Pentel, an amateur radio operator in Mendota Heights, Minnesota, applied for a zoning variance to erect a retractable steel tower that was 30 feet tall when lowered, and extended to a maximum height of 68 feet. The local zoning ordinance restricted antennas to 25 feet in height. Oblivious of the zoning ordinance, Pentel had previously been operating for two years with a vertical, high-frequency antenna mounted on her roof which reached a height of 56.5 feet. Without providing her an explanation, the city turned down her application. In order to comply with PRB-1, the city allowed Pentel to continue operating with the rooftop-mounted vertical antenna. Pentel challenged the local ordinance on grounds that it did not reasonably accommodate her radio needs per PRB-1, as well as other constitutional claims. She presented to the court evidence that over the two years of operating with her vertical antenna she was unable to make reliable contacts within the United States, and was able to make only one foreign contact. She showed that the radiation from the vertical antenna was blocked by trees and that the omni-directional nature of that antenna compounded the problem by dissipating her signals in all directions. Pentel presented information showing that a beam antenna was more effective than a vertical antenna, and that an antenna's effectiveness increased with height. Since her rooftop antenna did not provide satisfactory performance, Pentel claimed that the city's approval to allow her to continue using the vertical antenna did not, in effect, reasonably accommodate her two-way radio needs. The District Court, however, disagreed and granted summary judgment for the city. Pentel appealed to the US Court of Appeals for the Eighth Circuit. That court reviewed the case *de novo* (as if it were a new trial) and concluded

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that the city's decision to allow Pentel the continued use of her vertical antenna, but denying her the zoning variance, did not reasonably accommodate her amateur radio needs within the context of PRB-1. They reversed the decision of the District Court.

This time, the city appealed the court's decision.<sup>18</sup> The justices of the Court of Appeals for the Eighth Circuit reviewed the cases of *Evans v. Board of County Commissioners* and *Williams v. City of Columbia*, which held against amateur operators, and distinguished this case. This court actually disregarded the holding of *Williams*, commenting that the *Williams* court improperly evaluated whether the city achieved a proper balance between local interests and those of the Federal government. The *Pentel* court interpreted PRB-1 to require local communities to reasonably accommodate amateur radio, not just to achieve a balance between Federal and local interests. They supported the holding in *Evans*, however, by recognizing that the city in that case did evaluate the facts and made several alternative suggestions which *Evans* refused. Because the city made attempts to accommodate *Evans*, the Court of Appeals decided the city fulfilled their obligation under PRB-1.

In applying the law to the *Pentel* case, the court found that the city of Mendota Heights made no factual findings and informed Pentel of the application denial with a "bare bones denial that did not list any bases for the denial." Although the city made no fact finding, the Circuit Court deduced that there were four potential justifications for the city's refusal to approve the antenna request: (1) possible interference to local television and broadcast radio reception; (2) the physical safety of neighbors; (3) the city already accommodated Pentel by allowing her use of the 56.5 foot, rooftop-mounted vertical antenna; and (4) the antenna and tower would be unsightly. The court discharged those arguments by explaining that interference was an issue controlled by the FCC and that failure to correct such interference could result in the loss of Pentel's

radio license. The court also accepted the tower manufacturer's specifications indicating the tower could withstand 80 mile-per-hour winds as evidence that the tower was not a safety risk. As stated above, this court did not agree with the city that allowing Pentel to retain her inadequate vertical antenna accommodated her reasonably within the scope of PRB-1. Last, the court recognized that the aesthetics of the tower was a very subjective issue that was difficult to evaluate. They skirted the question of the tower's unsightly nature by indicating that the city failed to negotiate a compromise, implying that the city offered no better aesthetic alternative. The court concluded that the city did not accommodate reasonably the amateur operator as it "did not use the least restrictive means available to meet its legitimate zoning purposes."<sup>19</sup>

### Lessons Learned

Many other cases have been litigated, but their points of law do not vary greatly from the above rulings. No antenna dispute case involving PRB-1 has ever reached the US Supreme Court, which means that PRB-1 may be applied with varying results from one Federal Circuit to another. Since each Federal Circuit is not bound by the holdings of other Federal Circuits, an antenna ruling in one jurisdiction may have no effect in another. Every one of the above described cases was litigated in different circuits, which means that a definitive, binding rule of law may not be deduced from the sum of these cases.

However, the evolution of PRB-1 through ten years of litigation has yielded some common concepts in battling restrictive zoning ordinances. If a denied zoning variance application is contested, the court will most likely first determine whether the zoning ordinance is itself valid. If the ordinance outright prohibits any antennas above a certain height, or if the ordinance bans amateur radio operations altogether (as in the *Thernes* case), the zoning may be invalid. The *Bulchis* court implied that if the

ordinance was flexible enough to grant variances for amateur radio antennas, it was valid.

The second prong of the two-part *Bulchis* approach was to determine whether the city reasonably accommodated the amateur operator. The *Howard* court commented in dicta that as long as the city considered the variance application, made factual findings, and attempted to negotiate a compromise with the radio operator, it was free to deny an antenna permit application. In *Evans*, the City of Boulder did just that by making factual findings and negotiating alternate tower configurations, including a 60 foot crank-up tower. Because *Evans* refused these alternatives, the court supported the city's permit denial. However, providing alternative solutions is not always in itself sufficient to deny a variance. Sylvia Pentel was able to shoot down the city's proposed alternative antenna configuration by presenting technical evidence showing that the compromise suggested by the city was insufficient for effective two-way communications. She also successfully showed that her desired antenna provided the needed improvements in height and directional capability to remedy the situation. Because the city's recommendations did not reasonably accommodate her amateur radio operations, Pentel won her case.

Despite the success of PRB-1 in court, it would be wise to exhaust all non-litigation options before considering a lawsuit. Court battles are expensive, both in time and money, and the final ruling may not be favorable to the amateur operator. The legal accomplishments of PRB-1 may go a long way in assisting the amateur radio operator with negotiating an acceptable compromise without resorting to litigation.

PRB-1 is a valuable regulatory tool available to the amateur radio community, tried and tested in court for ten years. As cities and communities come to understand their requirements under the regulation, the need to battle zoning ordinances through litigation hopefully will diminish. A lawsuit is something no amateur radio operator should have to face in order to provide a valuable service to the community and the nation.

### Footnotes

1. PRB-1 is codified as 50 FR § 38813, Federal Preemption of State and Local Regulations Pertaining to Amateur Radio.
2. PRB-1.
3. *Id* at §§ 7-9.
4. 779 F.2d 1187 (6th Cir. 1986).
5. 671 F.Supp. 1270 (W.D.Wash. 1987).
6. 726 F.Supp. 770 (N.D.Ca. 1989).
7. In addition to using PRB-1, Howard also argued his case on grounds of free speech, and 42 U.S.C. § 1983.
8. 937 F.2d 1376 (9th Cir. 1991).
9. 707 F.Supp. 207 (D.S.C. 1989).
10. 906 F.2d 994 (4th Cir. 1990).
11. *Id* at 996.
12. *Id* at 998.
13. PRB-1.
14. *Id* at 997.
15. As explained in *Evans v. Board of County Commissioners*, 994 F.2d 755 (10th Cir. 1993).
16. 752 F.Supp. 973 (D.Colo. 1990).
17. 994 F.2d 755 (10th Cir. 1993).
18. 13 F.3d 1261 (8th Cir. 1994).
19. *Id* at 1265.



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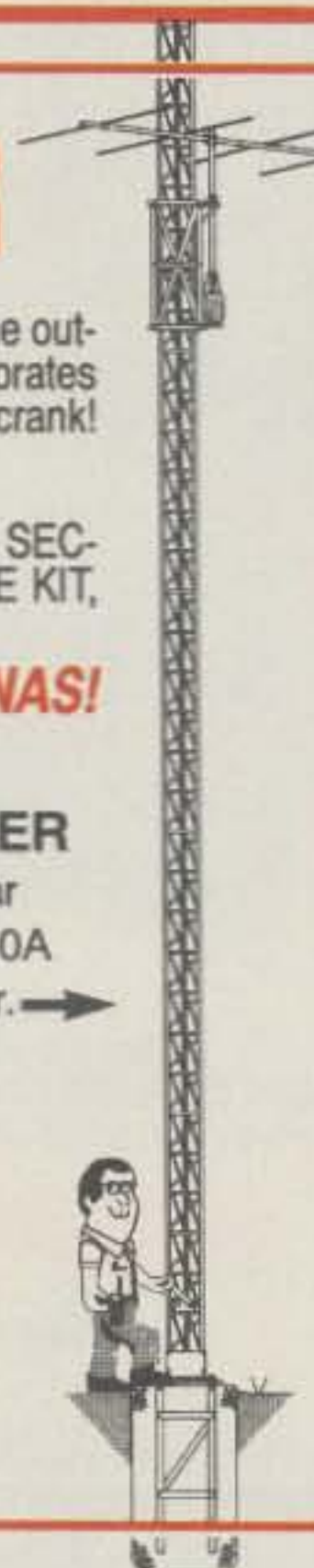
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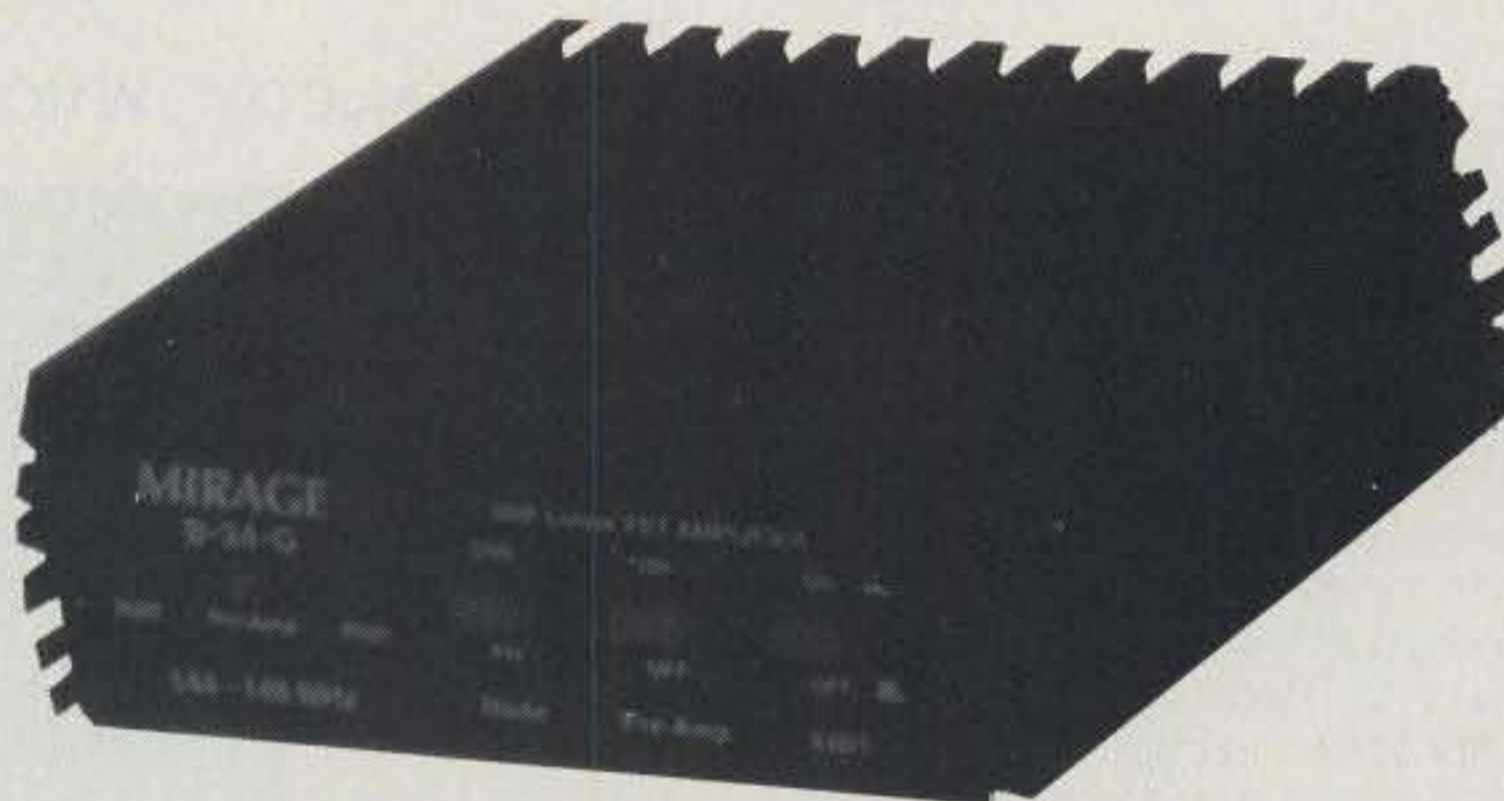
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# The Cushcraft Dual-Band Ringo The ARX-270U

BY LEW McCOY\*, W1ICP

**T**he Cushcraft ARX-270U is a dual-band 70 cm and 2 meter omnidirectional antenna that exhibits very good performance. It is a 16 foot high vertical that uses stacked phased elements to produce an excellent omnidirectional pattern. It comes (via UPS) in a single carton and consists of three fiberglass sections, necessary mounting hardware, and instructions. The instructions are clear and easy to follow. It only takes about an hour to complete the assembly.

Cushcraft calls the three fiberglass sections mounted together a *Radome*. Total height of the vertical is 16.5 feet. The antenna proper, which is enclosed in the Radome, consists of phased vertical elements with the necessary coils and capacitors.

A dual-band matching network is built into the base assembly. Actual specifications show a VSWR of 1.2 typical for the entire 2 meter and 430–450 MHz bands. Power rating is 200 watts on either band. The vertical radiation pattern is peaked at 27 degrees on 2 meters and 7 degrees on the 430–450 band. Of course, the horizontal pattern is 360 degrees—omnidirectional. There are three radials at the bottom of the antenna, each 20.5 inches long. Weight of the entire antenna is only 5 pounds.

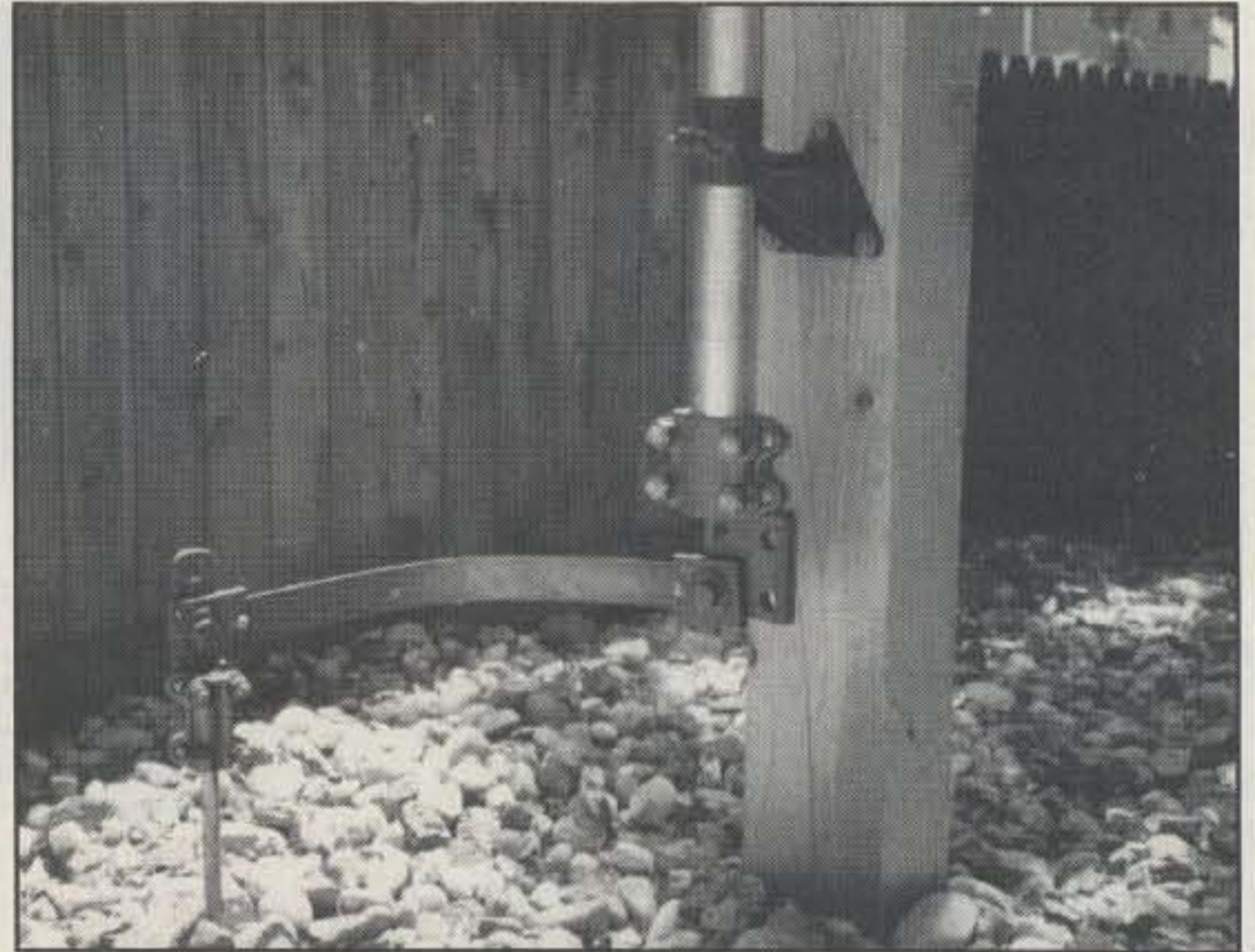
In testing we found that the antenna more than met the bandwidth specifications. Most important, it proved to be an excellent dual-band performer.

Putting the antenna together is very simple. There are brass couplings at the end of each of the vertical radiators. With the antenna completed, we mounted the antenna on a post installed for that purpose. On the post we placed a mounting mast on a wooden post (see photo). The vertical mounts to the mast pipe by means of U-bolts.

We had been using a  $\frac{5}{8}$ -wave vertical antenna and switching between it and the ARX-270U. We found that the ARX-270U provided much more solid contacts and extended our repeater range considerably.

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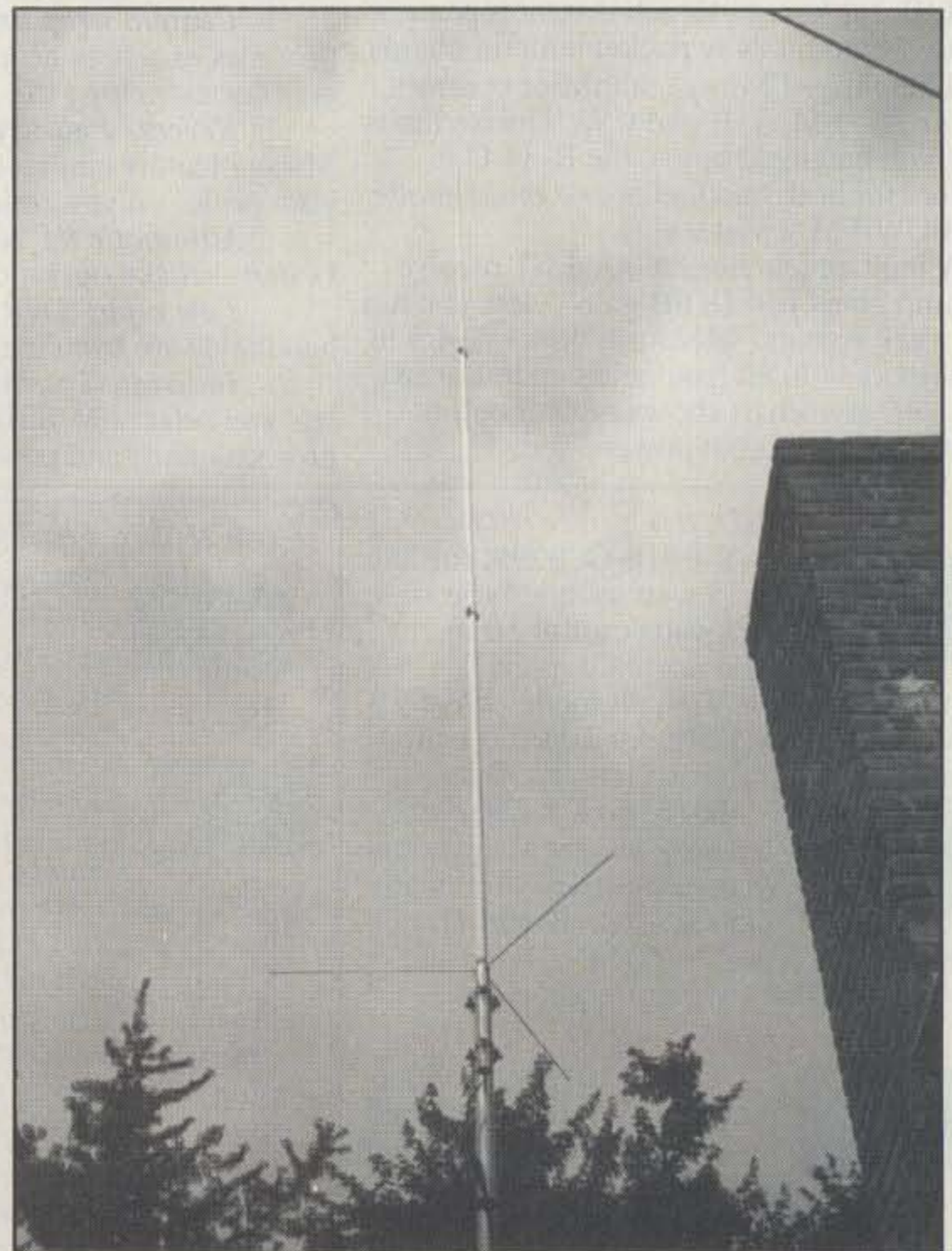
\*Technical Editor, CQ, 1500 W. Idaho St., Silver City, NM 88061



*This photo shows our base assembly. The hardware is some that we garnered at a fleamarket. We finally got a chance to put it to good use.*



*As shipped, here is the antenna unassembled.*

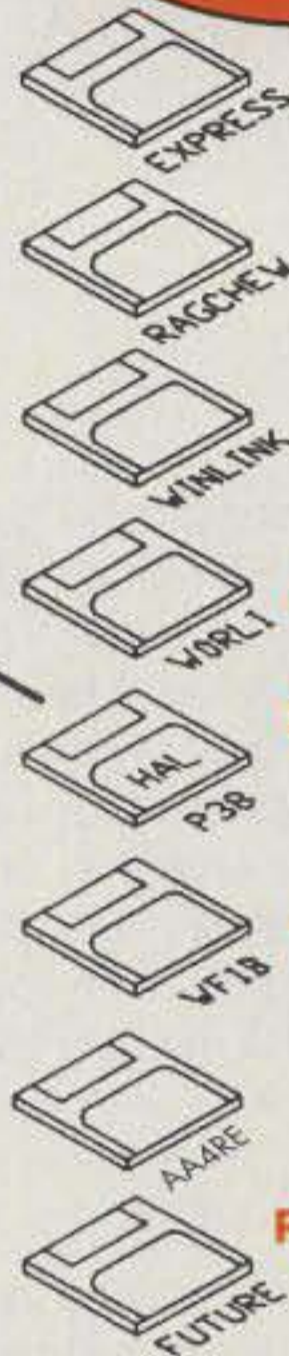


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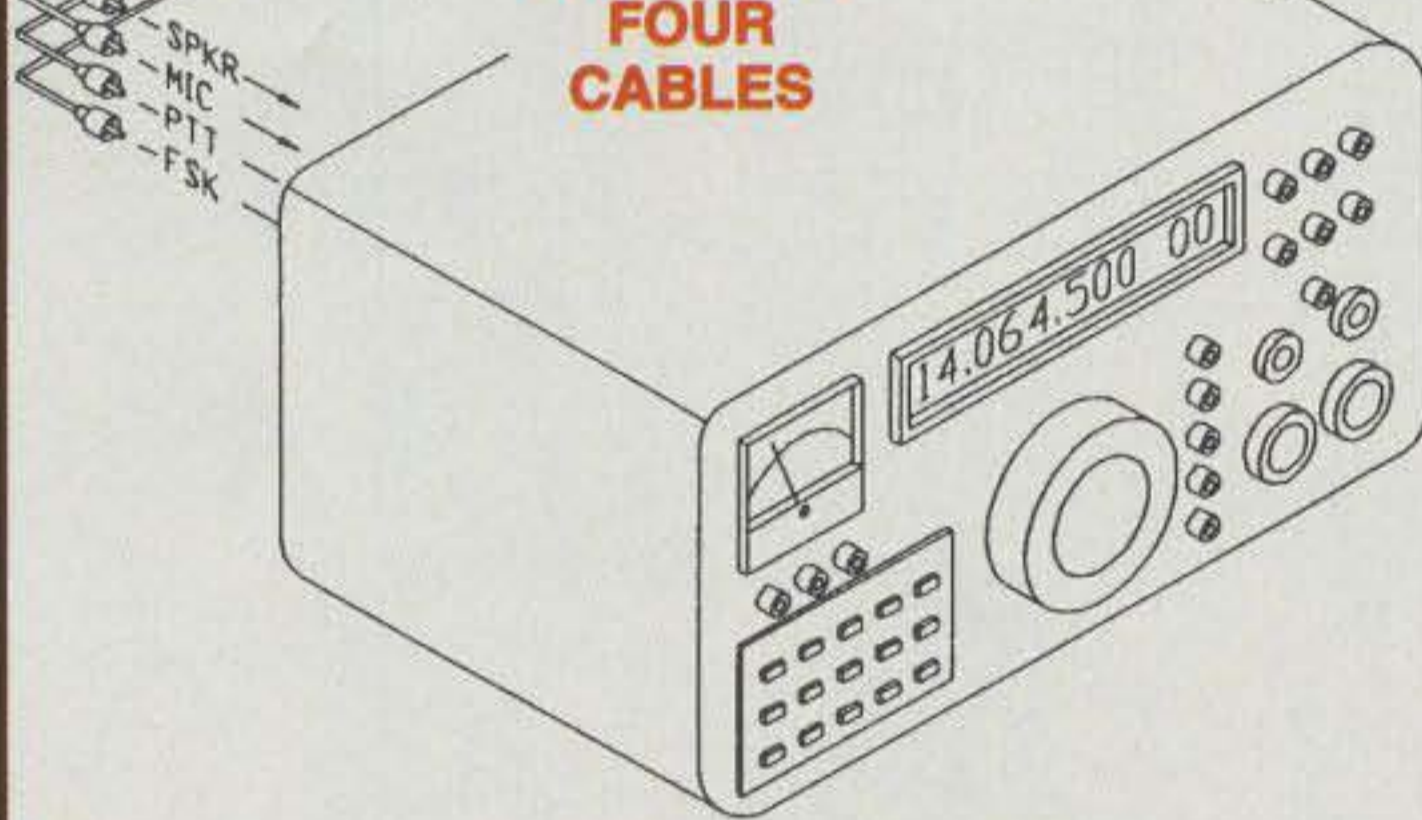


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# How To Add A Rotatable 17/12 Meter Trap Dipole To Your Antenna Farm

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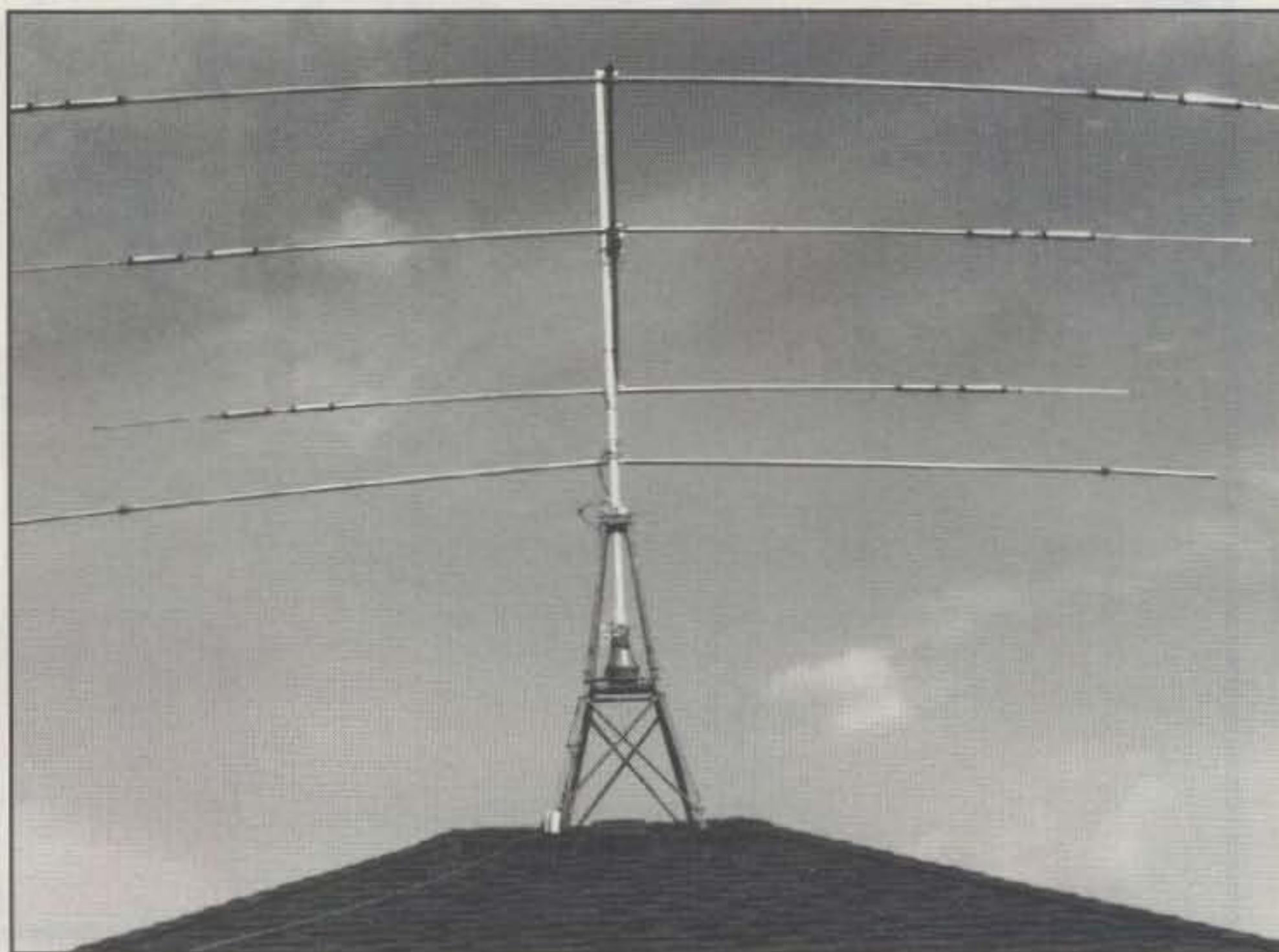
BY PHIL SALAS\*, AD5X

I have been happy for quite a few years using a Butternut HF6 vertical antenna on all the HF bands. However, after adding a 20/15/10 meter triband beam to my antenna farm (which brought my farm up to *two* antennas), I could easily see the advantages of a high horizontal antenna for the higher frequencies. Therefore, I decided that adding a rotatable trap dipole to my tower for 17 and 12 meters should be my next step.

## The Trap Dipole

I took the easy way out and used commercially available traps for this antenna. I chose the W2AU Unadilla 12 meter traps available for around \$40 for the pair. These traps are very ruggedly built, and should be high Q due to good turns separation on the coil. These traps have a 1 inch OD short aluminum tube on one end, and a  $\frac{3}{4}$  inch OD short aluminum tube on the other end for attaching to the antenna elements. Therefore, I chose  $1\frac{1}{8}$  inch OD (1 inch ID) aluminum tube for the inner 12 meter element, and  $\frac{7}{8}$  inch OD ( $\frac{3}{4}$  inch ID) aluminum tubing for the outer 17 meter element. The complete list of materials is given in Table I.

The actual lengths of tubing and all the antenna dimensions are shown in fig. 1. The details of the center insulator are shown in fig. 2. As you can see, you need two 9 foot lengths of  $1\frac{1}{8}$  inch OD tubing, two 2 foot lengths of  $\frac{7}{8}$  inch OD tubing, and one 2 foot length of fiberglass tubing. Use the #8 hardware to attach the tubing to the traps and to the center insulator. The tubing lengths I've shown in the list of materials are the standard lengths available from the suppliers that are given. I guess the worst case is having to buy 8 feet of fiberglass tubing for a single 2 foot center insulator. However, you'll have plenty of fiberglass for future



The new 17/12 meter trap dipole is mounted about 5 feet below the author's tribander.

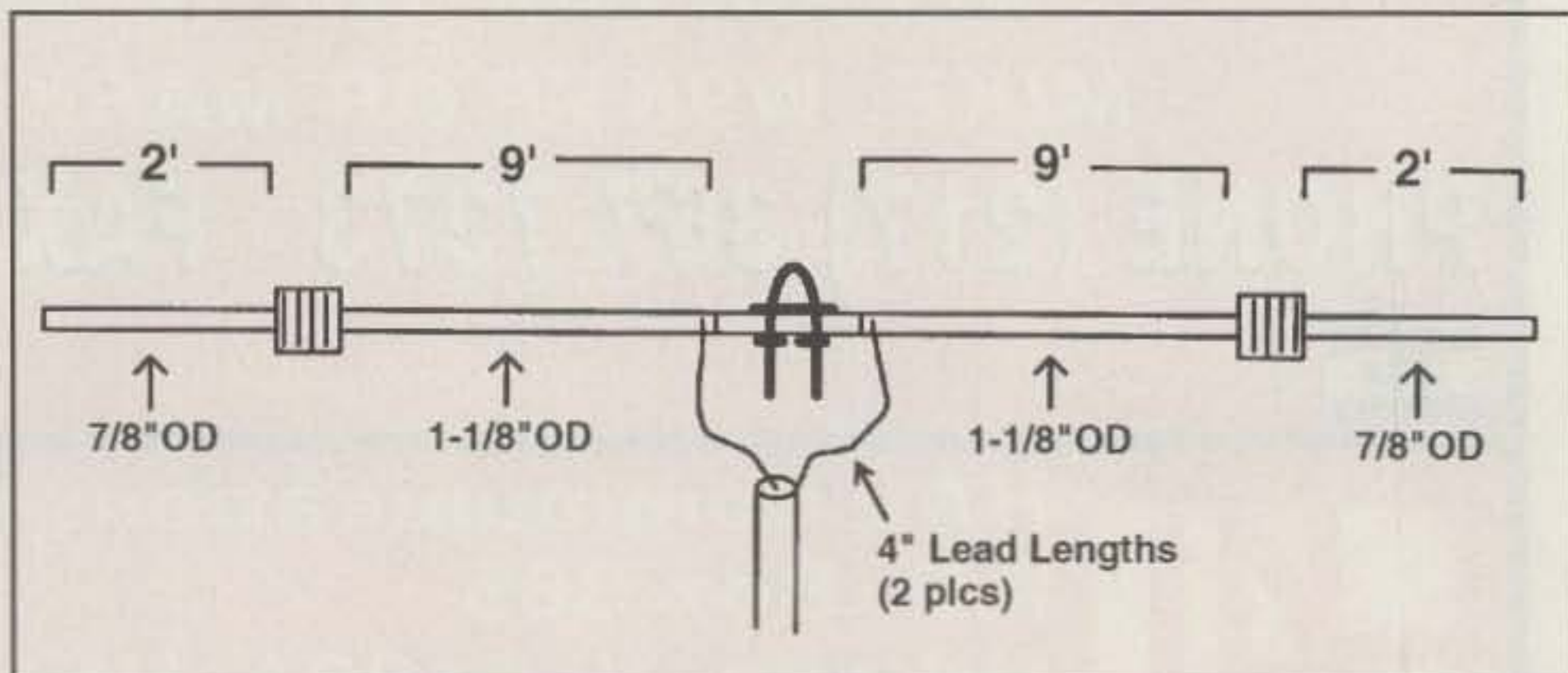


Fig. 1—Dimensions for the rotatable 17/12 meter trap dipole.

\*1517 Creekside Drive, Richardson, TX 75081

QTY	Description	Source
2	12 ft. Length of 1 1/8 in. OD Aluminum Tubing	Texas Towers (800-272-3467 or 214-422-7306)
1	6 ft. Length of 7/8 in. OD Aluminum Tubing	Texas Towers
1	8 ft. Length of 1 in. OD Fiberglass Tubing or Rod	Max-Gain Systems (404-973-6251)
1	2 in. Element Saddle Clamp for Mast Mounting	Harbach Elec. (407-723-7145)
1 pr	W2AU 12 Meter Traps	RadioWare (800-910-9273)
6	1 1/4 in. Long #8 Stainless Steel Screws	
8	#8 Stainless Steel Nuts	
8	#8 Stainless Steel Lockwashers	
2	#8 Solder lugs	

Table 1- List of materials and sources.

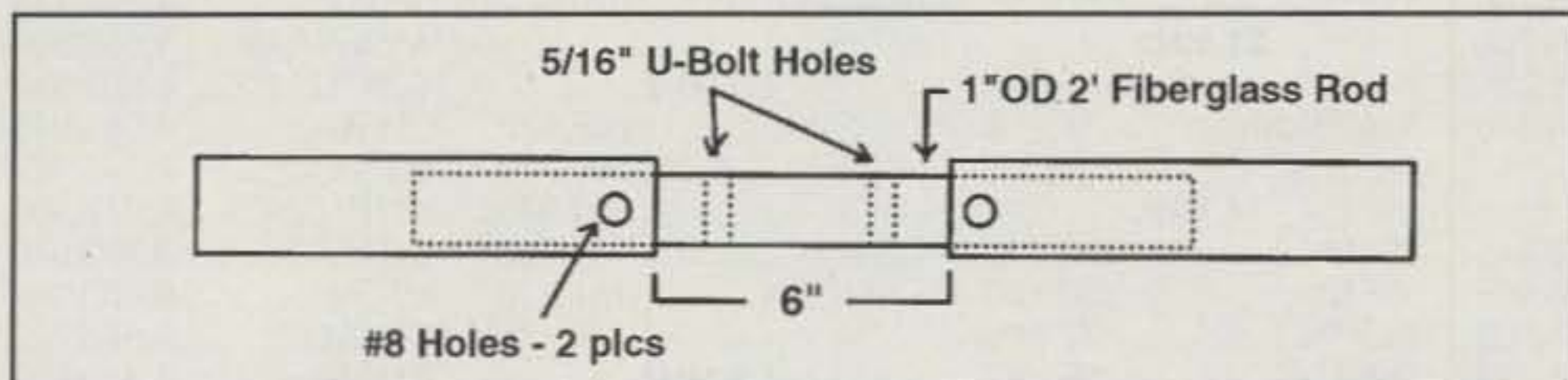


Fig. 2- Details of the center insulator construction.

projects. For a balun, I used an 8-turn coil (6 inch diameter) of RG-8X coaxial cable with 4 inch leads to connect to the antenna feed point. The bottom line: Build the antenna with the lengths shown in fig. 1 and the antenna will work perfectly on 17 and 12 meters! No adjustments necessary!

I mounted the 17/12 meter trap dipole about 5 feet below my Cushcraft A3S tri-band beam as shown in the photo. The 17/12 meter dipole height above ground is about 30 feet. Neither antenna (A3S or 17/12 dipole) affects the other antenna. So how does the trap dipole work? Well, 12 meters has been pretty dead since I put up this antenna. However, I've been averaging about two S-units (!) of improvement over my ground-mounted vertical on 17 meters!

### Conclusion

The total cost to build this antenna is around \$100. You could almost cut this in half if you build your own traps, use muffler clamps (painted) for the mast mount, and can come up with an alternative to the fiberglass center insulator. However, \$100 for two S-units of improvement is quite a deal! ■



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ALL BAND  
UNITED STATES**

K5ZD	5,748,591
KF3P	5,214,308
NR1E	4,868,460
KT3Y	4,292,394
K3ZO	4,282,248
W1WEF	3,552,384
W3BGN	3,206,923
K4PQL	2,750,925
WZ3Q	2,339,836
AB6FO	1,772,857
KA4RRU	1,644,480
K0IJL	1,552,608
AA2FB	1,310,970
KQ2M	1,238,787
WA3ECT	1,158,850

**28 MHz**

K3UA	3,150
------	-------

**21 MHz**

KX7J	12,065
------	--------

**14 MHz**

K11G	3,353,062
W6EEN	991,056
W5FO	852,945
AD5Q	835,620
N8II	809,744

**7 MHz**

AC4HB	2,089,540
W3GH	1,166,760
K3EST	1,053,328
NB6U	804,492
N6KI	757,010

**1.8 MHz**

K1ZM	40,824
------	--------

**DX**

**ALL BAND**

4M2BYT	8,379,504
XQ1IDM	6,632,912
A92Q	6,383,728
DX1EA	5,955,831
CJ3EJ	5,492,566
S50A	5,151,120
S59AA	4,829,660
YT1BB	4,669,962
TM6GG	4,630,032
YT1AD	4,382,774
4N0AV	4,313,650
JH4UHW	4,236,176
VS6WO	4,108,158
UT6Q	3,395,456
VE9ST	3,167,532
7Z5OO	3,038,702
UR3QT	2,991,252
UA3D	2,669,264
LY2IJ	2,422,824

**28 MHz**

S51AY	193,347
LZ1KPP	156,168
S59ZA	66,780
F5OQJ	65,394
TU2MA	60,348

**21 MHz**

LT6E	2,093,345
LU8DPM	1,893,999
4X/OK1JR	756,902
EM0F	689,283
LZ5Z	521,701

**14 MHz**

CT2A	4,231,598
ZF1A	3,890,432
N6VI/KH7	3,109,054
TA2ZW	2,933,974
ZA/OK5DX	2,627,979
RZ9U	2,314,445
KL7RA	2,237,325
OM5M	2,091,231
RW1ZA	1,966,595
SP5GRM	1,920,720

**7 MHz**

TK5NN	3,338,504
S50C	3,036,150
OT5T	3,027,858
CJ7NTT	2,821,280
UA6LAM	2,386,638
YT7A	2,284,362

**3.5 MHz**

EA8BR	949,696
S56M	675,642
S59KW	616,448
G0IVZ	595,556
4N50A	590,720
SN3A	560,028
SP7GIQ	546,720

**1.8 MHz**

S50K	219,880
S57DX	175,010
9A4D	131,166
SQ5O	123,510
LY2BR	113,240
ES1RA	104,780

**LOW POWER  
ALL BAND  
UNITED STATES**

K7GM	2,169,200
AC1O	1,814,676
N2BA	1,565,109
WN3K	1,131,438
AA8AV	1,111,968
N4YDU	630,772
WS8O	518,752
K3TLX	470,148

NF6S	469,872
N0AX	410,496

**21 MHz**

K6OY	44,037
WA7BNM	14,274

**14 MHz**

WA6KUI	393,048
WF1L	237,150
AC4PO	77,285
WA5JWU	76,467
AA0NB	74,382
KA2GSL	26,606

**7 MHz**

K2TW	189,756
AA2SZ	177,530
AA7FK	87,236
KD7EY	52,288
KQ1V	30,888

**3.5 MHz**

N5XUS	2,632
-------	-------

**DX**

**ALL BAND**

PT7CB	6,241,050
VP5BB	5,545,790
9X1A	4,435,956
EA7CEZ	3,557,658
YZ1AU	3,040,290
HA8FM	2,989,300
WJ2O/VP9	1,892,000
IQ4T	1,459,712
S54A	1,446,262
CX6VM	1,380,292
NH7WV5S	1,294,920
CJ6JO	1,089,045

**28 MHz**

EA1AK/EA8	308,855
LZ2GS	40,863
OZ7NB	16,564
RA6LW	12,870

**21 MHz**

LU7FJ	1,630,470
LU3FSP	974,647
OH1NOA/OD5	879,152
S57J	167,349
Z31GB	135,044

**14 MHz**

Z30M	2,212,569
HA8RH	949,783
IR9AF	860,570
EA7IL	847,780
7M1MCT	754,885

**7 MHz**

PA3AAV	1,125,296
HI3JH	976,480

HA8EK	775,838
HJ6WQH	762,884
IK4WMG	620,832

**3.5 MHz**

DL4FMA	306,772
HA4FV	267,240
S54X	250,976
OS4ON	187,488
OM3ZWA	187,128

**1.8 MHz**

HA8BE	84,270
YU1RA	62,622
9A3KR	58,606
SP5GH	38,880
UR5ZCL	38,504

**QRP/p  
UNITED STATES**

K3WW	A	260,536
N7IR	A	151,808
N1AFC	A	100,637
W4DEC	A	92,840
NW2I	A	78,396
KA1CZF	14	92,587
W1MK	3.5	19,240

**DX**

JA6GCE	A	444,276
SM3CCT	A	426,474
DL3KVR	A	414,918
KP4DDB	A	409,528
YU1LM	A	310,247
HG7MW	28	25,058
CJ7SBO	14	186,240
SP4GFG	3.5	100,636
YO4FRF	1.8	3,354

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SINGLE TRANSMITTER  
UNITED STATES**

WC4E	6,305,650
NB1B	5,198,250
NS0Z	3,751,326
NJ4F	3,376,965
KN5H	2,837,541
AG6D	2,709,432
KJ1N/0	2,673,693
N4ZZ	2,669,586
AA6MC	2,513,502
N5OK	2,399,412

**DX**

CQ3X	13,279,308
IH9/OK1MM/P	8,141,970
HV4NAC	7,738,947
LZ9A	7,042,828
UU5J	6,778,413
RK2FWA	5,623,884
OJ0/OH8AA	5,497,856
EA3AIR	5,221,200

GB6WW	5,152,616
II2K	4,659,984
DF0KW	4,575,114
WP3/WX9E	4,511,840
4U0ITU	4,505,087
OH0X	4,501,910
EG1RD	4,343,479
YT1R	4,077,400
OH7AAC	3,783,546
HG5M	3,653,310
OH1AD	3,576,783
OM3A	3,449,682

**MULTI-OPERATOR  
MULTI-TRANSMITTER  
UNITED STATES**

WW2Y	10,231,408
KG1D	9,962,469
WZ1R	7,066,584
NQ4I	5,187,771
WD8LLD	3,469,200

**DX**

9A1A	16,170,000
HG73DX	14,451,498
KL7Y	9,673,608
OT5A	8,331,430
PI4COM	7,465,329
LY7A	5,522,103
JA1YDU	4,455,933
OZ5W	3,211,538
OZ5WQ	3,083,184

**SINGLE OPERATOR  
ASSISTED  
UNITED STATES**

N3RS	A	3,767,248
AB2E	A	1,925,532
KM0L	A	1,105,800
N1CC	A	1,024,128
WX0B	A	822,544
K3KO	A	776,130
N8BJQ	A	459,792
WB5B	A	455,938
KA5W	A	369,240
WA3WJD	A	340,990
KO4EW	A	337,464
W1BIH	14	235,770
NA5Q	7	309,260

**DX**

S50D	A	2,496,000
DL4MCF	A	1,714,104
S56A	A	1,599,920
IK0HBN	A	858,690
F6IRA	A	592,790
G3TXF	A	572,182
OM6TX	A	481,194
HA0DU	14	2,036,040
OH3NXW	14	635,262
PY2DP	3.5	219,454

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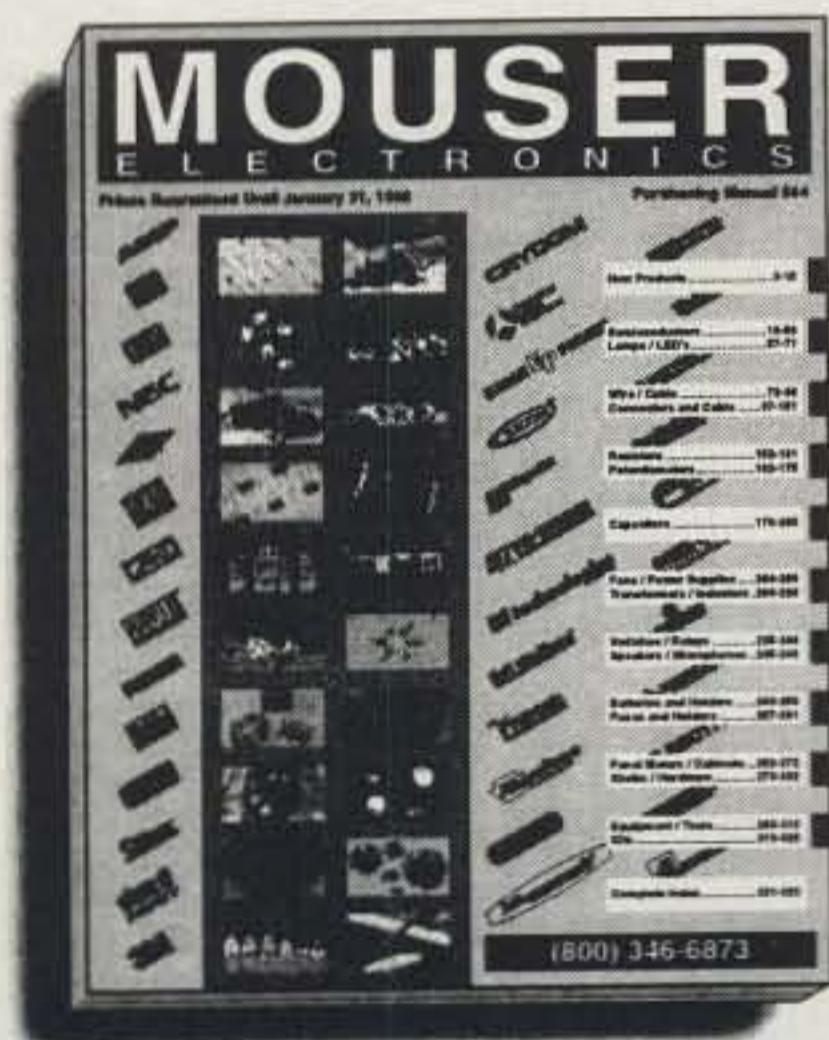
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LMR 400 DBL SHLD IIIA JACKET 2.7dB @ 450MHz	.....	.58/FT	.58/FT
LMR 400 UltraFlex DBL SHLD "TPE" JACKET 3.1dB @ 450MHz	.....	.75/FT	.72/FT
LMR 600 DBL SHLD IIIA JACKET 1.72dB @ 450MHz	.....	1.38/FT	1.32/FT
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FSJ-50 1/4" SUPERFLEX 2.23dB @ 150MHz	.....	.....	1.50/FT
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RG213/U MIL-SPEC DIRECT BURIAL JACKET 1.5dB @ 50MHz	.....	.36/FT	.34/FT
RG8/U FOAM 95% BRD UV RESISTANT JACKET 1.2dB @ 50MHz	.....	.32/FT	.30/FT
RG MINI 8X 95% BRD BLK, SILVER, or CLEAR UV RES JKT	.....	.15/FT	.13/FT
RG214/U (2) SILVER BRAID SHIELDS MIL-SPEC	.....	1.60/FT	1.45/FT
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RG142/U DBL SILVER SHLD "TEFLON"	.....	1.10/FT	1.00/FT
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# The Last of The Last

## How W6TC Achieved 5 Band WAZ

Everybody remembers one special QSL card, whether it's the first one ever received, or the last one needed to put you over the top if you're chasing awards. Even special cards get filed away in a book, put in shoe boxes, or simply stored somewhere for posterity. W6TC relates the story of one such special "card" and why it won't fit in all the regular storage spots.

BY GEORGE BADGER\*, W6TC

The photograph shows the wonderful bronze QSL I received from Ahmed, SU2MT, in Alexandria, Egypt. The QSL is for a QSO on 80 meters on January 1, 1994. What a great New Year's event! The bronze pyramid represents the culmination of 14 years of effort to achieve CQ's 5 Band WAZ—no lists and all on CW!

The 5 Band WAZ award is the most demanding of all the current HF achievement awards, including 5 Band DXCC. It took nine years for me to achieve 5BDXCC. However, to achieve the preeminent 5BWAZ award took 14 years.

From here on the West Coast the particularly difficult 80 meter zones are 17, 40, 37, and 34. Amazingly, zone 40 was relatively easy. Zone 37 was especially challenging. Tom Warren, K3TW, was in Tanzania as 5H3TW. Tom had good equipment and good antennas and was very active; there was little doubt that a contact was possible. One night while driving from my office to a stock holders' meeting at about 5:00 PM and with a few minutes to spare,

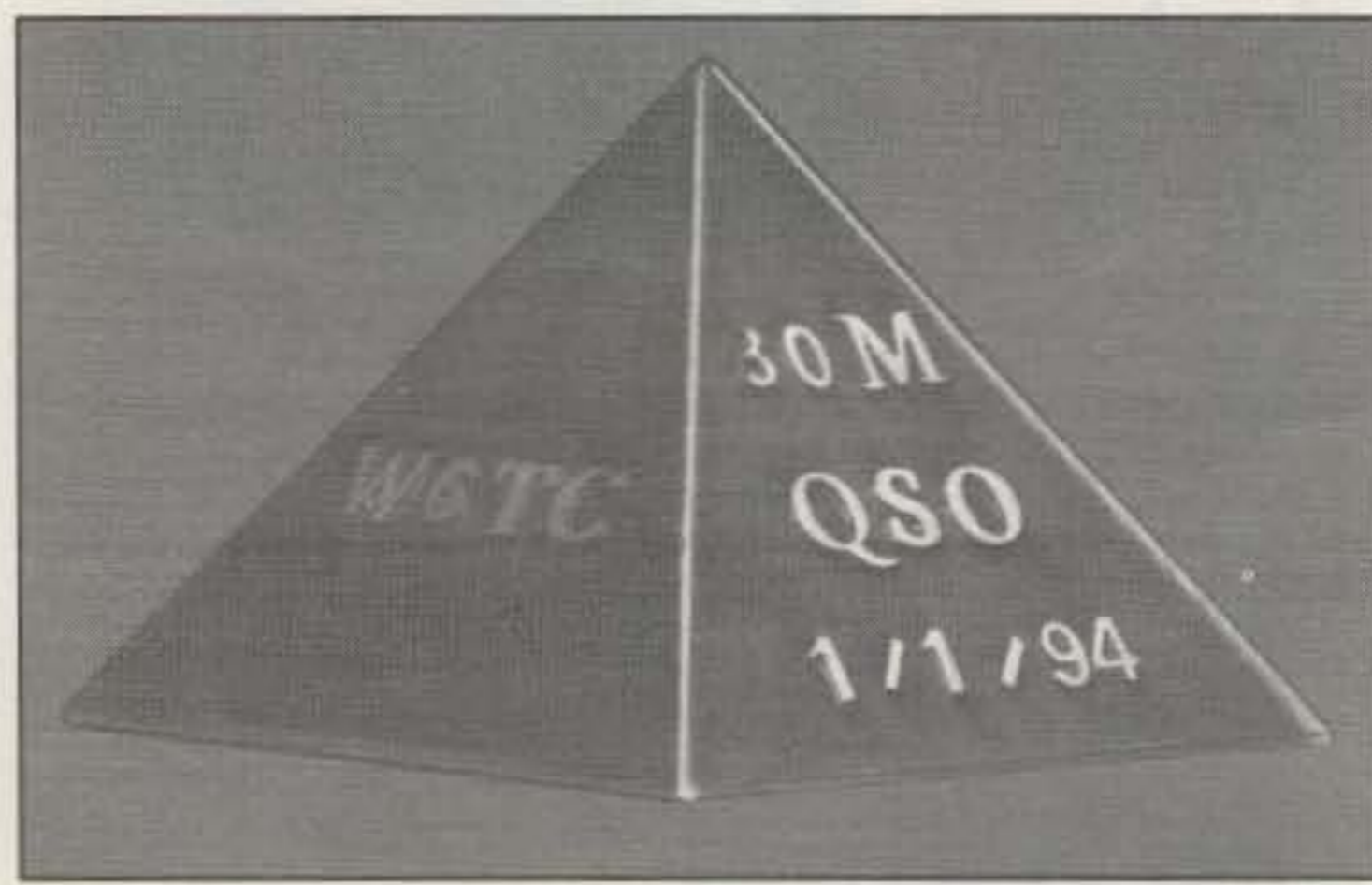
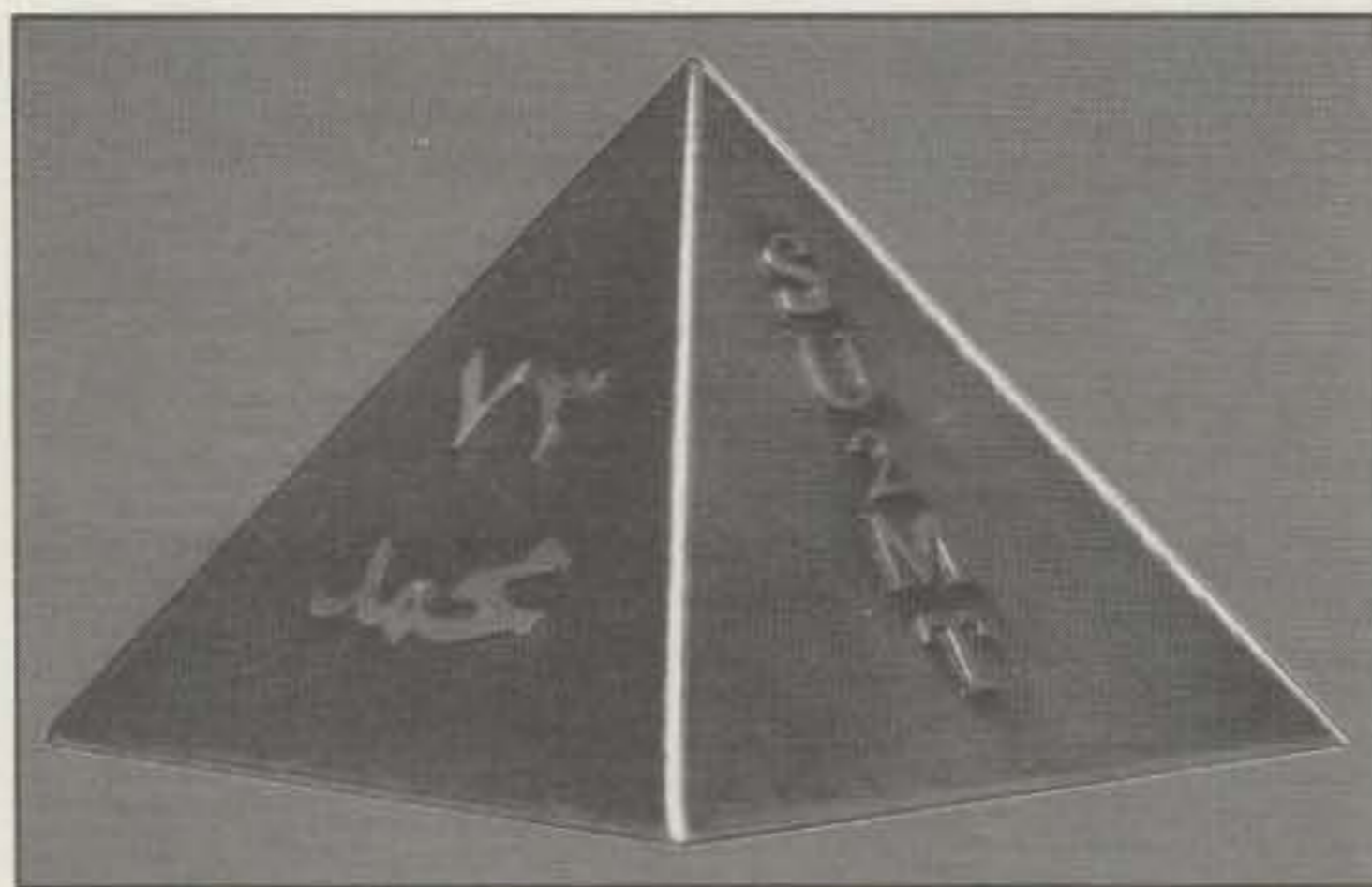
\*341 La Mesa Dr., Portola Valley, CA 94028

I detoured by my home to take a quick look over the 80 meter CW band. Sure enough, I heard K6DC calling K3TW. I called Merle and reminded him that Tom was in 5H land. Merle said, "shhhhh," as if to say not to alert the entire West Coast to join the little pileup at the low end of the band. I listened for the DX in the pileup. Finally I heard 5H3TW come out of the noise. After three calls I heard mine. We exchanged reports, but I did not hear a confirmation. I didn't worry, as there was little question there was a QSO. I was thrilled.

While I was late for the stock holders' meeting, the most important objective had been accomplished. Fortunately, there were a couple of amateurs at the meeting with whom I could share my triumph (K6UD and W6CHE). After the meeting I dominated the conversation with tales of success. The next day I called Merle, K6DC, who would be meeting Tom at the FOC meeting in Washington in two weeks. He promised to pick up my card. Lo and behold, I was not in the log! No QSO. No QSL. While I was disappointed at the time, on reflection I did have the thrill of working a new one.

My chance for zone 37 came three years later when C9RJJ was so active in Mozambique. I heard from Steve, AA6AA, that N6DX had a schedule with C9RJJ early in the 1992 CQ WW test. I put a note in my log but promptly forgot about it, as I knew I would be on a family vacation at the time. Fortunately, we came home early. When I walked into the shack something struck me. I looked in the log. Sure enough in five minutes C9RJJ would be showing up on 80. After a quick tune-up I heard Steve call. I heard the exchange, but by the time I called, the East Coast and the W4s were all over him. There was no chance to get through that aluminum wall of kilowatts. By some miracle, on the fourth call I heard my call weakly through the din. Reports were exchanged, QSO were confirmed, and I was in seventh heaven.

Now only one more zone to go—zone 34. It seemed impossible. A year later I heard from Bob, W6RJ, that Ahmed, ST2MT, would soon be on 80 meters. Here was my opportunity for the final zone. From time to time I called Bob to find out what was happening in



It was certainly worth the wait to receive this beauty. Shown here are all four sides of the unique 3 inch high "QSL card" W6TC received, which put him over the top for 5 Band WAZ CW.

Egypt. Bob was always encouraging and assured me that Ahmed was making progress towards getting on the air.

At last the time was about to arrive. Bob and Larry, told me that Ahmed would be on the air on the 18th of December between 1430Z and 1530Z, right for the morning long-path opening. On Saturday I heard SU2MT with a big signal on 40 before the appointed time. I threw my call in the pileup to be sure I would be recognized later on 80, but I couldn't get through the bedlam. I heard SU2MT say he was QSYing to 80, 3799, CW in the phone band. I heard the local guns calling up 2 kHz. I heard the reports and I heard the confirmations, but I never did hear SU2MT. What a disaster. All I could hear on 3799 was noise, clicks from the nearby pileup, and splatter from 75 meter rag chewers. A few of the local big guns got through. I know they were as happy as I was sad.

Something had to be done. SU2MT planned to show up each Saturday morning thereafter. Saturday, January 1 was the next goal. I had to do something about my receiving antenna. I live on a suburban lot and have two kite-shaped loops spaced just 12 feet apart which I use effectively on 40 as a rotary two-element quad. On 80 I voltage feed them in parallel. While the total width of the loops is only 25 feet, they seem to do reasonably well on transmit. The problem is receive. I suppose that's the problem for most 80 meter DXers, with the exception of those few blessed with the space for Beverages and the means for beams.

For a long time I had been thinking that the two loops could be phased to make an effective 80 meter receive-only beam. Like so many projects, that one was always put off until the following weekend, so it never happened. This time was different. This time 5 Band WAZ was hanging on the success of that idea! Fortunately, there were a few days off at Christmas, so I could experiment with the phasing idea.

The simple idea requires that the two loops be tuned near resonance. The loops are then loaded with 1K resistors to keep the Q within reason. Each loop can be tuned independently to get the necessary phase shift. The pot connected between the two loops should make it possible to pick off just the right relative signal from each of the two loops. With the right phase shift and with the right relative amplitude, I should have had an effective two-element receiving array.

A nearby friend, W6JPE, lives on a hill about five degrees above my QTH. He put a signal on 80. I tweaked the tuning controls and the relative signal pot. After some trial and error, miracle of miracles—30 dB front-to-back ratio! Over the next few days I used the array listening to 80 meter DX. Sometimes it worked well, sometimes it didn't. With Saturday, January 1 rapidly approaching, I decided to settle for what I had.

Saturday morning, right on time, SU2MT was on 40 meters long path. Again I called in hopes my call would be recognized. Again I didn't make it through the pileup. SU2MT QSYed to 80. By the time I returned from 40 to 80, SU2MT had worked one or two West Coast stations. I heard a contest-style QRZ. I called. By some miracle, through the noise I heard my call, report, and confirmation—5 Band WAZ!

After the QSO I listened for awhile and heard many W6s confirming contacts. Conditions were exceptional. SU2MT was easy to read. I

will never know whether that QSO was the result of luck, good conditions, or the hard work on my receiving antenna system. For whatever reason, I was in the log!

A few days later the beautiful cast-bronze "QSL" arrived from Ahmed. As the picture shows, it is a pyramid, about three inches tall. Cast in bronze on one face is "73 Ahmed" in Egyptian, on the next face is "SU2MT," then "W6TC," and the fourth face reads "80M CW January 1, 1994." It's the greatest QSL I've

ever received, and it confirms the most exciting QSO since my first, in 1939.

I deeply appreciate the QSL, the effort of Ahmed, and his understanding of the importance of those long-path QSOs for those of us who are seeking the elusive 5 Band WAZ. I am sure all of us who made the grade that morning, and on other Saturday mornings, feel the same. We all also are indebted to K1MEM and to CQ magazine for sponsoring the exciting and demanding 5 Band WAZ award. ■

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## WHAT'S NEW AND HOW TO USE IT

### The "Lowly" Op-Amp or "You've Come A Long Way Baby"

When one mentions the operational amplifier (or op-amp, as it is "lovingly" called), the image of a typical 8- or 14-pin device usable for low-frequency/signal applications usually comes to mind to anyone who is not an up-to-date avid experimenter. Well, things have progressed since the LM741, and as you soon will see, there are devices that will even work in amateur bands up to 440 MHz directly!

This month we will describe a number of new offerings from four of the more prominent semiconductor manufacturers. These are by no means the only such devices available, but they are an early 1996 sampling. Most other manufacturers have similar units (even ones with better or more unique specifications).

First, from Burr-Brown, one of the operational amplifier pioneers, comes the OPA650, OPA2650, and OPA4650. These units are single, dual, and quad voltage feedback op-amps with 360 MHz unity gain-bandwidth, 0.01% differential gain, 0.025 degrees differential phase, and price tags of \$1.95, \$3.12, and \$5.12 each, respectively. All are available in industry standard 8-pin, 14-pin, and surface-mount packages.

In the current feedback mode (stable frequency response independent of gain) are the OPA658, OPA2658, and OPA4658. These babies have a gain-bandwidth figure that is greater than 500 MHz and a slew rate of 1700 volts/ $\mu$ sec, making them ideal for video drivers, analog-to-digital inputs, and buffer applications. Costs are the same as for the 650 series.

These and similar devices are further described in a new "Operational Amplifiers Brochure" that can be obtained from Burr-Brown Corporation, P.O. Box 11400, Tucson, AZ 85734-1400.

Analog Devices, another op-amp pioneer, also has a new offering of devices that will be of interest. These include the AD8011, a 300 MHz device for \$1.95; the AD-8001, a 600 MHz device (also available in a dual) for \$2.75; and a couple of rail-to-rail devices. A rail-to-rail op-amp is one that can allow its output to swing from the plus supply voltage (within a few millivolts) to the negative supply voltage (or ground). Most standard op-amps have a maximum output peak-to-peak swing of 2 to 3 volts below the  $V_{cc}$  supply value, which limits the maximum output. When you only have a 3 volt or 5 volt supply to work with, this sort of limitation can make the difference between success and failure.

Speaking of 3 volt power supplies, Analog Devices has also introduced a series of 3 volt devices. The AD-812 offers a 160 MHz bandwidth (at 3 volts  $V_{cc}$  single-ended). The AD8020/822/824, etc., series offers JFET inputs, low noise, and bandwidths from audio to 160 MHz. To round out the selection, the

c/o CQ magazine

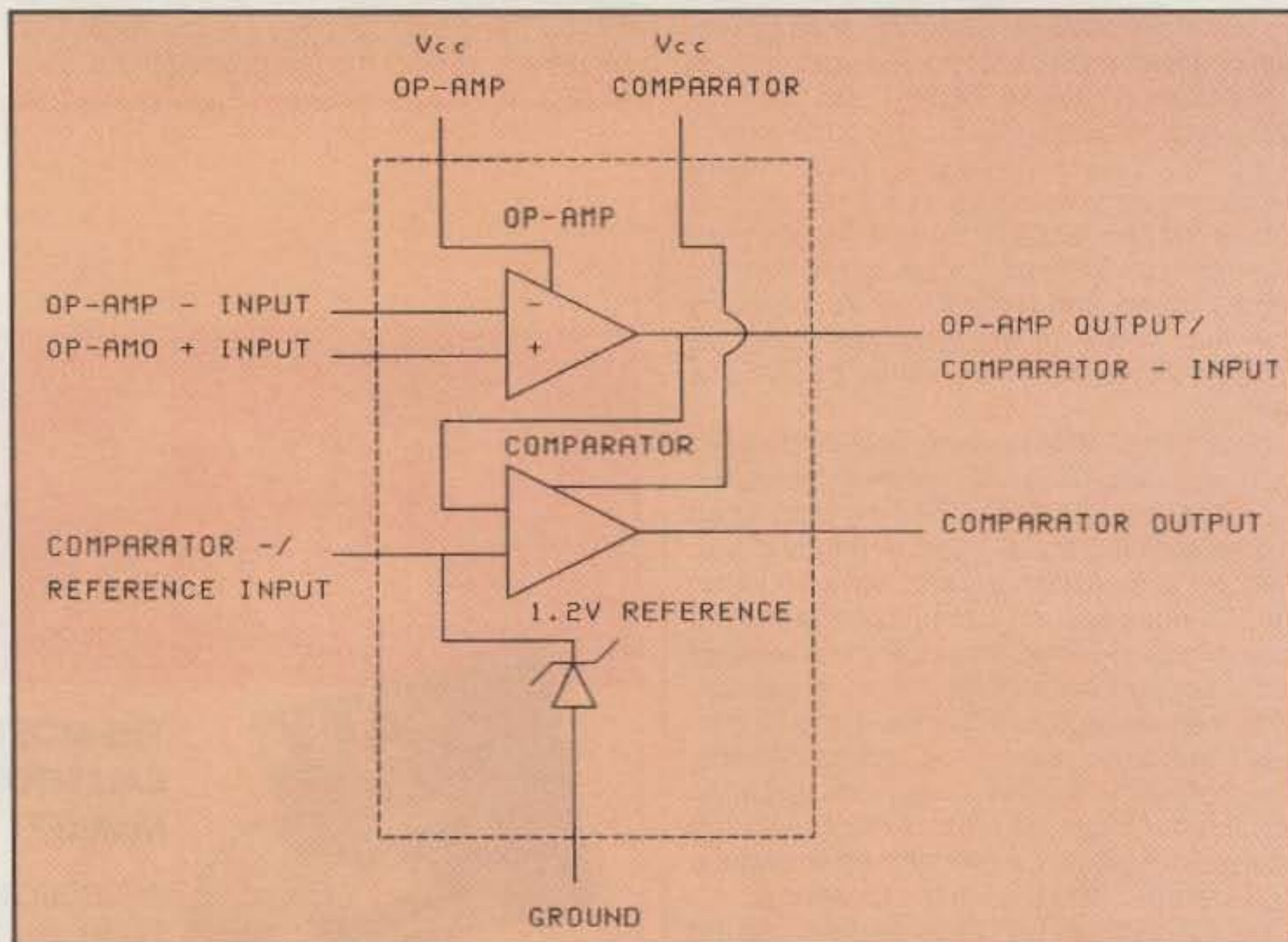


Fig. 1—Connections, MAX951/952/953/954 op-amp comparator series.

CMP400, a 20 nanosecond 3 volt comparator (at \$3.90), is also available.

Finally, the OP193 (single), OP293 (dual), and OP493 (quad) are a family of op-amps that guarantee full operation with a  $V_{cc}$  supply of only 2 volts (single ended). These would be ideal for solar-powered equipment or when using a lemon battery! (For details on this type of power source look into a high-school science textbook). Contact Analog Devices at P.O. Box 9106, Norwood, MA 02062-9106 for more details and data sheets.

Not to be undone, Linear Technology now has available their LTC1152, a 2.7 volt supply "zero-drift" device for instrumentation applications (\$3.12); the LT1112, a  $\pm 1$  volt unit (\$2.35) that only requires 0.42 milliamperes for operation; and the LTC1047, a 20 kHz DC stable chopper op-amp that draws 80 microamperes (0.08 milliamperes) from a 5 volt supply for \$2.15! Contact Linear Technology Corporation at 1630 McCarthy Blvd., Milpitas, CA 95035-7414 for further details.

Maxim Integrated Circuits, familiar from their wide selection of power-supply circuits and DC/DC converters, has also introduced some interesting amplifiers. The MAX4100 (\$1.95) is a voltage stable 500 MHz video/high-speed amplifier requiring 5 milliamperes and producing 3.5 volts output into 100 ohms. The MAX4112 (\$1.95) is a current feedback video amp, also with a 500 MHz bandwidth, stable with gain and a similar output swing. Both of these are designed for wide-band video use.

In the micropower area, MAXIM is offering the MAX495. This device guarantees rail-to-rail

operation with a supply voltage of 2.7 volts and a bandwidth of 500 kHz. Also available is the MAX473, a 10 MHz device (3 volts  $V_{cc}$ ). The *piece-de resistance* in low-power op-amps is the MAX406. This unit swings rail-to-rail, has a 150 kHz bandwidth, and—are you ready—draws 0.0012 milliamperes (1.2 microamperes) from a single-ended 2.5 volt or dual  $\pm 1.25$  volt power source. Even if you actually use a lemon battery (Hi) you can have a cup of tea and still produce enough current from the juice left over to run this device. (That was a joke, by the way.)

In addition, MAXIM also has a 100 nanosecond 2.7 volt comparator, the MAX941 (\$1.40). This is also available as an op-amp/comparator combination, the MAX951/952/953/954 family (\$1.60), which operates down to 2.8 volts but only up to a hundred kHz or so. These devices are packaged in an 8-pin chip with its own unique connections as shown in fig. 1. More information on all of these can be obtained from MAXIM Integrated Circuits, 120 San Gabriel Drive, Sunnyvale, CA 94086-9892.

As a final note, if I have not made it clear, all prices quoted are for quantities of 1000 pieces, the industry standard way of indicating relative costs. Smaller quantities are always available for somewhat higher prices; these prices are not usually more than 50% higher than the prices quoted. If you are an engineer and have a potential need for large quantities in a product you are designing, many of the manufacturers will be glad to even provide free samples. You need to speak to a friendly local rep or factory engineer, however, to arrange this.

73, Irwin, WA2NDM



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# BILL'S BASICS

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

## Getting Started—Part II of V

**H**ere is the second part of this five-part article. The first part covers junk equipment, guidance, magazines, clubs, build or buy decisions, building kits, homebrewing, modifying surplus, commercial equipment, new versus used equipment, cost comparisons, and solid-state versus tube equipment. Back issues of this magazine can be purchased directly from *CQ*.

### High or Low Power?

You do not need high power (QRO) to contact stations all over the world. You can use low power (QRP) gear and achieve good results. Medium-powered transmitter output does the job for most amateurs. We are allowed to run as much as 200 watts PEP (peak envelope power) maximum output in the Novice bands, which is more than enough power to communicate effectively. Most of the modern rigs put out about 100 watts, which is enough power to meet our normal needs.

QRP rigs cost less, are smaller, are well suited to emergency use, and are less likely to cause interference to RF-sensitive devices such as televisions and audio systems. Good antennas and an excellent station ground are important to every station, and they are particularly important when QRP operation is used. When operating QRP on 10 or 15 meters, a directional antenna is almost essential. A simple monoband (one band only) 3-element Yagi-Uda can be mounted on a heavy-duty TV telescoping push-up mast, and it can be turned with a heavy-duty TV antenna rotator. This type of installation is not expensive, and it provides easy worldwide communication opportunities, when it is used with a good rig and these bands are open.

It is not satisfactory to operate QRP on 40 meters when that band is crowded. QRP 40 meter operation should be restricted to times when activity is low. Otherwise, QRP signals are likely to be obliterated by stronger signals transmitted from QRO stations. QRP 80 meter operation is somewhat subject to the same problem that occurs on the 40 meter Novice band. However, 80 meters does not suffer from the high-power shortwave broadcast interference that ruins the 40 meter Novice band most evenings. International shortwave broadcast stations can be heard every 5 kHz (7105, 7110, 7115, etc.) throughout the 40 meter Novice band most evenings. The 80 meter band requires a relatively long antenna, which causes this band to be less popular with Novice and Technician-Plus amateurs. However, QRP operation is more likely to be successful and satisfactory on 80 meters than on 40 meters.

I like low-power operation and I often use a Ten-Tec Argonaut (5 watts input) transceiver that belongs to one of my sons. However, I do not advise new operators to get a QRP rig as their only equipment. If you can afford two rigs, a QRP transceiver is a fun second rig to use.



Thirteen-year-old Jason Sullivan, NØZFZ, of Loveland, Colorado picked up a No-Code Technician license when he was 11 years old, and he upgraded to the Extra Class license during the next two years. His great grandfather (Von Chesser, NØEWB) helped him prepare to take his first exam. Jason is very active on the air and urges other young people to become active licensed radio amateurs. He has several students, including his mother.

It is best to get equipment that puts out 50 to 150 watts power. Neither a low nor a high power rig is best for your initial use. Medium output power rigs provide good operating results without causing the problems that can be associated with operating high- or low-power equipment.

### Transceivers

The word *transceiver* was coined from the first

part of the word *transmitter* and the last part of the word *receiver*. Most early transceivers had some circuits that were used in both transmitting and receiving functions. Thanks to modern solid-state devices and reductions in component sizes, the receiver and transmitter sections in today's transceivers are usually completely separate, and the term *transceiver* just denotes transmitting and receiving equipment in a common single cabinet. Naturally, the transmitter and receiver portions of



Greek Novice operator Dimitris (Jimmy) Tsifakis, SV1DET, is 19 years old. He is a geology (earth sciences) student at the University of Athens. Jimmy's station includes a Yaesu FT-840 transceiver and an MFJ-949E antenna tuner, plus vertical loop and dipole antennas.

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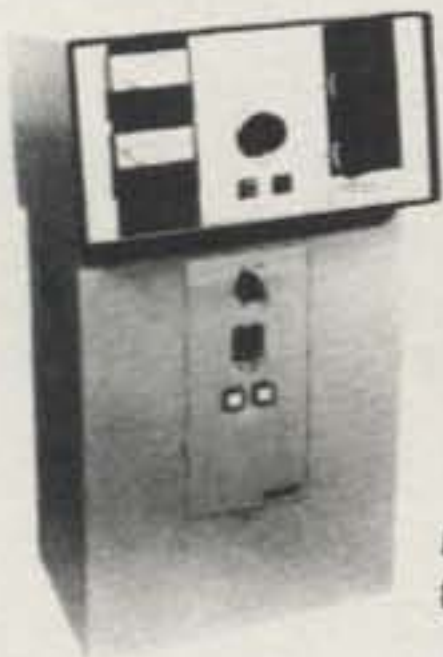
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transceivers still share commonality of control circuits, power supplies, antenna changeover circuitry, and associated intercontrol between the receiving and transmitting sections. An advantage of the transceiver over separate units is that the interconnections between the receiver, transmitter, power supply, and control circuits are all inside the transceiver case.

Most transceivers are primarily designed to provide mobile voice (SSB) communications capability. Code (CW) capabilities of some transceivers are not satisfactory. Keying characteristics (the shape of transmitted dits and dahs) is poor with a few of the oldest transceivers, and some older units emit an objectionable backwave (a signal output when key contacts are open). Many transceivers have no delay or insufficient delay before the receiver activates (comes on) after key contacts are opened. If your delay is not long enough, the receiver is activated between each character or word you transmit when working at a slow code speed rate. Most beginners need a 2 to 3 second delay, and it should be adjustable so that it can be reduced as code proficiency improves. This nuisance factor can be overcome by operating manual control (switching) between transmit and receive modes, if the transceiver has this capability. A few of the older transceivers do not incorporate the sidetone oscillator feature, which is needed to let you hear your own sending while you are transmitting. This sidetone feature is important to amateurs who want to minimize sending errors by monitoring their own keying. It is not particularly important to be able to adjust sidetone pitch, but sidetone volume should be separately adjustable. It is not particularly hard to add a sidetone oscillator to equipment lacking this important feature.

In addition to code transmitting deficiencies, some transceivers are not good for code reception on today's crowded Novice bands. Since modern SSB (single sideband) transceivers are primarily intended for mobile voice communication use, most of them are delivered without a suitable (narrow bandwidth) code filter, although some have good code filters available as accessories. There is no sense in listening to about 3000 Hz of interference from atmospherics and other stations when a good code filter (250 to 500 Hz) can be used to eliminate most of this interference. If lack of a code filter lessens the usefulness of your transceiver, and you are unable to obtain an accessory (plug-in) code filter, you can select one of the several excellent external filter devices that are available, and they will do the job very well for you. These external filters are simple to connect and use; they can be used to improve code reception of any receiver lacking this feature, including old communication receivers. The external filter is connected between the transceiver's speaker output and the external speaker/headphones.

Some old transceivers lack the required capability for the operator to tune the receiver above and below the transmitting frequency without also shifting the transmitting frequency. This feature is usually called RIT (receiver incremental tuning), clarifier, or OT (offset tuning) on transceivers. Simply stated, RIT/OT lets you tune the receiver (only) a maximum of about 5 kHz above and below the transmit frequency selected with the main tuning dial. This feature is very important, since some operators will not answer your general call (CQ) exactly on frequency. You must be able to move your receiver to tune in a station answering your CQ call, but not answering on frequency.

If you move your main tuning dial to tune in an off-frequency reply, the other station may lose you because you have also shifted your transmit frequency. Even if the other operator does not lose you when you shift the main tuning dial, he/she may shift frequency to tune you in and you may lose their station. If two stations keep shifting frequency due to this type of problem, they may leapfrog out of a band. When answering another station, your RIT/OT should be set to zero (center point) or turned off, or you will not be answering on frequency.

In summary, a transceiver can be an excellent choice as your first station. Be aware that some of the oldest transceivers do not fully cover all four Novice bands.

## SWR/Power Meter

Standing wave ratio (SWR) meters are used to get a rough idea of how good (or bad) the impedance matches are between the transmitter output, transmission line, and antenna. The SWR meter is strictly a test device, and it is not required for normal station operation. However, they are generally built into the transmitter output section of most modern transceivers. These rigs are designed to reduce RF power output when the SWR is above about 3:1. It is handy to borrow an SWR meter to conduct tests when the station installation is first completed, if you do not own one or have one built into your transceiver. If you are going to use a wire antenna in conjunction with a random wire tuner, you will need an SWR meter. It is a common practice to leave an SWR meter in the transmission line at all times. This is not really a good thing to do, however, because it involves two more connectors and a separate length of transmission line. If you leave the SWR meter in the line at all times, there is a slight but unnecessary loss of transmitted and received signals.

Don't spend too much time or effort trying to get your standing wave ratio down to the optimum one-to-one on each band. Obviously, it's best to have the lowest possible SWR to make sure that the antenna accepts (and radiates) as much RF energy as possible. A high SWR indicates a lot of power is being reflected back into the transmitter's output stage, which results in undesirable heating and possible component damage. Nevertheless, you can live with a bit of reflected power, and an antenna with an SWR of 3:1 (or less) is acceptable. An SWR of more than 3:1 is undesirable.

Power meters are in the same category as SWR meters, and the two are often combined in a single unit. A power meter is a useful piece of test equipment when checking a transmitter's RF output, but it is not required for normal station operation. Most transceivers, and many antenna tuners, include the capability to meter RF power output.

## Dummy Loads

The dummy load is used as an RF load for the transmitter when performing transmitter tests and adjustments. A true dummy load does not radiate RF energy. It is a piece of test equipment that is not required for normal station operation.

Please understand that it is not safe to load a transmitter into a dummy load and to assume that no further transmitter adjustments are necessary when you switch from the dummy load to an actual antenna. The dummy load is a useful piece of test equipment, but it does not present the same electrical load to a transmitter

as is presented by an antenna. I sometimes find new operators making this mistake, which results in poor operating results.

Amateurs sometimes use incandescent light bulbs as dummy loads. This is poor practice because light bulbs radiate signals, and they do not act as the flat resistive load you should have when you are conducting transmitter tests. Light-bulb dummy loads have been heard by amateurs thousands of miles away from the test location. However, if you are going to use a bulb as a dummy load, use a 250 watt one to more closely match the transmitter's output impedance.

## Receiver Sections Of Transceivers

Whether a receiver is housed in its own cabinet or is enclosed as part of a transceiver, it should be sensitive, stable, selective, and simple to operate. The receiver section in almost every modern receiver has excellent sensitivity and stability. Their selectivity is seldom good enough without adding a narrow code filter, and some are not simple to operate.

**Sensitivity.** A sensitive receiver can produce a useful audio output even when the received signal applied to its antenna input is extremely weak. Modern receivers are so sensitive that they will allow you to work stations which produce less than one-millionth of a volt (one microvolt) at the antenna connection. Simply stated, a sensitive receiver lets you hear extremely weak stations that would be difficult or impossible to hear with a less sensitive receiver. Sensitivity is the most important consideration in selecting a receiver because

you just cannot work stations that you cannot hear. Naturally, the reception of a weak station (that is marginal with a less sensitive receiver) becomes much easier when a more sensitive receiver is used to produce a stronger output.

**Selectivity.** A disadvantage associated with using an extremely sensitive receiver in a crowded band is that you can be greatly bothered by hearing several stations at the same time. A simple way to minimize this problem is to reduce the amount of frequency spectrum you hear, and this is what increased (narrower) receiver selectivity does for us. As previously mentioned in the transceiver coverage, lack of selectivity is easily overcome by using one of the fine internal or external filters that are available. You should have no trouble connecting or using a filter. If you have a receiver that has a code filter available but not installed, it is worthwhile to install it. Operating capability and pleasure are greatly improved by eliminating most of the interference that could be bothering you from other stations and atmospherics. Good selectivity is the second most important attribute of a receiver to be used in crowded bands.

**Stability.** Stability of two types must be considered—mechanical stability and electrical (thermal) stability. All modern receivers have good mechanical and electrical stability.

**Mechanical.** If a receiver has good mechanical stability, it is not jarred off frequency when someone or something physically causes it to be moved. If a receiver has poor mechanical stability, it jumps off frequency as anyone walks by your operating position, leans on the operating table, or applies even slight pressure to the front panel or cabinet of the receiver. It is

easy to determine whether or not a receiver has satisfactory mechanical stability. Select a steady signal such as the WWV time and frequency standard on 2.5, 5, or 10 MHz. Then set the receiver to its maximum (narrowest) selectivity position. Select the Code/CW mode. With receiver setup as described, and with the volume high enough to hear the received signal, jar the receiver's front panel with your hand. If the audible beat tone jumps with even a light touch of the hand, it has poor mechanical stability. If the received tone does not change pitch when the receiver is jarred, the receiver has good mechanical stability. The mechanical stability of some old receiver sections is so poor that frequency shifts when any front-panel control is touched, whereas others are so stable they won't shift frequency even when a corner is lifted and dropped. If you have a receiver section with poor mechanical stability in an old transceiver, you can learn to use it effectively as long as it has adequate sensitivity and selectivity. This problem is partially overcome by setting the mechanically unstable transceiver on a very solid table or desk, instead of on something flimsy such as a card table. You can learn to minimize the pressure you apply to front-panel controls as you operate the receiver. It sometimes helps to set the equipment on a cushioning material. It is nice to have a receiver with good mechanical stability, but this is a feature you can do without while still enjoying excellent operating results.

**Electrical.** If a receiver has good electrical stability, it does not shift frequency very much between the time it is turned on and the time when it has heated to its normal operating temperature. It is easy to check the electrical sta-



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bility of a receiver. As soon as you turn on the cold receiver, tune it to a dependable fixed frequency station (such as WWV) and note the exact setting of the tuning control. As the receiver warms up, you may find it necessary to adjust the tuning control to keep the station tuned in; this adjustment is due to electrical (thermal) instability. Record the amount of adjustment required every few minutes to keep the station tuned in. Even if a receiver is electrically unstable, it usually stabilizes fairly well after about 15 minutes of operation.

Some receivers in old transceivers continue to have slow but gradual frequency shifts no matter how long they are operated. If a receiver is electrically unstable, this problem can be minimized by leaving it turned on at all times. If a receiver is going to be left on when not in use, the standby-receive switch (if it has one) can be left in the standby position to minimize power consumption.

**Simplicity.** Simplicity of receiver operation is important to a new amateur. I have known amateurs who had a very difficult time learning to properly operate receivers which have a confusing assortment of front-panel controls. An overly complex-looking array of controls can decrease the confidence of a new operator and contribute to poor operating results. The proper use of simpler receivers is more easily mastered by new amateurs. Any new amateur using a receiver with a bewildering array of front-panel controls should determine which controls can be left off or at zero and leave them alone until their functions are completely understood. You should take the time to completely understand the exact function of each control on your station equipment, and instruction manuals provide this information. You must know your equipment very well to obtain optimum operating results.

## Stacking Equipment

New amateurs often stack their station equipment into one pile. This approach may look impressive, but it is a poor way to arrange a station. For one thing, equipment cooling is reduced when hot units are stacked on top of each other. An even more important argument against stacking is that it is more difficult to use equipment that is not set down on the surface of the operating position. It is particularly important to have receiver controls down where they can be used without lifting your arm off the table. Receiver controls are used much more often than the controls on the rest of the station equipment. In addition to locating all gear at the level of the operating surface and positioning everything within easy reach, it is also helpful to tilt each unit up in front to provide improved viewing of controls, meters, and dials. Some equipment has lifters (bails) installed to tilt up the front panel, but you usually have to customize your installation to obtain good front-panel visibility.

If you are right-handed, it's best to position the transceiver to your left. This leaves your right hand free to use your telegraph key, and you can very comfortably control the transceiver with your left hand.

## Custom Consoles

Some amateurs customize their stations by building operating consoles to house their equipment. I have seen some very well made station consoles, but I have never seen one that is as pleasant to use as when the gear is set on the operating surface of a table or desk. One problem related to customized station consoles is that amateurs do change equipment, and it can be a major job to revise a custom console to house different equipment. I have noticed that very few custom consoles provide adequate cooling, which causes installed gear to run hotter than is necessary. Cooling fans may be needed when customized consoles are used. It is also easier to make (and change) rear-apron connections on equipment that is not mounted in a console. Operating comfort and ease are important factors that can contribute to successful and satisfying operating results.

## Summary

This concludes the second part of this five-part article. The next part covers safety, electric power, grounds, and antennas.

## Printed Aids

My previous columns contains information that is useful to new and aspiring amateurs. Many of these items have been reprinted for distribution to students of licensing courses I instruct. For ease of use, these printed aids have been separated into six categories. These categories are introduction, code, theory, station, operating, and miscellaneous. Outdated items are continually replaced with newer material. Fifteen dollars brings a complete set of current printed aids, including shipping costs. A list of these printed aids will be sent to anyone who requests it and sends a business-size (#10) self-addressed and stamped envelope to my California address. Licensing-course instructors are welcome to revise and/or duplicate these items to suit their requirements.

73, Bill, W6DDB

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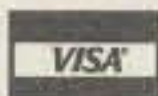
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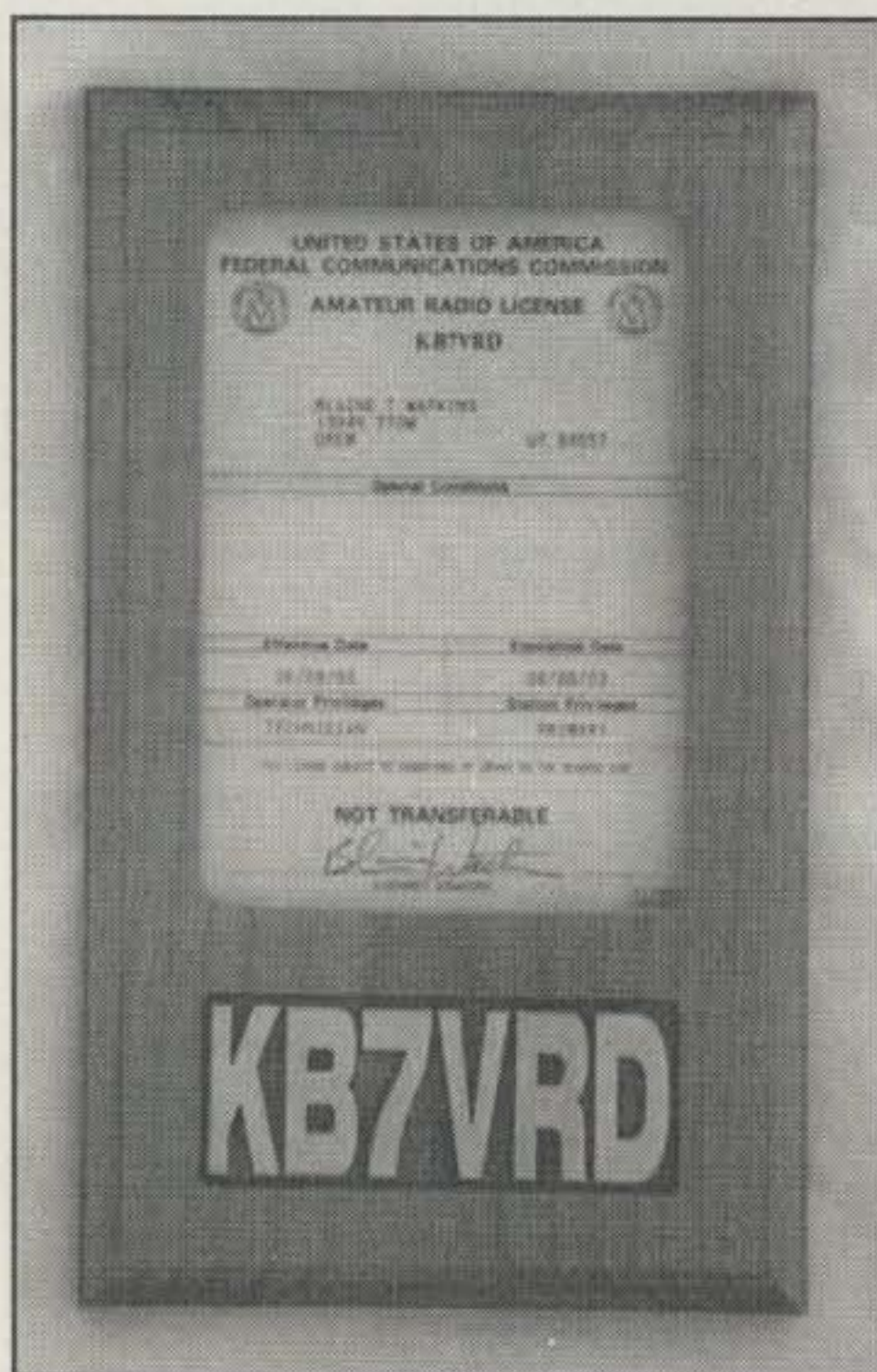
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## Callsign License Plaques From Shack Attack

Shack Attack offers callsign license plaques that meet FCC station license requirements. The plaques are hand-crafted and hand-finished from dark alder wood, finished with a polyurethane gloss, and measure 7 1/4 x 12 inches with 2 inch callsign letters inset. They also include a 5 x 7 inch clear plexiglass cover and mounting hardware. The Callsign License Plaque is available for \$19.95 plus \$3.50 s&h. Plaque upgrade packs (with letters for your new call) are \$3.00 and can be ordered by calling toll-free 800-573-7388.

Shack Attack also offers the Handie Station storage system for handheld radios (\$15.95 single; \$19.95 dual), and the Executive Desktop Callsign (\$8.00). For more info, write to Shack Attack, 51 W. Center St., Box 325, Orem, UT 84057-5903; or E-mail kb7vrd@aol.com; or circle number 101 on the reader service card.

## Palo Alto Software Sun Clock™

Amateur radio operators can now get the time of day anywhere in the world with Sun Clock, the computerized world time map from Palo Alto Software. Sun Clock's software graphically displays a world map with the current time for up to 20 customizable sites. The information box for each site can include telephone numbers and other details. The shortest distance between any two points can be instantly calculated. A night shadow moves across the world map and changes shape with the seasons.

Sun Clock is available in both Macintosh and Windows versions at computer software outlets. It may also be ordered from Palo Alto Software by calling 1-800-229-7526 or sending a fax to 541-683-6250. The suggested retail price is \$14.95. A demonstration of Sun

Clock and other business software is available on Palo Alto Software's home page. The home page address is: <http://www.pasware.com>. For more information contact Palo Alto Software, 144 East 14th Ave., Eugene, OR 97401 (phone 503-683-6162); or circle number 103 on the reader service card.



## Palomar Clamp-On RF Current Meter

Palomar's new clamp-on RF current meter makes it possible to check ground radials one by one to find broken radials and to determine antenna efficiency. It also checks for currents on coaxial cable shields and for any wire from the smallest up to 1/2 inch diameter. It is not a probe. The Model PCM-1 has three ranges: 0.1, 1, and 5 amperes full scale with direct panel meter readout and can be used from one milliamperere up to 5 amperes 1-30 MHz.

The Model PCM-1 RF current meter is priced at \$125 plus \$6 s&h U.S. and Canada. For more information, contact Palomar Engineers, P.O. Box 462222, Escondido, CA 92045 (phone 619-747-3343; fax 619-747-3346); or circle number 102 on the reader service card.

## New GPS Firmware for AEA PK-232MBX and PK-900

Advanced Electronic Applications' (AEA) PK-232MBX and PK-900 multi-mode data controllers are now shipping with Global Positioning System (GPS) firmware. The GPS firmware incorporated in both units automatically detects if there is a GPS receiver connected upon power-up. If a GPS receiver is detected, an initialization string will be sent and the TNC will be ready for GPS work; if no GPS receiver is detected, the TNC will be ready for traditional packet data work. The firmware allows remote programming of GPS commands. Other new features include time and date setting from the



Say You Saw It In CQ

## Antenna Software by W7EL

EZNEC ("Easy-NEC") captures the power of the NEC-2 calculating engine while offering the same friendly, easy-to-use operation that made ELNEC famous. EZNEC lets you analyze nearly any kind of antenna - including quads, long Yagis, and antennas within inches of the ground - in its actual operating environment. Press a key and see its pattern. Another, its gain, beamwidth, and front/back ratio. See the SWR, feedpoint impedance, a 3-D view of the antenna, and much, much more. With 500 segment capability, you can model extremely complex antennas and their surroundings. Includes true current source and transmission line models. Requires 80386 or higher with coprocessor, 486DX, or Pentium, 2Mb available extended RAM; and EGA/VGA/SVGA graphics.

ELNEC is a MININEC-based program with nearly all the features of EZNEC except transmission line models and a limitation of about 127 segments (6-8 total wavelengths of wire). Not recommended for quads, long Yagis, or antennas with horizontal wires lower than 0.2 wavelength; excellent results with other types. Runs on any PC-compatible with 640k RAM, CGA/EGA/VGA/Hercules graphics. Specify coprocessor or non-coprocessor type.

Both programs support Epson-compatible dot-matrix, and HP-compatible laser and ink jet printers.

Prices - U.S. & Canada - EZNEC \$89, ELNEC \$49, postpaid. Other countries, add \$3. VISA AND MASTERCARD ACCEPTED.

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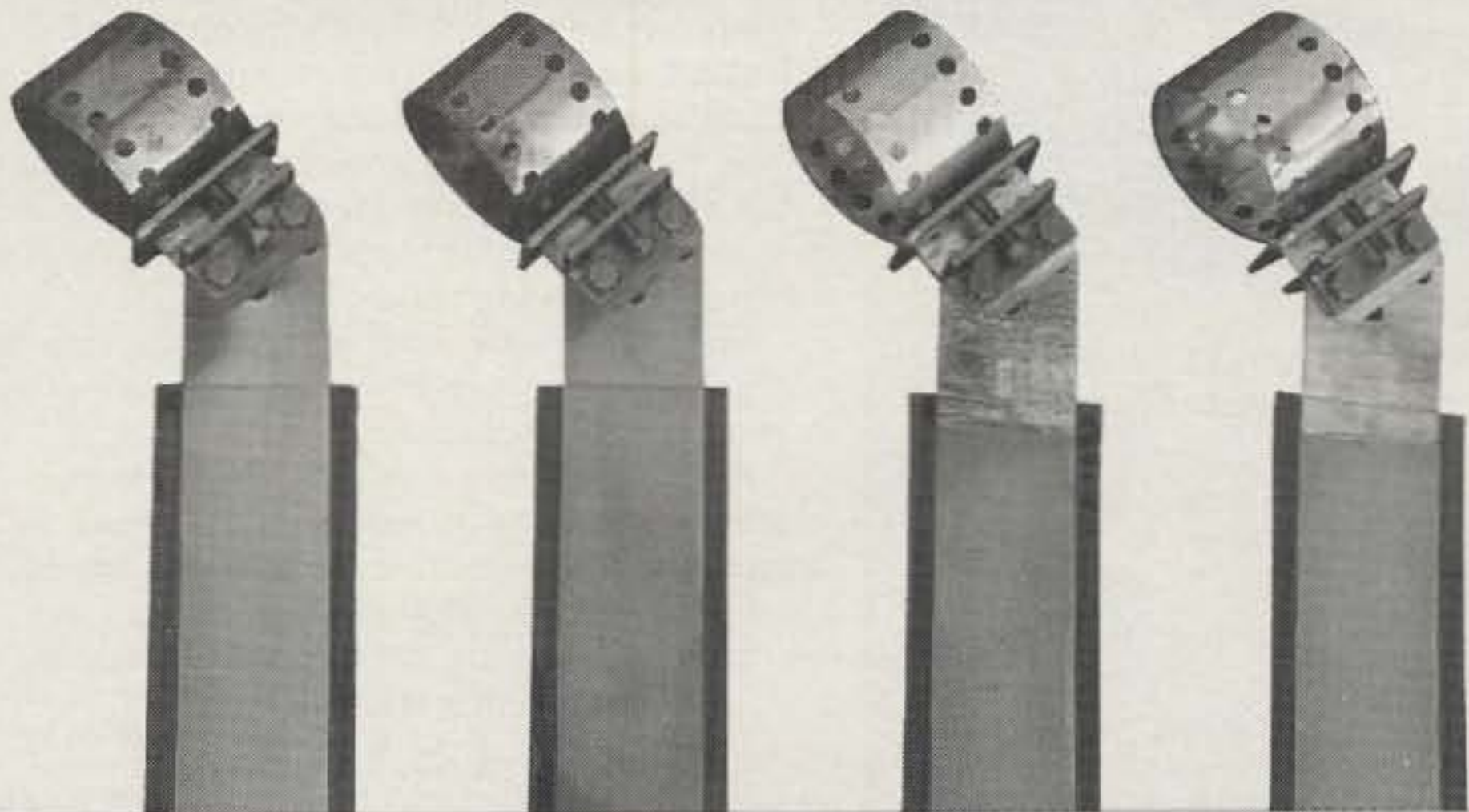


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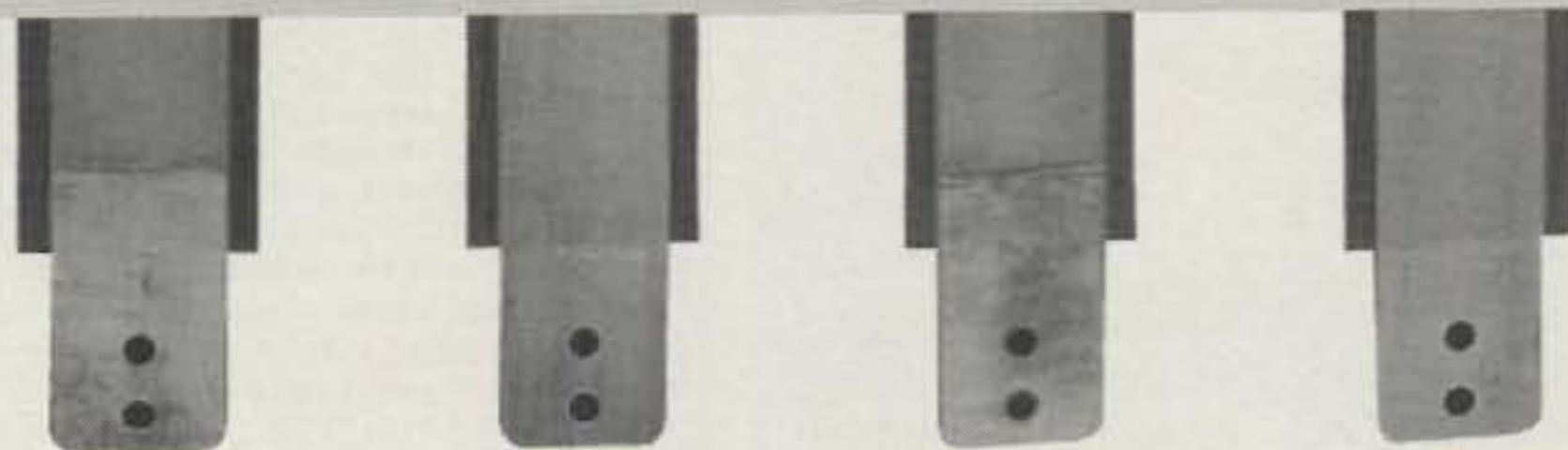
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\* Can also be used for grounding a galvanized tower leg.

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### Electronics Software Compendium™

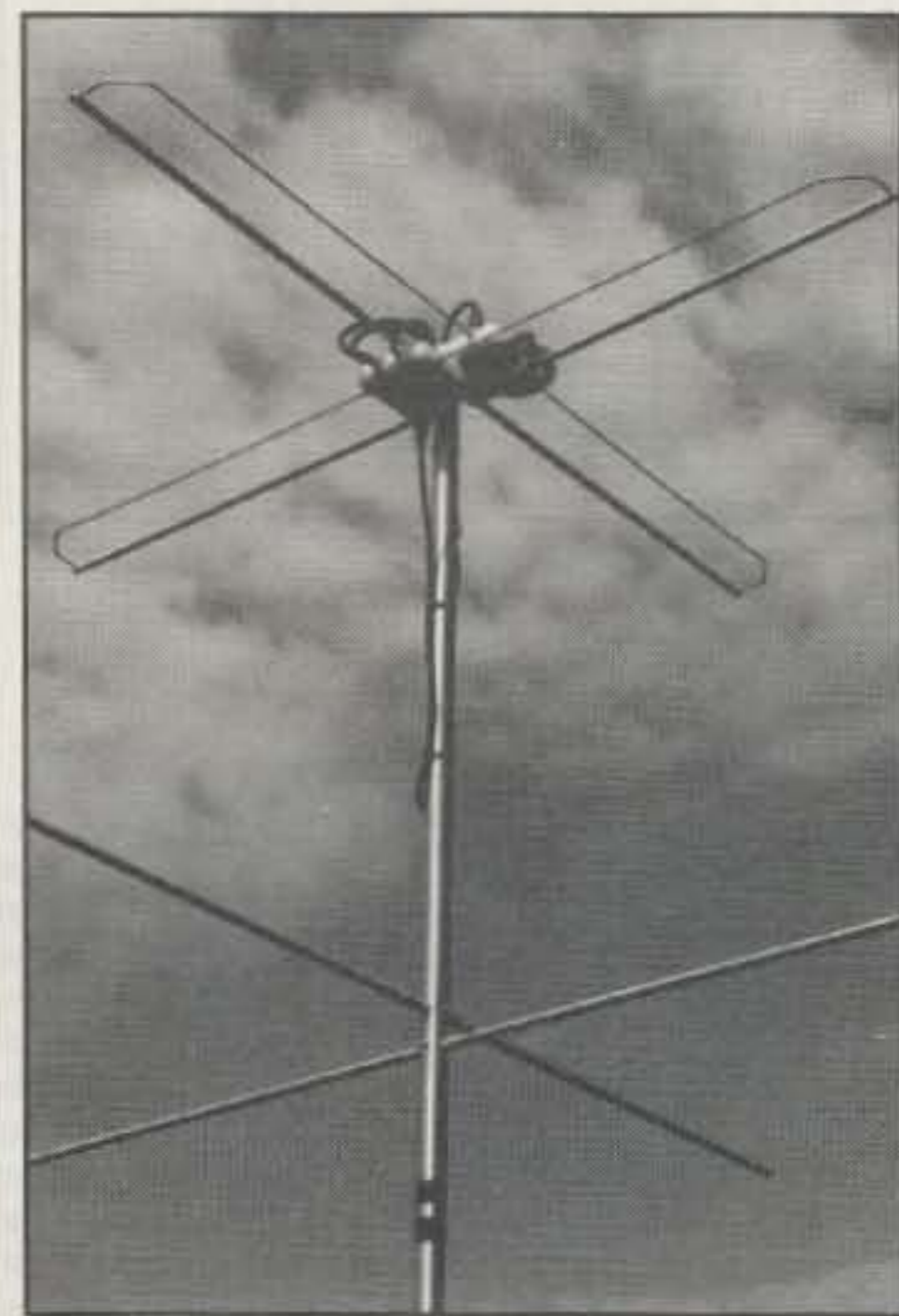
The Electronics Software Compendium is a collection of shareware programs and data files that pertain to electronics, broadcasting, amateur radio and SWL activity.

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GPS receiver, remote programming of the GPS receiver itself, and the ability to operate as a WIDE and RELAY digipeater. Exact time and date information can be extracted from the GPS receivers to set the PK-232MBX's and PK-900's internal clocks.

The PK-232MBX and PK-900 multi-mode data controllers are available from amateur radio dealers. For more information, call AEA's Literature Request line at 1-800-432-8873; fax to 206-775-2340; write to them at P.O. Box C2160, Lynnwood, WA 98036; or circle number 104 on the reader service card.



## Omnidirectional Antenna For APT Satellites

Woodhouse Communication has an omnidirectional, circularly polarized antenna made especially for the APT satellites operating near 137 MHz. The APT-2CP is an omnidirectional antenna for polar orbital satellites and is built with the heritage of the APT-4X4 Yagi. The antenna offers dual, balanced driven elements for uniform performance. The driven elements are fed by a delay line to offer true circular polarization. The entire antenna is at DC ground for increased lightning/static protection. The optimized antenna provides "no-holes" over the top reception for near overhead passes, and good low-angle pass reception. Mast construction is 1" OD 6061T6 aluminum, with a wall thickness of .065". The 3/8" diameter elements pass through the mast for mechanical strength. The driven element insulators are the same HDPE used on the APT-4X4, and amateur band antennas. HDPE is stable and environmentally secure against moisture, temperature extremes, mechanical shock, and UV exposure. All hardware is stainless steel.

Supplied with an aluminum mounting bracket and four stainless-steel clamps, the APT-2CP will clamp to any vertical pipe, mast, or extension from 1 to 2 inches in diameter. The APT-2CP is priced at \$119.95 and is available from Woodhouse Communication, P.O. Box 73, Plainwell, MI 49080-0073 (phone 616-226-8873; fax 616-226-9073). For more information circle number 105 on the reader service card.

## NEWS OF CERTIFICATE AND AWARD COLLECTING

Unfortunately, we have no USA-CA award recipient featured this month. I have run through my backlog of USA-CA award winners. However, I do have a number of new honorees who are preparing their material for future columns. As I indicated recently, I would like to expand this section of the column to include the achievements of amateurs who have received awards other than the USA-CA. Don't be modest, or if you know of someone who has achieved a significant accomplishment in amateur radio, send your material to me. Photographs are also welcome.

### Awards Issued

USA-CA 500 #2893 was issued to John Scott, WM9U.

USA-CA 2500 #1000 and USA-CA 3000 #909 were issued to Larry D. Hagen, KG7GV.

Last month we neglected to include Egon Ron, 4X4RE, in our "Awards Issued" section. Egon received USA-CA 2500 #996. Sorry about that, Egon.

### DARC DX Awards

Issued by the German Amateur Radio Club Department for DX and HF Contesting, the following are the general rules for the program.

The official awards of the German Amateur Radio Club (DARC) are processed by the department for DX and HF Contesting. The awards may be claimed by all licensed amateurs and SWLS. All contacts must be made from the same country. All cards must be in the applicant's possession. Any submission of forged or altered cards may lead to the appli-

Box 76, Pleasant Mount, PA 18453-0076

### SPECIAL HONOR ROLL

Timothy J. Heber, KBØG  
USA-CA All Counties #890  
November 25, 1995

Larry D. Hagen, KG7GV  
USA-CA All Counties #891  
December 7, 1995

cant's disqualification from the program.

Awards of any class may be endorsed "YL Award," "Via Satellite," or "QRP" if the applicant can submit the necessary credits. Awards for club stations may be applied for and will be issued under the club's name, not that of the applicant.

To qualify for the awards, applicants from outside Germany must submit a GCR list—i.e., a list of cards verified by the applicant's local club or by an official awards manager. If there is any doubt, the manager may require the submission of the cards for verification.

Applications should be sent to the respective award manager. New holders of the awards will be published in the official journal of the DARC, *CQ DL*.

The service charge for any one of the awards is DM 15.00; for an application for one or more stickers DM 5.00; for any one of the plaques, if sent by mail, DM 40.00 or DM 25.00 if claimed personally at the amateur radio convention in Friedrichshafen (please indicate on your application form).

The country list and application forms can be obtained from the managers by sending a self-addressed label plus postage (stamps or IRC). It is recommended that the official appli-

### HONOR ROLL

500		3000	
WM9U	2893	KG7GV	909
2500			
KG7GV	1000		

The total number of counties for credit for the United States of America Counties Award is 3076. The basic award fee for subscribers is \$4.00. For nonsubscribers it is \$10.00. Initial application must be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 76 North Broadway, Hicksville, NY 11801 USA for \$2.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. 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 15, 1991. A complete copy of the rules may be obtained by sending an SASE to Norm Van Raay, WA3RTY, USA-CA Award Manager, Box 76, Pleasant Mount, PA 18453-0076 USA. DX stations must include extra postage for airmail reply.

cation forms issued by the DARC be used, but unofficial applications containing all the relevant data will also be accepted. A complete set of application forms is available for DM 4.00 (stamps) or 5 IRCs from Eberhard Warnecke, DJ8OT. US\$ and IRCs will be accepted at a rate of DM 1.50 each.

All decisions of the Department for DX and HF Contesting are final.

Address correspondence to: Eberhard Warnecke, DJ8OT, Postfach 10 12 44, Velbert D-42512 Germany.

**EU-DX Award.** The basic idea of this award is a proportional combination of European and DX contacts in *one calendar year*. It is issued in the following classes: 2xCW, 2xSSB, and mixed modes.

A minimum of 50 points is required for the

### WAE VALID COUNTRIES LIST

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2. CT Portugal
3. CU Azores
4. DL Germany
5. EA Spain
6. EA6 Balearic Islands
7. EI Ireland
8. ER Moldova
9. ES Estonia
10. EU White Russia
11. F France
12. G England
13. GD Isle of Man
14. GI Northern Ireland
15. GJ Jersey
16. GM Scotland
17. GM Shetland Islands
18. GU Guernsey & Dependencies
19. GW Wales
20. HA Hungary
21. HB Switzerland
22. HBØ Liechtenstein
23. HV Vatican
24. I Italy
25. IS Sardinia
26. IT Sicily
27. JW Bear Island

28. JW Svalbard
29. JX Jan Mayen
30. LA Norway
31. LX Luxembourg
32. LY Lithuania
33. LZ Bulgaria
34. OE Austria
35. OH Finland
36. OHØ Aaland Islands
37. OJØ Market Reef
38. OK Czech Republic (after 1-1-93)
39. OM Slovak Republic (after 1-1-93)
40. ON Belgium
41. OY Faroe Islands
42. OZ Denmark
43. PA Netherlands
44. RI/FJL Franz Josef Land
45. RI/MVI Malyj Vysotskij Island
46. RA Russia (eu. part)
47. RA2 Kaliningradsk
48. S5 Slovenia (after 1-15-92)
49. SM Sweden
50. SP Poland
51. SV Greece
52. SV5 Rhodes
53. SV9 Crete
54. SY Mt. Athos

55. 'M San Marino
56. T9 Bosnia-Herzegovina (after 4-7-92)
57. TAI Turkey (eu. part)
58. TF Iceland
59. TK Corsica
60. UR Ukraine
61. YL Latvia
62. YO Romania
63. YU Yugoslavia
64. Z3 Macedonia
65. ZA Albania
66. ZB Gibraltar
67. 1A S.M.O.M.
68. 3A Monaco
69. 4U/ITU UN Geneva
70. 4U/VIC UN Vienna
71. 9A Croatia (after 1-15-92)
72. 9H Malta

#### Deleted Countries

1. 9S4 Saar (from Nov. 8, 1947 to Dec. 31, 1956)
2. I1 Trieste (to March 31, 1957)
3. UN Karelo-Finnish Rep (to June 30, 1960)
4. DL Germany (to Sept. 16, 1973)
5. Y2 GDR (from Sept. 17, 1973 to Feb. 10, 1990)
6. UA1N Karelia (from July 1, 1960 to Dec. 31, 1991)
7. OK CSSR (to 31 Dec. 1992)

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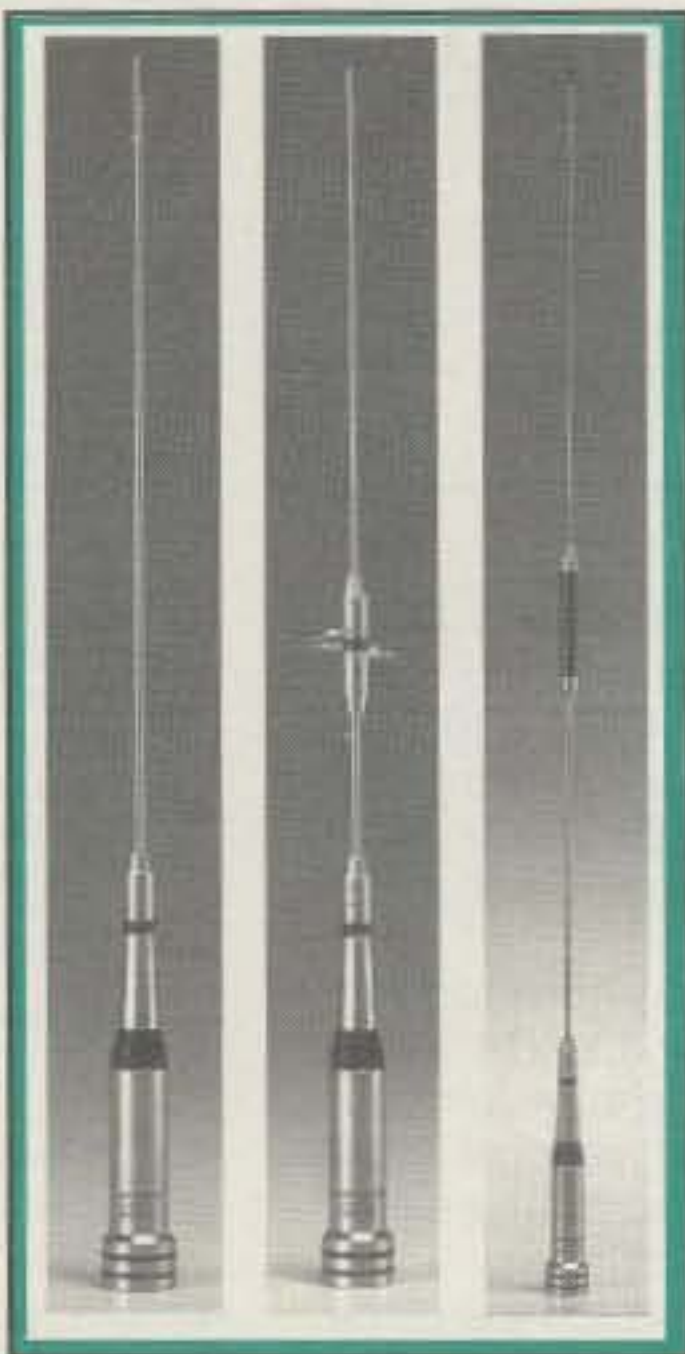
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**Connector:** Low Loss "N" Type

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the 1300MSAX is designed for larger antenna arrays and has forged steel gears that withstand large external forces. Double gear and twin drive design, plus powerful patented braking function.



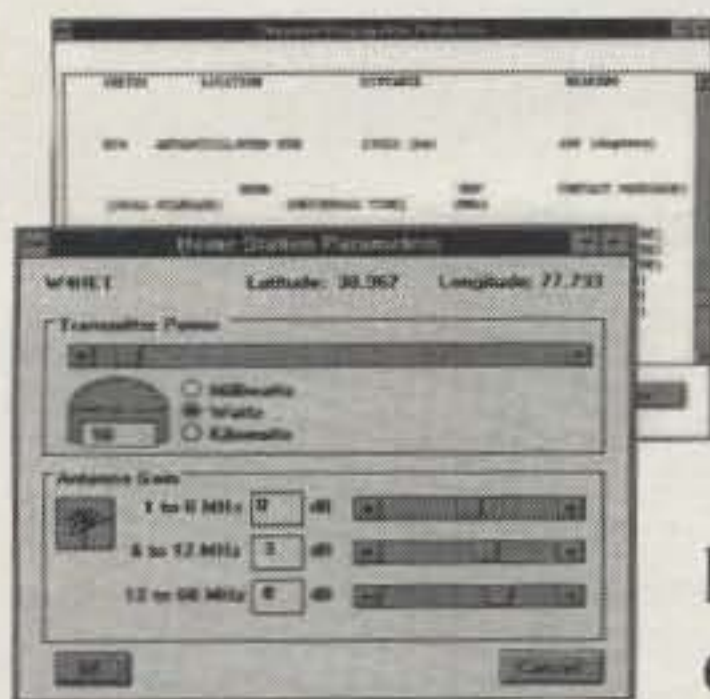
### 747SRX

Use with larger Tri-Band beams, high rotating speed (35 sec) and 470° rotation. Computer compatible.



## Skywave Propagation Prediction Software for Windows 3.1/Windows 95

# SKYCOM 2.0



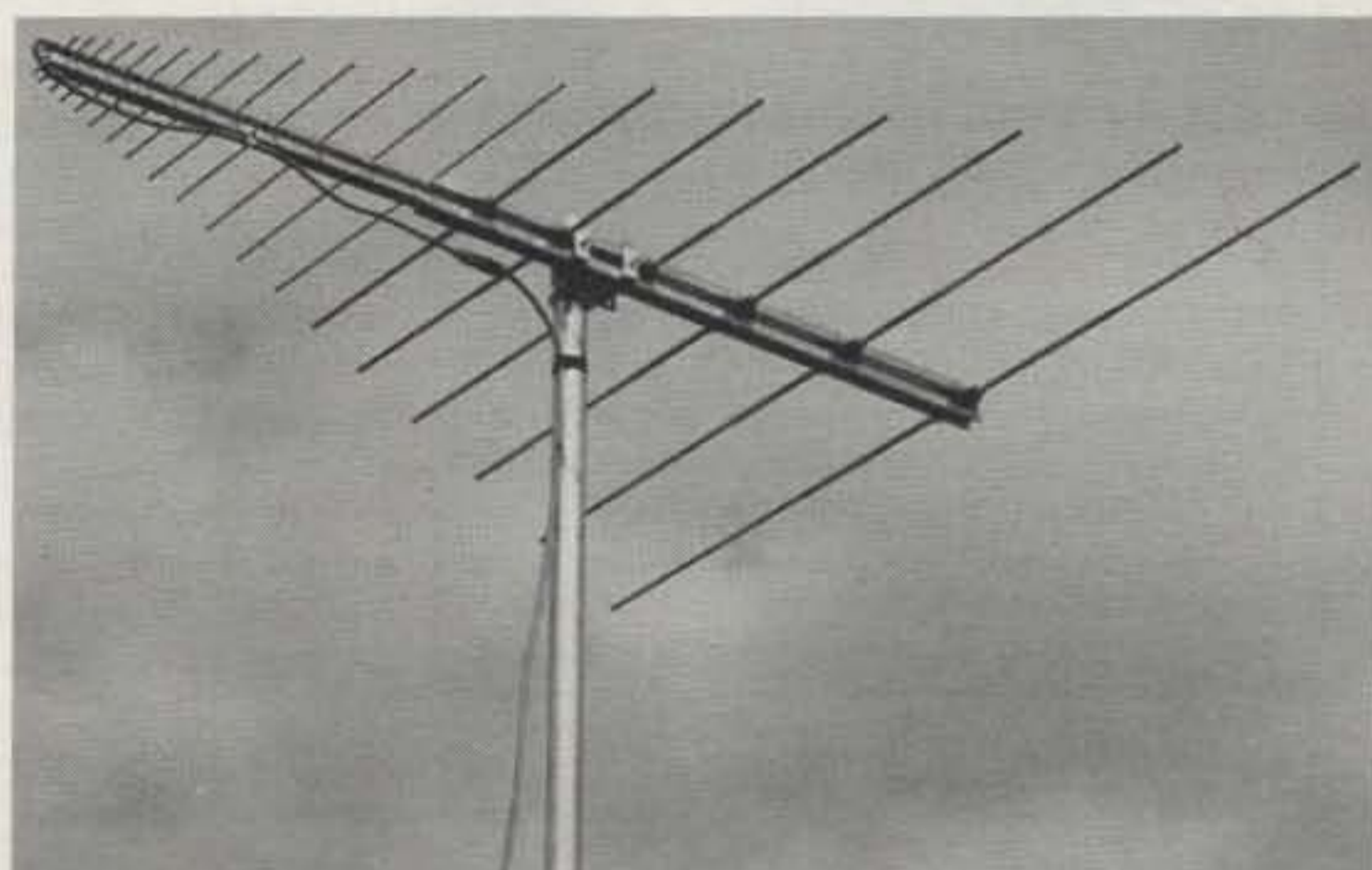
Pick a location from SKYCOM 2.0's database of over 400 call sign prefixes. Tell SKYCOM 2.0 where you are, your transmitter power, your antenna gain. Input the current solar flux or sunspot number. SKYCOM 2.0 instantly predicts and evaluates the MUFs expected for each hour of the day, calculates total path loss, and tells you the proper beam headings. SKYCOM is simple enough for the newest novice yet sophisticated enough to enable advanced users to fine tune parameters.



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NOVA is a new, extremely high performance satellite tracking program. NOVA is designed to perform all the Frequency Management, Logging and Tracking operation an OSCAR enthusiast might ever need. its style is all new and NOVA is easy to use. NOVA's features are unmatched by an other satellite tracking program. It can directly Tune your satellite transceiver through an external level converter such as the SASI Frequency Manager. It will control several radios at once, necessary feature when working Mode A satellites. Tuning both the uplink and the downlink frequency at the same time provides accurate Doppler shift compensation, even for the Low Earth Orbit satellites. NOVA full supports automatic AZ/EL antenna rotor tracking units like the SASI Sat Tracker. NOVA's Tracker interface is compatible with most other trackers on the market. There are 16 map displays, each selectable in two size. NOVA can track and display on the maps up to six satellites at once. It can also present ground tracks for up to five orbits.



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EU-DX Award per year. Twenty points must be obtained by contacts with European countries, and 30 points by contacts with countries outside Europe. Each country counts one point; two points on 80 and 160 meters. All bands may be used. European countries are defined in the WAE country list; non-European countries in the valid DXCC list.

Bonus points may be obtained for any additional block of four European and six non-European countries within the same calendar year. Each year's score may be added to obtain the EU-DX 500 badge. Stickers will be awarded for any block of 50 points, regardless of the annual scores. Example:

20 EU points in 1994 + 30 DX the same year = 50 points for that year

28 EU points in 1993 + 42 DX the same year = 70 points for that year

32 EU points in 1992 + 48 DX the same year = 80 points for that year

Total: 200 points—i.e., four stickers.

**EU-DX ION Trophy (plaque).** The trophy is awarded for a total of 1000 points, no matter in how many years.

EU-DX Manager: Dietmar Kasper, DL3DXX, Birkenweg 3, Pirna-jessen, D-01796.

**Europe Award.** This certificate is awarded for working or hearing amateurs in European countries for a total score of at least 100 points.

**Scoring:** The idea is to work or hear as many European countries on different bands in different calendar years. There are no restrictions as to bands or modes.

**Annual score:** Each confirmed European country counts one point per year on each amateur band. Only the current and the five previous years are valid. Contacts older than five years no longer count.

**Total score:** Sum of the annual score for the year of application and the five preceding years.

**Europe Award Honor Roll.** Each certificate holder with an actual score of at least 300 points becomes eligible for the Honor Roll, which is published regularly in *CQ DL*. Cards may be submitted every year, before December 1, to be considered for Honor Roll listing.

**Europe 300 Trophy (plaque).** Holders of the Europe Award may obtain the Europe 300 Trophy. Applicants must achieve 300 country points counting each country on each band only once in all the years. Examples:

50 countries on 6 bands = 300 points

10 countries on 9 bands + 20 countries on 6 bands + 15 countries on 5 bands + 5 countries on 3 bands = 300 points

Europe Award Manager: Franz Berndt, DL9GFB, Heinrich-Heine-Str. 1, Bad Doberan, D-18209.

**Worked All Europe (WAE).** The oldest and most renowned of all DARC certificates is awarded for contacts with amateur stations in many European countries and on the European islands on different bands. Each confirmed country counts one point per band, with a maximum of five claimed bands per country. DX stations may count two points for any contact on 160 or 80 meters.

The award is issued in two divisions: two-way telegraphy (CW) and two-way phone (SSB). No mixed modes award.

**Classes:**

WAE III: at least 40 countries and 100 points.

WAE II: at least 50 countries and 150 points.

WAE I: at least 55 countries and 175 points.

Holders of the WAE I get a WAE badge.

**New WAE Top Trophy (plaque):** at least 70 countries and 300 points. Unlike WAE I, II, and III, deleted countries may not be counted for the WAE Top Trophy.

WAE Award Manager: Michael Adaszewski, DL5ARX, Postfach, Suhl 3, D-98509.

## Royal Naval ARS Awards Program

**Mercury Award.** This award is for contacting/hearing members of the RNARS on or after October 1, 1960. The award is issued on a points basis of one point per member station per band worked/heard, two points per band for RNARS special stations, and double points for stations worked/heard above 30 MHz.

The award is issued in three classes:

Class 1—20 points required (basic minimum for UK stations).

Class 2—10 points required (basic minimum for EU stations).

Class 3—5 points required (only available for outside EU).

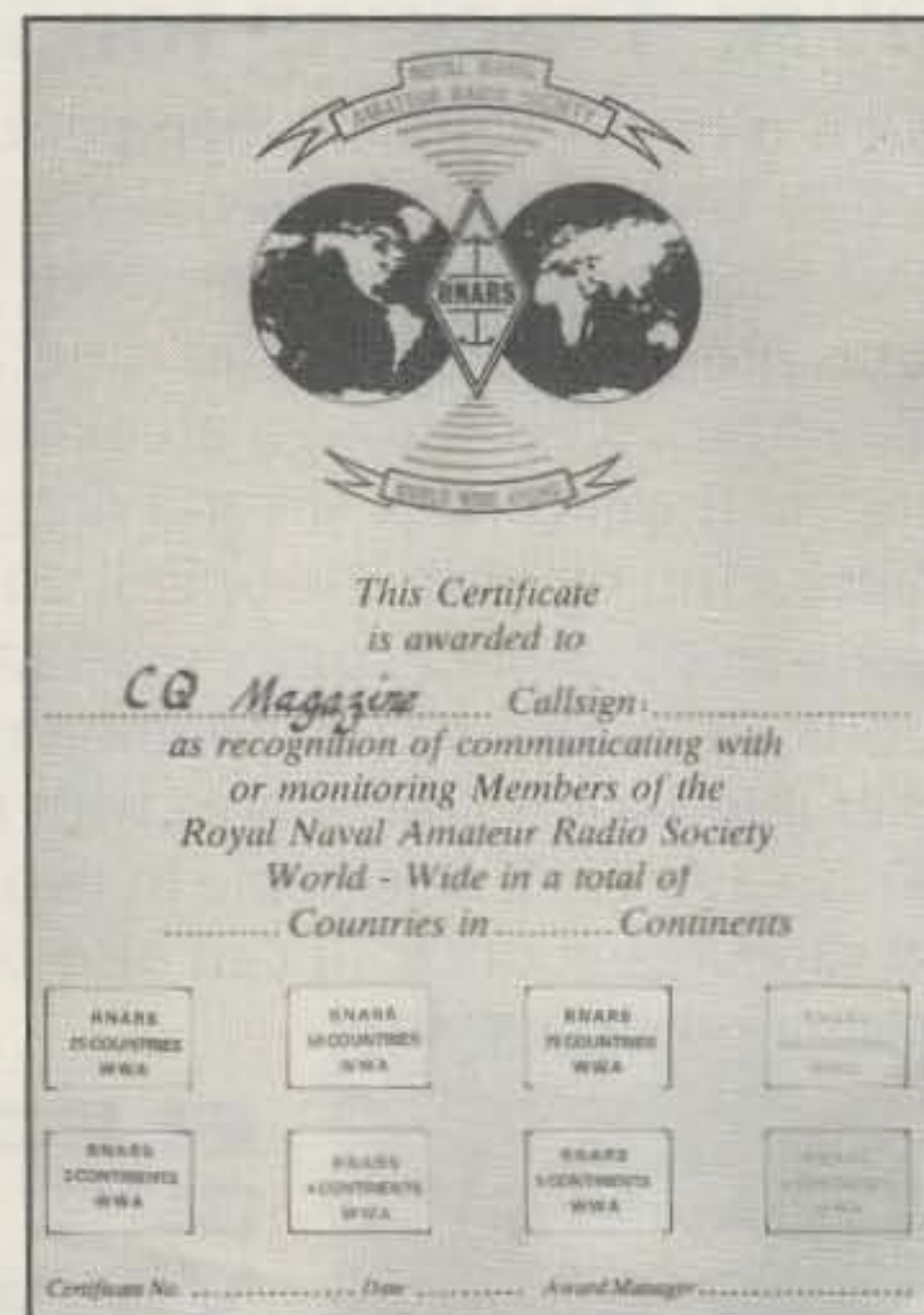
Stickers are available in increments of 10 points up to 100 points, and thereafter for 150, 200, 250, 500, 750, and 1000 points. Stickers cost a reply paid envelope for UK stations and 1 IRC for overseas applicants together with a return envelope.

An application giving full log data, with membership numbers if known, together with a fee of f 1.00 (UK), f 1.50/\$3/6 IRCs for all others, signed by two other radio amateurs must be sent to the RNARS Awards Manager.

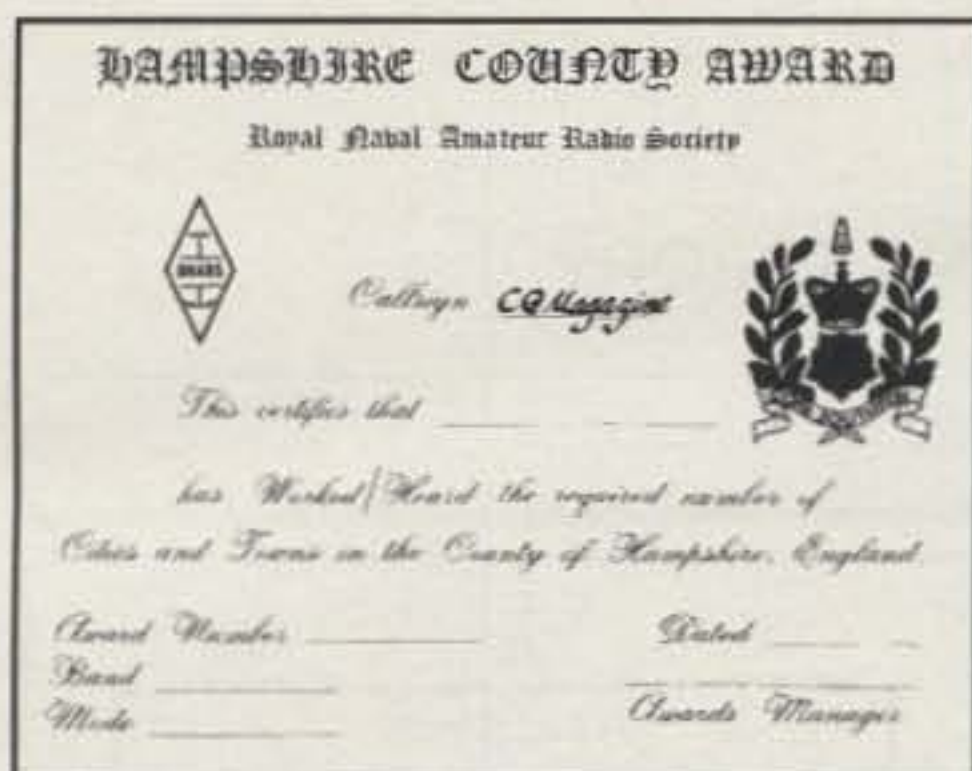
**World Wide Award.** Available for contacting/hearing members of the RNARS in ten DXCC countries and on two continents on or after October 1, 1960.

Stickers are available for 25, 50, 75, and 100 countries and 3, 4, 5, 6 continents and cost a reply paid envelope for UK applicants, and 1 IRC plus a return envelope for overseas applicants.

Full log data, signed by two radio amateurs together with a fee of f 1.00 (UK), f 1.50/\$3/6 IRCs for all others, must be sent to the RNARS Awards Manager.



The RNARS World Wide Award.



The RNARS Hampshire County Award.

**Hampshire Award.** Available for contacting/hearing amateur stations in the English county of Hampshire (note that the Isle of Wight is a separate county) on or after October 1, 1960. Each Hampshire station counts one point and each RNARS special station operated within the county counts two points.

The award is issued in three classes:  
 Class 1—UK 50 points, EU 20 points, DX 15 points.  
 Class 2—UK 30 points, EU 15 points, DX 10 points.  
 Class 3—UK 20 points, EU 10 points, DX 5 points.

Applications including full log data, signed by two radio amateurs, plus a fee of £1.00 (UK), \$1.50/\$3.6 IRCs for all other amateurs, must be sent to the RNARS Awards Manager.



The Kaleidoscope Award from the RNARS.

**Kaleidoscope Award.** To obtain this award applicants must spell ROYAL NAVAL AMATEUR RADIO SOCIETY using the last letter of the RNARS member's callsign (total of 29 contacts). No more than one member may count for any single letter. All contacts on or after January 1, 1986 are valid. For example: G4JBR, G4SFO, G3ZAY, G4MVA, G3VLL, etc.

Full log data listing members in order (as shown) signed by two amateurs plus the award fee of £1.00 (UK), \$1.50/\$3.6 IRCs must be sent to the RNARS Awards Manager.

The RNARS Awards Manager is Glynn Burhouse, G4MVA, The Cedars, Foulbridge Lane, Snainton, Scarborough, North Yorkshire, YO13 9AY England.

For packet users G4MVA can be reached via GB7YDX (DX YORK). A list of current members of the RNARS is available for £1.00 (UK), \$1.50/\$3.5 IRCs for overseas members. The society has over 1000 members worldwide.

Following are some of the group's other awards.

**RNARS London (HNS BELFAST) Group Award.** The London Group sponsors this award to promote activity between RNARS members, group members, and other operators and SWLs. Requirements are as follows.  
 UK—15 QSOs with RNARS members, at least 4 members of which belong to the London Group.

EU/DX—8 QSOs with RNARS members, at least 4 members of which belong to the London Group.

For UK VHF members the requirement is the same as EU/DX members.

HMS BELFAST's callsigns are GB2RN, G4M4S, and G7HKS. These count for 2 points.

Stickers are available under the same rules as the certificate for an SASE (UK), 1 IRC plus return envelope for overseas amateurs.

There is no list of members available. Those seeking the award are advised to ask contacts if they are also London Group members and obtain their group membership number. London group members are asked to volunteer their membership details. This will give award seekers a target and also help



The RNARS London Group Award.

the SWLs who are unable to ask.

Applications giving log extracts highlighting London Group members plus £1.50 (f2.00 or equivalent outside UK) should be sent to manager J. S. Wilson, G4BCJ, 62, Wanstead Park Road, Ilford, Essex IG1 3TQ England.  
 73, Norm, WA3RTY

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EB63 (140W)	75W - Model 875A, \$119.95/\$159.95	Model ATV-4 (902-926)	
AR305 (300W)		(GaAS - FET)	
AN 758 (300W)	<b>440-450 MHz Amplifiers</b>	\$49.95/\$69.95	
AR313 (300W)	(SSB-FM-ATV)	Model ATV-4 (902-926)	
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# DOUG'S DESK

CONSTRUCTION PROJECTS, TECHNIQUES, AND THEORY

## Small Antennas For 160 Meters

The 160 meter season is upon us, and my mailbag is overflowing with letters from amateurs who want to operate top band, but lack the space for a full-size antenna. Although this subject has been covered in the amateur literature many times in recent years, it is worth treating again for those who are new to 160 meters. This article describes various "widget" types of 1.8 MHz antennas that I have used successfully as an urban dweller in the Detroit and Hartford, Connecticut areas.

It is important to recognize that antennas of reduced size for any MF or HF band are not as effective as fully dimensioned radiators. They do, however, offer an acceptable alternative to having no antenna at all. In fact, some of the smaller antennas can provide surprising results, even for DX work.

It is not unusual to hear weak signals from nearby stations on 160 meters during the course of an evening's activity. The operators of these stations frequently join my 1919 kHz group and ask for signal reports. Many of them are making their first excursions into top band. Almost without exception, the weak signals come from operators who are feeding a 75 meter dipole with a Transmatch. Although the system presents an SWR of 1 via the tuner, the antenna efficiency is poor, especially with coax-fed short dipoles. Better results can be expected when using tuned feeders with a short dipole. Others with weak signals report using random-length end-fed wires close to the ground.

Best results with a 75 or 40 meter dipole on 160 meters can be expected when the coaxial or balanced-feeder transmission line is shorted at the station end and matched with a tuner. This provides the equivalent of a flat-top T, which operates as a  $1/4$ -wave vertical. The legs of the dipole function as a capacitance hat. The higher the dipole and the more vertical the feed line, the better it will perform. A counterpoise or ground radial system is essential in order to make this style of antenna function efficiently.

### Compressed Full-Wave Loop

It is well known that closed loops are less responsive to manmade noise than are the more common dipole and vertical antennas. Furthermore, loops don't require ground screens, such as radials. A small, loaded 160 meter loop is attractive for those who live on city lots. The performance tradeoff for smaller, loaded antennas is restricted bandwidth. Therefore, moving from one part of the 160 meter band to another requires readjustment of the antenna tuner or loading coils to ensure a low SWR.

Fig. 1 shows a mini loop that uses four loading coils. This technique was described by two authors.<sup>1</sup> I have chosen a wire length of 30 feet for each side of the square loop in order to make it small. The antenna may be erected vertically from a tower and a mast, or from a tall

tree. It can be used as a horizontal loop if four supporting structures are available. The choice between vertical or horizontal deployment is not important, apart from the directivity that results from vertical erection. In either situation the radiation angle of the signal is high (a "cloud warmer"), which is especially desirable for communication out to a few hundreds of miles.

L1 through L4 have an inductance of 212  $\mu$ H. They are inserted at the outer ends of the two horizontal sides of the loop, as shown. The center frequency for this antenna is 1.9 MHz. No. 12 wire is used for the radiator. Resonance is effected by trimming wire from the vertical sides of the loop. I recommend a dip meter, SWR meter, or an instrument such as the MFJ-259 SWR Analyzer for adjusting the loop. With the latter two instruments resonance will be indicated by the lowest value of reflected power, regardless of how high the SWR may be.

For 1.5 KW PEP the loading coils are close-wound with 132 turns of No. 12 enamel wire. The coil form OD is  $2\frac{3}{8}$  inches, which is a standard PVC tubing size. The coil form length is  $12\frac{1}{2}$  inches to accommodate the  $11\frac{3}{8}$  inch winding. Smaller coil forms and wire of higher gauge may be used to decrease the weight and bulk of the inductors if the transmitter power does not exceed 200 watts. The ideal form factor for the coils is 1:1 to 2:1 to obtain the highest Q. However, form factors up to 5:1 will produce good results. For power outputs up to 200 watts you may use 175 close-wound turns of No. 18 enamel wire on a  $1\frac{1}{2} \times 9$  low-loss form.

A balanced antenna tuner and 300 or 450 ohm balanced feeders work well with this and other loop antennas. A single-ended tuner can be used as a balanced tuner, as described by A. Roehm in *The ARRL Antenna Compendium*.<sup>2</sup>

### A Short Dipole For 160 Meters

Fig. 2 provides details for using loading coils to convert a 75 meter dipole for operation on top band. L1 and L2 have an inductance of 106.5  $\mu$ H for operation at 1.9 MHz. The dipole may be erected horizontally, or you may use it as an inverted V. For maximum amateur power the coils are close-wound with 72 turns of No. 12 enamel wire on forms that are  $2\frac{3}{8} \times 8$ .

Smaller coils for operation up to 200 watts can be wound on  $1.5 \times 4$  forms. Use 82 close-wound turns of No. 20 enamel wire. All coils for

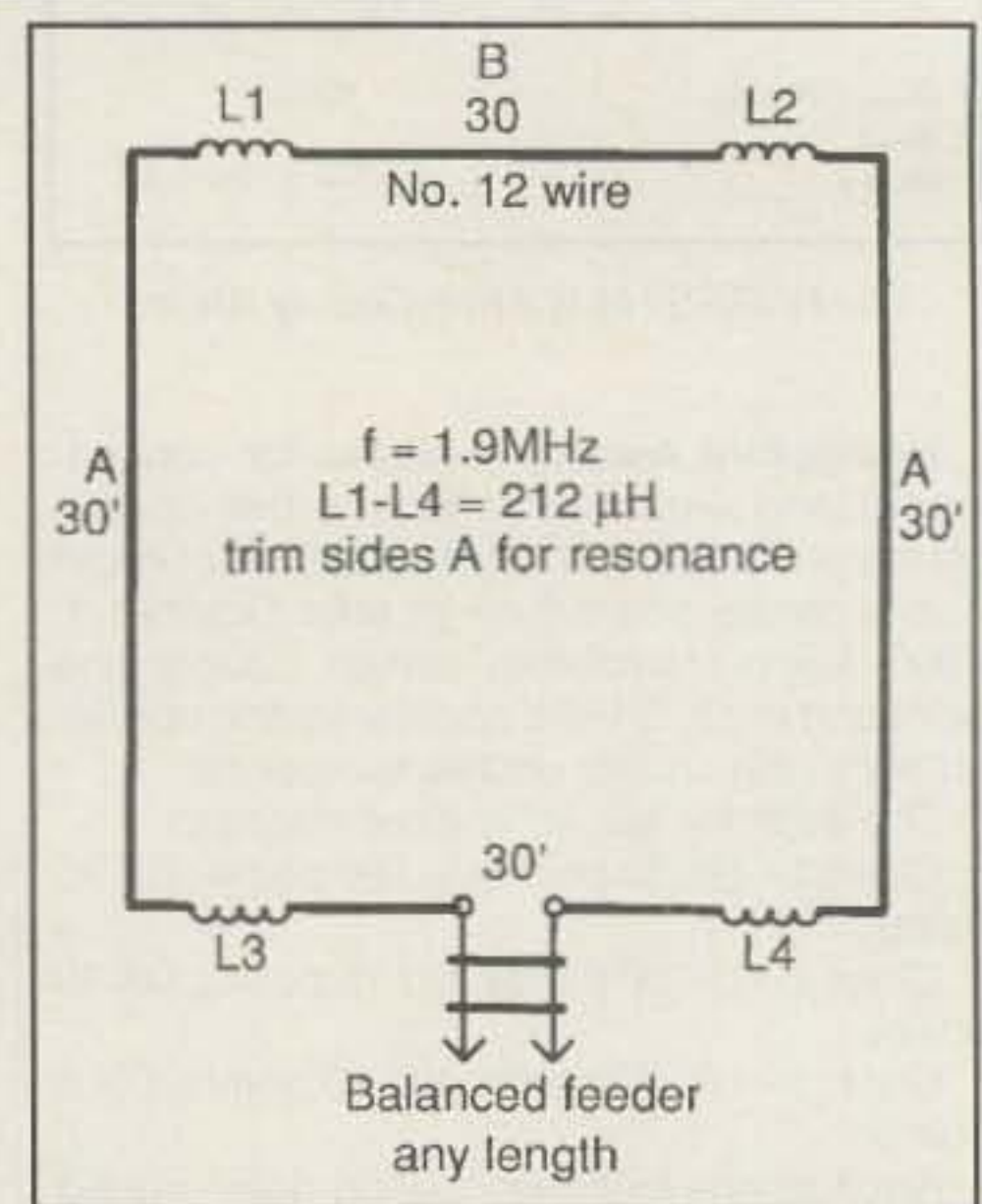


Fig. 1—Details for a compressed loop antenna. See text for information about the loading coils and antenna adjustment.

the short antennas described in this article need to be protected from dirt and moisture by enclosing them in plastic soda bottles, or by coating them with two layers of polyurethane exterior lacquer, glyptol, or marine spar varnish.

This short dipole has a much narrower 2:1 SWR bandwidth than that of a full-size dipole. Therefore, as with the fig. 1 loop, it will be necessary to readjust the tuner when making large frequency changes. Balanced feeders are recommended for this antenna, but coaxial feed may be used.

### Helically Wound Short Vertical

Helically wound antennas have been used since the early 1950s by a number of city-dweller amateurs. I prefer them over lumped-constant antennas that are base, center, or top-loaded because the voltage and current distribution across the radiator is more linear than with the latter types of radiators. How much this buys us in dB, if at all, is questionable. However, in my mind it is a more "sani-

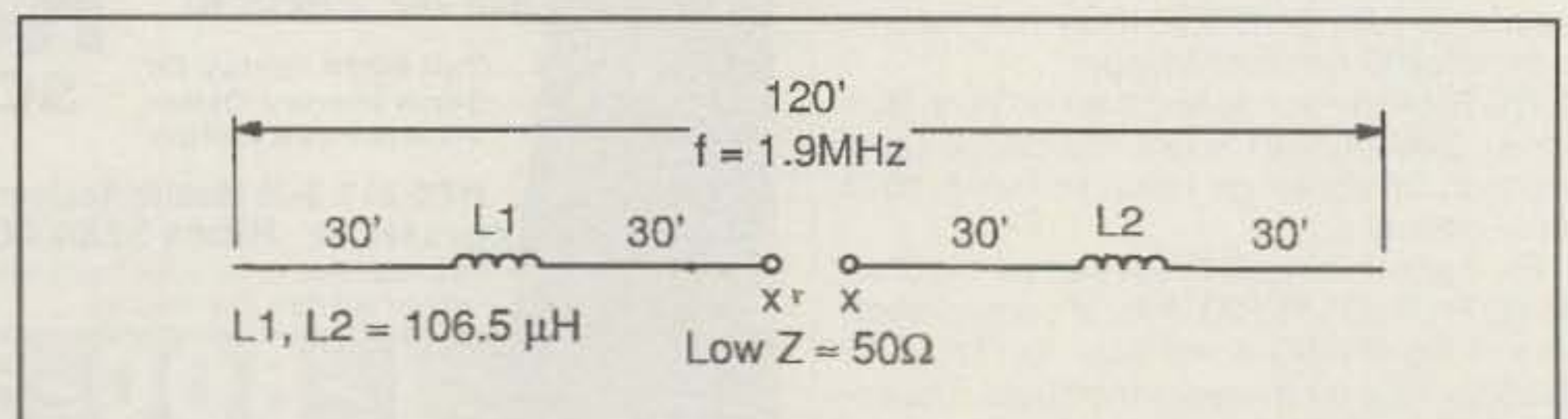
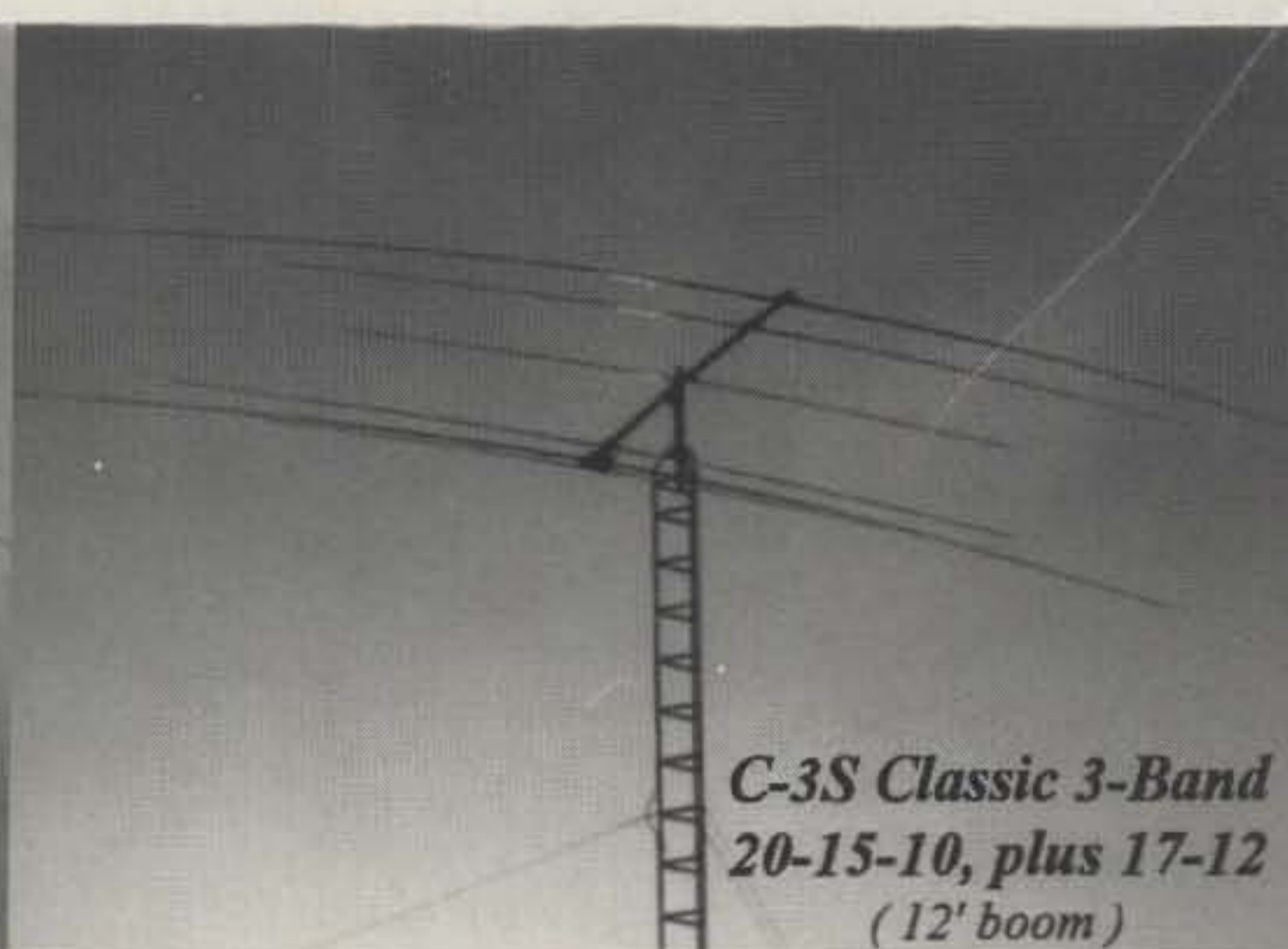


Fig. 2—Method for using a 75 meter dipole on 160 meters. Two center-loaded elements are used to provide resonance at 1.9 MHz. (Coil winding data provided in the text.)

# In response for a smaller model of the fantastic C-3, we put it on a little diet: the C-3S.



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(12' boom)*

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Serving Size (Mtrs)	20-15-10 primary + 17 & 12	Elements (all full size)	6
Net Wt.	26 Pounds (12 kg)	Length of Boom	12'
Power Handling	5KW	Wind Load (sq.ft.)	4.9
Fat	0	Wind Rating (min.)	>80 mph
Average Gain (20-15-10)	4.5dBd	Average F/B (20-15-10)	>14dB
Number of Traps per Antenna	0	Efficiency	>98%
Number of Phasing Lines	0	Average Time for Assembly	1 hour
Pre-aligned elements (on boom)?	YES	Riveted Construction?	YES
Easy-On™ Mount?	YES	Optional Bands per Antenna	40 Mtrs
Standard Packaging	4' box	1:1 Balun or RF Choke Required?	YES
Percentage of Minimum Daily Radio Enjoyment		100%	

The unbeatable C-3 performance has been extended to a smaller footprint. The C-3S incorporates a re-designed 10 mtr section allowing the boom to be only 12'. The trade-off is the C-3S covers about 1.1 MHz (i.e. 28.200-29.300) with a 2:1 VSWR, where the C-3 covers the entire 10 mtr band. The gain of the C-3S is within .1 to .2dB of the C-3. The C-3S can also cover 40 Mtrs, with 130 kHz 2:1 VSWR. This is the C-4S. The C-4C conversion can be utilized later to make the C-3S into a C-4S in the field.

Force 12 has the finest line-up of antennas to cover the classic 20-15-10 bands with a single feedline. The antennas also feature gain on 17 and 12 mtrs, with a VSWR of about 2.8:1, easily matched with any tuner. All are trapless and are acclaimed as outperforming all the various trapped antennas. Included in the line-up is the C-3XL, a composite of larger monobanders.

The complete series of antennas for the classic 3 bands (plus 40 mtrs) is the following:

C-3S	20-10 mtrs, 12' boom	C-4S	40-10, 12' boom	C-4SXL	40-10, 23' boom (includes 2 el on 40)
C-3	20-10 mtrs, 18' boom	C-4	40-10, 18' boom	C-4XL	40-10, 30' boom (includes 2 el on 40)
C-3XL	20-15-10, 32' boom, which has a 3 el 20, 3 el 15 and 4 el 10, all with separate feedlines for maximum versatility.				

Force 12 has more than 60 antennas from 160-6 mtrs. They include rotatable dipoles for 160, 80/75, 40, 30; 2 and 3 element yagis for 80, 40 and 30. Several combinations of 40/20, 40/30/20 and 40/30 yagis; the MAGNUM 2 / 2 which has 2 el on 80 and 2 el on 40. Multibanders for 20-17-15-12-10, 20-17-15, 17-15-12-10, 15-10, 17-12; all without traps or phasing systems. There are also magnetic transmitting and receiving loops (MTR's) for 80, 40 and 40-20 made from 2" tubing. They provide an excellent antenna for confined or restricted locations. MTR's are perfect for regional coverage with NVIS propagation. There is more.

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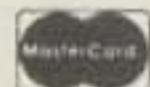
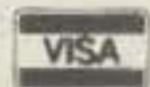
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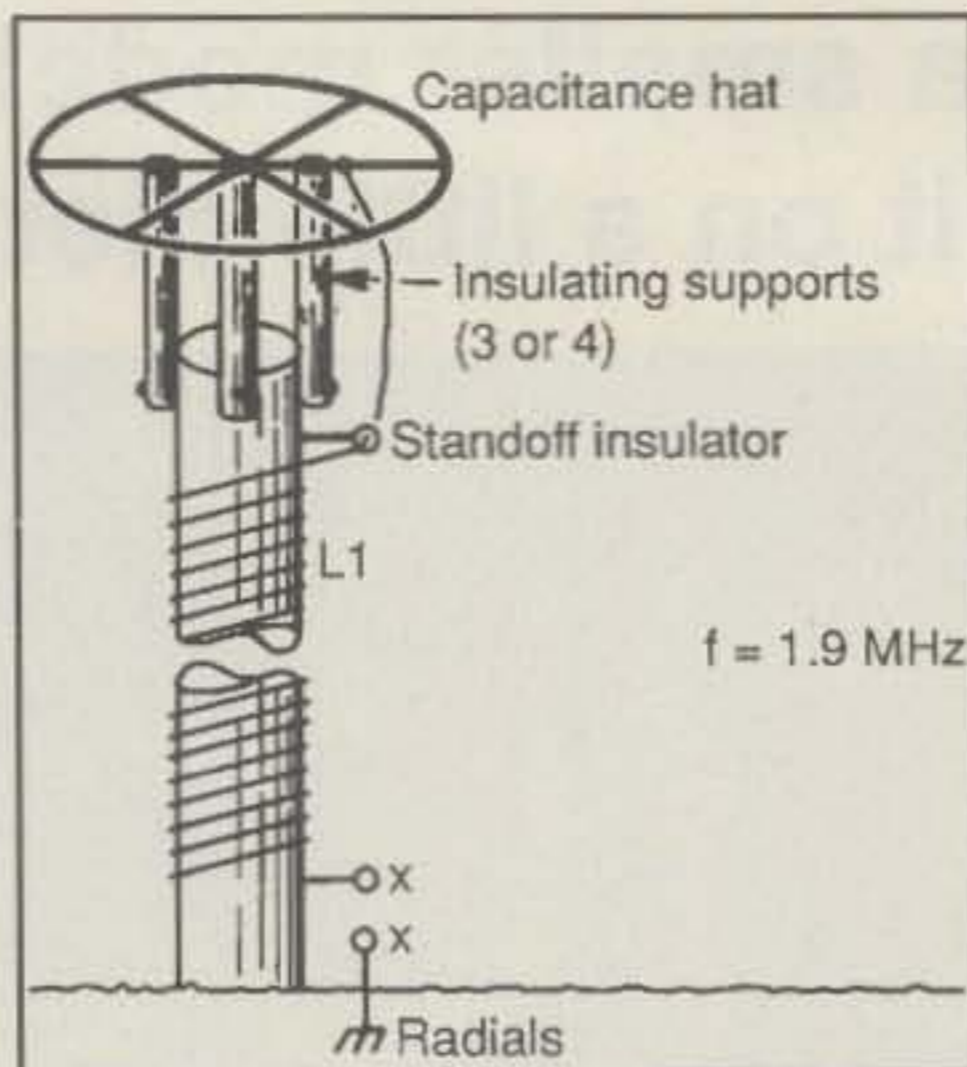


Fig. 3— Example of a short, helically wound 1/4-wave vertical for 1.9 MHz. L1 is wound on 26 feet of 2 3/8 inch OD guyed PVC pipe (see text for details).

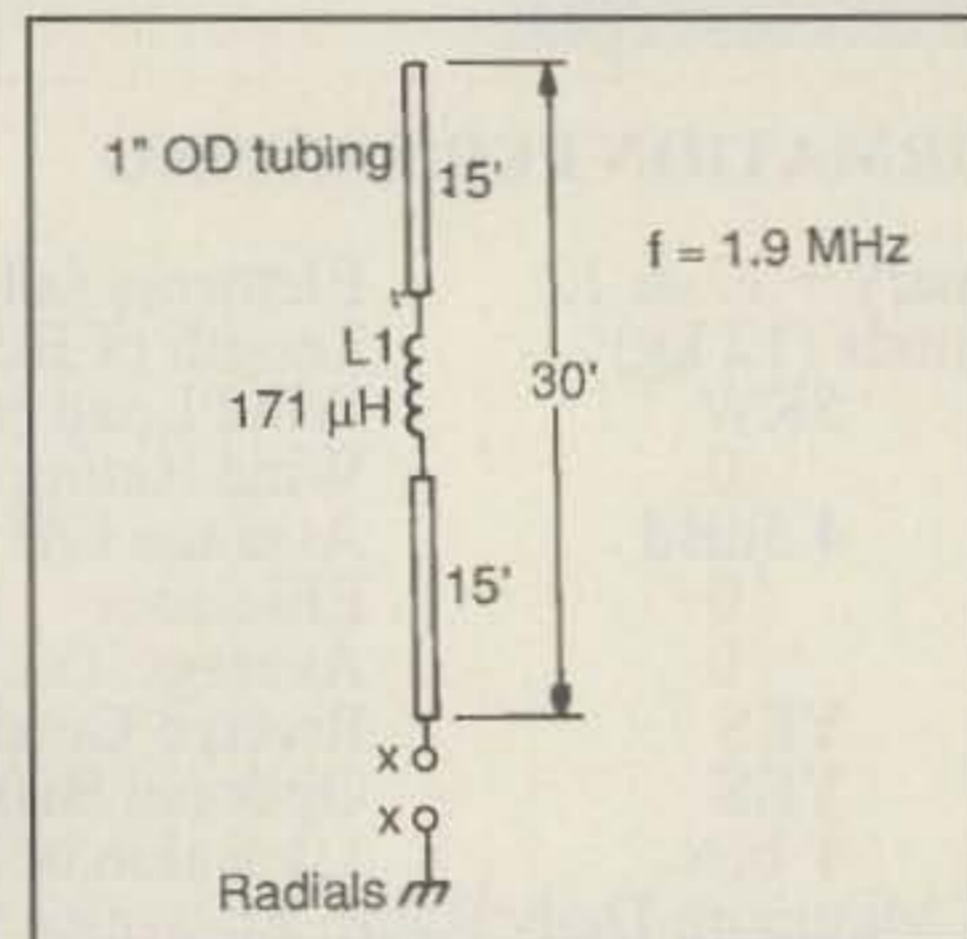


Fig. 4— Details for constructing a center-loaded 30 foot vertical for 1.9 MHz (see text). The elements are made from 1 inch OD aluminum tubing. For power less than 200 watts close-wind 123 turns of No. 20 enamel wire on a 1.5" x 6" coil form.

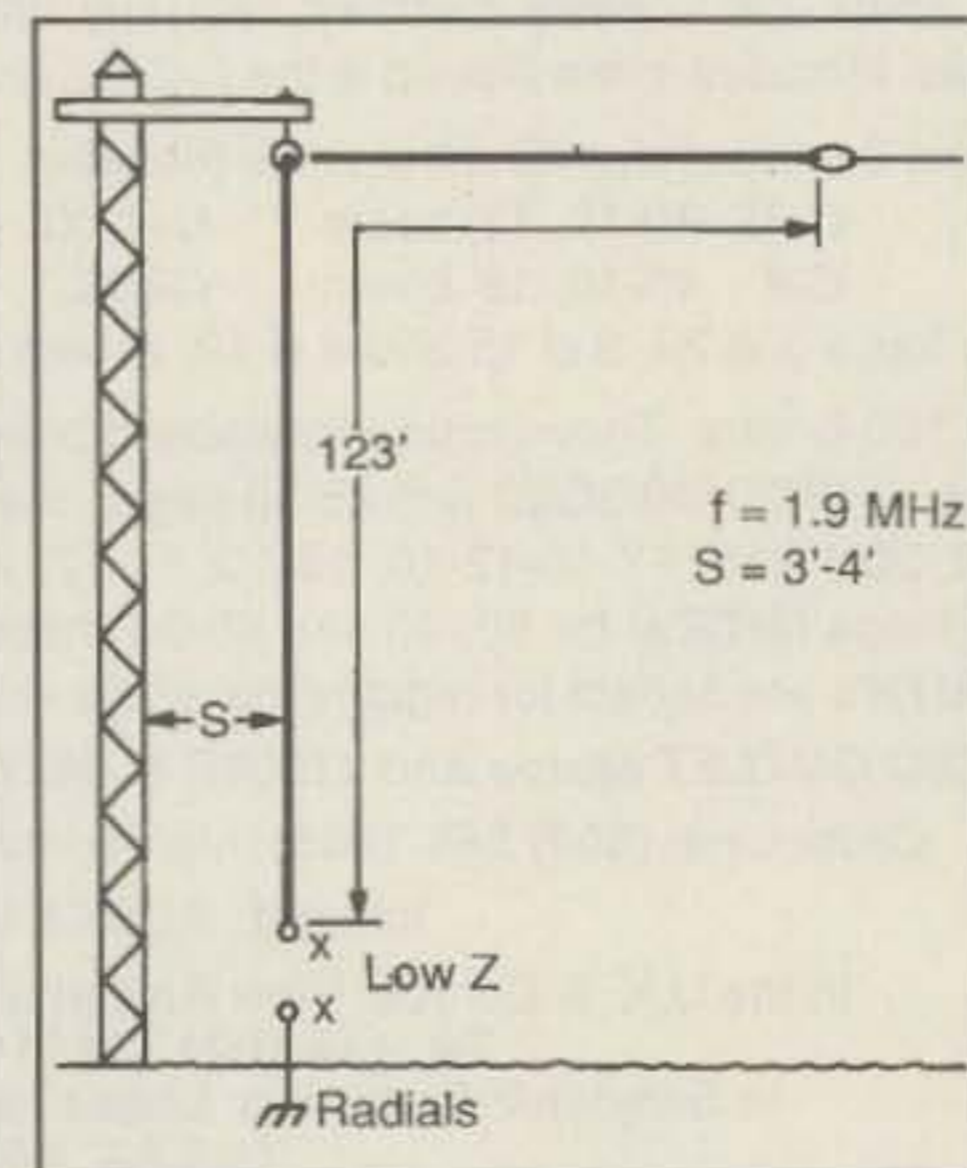


Fig. 5— Configuration for a classic 160 meter inverted-L antenna. The vertical portion of the wire should be as long as is practicable for best results.

tary" approach to design.

Fig. 3 shows how a helically wound vertical is configured. To achieve 1/4-wave resonance it is necessary to use approximately one-half wavelength of wire, spiral wound on a low-loss form. The fig. 3 ground-mounted radiator can be wound on 2 3/8 inch PVC tubing. Guying is required. Best performance will be had when using 16 or more buried or on-ground radials that are 30 feet or greater in length.

This antenna is 26 feet high. It may be wound with No. 12 or 14 bare or enamel wire. The spacing between turns is 3/4 inch. You will need to wrap 259 feet of wire on the coil form (410 turns). It is helpful to anchor the turns in place periodically during the winding process by means of tape. Once the winding is completed, it should be doped with exterior polyurethane lacquer or spar varnish (two coats) and allowed to dry before the tape is removed. This will keep the turns in place. The Q of this antenna is 5; the feed impedance is roughly 8 ohms.

An aluminum pie plate or similar metal disc is used at the top of the helical. It functions as a capacitance hat and prevents RF corona. A larger capacitance hat will reduce the number of turns needed to achieve resonance, and this will improve the antenna efficiency. A 3 foot diameter hat is not unreasonable. It can be fashioned like a wheel (with six spokes) from 3/8 or 1/2 inch OD aluminum or brass tubing. Mount the capacitance hat on three or four low-loss standoff insulators, such as Plexiglass or Delrin rods, that are screwed to the PVC tubing. Avoid allowing the high-impedance end of the helical winding or the hat to come in contact with the PVC tubing.

The L network in fig. 6A is suitable for matching 50 ohm coax to this antenna and to the low-Z radiators illustrated in figs. 3, 4, and 5. Fig. 6B shows how the L network can be reversed for use with end-fed antennas that present impedances greater than 50 ohms.

### A 30 Foot Top-Band Vertical

A 30 foot, center-loaded 160 meter vertical is illustrated in fig. 4. The elements are made from 1 inch OD aluminum tubing. You will require a loading coil with an inductance of 106.5  $\mu$ H for operation at 1.9 MHz. This is accomplished by winding 72 close-wound turns of No. 12 enamel wire on a 2 3/8 inch OD by 8 inch form, such as PVC tubing. Antenna efficiency will increase if you place a capacitance hat above the loading coil. This requires reducing the number of coil turns to obtain resonance at 1.9 MHz or some other top-band frequency of your choice. Prune the coil for minimum SWR when you adjust the system for resonance. The 2:1 SWR bandwidth of this antenna is approximately 25 kHz. The feed-point impedance is on the order of 15 ohms.

Use 16 or more on-ground or in-ground radial wires. Each wire should be 30 feet or greater in length. The radials for this and other 1/4 wave (or multiples thereof) antennas can be made from small-diameter bare or insulated wire. However, the smaller the wire the more rapidly it will deteriorate because of soil acidity. Wire as small as 20 gauge is satisfactory because only milliamperes of RF current flow in these conductors.

You should be aware that vertical antennas have a low radiation angle, even though they may be physically shortened. This means your signal will at times be weaker out to 300 miles

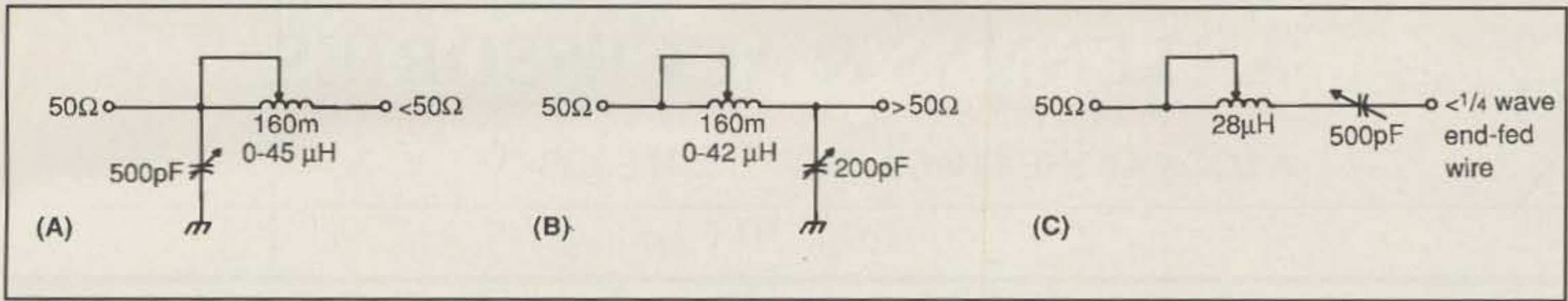


Fig. 6—Matching networks for the fig. 3, 4, and 5 antennas. Circuit A is for matching 50 ohms to a lower impedance. The circuit at B is for matching 50 ohms to a higher impedance. The series C and L combination at C is suitable for matching 50 ohms to quarter-wave antennas that are resonant higher than the desired operating frequency (see text).

than when using a horizontal antenna that is close to ground (less than  $\frac{1}{2}$  wavelength high).

## The Popular Inverted L

There is probably no 160 meter antenna that is less complicated or costly to construct than the inverted L. This antenna consists of a  $\frac{1}{4}$  wavelength of wire that is bent into a L shape, as seen in fig. 5. The objective is to make the vertical portion as long as practicable, since the inverted L is a vertical type of antenna. The horizontal portion of the wire acts as a capacitance hat to provide resonance. This horizontal section produces minimal radiation.

As with the antennas in figs. 3 and 4, this radiator requires a ground screen. Each of the radials (or a counterpoise wire) should be 130 feet in length. Try to deploy at least 16 radials (the more the better). If you lack the real estate for  $\frac{1}{4}$ -wave radials, use as many shorter ones as you can fit into the available space. I have employed mixed-length radial systems with some of the wires as short as 25 feet, while others were up to 130 feet long. Use whatever wire length you can manage for your property size, and then test the system for performance.

If your inverted L is supported by a tower or metal mast, try to space it away from the metallic support by a distance of three or four feet. Also, keep this and the other antennas described in this article well away from phone and power lines. This will reduce noise pickup and prevent nearby conductive objects from degrading the antenna performance.

## Short Random-Length Wires

If antenna space is lacking for a full-size inverted L, you can erect a shorter length of wire and configure it as an inverted L, keeping the vertical portion as long as practicable. Reasonable performance may be expected if you provide radials or a counterpoise wire to work the antenna against. The wire must be resonated for  $\frac{1}{4}$ -wave operation by adding a center loading coil (as in fig. 2). As an alternative, the matching network in fig. 6C will enable you to obtain an SWR of 1 without a loading coil. In fact, the series coil and capacitor arrangement in fig. 6C may be used with the antennas in figs. 3 and 4 if you resonate them higher than the desired operating frequency. If the resonant frequency is lower than desired, use only the series variable capacitor to tune out the unwanted inductive reactance (XL).

## Some Final Comments

If you are new to 160 meters, it is important to

know that the frequencies between 1825 and 1830 kHz are reserved by gentlemen's agreement for use as a DX window. Foreign stations operate in that segment. You should answer them, or call CQ DX (if you must), above or below the window.

Most of the antennas treated here can be used for working DX if band conditions are good, and if you apply strategic operating techniques. It's unlikely that you will break pile-

ups with these antennas, but don't be shocked if you do!

## Footnotes

1. D. Sanders, CQ December 1981, p. 44. Also see Merschrod, KA2OIG, *The ARRL Antenna Compendium*, 2nd ed., p. 90.

2. A. Roehm, W2OBJ, *The ARRL Antenna Compendium*, 2nd ed., p. 90.

73, Doug, W1FB

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# ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

## Book Revue

**D**espite our two-part book review several months ago, once again I've got a tall stack of reading matter to share with you. With that in mind, we'll depart somewhat from our usual "antennas, accessories, and software" format to first cover some of these interesting amateur radio, shortwave, electronics, and computer related publications. Let's begin before that top-heavy stack literally does us in.

### Book Nook

**The Handy HamBook de K2EWA.** Jerry Wagman, K2EWA, has come up with what he bills as "a technical data handbook for the radio amateur." *The Handy HamBook*, issued in a compact looseleaf format (5 1/2" x 8 1/2") that lets it lie flat. Jerry put the book together when he got tired of looking through his folders of bits and pieces of data, scraps of paper, and scribbled notes containing information that he wanted right away.

Jerry's book is thus a compilation of data of the type that you may well need right away, but aren't sure if you have it at hand or even where to find it without considerable searching. Most of what's in the book can be found elsewhere—in engineering handbooks, textbooks, *The ARRL Handbook for Radio Amateurs* and *The ARRL Antenna Book*, and even *CQ Communications' own annual CQ Amateur Radio Almanac*—but here it's all in one place. The book contains more than 200 pages of information and has formulas, antenna data, tables, graphs, maps, shop techniques, fill-in SWR charts, country calls, operating aids, and more.

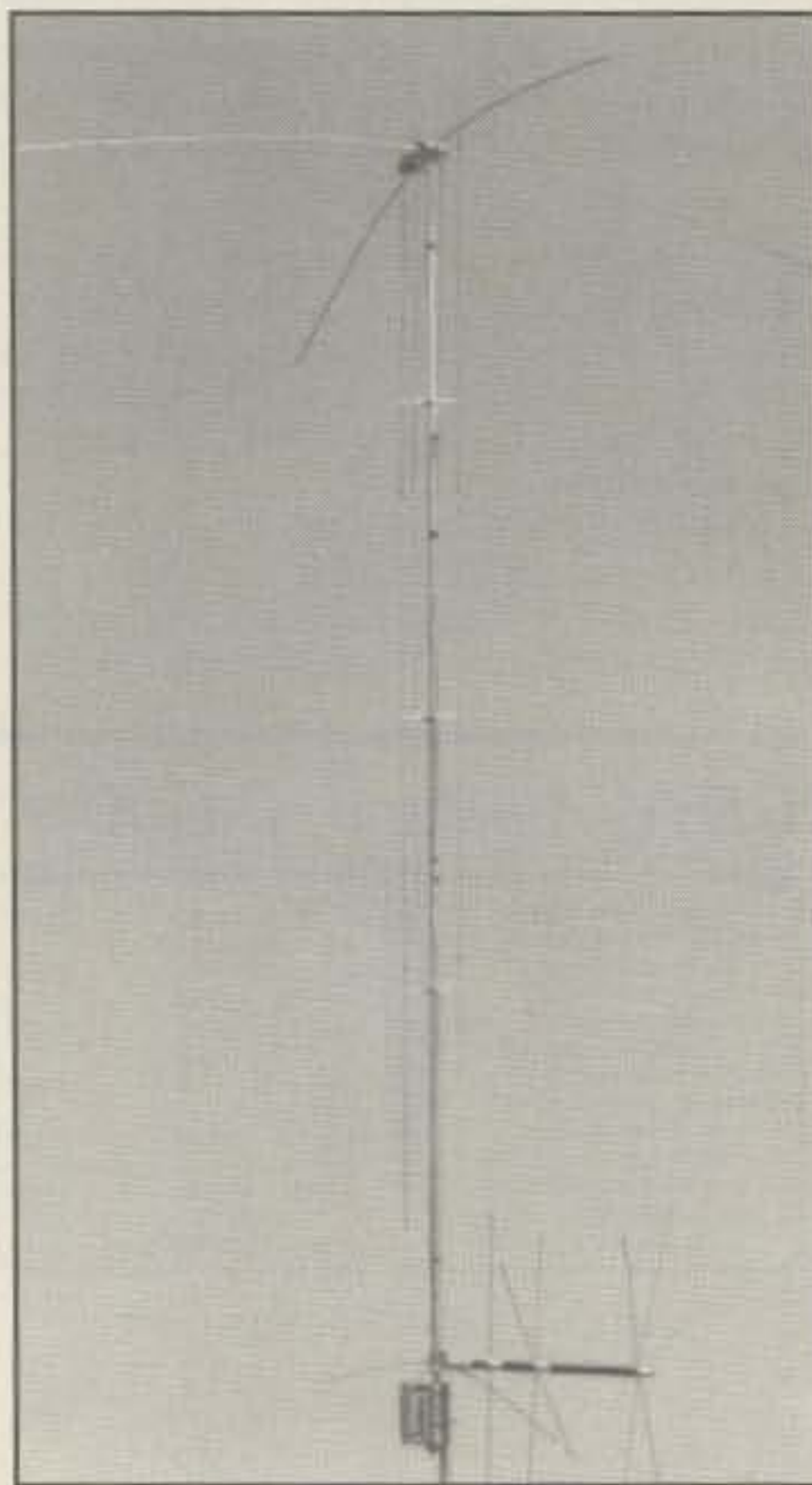
*The Handy HamBook* is sold in radio bookstores, or you can order it from Romanco Enterprises, P.O. Box 34, Milltown, NJ 08850-0034 for \$12 plus \$2.50 s/h. Club and group rates are available.

**INSTA-GRESS™ Books de WA1CFT.** Richard M. Norley, WA1CFT, offers his "third generation" series of multiband "INSTA-GRESS™" record books for hard-core DX hounds. Earlier editions have been in use for some 19 years.

The INSTA-GRESS system is a comprehensive, paper-based method of indexing stations worked and confirmed; it's also a concise method of recording contacts and QSLs for specific awards. The system is a companion to the conventional station logging system, whether manual or computer-based.

The basic system keeps you up to date while you operate and alerts you to grid squares, states, countries, and zones worked but which have QSLs missing. It lets you determine at a glance the progress and status on any of the nine HF bands (10, 12, 15, 17, 20, 30, 40, 80, and 160 meters) in multiple operating modes. Books are available for the 5BWAS, 5BWAZ, and 5BDXCC awards.

289 Poplar Drive, Millbrook, AL 36054



*The MFJ-1798 10-Band Antenna has no ground or radials yet claims full-size antenna performance. The antenna covers all bands from 75/80 through 2 meters in a single system. It features separate full-size radiators, end loading, elevated top feed, low radiation angle, and wide bandwidth. The \$269.95 antenna is self-supporting and 20 feet tall. It can be mounted to any ground level spot, tower top, condo, or rooftop. (Photo courtesy MFJ Enterprises, Inc.)*

A multiband VUCC (VHF/UHF Century Club) system covers 18 VHF/UHF/SHF bands from 50 MHz to 241 GHz, plus laser and satellite bands. The system provides a permanent, 18-band tracking system for all awards, in all 32,400 grid squares, and including up to 583,200 contacts and the same number of QSLs. There also is a companion 108-page single-band VUCC record book with space to record call signs worked for all grid squares.

Various other INSTA-GRESS record books are available, plus a guide to international and local holidays, singly and in combination, from \$12 to \$46. More information is available from Richard M. Norley, WA1CFT, P.O. Box 350, Salem, NH 03079-0350.

**Two from CQ.** Over the past few years *CQ Communications* has developed a strong presence in the radio hobbyist press, with dozens of books bearing its imprint. These

books are authored by amateurs prominent in the hobby, many of whom are *CQ* magazine columnists.

My colleague George Jacobs, W3ASK, has the distinction of authoring the longest-running column in *CQ*. Legend has it that he hasn't missed a deadline since he took over the column in 1951 from Oliver P. ("Perry") Ferrell (not an amateur, but a topnotch shortwave hobbyist who founded *Gilfer Shortwave*). George has published at least two authoritative books in co-authorship with Ted Cohen, N4XX, with his latest adding Robert Rose, K6GKU, to the authorship; the latest is *The NEW Shortwave Propagation Handbook*, a complete rewrite and major expansion of *The Shortwave Propagation Handbook*, Second Edition.

The new *Handbook* covers propagation from A to Z, including do-it-yourself propagation predictions, HF propagation programs, and unusual HF and VHF ionospheric propagation. It can be used equally well by rank beginners or old hands. Even the book's dedication and preface contain some very interesting and useful historical perspectives on the art and science of propagation prediction. The book is \$19.95.

Another relatively new book bearing the *CQ Communications* imprint is *Building and Using Baluns and Ununs* by Dr. Jerry Sevick, W2FMI. In several columns, most recently in last month's column where we profiled Amidon Associates and their line of W2FMI-designed baluns and ununs, we discussed these now-popular transmission line transformers.

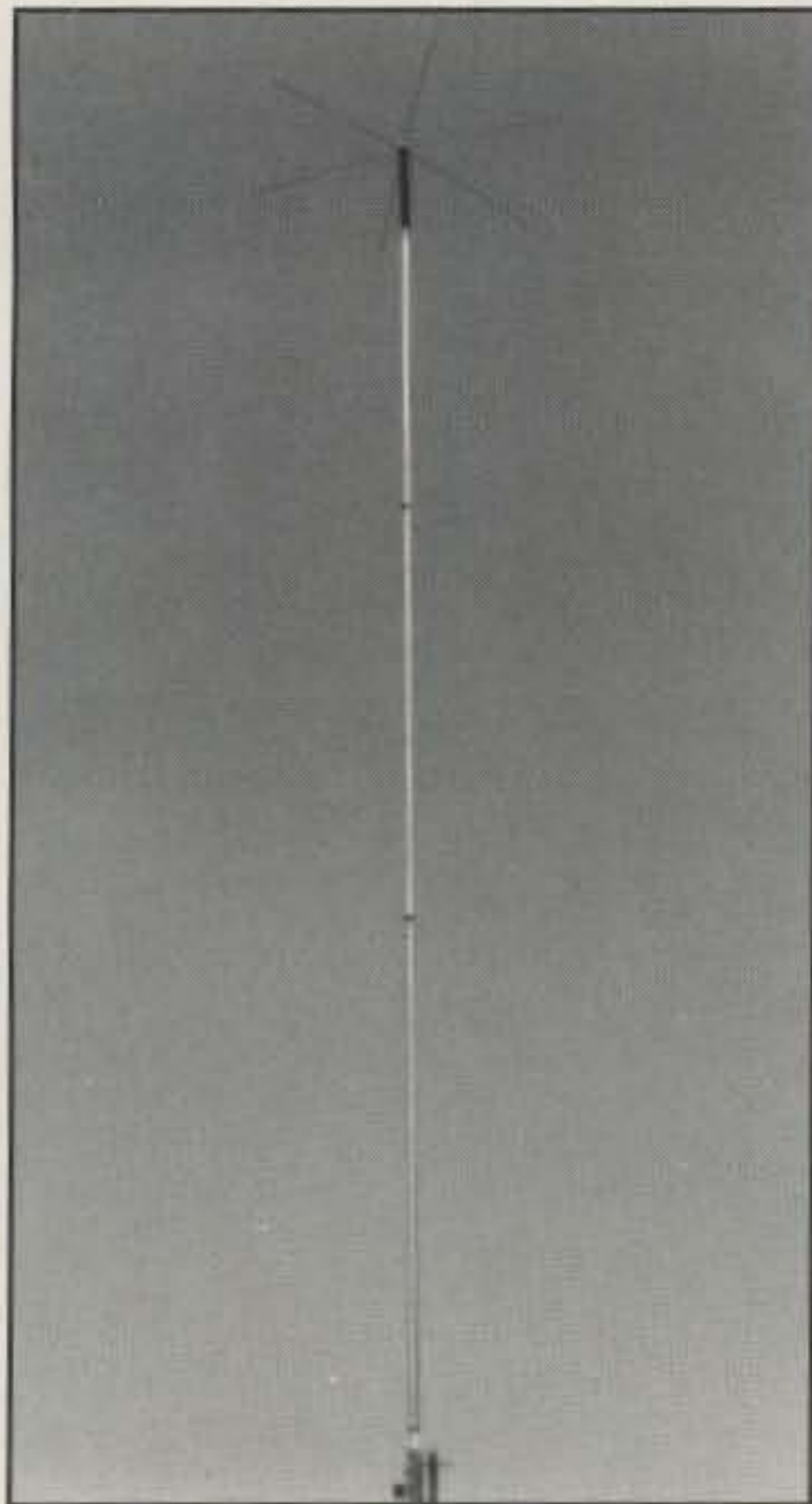
In his latest book Jerry unravels the technological mysteries, myths, and confusion surrounding these powerful devices with his simple explanations and workable balun and unun designs. Special topics include dual-ratio ununs, multimatch ununs, and ununs for Beverage antennas. The book is \$19.95.

Both books are available from *CQ Communications, Inc.*, 76 N. Broadway, Hicksville, NY 11801 (orders 1-800-853-9797).

**Shortwave Receivers, Past and Present.** Several years ago we covered the original 1987 printing of this interesting receiver "blue book" by Fred Osterman, but we've missed the fact that it's been updated several times since then. Though not brand-new, the most recent (1993) printing warrants a few words here.

Now in its eighth printing, the book is a 106-page directory of the vital statistics of more than 200 communications receivers, tube-type and solid state, that have been marketed over the past 20 years or so. The book provides specifications and photos of most of the receivers; also included is a handy chart showing the new and approximate used cost of each set.

A solid reference for amateurs and SWLs alike, it includes photos of the majority of the receivers it lists, and it contains general specifications and circuit information, physical dimensions, frequency coverage and display, available accessories, and the like. The book



If your taste runs to 80 and 40 meters in a quarter-wave vertical, consider the 33 foot, end-loaded MFJ-1792 80/40-Meter Vertical Antenna. This antenna is a full quarter-wavelength on 40 meters, and it uses end loading for 80 meters. The \$159.95 antenna also features a built-in L-network for matching, and it handles 1500 watts PEP SSB. A similar triband (80/40/20 meter) version is \$179.95. (Photo courtesy MFJ Enterprises, Inc.)

is \$8.95 plus \$2 shipping from Universal Radio, Inc., 6830 Americana Pkwy., Reynoldsburg, OH 43068-4113 (1-800-431-3939).

**Buying a Used Shortwave Receiver, Expanded Third Edition.** In July 1992 we noted a companion booklet from Fred Osterman—his *Buying a Used Shortwave Receiver*, which now is available in an expanded third edition. The booklet is for the SWL who's looking for a used *solid-state* (as opposed to vacuum tube) set. The author discusses the relative merits of purchasing radios privately, at hamfests, and at radio stores. He also offers a six-point receiver performance checklist for quick and accurate on-the-spot radio evaluation at a flea market or hamfest. Of special interest is the table of prices and an overall rating score for 70 popular used receivers. It's \$3.95 plus \$2 shipping from Universal Radio, Inc. (address above).

**RSM Communications Update.** In the July 1994 column we highlighted *Communications Receivers, Third Edition*, by Raymond S. Moore, ex-K1DBR. As we noted, the \$19.95 book presents a wealth of data on American-made, general-coverage communications receivers from 1932 to 1981. We also pointed out that a companion book on vacuum tube transmitters was in the works.

A recent letter from Ms. Marty Moore of RSM Communications updates their publication plans. The new book will be entitled *Amateur*

*Transmitters and Amplifiers*, and it will cover all vacuum-tube amateur transmitters and power amplifiers made in the U.S. from 1930–1975. Specs and photos of each piece of equipment will be included in a format similar to that of the present receiver book. The book should be available by the time you read this, and we're promised a copy to review in the column. For more information and pricing, contact RSM Communications, P.O. Box 1046, Key Largo, FL 33037-1046 (305-853-0379).

**WRTH Equipment Buyer's Guide.** Offered by the publishers of the authoritative annual shortwave reference book, the *World Radio TV Handbook (WRTH)*, the *WRTH Equipment Buyer's Guide*, by W. Bos and J. Marks, is of special interest to SWLs. It presents objective test results on most modern receivers and a price vs. performance evaluation. Its coverage includes portables and communications receivers, plus antennas and other equipment. Included is a used-radio equipment checklist.

The *Guide* is published by Billboard Publications, Inc., 1515 Broadway, New York, NY 10036 (212-764-7300) at \$24.95. Dealers include Radio Bookstore (P.O. Box 209, Rindge, NH 03461-0209 [1-800-457-7373]) and Universal Radio, Inc. (address above).

**Windows 95 Made Easy.** For better or worse, we personally have made the decision to stick with good old Windows 3.1 on our own PCs for a while, at least until the first Windows 95 operating system update makes it out of Microsoft's Redmond, Washington headquarters. We may even wait until it's time to buy that new Pentium or higher PC with Windows 95 already preinstalled, in view of the so-called

"legacy hardware" that graces our PCs.

That decision hasn't kept the Windows 95 "how to" books from crossing my desk, however. One of the better ones, at least for beginning to intermediate computerists, is Tom Sheldon's *Windows 95 Made Easy*. It's a 718-page, \$27.95 Osborne McGraw-Hill book.

It constitutes a good, basic roadmap to Windows 95, and then some. It starts by giving you an overview of the new user interface, then goes on to teach you about essential Windows 95 features. The book is well-illustrated and contains numerous hands-on examples and shortcuts. There also is a form in the back of the book you can fill out and send in to receive a free copy of a "Windows Update Notes" newsletter published by the author.

The book is available in most bookstores, or contact Osborne McGraw-Hill, Inc., Customer Service Dept., P.O. Box 547, Blacklick, OH 43004 (1-800-822-8158). A catalog is also available.

**Several from Macmillan.** Several excellent (and rather thick) Macmillan books on the Internet have crossed my desk recently. Most of them bear the specialized new Sams.net Publishing imprint.

The first is *Navigating the Internet, Third Edition*, by Richard J. Smith, Mark Gibbs, and Paul McFedries. Appropriate even for beginning Internet users, the new edition adds discussions of topics and technologies such as setting up shop on the Internet and the World Wide Web, and navigating the Net from a commercial online service. The book also shows how to get on the Internet and use its tools and resources. It's \$22.50.

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The other two books are monster-size; both are encyclopedic references best-suited to accomplished to expert Internet computerists. The first is *The Internet Unleashed, Second Edition*, by the Sams Development Group. The 68-chapter book gives the collective experience of over 40 top Internet experts, and offers advice for using current Internet tools. New chapters include ones on the Web, setting up Internet servers, integrating the Net into a business, and more. It also explores the controversies surrounding the Net. The 1384-page book is \$35.

The second is *The World Wide Web Unleashed, Second Edition*, a 1346-page, 52-chapter book by Web experts John December, Neil Randall, and others. It aims to offer you everything you need to master the Web. The book shows you how to navigate the Web, find Web resources, create Web pages, and set up servers. It also explains how to download, install, and get the most out of popular browser software. The book is \$39.99.

For a catalog contact Macmillan Computer Publishing USA, 201 West 103rd St., Indianapolis, IN 46390 (1-800-858-7674) for a catalog, or check out the Macmillan Information SuperLibrary™ Web site at the Web address <http://www.mcp.com>. You can download valuable Internet software tools from this site, or you can use the company's Gopher site ([gopher.mcp.com](http://gopher.mcp.com)) or FTP site ([ftp.mcp.com](http://ftp.mcp.com)).

**Inside the Internet.** The Cobb Group, well-regarded for its various informative computer and software-specific journals and newsletters, offers another periodical with Internet timesaving tips and techniques. It's the *Inside the Internet* journal, a newsletter designed to simplify your use of the Net.

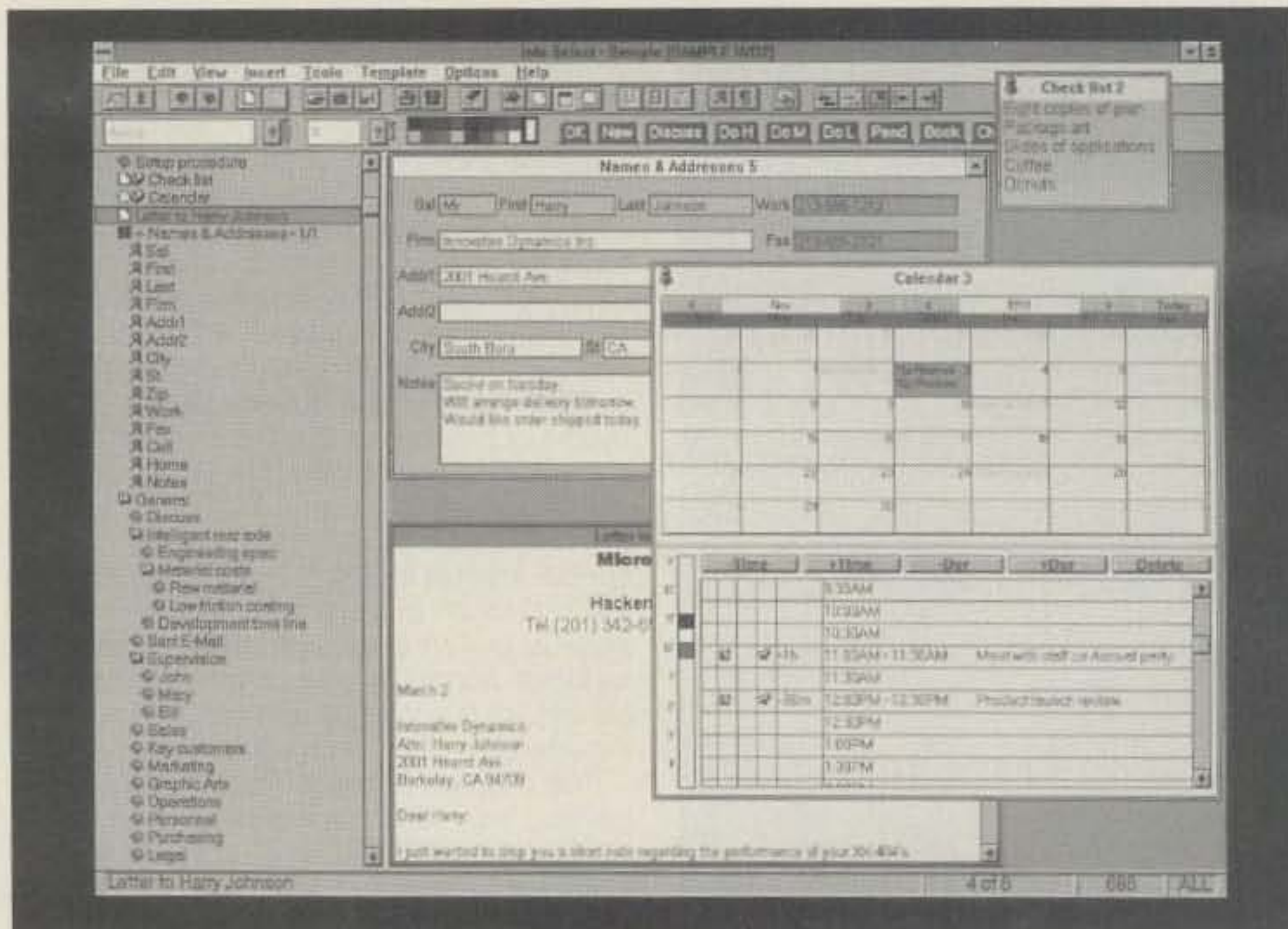
*Inside the Internet* helps you connect to the Net, choose the Internet provider that best suits your needs, collect shareware files, pick the most efficient software for exploring the Net, scan the Internet with tools such as Gopher and Mosaic, find the companies and services you want, send files back and forth to friends and coworkers using the Net, and more. Each issue is full of vital examples, illustrations, and help features.

Subscriptions (12 monthly issues) are \$39; the single copy price is \$5. For more info, contact The Cobb Group, P.O. Box 35160, Louisville, KY 40232-9719 (1-800-223-8720).

## Antenna Notes

**Two New Antennas from MFJ.** Newest in the series of MFJ HF multiband vertical antennas is the MFJ-1798 10-Band Antenna, which has no ground or radials and which claims to offer essentially "full-size performance" (see photo). The antenna covers all bands from 75/80 through 2 meters in a single system. The MFJ-1798 offers separate full-size radiators, efficient end loading, elevated top feed, low radiation angle, and wide bandwidth. End loading is used on the lower HF bands, 30, 40, and 75/80 meters. On 20 through 10 meters and on 2 meters the antenna uses quarter-wave radiators, and on 6 meters the 17 meter radiator becomes a 3/4-wave radiator. In this MFJ design the active radiator acts as a stub to decouple everything behind it.

A low SWR and 1500 watts PEP SSB power-handling capability on HF are claimed. Frequency adjustments are essentially independent, so adjusting one band has minimum effect on the resonant frequency of other bands. The



*INFO SELECT Version 3 for Windows adds some needed data management structure to the free-form character of INFO SELECT. In it, you can organize text, documents, ideas, and schedules in a variety of ways. In effect, you can design your own PIM that's adapted to your own needs. It now includes five building blocks or data-types: free-form notes, tree-structured outlines, field-based forms, lists, and calendars. See the text of this month's column. (Photo courtesy Micro Logic Corp.)*

\$269.95 antenna is self-supporting and only 20 feet tall, so it can be mounted to any ground level spot, tower top, condo, or rooftop.

If your taste runs to 80 and 40 meters in a quarter-wave vertical, consider the 33 foot, end-loaded MFJ-1792 80/40 Meter Vertical Antenna (see photo). The antenna is a full quarter-wave on 40 meters, and efficient end loading is used for 80 meters.

End loading is accomplished through a low-loss 4 1/2 ft. capacitance hat and a high-Q coil, wound with Teflon®-covered wire on a low-loss fiberglass form. The antenna features a built-in "Frequency Adaptive L-Network"™ and has a heavy-duty swing mount. The antenna handles 1500 watts PEP SSB and requires guying and radials, counterpoises, or a ground screen; it's \$159.95. A similar triband (80/40/20) version, the MFJ-1793, which includes a full-size, 20 meter quarter-wave radiator, is \$179.95.

For more information, contact MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762 (1-800-647-1800).

**New from Centaur Products.** In November 1994 we highlighted the Centaur Electronics baluns and antenna kits. Recently, we realized that Centaur had expanded its line of antennas and antenna accessories to include several additional toroidal core and coaxial choke baluns, antenna center supports, high-quality wire, and custom high-power antenna switching systems.

Baluns offered by Centaur include 1:1 dipole and Yagi, 4:1 Yagi, and 4:1 ladderline-to-coax toroidal baluns. Also offered is a new "Big Bertha"-style, "Aegis Class" 10 KW coaxial choke available in 1:1 and 4:1 versions. Custom-designed baluns also are available, as are coax, connectors, and other accessories.

Something new is the "Cricket" pulser. It's a user-controlled, plug-in, variable-duty-cycle

station-tuning instrument. To use it, press the pulse button and adjust the duty-cycle control for the desired pulse width. When adjusting for a particular duty cycle, tune your station using any relative or peak-reading wattmeter.

The pulser can reduce considerably the need for tuning your exciter amplifier in the key-down mode and creating excessive heat and loading of the rig's power supply. The unit is compatible with positive and negative keying circuitry and has an adjustable duty cycle of about 0.5 percent to 95 percent.

For more information, contact Centaur Electronics, 3720 S. Park Avenue #604, Tucson, AZ 85713 (520-622-6672).

**New from Cable X-Perts.** In previous columns, most recently last July's, we noted a variety of cable and cable-related products offered by Marc Abramson, KC9VW, of Cable X-Perts. Besides coax, Marc also offers ladderline, rotor cable, antenna wire, rotor cable, grounding braid, Dacron® rope, low-loss microwave cable, coax connectors, dipole center and end insulators, W2AU- and W2DU-style baluns, and other accessories.

One novel item in the catalog is a Beverage and longwire matching unit. The \$39 network is designed to match most Beverage and longwire antennas to 50 or 75 ohm coax; there are output impedance taps at 300, 450, 600, and 800 ohms. The matcher, for indoor or outdoor use, has a built-in lightning protector.

Two new products are of special interest. One is the LMR-400 UltraFlex cable. This cable is for situations requiring low loss, double shielding, repeated bending, and installation in tight spaces. It maintains excellent flexibility in any temperature environment, and it has a very tight bend radius. The shielding is 100 percent aluminum bonded foil plus a tinned copper braid, providing RF shielding better

than 90 dB. The nominal cable attenuation is 3.1 dB at 450 MHz.

The second new product is 440 ohm stranded ladderline. This highly flexible parallel conductor line, which is constructed of compressed, stranded, 30-gauge Copperweld™ conductors, is a good alternative to the original solid-conductor ladderline in that it withstands high winds, thereby reducing or eliminating the stress-point breakage common with line using solid conductors.

For more details and information on other wire and cable products, contact Cable X-Perts, Inc., 113 McHenry Rd., Suite 240, Buffalo Grove, IL 60089-1797 (1-800-828-3340). A thick information package and price list is yours for a No. 10 SASE.

## Software Notes

**PROLOG Logging Program.** In August 1994 we detailed the DOS-based PROLOG QSL Route Management System, offered by Data-matrix proprietor Edward Longhi, KI5OG. As we noted, the program is supported by a database containing over 35,000 call records listing either the direct route or the manager's address. There's also a comprehensive display of prefix information relating to the displayed call.

Ed recently introduced "PROLOG the Logging Program." By combining PROLOG's logger, a packet interface, QSL route management, and external callsign databases—SAM and Buckmaster HamCall™ are supported—the new program becomes a complete, stand-alone platform that accommodates up to 36

separate logbooks, each with its own callsign assignment and awards tracking.

The program's features include a comprehensive logging form, to which you can input as much or as little information as you like; an "auto" mode is provided. The prefix information window provides a complete "prefix profile" including country, bearing, continent, CQ Zone, ITU Zone, Grid Square, and third-party and QSL bureau availability information. There also is an immediate indication of previously worked callsigns—contact "go, no go" status is displayed instantly, telling you at a glance if the callsign represents a new prefix, band, and/or mode. A powerful wild-card call-entry search is offered.

Award tracking for most awards, as well as non-specific award assignment for tracking awards of your choice, is provided. Other features include award overview screen, list and status file generators, and QSL label printing.

PROLOG the Logging Program is \$69.95 and includes the QSL route database; special pricing is offered to existing PROLOG customers. For more information, contact Data-matrix, 5560 Jackson Loop N.E., Rio Rancho, NM 87124-1504 (505-892-5669).

**QRZ! and Other New Goodies from Walnut Creek CDROM.** We mentioned in the October 1992 column that there was yet another CD-ROM amateur radio callsign database on the market. This one was called QRZ!™ and was offered by Walnut Creek CDROM, which today is issuing impressive, multi-megabyte CD-ROM collections faster than I can keep track of and report on them.

Since we last covered it, the QRZ! program

## The NEW Shortwave Propagation Handbook

By George Jacobs, W3ASK  
Theodore J. Cohen, N4XX  
Robert B. Rose, K6GKU

The NEW Shortwave Propagation Handbook by W3ASK, N4XX, and K6GKU is the authoritative volume on propagation, and should be the only book you will need on the subject for the next ten years.

has really come into its own, having been updated at least five times. It now is referred to as the QRZ! Ham Radio CDROM Callsign Database, and has grown to a disc with more than 650 MB of information onboard. It's also been selected as the official online callsign database for the



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- Full CTCSS Encode/Decode



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# AEA

## Computer Software

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### AEA Control Software

**If you have Windows, get...**

#### AEA PC PakRatt for Windows 2.0™

Controls the entire family of AEA data controllers in the easy-to-use Microsoft Windows™ environment. Works with Windows '95, Windows 3.1, and Windows N/T. All popular modes are supported. Run two data controllers at once. Everything your AEA data controller can do, PC PakRatt for Windows makes easier. New features allow you to send and receive ANSI graphics in PACTOR and interface with Log Windows 2.0 or above for state-of-the-art logging and tracking. Individual windows for mailbox and QSO logging. Separate parameter settings for different modes and data controllers. Powerful and easy to use software.

**If you have DOS, get...**

#### AEA PC PakRatt II™

This is a DOS program terminal control program for all popular modes. Split screen makes working the modes easy. Works with IBM-compatibles and all AEA data controllers. On-screen help, full QSO logging, DOS gateway.

**If you have a Mac, get...**

#### AEA MacRatt 3.0™

This is AEA's newest control program for the newest Macintosh computers. Works with all AEA data controllers. Separate windows for each TNC's parameters, MailDrop, QSO logging, help, and many others. Lets you run two AEA TNCs at once, operating all the modes the TNC is capable of.

# More than great TNCs

### AEA WeFax Software

**If you have DOS, get...**

#### AEA FAX III™

AEA FAX III is a hardware and IBM-compatible software package that allows you to decode HF WeFax, RTTY, NAVTEX, and CW signals with your general coverage SSB or HF receiver. You don't need a data controller. WeFax images are received in gray-scale and can be enhanced with 256 false-color. These colorized images can be exported to GIF or PCX graphic files for use in other applications. In addition to the images, you'll be able to receive and decode Morse code, RTTY, and NAVTEX transmissions. A fax station database lets you store often used stations. AEA FAX III allows your computer to switch frequencies on your computer controlled receiver for unattended WeFax reception. AEA FAX III is easy to use right out of the box. Simply plug in the demodulator, install the software, and you are ready to receive highly detailed images.

**DOS Money Saver!**

#### AEA FAX III 900™

This is the software-only version of the AEA FAX III WeFax receiving system. If you have a new DSP-232 or PK-900 the hardware is built into your TNC and all you need is AEA FAX III 900 software for your computer. This software is less expensive than the regular AEA FAX III and has all the features mentioned above. AEA's DSP-232 and PK-900 were designed to give you added value with such items as AEA FAX III 900.

**If you have Windows, get...**

#### AEA WeFax 256™

This is the WeFax receiving program for those who have an AEA DSP-1232/2232 or the new DSP-232 and run Microsoft Windows™. WeFax pictures can be received from the NOAA HF WeFax Service or the NOAA APT Satellite Service. Received images can be colorized with the 256-color palette. Export images to BMP, GIF, PCX, TIF, or JPG image formats. Allows for unattended reception of WeFax transmissions.

### AEA Logging Software

**If you want Logging, get...**

#### AEA Log Windows 3.0™

Logging, rig control, and DX cluster monitoring with award tracking and reporting, it's all here and much more! Works with Windows '95, Windows 3.1, and Windows N/T. Interfaces with PC PakRatt for Windows 2.0. It has its own Packet Cluster interface. Includes a database browser, transceiver control, antenna rotor control, QSL manager, and voice announcements of DX spots. Gives bearing & distance. Interfaces with SAM, Buckmaster, and QRZ. Switching to Log Windows is easy, you can use the LW Import program included. Award types: UC-CA, US country, DXCC mixed, phone, CW, FSK, bands, CQ mixed, SSB, FSK bands, WAS mixed, SSB, CW, FSK, and bands.

### AEA ACARS Software

**AEA ACARS™**

ACARS stands for Aircraft Communications Addressing and Reporting System, and AEA ACARS is a hardware and IBM-compatible software package that lets you receive the digital communications used by airliners. With your PC, AEA ACARS, and your VHF AM (131.55 MHz) receiver, you will see aircraft status reports and other messages transmitted by aircraft in your area. There are two ways you can get AEA ACARS: 1) you can get the full AEA ACARS package, which includes a demodulator that plugs into your PC and software that you load onto your PC. 2) If you already own AEA FAX III, you can get the software-only version of AEA ACARS, called AEA ACARS 900. The same demodulator is used by both AEA FAX III and AEA ACARS. All you need to do is buy one of the programs and then the software for the other—this saves you money.

**AEA ACARS 900™**

This is a software-only version of ACARS for use with AEA's new DSP-232 and PK-900 and for those who already own AEA FAX III. The hardware is already built into the data controllers, so all you need is this special software.

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# The Mode Warrior



The AEA DSP-232 Multi-Mode Data Controller



## The AEA DSP-232

The DSP-232 multi-mode data controller—is *the* mode warrior. AEA engineered the first DSP data controllers nearly four years ago. AEA's PK-232MBX is the most popular data controller ever. Now, AEA has combined the power of Digital Signal Processing technology with affordability. We are proud to introduce the AEA DSP-232, our newest multi-mode data controller. It offers state-of-the-art DSP signal filtering, advanced modem performance, cutting-edge features, and an eye toward the future.

## The Modes

Operate all the popular modes on two computer controlled radio ports. 9600 and 1200 bps VHF packet come standard. HF packet, PACTOR, AMTOR/SITOR, RTTY, CW, TDM, and NAVTEX—all standard. Plus, when new modes come out, like PACTOR II, this unit will handle them. Whatever your license class, the DSP-232 is your ultimate digital platform today and for years to come.

## The Processor

At the heart of the DSP-232 is a high-speed Digital Signal Processor providing superior filtering. AEA data controllers are known for excellent filtering and shape-factor—the DSP-232 goes a step beyond. Noise is not a problem with the steep-skirts created by the analog to digital filters. Coupled with the memory ARQ, hardware HDLC, and DCD state machine, the DSP-232 is truly a warrior for all modes—battling through noise so you connect.

## The MailDrop

Full PakMail™ MailDrop facilities for packet, PACTOR, and AMTOR are included. The DSP-232 comes standard with 18K (32K RAM) of dynamically allocated mailbox space and is expandable to a whopping 242K (256K RAM)! You even control what call signs have access to your mailbox.

## The Future

Where other TNC manufacturers are spending money marketing their outdated hardware, AEA is developing innovative, new equipment. Look at the features. Look at the price. Look at all the AEA computer software available. You will see that the DSP-232 was designed to be a powerhouse for all skill and budget levels. As with other AEA data controllers, we've designed the new DSP-232 to handle whatever the future brings, making this your digital platform for the next decade.

This is the right machine for advanced digital users. A smart choice for beginners because it's loaded with features now and will grow as you do in the years to come. The tradition of the PK-232 continues with the new DSP-232.

## Includes

The AEA DSP-232 comes with a detailed manual, two RX audio cables, one 2.1mm power cable, one 8-pin and one 5-pin DIN radio cable, one PC-comp. DB-9 male-to-female RS-232 serial cable, one wire loop-back jumper, one 5-pin DIN plug for FSK/AUX connections, and a limited one year warranty.

## FEATURES

- Fast Digital Signal Processor (DSP)
- Upgradable for new operating modes
- 9600 & 1200 bps VHF/UHF packet
- PSK satellite modems built in
- 300 bps HF packet, PACTOR, AMTOR/SITOR (ARQ & FEC), RTTY (Baudot & ASCII), CW, TDM, NAVTEX
- Two switchable radio ports with rear-panel AFSK pots for both ports and another pot for 9600 bps packet
- 18K (32K RAM) PakMail™ Mailbox expandable to 242K (256K RAM)
- GPS firmware compatible with GPS, Loran, ARNAV, and ULTIMETER-II™ Allows for remote control, polling, auto GPS initialization, plus more!
- Automatic threshold command
- SIAM™ automatically identifies HF signals & switches to them
- PACTOR memory ARQ
- Gateway firmware which works as a packet node and identifies TCP/IP, TheNet, and NETROM stations.
- DCD state machine for 9600 & 1200 bps packet
- PACTOR, AMTOR, & Packet MailDrop
- LED readout displays system status
- Up to 19,200 bps terminal baud rate
- Full-duplex Packet capability
- Optional AEA WeFAX receiving software available for DOS & Windows™
- Optional AEA ACARS™ software
- Compatible with most all popular control programs including AEA's own PakRatt for Windows 2.0, PC PakRatt II for DOS, & MacRatt 3.0

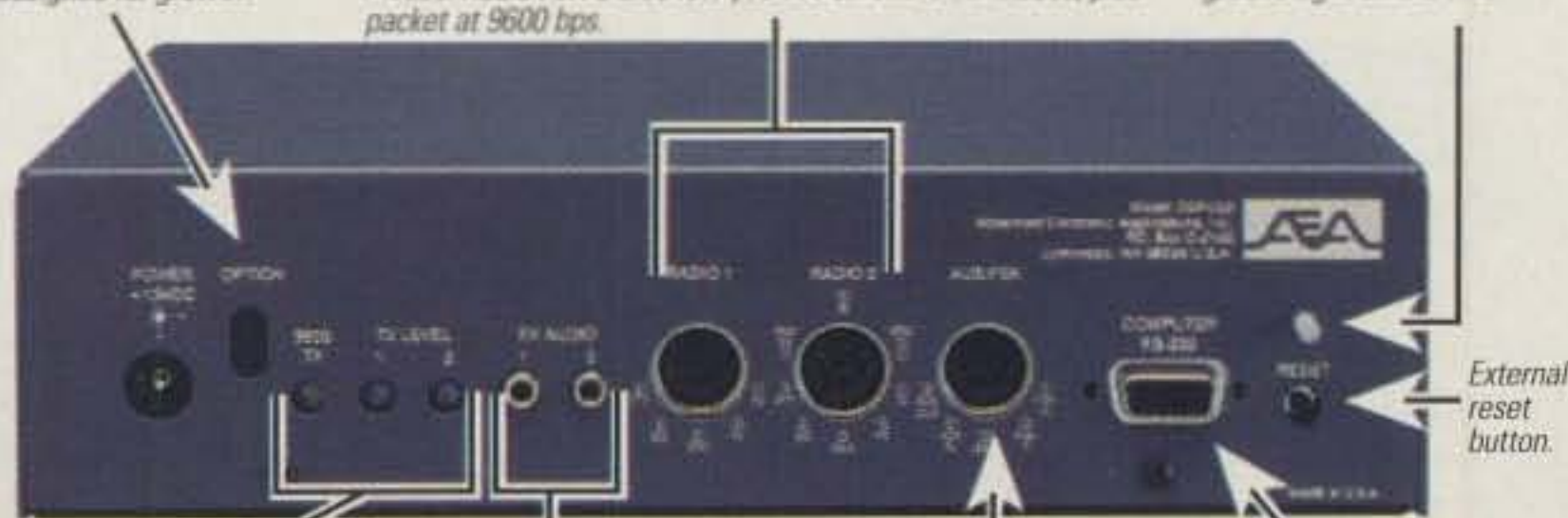
## You don't just buy the front of a data controller. . .

Why not just use a PCB data controller? Why not go for the smallest data controller? Take a look at the back of AEA's DSP-232 and you will see why. We have built our controllers to make life simpler for you. There are more input connections, more output connections, more external adjustments, and room for future growth and upgradability. PCB data controllers are difficult to work with. Small controllers don't provide proper connections and expandability. AEA engineered the DSP-232 to be compatible with the equipment you have now, to offer convenient adjusting, and to be upgradable for future applications.

This "Option" space is set aside for future applications; the DSP-232 is designed for growth!

The DSP-232 has two computer controlled radio ports that you can switch between. Radio Port 1 lets you use all the VHF & HF modes. Radio Port 2 also lets you use all VHF & HF modes, plus packet at 9600 bps.

This is a feature you've wanted for years, a station ground right on the TNC.



Individual transmit level adjustments for both radio ports, plus another adjustment specifically for 9600 bps packet operation.

The receive audio in connectors (1 for each radio port) let you receive audio without using the mic jack. Great for the SWLs.

FSK connection allows direct FSK control of most transceivers.

RS-232, DB-9 computer interface.



Call AEA's 24-Hour Literature Line for more information on the DSP-232 at (800) 432-8873 or use CompuServe to download files at 76702,1013

GEnie online information utility service.

The heart of the \$29.95 disc is the extensive callsign database; it contains about 1 million callsigns, not only from the United States, but also from the U.K., Canada, Italy, and Cuba, as compiled by Fred Lloyd, AA7BQ. With the included MS-DOS and attractive Windows search and retrieval programs, you can locate and display callsigns directly from the CD drive. No hard disk space is required; the search software is on the CD-ROM.

Some new features (thanks, in part, to a revised FCC source database) include the ability to display callsigns registered by U.S. amateur radio clubs as well as the club trustees. Also new is the callsign listing of registered alien (foreign) amateurs operating in the U.S.—a listing I didn't even know existed.

Fred notes in the disc README file that getting callsigns from many countries is slow going for a variety of reasons, not the least of which is that some countries consider their callsign databases proprietary, to be sold to the highest bidder. This in some cases (such as that of Germany) precludes calls from being placed on a CD-ROM by a firm that hasn't bought "exclusive publishing rights" to the country's callsigns.

Fred also indicates that on the horizon for future CD-ROM editions are digital QSL card GIF images (they're starting to collect them already); amateurs' e-mail addresses; other personalized licensee information; and full Macintosh support.

On this disc there also has been a major effort to improve the quantity, quality, and freshness of the shareware data files; there now are over 7000 such files. Also included

are ARRL information files and bulletins, radio and scanner modifications, and other types of useful and interesting radio data.

For a CD-ROM catalog depicting an amazing variety of interesting and reasonably priced discs, contact Walnut Creek CDROM, 4041 Pike Lane, Suite D, Concord, CA 94520 (1-800-786-9907). If you're on the Internet, check out their Web site at <http://www.cdrom.com/>; QRZ! Web server at <http://www.qrz.com/>; and an FTP server at <ftp.qrz.com>.

**INFO SELECT Version 3 for Windows.** In the April 1995 column we reviewed Micro Logic's INFO SELECT for Windows (\$149.95). As we pointed out, it's a very capable PIM, one that's easy to learn, since it uses a data structure analogous to the familiar "stacks of paper" in which we tend to accumulate information. Features include phone dialing, wordprocessing, and database functions; a computational capability; information overviews; and more.

We noted that to attract new users to its product line, the publisher also developed an introductory Windows-based version to sell at \$19.95. It did this largely by removing some of the more advanced features, packaging it in a box the size of a CD, and using an online rather than a printed manual. We discussed this product, INFO SELECT Express, last June.

Before we proceed, in case you're not familiar with PIMs, a PIM (or "personal information manager") is a database that lets you enter, retrieve, analyze, and crossreference data, both words and numbers. It handles "random information" that covers a person's home, office, or hamshack, and includes notes, names, addresses, parts lists, projects, and magazine articles. This information often doesn't fit into

well-defined formats as does data you can place in a conventional database. Thus, a PIM can help you deal with a hodgepodge of unstructured stuff.

Recently, the publisher issued Version 3, the most extensive upgrade of INFO SELECT to date; we had the opportunity to work with the pre-release version. The new upgrade adds some needed data management structure to the free-form INFO SELECT. With it, you can organize text, documents, ideas, and schedules in a variety of ways. In effect, you can design your own PIM that's well-adapted to your needs. The new version includes five building blocks or data-types: free-form notes, tree-structured outlines, field-based forms, lists, and calendars.

A new "Selector" lets you manage diverse topics or "Infobases," each capable of containing thousands of data items. A new "Folders" feature lets you assign any data item to one or more folders and view all the items in any folder instantly. A host of enhancements include spell checking, stationary "pin-up" windows, database file importing, searching across multiple Infobases, and a new calendar and scheduler facility.

The new program is \$149.95, but previous INFO SELECT users may upgrade at special prices. Contact Micro Logic Corp., P.O. Box 70, Hackensack, NJ 07602 (1-800-342-5930).

**Symantec Goodies for Windows 95.** We mentioned earlier in this column that we had decided not to upgrade immediately to Windows 95—to let the "version 1.0" dust settle first. Although we have not upgraded yet, we're well aware of the benefits and limitations of the operating system upgrade: the benefits are

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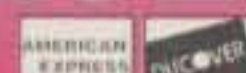


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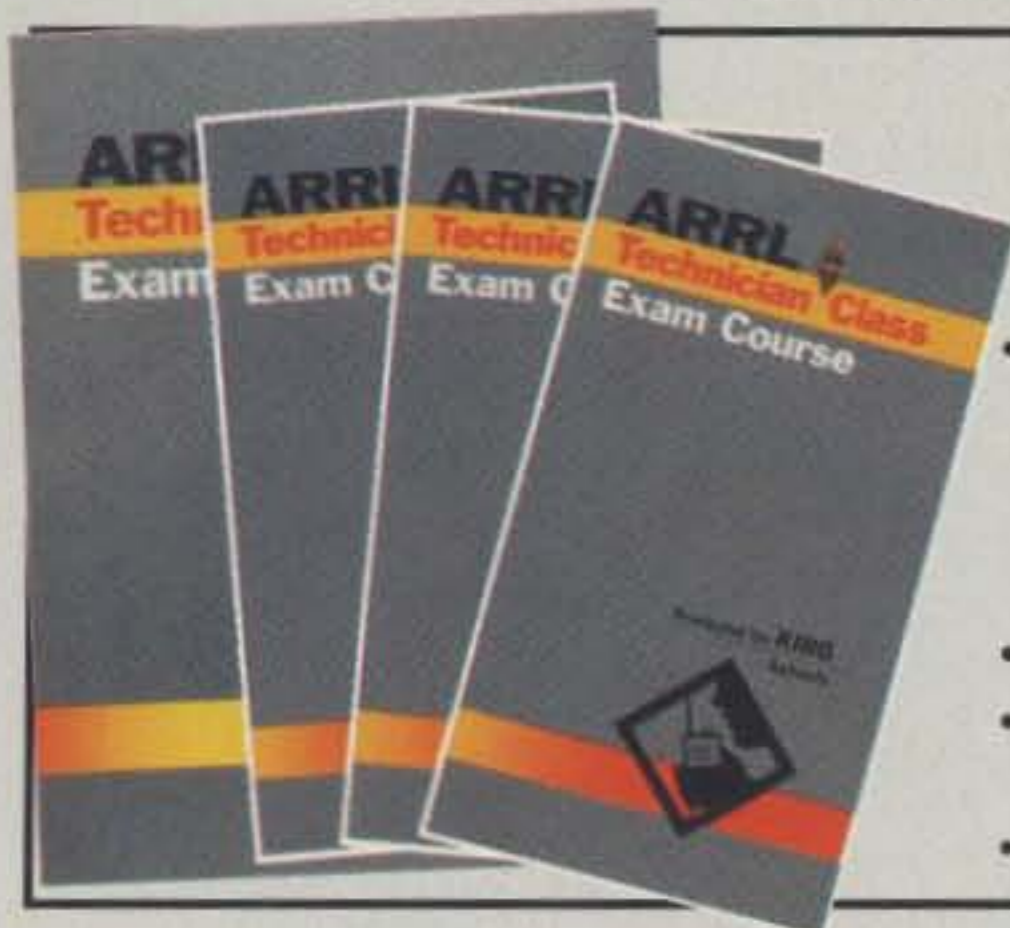
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# FT-51R FT-11/41R

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Only Yaesu lets you program with the ADMS-1B Windows™ software or keypad.

Unlock all the features of your FT-51R and FT-11/41R HTs, with a simple "point and click", easy programming of these dual band and 2-meter HTs, is yours. And, there's a Programmer Help window for each radio. Use ADMS-1B to download from HT to PC, then clone the information to another FT-51R or FT-11/41R HT instantly! Create memory Files for each city you visit then load

and go! Affordable for everyone, ADMS-1B Windows™ software is a neat little package that will change your HT use forever.

If you prefer conventional programming, it's always straightforward and practical with Yaesu. The FT-51R and FT-11/41R are no exceptions! Enjoy exploring each feature-packed HT from the keypad, as you make these radios uniquely "yours".



ADMS-1B Windows™ Software Kit  
3.5 Floppy Disc and Programming Cable with DB-25 Connector.



**Main Window** – Use Main Window to customize your HT. For example, the Auto Repeater Shift and Keypad Beep Tone can be selected "on" or "off". When scanning, the Display Lamp can be programmed to light up when a Busy Channel is found.



**Auto Dialer Edit Window** – Programming the Auto Dialer is easy. Type in names, phone numbers and in less than a minute, all DTMF Auto dial Slots are programmed.



**Memory Listing Window** – Left and Right Memory Channels can be displayed independently. View up to 22 memory channels in a single window. Frequency, CTCSS, Encode/Decode, Scan Skips, and Alpha Names are displayed for quick and easy changes.



**Memory Channel Edit Window** – Each Memory Channel has a detailed window. With a simple click of the mouse, program the following for each memory: Frequency, Alpha Name, Repeater Offset, CTCSS, Power Level, Channel Step Size, and more!

### E-DC-12 Mobile DC Adapter

New optional E-DC-12 Mobile DC Adapter, slides onto the bottom of the FT-51R and FT-11/41R to provide direct 5 Watt power output, and trickle charge the battery simultaneously. Go mobile with this quick-mount, easy to use, Yaesu "exclusive"!



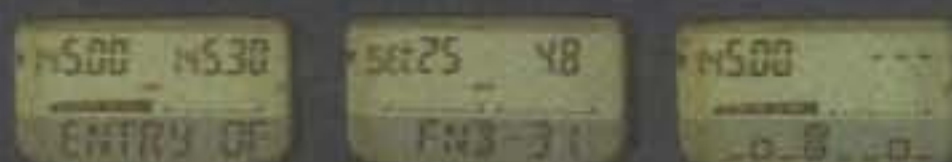
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### The First Dual Band HT with Windows!

The FT-51R is the most high-tech, state-of-the-art, example of HT technology made today. Easy to use, too. So easy, you won't need an operating manual. Exclusive, scrolling instruction menu in the large, backlit display, guides you through total operation. Other new features are exciting, too. Spectrum Scope™, for continuous real time frequency activity scanning in VFO, or in 8 user-choice memories. A digital battery voltage display, five power output levels, Smart Mute™, two VFOs on both bands and



Receive VHF/VHF, UHF/UHF or VHF/UHF, right or left side of main band, TX on main, or sub band. Alphanumeric menu guides operation in display bottom.

Readout displays battery use condition. Scan skip allows memory channel lockout in scan mode.

Spectrum Scope™ displays active adjacent frequencies in real time with signal strength.

the largest backlit dual band keypad. All of this in 2 and 5 Watt versions in the world's smallest dual band HT radio!

### World's smallest size HT with full sized keypad measures only: 4"Hx2-1/4"W x 1"D.



NEW! Alphanumeric Display Full function LCD combines letters and numbers!

NEW! Up/Down Thumb Control with Volume and Squelch Bar Graph. Back lit, too!

NEW! Compact Battery Design 4.8V gives you 1.5 Watts. A first for amateur radio!

Size is reduced, but not the quality or number of features. A full-sized keypad makes programming simpler. Alphanumeric capability to let you customize your radio. Convenient Up/Down thumb control for Volume and Squelch speeds operation. Famous back-lit keypad for easier night viewing. Compact battery design, also available in 5 watts, keeps radio slim and trim. Small in size, not in performance!

### Specifications

- Frequency Coverage:
  - 2 m: RX: 110-180 MHz TX: 144-148 MHz
  - 70 cm: RX: 420-470 MHz TX: 430-450 MHz
- 120 Memory Channels (80 w/Alphanumeric)
- Spectrum Scope™ LCD Display
- Scrolling User Help Menu
- 8 Character Alphanumeric Display
- Up/Down Volume/Squelch Controls & Display
- Automatic Repeater Shift (ARS)
- Digital Battery Voltage Display
- AM Aircraft Receive (110-136 MHz)
- Large Backlit Keypad & Display
- Automatic Repeater Shift (ARS)
- RX/TX Battery Savers Built-in
- Scanning Light System (SLS)
- Multiple Scanning Modes
- 3 Selectable Scan Stop Modes with Scan Skip
- Selectable Sub-Band TX Mute
- Automatic Power Off (APO)
- User Selectable Lock Functions w/ 15 combinations
- Built-in CTCSS Encode/Decode
- 5 Selectable Power Output Levels
- Message System with CW ID
- Selectable RX Smart Mute™
- Cross-Band & One-Way Repeat Functions
- DTMF Paging/Coded Squelch Built-in
- Accessories: Consult your local dealer.

### Specifications

- Frequency Coverage:
  - FT-11R:
    - 2 m: RX: 110-180 MHz TX: 144-148 MHz
  - FT-41R:
    - 70 cm: RX: 420-470 MHz TX: 430-450 MHz
- Selectable Alphanumeric Display
- Compact Battery Design 4.8V produces 1.5 Watts 9.6V produces full 5 Watts\*
- 150 Memory Channels (75 w/Alphanumeric)
- AM Aircraft Receive (110-136 MHz)
- Small Size: 4" H x 2-1/4" W x 1" D
- RX/TX Battery Savers Built-in
- MOS FET Power Module
- Backlit DTMF Keypad and Display
- Backlit Up/Down Volume/Squelch Controls
- DTMF Paging/Coded Squelch
- Automatic Power Off (APO)
- Accessories: Consult your local dealer.
- \*FT-41R, 3.5 Watts

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PROGRAMMABLE**

# Dual Band Mobile FT-8500

"Each of the mics function the same, and the radio is PC programmable with ADMS-2!"

"Look, the digital voltage display monitors my car battery voltage, too!"



"I like the Spectra-Analyzer. It keeps track of my favorite repeaters, and checks UHF and VHF channel activity."

"Yaesu did it again!"

## Features

- **Frequency Coverage:**
  - 2m RX: 110-174 MHz TX: 144-148 MHz
  - 70 cm RX: 410-500 MHz TX: 430-450 MHz
- Spectra-Analyzer™ w/adjustable signal width, spacing & span markers
- 6-Character Alphanumeric Display
- 110 Memories (in 5 memory banks)
- Omni-Glow™ Display
- Digital voltage display
- Selectable 1200/9600 baud
- 3-Level Auto-Mute w/Mute Timer
- V+V, U+U, V+U Dual Receive
- 3 Power Output Levels
  - 2 m 50/10/5 Watt
  - 70 cm 35/10/5 Watt
- Built-in Auto Power Off (APO) and Time-out Timer (TOT)
- MIL-STD 810
- 9 Memory DTMF Autodialer
- PC Programmable w/ADMS-2
- 3 Scanning Modes w/ Clear Scan
- Adjustable LCD Contrast/Brightness Control
- **Accessories:**  
Consult your local Yaesu dealer.

## The only alphanumeric dual band mobile now comes with a choice of two unique microphones.

**FS-10  
Smart Controller™  
Microphone**  
Use unique Joystick-type lever to command functions.



**NEW**

**MH-39  
DTMF Microphone**  
All functions conveniently at your fingertips including two user-programmable buttons.



Rear-panel data jack for packet with 6-pin connections for Data Input, PTT, 9600 bps and 1200 bps Receive Data, Squelch Status, Ground.

**ACTUAL SIZE**

5.6 x 1.6 x 6.4 in. (140 x 40 x 160 mm)



**Rotary Dial Selector Knob**  
Select memories and other settings according to the current mode functions.

For the first time ever, the only dual band mobile with alphanumeric capability is available with two microphones. Customize your mobile radio use by choosing the high-tech FS-10 Smart Controller™ Microphone with its unique Joystick-type lever, or the new MH-39 DTMF Microphone which includes convenient handheld programmability. The FT-8500 has a built-in function menu, so you can program the radio from the microphone, or use the exclusive, optional new ADMS-2 Windows™ Software Kit. An unbeatable combination—user-friendly Yaesu engineering, and state-of-the-art performance.

The FT-8500 offers more than a choice of microphones. Watch the exclusive Spectra-Analyzer™ exhibit station activity above and below your current operating channel. See the digital voltage readout monitor your car



**VHF&VHF, UHF&UHF, VHF&UHF** Select three dual band configurations. Shown with custom 6-character alphanumeric code.



**SPECTRA-ANALYZER™** Display station activity above and below current operating channel. Exhibit programmed channel signal strength in Memory Recall.



**DIGITAL VOLTAGE DISPLAY** Monitor automobile battery voltage. Choose 1200 or 9600 bps from Menu Selectable Packet Baud Rate.

battery voltage big and bold in the Omni-Glow™ display. View frequencies and custom alphanumeric messages at the same time in V+V, U+U or V+U. What's more, the FT-8500 features handy cloning, selectable 1200/9600 baud, and a rear-panel data jack for packet!

The company who defined dual band for amateur radio has now made it better. The FT-8500, with two microphones to choose from, and a host of terrific features for exciting operation, and extraordinary performance. We give you a choice, the FT-8500/FS-10 or the FT-8500/MH-39. Make it today!

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considerable, but there are several "soft spots" beyond the expected difficulty of installation using older PC hardware.

Perhaps the most significant of the "soft spots" is the lack of virus-detection support, the absence of a complete set of powerful disk utilities, and weaknesses in what might be called "desktop navigation and file management." Unfortunately, since the file structure is changed from Windows 3.1, existing utility software, especially antivirus and file management products, won't work in the Windows 95 environment.

Symantec Corporation has issued a comprehensive set of three utility products for Windows 95 to address this situation and assist you in moving to the new operating system. The three products are Norton AntiVirus (\$79),

a comprehensive 32-bit antivirus protection utility; the Norton Utilities (\$119), a 32-bit package of utilities that offers continuous system protection and data recovery; and Norton Navigator (\$99) for enhanced file management and desktop navigation.

Norton AntiVirus for Windows 95 supports the Windows 95 interface and offers unobtrusive protection with an easy-to-use interface and program configurability. It stops all viruses before they cause damage or data loss with a multi-layered line of defense that combines scanning, virus sensing, and inoculation.

Norton Utilities for Windows 95 is the successor to Norton's well-regarded utilities for previous operating systems, such as Norton Utilities Version 8. The new 32-bit package, with its heavy-duty disk analysis and repair

capabilities, was designed to help you prepare and properly protect your Windows 95 system.

Besides its "pre-installation system tuneup," it has many utility features and functions not found in Windows 95. Norton Utilities eliminates the need for you to know when or how to use the utilities. For example, the Norton System Doctor monitors all vital system components automatically, alerts you to a problem, and responds by launching the appropriate utilities.

The Norton Navigator is the successor to the popular Norton Desktop for Windows and PC Tools for Windows (the latter is our current favorite "Windows shell"). Navigator's file management and desktop navigation capabilities extend and enhance the performance of the new operating system, and it includes a host of file management features not found in Windows 95. For example, Norton FastFind finds files very quickly using index-based searching, and the Norton Taskbar adds multiple desktops and a Quicklauncher feature to the Windows 95 Taskbar.

For more information, contact Symantec Corporation, 2500 Broadway, Suite 200, Santa Monica, CA 90404-3063 (1-800-441-7234). The new utility retail prices are as indicated above; special trade-up pricing also is available for previous Norton, Symantec, and Central Point Software users.

## Looking Back Five

**Five Years Ago in Antennas and Accessories.** What were the hot topics of discussion in February 1991? This column was a potpourri called "Of This and That."

From our antenna notebook we started out with an overview of the Rotating Tower Systems offered by Dick Weber, K5IU. We profiled the Hy-Gain DX88 eight-band HF vertical antenna, the Radio Shack Discone VHF/UHF antenna, the AEA ET-1 Econo-Tuner, and the Ampire Switchable RF Preamps for VHF and UHF. We also ran an update on the antennas, parts, and antenna accessories offered by SpiRo Manufacturing and Kilo-Tec.

Software-wise, we highlighted the WA7RAI Antenna Designer program, by Chuck Smith, WA7RAI; RCSS-R7000, which offers computer control of the ICOM R7000 receiver, by Systems and Software International; the TRS Event Manager, which remotely controls the Kenwood R-5000 receiver, from Tom Sundstrom, W2XQ; GEOCLOCK, a versatile shareware world clock program from Joseph Ahlgren; the K1VUT 10 Meter Contest Program by Dave Clemons, K1VUT; and the L.L. Grace DSP-12 Multi-Mode Controller for use with up to three receivers. We also examined the Pizazz Plus 2.0 graphics screen capture and print utility from Application Techniques, Inc.

Finally, we shared our personal brush with lightning in the summer of 1990. This incident was a near miss that didn't damage our house, but generated lots of electrical damage in and around the hamshack. We hope not to witness a repeat of that incident!

## Wrap-Up

That's all for this time, gang. Next time more Antennas and Accessories topics of current interest. See you then.

*Overheard:* We all know what luck is. It's what happens when people you can't stand suddenly become successful. 73, Karl, W8FX

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**FT-990 HF Transceiver** • tx: 160-10m • rx: 100kHz-30MHz • 90 memories • SCAF • FSP • DDS • high speed antenna tuner w/memories • AC power supply • 12" w x 4" h x 11" d. **FT-990DC** is DC version

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**FT-900/AT HF Transceiver** • tx: 160-10m • rx: 100kHz-30MHz • 100W • 100 memories • built-in antenna tuner • front sub-panel optionally mounts separately from the main body • CTCSS encode with repeater offset • twin stacking VFOs.

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**FT-2200** • 2m with 110-180MHz rx (50w).  
**FT-7200** • 440MHz (35w)

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FT-2500M  
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**FT-7400H Mobile** (left) • 440MHz (35w) • 31 memories • alpha display • track tuning • CTCSS encode • backlit DTMF microphone • 6" w x 1" h x 7" d, 3.3 lbs.

**FT-2500M 2m Mobile** (top) • 50w • 31 memories • CTCSS encode • scan • backlit DTMF mic • 6" w x 1" h x 7" d.

**FT-912RH Mobile** (right) • 1.2GHz

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### Antenna Tuner with Digital Bargraph



The VC300D Antenna Tuner features a Digital Bargraph Display for reading Peak Output Power. Level and Delay controls calibrate the display and vary the delay response. The VC300D also features a built-in Dummy Load.

#### SPECIFICATIONS:

- RF Power: 1.8 to 30 MHz, continuous 200 Watts; 150 Watts on 1.8 MHz. (max SWR 4:1)
- Frequency Range: 1.8 to 30 MHz.
- Transmitter/Antenna Tuning: Continuous Rotation Capacitors, 48 Position Rotary Switch Inductor
- Antenna Selector: Six Positions: COAX 1 (TUNED and DIRECT), COAX 2 (TUNED AND DIRECT), BYPASS, and Balanced Antenna.
- Power Switch: High and Low (300W / 30W)
- Dimensions: 10.2" (259mm) W x 9.4" (339mm) D x 3.5" (89mm) H
- Weight: 3.4 lbs. (1.5 kg)

**Also Available:** VC300DLP; Same as the VC300D but without the Digital Bargraph Display.

## HFT1500

### Digital Peak Reading Antenna Tuner



The HFT1500 Antenna Tuner optimizes the performance of your antenna system from your transmitter or SWL receiver by providing adjustable impedance matching. The HFT1500 measures the power and SWR, allowing you to tune the SWR to the lowest possible ratio for the selected transmit frequency. It features a Roller Inductor and a Digital Bargraph Display for analyzing Peak SSB Power. Level and Delay controls calibrate the display and vary the delay response, and are front panel adjustable.

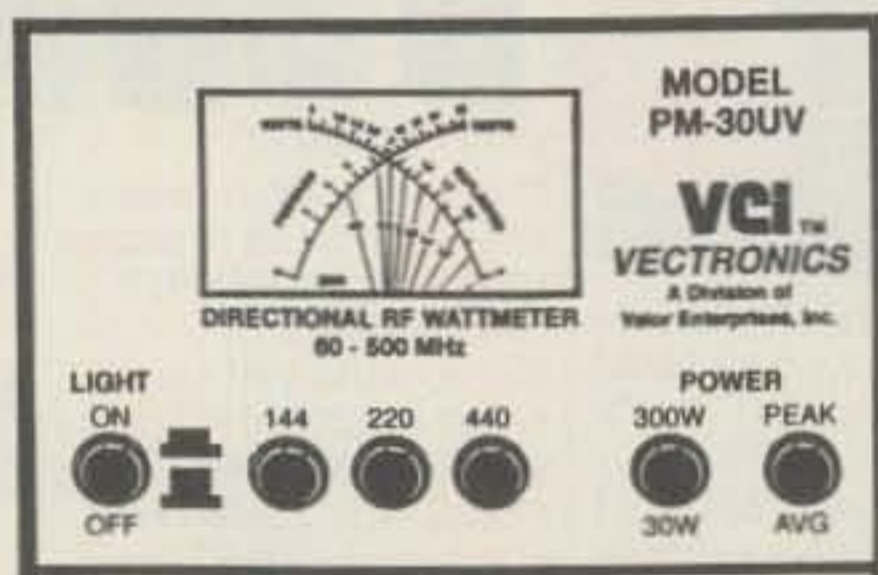
#### SPECIFICATIONS:

- Frequency Coverage: 1.8 to 30 MHz, continuously tuneable.
- Maximum Power: 1000 W single tone continuous; 2 kW PEP SSB (Max. SWR: 4:1)
- Dimensions: 12.5" (318mm) W x 12" (305mm) D x 5.5" (140mm) H
- Weight: 10 lbs. (4.5 kg)

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## PM30UV

### SWR/Power Meter



The PM30UV measures and displays Forward Power, Reflected Power, and SWR simultaneously on its' dual movement meter system in the frequency range of 100 to 500 MHz in three programmed switch steps. Accuracy of the reading is assured because the PM30UV features a true shielded directional coupler. The PM30UV's aluminum case is chemically treated for scratch and chip resistance to keep it looking new for many years. 115VAC to 12VDC adaptor is not included.

#### SPECIFICATIONS:

- Frequency Range: 100 to 500 MHz.
- Dimensions: 5.3" (135mm) W x 5.75" (146mm) D x 3.5" (89mm) H
- Weight: 1.2 lbs. (.55 kg)

**Also Available:** PM30; Same as the PM30UV but has a frequency range of 1.8 to 60 MHz.

## CK200

### Deluxe CW Keyer



The CK200 features a Curtis 8044ABM Keyer Chip with adjustable weight and tone, volume and speed controls, and dot-dash memories. The CK200 is compatible with all tube and solid state rigs and is powered by either a 9V battery or an AC adaptor (not included).

#### SPECIFICATIONS:

- Dimensions: 5.8" (148mm) W x 5.5" (140mm) D x 2.1" (53mm) H
- Weight: 1 lb. (.45 kg)

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# WORLD OF IDEAS

A LOOK AT THE WORLD AROUND US

## What Makes CW Fun? All The Keys!

**U**nbelievable but true! The more keys we highlight, the more keys that pop up—new and old! These little gems simply have to be amateur radio's all-time favorite accessory and most popular collectible, and with good reason. Using a fancy new paddle, bug, or famous old-time key on the air today is more delightful (and affordable!) than operating a new rig or driving a classic car. Maybe I'm just CW sun struck, but to me the in-use action and rhythmic sounds of a skillfully handled bug or paddle are comparable to an artist sharing his or her closest interest. Keyboards,

4941 Scenic View Drive, Birmingham, AL 35210

multimode TNCs, and memory keyers are good contest aids, but in my mind they do not hold a candle to a nice group of keys, paddles, and bugs for personal-touch communications. Keys are just plain fun to use!

Several years ago I humorously asked why the selection of new keys seemed small (I also hinted at buying bugs while interest was low). Today more people are making paddles and keys than ever (and classic bugs have skyrocketed in value). Few amateurs know of limited-production keys, however, as their makers cannot afford large ads and depend on friends telling friends about the keys. That is one reason why we strive to include as many new keys as possible herein. If anyone has

been overlooked, just let us know. We aim to please—everyone!

I should also mention that our keys coverage is cumulative, and as much as I favor popular and previously highlighted items such as N2DAN's Mercury, G4ZPY's Miniature paddle, etc., going back and re-featuring them every year is not always feasible. Next month I will therefore include an index to past keys columns. That should make everyone happy.

So what is in store this time? We will start with some new paddles and keys, and then include a couple of exotic items from my new self-published book, *Keys II: The Emporium*. (Folks are really going crazy over this one. My XYL, Sandy, WB4OEE, is filling orders like

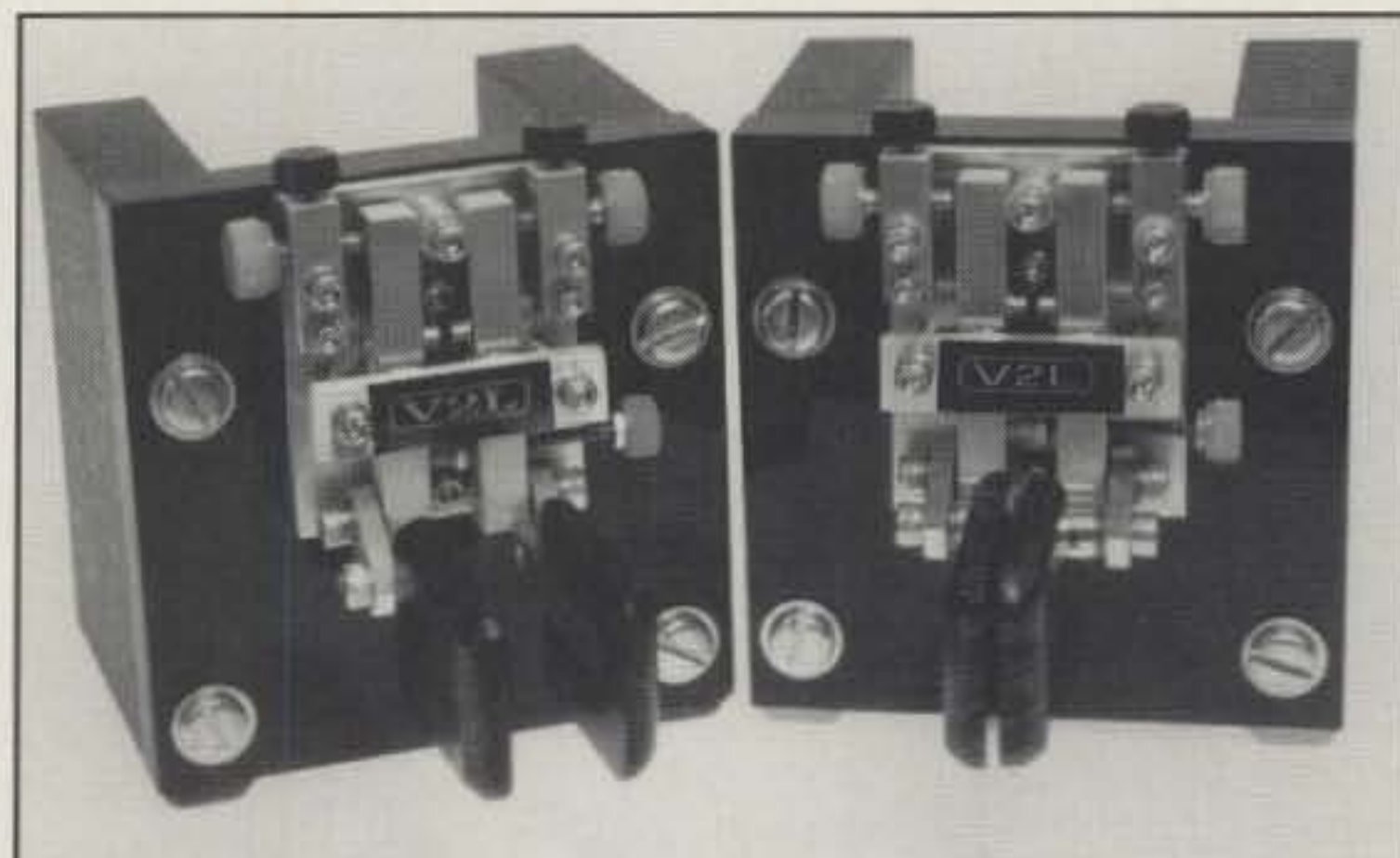
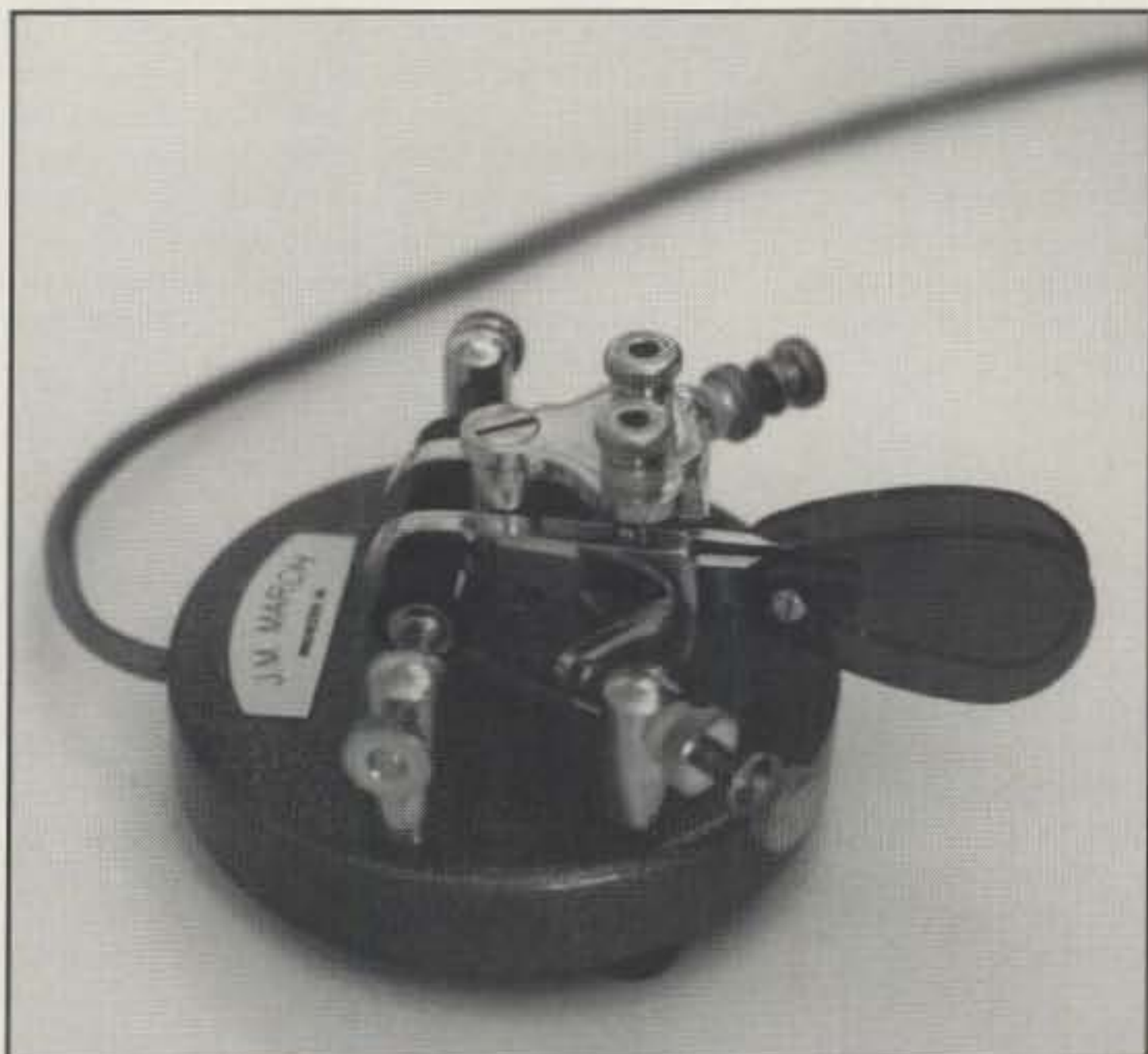


Photo 2— The new Vertical Twin Lever (V2L) paddle from W9WBL. It is especially designed to mate with natural wrist movements, and its fingerpieces are fully adjustable to fit any fist. ▲

Photo 1— The sharp-looking J. M. March magnetic paddle's wide range of tension/gap adjustments, smooth operation, and reasonable cost should make it very popular in 1996. ◀

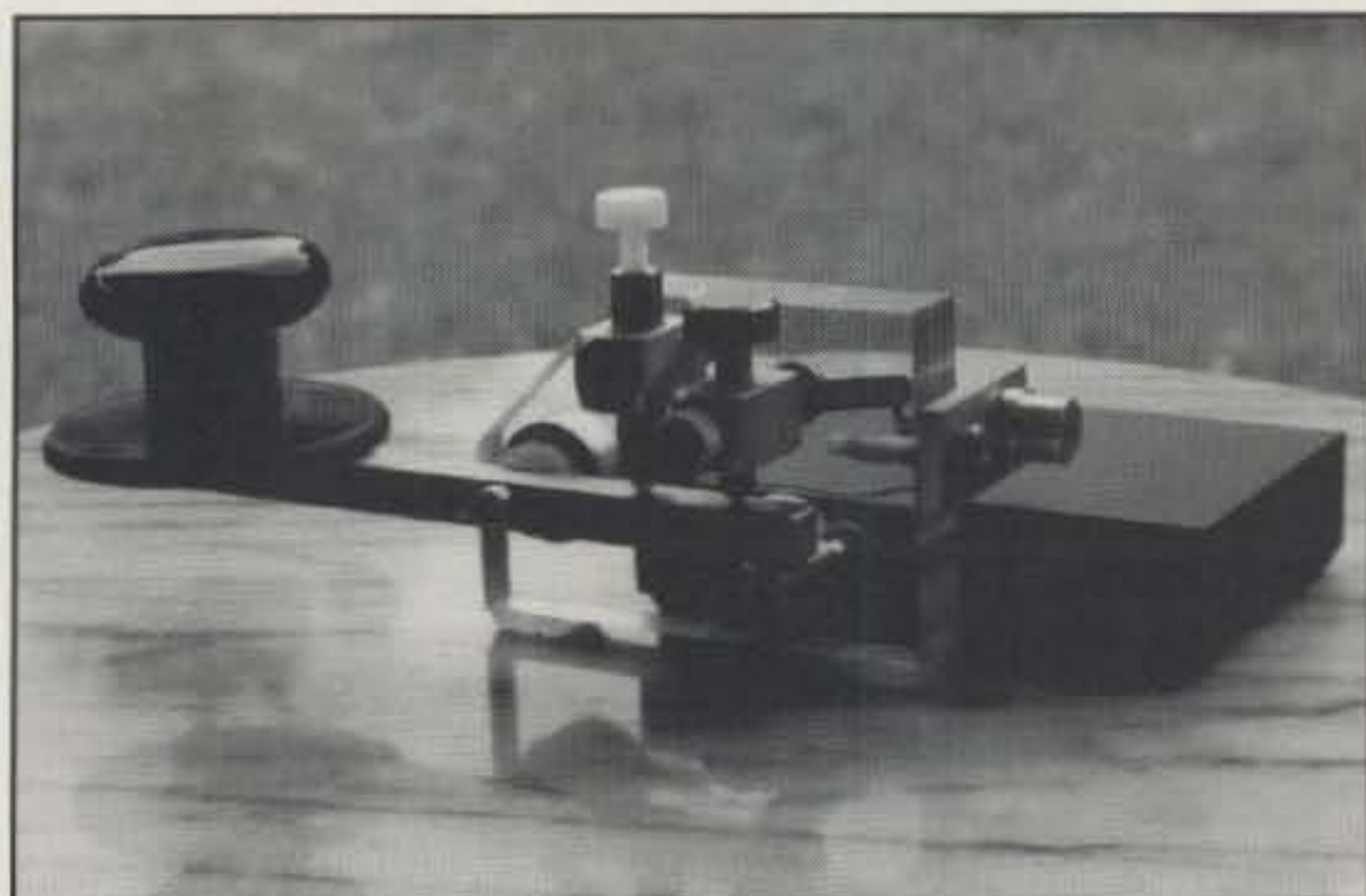


Photo 3— Have you ever seen a left-hand straight key? Here it is! The mechanism is mounted on one side of the base! View it in a mirror to see the right-hand model. This "side key" is another W9WBL exclusive.

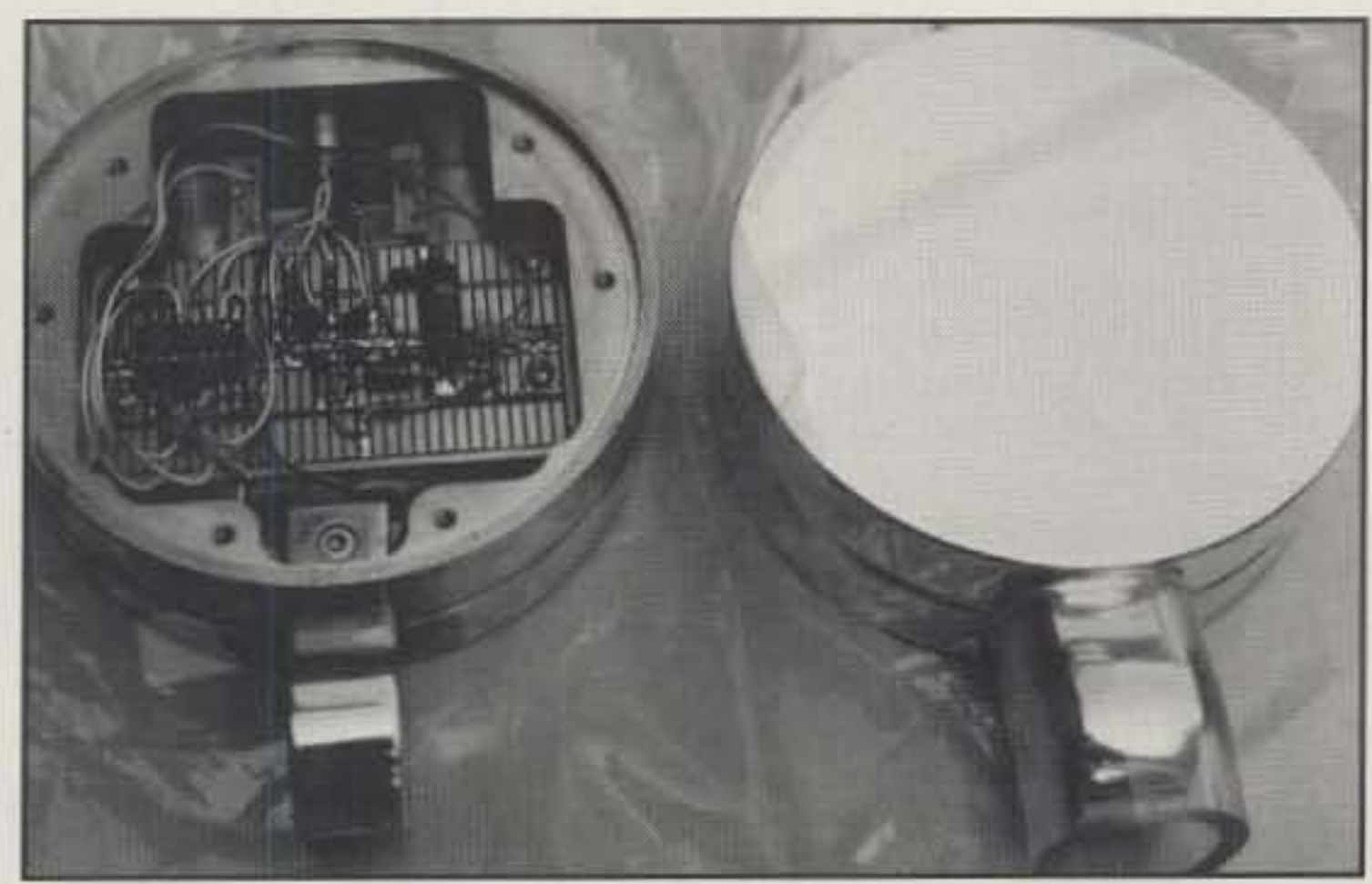


Photo 4— Elegant, totally silent, and quite impressive are adjectives that describe this touch paddle with built-in keyer and rechargeable battery from CAL-AV/K6HPX.



Photo 5— Want a real attention-grabbing bug to grace your den, shack, or office desk? This little gem fills the bill, and it is also fun to occasionally use on the air. The bug is made by Llaves Telegraficas Artesanes (EA6YG) in the Baleric Islands, and can be ordered direct.

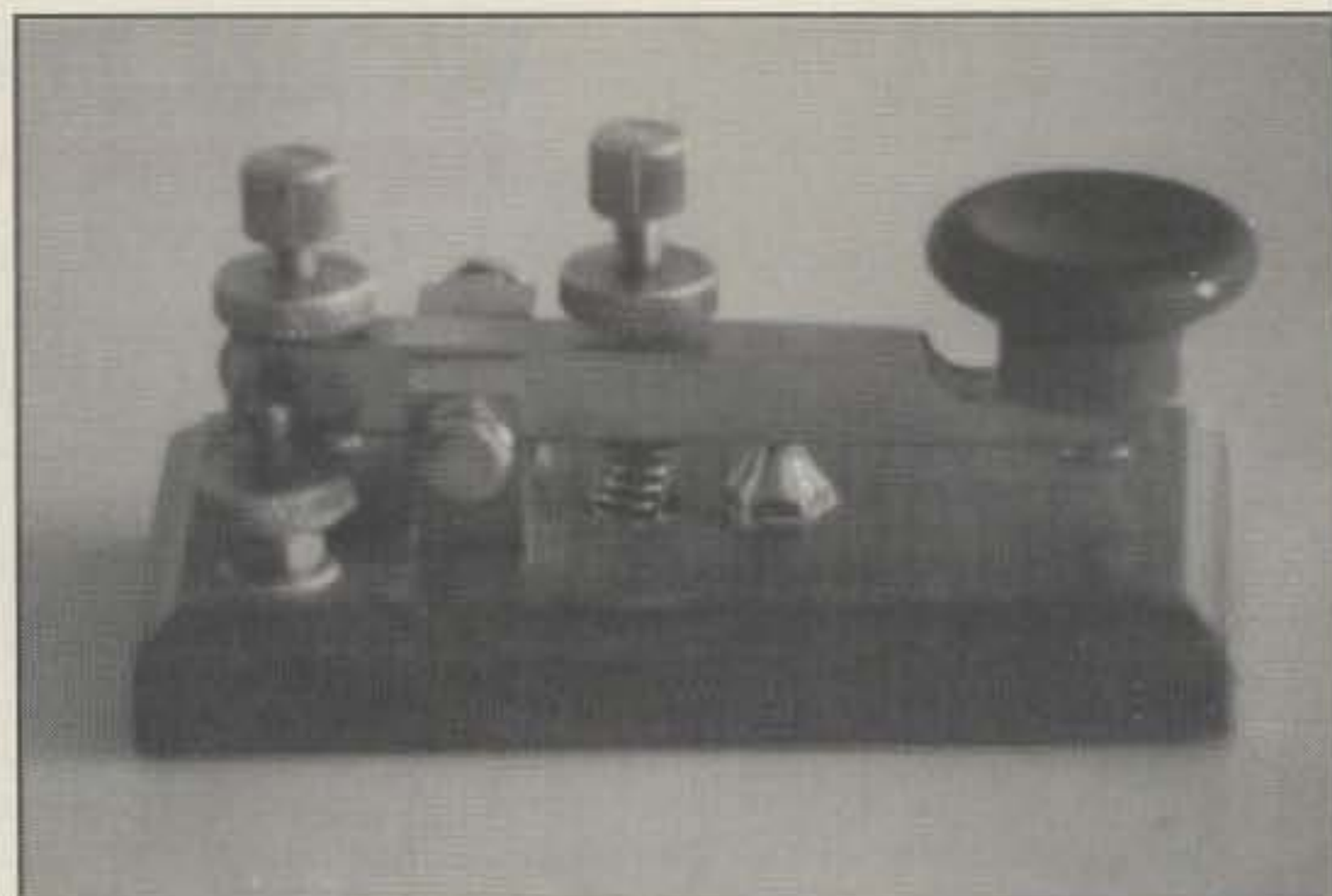


Photo 6— EA6YG's new "GMP" QRP key is another treat from the Baleric Islands guaranteed to be the envy of your local friends.

crazy, and I'm autographing copies on request.) We then will quickly wrap up this first part with some unusual foreign keys for international flavor. Now let's jump to the key views! Since there are a large number of contributors to recognize, we will thank each one (and include ordering addresses) as we progress.

### WB4FJJ's Dual-Lever Paddle

Leading our 1996 parade of new CW stars is this neat magnetic-tensioned dual-lever paddle (photo 1) being made by J. M. March, WB4FJJ (1415 Graystone Terrace, Winchester, VA 22601; telephone 703-662-4279). Its combination of a high-gloss brass mechanism, translucent red fingerpieces, and blue-gray hammertone base is captivating. Attention to fine detail is everywhere. There are even white teflon washers behind adjustment screw locknuts for "stay put" security. Speaking of adjustments, each lever can be set for a desired travel/gap; then its related magnet can be set closer or farther from the lever's "far end" for a heavier or lighter touch to mate with any fist. I have been using a J. M. March paddle with my den QRP rig for several months, and it is a real treat. It is nimble, has a very good "feel," and produces traditional "click clack" sounds like a spring-tensioned paddle during operation.

This smart-looking, smooth-handling magnetic paddle is available in painted steel, brass, and marble base, and is priced low so anyone can afford a custom paddle.

### V2L Vertical Dual-Lever Paddle

Next in the limelight is the intriguing new V2L Vertical Dual Lever paddle (photo 2) recently announced "ready for sale" by Stan Hails, W9WBL, of 6345 Coffman Road, Indianapolis, IN 46268-2591 (1-800-726-8936). The idea of this iambic paddle evolved from Stan's Vertical Single Lever paddle (which has also been design-upgraded for '96), and like H. G. Martin's famous vertical bug of eras past, it occupies minimum space on a crowded desk. The paddle's mechanism is solid brass with permanently lubricated steel pivot pins and solid-gold contacts. This mechanism is secured to a black lexan base inset with two pounds of steel weights to minimize "walking." It has cocobolo wood fingerpieces that are fully adjustable in vertical position and spacing to

fit any fist (spacing differences are obvious on the left and right V2Ls in photo 2). I have not tried a V2L yet, but judging from use of Stan's original VSL, I'd say he has another winner.

If slower-paced CW is your preference, incidentally, check out W9WBL's new "Sidekey" shown in photo 3. This little critter has a solid brass mechanism on a clear lexan frame, weighted base, gold contacts, and adjustments that can be tweaked while sending, and comes in a left- or right-hand model. What is the difference? One model has its mechanism mounted on the base's right; the other model has it mounted on the base's left side. Of course, you could always turn one model backwards for quick-changing to the other hand.

### CAL-AV Labs/K6HPX Paddle With Built-In Keyer

Our December 1995 "World of Ideas" Christmas column briefly highlighted this all-electronic paddle with built-in keyer being made by CAL-AV Labs, Inc./Ken Hirschberg, K6HPX (515-B Westchester Dr., Campbell, CA 95008; phone 408-369-1000). There was insufficient space to include a photo of the keyer inside this massive brass (or optional goldplated)

treat, so I am including it in this keys column (see photo 4). The keyer's on-board battery sits below the (prototype) circuit board, and the fingerpiece's 15-turn dot/dash sensitivity pots are the square, brass-looking pieces on each side of the (rear center) output socket. The CAL-AV paddle on the right has a thick fingerpiece cover used to prevent accidentally draining the battery when the paddle is packed or shipped. I quick-tested this high-end paddle/keyer, and found it mouse-quiet with a very comfortable feel. It is very nice, and there is no need to worry about dust collecting in tight corners, as everything is enclosed.

### EA6YG's "DX Keys"

Continuing our tour of special CW treats for 1996 is this impressive pair of "DX keys" (see photos 5 and 6) made by Llaves Telegraficas Artesanes (Guillermo Mestre, EA6YG), P.O. Box 358, E-07300, Inca, Baleric Islands, Spain. Guillermo designed and built the bug (his model "GMS") without ever seeing a Vibroplex. Thus, his concept for semi-automatic operation is a bit unique. The pendulum moves to the left and its horseshoe spring taps its related contact to make dots like usual. When the



Photo 7— This remarkably smooth, precise paddle is made by Valery Pavlov, RA1AOM, and is a delight. Dot/dash contacts are in the middle (between levers), and adjustments on each side of the levers set travel/gap. Output connections are via a rear-mounted DIN socket.

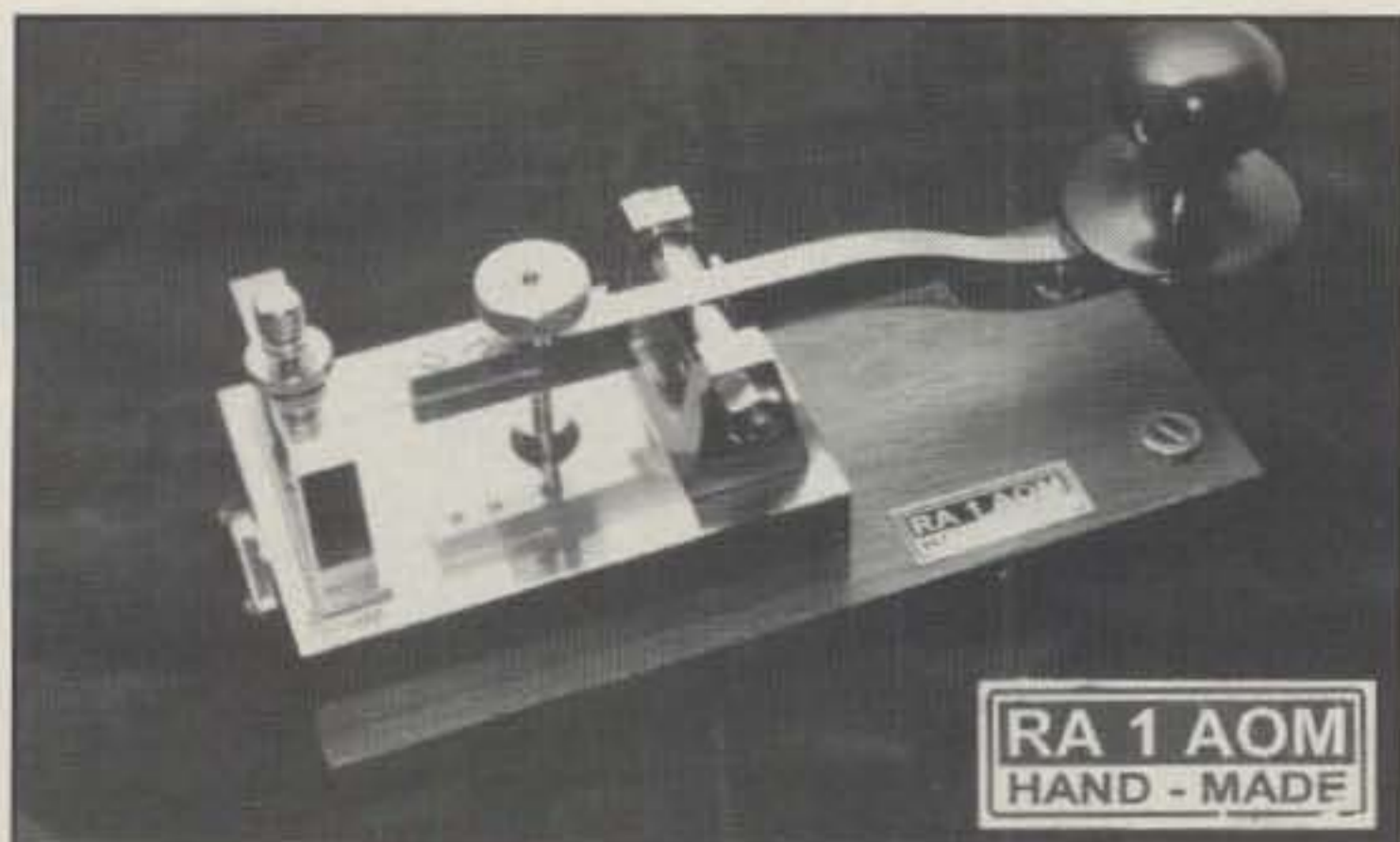


Photo 8- Just-arrived photo of the new handcrafted pump key made by RA1AOM. Note rear mating contacts; long, evenly balanced arm; and overall quality of workmanship. Magnificent!



Photo 9- The new square-based Vibroplex Brass Racer dual-lever paddle. Item is economically priced, has positive snap action and a very good "feel," and looks terrific. It is also available from amateur radio dealers nationwide.

fingerpiece is moved in the other direction, however, the pendulum's arm end moves against its mating contact on the right side to make a dash. In this case, the pendulum is held stationary by the rear damper (a rubber-tipped brass screw), while the pendulum's main-spring applies tension for arm return after making a dash. In other words, the mainspring vibrates one way to make dots or flexes the other way to make dashes. The pendulum is also comprised of an inner rod and outer tube; the tube can be extended back past the damper for ultra-slow speed dots. The bug's brass assembly, teakwood fingerpieces, rich

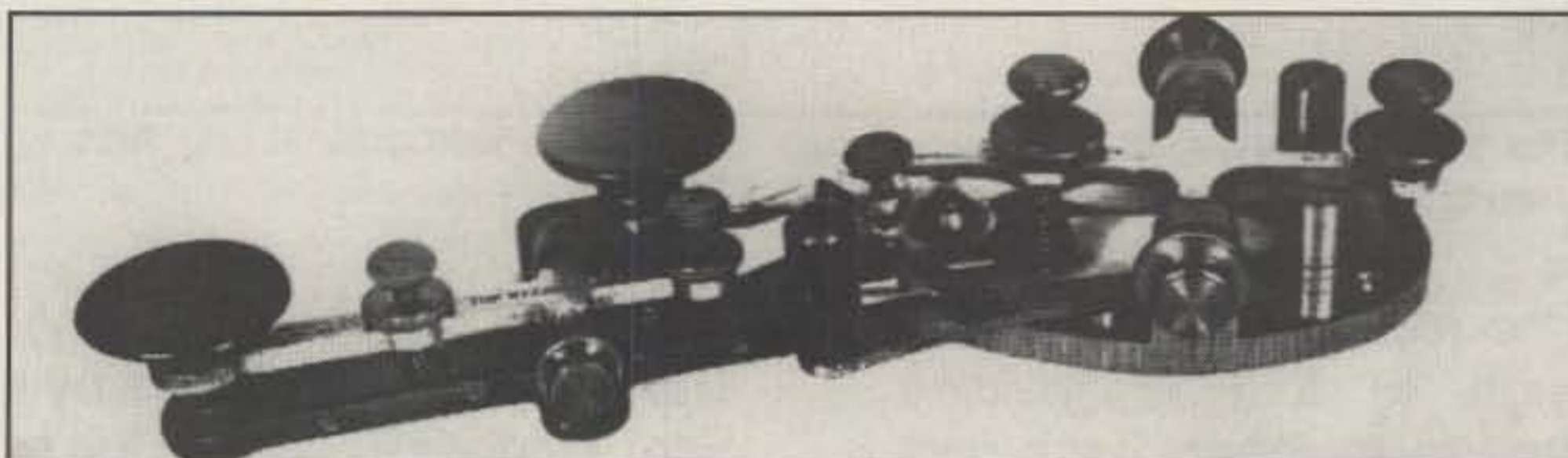


Photo 10- The famous D & K Wizard key was a unique approach to making long hours of operating a regular hand key easier on the wrist. It is shown here (on left side) fitted to an open-frame key and ready to use. (Photo courtesy David Combs, W5VJW)

## The PicoPacket by PacComm

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**Optional RAM.** 128k, or 512k.



**Battery Pack** model has a quick-change 6VDC slide-on/slide-off battery pack. The PicoPacket contains a built-in battery charging circuit.

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BBS: +(813) 874-3078

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**Full-time GPS port** (2nd serial port) allows both a GPS and computer to be attached to the PicoPacket. This option also provides a real-time clock, 128k RAM, and Digital DCD.

**Built-in GPS receiver.** The GPS model has a built-in Trimble SVEeSix-CM3 GPS receiver. Total size only 2 x 2.5 x 3.25 inches. Active external GPS antenna provided. Includes all the features of the 2nd serial port model.

### Models and Prices.

- PicoPacket w/32k RAM - \$129.
  - » Open Squelch DCD - add \$15.
  - » 128k RAM - add \$20.
- PicoPacket with 2nd serial port, 128k RAM, Real Time Clock, Open Squelch DCD - \$189.
- PicoPacket Battery pack model with 32k RAM - \$189.
  - » Open Squelch DCD - add \$15.
  - » 128k RAM - add \$20.
- PicoPacket Battery pack model with second serial port, 128k, RTC, Open Squelch DCD - \$249.
- PicoPacket/GPS. Same as model directly above plus internal GPS receiver and GPS antenna - \$629.
- Companion GPS receiver w/active antenna, data cable - \$399.
- Extra battery pack - \$30.

mahogany-like base, and flashy gold label produce a marvelous appearance guaranteed to impress shack visitors.

The little pumper shown in photo 6 is Guillermo's new "GMP" QRP key. It is 3.5 inches long, brass with olive-wood base and cherry-wood knob, looks great, and handles like a J-38. It also produces classic "click-clack" sounds during use. Very nice! Guillermo also makes a sharp-looking dual-lever paddle and a sideswiper, and he even repairs, rebuilds, and makes replicas of rare classic keys by special request. Obviously, he is a man after our own heart!

### RA1AOM's Russian Paddle

Although made for a love of CW and keys rather than for general open sale like our previously highlighted keys, I could not resist sharing a view of this magnificent paddle (photo 7) from Valery Pavlov, RA1AOM. I'm sure Valery would also enjoy hearing from readers sharing my enthusiasm for his handiwork. (Val's address is P.O. Box 98, St. Petersburg, Russia 197022.)

The paddle has a brilliant chrome mechanism mounted on a "lakestone" base (evidently something akin to marble, except more colorful and glossy). I have also noticed colors and designs on bases vary, evidently because no two stones are identical. Undeniably, this is the best looking and smoothest handling paddle I have seen out of Russia—possibly out of Europe. The precise adjustments, quiet operation, and accuracy of contacts are remarkable. Val's custom-made paddle is truly destined to become a classic!

*Flash!* Val just reported he is making a hand key to complement his paddle, and it too is a real showpiece (see photo 8). This key looks similar to the famous Swedish key sought by amateurs worldwide and featured in this column a few years ago. If Val's new key handles like his paddle, it's a real dream! More details will be reported as they become available.

### Brass Racer From Vibroplex

This is a first-glimpse view of the new square-

## THE WIZARD



### A REVELATION IN TELEGRAPH KEYS

Key lever and contacts operate separately and independently. Regular circuit-closing lever serves for both keys.

By giving the screw at the back a mere twist you can send very heavy, very light or mediocre signals over the longest circuit with no extra effort whatever.

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No lagging of relay and sounder, which in itself, is one of the chief causes of telegraphers' paralysis. Impossible to produce light signals if adjusted to send heavy and vice versa.

Can be connected or disconnected instantly with any telegraph key, sets perfectly rigid on the table and can be carried in the vest pocket.

If you have lost or are losing your "grip," get The Wizard. A positive remedy.

### THE KEY WITH A VELVET TOUCH

Made of attractively polished metal, containing flexible, pure platinum contacts throughout.

Mailed postpaid to any address in the U. S., Canada or Mexico upon receipt of.... **\$2.25**

Photo 11—Original-era slick-tongued ad for D & K's Wizard add-on key. Was it really as good as ads suggested? Several old-time telegraphers I talked with said it was one of the smoothest hand keys they ever used. Where have all the Wizards (keys, that is) gone today?

based Brass Racer from Vibroplex, and it is one smart-looking iambic paddle (see photo 9). The magnetically tensioned mechanism is mounted on a hard-oak wood base, and topped with a glossy brass nameplate bearing Vibroplex's new Mobile, Alabama address (obviously making it a modern-day collectible item). The mechanism is that of a standard Brass Racer, but to me it has a more responsive "feel" than previous (triangular based) Racers. Possibly the new base raised the fingerpieces to a perfect-to-use point; possibly the paddle's good looks tantalized my imagination. Either way, I really enjoyed testing their

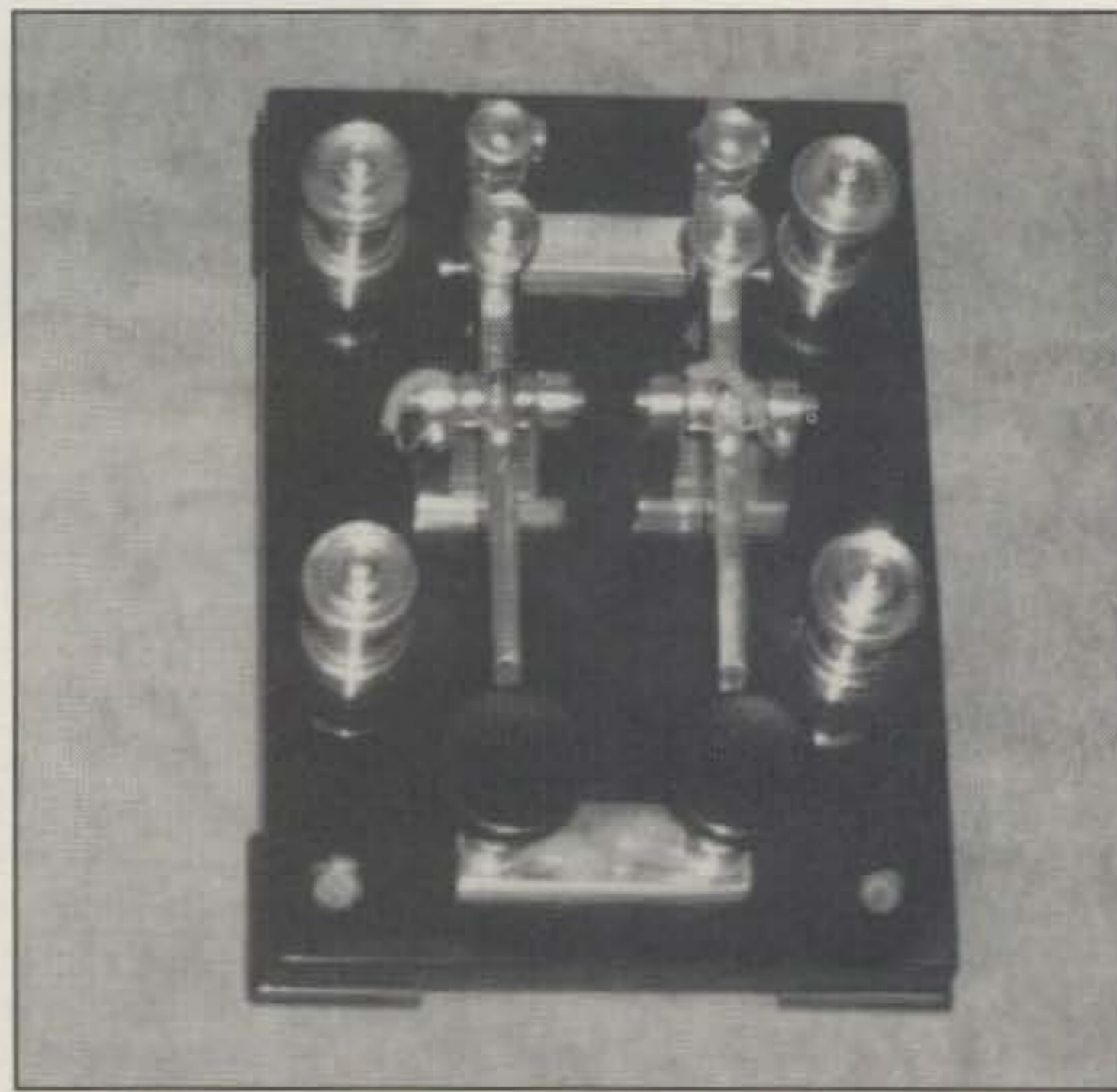
prototype Racer. Vibroplex reports the Brass Racer is their most requested paddle, so this change should make it even more popular. Our congratulations to Mitch Mitchell, WA4OSR, for including this 1996 update in the famous Vibroplex line of fine bugs and paddles.

### The D & K Wizard Key

Following our previous group of flashy new paddles and keys is almost impossible, so let's shift directions and admire some of the unusual gems from my new *Keys II* book. The item shown in photos 10 and 11 is the "Wizard" vel-

Photo 13—This cricket key was used on dual-polarity submarine cables during the early part of this century. Dots and dashes were sent by alternating forefinger and middle finger and were differentiated by voltage polarity rather than length. (Photo via Gustavo A. Coll) ▶

Photo 12—Unusual and quite rare Double Current Morse Key made by Silvertown Telegraph Works in the U.K. during the 1920s. This dazzler was used on two polarity landline setups (see text). (Photo courtesy Gustavo A. Coll of Uruguay) ▼



vet-touch add-on key for a key made in 1910 by the D & K Manufacturing Company of Cleveland, Ohio. This is the same company, incidentally, that made the fascinating "string and spring" Dinger bug highlighted in our May 1995 "Keys Special" column. The Wizard was designed to reduce "fist strain" and hopefully avert the "glass arm syndrome" among professional telegraphers sending messages hour after hour in eras past. It is the narrow key on the left side in photo 10. The Wizard's contacts extend from its base and arm's tip end, and slide under the circuit closing straps on a regular hand key such as a J-38. The Wizard can then be adjusted for a wide or narrow gap, light or heavy Morse characters, and the Wizard's "feel" stays velvet smooth. After a shift, a telegrapher could just quickly remove the Wizard and slip it into a shirt pocket.

### Double Current Morse Key

Next up (in photo 12) is an unusual double current Morse key from the private collection of Gustavo A. Coll, of Montevideo, Uruguay. As Gus explains, "The double current system was often used on long-distance landlines. Basically, one voltage polarity was applied to the line when receiving and the reverse polarity was applied when sending." This key thus has five terminals plus a send/receive lever. The key was made by Silvertown Telegraph Works, a well-known British firm during the 1920s. It sports a round crystal top, glossy brass frame, and teakwood knob, and is quite a showpiece. In fact, a side view of this gem makes it look like an item right out of Captain Nemo's "Nautilus" (*20,000 Leagues Under The Sea*).

### Cable Code Key

This is a "cable code key" also owned by Gustavo A. Coll, and it was used on submarine cables in eras past (see photo 13). Gus explains that sub cables used modified Morse in which dots and dashes were differentiated by their voltage polarities rather than their length. Gus should know, as he was a technician for such a cable company and had to master Morse codes used on both landlines and submarine cables. The keys shown here are operated by placing a forefinger on the left lever and a middle finger on the right lever. Reception ("decoding") involved observing a beam of light reflected from a small mirror attached to a galvanometer at the cable's "other end."

The cable key shown does not have any markings, but Gustavo's educated guess is it was made by Muirhead & Co., another popular British manufacturer of keys during the 1920s. Our thanks to CW aficionado Coll for sharing views of these unusual items with us.

### Summary

We moved at a breakneck pace, but still ran short on space before running out of photos and information. Remaining views and tales will thus be carried over to next month. Stay tuned, keep on working CW with special keys, and I will be listening for calls from friends and fans on 30 meters weeknights or 20 meters on Sunday afternoons (10.110 ±10 kHz/0245 GMT or 14.200 ±10 kHz/2300 GMT).

73, Dave, K4TWW



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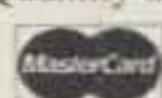
The Digital Voice Processor (DVP) is a plug-in board that can transform your PC into a powerful digital voice keyer and recorder. Controlled by the CT contest logging software, high speed 12-bit digitizers store data on your hard disk (or RAMdisk) and generate natural sounding audio at the touch of a function key.

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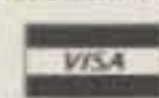
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DVP only	\$149.95 \$6 S/H	\$19
DVP with CT version 8 for XT/AT/386/486	\$199.95 \$6 S/H	\$19
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CIRCLE 65 ON READER SERVICE CARD



# PACKET USER'S NOTEBOOK

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

## SSTV Is Digital Communications, Too!

As everyone knows, I enjoy the graphics communications modes in which full-color pictures are transferred between stations using digital modes and digital technology. Recently, I was listening to VHF 2 meters with my Alinco DR-610 in the scan mode. Suddenly it stopped scanning, and I heard the familiar twiddle-beep, twiddle beep over and over. Wow, SSTV on VHF! I thought this should be fun. VHF SSTV is much better (cleaner), since it does not have the noise we experience at 14.230 and 14.233 MHz SSB.

In the Roanoke, Virginia area there is a (WB4QOJ) repeater at 145.210 MHz that is used primarily for voice during the daylight hours. The coverage is good enough that it easily covers the Lynchburg and Evington, Virginia area. At night beginning at about 8 PM, however, this voice repeater reverts to use by several Slow-Scan TV enthusiasts who send SSTV pictures through it. The audio passband of the repeater is good enough that no loss to our SSTV audio is noticed.

It didn't take long for me to grab the soldering iron and make up an SSTV interface connector for my Alinco DR-610 transceiver. In nothing flat I was receiving pictures from Fred, KE4HI; Danny, KE4NGW; and several other SSTVers on 145.210 MHz (see photos).

I don't smoke, drink, or do drugs, but if the term "getting a fix" was ever applied to my digital hobby, I just got a "rush." Now we are having fun!

### My SSTV Digital Hobby

Recent advances in Slow Scan television (SSTV) techniques have brought us to new heights in picture transfer capabilities. Add to the SSTV technology the ability to use an economically priced "frame grabber," and you have the best of the SSTV hobby.

The reason I am into pictures is because of the ease with which I can generate my picture library. It used to be difficult to capture a picture for the purpose of transmitting via SSTV. However, that too has changed.

I just got my new Video Frame Grabber from John Hoot Software Systems Consulting (SSC). It allows you to use any standard NTSC video camcorder, video camera, or VCR as an input device to your IBM PC or compatible computer. When you connect any composite video source to the SSC Video Frame Grabber, you can capture vivid color or monochrome video images on your PC.

The ability to input live or pre-recorded video into your computer opens up a world of new possibilities, some of which are:

1. Putting images into documents using most word-processing systems.
2. Instant photos of family, friends, and property.
3. Creating image databases.

Format	Lines	Duration	Color	Async
Robot 8	120	8 sec	N	Y
Robot 12b	120	12 sec	N	Y
Robot 12c	120	12 sec	Y	Y
Robot 24b	240	24 sec	N	Y
Robot 24c	120	24 sec	Y	Y
Robot 36b	240	36 sec	N	Y
Robot 36c	240	36 sec	Y	Y
Robot 72c	240	72 sec	Y	Y
Scottie 1	256	110 sec	Y	Y
Scottie 2	256	71 sec	Y	Y
Martin 1	256	114 sec	Y	Y
Martin 2	256	58 sec	Y	Y
AVT 90	240	90 sec	Y	N
AVT 94	200	94 sec	Y	N
AVT 125	400	125 sec	N	N
Test	800	400 sec	N	N

Table 1- SSC's PC-SSTV product supports the above image formats.

4. Analyzing motion sequences.
5. Multimedia software authoring.
6. Computer-based medical or insurance documentation.

7. Computer-based security systems.

Best of all, SSTV communication is as simple as pressing a button while watching your TV monitor to freeze the action on a full-color computer screen image. SSC's revolutionary digital signal processing approach to TV lets you have complete control of the process.

Where the older model frame grabbers took sometimes as long as 24 seconds to capture a picture, the SSC frame grabber makes capturing color or mono pictures faster than I can blink. With my SSC frame grabber I can capture a still color picture in one-thirtieth of a second, and this is from a full-motion video source.

The SSC frame grabber includes software that lets you use your computer as a video image processor. It also enables the pictures to be saved in some of the most popular graphics formats: GIF, TARGA, 24 bit TIF, and PCX File output. One of the formats includes the "DTV" mode, which is used with the SSC Slow Scan TV system.

As a matter of fact, if you are using the SSC SSTV system, there is a callout in the SSTV software menu that provides for real-time capture of a picture by my video camera and immediate sending in one of 15 (selectable) formats to another SSTV station.

The SSC SSTV software provides for text lettering of any picture captured or loaded for transmitting. I'll have more on this feature later on in this column.

Software Systems Consulting's Video Frame Grabber is priced at \$199.00. This is about \$300.00 less than a slower version frame grabber that I purchased less than two years ago.

Another advanced feature of the SSC frame grabber is the lack of hardware controls. I used to have to change the contrast and brightness by groping behind my computer to reach the

controls. All this is now done by using the on-screen menu to set Contrast, Brightness, Level, Intensity, and Tint Controls.

The SSC frame grabber supports up to 640 x 480 x 256000 colors and prints on most popular printers.

### SSTV Picture Structure

Before we go too far into the fun part of SSTV, let's look at some of the basics of SSTV theory. The system we will be discussing in this month's column is Software Systems Consulting's PC Slow-Scan TV software and hardware developed by John Hoot.

There are many different methods of encoding SSTV pictures for transmission on the amateur bands. The SSC PC Slow-Scan TV system supports the transmission and reception of SSTV in 15 formats. Basically, each of the formats differs with respect to the image resolution, color content, synchronization, coding, and transmission time.

A typical image is made by tracing a series of lines from left to right across the screen starting first at the top and moving toward the bottom. As each line is traced, the tone sent corresponds to the brightness of the image at that position on the screen. The brighter the spot, the higher the pitch.

In some modes a very low-frequency sync pulse (1200 Hertz) is sent to indicate the end of one line and the start of the next. These modes are called the asynchronous modes and include Robot, Martin, and Scottie formats. The other modes rely on precise timing standards between the sender and receiver to keep the sender and receiver in phase. These are the Amiga and Synchronous modes.

Asynchronous color images are encoded a little differently. Robot color images use the first half to two-thirds of the scan line to encode brightness information. The remaining portion of the line contains color information. This infor-

211 Luenburg Drive, Evington, VA 24550

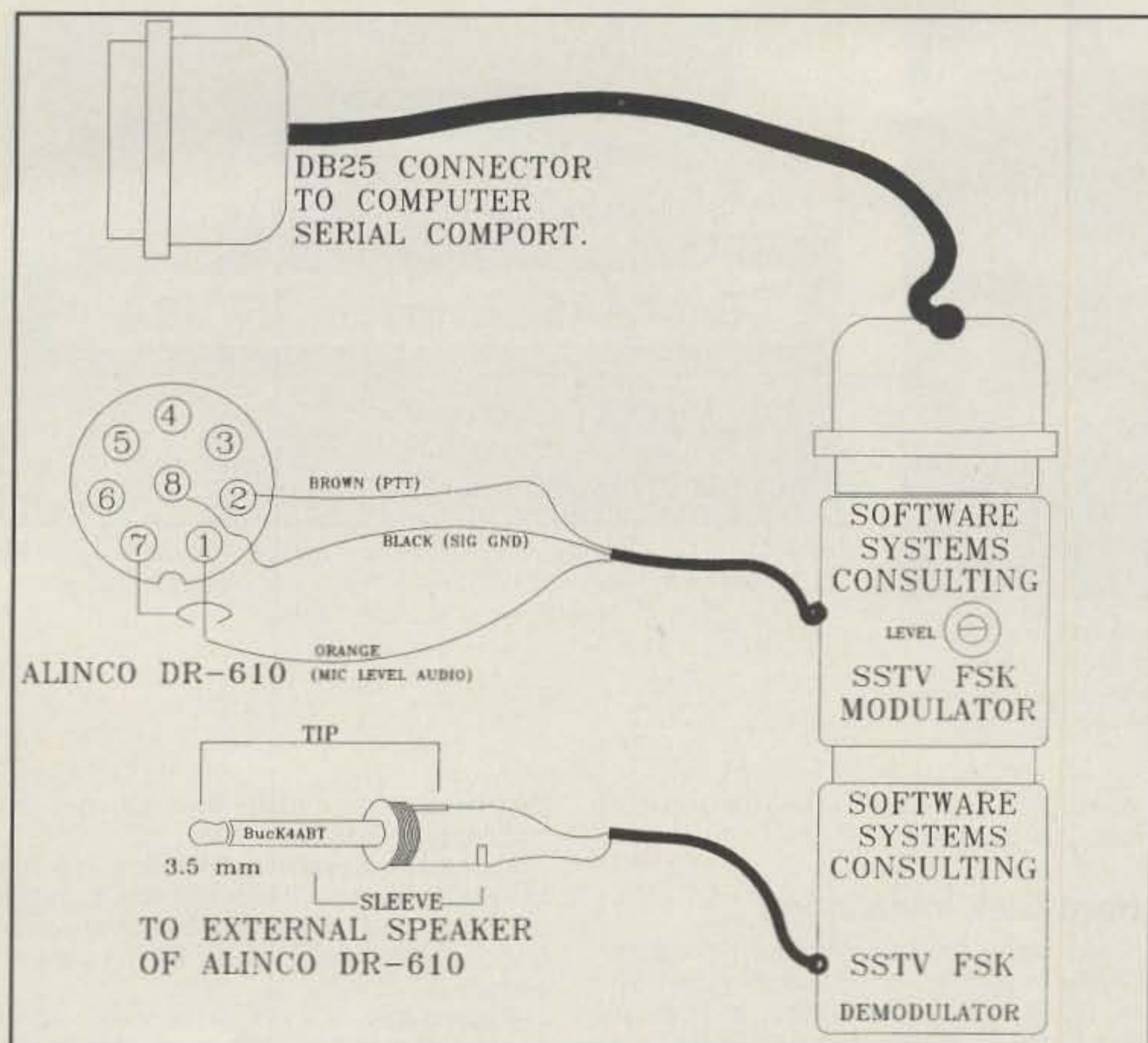


Fig. 1— This drawing is an example of how the SSC PC-SSTV is interfaced to a VHF transceiver. Connections to an HF transceiver are similar. Note the "Level" adjustment on the modulator. With the SSC PC-SSTV there is no need to open the PC and install internal cards. All connections are made external of the PC.

mation is recorded as the red intensity minus the total brightness, and blue intensity minus the total brightness. Scottie and Martin asynchronous modes send the green, blue, and then red intensities as separate scan lines.

The ATV transmission modes use a synchronous format. They send a digital header that identifies the transmission format and the location of the start of the image. Following the

digital header, the red, green, and blue components of each line are sent sequentially. Monochrome ATV modes send only intensity following the header.

SSC's PC Slow-Scan TV product supports the image formats listed in Table I. In addition to the 15 predefined formats, the user can specify an additional custom format by overwriting the Test entry once calibration is com-

plete. This flexibility is provided so that new reception formats can be configured into the program as they are encountered. Later in the manual we will discuss the settings that determine how these formats are specified.

Normally, prior to sending a picture a station will announce the format it will be using. To select a format different from the main menu, select Mode. A window containing the available modes will open up on the main menu. You can select a new mode either by using the cursor arrows or by pressing the letter to the left of the desired format.

## Installing The Hardware

PC Slow-Scan TV is shipped with an FSK demodulator and an FSK modulator. Plugged together these make a complete FSK modem that plugs into a standard 25-pin RS232C serial port. The first step is to plug the modulator into the demodulator. The demodulator is the black serial device that has a single 25-pin connector attached. The modulator has a 25-pin connector on both ends and looks like a gender changer. Plug the female connector on the demodulator into the male end of the modulator. Now plug the female end of the modulator into a serial port COM1 through COM4.

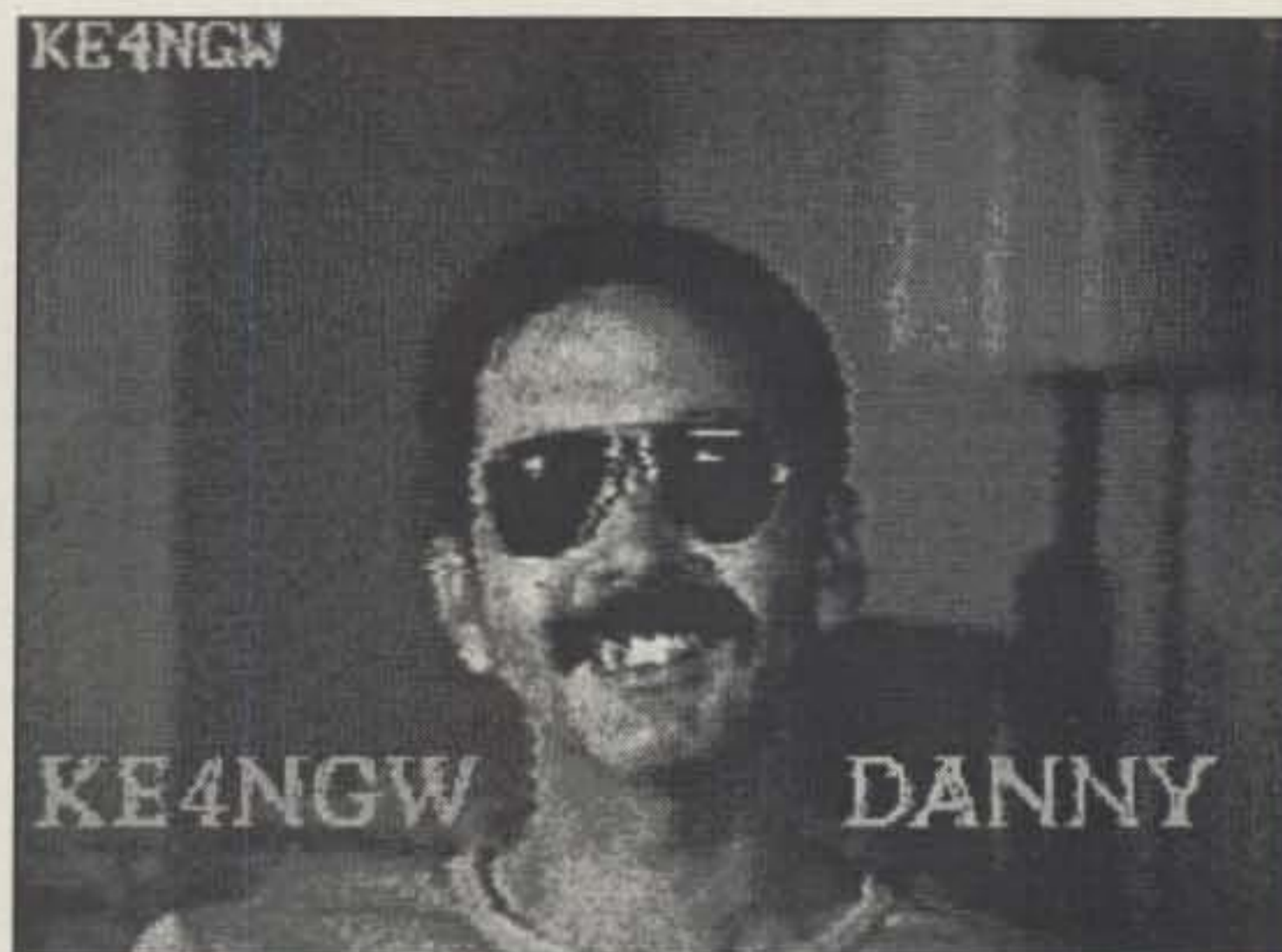
## The Interface

The modulator assembly has two cables coming off of it. One is a black audio cable with a 3.5 mm mini phone jack. This is the audio input to the FSK modem assembly. During the checkout period it should be connected to the output of a cassette tape recorder. It is most convenient to use a "Y" connector so that both headphones and the phone jack can be plugged into the cassette player at the same time.

During on-the-air operation the demodulator should be connected to the audio output of your transceiver (see fig. 1). Many receivers contain extra audio outputs for FSK modems or phone patches. Either of these, or a Y connector to the external speaker connection, works nicely. The manual supplied with the SSC PC SSTV contains a schematic of a micro-



This picture of Fred, KE4HI, is one of the first SSTV pictures I received on the 145.21 repeater. The grainy look of the picture is because I had not set the correct VESA driver for my VGA card. The SSC PC-SSTV is supplied with video drivers for most computer video cards.

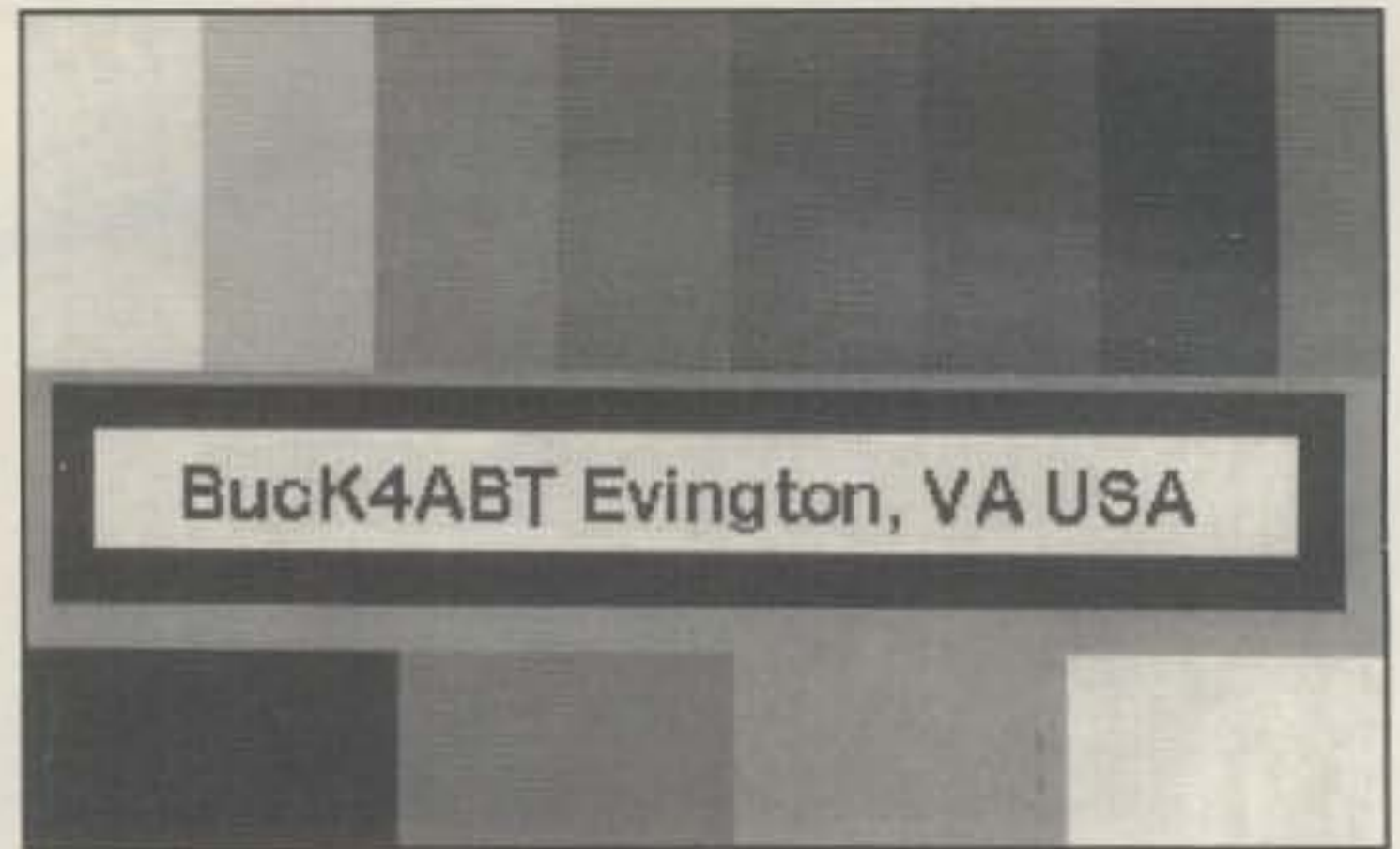


Danny, KE4NGW, is sometimes shy, so when he is the "center-stage" star on SSTV, the west-coast blinders shade his eyes from the bright lights of Broadway.



FROSTY (Toy Poodle) K4ABTV

Finally I read all of the manual. Now we have the video card set with the correct video driver. Frosty is my able assistant in the lab here at the K4ABT SSTV studios. This "toy" poodle is a real live animal who sometimes thinks he is human, when indeed he is a real "ham."



The K4ABT SSTV test pattern as shown. This gray-scale test-pattern is actually in full color. All pictures in this article are color and were received in "Scottie1" format.

phone/SSTV switcher. There are also several mic/aux switch boxes on the market that serve this purpose well. The switch box that I use is from MFJ Enterprises (Model 1272B). I installed a 5-pin DIN female on the SSC modulator cable and set the internal switch-box jumpers to the Alinco setup, and the TNC-to-transceiver switch box became an SSTV or TNC plug-n-play switcher.

Using the drawing shown in the SSC PC SSTV manual will allow automatic changeover from SSTV transmit input to microphone input. The method is the user's choice.

The cable that comes from the modulator is a foil-shielded four-conductor cable. You will need to connect the modulator to the transmit portion of your radio according to the manufacturer's instructions. The easiest method of interfacing to most radios is to attach a microphone-style connector to the supplied cable and plug it directly into the microphone input of the radio when you wish to transmit. The four conductors are black (signal ground), orange (microphone level audio), brown (push to talk—PTT), and red (Morse key).

The shielded conductor should be connected to the radio's chassis to ensure that stray RF radio does not leak into the transmitter during operation.

The PTT line is keyed through a small signal-switching transistor internal to the SSC modulator/demodulator. To key the radio the transistor will pull a positive voltage to ground. The keying voltage should not exceed 35 VDC, and the total keying current should not exceed 100 ma. If the keyer of your radio exceeds these values, you will need to use an external keying relay for your transmitter. It assumes that the +12 V for this circuit can be obtained from the radio's power supply.

Once the hardware is wired up, you are ready to continue learning about SSTV.

## Loading The Software

Turn on your computer and load it with MSDOS or PC DOS. Before you go any further with the program, you should make a back-up copy of the distribution disk. This disk contains the PC Slow Scan TV program, data files, and sample pictures. *Never* use the original disks. Make working copies of the original disks with DOS

DISKCOPY and store the original in a cool, safe, and dry place.

## Hard-Disk Installation

If your computer does not have a hard disk, skip to the next section on executing from floppy disk. If your computer has a hard disk, you may install the software on your PC by inserting distribution disk #1 into drive A of your PC. Close the door and type the following two commands:

```
C:>A:
A:>install C:\SSTV
```

This command will make a directory called **SSTV** on your hard disk and install the program there.

## Listen and Learn

In the SSC startup kit there is a tape of SSTV instructions and SSTV pictures. If you have a cassette tape player handy, take the PC Slow Scan TV out of the box and put it into the tape cassette player. This tape contains sample signals. These signals will help you know what to listen for as you tune SSTV signals off the air. It is also an indispensable aid to setting up and checking out the program.

Turn on the tape recorder and play the first section of the tape. The announcer will introduce each of the sounds associated with PC Slow Scan. Listen to the tape once or twice before going any further.

## Back To The Program

After the program loads, you will see the main title screen. PC Slow Scan is an interactive, menu-driven program. Typically, you will be presented with multiple-choice screens describing a number of alternative actions. There are two ways to select any of the menu items. Each item may be selected by pointing to the item or by a single keystroke abbreviation.

**Method 1—Cursor Pointing.** At any time when you are allowed to make a selection, one of the items will be displayed in reversed highlight. Pressing the arrow keys on the keyboard changes the highlighted item. Once

the highlight is placed over the desired choice, press the ENTER key.

**Method 2—Keystroke Selection.** The first letter of each command description is unique on each menu. Pressing the first letter of a command description will cause the program to execute the command.

**Escape Key.** At any menu or screen within the program, with the exception of the main menu, you can press ESCAPE and return to the previous menu.

Before you can perform any operations, you must configure the program for your display. To do this press the letter **H** for Hardware Configuration. The Hardware Configuration screen will appear.

## Hardware Configuration Menu

This is the hardware configuration screen. Press the **G** key for Graphics Card until your graphics-card type appears on the screen. For initial checkout, the easiest setting is VGA. It will work on VGA machines. Later on you can tune the display to your exact system. For details on other modes, see the Graphics Card section of the reference portion of the manual.

Once you have selected the type of graphics card, the program will pick the most common default for the monitor display attached to your computer. If the indicated video display type is not correct, press **V** until your particular monitor type is displayed.

Next you will need to indicate where you have plugged in the FSK modem assembly. Select Demodulator port until the correct port number is indicated.

Press **Q** to quit the configuration screen. Before the program erases this screen, it prompts you with the question "Do you wish to make these values permanent (Y/N)?" Press the letter **Y**. This causes these values to be saved on the disk. Had you pressed **N**, these values would have been used only for this session with PC Slow Scan TV.

The main menu will be displayed again. Typically, you will be presented with multiple-choice screens describing a number of alternative actions. The first letter of each description is set off from the rest of the description by a right parenthesis. Pressing the letter associ-

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## KNAT BYTES

In the December issue I covered the use and application of X-1J+ nodes in an APRS environment. I received several letters and calls asking how to install the correct BTEXT or beacon text so the APRS node would reveal its location on other APRS (screens) maps. The following is the format used to install that beacon text string:

**BT !nnnn.nnN/nnnnn.nnW#PHGnnnn/WIDE-RELAY**

where "n" is the numbers of the geographic coordinates, and the "n" following the PHG represents the Power, Height, and Gain numbers detailed in the file called DIGI.TXT. The portion of the beacon text header "PHG" is covered in the documentation supplied with the APRS files from Bob Bruninga, WB4APR, in a file called "DIGI.TXT." All text is in upper case!

The beacon text must be on the first line of the beacon text or it will not be transmitted in the correct format to appear on APRS users' screens. Thanks to Bob, WB4APR, and Bruce, WD4HIM, for help in clearing up this oversight.

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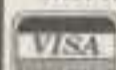
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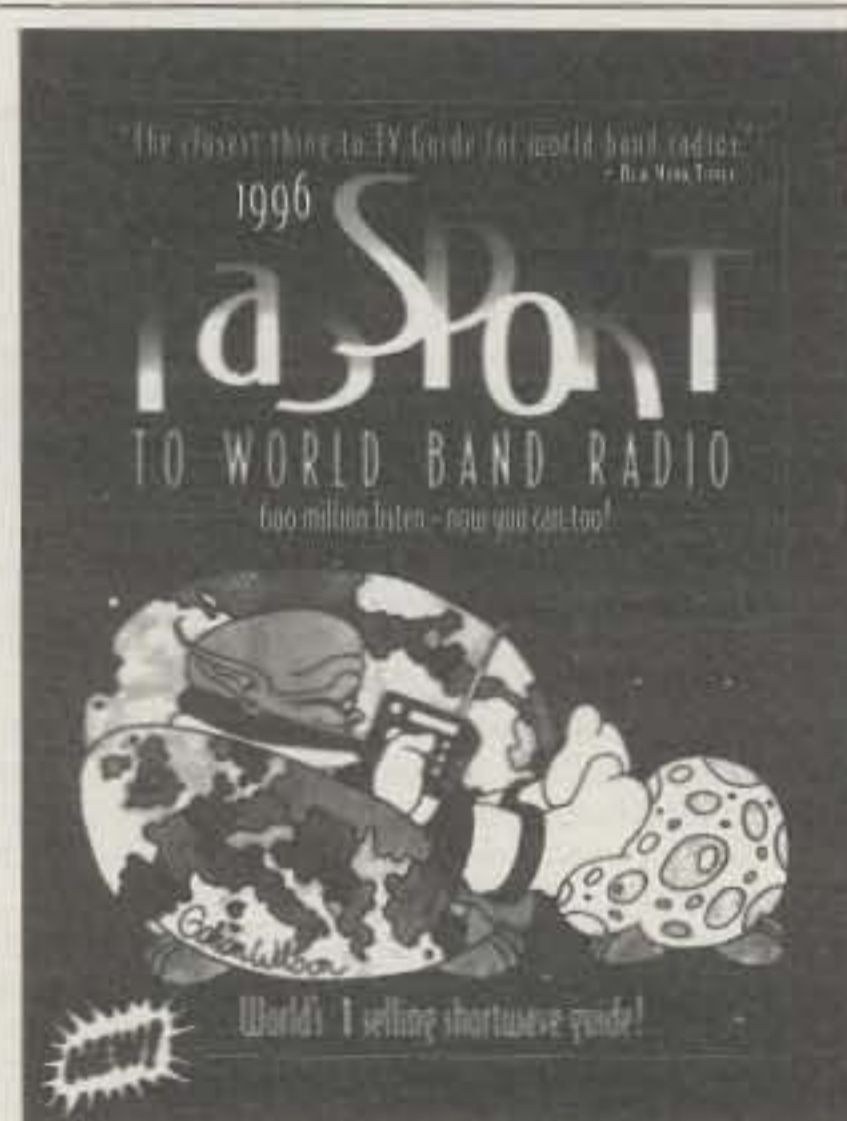
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ated with each command will cause the program to execute that command.

## Examining A Picture

To check that everything is working correctly, let's load one of the sample images that are on the program disk and examine it. Select File Management by positioning the selection highlight and pressing ENTER, or by pressing **F**. The main menu will be erased and the File Management screen will appear. The top of the file management screen shows the current disk drive prefix and the amount of space available on that disk drive. The bottom line of the display contains some function-key operation descriptions. The center of the screen contains a list of SSTV image files that are available in the current prefix directory. In this case, the samples supplied with the program appear along with the dates they were created and their sizes.

Select the file **FACE.STV** using the up and down arrow keys. When the selection highlight is over the file, press ENTER. After a few moments of disk activity the image will begin to appear on the computer's display. You should now see the face of a model showing off matching nail polish and lipstick. A black-and-white printout of this image is contained in Appendix B of this manual. Compare your display to be sure things are working right.

## Modem Assembly Checkout

A cassette player is used to check that everything is connected and configured properly before working on the air. Even as you become an experienced operator, you will find that with Slow Scan TV a cassette tape player is an indispensable tool in your shack. It is a very inexpensive way to save your favorite SSTV picture for viewing or retransmission. A 30 minute audio cassette easily stores 20 to 30 Robot, Martin, or Scottie pictures. When saved on disk, this many pictures could occupy 10 megabytes of storage.

This comparison shows clearly why audio cassettes are an economical storage method. Additionally, you may want to record SSTV pictures off the air onto cassette so that you can experiment with contrast and enhancement, or this method can be used for unattended capture of SSTV nets when you can't be actively operating.

To test the program plug a "Y" connector into the earphone output of an audio cassette player. Plug the audio jack into one side of the "Y" connector and a headphone into the other side. This method of connection lets you listen to the tape while the computer decodes the signal.

To verify that the hardware is correctly configured and installed turn on the tape and select Tuning Oscilloscope on the main menu. A line should be traced across the bottom of the display. Now turn on the tape recorder. You should see the trace move up and down as it crosses the display. When a Slow Scan image is played, the distinctive pattern of a Slow Scan image should be displayed.

## Previously Received Images

Once you have calibrated the received signal, select View and the image will be displayed on your monitor. The image displayed should appear like the FACE picture you viewed earlier. Once you get the image displayed, go

back and adjust the calibration to get the best contrast and detail on your monitor.

## Adding Text To Images

While you are viewing an image, you can write on it with the PC Slow Scan image editor. To add text to an image press the Function key, **F5**. A cursor will appear in the upper left of the image. Type a few letters or your callsign. You will see the letter written in white across the top of the display. You can change the foreground and background of the characters using the following function keys:

Color	Foreground	Background
White	Fn1	Shift+Fn1
Black	Fn2	Shift+Fn2
Blue	Fn3	Shift+Fn3
Green	Fn4	Shift+Fn4
Cyan	Fn5	Shift+Fn5
Red	Fn6	Shift+Fn6
Magenta	Fn7	Shift+Fn7
Yellow	Fn8	Shift+Fn8
Transparent	Fn9	Shift+Fn9

When you have finished adding text to the image, press ESC. The character cursor will disappear. If you want to discard the changes you have made to the image, press ESC again and you will return to the main menu. If you wish to permanently save the changes you have made to the image, press Fn10. The program will pause while it saves the changes and then return to the main menu.

## Sending A Picture

When you have successfully connected the modulator, view the stored image FACE and then return to the main menu. From the main menu select Send Picture. The main menu will be erased and the Transmit Menu will appear. From this menu select Current Image. The last image you displayed on your monitor will appear again.

At this point you are ready to transmit the image. Press the space bar. Your radio will key up. If your radio has a monitor option, you should hear the sound of a Slow Scan TV image being sent. Once the image has been sent, the Transmit Menu will appear again.

Before going on the air it is a good idea to practice receiving signals off the air and viewing them. This monitoring will refine your skills at calibration and capture. It will also allow you to observe standard operating practices on Slow Scan.

## Where To Get Pictures

The final step before you are ready to get on the air is to collect a set of pictures to exchange with other amateurs. These pictures can come from a variety of sources. It is not necessary to have a video camera, frame grabber, or other exotic hardware to participate in Slow Scan. Any image you can display on a PC is fair game for Slow Scan.

Probably the best place to start is with a compatible paint program such as NEOPAINT. I use NEOPAINT because it is easy to use and

it supports the four basic formats that are easily converted into SSTV formats. NEOPAINT is a product of NeoSoft with color support for 2, 16, 256, and 16 million colors. It allows drawing and modification of pictures in the PCXÖ, BMP, GIFÖ, & TIFF formats. This type of paint program allows you to use your computer's display to draw, convert, or modify pictures used with SSTV.

For more info contact Kevin Daniel of NeoSoft Corp., 354 Greenwood Ave., Suite 108, Bend, OR 97701-4631 (phone 541-389-5489; toll-free orders 800-545-1392). Trial versions of NEOPAINT and other NeoSoft products may be downloaded from WEB page URL address (<http://www.neosoftware.com/~neosf/>). NeoSoft also has a 24 hour BBS at 541-383-7195.

Another method for getting images to transmit is downloading pictures from bulletin boards, image scanners, and video frame grabbers. The picture of "Frosty," my toy poodle, is a live shot grabbed and sent via Scottie 1 SSTV format in almost real-time. The SSC Frame Grabber was directly accessed from the SSC PC SSTV program and the picture was taken without setting the TV camera or adjusting focus. From the SSC Frame Grabber to SSTV ready-to-send took place in less than 10 seconds, and the picture shown is printed in the SSTV format.

## Downloaded Pictures

Many computer services such as PRODIGYÖ, COMPUSERVEÖ, and BIXÖ, have sections

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ARD11/11B	41.5"	2m:3.7/70cm:6.1	120w
ARD12/12B	48.2"	2m:4.3/70cm:6.8	150w
ARD16/16B	64.8"	2m:5.0/70cm:7.7	150w

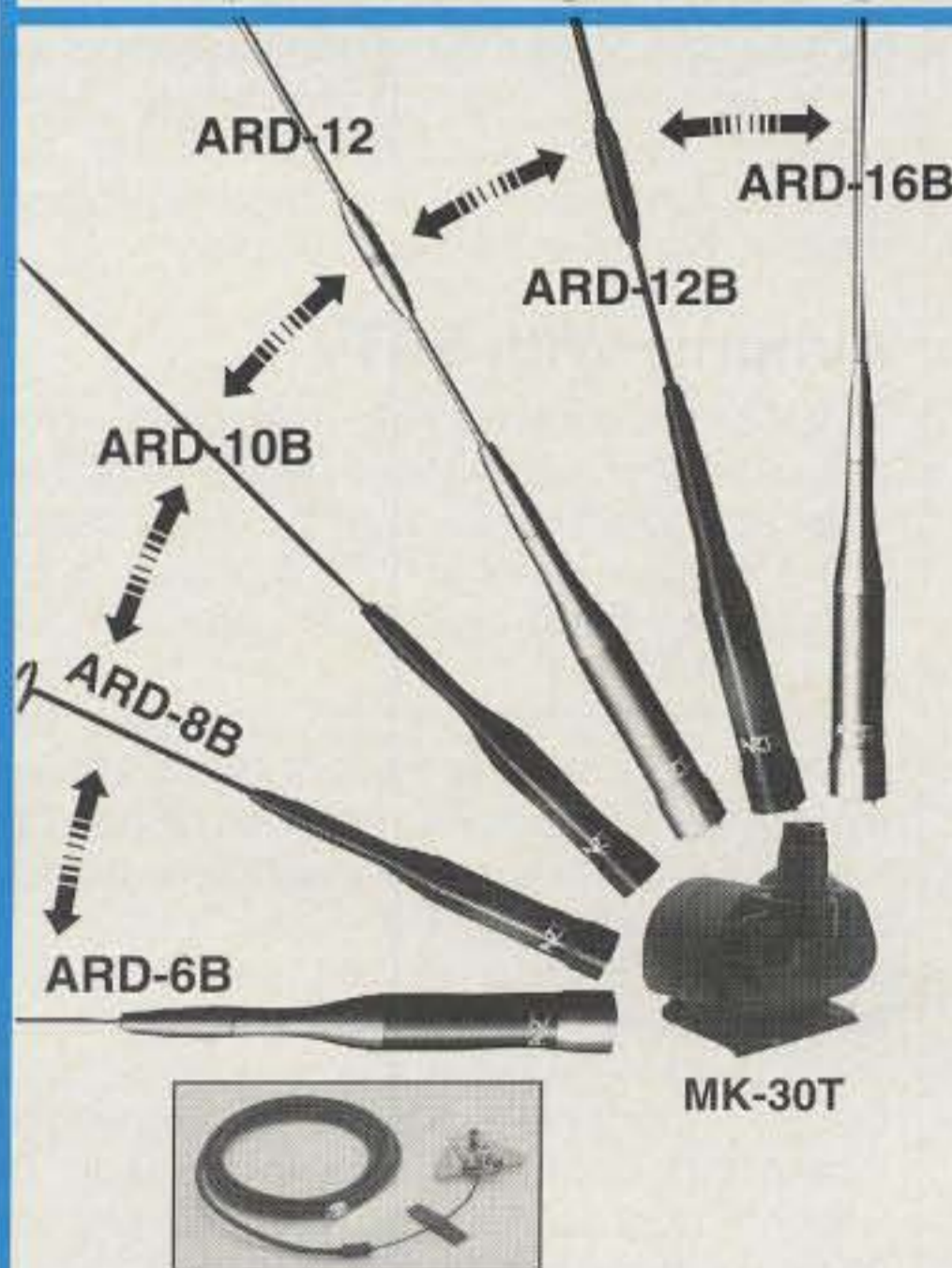
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dedicated to the exchange of computer images via modem. They often provide free software to display and create these file formats. If you subscribe to one of these services, check to find out what GIF (graphics interchange format) or PCX (run length encoded) images they have available for downloading.

Another type of device that is popular is called a hand scanner. This is a device you

hold in the palm of your hand and drag across a picture. It converts it to a black-and-white or color computer image. Such a device is a nice complement to the Slow Scan amateur station. In addition to the hand scanners, there are page-style desktop scanners available as well.

I use the MUSTEK 6000 SX flat-bed scanner to capture full-page color pictures in 66 million colors. Once converted to SSTV format

these pictures (when sent at VHF) are almost "closed-circuit" quality.

## Video Frame Grabbers

A video frame grabber converts NTSC composite video signal into a computer readable format. Images can be captured from a VCR or video camera with a frame grabber. SSC offers a modestly priced full-color frame grabber that integrates directly with PC SSTV. It easily lets you send image from video camera or videotape.

## Screen Capture Utility

To facilitate flexible operation PC Slow Scan TV comes with a background to snatch graphics-mode screens whenever you like. No matter how you get it on the screen, anything from a video game screen to a Lotus graph can be captured for Slow Scan transmission.

Once the background capture program is loaded, every time you simultaneously press the PrtSc key, the current contents of the graphics screen will be written to a disk file. Later, when running the SSTV program, these stolen screens can be recalled and recorded for transmission.

The supplied program is called GRABPCX. To load the screen capture program, enter:

**C:\SSTV>GRABPCX C:\PIC**

from the command prompt. This will load the background program to catch screens. The first time PrtSc is pressed, the screen will be saved in a file named PIC01.PCX. The next frame will be PIC02.PCX, etc. If you do not enter any file prefix for the print capture program, the default file's name is IMAGE01.PCX.

Because this program stays in memory even after it is run, it reduces the amount of memory available for applications by about 10,000 bytes. Unfortunately, because each program can use different screen conventions, there are some programs that will not let you grab screens. You will know that the screen has been captured successfully when the program emits a short tone from the speaker.

## Airborne With SSTV

To get on the air simply store on the PC a few pictures that you would like to share. Most Slow Scan activity on HF takes place on 20 meters at the frequencies of 14.230 MHz and 14.234 MHz. When band conditions permit, 28.680 MHz is also used.

It is a good idea to get a picture that has your callsign and some type of logo and keep it handy on a disk. This image can be used as a kind of CQ or a way to announce yourself to a QSO in progress.

When composing images, remember that interesting pictures, like interesting talk, make you an amateur radio operator worth working. Once you start working Slow Scan, you will find local amateurs who are active in the mode. Try working local SSTV's on VHF FM. The low noise on these bands makes pictures come over as if they were sent closed circuit.

If you would like more information about the SSC's SSTV products, send to Software Systems Consulting (SSC), 615 El Camino Real, San Clemente, CA 92672 for their catalog, or call John Hoot, N6NHP, at 714-498-5784.

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Ripple(max.)	3mV	3mV	3mV	3mV	3mV
Regulation	1%	1%	1%	1%	2%
Cooling Fan	NO	NO	NO	YES	NO
Size(inch.)	5x4x9	5x4x9	7x6x9	11x5.5x9	6x3x9
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# CONTEST CALENDAR

NEWS/VIEWS OF ON-THE-AIR COMPETITION

## What Does Cycle 23 Have in Store for Contesting?

**H**allelujah! Scientists from around the world are starting to report the existence of new sunspots on the sun's surface! As we're finally beginning to leave the bottom of the current sunspot cycle, I've been thinking a lot about what the future holds for contesting in Cycle 23. Before we embark on that thought, let's reflect a little on what has already occurred.

Some of the more pessimistic contesters have been saying for years that there would be serious repercussions to contesting due to poor 10 and 15 meter propagation during the bottom of this current cycle. After all, the last sunspot peak brought with it unprecedented operating levels in contesting from around the world. Not only was there phenomenal growth in U.S. HF operators (especially on 10 meters), but our ranks were exploding in Europe and other parts of the world. A typical CQ WW SSB contest would find 10 meter activity as high in the band as 29 MHz and 15/20 meters were absolutely filled to the brim! More and more stations, especially overseas, were discovering the benefits from CQing in contesting (rather than limiting their operation to calling others, exclusively). The question being asked was: How will DX contesting function when all of this activity has to find its way to 20 meters—the only useful daylight HF band for worldwide communication? Well, those of us with a few cycles under our belts knew that things would work themselves out. While 20 meters has been a little crowded this year, to say the least, I'm not sure it's that much different than in the past. We were also blessed this fall with extraordinary conditions in the CQ WW, allowing for excellent propagation on 15 meters. Basically, the doomsday types blew their prediction—contestng has continued on just as it always has through this cycle. In fact, with outstanding low-band conditions and increasing activity levels, many records were broken in this past year's CQ WW. Now who would have guessed that?

Well, before we get carried away with patting ourselves on the back, there are many issues still facing us as we enter Cycle 23. For starters, have you noticed the graying and retreating hairlines of your fellow contesters recently? How many 16-year-old contest operators (or hams for that matter) do you know? This subject has been widely discussed and perhaps even beaten to death, but it remains at the very core of contesting's future. This year, together with some of you, I'd like to propose some practical ideas to make real progress in this area. Watch for more reporting in this area.

Another topic to be thinking about is continued technological advances and their application to contest operating. Some folks feel that we have already gone too far in removing the

### Calendar of Events

Jan.	26-28	<b>CQ WW 160 Meter CW Contest</b>
Jan.	27-28	U.B.A. SSB Contest
Jan.	27-Feb. 4	QRP ARCI Novice/Tech CW Roundup
Feb.	3	North American SSB Sprint
Feb.	3-4	Northern New England QSO Party
Feb.	4-5	1996 Classic Radio Exchange
Feb.	10	North American CW Sprint
Feb.	10-11	PACC Contest
Feb.	10-11	Digital Journal RTTY WPX Contest
Feb.	10-11	QCWA CW QSO Party
Feb.	10-12	YLRL YL-OM SSB Contest
Feb.	16-18	YLRL Int'l. SSB QSO Party
Feb.	17-18	ARRL CW DX Contest
Feb.	23-25	<b>CQ WW 160 Meter SSB Contest</b>
Feb.	24-25	U.B.A. CW Contest
Feb.	24-25	North Carolina QSO Party
Feb.	24-25	RSGB 7 MHz CW Contest
Feb.	24-26	YLRL YL-OM CW Contest
Feb.	25-26	Winter QRP QSO Party
Mar.	2-3	ARRL SSB DX Contest
Mar.	9-10	QCWA SSB QSO Party
Mar.	10-11	Wisconsin QSO Party
Mar.	12-13	CLARA HF Contest
Mar.	16-17	Bermuda Contest
Mar.	30-31	<b>CQ WW WPX SSB Contest</b>
Apr.	6-7	EA RTTY Contest
May	27-28	<b>CQ WW WPX CW Contest</b>

"operating element" from some stations. Frankly, the technology is available today to make the ancient art of using the VFO dial a thing of the past. There seems to be growing consensus that packet spotting is not entirely good for contesting either. The combination of busted callsigns being spotted and those tedious "packet pileups" makes one think critically about this technology at times. And, will we continue to fall into the trap while operating that unless there's a needed multiplier displayed on the screen, we have nothing else to do while operating on our own? Questions, difficult questions. Contesting's leaders had better get a handle on the issues in this area before it gets away from us.

Finally, there is the matter of frequency usage. We all know the impact that contests have on the bands. I'm hearing more and more discussion about implementing contest-free zones on the bands, but I think the overwhelming view is that they are not practical for any number of reasons. Rather than worrying about blocks of clear frequencies, we all should be putting more emphasis on cleaning up the "courteous factor" of our operating style.

Cycle 23, issues aside, is going to be an incredible time for contesting. When I look at the results of the last cycle and consider them in the context of where we are now in contesting, both technologically and from a participation standpoint, contesting in the late 1990s is going to offer a thrilling time for nearly every participant. Will world high SSB single op scores exceed 20 million? It could be quite possible. Will a U.S. single operator be able to

### February's Contest Tip

On a contest weekend (due to the high duty cycle of your equipment), unlike any other weekend of the year, your shack may get very warm. Try this: Use a 24 volt fan powered by a 12 volt source to provide a light breeze on your face while operating. It just may be the "creature comfort" you've been looking for when operating (thanks to K1VR).

make 5000 SSB QSOs? I think it is quite likely.

As we enter Cycle 23, we have an incredible opportunity to enjoy amateur radio and contesting in ways never before possible. I'm optimistic that this solar milestone may also be one of the catalysts we desperately need to deal with our problems, too. I hope you agree!

### CQ Profiles: Tony Cardelli, I6FLD

One of the things about contesting that continually amazes me is the incredible consistency of some operators. Year in and year out they seem to always be there; a sort of beacon station that you know will always make it into your log in every contest.

Recently I received a letter from my good friend Tony, I6FLD, who I had the pleasure of meeting for the first time at last year's Dayton Hamvention. Tony was as gracious in person as he is on the air, and I'm proud to profile him in this month's issue.

Tony has been an active amateur for over 47 years. At 65 years old, he has quite a few sunspot cycles to his credit with one consistent theme throughout his amateur radio career—contestng! With the exception of a



The first station of I6FLD in 1951.

c/o CQ magazine  
Internet: p00259@psilink.com  
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small period of inactivity while attending agricultural college and starting his family, Tony has lived and breathed amateur radio. It all started with the inspiration of his father and radio pioneer, I1AZK (ex-I2RCM).

Tony first went on the air in 1948, after the war, with a Hartley Oscillator, regenerative receiver, and a simple Zeppelin wire antenna. Shortly thereafter Tony significantly upgraded his station by homebrewing a pair of 813s on AM modulated with a pair of 811s and an old Hammarlund Super-Pro receiver. As you can see by his early photo, it was nothing close to what we enjoy today. By 1951 Tony put up his first rotary beam—a three-element 15 meter Yagi interlaced with two elements on 20 meters. This station combination enabled Tony to achieve DXCC Phone #435 in 1952. And all of this was going on while he was just in his early 20s!

After graduating from college and starting a successful career with Consorzio Ortofrutticolo, specializing in fruit exports, Tony really began to establish his contesting presence in the 1960s. His station evolved with the hobby's technology. Tony's antennas have been ever-growing over the years as well. From his early days using interlaced Yagis, he moved from using a Mosley Classic 33 beam to an impressive array of monoband Yagis and a two-element quad on 40 meters—all of this while operating from a hilltop in Giovanni Teatino, 200 meters above sea level. Compared to his early days of homebrew AM equipment, Tony has made great strides inside his shack, as it is adorned with several homebrew amplifiers as well as a TS950SDX and an FT1000.

During Tony's 29 years of active contesting, consistent "top ten" performance has been the norm. As I6FLD puts it: "to me, contesting is a way of life." His results over the years bear this out. Preferring single operator, all band operating, Tony has placed high in 53 major contests, including 20 top ten performances, 33 top Italian, and 11 top European finishes. It's an amazing legacy that may never be duplicated again. While Tony feels that superior operating techniques, knowledge of propagation, world-class station hardware, and experience all contribute to contesting success, a "never give up" attitude is most important when competing.

Although Tony prefers the single operator category, he has been part of a number of highly successful multi operations, including IQ3A (multi-multi European record, CQWW), IH9AA (number 3, world, multi-single 1973 CQ WW), and many others. In fact, the list of callsigns that Tony's familiar voice has used over the years includes I2FLD, I1FLD, I9FLD, IP9FLD, I6FLD, IJ6ONU, IH9AA, IG9PLN, IØRDJ, IØIJ, IQ3A, II6K, IR6L, IU6A, IQ6A, IQ6F, and II6F. Imagine trying to keep all those QSLs in order!

In addition to Tony's contest operating achievements, he has also been active in many other operating areas, obtaining 5BDXCC, 5BWAS, 5BWAZ, USA-CA All Counties, and top DXCC Honor Roll (363/326). Not only is Tony the only Italian station to ever achieve this impressive array of operating achievements, he's done it with class and grace throughout his amateur radio career.

For Tony, amateur radio in general and contesting in particular have had a profound impact on his life. It's part of his soul resulting in an amazing list of accomplishments. What I learned about Tony when I met him in Dayton

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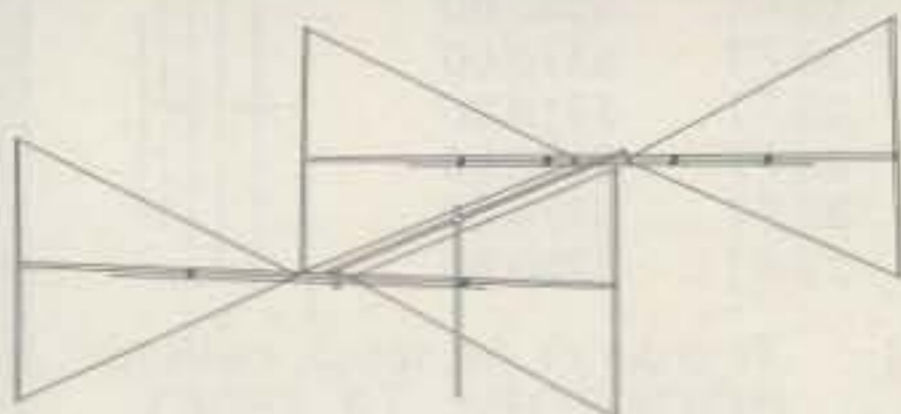
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Contest	Total Operations	Top 10 Finishes	#1 Italy	#1 Europe
ARRL DX	15	7	8	4
CQ WPX	12	5	8	-
CQ WW	20	6	15	5
WAE	3	2	2	2
IARU	3	-	2	-
<b>Total</b>	<b>53</b>	<b>20</b>	<b>35</b>	<b>11</b>

Table I—Summary of I6FLD's DX contest operating results.

last year is that there is another part to this incredible person. He is a warm, fascinating individual who is a true ambassador for amateur radio and one I'm proud to call my friend. Congratulations, Tony, on a fine amateur radio career. Somehow I don't think you're done hanging up winning awards on your shack's walls. In any event, I look forward to our next contest QSO when you say: "K1AR, Hello my friend John, you're 5915!"

## Closing Remarks

As I'm writing this month's column it's 14 degrees and snowing outside. Sure sounds like perfect antenna weather to me. Seriously, we all hopefully are enjoying the benefits of our hard "outside" work this past summer and dreaming about new projects for the spring.

All of your 1995 CQ Contest Survey comments are in and the pile is formidable. I'll be digging through the pile and producing a report for you all to read next month. There are some very interesting data buried in it all! Thanks again for your participation.

As always, May contest calendar submissions must be received no later than March 1st.  
73, John, K1AR

## New England QSO Party

0000Z Sat. to 2400Z Sun., Feb. 3-4

This is the combined Vermont, New Hampshire, and Maine QSO parties. Although each

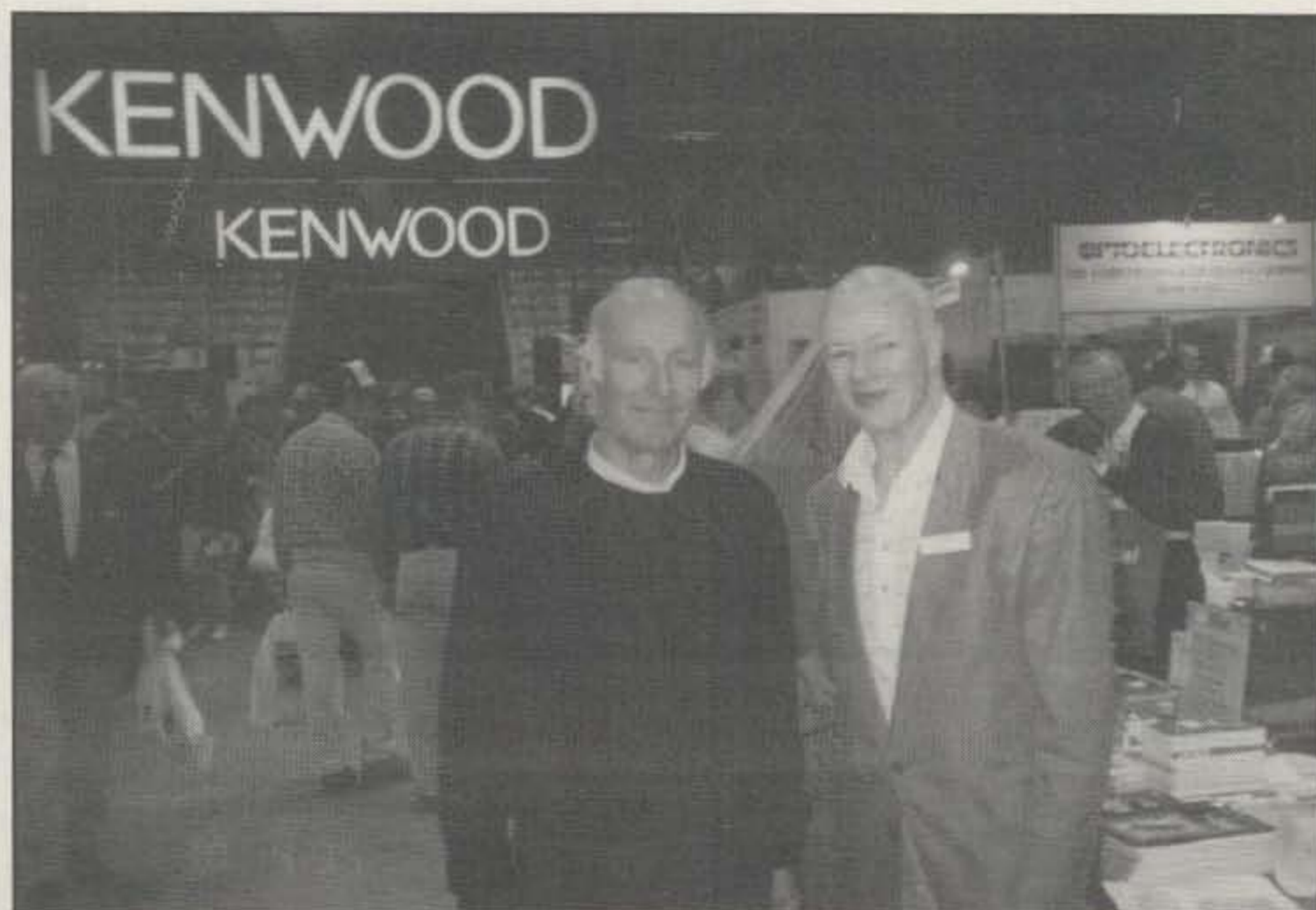
contest is separate (with separate scoring and awards), they all use the same rules and times. Entrants may work any 24 hour period with off times being a minimum of 6 hours. Stations may be worked once per band and mode.

**Classes:** Single or Multi-Operator all bands, large club, small club, low power (less than 150 watts), high power, and mobile.

**Exchange:** New England stations send RS(T) and county. All others sent RS(T) and state/province/DXCC country.

**Frequencies:** Phone—first 25 kHz up from the beginning of the General band and Novice 10 meter band. CW—40 kHz up from the bottom edge of the bands and 20 kHz up from the bottom of Novice portions. VHF—50.200, 144.20, and 146.69 MHz. Other modes can be used. Repeater contacts do not count.

**Scoring:** Credit 1 point per phone QSO and 2 points for CW, digital-mode QSOs. CW QSOs with special-event stations KB1BQI, K1UFL, KB1BRN, W1KOO, W1BD, WB1FPT, KB1BQH, KB1BSB, WA1WLM, KB1BRI, KB1BPR, KB1BPX, KB1BSP, W1FN, and WB1GQR are worth 10 points for the Vermont party. Credit 10 points for CW QSOs with WB1CAG, K1BKE, KB1BRO, W1WQM, N1KLP, WW1G, KB1BTW, W1ET, W1GUA, KC1XG, and W1WA in the New Hampshire version. And for the Maine event, CW QSOs with NS1Z, K1GUP, KD1HH, WA1WPR, AA1KC, W1TLC, N1JBD, N1BUG, W1KVI, and WA1URS are worth 10 points. Non-New England stations multiply total QSO points by the number of VT, NH, and ME counties. New Eng-



Here's Tony, I6FLD (left), and Ken, K6IR, at last year's Dayton Hamvention.

land stations follow a similar format with the addition of states/provinces/DXCC country multipliers.

Send your postmarked entries no later than March 1, 1996 for the Vermont party to: Central Vermont Amateur Radio Club, Vermont QSO Party, P.O. Box 674, Montpelier, VT 05601. Send New Hampshire party logs and comments to: North Country ARC, Richard C. Force, WB1ASL, 12 Cottage Street, Lancaster, NH 03585-1903. The Maine party logs go to: Portland Amateur Wireless Association, P.O. Box 1605, Portland, ME 04104. Be sure to include an SASE for final results.

### North American "Sprint"

SSB: Feb. 3 CW: Feb. 10  
Sunday 0000Z to 0400Z (Sat. night)

This is the Spring edition of the "Sprint" run by the National Contest Journal. As the name implies, it's a shorty, only four hours long.

North Americans will be contacting other North American stations as well as stations in other countries, single operator only. North American boundaries are as defined by the rules used in the CQ WW DX Contest. Refer to the *National Contest Journal* for additional information.

### YLRL YL-OM Contest

SSB: 1400Z Sat. to 1400Z Mon., Feb. 10-12  
CW: 1400Z Sat. to 1400Z Mon., Feb. 24-26

Sponsored by the Young Ladies Radio League, this annual event is open to all licensed men and women operators around the world.

**Exchange:** Callsign, QSO number, RS(T), ARRL section/VE province/country.

**Scoring:** Phone and CW are considered separate contests. Score 1 point for each station worked. YLs only work OMs and OMs only work YLs. Credit a special multiplier of 1.5 if you are using 100 watts or less on CW and 200 watts PEP on SSB. Final score is the total QSO points times the sum of ARRL sections, provinces, and countries worked per band.

**Frequencies:** CW—3540-70, 7040-70, 14040-070, 21120-150, and 28150-200 kHz. SSB—3940-70, 7240-70, 14175-280, 21380-410, 28300-610 kHz.

**Awards:** Special award cups will be awarded to the winning phone and CW YL and OM. There are also first place YL and OM CW-only cups. Certificates will be sent to the high scorers in each US call area, VE province, and DX country, provided there are at least 10 valid QSOs in the log.

All logs are to be postmarked no later than 30 days after the contest and should be sent to: Carol Hugentober, K8DHK, 4441 Andreas Ave., Cincinnati, OH 45211.

### Dutch "PACC" Contest

1200Z Sat. to 1200Z Sun., Feb. 10-11

It's the world working The Netherlands on all six bands, 1.8 through 29.7 MHz, in the band sections recommended for contest operation by the IARU. The same station may be worked on each band, but on one mode only, phone or CW, for QSO and multiplier credit. Note that SSB QSOs are not allowed on 160 meters.

**Categories:** Single operator, multi-operator, and SWL.

**Exchange:** RS(T) plus a QSO number starting with 001. Dutch stations will add two letters to identify their province. There are 12 provinces: DR, FR, GD, GR, LB, NB, NH, OV, UT, FL, ZH, and ZL.

**Scoring:** Each QSO with a PA/PB/PI station counts one point. DX stations determine their multiplier by the number of provinces worked on each band (maximum of 72).

**Final Score:** Total number of QSOs times the number of provinces worked on each band.

**Awards:** Certificates to the top-scoring station in each category in each country. Also second- and third-place awards if returns justify.

SWLs must log the call of the Dutch station as well as the station being worked and both serial numbers. Scoring same as above. Indicate the multiplier in a separate column in your log only the first time it is worked on each band. Include a summary sheet showing the scoring, your name and address in block letters, and the usual signed declaration.

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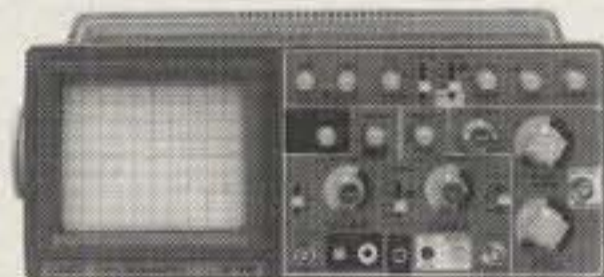
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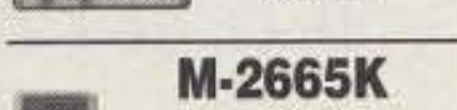
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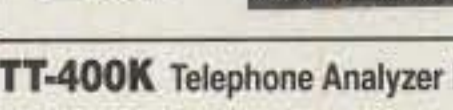
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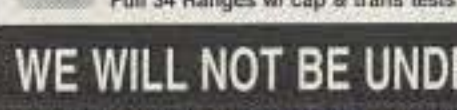
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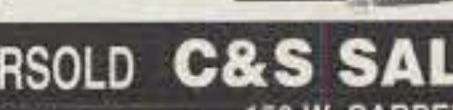


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### Digital Journal WW RTTY WPX Contest

0000Z Sat. to 2400Z Sun., Feb. 10-11

Sponsored by the International Digital Radio Association and the *Digital Journal*, this event is an excellent way to enjoy the fast-growing HF digital modes (80-10 meters, no WARC bands).

**Classes:** Single Operator (high power, low power, single band, all band), Multi-Operator (single transmitter, multi-transmitter), SWL. Single and Multi-Single operations may only use 30 of the 48 hour operating period. Multi-Multi stations may use the full 48 hour period. DX alerting assistance is permitted in all classes of operation.

**Exchange:** RS(T) plus a progressive serial number (e.g., 599001).

**Scoring:** Contacts between stations on different continents are worth three points on 14, 21, and 28 MHz and six points on the low bands. Credit 2 points for QSOs on the same continent (4 points on the low bands), and 1 point between stations in the same country (2 points on the low bands). Multipliers are the number of different prefixes worked using CQ's WPX prefix system.

**Final Score:** Total QSO points from all bands multiplied by the number of different prefixes worked.

**Awards:** Certificates will be issued to the winners of all categories and call areas in densely populated countries (i.e., U.S., Japan, etc.). An extensive trophy program is being developed for winners as well.

Logs must be postmarked no later than 30 days after the contest. Mail your entries to Jay Townsend, WS7I, P.O. Box 644, Spokane, WA 99210-0644. Computer entries will be accepted provided the file is in ASCII format. You can also send your logs via Internet c/o: "jayt@comtch.iea.com". For rules, log forms, or other information (including your desire to donate a trophy) contact Ron Stailey, AB5KD, 504 Dove Haven Dr., Round Rock, TX 78664-5926.

### QCWA QSO Party

CW: 0001Z Sat. to 2400Z Sun., Feb. 10-11  
SSB: 0001Z Sat. to 2400Z Sun., Mar. 9-10

This is the 38th annual edition of QCWA's fun and traditional QSO Party, which is open to QCWA members worldwide. Please note that CW QSOs are only valid in the CW section and visa versa for SSB.

**Classes:** Single operator, all bands.

**Exchange:** QSO number, operator's first name, chapter identification (members not belonging to a chapter should send "AL"), and state or DXCC country.

**Scoring:** Final score equals the total number of stations worked times the multiplier. Multipliers are the number of QCWA chapters

worked during the contest (credit a chapter multiplier only once).

**Frequencies:** CW—3530-3560, 7025-7055, 14030-14060, 21040-21070, 28040-28070. SSB—3900-3930, 7230-7260, 14260-14300, 21350-21380, 28530-28560. No QSOs on WARC bands. Check 160 meters at 0400-0500Z and 1200-1300Z.

**Awards:** Certificates will be awarded to the top scorer worldwide on each mode.

Separate logs and scores must be submitted for both modes. All logs must be received by April 15, 1996. CW logs should be sent to: Arthur Monsees, W4BK, 420 Bay Avenue, Apt. 1521, Clearwater, FL 34616. SSB logs go to: Donald Bice, W4PCO, 5511 18th Ave. N., St. Petersburg, FL 33710.

### YL ISSB QSO Party

0001Z Sat. to 2359Z Sun., Feb. 16-18

The party is open to all, but the emphasis is on membership participation.

**Categories:** Single operator, DX-US Partners, and YL-OM Teams.

**Exchange:** Call, name, QTH (state, province, territory, district, or country), name, ISSB number, YL-OM teammate, DX-US partner.

**Points:** One point for non-member contacts, 3 points for member contacts on the same continent, and 6 points if in a different continent.

**Multiplier:** Only contacts with member stations count as a multiplier. In addition, credit

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**Frequencies:** The General portions of the CW and phone bands, 10 through 80 meters. Avoid 14332 used by ISSB Net. Check 40 and 80 hourly.

**Awards:** Category and QTH area winners. Special certificate to the top combined CW and Phone score.

**Logs:** Should be set up as outlined in the exchange and should indicate at least two 6 hour rest periods. A summary sheet showing the scoring and other essential information would be helpful.

The mailing deadline for all entries is March 30th and they should be sent to: Rhonda Livingston, N4KNF, 2160 Ivy Street, Port Charlotte, FL 33952.

### ARRL International DX Contest

CW: Feb. 17-18 Phone: March 3-4  
0000Z Saturday to 2400Z Sunday

This is a great DX contest that you should not miss. I strongly recommend that you study the announcement in the December issue of QST for more details. Also send a large SASE (2 IRCs for DX) for sample log and entry forms.

All bands may be used, 1.8 through 28 MHz, but not 10, 18, or 24 MHz. Aeronautical or maritime mobile stations cannot be worked for contest credit. Following is a brief outline.

**Categories:** Single Operator, both single and all band, and Single Operator assisted. Multi-Operator, one transmitter and two transmitters. Also Multi-Operator, Multi-Transmitter. Also QRP, all band only (5 watts or less output). Multi-transmitter stations must remain on a band at least 10 minutes once a contact is made.

**Exchange:** RS(T) and state or province for WVE; RS(T) and power input for DX stations (three-digit number).

**QSO points:** W/VE stations earn three points for each W/VE contact.

**Multiplier:** Each DXCC country worked on each band for W/VEs. DX stations use US states (48), District of Columbia (DC), and VE provinces (13) for their multiplier. (Maximum multiplier of 63 per band.)

**Final Score:** Total QSO points times the sum of the multiplier from each band. Entries with 500 or more QSOs must include a QSO check sheet.

**Awards:** Certificates given in each category, in each country, and in each ARRL section, plus a wide selection of plaques. Also certificates to DX stations making over 500 QSOs.

Log entries are accepted on 5 1/4 inch MS-DOS formatted diskettes. Submit an ASCII file along with a signed summary sheet. No paper logs are required with this method.

Disqualification regulations will be strictly enforced and are listed in the official rules. Mailing deadline for all entries is April 5th, and they go to: ARRL DX Contest, 225 Main Street, Newington, CT 06111.

### CQ WW 160 Meter SSB Contest

2200Z Fri. to 1600Z Sun., Feb. 23-25

Just a reminder that the SSB section of our 160 Meter Contest will be coming up the last

full weekend of this month. (Yes, the SSB section is in February and the CW section was in January.—ed.) Extensive coverage has been given to this event, with complete rules in the November issue.

### North Carolina QSO Party

0000Z Sat. to 2400Z Sun., Feb. 24-25

This favorite is being revived again by the Alamance Amateur Radio Club, K4EG and is open to amateurs worldwide. Stations may be worked once per band/mode for QSO credit.

**Exchange:** RS(T) and QTH (NC county, state, or country).

**Frequencies:** CW—40 kHz up from lower band edge; SSB—3860, 7260, 14260, 21360, 28360 kHz.

**Scoring:** Credit 1 point for each SSB QSO, 2 points for CW, 5 points for each Novice/Tech QSO, and 25 bonus points for working both Cherokee and Dare counties. NC stations multiply total points times the number of NC counties, states, VE provinces, and DXCC countries. Others simply use NC counties as the multiplier (100 total). Add bonus points after all other calculations.

Logs must be postmarked by March 22nd and should be sent to: NC QSO Party, c/o K4EG, Box 3064, Burlington, NC 27215. Include an SASE for results and certificate. ■

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## ALL ABOUT THE WORLD ABOVE HF

### FCC's Haller Proposes Changes to Repeater Controls, Callsigns

In an address given to a meeting of the nation's repeater coordinators in St. Charles, Missouri on 7 October, FCC Wireless Telecommunications Bureau Deputy Chief Ralph Haller, N4RH, proposed certain changes and a system of callsigns for the repeater systems throughout the U.S. Following are excerpts from Haller's speech courtesy Bill Pasternak, WA6ITF, and "Newline On-Line Services."

"I have never been particularly comfortable with the notion that there was no official recognition for the coordinator in a given area. Under our rules, most anyone could claim to be a coordinator. Now, that has happened very few times, but unfortunately, it has happened.

"So, just as a precaution as we move into the future, I would like to provide a recognition mechanism for coordinators. You have devoted time, money and resources to the development of the coordination data bases that you have in place today. Nobody wants a fly by night interloper to come in and be able to issue a faulty coordination just because a couple of other amateurs in the area happen to agree with that person.

"I don't necessarily have the best answer for how to do this, but I have envisioned the possibility of some type of umbrella organization of coordinators across the country—not necessarily one entity—but you as a group working together in a formal or informal umbrella organization that would serve two purposes.

"First, it would be a single point of contact for the FCC to deal with amateurs on coordination matters. Second, it would be a group that would keep track of recognized coordinators throughout the country and serve as a second level review of contested coordinations.

"How about implementing a simplified repeater licensing program? No, I don't mean sending off tower heights and ERPs and coverage maps to the FCC. But suppose that once a repeater was coordinated by this umbrella group we assume that in itself would be sufficient for a repeater callsign. Perhaps a 'KR' callsign to be issued to truly coordinated repeaters. [Editor's note: Such 'KR' callsigns would presumably be issued from the Novice pool of callsigns because all Extra Class 'KR' callsigns have been issued and in some call districts the Advanced class 'KR' callsigns are now being issued.] The basic operating authority for a repeater has and will continue to come from the trustee's license which is issued directly by the Commission.

"But, we might be able to come up with a process whereby this umbrella organization would actually be able to issue the 'KR' callsigns and then just advise the Commission to update its database.

"I believe this is a win-win situation for the amateur community and for the FCC. I have wanted to resume issuance of repeater callsigns for years, but never had the resources.

P.O. Box 73, Oklahoma City, OK 73101  
Internet jlynch@post.cis.smu.edu  
Compuserve 72124.2734@compuserv.com

#### VHF PLUS CALENDAR

February 2	Moon apogee.
February 4	Full moon. Moderate EME conditions.
February 10	Aurora '96 VHF conference. (See text for details.)
February 11	Moderate EME conditions.
February 12	Last quarter moon.
February 14	Lowest moon declination.
February 17	Moon perigee.
February 18	Good EME conditions, but near new moon.
February 19	New moon.
February 25	Poor EME conditions.
February 26	First quarter moon.
February 27	Highest moon declination.

(EME conditions courtesy W5LUU.)

With many of the resources coming from your efforts, I think we can now accomplish this repeater licensing program.

"In addition to that, we have new equipment and software in place at the Commission that instead of manually processing these special callsigns permits us to do it electronically. As you know, in the VEC program, most of that information is coming to us electronically and I foresee that we can continue into other areas to receive information electronically which in turn minimizes our processing.

"Over the next several years we expect the Gettysburg facility where your licenses are processed to decrease in size, but I do not expect the services to the public to decrease. Rather, I want services to the public to increase. But the only way we are going to see that happen is for us to become more efficient and for us to rely much more on you—the users of the FCC services to take on some of the responsibilities that have traditionally been government responsibilities.

"I am looking to you for other ideas here today, or to tell me that mine are fairly stupid—and I do not mind hearing that if they are. That's why we're here. This is the first meeting of its kind. This is the first time that some of you have met each other. I hope that it is not the last time, because you are the ones out there performing a great service on a day to day basis, with relatively little recognition and lots of problems.

"We would like to help that and smooth that. The Commission can become the final arbiter in disputes. This relieves some of the risk that you have today. I don't know what the new process should look like. I don't know if we should even make any changes. But I think it is appropriate that, after the frequency coordination system has been in place for the number of years, we at least talk about the process.

"When the current system was put in place, none of us knew whether it would work. It has worked because you people in this room made it work, not because we back in Washington had created such visionary rules. Now that your program has matured, let's put the finishing touches on it.

"Nothing that I am suggesting in any way removes any autonomy that you currently have, but it gives you some protection. It adds no technical complications, but it does give some incentives and rewards."

As a result of the address by Haller, the coordinators decided that they did want a "Point of Contact" (POC) entity between the frequency coordinators and the FCC. The coordinators decided that they wanted the ARRL to be that point of contact.

The coordinators then selected a five member drafting committee to develop a Memorandum of Understanding (MOU) that would define the role of the POC. The committee was to have developed the MOU in time for presentation to the League's Board meeting last month. The committee members are Owen Wormser, K6LEW/4; Dick Isley, WD9GIG; Bill Kelsey, WA6FVC; Jim Fortney, K6IYK; and Whit Brown, WB0CJX.

Thanks goes to the "ARRL Letter," which provided additional material for this topic.

#### CO10TA Operation Report

The following report from the Internet is on the Cuban VHF Group's DXpedition to Julia Key, EL72xq, and is from Oscar Morales, CO2OJ.

"Operations were conducted on 6 and 2 meters and 70 and 23 cm. Operators included Moly, EA7AHS, and myself. We used his equipment on 70 and 23 cm, and mine on 6 and 2 meters.

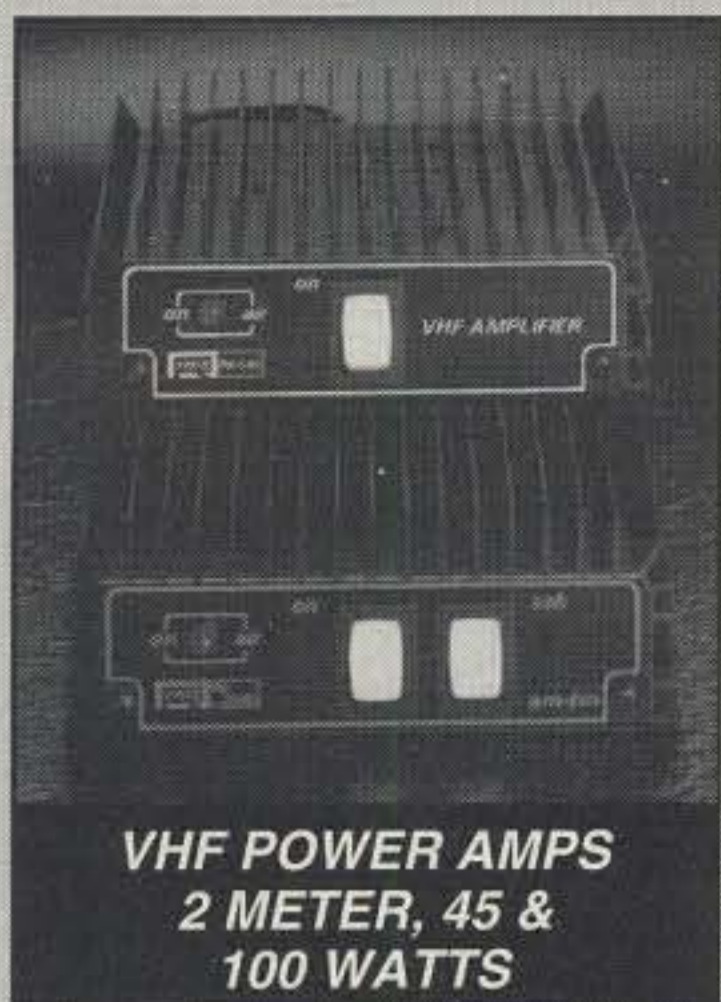
"Here are the final lists of contacts per band: On 6 meters, 101 QSOs, 47 grids. Longest DX, WB9AHM, and W1AJR, EN91, 2145 km (1330 miles). First QSO, KE4NJM, EL94, 23 November. We heard some meteor scatter in the early morning and tropo, or whatever it was, with stations in Florida, almost all the time.

"On 2 meters, the following: 68 QSOs in 25 grids. Longest DX, XE2OR, DL98 1730 km (1075 miles). First QSO, KE4NJM, EL94, 23 November. We worked stations in Mexico, Texas, Arkansas, Georgia, and others. I worked as CO10TA some stations in this band I would like to work someday from my QTH. These sta-

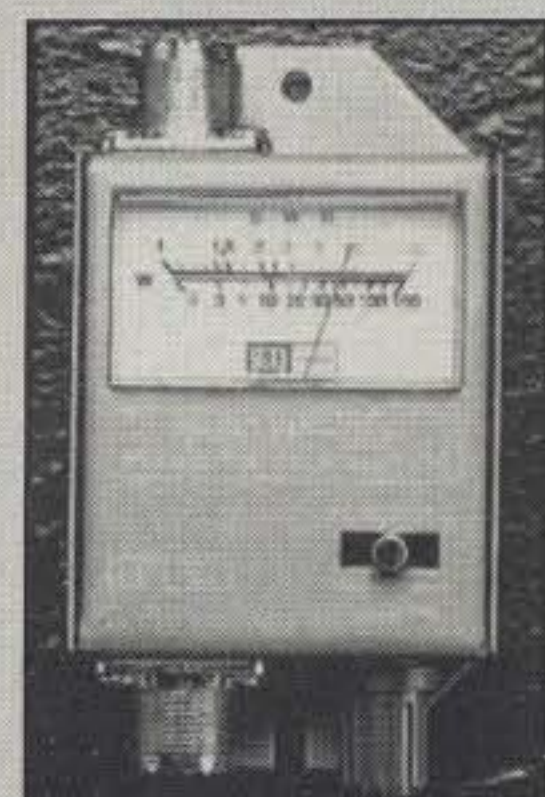
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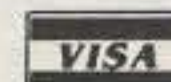


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From left to right, Michael, DB6NT, Jürgen, DCØDA, and Uwe, DF9LN receive cups of honor for their participation and contributions to the success of the ten years of the Danish Microwave Activity Week. (Photo via OZ9ZI)

tions include K4KAE, FM02, KC4YYD, EL79, and XE2OR, DL98!

"On 70 cm, the following: 12 QSOs in 9 grids. Longest DX, Al Ward, WB5LUA, EM13, 1690 km (1050 miles). First QSO, WA4LOX, EL87, 25 November. By the way, I have just repaired a 70 cm 15 watt transverter. If I find the correct crystals for use with my 6 meter rig, there will be another 70 cm station QRV in Cuba for the next tropo season. [Editor's note: Several of the states Oscar worked are the first-ever contact made between Cuba and that state. Not a little envy must be felt by some of the EME guys who have yet to work Cuba on this band for a new country!]

"On 23 cm, the following: We tried in this band with NI4Z, WB4JEM, KB5IUA, and WB4NPH. This last station were heard calling us, but he didn't hear our calls. Next time we will make it!

"In summary, we had one big 6 meter opening on the 23rd. We missed another one the 24th because a cold front with 40 miles winds arrived at our QTH at about the time the band opened. Have you ever been on a 45 meter (150 ft.) high tower with such a wind? If you have, you will then understand why we missed that opening! We had a good tropo opening on Sunday morning all the way through from Texas to the Florida Keys on both 2 meters and 70 cm.

"Some people told me (and I'm sure others thought) that a VHF DXpedition in November was a crazy idea. To them I just say that I believe that in the VHF bands! Anything is possible and any time may be good; you only have to be listening and prepared.

"I want to give a public recognize to KE4NJM for all the help and information he gave us, and to the rest of the hams interested in working CO1OTA. Thanks, Dean! Thanks also to all of you who look for us in the VHF bands and make possible such a fun. 73 and see you in the next opening—Oscar, CO2OJ."

### VE3ONT Operation Report

The Algonquin Park 150 ft dish was in operation during the first weekend of the ARRL EME

contest last October. Unfortunately, the operations scheduled for the second weekend of the test (in November) were scrubbed when a "paying customer" needed to use the dish that weekend. The following, from the Internet, was prepared by Peter Shilton, VE3VD, for the Toronto VHF Society, and is an unofficial list of stations worked during the first weekend: "On 50 MHz: OH2BC, WA4NJP, W5FF, and W6JKV. Other stations heard included I5MXX and W7HAH. An attempt to work VK3OT failed when nothing was heard from Steve. On 125 cm: WD8ISK, WA4NJP, W8IDU, WA6GVC/4 during the contest, and KFØM and KAB6IGC after the contest. On 23 cm the following: OZ4MM, EA6/DF5JJ, OH2AXH, OZ4HH, F1ANH, IK3COJ, OE9XXI, OK1KIR, OE9ERC, VE1ALQ, WD5AGO, F5PAU, K2EAV, WA4OFS, AA6WI, OE5JFL, WØRAP, KB3PD, EA3UM, F5PL, N7ART, VE6TA, K2UYH, KB2AH, W7GBI, W2UHI, AA4TJ, WØKJY, JH3EAO, JA8ERE, JH7BMB, and JH5LUZ.—73 de Peter Shilton, VE3VD."

### Thailand To Be on 2 Meter EME

According to a report in the November issue of the "VHF EME Report" newsletter Thailand is expected to be QRV on 2 meters EME some time this year. Met, HS3DF, will be operational with four M<sup>2</sup> 2M18XXX Yagis, a homebrew 8877 amp, and a manual rope elevation rotator (he expects to replace the rope with an MT-3000 rotator in the near future). As of November Met was awaiting shipment of the tube and some capacitors for the amp. Keep listening to the EME net for more information on this new country on 2 meters.

### Danish Microwave Activity Week Report

The following is a report on last year's Danish Activity week, which took place between 10 and 17 June. It is submitted by Steen Gruby, OZ9ZI.

"This year's Danish Microwave Activity Week was very special for us, as it marked the 10th anniversary of our activities in connection

with microwaves, which had to be celebrated in the proper fashion, of course.

"We have not attempted to upgrade to 76 GHz as mentioned in the report from last year [Editor note: See February 1995 CQ], as we recognized that it was more important to get the frequency stability under control in the bands for which we have built equipment than to extend our area of activity in general.

"For this purpose Uwe, DF9LN, has designed a temperature-controlled oscillator, known as an OCXO (Oven Controlled X-tal Oscillator), which we in the group decided to attach to the instruments which we had made earlier as building projects, Solectra, LMT 1-24 and JIT 47.

"Fifty oscillators had to be produced for this purpose, which does not sound discouraging, but various factors, such as problems with the crystal deliveries, prevented us from being ready for Danish Microwave Activity Week.

"Freddy, ON6UG, who had built the same OCXO into his 47 GHz equipment, provided an excellent demonstration of the amount of stability that can be achieved with this oscillator. More than one hour of listening to a beacon with the same type of OCXO without having to adjust for frequency drift at any time was quite impressive. (There was a malicious rumor that Freddy had managed to build two OCXOs which were running in the same direction at the same speed.)

"Another project that was decided upon during the winter was to build a microwatt meter. Bjarne, OZ1UM, has four instruments built a couple of years ago according to DJ4GC's design in UKW-Berichte, for which we had been so lucky in getting HP3333 probes, giving us at that time an instrument which could be used from 1 MHz to 24 GHz with reasonable accuracy and with an output contrast of approximately 70 dB. Without this instrument, we would have had difficulties in measuring the equipment we have produced during the last couple of years.

"Because four instruments are not a lot and in recognition of the fact that the ability to measure is a vital feature, the decision was taken to construct an instrument for each member in the group, plus some as presents for each foreign participants.

"The instruments we have made are built using a newly designed logarithmic amplifier, which can be adjusted to a wide range of detectors, such as HP or the new detector produced for the purpose by PROCOM A/S. Just as with the 'old' instrument, the contrast area is 70 dB, from -50 to +20 dBm, and depending on the choice of probe, an accuracy of  $\pm 1.5$  dB can be reached.

"Of course we had planned on being QRV on 10, 24, 76, 145, and 241 GHz with SSB and CW, and 10 GHz ATV. Unfortunately, the weather gods were not in a very good mood, just like last year. Therefore, we had problems with the very high frequencies over 24 GHz.

"During the weekend, the longest QSO of 10 GHz was 350 km (218 miles). That was made between Finn, OZ2FF, and Jürgen, DCØDA, and just barely on CW. The team of Hans, OZ/PAØEHG, and Jan, OZ/PAØJGF (JO47fj), made a 24 GHz contact with the team of Jens Henrik, SM/OZ1JLA, and Palle, SM/OZ1FPN (JO67cc), for a distance of 110 km (68 miles). Additionally, Bjarne, OZ1UM (JO55wx), and Freddy, OZ/ON6UG (JO56gx), made a 90 km contact on the same band. On 47 GHz, Bjarne

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Jürgen, DCØDA, is working hard in the Norwegian mountains during the Danish Activity Week. (Photo courtesy OZ9ZI)

could read Freddy for 3 hours over the 90 km distance, but unfortunately, because Freddy could not read Bjarne, so no QSO took place.

"On Tuesday, 13 June, the weather was wonderful at Verdens Ende, Norway. Operating from there were Jürgen, LA/DCØDA, and Steen, LA/OZ9ZI (JO59fe). The weather at Skagen, Denmark was not too bad, so we decided to try to make a first-time connection between Norway and Denmark on 24 GHz over a distance of 162 km (100 miles). Operating on the Denmark side was DF9LN/p as operator and DB6NT/p as cooperater from Skagen, and OZ9ZI/p as operator in Norway with DCØDA/p as cooperater.

"The contact was made at 5:10 PM, local time. The reports were 59+ both ways. As a result of the excellent conditions, we made an additional QSO on FM. These contacts were the best DX for the week on this band.

"The equipment used was DB6NT modules at both ends, built by Jürgen, DCØDA, and Uwe, DF9LN. The output was approximately 200 mw and the receiver noise figure was approximately 2 dB. The antenna was a 50 cm PROCOM dish. We tried to receive solar noise, and the noise did increase significantly when the antenna was directed at the sun. Unfortunately, we were incapable of measuring the solar noise due to the lack of instruments, but a conservative estimate is approximately 5 dB, which is quite good.

"An attempt to establish a connection on 47 GHz was nil, which can probably be ascribed to the fact that the equipment use in Norway emitted a maximum of 100 µW [microwatts] and that the noise figure of the recipient is above 10 dB.

"As a terrible storm broke out over Sjælland on the same evening, LA/OZ9ZI was able to implement a rain-scatter CW connection with OZ1UM over 380 km (236 miles) from Verdens Ende (JO59fe) to Hillerød (JO65dx) at 10 GHz, which was the best DX for that band for the week! All the stations which were QRV on that evening had a tremendous demonstration of

the rain scatter and the possibilities that this phenomenon offers.

"Unfortunately, the ATV equipment, which we in our optimism had taken to Norway with us, was not even unpacked because of the weather. It would have been an achievement to get a connection of 350 km (218 miles) between Verdens Ende and Spodsbjerg, but the weather gods thought differently.

"A number of tests between Stabel Høje and Kalø Vig, a distance of 9 km (5.6 miles), were made. Successful contacts were made on both 47 and 76 GHz on as a result of these tests.

"The French participants made a very special contribution to the week. They had decided that since they were banished to a (desert) island anyway, they might as well establish



Pavel, OK1AIY, watches the Norwegian beacon on 10 GHz just before the first 24 GHz contact was established. (Photo courtesy OZ9ZI)

themselves on all bands, from 50 MHz and upwards, if for no other reason than to keep boredom at bay.

"They managed to occupy the island's only community aerial so effectively that it was necessary to make an agreement with the 'natives,' after which there was radio silence from 6 PM until midnight every day. And yet, the four men managed to make more than 1000 QSOs from 50 MHz and upwards, in addition to the connections which were established at 10 GHz and upwards. Very well done.

"Over the years we have learned that construction is an important part of the equipment for the GHz bands. We ourselves think that we have come a long way in this respect, but it is still very difficult to match the accuracy that DB6NT, DCØDA, and DF9LN have put into the construction of their equipment. Generally, it is also the fact that the more effort that is put into mechanical and electrical construction, the better the performance of the equipment, as is proved by practical tests.

"On Friday, 16 June all the participants gathered in Ebeltoft to inspect the equipment used in the past week and to make comparisons, but also to mark the 10th anniversary of the Danish Microwave Activity Week. Our sponsor, PROCOM A/S, was the host at a gathering at Hotel Hvide Hus in Ebeltoft. During the dinner cups were handed to Michael, DB6NT, Jürgen, DCØDA, and Uwe, DF9LN, with thanks for ten years of support for our building activities and participation in our activities concerning Danish Microwave Activity Week.

"I would like to thank all the participants, especially the foreign participants from Germany, Belgium, the Netherlands, France, and the Czech Republic. I hope to see you again next year when Danish Microwave Activity Week has been postponed to the last full week in June. On behalf of the North Zealand GHz Work Group and the PROCOM Amateur Radio Club, 73 de Steen Gruby, OZ9ZI."

The following is a list of the participants in the Danish Microwave Activity Week: from Germany DB6NT, DCØDA, DF9LN, and DF2CA; from France F10IH, FB1NZQ, F5LTB, and F5ORF; from the Czech Republic OK1AIY; from Belgium ON6UG; from Denmark OZ1COX, OZ1DAT, OZ1DCT, OZ1FPN, OZ1JLA, OZ1KRH, OZ1LPM, OZ1SDE, OZ1TKN, OZ1UM, OZ2FF, OZ2LLP, OZ2OP, OZ2TG, OZ5BZ, OZ5DI, OZ5UJ, OZ6JI, OZ6TX, OZ7DX, OZ7J, OZ8AO, OZ9AC, OZ9FR, OZ9ZI and (no call) Henrik Nielsen; from the Netherlands PAØEHG and PAØJGF.

## 1995 SMIRK Contest Results

The following is from Pat Rose, W5OZI, Secretary of the Six Meters International Radio Klub (SMIRK).

"Good sporadic-E propagation and excellent participation describe the 1995 6 meter SMIRK Contest. Over 1250 6 meter hams participated. More than 250 SMIRK members got in on the action.

"John Godwin, KB5IUA, was the big winner again this year, with 141 SMIRKs, 159 non-SMIRKs, and 158 grids. John was followed by Tom Glaze, KC4SUS, in the number two spot. Oscar Morales, CO2OJ, got the highest score of the DX entries, and his award was presented to him at the Central States VHF Conference in Colorado Springs last July. Oscar was fol-

lowed closely by Rafael Ortiz, XE2LQB, the winner for Mexico. Log entries were greater than last year, with entries again this year from Cuba, Mexico, and Canada.

"The 48 hour annual SMIRK contest is usually held on the weekend between the June ARRL VHF Contest and Field Day, and will be announced in all the major amateur radio publications and newsletters later this year.

"SMIRK currently has almost 6000 members worldwide and its goal is the promotion of 6 meter activity. SMIRK has donated equipment to amateurs in rare DX countries and to DXpeditions, thereby putting new countries on 6 meters.

"To become a member of SMIRK, send a list of six SMIRK members you have contacted on 6 meters. Include their call signs and SMIRK numbers in your list. Send it to SMIRK Secretary Pat Rose, W5OZI, P.O. Box 393, Junction, TX 76849, along with a check for \$6.00, payable to SMIRK.

## Current Conference

**Aurora '96:** The 13th annual winter VHF gathering, Aurora '96, will be held on Saturday, 10 February 1995. As last year, it will again be in conjunction with the Midwinter Madness hamfest. Full details of Aurora '96 were to have been announced in a mailing in early January.

If you are not familiar with Midwinter Madness, it is the only hamfest in the Twin Cities between October and May. Attendance is on the order of 3000, with over 300 fleamarket tables in an outstanding facility at the National Sports Center. The organizers suggest that you consider bringing your family and sending them off to the Mall of America and Camp Snoopy (now *that* would interest me!) while you explore the fleamarket and enjoy Aurora '96.

For more information, contact Paul Husby, WØUC, 1462 Midway Parkway, St. Paul, MN 55108, or call 612-642-1559, or e-mail him at husby002@maroon.tc.umn.edu.

## And Finally . . .

It has been your positive opinion of this column and your input that has kept it going these past four-plus years. I always enjoy hearing from you and reading about your exploits on the VHF+ frequencies.

Additionally, I really appreciate your kind words to me, your letters, or e-mail that says that this column is very important to you, that you even turn to it first before reading anything else in the magazine! Sometimes these notes come just when I need them the most. For example, a couple came just as I was finishing classes, just before finals. I was in the library researching material for a paper in lieu of a final when I decided to take a break from the stress of that work and check my e-mail. It was then that I came across those messages thanking me for writing the column. Thank you! Thanks for the readership and for the input.

If you have something to report, please drop me a note at the address at the beginning of the column or e-mail it to me at my e-mail address also at the beginning of the column. You can also phone me at 405-528-6625 or send me a fax to 405-528-0746. I will continue to look for your input, which makes this column so interesting to your fellow VHFers.

A quick glance at the VHF-Plus Calendar will show you that on Valentine's Day, the moon will be at its lowest declination. Furthermore, by evening of that day the moon will already have set over North America. Not a good time to try to work EME. Rather, it's a better time to take that special someone out to dinner and impress her with just how much knowledge you have about the moon, or anything else, for that matter. Regarding the moon, you can tell her that your read all about it in this column!

On second thought, maybe you had better skip the impressing part and just enjoy each other's company. There'll be another day for amateur radio.

Until next month . . .

73, Joe, N6CL

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CIRCLE 131 ON READER SERVICE CARD

## NEWS OF COMMUNICATION AROUND THE WORLD

*QSLing Tips*

**S**ome recent comments on the Internet DX Reflector suggest that many DXers remain woefully ignorant of some of the most basic QSLing practices. This opinion is reinforced by comments from several overseas amateurs about the sorry state of QSL requests from US DXers. Given the widespread nature of the problem, perhaps a review of elementary QSLing is in order.

Effective QSLing begins with the QSL card. While an amateur might want a highly distinctive card for special purposes, a DXer looking for a high rate of return in QSLing should stick to a simple, one-sided card. Make sure the card is the standard size according to USPS regulations—3½ × 5½ inches. Your callsign should be prominently printed in large block characters. If you force the DX station to search for your callsign or hide it with strange typefaces or fancy colors, you will reduce your QSLing success. I have received cards that forced me to seek help reading the callsign (compounded by my colorblindness). Obviously, these cards are not going to be answered right away.

Make sure that your callsign is easily readable on the side of the card that contains the QSO data. Two-sided cards are among the QSL manager's worst enemy. While you may think flipping a card over to read the QSO data is a trivial task, such an action becomes a dreaded chore when multiplied by the thousands. You *can* use a two-sided card if you have your callsign printed on the back with the QSO data. However, this is a waste of money, as few DXpeditioners or active QSL managers will bother to look at the front of the card.

Next fill out the QSO data neatly and cleanly in indelible **black** ink. To make sure your card can reach its destination still legible, wash a sample card in your sink. If the ink smudges or smears, find another pen. This is not an exaggeration. My mail in Montserrat is handed out a window through the rain; non-waterproof ink washes away. Of course, pencil is not suitable for permanent QSLing.

Write carefully, double-checking the time and date. A small error in time can force the QSL manager to search through many pages of a DXpedition log. Review the UTC date as well, remembering that the UTC day changes in the evening, local time. Errors in date and time are the most common problems in QSLing. For many active QSL managers or DXers, such cards go onto the "turkey" pile, to be dealt with at some future date. (The increased use of computer logging has reduced this requirement, but not eliminated it. Many DXers retain the paper logs to help locate callsigns not found in the computerized logs.)

If you make an error in filling out the card, throw it away and start again. While the odds that the DX station needs your card for some award are small, you don't want to provide a valueless card while asking for an error-free card in return. Some particularly fussy managers (F6FNU comes to mind) will not reply to



*SV1QN operated /8 from Myconos Island (EU-067) last August.*

a card that contains the slightest error. Ask yourself if you would submit the card for your own DXCC; if it isn't good enough for you, it should be discarded. This is yet another reason to use an inexpensive card.

The next step is to locate the correct address to send the card. The single best source of such information is from the DX station you just worked. No, don't ask for QSL information as you work the DX station; simply listen for a while. Most DX stations and every experienced DXpeditioner will give the QSL route every 10

to 15 minutes (either that or be swamped by "What's your QSL?").

The next best source of QSL routes is the "GOLIST" (P.O. Box 2306, Paducah, KY 42002-2306). QSL information in the "GOLIST" is carefully assembled from the most accurate sources. While most other lists of QSL routes and QSL databases are simply thrown together without regard to the source of the information, the routes in the "GOLIST" are evaluated based on reliability of the source. You will seldom go wrong using this information. If the



*Renato Langona, PY2IRG, has a very well-equipped shack.*

*P.O. Box 50, Fulton, CA 95439*

## The WAZ Program

### Single Band WAZ

#### 10 Meter SSB

484.....SM6DHU

#### 20 Meter SSB

977.....F6GKA

#### 80 Meter SSB

69.....EA2KL

#### 15 Meter CW

263.....KM1D

#### 20 Meter CW

463.....JA2GWL

#### 40 Meter CW

186.....W1OX

### All Band WAZ SSB

4302.....W5RUK      4305.....VE1XDX  
4303.....IK0VPE      4306.....J17HAV  
4304.....EA3FQV      4307.....IK5UIS

### CW/Phone

7624.....FS5PL      7628.....W9CBE (CW)  
7625.....N2TGZ      7629.....NI3I  
7626.....VE5KX/WØ      7630.....IK5MEN  
7627.....WA2CJT

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 Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all CQ awards is \$4.00 for subscribers (please include your most recent CQ mailing label or a copy) and \$10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a CQ checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

SH/QSL function on your local PacketCluster uses the "GOLIST," then you can rely on that database. However, beware of unsanctioned updates or "Brand X" databases. (I spend an inordinate amount of time correcting wrong QSL routes.)

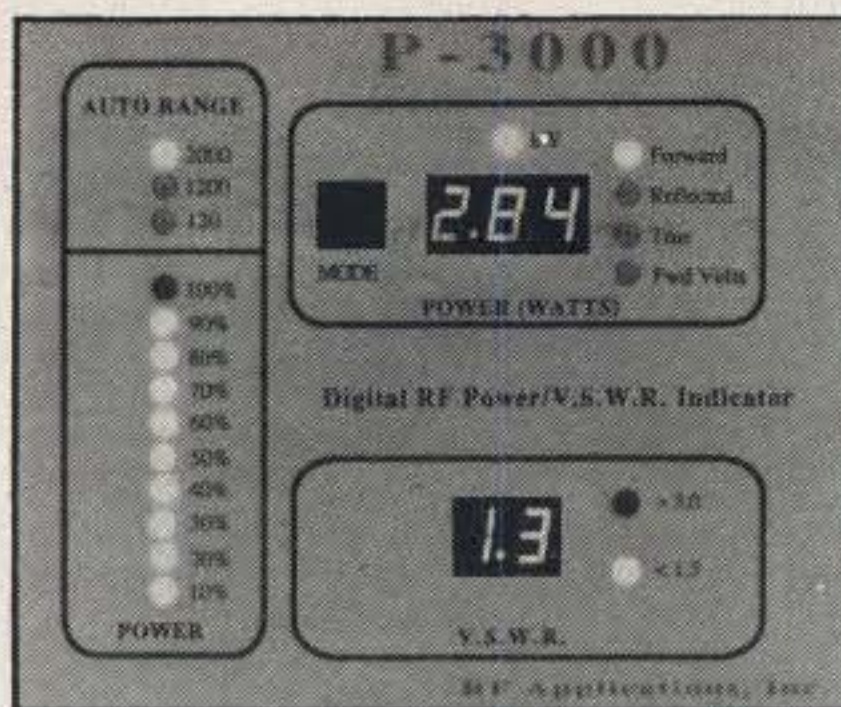
Other reasonably reliable sources of QSL routes and addresses are the DX newsletters and magazines. *The DX Magazine*, for example, contains a subset of the "GOLIST" every issue. The list of QSL routes that accompanies this column is cross-checked against the "GOLIST" database.

Once you have the completed card and the correct mailing address, it is time to prepare the envelopes. This is where USA DXers fall far short of the mark, and hence have relatively low QSL returns. If you are at all serious about DXing, you should invest in nesting airmail envelopes. The use of airmail envelopes with the colored border is *essential* to ensure airmail service. Simply putting airmail postage on the envelope might possibly lead to airmail service, and writing "airmail" on the envelope also helps, but using true airmail envelopes is the only sure-fire means of ensuring airmail service in foreign countries.

The envelopes should be large enough for the oversized cards that many European DXers and managers prefer. Check your local

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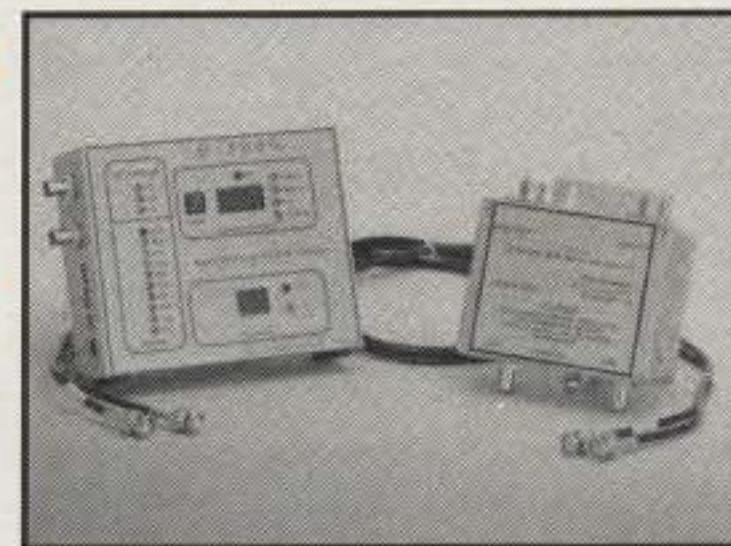
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AT-180 HF/6-Meter Automatic Antenna Tuner .....	480.00
PS-55 AC Power Supply .....	244.00
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IC-R7000A Communications Receiver .....	1808.00
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BP-173 9.6 VDC, 650 mA, Ni-Cad Batt. Pack .....	108.00
BP-174 12 VDC, 600 mA, Ni-Cad Batt. Pack .....	96.00
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ARX-2B 2-Meter, Ringo Ranger II Vertical .....	51.00
ARX-220B 220-MHz., Ringo Ranger II Vertical .....	51.00
ARX-270U 2-Meter/440-MHz., Fiber. Ringo Vert. ...	191.00
CS-270M 2-Meter/440-MHz., Mag. Mt. Mobile .....	61.00
A50-3S 50 To 54-MHz., 3-Element Beam .....	78.00
A50-5S 50 To 54-MHz., 5-Element Beam .....	127.00
A148-3S 144 To 148-MHz., 3-Element Beam .....	33.00
124WB 144 To 148-MHz., 4-Element Beam .....	51.00
A148-10S 144 To 148-MHz., 10-Element Beam .....	60.00
13B2 144 To 148-MHz., 13-Element Beam .....	100.00
224WB 222 To 225-MHz., 4-Element Beam .....	48.00
225WB 222 To 225-MHz., 15-Element Beam .....	104.00
A270-10S 2-Meter/440-MHz., 5/5-Element Beam ...	70.00
A449-6S 440 To 450-MHz., 6-Element Beam .....	42.00
A449-11S 440 To 450-MHz., 11-Element Beam .....	58.00
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## The WPX Program

### SSB

2544 ..... LU8FVS	2547 ..... VE4ROY
2545 ..... EA5BY	2548 ..... KM6HG
2546 ..... EA3FBO	2549 ..... CT1CFH

### CW

2893 ..... AA1ER	2895 ..... F5MQW
2894 ..... EA1EZZ	

### Mixed

1721 ..... VE7EGK
-------------------

Mixed: 450 VE7EGK, 500 VE7EGK, 550 VE7EGK, 600 VE7EGK, 650 VE7EGK, 700 VE7EGK, 750 VE7EGK, 800 VE7EGK, 850 VE7EGK, JR3TOE, WD6CKT, 900 VE7EGK, JR3TOE, WD6CKT, 950 VE7EGK, WD6CKT, 1000 VE7EGK, 1050 VE7EGK, 1100 YV7QP, 1150 YV7QP, 1200 YV7QP, 1250 YV7QP, 1450 WA3HUP, 1500 WA3HUP, 1550 W9IAL, WZ1R, 1600 WZ1R, 1650 WZ1R, 2050 WB4RUA, 2100 WB4RUA, 2450 KS3F, 2500 KS3F, 2550 KS3F, 2600 KS3F, 2650 KS3F, 2700 WB2YQH.

SSB: 350 EA5BY, KM6HG, VE4ROY, CT1CFH, 400 EA5BY, VE4ROY, CT1CFH, 450 VE4ROY, CT1CFH, 500 VE4ROY, CT1CFH, 550 VE4ROY, CT1CFH, 600 VE4ROY, CT1CFH, 650 VE4ROY, CT1CFH, 700 CT1CFH, YV7QP, 750 CT1CFH, YV7QP, 800 CT1CFH, YV7QP, 850 WA7OBM, 900 WA7OBH, 1100 WZ1R, 1150 WZ1R, 1200 WZ1R, 1350 I3ZSX, 1400 I3ZSX, 2000 KD9OT, 2050 KD9OT, 2200 KS3F, 2250 KS3F.

CW: 350 G3TVI, 400 LY3BY, 450 KA1RJI, 500 KA1RJI, 650 EA5FV, I5ZJK, 700 I5ZJK, 750 I5ZJK, 800 I5ZJK, YV7QP, 850 YV7QP, 900 YV7QP, 1100 WZ1R, 1200 WZ1R, 1300 IK2ECP, 1350 IK2ECP, 1600 KS3F, 1650 KS3F, 1700 KS3F, 1750 KS3F, 1800 KS3F, 1850 KS3F, 3850 WA2HZR.

15 Meters: IK6JYY, EA2CIN
20 Meters: EA2CIN, IK6JYY, 5N0ETP
40 Meters: EA2CIN, IK5TSS
160 Meters: AA1ER

Asia: EA2CIN
Africa: AA6WJ
No. Amer.: KA1RJI, AA1ER, EA2CIN
So. Amer.: AA6WJ, WA7OBH
Europe: KA1RJI, EA2CIN

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Complete rules and application forms may be obtained by sending a business-size self-addressed, stamped envelope (foreign stations send extra postage if airmail desired) to: "CQ WPX Awards," P.O. Box 593, Clovis, NM 88101-9511 USA.

stationery store for Eaton 32-635-10, which is a business-size airmail envelope. Eaton 32-634-10 is a smaller envelope that fits neatly inside the former. You can also purchase nesting, European-size airmail envelopes from foreign stamp sales outlets such as William Plum (12 Glenn Road, Flemington, NJ 08822) and J. Mackey (P.O. Box 270569, West Hartford, CT 06127).

Avoid folding the inner return envelope. Foreign postal workers quickly discover that such "fat" envelopes contain currency and they never reach their intended destination.

Put your return address on the inner envelope. Don't include your callsign, as it attracts unwanted attention. If you use a rubber stamp to put your return address on the envelope, make certain that it *doesn't* include your callsign and that it *does* include "U. S. A." as the last line.

On the *inside* of the return envelope, under the flap, put your callsign and QSO data. Then if your envelope gets separated from your QSL card, the DX station or manager will be able to confirm the contact. Fold the flap over the back of the envelope. In high humidity this will reduce the chance that the envelope will arrive at its destination sealed. Insert your QSL and your return postage, either U.S. dollar bills or IRCs, and put the return envelope, flap down, into the outer envelope. This eliminates the

possibility of slicing off the flap when the outer envelope is opened.

Seal the outer envelope securely. If the destination is a "high risk" country, such as South America, ex-USSR, etc., consider additionally sealing the envelope flap with tape.

Print the address of the DX station or manager neatly on the front of the envelope, including the country in all capitals as the bottom line. Include any additional routing information in the lower left corner of the envelope. For example, when I moved to California from Montserrat, at least half of my mail back to Montserrat never arrived there. I later discovered that some postal worker in San Francisco had thought that my "BWI" (British West Indies) under Montserrat was a town in China, and half of my mail went in the wrong direction. Adding "via Miami" in the lower left got the mail started in the right direction and Miami postal workers knew what BWI meant.

Include your return address in the upper left, again omitting any reference to callsigns and including U.S.A. as the bottom line.

Affix proper postage. The minimum foreign rate of \$0.60 is good only up to one-half ounce. With a QSL, return postage, inner envelope, and outer envelope, your mailing may well be more than the minimum. Take a sample mailing to a post office and have them weigh it. If it exceeds one-half ounce, use \$1 in postage.

## 5 Band WAZ

As of October 31, 1995, 427 stations have attained the 200 Zone level.

New recipients of 5 Band WAZ Award with all 200 Zones confirmed:

F5PYI

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)	RA3AUU, 199 (1)
AA4KT, 199 (26)	UY5XE, 199 (27)
K7UR, 199 (34)	NN7X, 199 (34)
NAØY, 199 (26)	SM6AHS, 198 (12, 31)
WØPGI, 199 (26)	UA3AGW, 198 (1, 12)
W2YY, 199 (26)	VO1FB, 198 (19, 27)
W9WAQ, 199 (26)	EA5BCK, 198 (27, 39)
W1JR, 199 (23)	KZ4V, 198 (22, 26)
VE7AHA, 199 (34)	K4PI, 198 (23, 26)
W1FZ, 199 (26)	G3KDB, 198 (1, 12)
IK2GNW, 199 (1)	DK2GZ, 198 (1, 24)
W9CH, 199 (26)	KG9N, 198 (18, 22)
ACØM, 199 (34)	KM2P, 198 (22, 26)
IK8BQE, 199 (31)	I1ZXT, 198 (1, 1 on 40)
JA2IVK, 199(34, 40m)	GM3YOR, 198 (12, 31)
KA5W, 199 (26)	OE6MKG, 198 (12, 31)
K1ST, 199 (26)	DKØEE, 198 (19, 31)
ABØP, 199 (23)	KØSR, 198 (22, 23)
KL7Y, 199 (34)	YO3APJ, 198 (29, 35)

The following have qualified for the basic 5 Band WAZ Award:

WB6JMS, 181 Zones      YO3APJ, 198 Zones

Endorsements:

NN7X, 199 Zones      N1QY, 179 Zones  
F5PYI, 200 Zones

981 Stations have attained the 150 Zone level as of October 31, 1995.

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 Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all CQ awards is \$4.00 for subscribers (please include your most recent CQ mailing label or a copy) and \$10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a CQ checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

which pays up to one ounce. You don't have to use airmail stamps, but don't use the "interim" stamps the post office uses when the rates increase. If the stamp doesn't have a denomination on it, it can't be used on mail sent outside the U.S. I recommend *not* using fancy commemorative stamps; stick with the most common to avoid possible postal theft. (If you want to bribe the DX station with fancy stamps, stick some in your return envelope.)

About the return postage: This, along with poor envelope selection, is where the practices of many U.S. DXers reduce QSLing returns. There are three ways to provide the DX station with sufficient funds to pay for airmail return of your card: foreign stamps, IRCs, and U.S. dollar bills. Each has its advantages and disadvantages.

Foreign postage is available from several sources, including Plum and Mackey mentioned above. The pluses of this method are simplicity and reduced postal theft. The DX station or manager merely needs to affix the stamps and mail your return card. The small stamps are difficult to spot by thieving postal workers, reducing rip-offs. The disadvantages to this method are high cost and ever-increas-



Gyuri, HA5JI, at the shack of Bob, WB9YXY.

ing postal rates in foreign countries. Especially in countries with high inflation rates, airmail postage rates can change quickly and your stamps might not cover the return postage. *Do not* send U.S. postage stamps, as they have

no value to the DX station.

Including a U.S. dollar bill (the so-called "green stamp") used to be the recommended method of providing return postage. However, two changes have made this the last choice



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CIRCLE 24 ON READER SERVICE CARD



## The WPX Honor Roll

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with CQ Master Prefix List. Scores are based on the current prefix total regardless of an operator's all-time count. Honor Roll must be up-dated annually by addition to, or confirmation of, present total. If no up-date, file will be made inactive. Lifetime Honor Roll fee is \$4.00 (U.S.) for each mode, with no fee for additions.

### MIXED

4734	9A2AA	3200	I2PJA	2855	HA8DU	2478	I2EOW	2140	W8UMR	1855	S58MU	1495	K8IFL	1305	CT1EEB	1003	WB2PCF
4323	K2VV	3154	N4UU	2825	YU7BCD	2471	S53EO	2122	N6JM	1796	KASTOF	1491	KC6X	1295	I1-50158	993	VE6BMX
4143	IT9TOH	3153	N4MM	2764	K9BG	2470	K2POF	2063	W9IAL	1794	HA8QC	1484	I2EAY	1286	HP2CWB	900	JR3TOE
3729	EA2IA	3136	YU1AB	2761	IT9QDS	2467	WB2YQH	2059	WB4RUA	1773	WB8ZRL	1476	JN3SAC	1270	CT3CU	840	EA2BNU
3607	W2FXA	3135	I1EEW	2759	YT7DX	2452	SM6DHU	2056	9A4RU	1729	VE9RJ	1394	IK1GPG	1235	AA7FL	811	VE6FR
3507	K6JG	3063	KA5W	2741	HA8XX	2440	S50A	2039	K80G	1718	PY2DBU	1393	I1-21171	1164	YU7EW	785	W2EZ
3482	VE3XN	3048	WA8YTM	2717	SM7TV	2375	K8LJG	2034	W6OUL	1663	LU8DY	1392	EA3CWK	1149	IK2PZG	689	W4RTE
3462	N4NO	3013	UA3FT	2714	KF2O	2362	HA5NK	2013	KS4S	1655	WB3DNA	1372	WA3HUP	1127	G4SDJ	671	H18LC
3393	N6JV	3007	W9DWQ	2676	N2AC	2230	K5UR	1975	G4OBK	1655	I8AOF	1369	W9IAL	1123	WT3W	670	KB5OHT
3326	W1BWS	2999	9A2NA	2675	K9AGB	2227	IK2ILH	1946	WB2ABD	1617	HA9PP	1317	KS8Z	1066	IT9JAC		
3286	N9AF	2901	YU7SF	2535	HA8HW	2164	W4UW	1915	SM6CST	1566	F5NBX	1316	NH6T	1038	N4PYD		
3237	SM3EVR	2890	PA8SNG	2534	4N7ZZ	2162	S51NU	1909	W3KH	1532	AE5B	1314	W8IZV	1020	WU1F		

### SSB

4143	IT9TOH	2709	I1EEW	2212	PY4OY	1907	IN3QCI	1514	CT1BWW	1334	OE2EGL	1070	K8IFL	891	W6RQQ	753	EA1OT
4053	I0ZV	2707	EA8AKN	2206	YU7BCD	1902	K5UR	1463	AE5B	1312	G4OBK	1054	EA8PP	890	SV3AQR	729	N3DRO
3658	K2VV	2691	N4NO	2174	I2EOW	1811	SM6DHU	1462	K2EEK	1306	CT1EEB	1047	KB4HU	867	I6KYL	714	SM6CST
3622	VE1YX	2660	I4CSP	2144	CT1AHU	1801	K2POF	1455	K80G	1305	IK1GPG	1042	WA2FKF	853	EA3EQT	681	H18LC
3555	ZL3NS	2572	KA5W	2111	4X6DK	1749	LU8DY	1445	N2AC	1250	NG9L	1033	N4PYD	851	VE4ACY	658	VE9RJ
3361	F6DZU	2500	I5ZJK	2108	EA5AT	1676	N6FX	1431	K3IXD	1249	K8MDU	1028	AA6BB	845	LU4HBO	649	VE4ROY
3258	K6JG	2491	HA8XX	2045	N4UU	1630	W5AWT	1405	DK5WQ	1223	T30JH	1027	NH6T	839	S51NU	614	EA1MK
3189	I2PJA	2378	WA8YTM	2027	K5RPC	1619	YU7SF	1403	W6OUL	1188	EA5GKE	1000	IT9JPK	827	EA5DCL	610	JA2OCU
2984	CT4NH	2376	9A2NA	2004	KD9OT	1608	K8LJG	1401	IK8EIM	1158	HP2CWB	990	IK2PZG	813	JR3TOE	601	KJ8F
2804	N4MM	2375	I2MQP	2003	CX6BZ	1565	LU7HJM	1389	HA5NK	1145	K80G	974	EA8BGY	798	HA9PP	601	EA6AU
2780	EA2IA	2319	KF2O	2000	EA2AOM	1526	KS4S	1383	WB8ZRL	1124	EA1KK	955	DF7HX	798	EA7CRL		
2768	F2VX	2309	LU8ESU	1999	KF7RU	1521	KA5TOF	1364	I3ZSX	1080	KC6X	931	WU1F	782	CE5FSB		
2722	OZ5EV	2228	EA3AQC	1969	W4UW	1520	CT1DIZ	1343	IK2AEQ	1074	EA1IF	911	EA1AX	771	KE4BM		

### CW

4139	IT9TOH	2617	YU7SF	2057	W8IQ	1823	T4SU	1710	K80G	1398	W2YA	1156	EA6AA	964	KA5TOF	682	K8IFL
3715	K2VV	2408	N2AC	2017	9A2NA	1822	K8LJG	1690	VR2UW	1395	EA6BD	1122	WB8ZRL	871	I2MQP	679	EA5FV
3697	WA2HZR	2397	K9QVB	1999	JA9CWJ	1817	W5AWT	1670	I7PXV	1338	IK2ECP	1098	9A3SM	860	YU1TR	674	EA1AUI
3366	N6JV	2393	W9DWQ	1977	G3VOD	1791	N6FX	1652	VE9RJ	1335	JN3SAC	1077	EA2CLN	855	PY4WS	656	VE6BMX
3056	VE7CNE	2331	WA8YTM	1975	KA7T	1788	HA8XX	1599	S58MU	1326	I2EAY	1067	9A2HF	848	NH6T	651	IK1GPG
2979	N4NO	2253	YU7BCD	1933	HA5NK	1787	K5UR	1538	I1EEW	1289	H18LC	1053	W9IAL	801	K2LUQ	647	ZS1AFZ
2825	YU7LS	2250	KA5W	1932	S51NU	1785	SM6CST	1505	G4OBK	1259	KA1CLV	1038	4X6DK	798	EA2BNU	617	9A3UF
2796	N4UU	2245	G4UOL	1889	KF2O	1734	OZ5UR	1476	DJ1YH	1254	G4MVA	1032	W4UW	739	KF7JF	613	VE4ACY
2785	EA2IA	2164	N4MM	1866	K2POF	1728	W1WAI	1467	IK3GER	1253	EA7TG	1009	KC6X	703	I2EOW	602	WT3T
2746	K6JG	2133	S51NR	1842	SM6DHU	1726	ZS6EZ	1443	KS4S	1233	EA7AAW	966	IK5TSS	695	HA9PP	602	KB5OHT
																602	K3WWP

for savvy DXers. First, postage rates in many countries are now more than US\$1, thanks to the low value of the dollar overseas and higher postage rates. In most European countries and Japan, the minimum rate to send an envelope back to the U.S. by air is more than US\$1. You can try sending \$2, which covers postage from most countries, but not to high-risk countries, especially the former USSR.

Postal workers have invested in hand-held magnetic ink scanners that can be waved over a tray of mail and beep when currency is noted. Your envelope will probably never get to its intended destination. If you do decide to send a dollar bill, get a nice new one from your local bank. Some foreign banks are reluctant to accept highly soiled US currency.

The best way to provide return postage is through International Reply Coupons—IRCs. IRCs can be purchased at most U.S. post offices for \$1.05. When you buy them, make sure that the clerk stamps the *left* side of the IRC with the postmark. IRCs stamped on the right or unstamped are (theoretically) valueless. If the post office doesn't have the new \$1.05 IRCs, the clerk can put a \$0.10 stamp on the older \$0.95 IRCs.

There is probably more misinformation circulating in the DX community on IRCs than on any other single topic. Even the majority of

postal workers are ill-informed about these coupons. Here's the straight scoop:

All current-edition IRCs are now exchangeable for the minimum *airmail* postage to any foreign country that is a member of the Universal Postal Union. This includes most countries, with the exception of ex-USSR countries, some small Pacific nations, and South Africa. Even the older IRCs that don't mention airmail return are valid for this airmail return service.

This does *not* mean, however, that a single IRC is guaranteed to pay for return airmail of your envelope. Most countries have different airmail rates depending on destination. Thus, an envelope going from France to Germany by air may be less expensive than the same weight envelope going to the U.S. Also, many countries use 10 grams as the minimum weight, not one-half ounce as in the U.S. An airmail envelope with as few as two return QSLs can exceed the 10 gram limit.

Two IRCs will guarantee return airmail postage from every country except South Africa. One IRC and a "green stamp" (U.S. dollar bill) will also work in countries without postal theft.

IRCs may be exchanged at any cooperating post office for \$0.60 in *stamps*. IRCs may not be exchanged for cash. In theory, IRCs may be returned to the *issuing* post office and exchanged for face value of postage, minus a

service charge of \$0.01. Thus, a \$0.95 IRC may be exchanged for \$0.94 of postage. Very few postal clerks know about this, however.

There is a (technically illegal) secondary market in IRCs in the DX community. This means that most DXers "recycle" their IRCs, rather than cash them in at a post office. DXers can purchase IRCs in bulk from active QSL managers and some DX stations. The going rate for these transactions is \$0.60 to \$0.65 for unsorted IRCs and about \$0.75 for valid IRCs. (About 10% of all IRCs in circulation are improperly stamped and thus cannot be exchanged for postage.)

If you experience difficulty in purchasing or exchanging IRCs in the U.S., try another post office. If you try several, you are bound to find one with the intelligence to look up the appropriate entry in the International Mail Manual (IMM) and follow the simple, clear instructions.

One IRC is the best method to pay for return postage to Japan, while two U.S. dollar bills is probably the best to Western European countries (or two IRCs if purchased on the secondary market).

The next step in QSLing is probably the most difficult one: Have patience! SM7PKK reported that he received a nasty letter berating him for not responding to a QSL request while he was still out on the Conway Reef DXpedition!

## QSL INFORMATION

3D2RW to ZL1AMQ  
 3DA8CA to W4DR  
 3Z0CDP to SP6CDP  
 3Z2EBG to SP2EBG  
 3Z4EAK to SP4EAK  
 3Z9BRP to SP9BRP  
 4G2X to DU3DO  
 4K8F to UA9AB  
 4K9W to DL6KVA  
 5N3/SP5XAR to SP5CPR  
 5N35/OK1MU to OK1DCH  
 5N35ALE to DJ2VZ  
 5N35T to F2YT  
 5X4F to KB4EKY  
 7Q7RM to G8IAS  
 7S6AG to SK6AG  
 7S6SAQ to SK6DK  
 8Q7CW to DK7PE  
 9G1YR to G4XTA  
 9H0DX to DK9IP  
 9H3PB to DF4EK  
 9H3RJ to HB9TU  
 9H3VG to G4PDO  
 9J2SZ to SP8DIP  
 9K2ZC to KC4ELO  
 9L1PG to NW8F  
 9M8PR to DJ8PR  
 9Q5MRC to G3MRC  
 9X/DN4WW to ON5NT  
 AP2JZB to K2EWB  
 C53HG to W3HCW  
 CE0Z to K8IYF  
 CE0ZAM to CE3ESS  
 CN2NI to F5NII  
 CN8MC to WB2AQC  
 CN8TM to JR2ITB  
 CQ3X to DL7MAT  
 CQ5L to CT1BWW  
 CT1ESV to WA4JTK  
 CU9B to CU3AV  
 EA1AAD/P to EA5OL  
 ED1IRA to EA1BEZ  
 ED2FPA to EA2CBY  
 ED5MFS to EA5VM  
 EG9A to EA4URE  
 E050HZ to W3HNC  
 ES60Q to ES5QA  
 ET3KV to DL1VU  
 EW1WZ to DL1OY

EX2M to DL4MFM  
 EX8F to DL8FCU  
 F5CCO/P to F1JRT  
 FK8FU to NA5U  
 F08SUC to F5JW  
 FS5PL to KF0UI  
 FY5FY to F6EZV  
 G4MFW/ZL8 to KA1JC  
 GB5FI to GW0ANA  
 GW0HGN/P to GW0MOI  
 HC8KU to DK5VP  
 HD2RG to HC2RG  
 HH2/N3SIY to KF0UI  
 HH2LQ to KM6ON  
 HK100GM to HK3DDD  
 HL5KY to W3HNC  
 HL9DC to N7RO  
 HV4NAC to IK0FVC  
 IJ7/IK7XIV to IK7IMO  
 IM0/IK2GAO to IK2GAO  
 IU0PAW to IK0SHF  
 IY4QTA to IK4QJH  
 J28ML to F5LBM  
 J55UAB to F6FNU  
 JY5SK to WB9YXY  
 JY8XY to WB9YXY  
 KC4AAA to NC6J  
 KC6HN to JF1VXB  
 KG4CM to N5FTR  
 KH0T to JA1SGU  
 LZ4SA to LZ2HM  
 M100G to R5GB  
 OD/N4ISV to N4JR  
 OH0NRG to OH2NRG  
 OL5PLZ to OK1DRQ  
 OZ4CHR to OZ1LUR  
 P39P to 5B4ES  
 PI50TUE to PI4TUE  
 PJ4/WA3LRO to K2SB  
 R1MVI to OH2BU  
 RADFU to W3HNC  
 RA4HW to N7OTR  
 RA9LI/9 to DL6ZFG  
 RU0B to UA9OBA  
 RZ0IWR to WA6AJB  
 SJ9WL to SM0DJZ  
 T53LB to 5Z4YQ  
 T77BL to T70A  
 T88A to I1RBJ  
 T92A to S57MX  
 T99W to DL1QQ

TA3DD to TA1KA  
 TI4VSG to WA5TUD  
 TJ1GG to I2EOW  
 TMSITU to F6IMS  
 TU4FB to K4ZLE  
 TY8G to LA8G  
 UA0AZ to W3HNC  
 UA0SMF to DL5OV  
 UA3YH/KC4 to UA3XBY  
 UA9FAR to W7YS  
 UE50MIR to UA2MF  
 UR5FAV/MM to UX3FW  
 UU2JZ to LZ1ZJ  
 V31ML to N5FTR  
 V31MX to K0BCN  
 V73CO to V73AX  
 V73GT to WF5T  
 VE8TA to VE2BQB  
 VI0PEACE to VK4CHB  
 VK2CWT/VK9X to JA2NVY  
 VK9XA to JA2NVY  
 VP2EO to WC0W  
 VP2MDE to K5GN  
 VP5/PA3BBP to PA3ERC  
 VP5/PA3ERC to PA3ERC  
 VP5/PA3EWP to PA3ERC  
 VP8CRT to G4YXG  
 VP8CSA to DL1SDN  
 WW2END to KG7XD  
 X5BYZ to YU7KMN  
 XJ2CQ to VA2RC  
 XJ3AT to VE3AT  
 XR0Y to WA3HUP  
 XR0Z to WA3HUP  
 YE8SUN to YB8UMX  
 YE8TI to YB8UMX  
 YJ8RN to N9DRU  
 YQ0TO to YO5KAU  
 YS1ZV to KB5IPQ  
 YS4/TI5NW to WB3LUI  
 YS9I to KJ5IX  
 YT50AT to YU1SZ  
 Z32XA to KM6ON  
 ZC6B to K9JJR  
 ZD7JP to N5FTR  
 ZD7WRG to WA2JUN  
 ZK1SSN to SM5BOQ  
 ZL6RCS to G3CWW  
 ZP5XYE to JA7ZF  
 ZS50A to WA3HUP

DXers tend to forget that many DXpeditioners and their QSL managers don't even print up cards until a few months after the end of the DXpedition. Logs need to be entered into computer databases, labels generated, and cards mailed—a very time-consuming task.

When I returned from an 11,000-QSO DXpedition to the Galapagos, I found six sacks of mail waiting for me. They covered the entire surface of my pool table, and took more than four months to open, sort, and respond to the QSL requests. And that was only with the help of a bunch of local amateurs.

DXers should not begin to panic for at least six months after a major DXpedition. Then they should first check the DX newsletters that list QSLs received for others receiving their cards before contacting the QSL manager.

Remember the three main reasons why your card may be delayed or lost: wrong envelopes, callsigns on envelopes, and inadequate return postage. Taking a little bit of extra time (and money) on these items can dramatically improve your QSLing success.

## QSLing Ethics

While all but a handful of DX stations and QSL managers are honest, hard-working volunteers, there are a few bad apples in the field who let greed overpower their commitment to the DX community. Some managers and DX stations insist on funds over and above the cost

of return postage, refuse to deal with multiple-callsign QSL requests, or refuse to answer bureau cards. In an effort to stem such abusive practices, the ARRL has adopted a set of QSLing guidelines.

1. (a) Any DX station or organized DXpedition appointing a QSL manager or acting as their own manager should ensure that satisfactory arrangements are in place for receiving and responding to incoming bureau and direct cards. (b) When selecting a QSL manager, the reliability of the manager's postal system should be taken in consideration. (c) Any DXpedition organizer or person appointing a QSL manager must accept responsibility for that manager's performance.

2. The QSL manager should respond direct, and within a reasonable period of time, as long as sufficient funds (IRCs, stamps, money orders) to cover the cost of return postage (and return envelope, if one isn't enclosed) are enclosed with the request. Airmail should be used if sufficient funds are enclosed.

3. The QSL manager should respond to incoming SWL cards under the same conditions as QSL cards for two-way contacts.

4. DXpedition QSL managers should not insist on separate envelopes for different QSOs or stations. They should establish internal procedures to handle such multiple requests.

5. Recognizing that mistakes of time and/or date are frequently made, QSL managers are expected to make a diligent search for QSOs

## JONES KEYS



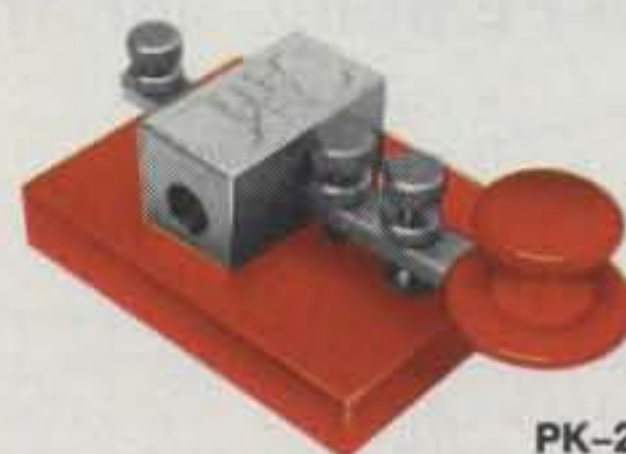
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PK-205

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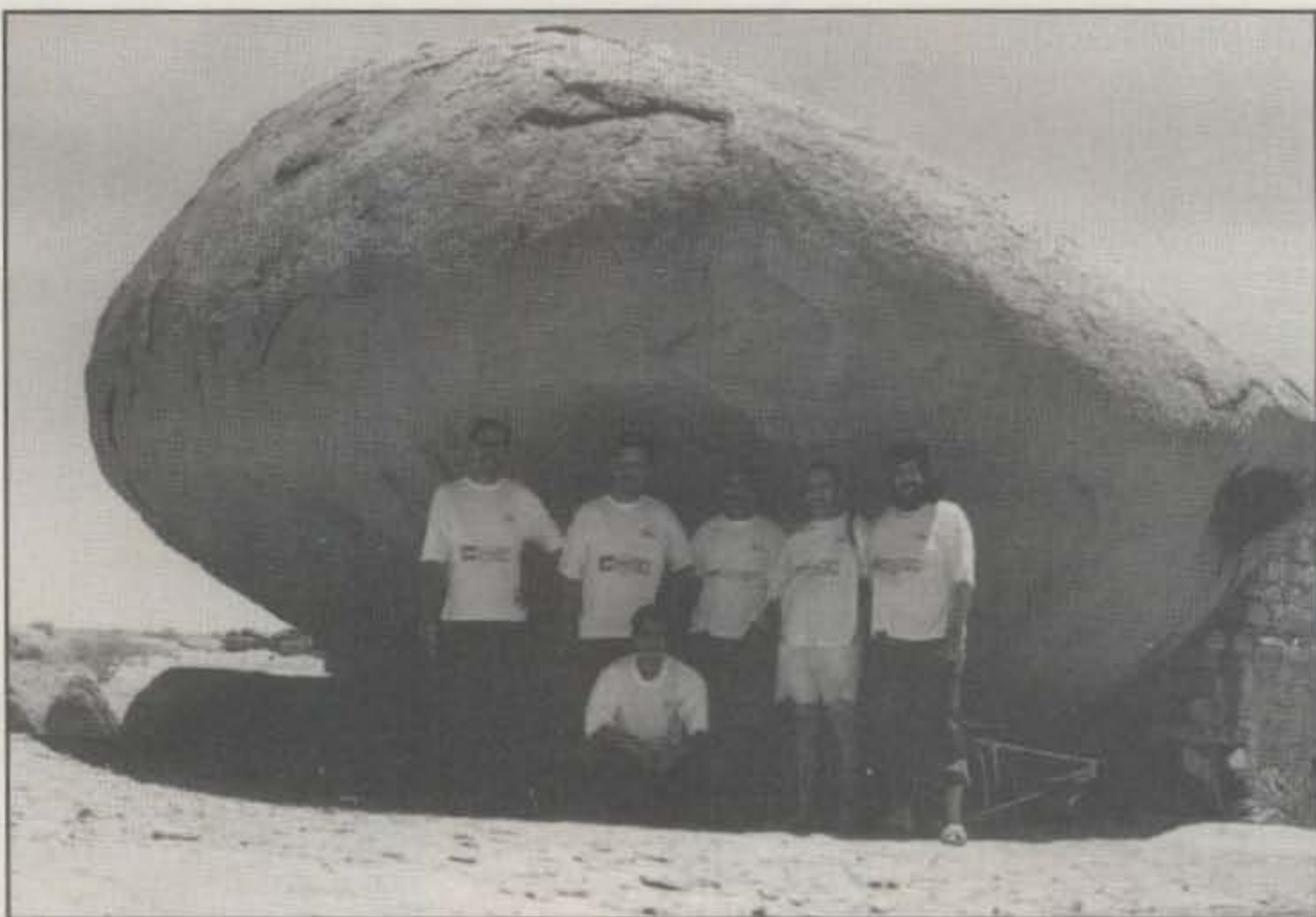
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The S07URE team: from left, EA5AD, EA7EL, Turnio, S01MZ, and S01M.

that can't be found in the log.

6. It's unacceptable and unethical to demand a specific number of IRCs or "green stamps" (dollar bills) if a smaller number would cover the costs mentioned in Point 2.

7. There should be no [time] limit for applying for QSLs. Old logbooks should be passed to responsible volunteers or DX clubs when the manager no longer wishes to retain them.

8. All amateur stations engaged in DX operating and the exchange of QSL cards are expected to adhere to the above-recommended guidelines. Radio amateurs are not required to belong to their national amateur radio societies or clubs. Accordingly, stations without incoming and/or outgoing QSL bureau service should make their own arrangements for QSLing, but within the guidelines of Point 6.

Violations of the above guidelines may subject the DXpedition or DX station to disqualification by the ARRL Awards Committee in accordance with Rule 12, operating ethics of the ARRL DX Century Club rules.

If you feel a DX station or QSL manager is violating these guidelines, send your information to the ARRL Awards Committee at ARRL Headquarters.

## Heard Island Report By Ralph Fedor, KØIR

As most of you are aware, the Heard Island DXpedition team ran into difficulty in Australia. As a result, we must postpone the DXpedition.

Upon arriving in Australia, the advance team of ON6TT and PA3DUU found our charter vessel, the *Tallarook*, unsuitable for a voyage into the southern ocean. The owner/operator of the *Tallarook*, Mr. Kris Mitchell of K & DM Transportation, misrepresented his vessel in the contract and did not outfit the vessel as we had specified. He fled under the cover of darkness with the team's down payment.

Investigations into Mr. Mitchell's credibility revealed no problems prior to these incidents. Legal limitations on information that can be released shielded Mr. Mitchell from thorough scrutiny during our initial contact with him.

Legal council in Australia tells us our chance of recovering our down payment is essentially zero. We have, however, contacted the police, the Attorney General of Australia, the Minister of Tourism, and other Australian government officials. Although our loss seems unrecoverable, perhaps our action will shield other visitors from Mr. Mitchell. Save for our contact with Mr. Mitchell, the Australian people and the Australian amateur community have been gracious hosts and were saddened by our misfortune.

Our team at first considered a hurried reorganization and a trip to Heard Island in January of 1996. Securing a ship on such short notice and rearranging our personal schedules proved unrealistic. We therefore are planning a one-year delay in the operation.

Losses resulting from our encounter with Mr. Mitchell are substantial. They exceed \$100,000. However, no contributions sent to The Heard Island Expedition (P.O. Box 163, Waite Park, MN 56387) have been spent. Checks have not been cashed. Contributions will all be returned to those who sent them. In addition, funds from the NCDXF and INDEXA remain untouched. From the beginning I made it clear that the risks of this DXpedition would be borne by the team members. Acceptance of those risks was a prerequisite for becoming a member of the Heard Island team. The same was true of the 3YØPI team. Painful as it is, the Heard Island team members will honor that commitment and be responsible for the loss.

While we regret what has happened, we are fortunate in that we did not let the emotion of the moment control our actions and board a vessel that was unsafe. We all are alive and well and anxious to get on with our commitments, albeit a year later. Undoubtedly there will be changes, but team's consensus is to carry on.

I have doubts that my schedule will allow me to participate in an expedition a year from now. Therefore, I have asked KK6EK and ON6TT to assume the leadership role in developing future plans.

Thanks to all of you who supported us and encouraged us.

## CQ DX Awards Program

### SSB

2170 ..... JN6MIC      2172 ..... EA3FYD  
2171 ..... EA3CYM

### CW

929 ..... G3PVA      930 ..... IK2WVG

### SSB Endorsements

320 ..... VE2WY/326	300 ..... VE3CKP/304
320 ..... YV1CLM/326	275 ..... EA5GKE/298
320 ..... K1UO/325	275 ..... CT1BWW/296
320 ..... KB8O/321	275 ..... 4X6DK/290
320 ..... VE2GHZ/320	275 ..... OA4EI/276
320 ..... LU1JDL/320	250 ..... KA5OER/250
310 ..... IØSGF/315	200 ..... EA3CYM/209
310 ..... OA4QV/313	150 ..... OA4OSW4/153
300 ..... KQ4GC/305	

### CW Endorsements

320 ..... DL8PM/326	275 ..... KB8O/277
310 ..... WB5MTV/319	250 ..... W4EEU/259
310 ..... WB4UBD/311	200 ..... G3PKA/203
310 ..... WB6OKK/310	200 ..... AB4NS/201
275 ..... NI4H/288	150 ..... IK2WVG/170

### RTTY Endorsements

250 ..... K3UA/274

Total number of active countries is 326. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply. Please make all checks payable to the awards manager.

## QSL Notes

**YWØRCV** Aves Island QSL cards may be requested via Reinaldo Leandro, YV5AMH, M207 P.O. Box 020010, Miami, FL 33102.

QSL **J48ISL** and **4L4KK** via Pavlidis Savas, SV2AEL, P.O. Box 22013, Triandria 55310, Thessaloniki, Greece.

QSL **DX9C** to Robin Go, DU9RG, 818 Acacia Ave., Ayala-Alabang Village, Muntinlupa 1780, Philippines.

**VK3UB**, Bob in Sydney, is a pirate operation. Do **not** QSL. (VK3UB is Jock in Melbourne.)

QSL **ZW5VB** to P. Sirzanink, PP5SZ, Rua Pd Roma 194/704, 88010-090, Florianopolis SC, Brazil.

QSL **VP5FOC** via W9VNE, P.O. Box 54482, Cincinnati, OH 45255-0482, with SASE.

**AB4PW** says he is no longer QSL manager for CT1DVV or CT8T.

QSL **9M2TO** via his home call of JAØDMV or direct to Tex Izumo, Bukit Dumber Apt. 9-4, 97 Jalan Thomas 11700, Gelugor, Penang, Malaysia.

QSL **AHØT** via the Japanese bureau only to JA6BSM.

QSL **FY5YE** to Jack McElwain, W5SVZ, 9427 Angleridge Road, Dallas, TX 75238.

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# PROPAGATION

THE SCIENCE OF PREDICTING RADIO CONDITIONS

## Mother Nature Must Love Us!

**A**gain Mother Nature cooperated with amateur radio during the CQ World-Wide DX CW Contest weekend of November 25 and 26. The radio storm which seemed likely to take place during the contest weekend held off until the contest was over. In fact, worldwide conditions on the HF bands were at least one grade better than had been expected. According to worldwide reports compiled jointly by the USAF and NOAA, conditions in the polar and auroral regions were generally Low Normal, in middle and low latitudes mainly High Normal, and in equatorial latitudes between High and Above Normal. The sun was reported to be spotless during the entire weekend, with a 10.7 cm solar flux level of 73. A worldwide geomagnetic activity (Ap) index of 1 was reported for both days. This relationship of solar flux and geomagnetic indices indicates a very quiet and stable, albeit weak, ionosphere. It can't get much better than that during the low phase of a solar cycle!

All in all the 1995 WW DX Contest periods, both SSB and CW, enjoyed relatively good propagation conditions despite the decline in the solar cycle. While no new records may be set, some impressive scores are likely. We owe much to Mother Nature's cooperation and to this year's successful salting of the ionosphere.

Table I summarizes the worldwide HF propagation conditions during the 1995 CW contest weekend. It is based on data provided by the Space Environmental Services Center, Boulder, Colorado.

### Sunspot Cycle 22 Progress

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean sunspot number of 22 for October 1995. This results in a smoothed running sunspot number of 21 centered on April 1995.

The present sunspot cycle is continuing to decline at a steady rate. A smoothed index of approximately 13 is forecast for February 1996. Canada's Dominion Radio Astrophysical Observatory in Penticton, BC reports a corresponding mean 10.7 cm solar flux level of 78 for October 1995, resulting in a smoothed level of 79 centered on April 1995 and a predicted level of approximately 77 for February 1996.

### February Conditions

February, while still a winter month, is a time of transition between winter and springtime propagation on the HF bands. Days will be getting noticeably longer in the Northern Hemisphere and nights will be getting shorter. Expect a seasonal decrease in the range of frequencies that will propagate long distances during the daylight hours (i.e., 10 and

LAST MINUTE FORECAST				
Day-to-Day Conditions Expected for February 1996				
Propagation Index.....	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 1, 7-8, 12, 24-25	A	A	B	C
High Normal: 2-3, 6, 9, 13, 23, 26-27, 29	A	B	C	C-D
Low Normal: 4-5, 11, 14, 17-19, 22, 28	B	C	D	D-E
Below Normal: 10, 16, 21	C	C-D	D-E	E
Disturbed: 15, 20	C	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 S9 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

### HOW TO USE THIS FORECAST

1. Find *propagation index* associated with particular band opening from 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 band opening for any date of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be excellent (A) on Feb. 1st, good (B) on the 2nd and 3rd, fair (C) on the 4th and 5th, good (B) on the 6th, etc.

12 meter bands), and an increase during the hours of darkness (i.e., 30 and 40 meter bands).

Low solar activity coupled with normal seasonal changes in HF propagation conditions is expected to result in very few 10 and 12 meter DX openings during February. The bands occasionally may open towards southern and tropical areas during the daytime when conditions are High Normal or better. There's a somewhat better chance for 15 and 17 meter DX openings to many parts of the world during the daylight hours, especially when conditions are High Normal or better.

Twenty meters should continue to be the best band for DX propagation during February. Look for a DX window of an hour

or two duration, beginning just after sunrise, during which the band should open to most areas of the world. DX should be possible throughout the day, with another peak in conditions expected during early afternoon. When conditions are High Normal or better, 20 meters should stay open to some areas of the world well into the hours of darkness.

Good nighttime DX propagation conditions are expected on 40 meters during February. Bands should open towards Europe and the east an hour or so before sundown, peaking during the early evening. South America should be within range from about 7 PM until sunrise. Look for openings towards the South Pacific, Asia, and the Far East from about an hour or two before to about an hour after local sunrise. Good 80 meter openings are also forecast to most areas of the world during the hours of darkness. Be sure to also check 160 meters between sundown and sunrise for fairly good DX openings to many areas of the world.

A seasonal increase in static levels may begin to be noticeable on the HF bands during February.

### Short-Skip Conditions

On 160 meters no significant skip is expected during the daylight hours, but up to 1300 miles and beyond should be possible on a regular basis during most of the hours of darkness. On 80 meters expect openings up to about 250 miles during most of the daylight hours, with the skip lengthening to between 400 and 1300 miles just after sundown, and between 800 and 2300 miles by midnight. On 30 and 40 meters daytime skip should be possible between approximately 250 and 750 miles, extending to between 750 and 2300 miles during the early evening.

During the hours of darkness expect to work 30 and 40 meter stations within a range of 1500 to 2300 miles. Daytime skip on 20 meters should range between 750 and 2300 miles through the late afternoon. During the late afternoon and until just after sundown it should lengthen to between 1500 and 2300 miles, with the band out for short-skip by 8 PM on most nights. On 17 and 15 meters skip should range between 1300 and 2300 miles during most of the daylight hours, with the bands going dead for short-skip about an hour or so after local sundown. Occa-

Geographical Area	November 25	November 26
Polar	Low Normal	Low Normal
Auroral	Low Normal	Low Normal
Middle Latitude	High Normal	High Normal
Low Latitude	High Normal	High Normal
Equatorial	Above Normal	Above Normal
10.7 cm Radio Flux	73	73
Geomagnetic (Ap) Index	1	1

Table I—Summary of HF propagation conditions reported jointly by USAF and NOAA during the CQ WW DX CW Contest weekend of November 25–26, 1995.

11307 Clara Street, Silver Spring, MD 20902

### 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 (15 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. An \*\* indicates best time to check for 10 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 standard time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 8 hours in PST Zone, 7 hours in MST Zone, 6 hours in CST Zone, and 5 hours in EST Zone. For example, 13 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 04 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.

Central & South Asia	09-11 (1) 16-18 (1)	06-07 (1) 07-09 (2) 09-11 (1) 18-21 (1)	04-07 (1) 17-21 (1)	04-07 (1) 18-20 (1)
Southeast Asia	17-19 (1)	06-07 (1) 07-09 (2) 09-11 (1) 19-21 (1)	05-08 (1) 19-21 (1)	06-07 (1) 19-21 (1)
Far East	16-19 (1)	06-07 (1) 07-09 (2) 09-11 (1) 17-20 (1)	05-08 (1) 17-19 (1)	06-07 (1) 17-18 (1) 06-07 (1)*
South Pacific & New Zealand	14-16 (1) 12-15 (1) 15-18 (2) 18-19 (1)	15-19 (1) 19-22 (2) 22-07 (1) 07-09 (2) 09-11 (1)	00-01 (1) 01-02 (2) 02-06 (3) 06-07 (2) 07-08 (1)	02-03 (1) 03-06 (2) 06-07 (1) 02-07 (1)*
Australasia	15-17 (1)** 09-11 (1) 22-16 (1) 16-18 (2) 18-20 (1)	06-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-18 (1) 18-20 (2) 20-22 (1)	03-05 (1) 05-07 (2) 07-08 (1)	04-05 (1) 05-06 (2) 06-07 (1) 04-07 (1)*
Caribbean, Central America & Northern Countries of South America	11-16 (1)** 07-08 (1) 08-09 (2) 09-11 (4) 11-13 (2) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	05-06 (1) 06-07 (2) 07-09 (4) 09-10 (3) 10-14 (2) 14-16 (3) 16-18 (4) 18-19 (3) 19-21 (2) 21-23 (1)	18-19 (1) 19-20 (2) 20-03 (3) 03-05 (2) 05-07 (1)	19-21 (1) 21-04 (2) 04-06 (1) 20-02 (1)* 02-04 (2)* 04-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-15 (1)** 08-09 (1) 09-11 (2) 11-13 (1) 13-14 (2) 14-15 (3) 15-16 (2) 16-17 (1)	06-07 (1) 07-10 (2) 10-14 (1) 14-16 (2) 16-17 (3) 17-19 (4) 19-20 (2) 20-22 (1) 22-23 (2) 23-00 (1)	19-21 (1) 21-04 (2) 04-07 (1)	21-06 (1) 01-05 (1)*
McMurdo Sound, Antarctica	15-17 (1)	17-19 (1) 19-22 (2) 22-00 (1) 07-09 (1)	22-00 (1) 00-04 (2) 04-06 (1)	00-04 (1)

### February 15-April 15, 1996 Time Zone: EST (24-Hour Time) EASTERN USA TO:

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Central Europe & North Africa	10-12 (1)** 08-10 (1) 10-12 (2) 12-13 (1)	06-08 (1) 08-11 (2) 11-12 (3) 12-13 (4) 13-14 (3) 14-15 (2) 15-17 (1)	16-17 (1) 17-19 (2) 19-20 (3) 20-00 (2) 00-02 (3) 02-03 (2) 03-04 (1)	18-20 (1) 20-21 (2) 21-01 (3) 01-02 (2) 02-03 (1) 20-22 (1)* 22-01 (2)* 01-02 (1)*
Northern & CIS (former European USSR)	09-12 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-14 (2) 14-16 (1)	17-19 (1) 19-02 (2) 02-03 (1)	20-22 (1) 22-00 (2) 00-02 (1) 20-00 (1)*
Eastern Mediterranean & Middle East	09-11 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-13 (2) 13-14 (3) 14-15 (2) 15-17 (1)	18-20 (1) 20-23 (2) 23-01 (1)	19-23 (1) 20-22 (1)*
Western Africa	10-13 (1)** 09-10 (1) 10-12 (2) 12-14 (3) 14-15 (2) 15-16 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-19 (1)	18-19 (1) 19-00 (2) 00-02 (1)	19-21 (1) 21-23 (2) 23-01 (1) 21-01 (1)*
Eastern & Central Africa	11-13 (1)** 09-11 (1) 11-14 (2) 14-15 (1)	13-15 (1) 15-18 (2) 18-19 (1)	19-22 (1) 22-00 (2) 00-01 (1)	20-00 (1)
Southern Africa	10-13 (1)** 09-10 (1) 10-12 (2) 12-13 (3) 13-14 (2) 14-15 (1)	07-14 (1) 14-16 (2) 16-17 (3) 17-18 (2) 18-20 (1)	18-20 (1) 20-22 (2) 22-00 (1)	21-23 (1) 21-23 (1)*

### February 15-April 15, 1996 Time Zones: CST & MST (24-Hour Time) Central USA TO:

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Southern Europe & North Africa	08-09 (1) 09-12 (2) 12-13 (1)	06-08 (1) 08-12 (2) 12-14 (3) 14-15 (2) 15-17 (1)	16-18 (1) 18-21 (2) 21-00 (1) 00-02 (2) 02-03 (1)	18-20 (1) 20-00 (2) 00-01 (1) 20-00 (1)*
Northern & Central Europe & CIS (former Euro. USSR)	08-11 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-13 (2) 13-15 (1)	19-22 (1) 22-00 (2) 00-02 (1)	20-01 (1) 21-01 (1)*
Eastern Mediterranean & Middle East	08-11 (1)	07-11 (1) 11-14 (2) 14-16 (1) 22-00 (1)	19-20 (1) 20-22 (2) 22-23 (1)	20-22 (1)
Western Africa	09-12 (1)** 08-10 (1) 10-13 (2) 13-15 (1)	07-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	18-20 (1) 20-22 (2) 22-01 (1)	21-00 (1) 21-23 (1)*
Eastern & Central Africa	08-11 (1) 11-13 (2) 13-14 (1)	07-12 (1) 12-14 (2) 14-15 (3) 15-16 (2) 16-18 (1)	19-23 (1)	19-22 (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) 15-16 (3) 16-17 (2) 17-19 (1) 22-00 (1)	18-20 (1) 20-23 (2) 23-00 (1)	19-22 (1) 20-22 (1)*
Central & South Asia	09-11 (1)	06-07 (1) 07-09 (2) 09-11 (1) 19-21 (1)	04-08 (1) 17-21 (1)	05-07 (1) 17-19 (1)

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Far East	16-18 (1)** 16-17 (1) 17-18 (2) 18-19 (1)	06-07 (1) 07-09 (2) 09-11 (1) 16-18 (1) 18-20 (2) 20-22 (1)	02-04 (1) 04-07 (2) 07-08 (1)	04-07 (1) 05-07 (1)*
South Pacific & New Zealand	14-17 (1)** 11-16 (1) 16-18 (2) 18-20 (1)	06-07 (1) 07-10 (2) 10-18 (1) 18-19 (2) 19-21 (3) 21-23 (2) 23-02 (1)	22-00 (1) 00-01 (2) 01-06 (3) 06-07 (2) 07-08 (1)	00-02 (1) 02-06 (2) 06-07 (1) 03-07 (1)*
Australasia	14-17 (1)** 12-16 (1) 16-18 (2) 18-20 (1)	06-07 (1) 07-09 (3) 09-12 (2) 12-15 (1) 15-17 (2) 17-19 (1) 19-21 (2) 21-00 (1)	01-04 (1) 04-06 (3) 06-07 (2) 07-08 (1)	04-05 (1) 05-06 (2) 06-07 (1) 05-07 (1)*
Caribbean, Central America & Northern Countries of South America	11-15 (1)** 07-08 (1) 08-09 (2) 09-11 (3) 11-13 (2) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	05-06 (1) 06-07 (2) 07-09 (4) 09-10 (3) 10-15 (2) 15-16 (3) 16-18 (4) 18-20 (3) 20-22 (2) 22-00 (1)	18-19 (1) 19-20 (2) 20-02 (3) 02-05 (2) 05-07 (1) 15-16 (3) 16-18 (4) 18-20 (3) 20-22 (2) 22-00 (1)	19-21 (1) 21-04 (2) 04-06 (1) 20-02 (1)* 02-04 (2)* 04-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-14 (1)** 07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	05-07 (1) 07-09 (2) 09-12 (1) 12-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2) 00-01 (1)	19-20 (1) 20-04 (2) 04-06 (1)	21-05 (1) 01-04 (1)*
McMurdo Sound, Antarctica	15-17 (1)	16-19 (1) 19-22 (2) 22-00 (1) 07-10 (1)	22-01 (1) 01-04 (2) 04-06 (1)	01-04 (1)

### February 15-April 15, 1996 Time Zone: PST (24-Hour Time) WESTERN USA TO:

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Southern Europe & North Africa	08-11 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-12 (2) 12-14 (1) 22-00 (1)	19-22 (1) 22-00 (2) 00-01 (1)	19-22 (1) 20-22 (1)*
Northern, & Central Europe & CIS (former European USSR)	08-10 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-12 (2) 12-13 (1) 22-00 (1)	19-21 (1) 21-22 (2) 22-23 (1)	19-22 (1) 20-22 (1)*
Eastern Mediterranean & Middle East	08-10 (1)	07-10 (1) 10-11 (2) 11-13 (1) 22-00 (1)	18-21 (1)	18-20 (1)
Western Africa	09-10 (1)** 08-09 (1) 09-12 (2) 12-14 (1)	05-07 (1) 07-08 (2) 08-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-18 (1)	18-22 (1)	19-21 (1) 19-21 (1)*
Eastern & Central Africa	09-11 (1)	06-08 (1) 11-13 (1) 13-15 (2) 15-16 (1)	18-21 (1)	18-20 (1)
Southern Africa	09-11 (1)** 08-10 (1) 10-13 (2) 13-14 (1)	05-06 (1) 06-08 (2) 08-13 (1) 13-17 (2) 17-18 (1) 23-01 (1)	18-22 (1)	19-21 (1) 19-21 (1)*

Central & South Asia	08-10 (1) 18-20 (1)	06-07 (1) 07-09 (2) 09-11 (1) 16-18 (1) 18-20 (2) 20-21 (1)	05-08 (1) 17-19 (1)	05-07 (1) 17-18 (1)
Southeast Asia	16-18 (1)** 08-10 (1) 16-17 (1) 17-18 (2) 18-19 (1)	02-07 (1) 07-09 (2) 09-11 (1) 16-17 (1) 17-19 (2) 19-20 (1)	02-04 (1) 04-06 (2) 06-08 (1)	05-07 (1)
Far East	14-16 (1) 16-18 (2) 18-19 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-19 (3) 19-20 (2) 20-22 (1)	01-02 (1) 02-04 (2) 04-06 (3) 06-07 (2) 07-08 (1)	02-03 (1) 03-06 (2) 06-07 (1) 03-06 (1)*
South Pacific & New Zealand	15-17 (1)** 11-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	06-09 (1) 09-11 (2) 11-16 (1) 16-18 (2) 18-19 (3) 19-21 (4) 21-22 (3) 22-00 (2) 00-04 (1)	21-22 (1) 22-06 (3) 06-08 (2) 08-09 (1) 18-19 (3) 19-21 (4) 21-22 (3) 22-00 (2) 00-04 (1)	22-00 (1) 00-06 (2) 06-07 (1) 22-00 (1)* 00-06 (2)* 06-07 (1)*
Australasia	15-17 (1)* 14-16 (1) 16-19 (2) 19-20 (1)	07-08 (1) 08-11 (2) 11-17 (1) 17-18 (2) 18-20 (3) 20-21 (2) 21-23 (1)	00-02 (1) 02-03 (2) 03-06 (3) 06-07 (2) 07-08 (1)	02-03 (1) 03-06 (2) 06-07 (1) 03-06 (1)*
Caribbean, Central America & Northern Countries of South America	10-14 (1)** 07-08 (1) 08-12 (2) 12-14 (3) 14-16 (2) 16-17 (1)	05-06 (1) 06-07 (2) 07-09 (4) 09-14 (2) 14-16 (3) 16-18 (4) 18-20 (3) 20-22 (2) 22-02 (1)	18-19 (1) 19-20 (2) 20-01 (3) 01-04 (2) 04-06 (1) 16-18 (4) 18-20 (3) 20-21 (2) 21-23 (1)	19-20 (1) 20-03 (2) 03-04 (1) 20-01 (1)* 01-03 (2)* 03-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	10-15 (1)** 07-08 (1) 08-10 (2) 10-12 (3) 12-13 (2) 13-15 (3) 15-16 (2) 16-17 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-21 (2) 21-23 (1)	18-20 (1) 20-03 (2) 03-05 (1)	21-04 (1) 22-03 (1)*
McMurdo Sound, Antarctica	13-15 (1) 15-17 (2) 17-18 (1)	16-19 (1) 19-22 (2) 22-02 (1) 06-07 (1) 07-09 (2) 09-11 (1)	22-02 (1) 02-05 (2) 05-06 (1)	02-05 (1)

\*Indicates best time for 160 meter openings.  
\*\*Indicates best time for 10 meter openings.  
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.

sional short-skip openings may also be possible on 10 and 12 meters.

### VHF Ionospheric Openings

Best chances for unusual ionospheric openings should be during periods of radio storminess on the HF bands. Check the Last-Minute Forecast at the beginning of this column for days during February expected to be Below Normal or Disturbed. Check the VHF bands on these days for auroral-type and sporadic-E short-skip openings.

Short-Skip Charts for February, valid for distances between approximately 50 and 2400 miles and between Alaska, Hawaii, and the mainland, appeared in January's column.

73, George, W3ASK

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# WASHINGTON READOUT

REGULATORY NEWS IN THE WORLD OF AMATEUR RADIO

## FCC Issues Form 610-V—Vanity Call Sign Application Form

**A**fter some two years of rulemaking and additional delays caused by appeals from the amateur radio community, the Amateur Service "vanity" call sign program is about to get underway.

On August 10, 1993 President Clinton signed his well-publicized Deficit Reduction Plan into law. Tucked away on page 57 was a provision for amateur radio station call signs to be selected by the user. Getting this provision incorporated was largely the work of a single, very persistent Extra Class amateur.

Jim Wills, N5HCT of Tyler, Texas wanted his old call sign (WA5EHQ) back. Wills began by filing a Petition for Rulemaking with the FCC in June 1990. He suggested that amateurs be allowed to specify three call sign choices in order of preference in exchange for paying a \$30.00 fee to the FCC. His request was denied, but he didn't give up. Wills began working with Congress. He told them that amateur radio operators wanted—and were willing to pay for—station call signs of their choosing. After a lengthy series of letters and phone calls, Wills began to make headway. Neither the ARRL nor the FCC was really aware of this progress until a provision for "vanity" amateur station call signs surfaced in the Clinton budget package!

For decades the FCC had said that they could not grant special amateur station call signs even if they were reimbursed for their cost. Their reasoning was that amateurs, being non-profit, were statutorily exempt from all fees. Furthermore, the FCC did not have the ability to process special call signs with their old Honeywell data processing system. But a new amateur service computer system would be coming online shortly, and with it the capability to handle assignment of special call signs.

The cost of a special call sign was initially supposed to have been \$70.00 for a ten-year term license. Last summer, however, the FCC reduced the fee to \$30.00 to more closely reflect the actual cost of the program. They came up with the \$30.00 figure by estimating that 28,000 amateurs every year would want a vanity call sign at an annual cost of \$840,000.

The American Radio Relay League quickly formed an Ad Hoc Committee on Vanity Call Signs to develop how they thought the program should be administered. On December 23, 1994 the FCC Commissioners adopted final rules implementing vanity call signs in the Amateur Service, and the ARRL suggestion that the system should be phased in was adopted. However, the League's proposal of a one-time \$150 fee (which would require Congressional approval) rather than payment for each license term was not.

Initially the FCC was to assign the first available call sign from a list of ten preferential call signs chosen by the licensee. At the ARRL's urging, however, this was changed to 25 to in-

crease the chances of obtaining an assignable call sign. A system of "opening gates" was established. The FCC said they would announce the opening of each gate by Public Notice.

The new FCC Form 610-V was completed almost a year ago. This is the application form that would be used to list the specific call sign choices. Its release to the public, however, was held up pending resolution of several Petitions of Reconsideration. Several amateurs and the ARRL wanted the FCC to change certain facets of the program. The League was particularly unhappy with the provision that an amateur could select a call sign from other regions. A second round of petitions were filed after the FCC ruled on the first batch.

Finally, on November 29, 1995 the FCC resolved all of the issues and issued a Fact Sheet detailing how the vanity call sign program would work. The following is a verbatim copy of this release (quote):

### Amateur Station Vanity Call Sign System

A vanity call sign (a call sign selected by the FCC from a list of call signs requested by the station licensee or license trustee) may be requested for a primary or club station. The request must be made by the licensee or, in the case of a club station, by the club station license trustee, on FCC Form 610-V *Amateur Radio Station Vanity Call Sign Request*. It must be filed with the required fee. (See FCC Form 1070-V for mailing instructions and fee requirement.) RACES and military recreation stations are not eligible for vanity call signs.

The requestor may list up to twenty-five call signs in order of preference. The exact prefix, numeral, and suffix must be given for each call sign. Requests stated in general terms such as, "Any call sign with my initials" or "Any call sign having the prefix (or suffix) \_\_\_\_" will be dismissed. The first assignable call sign on the list for which the requestor is eligible will be shown on the license grant for the requestor's station and the original call sign will be vacated. Should no requested call sign be assignable to the station, the original call sign will continue to be shown on the license grant.

**A call sign is assignable** two years following license expiration, surrender, revocation, set aside, cancellation, void *ab initio*, or death of the grantee. See Fact Sheet PR-5000 #206 *Sequential Call Sign System* for explanation of call sign group, format, and prefix (see Table I). The exceptions are:

- **Former holder**—The two-year requirement does not apply to an otherwise eligible primary station if the call sign was previously assigned to the primary, secondary, repeater, control, auxiliary link, or space station of the requestor.

- **Close relative of former holder now deceased**—Upon the death of the holder, a call sign is assignable *immediately* to an otherwise eligible primary station of a *close relative* (the

holder's spouse, child, grandchild, stepchild, parent, grandparent, stepparent, brother, sister, stepbrother, stepsister, aunt, uncle, niece, nephew, or in-law).

- **Request in memoriam**—Upon the death of the holder, the call sign is assignable *immediately* to an otherwise eligible club station. The trustee's files must include a written statement from a close relative, as listed above, of the deceased showing consent of the relative to the request.

**Call sign group eligibility** is determined by the requestor's class of operator license:

- Amateur Extra—Group A, B, C, or D.
- Advanced—Group B, C, or D.
- General—Group C or D.
- Technician Plus—Group C or D.
- Technician—Group C or D.
- Novice—Group D.

The only **exception** is:

- **Former holder**—The operator class requirement does not apply to an otherwise eligible primary station if the call sign was previously assigned to the primary, secondary, repeater, auxiliary link, or space station of the requestor.

**Requestor's mailing address determines eligibility for call sign format and prefix:**

- **One of the contiguous 48 states**—Regions 1–10.

- **Alaska**—Regions 1–11.

- **American Samoa**—Regions 1–10 or a prefix in Region 13 having the numeral 8.

- **Commonwealth of Northern Mariana**—Regions 1–10 or a prefix in Region 13 having the numeral .

- **Guam**—Regions 1–10 or a prefix in Region 13 having the numeral 2.

- **Hawaii**—Regions 1–10 or a prefix in Region 13 having numeral 6 or 7.

- **Puerto Rico**—Regions 1–10 or a prefix in Region 12 having the numeral 3 or 4.

- **Virgin Islands**—Regions 1–10 or a prefix in Region 12 having the numeral 2.

The **exceptions** are:

- **Former holder**—The mailing address requirement does not apply to an otherwise eligible primary station if the call sign was previously assigned to the primary, secondary, repeater, control, auxiliary link, or space station of the requestor.

- **Close relative of former holder now deceased**—The mailing address requirement **does not** apply to the otherwise eligible primary station of a close relative, as listed above.

- **Request in memoriam**—The mailing address eligibility requirement **does not** apply in the case of an otherwise eligible club station for a vanity call sign requested *in memoriam*. The trustee's files must include a written statement from a close relative, as listed above, of the deceased showing consent of the relative to the request.

**Starting gates** are being used to implement the system in stages. Applications filed before

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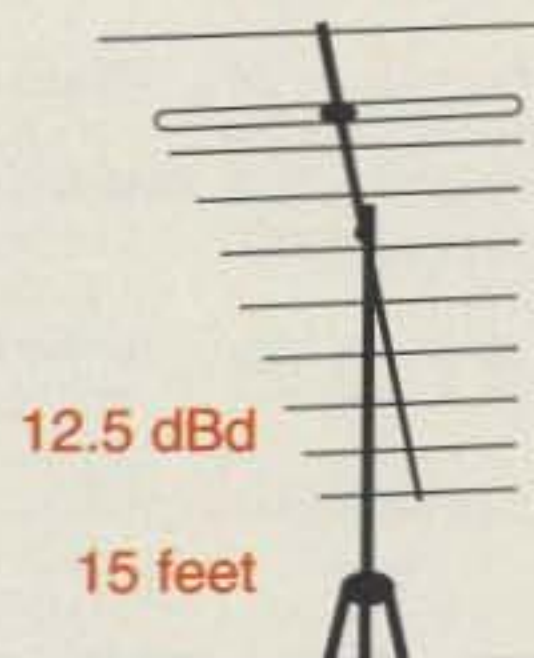
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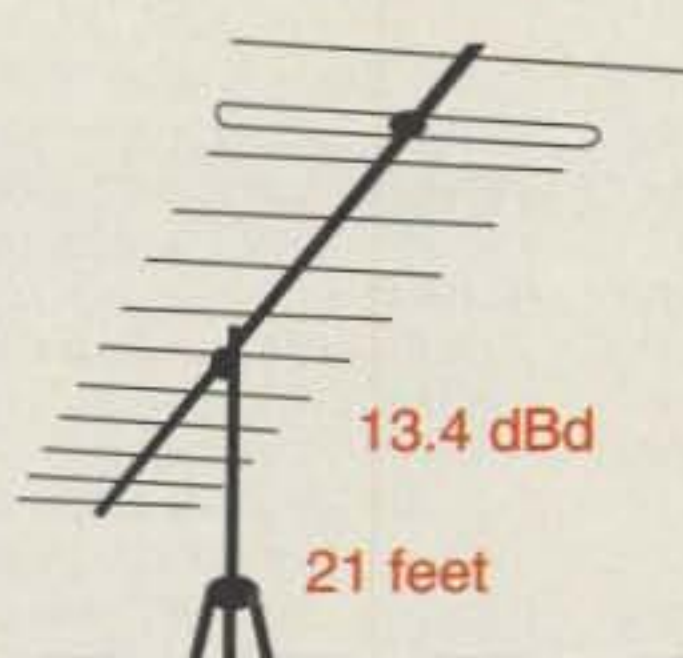
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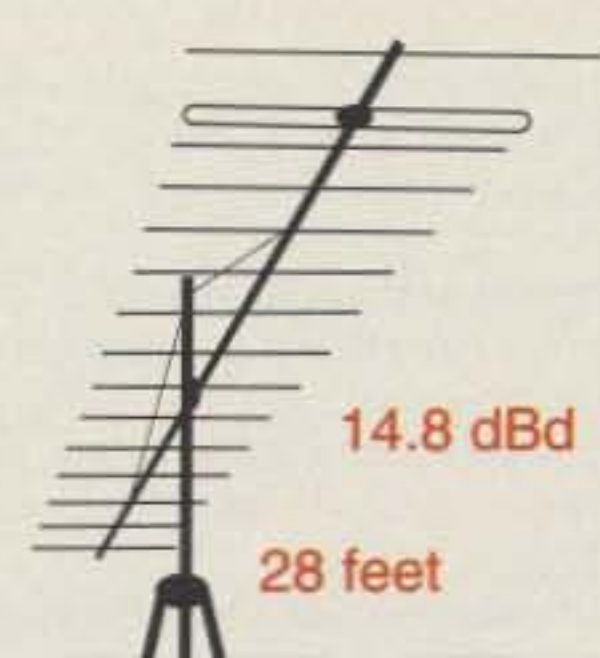
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CIRCLE 72 ON READER SERVICE CARD

## AMATEUR STATION SEQUENTIAL CALL SIGN SYSTEM

Adapted from PR-5000 #206

A unique call sign is assigned to each amateur station during the processing of a license. The call sign format consists of the prefix, followed by a single numeral, followed by the suffix. The call sign prefixes can be one or two letters. Single-letter prefixes are either K, N, or W. Two-letter combinations are either AA-AL, KA-KZ, NA-NZ, or WA-WZ. The numeral is a single number, through 9, indicating a geographical district.

The station is reassigned its same call sign upon renewal or modification of its license, unless the licensee applies for a change to a new sequential call sign using FCC Form 610. Each new call sign is sequentially selected from the alphabetized regional-group list for the licensee's operator class and mailing address. The mailing address must be one where the licensee can receive mail delivery by the United States Postal Service. Certain combinations of letters are not used. [The FCC is in the process of updating this Fact Sheet to include these unused combinations.] When the call signs in any regional-group list are exhausted, the selection is made from the next lower group.

### GROUP A: For primary stations licensed to Amateur Extra Class Operators

Regions 1 to 10—Continental 48 states:

1. Prefix K, N, or W, and a two-letter suffix;
2. Two-letter prefix with the first letters AA-AK (except AH), NA-NZ (except NH, NL and NP), KA-KZ (except KH, KL and KP) or WA-WZ (except WH, WL and WP), and one-letter suffix; and
3. Two-letter prefix with the first letters AA-AK, and two-letter suffix.

Region 11—Alaska:

Prefix AL, KL, NL, or WL, and one-letter suffix.

Region 12—Caribbean area:

Prefix KP, NP, or WP, and one-letter suffix.

Region 13—Pacific area:

Prefix AH, KH, NH, or WH, and one-letter suffix.

### GROUP B: For primary stations licensed to Advanced Class Operators

Regions 1 to 10—Continental 48 states:

Two-letter prefix with the first letters NA-NZ (except NH, NL, and NP), KA-KZ (except KH, KL and KP) or WA-WZ (except WH, WL, and WP) and two-letter suffix. [Special Note: According to an FCC Public Notice, KC6, KG4, and KX6 and two-letter suffix are not available to the sequential call sign system.]

Region 11—Alaska:

Prefix AL and two-letter suffix.

Region 12—Caribbean area:

Prefix KP and two-letter suffix.

Region 13—Pacific area:

Prefix AH and two-letter suffix.

### GROUP C: For primary stations licensed to General, Technician Plus, and Technician Class Operators

Regions 1 to 10—Continental 48 states:

Prefix K, N, or W, and a three-letter suffix.

Region 11—Alaska:

Prefix KL, NL, or WL and two-letter suffix.

Region 12—Caribbean area:

Prefix NP or WP and two-letter suffix.

Region 13—Pacific area:

Prefix KH, NH, or WH and two-letter suffix.

### GROUP D: For primary stations licensed to Novice Class Operators

Regions 1 to 10—Continental 48 states:

Two-letter prefix KA-KZ (except KH, KL, and KP) or WA-WZ (except WH, WL, and WP) and a three-letter suffix. [Special Notes: NA-NZ and three-letter suffix may not be selected in any region. The letter X may not follow the digit in any 2x3 format call sign. See §2.302. According to an FCC Public Notice, KC4AAA- AAF and KC4USA-USZ are not available to the sequential call sign system.]

Region 11—Alaska:

Prefix KL or WL and three-letter suffix.

Region 12—Caribbean area:

Prefix KP or WP and three-letter suffix.

Region 13—Pacific area:

Prefix KH or WH and three-letter suffix.

### THE REGIONS AND NUMERALS IN A CALL SIGN ARE:

(Two-letter state postal codes. The regions and call sign digits are the same for Regions 1 through 9.)

- 1 CT, ME, MA, NH, RI, and VT
- 2 NJ and NY
- 3 DE, DC, MD, and PA
- 4 AL, FL, GA, KY, NC, SC, TN, and VA
- 5 AR, LA, MS, NM, OK, and TX
- 6 CA
- 7 AR, ID, MT, NV, OR, UT, WA, and WY
- 8 MI, OH, and WV
- 9 IL, IN, and WI
- 10 CO, IA, KS, MN, MO, NE, ND, and SD (Numeral is 0.)
- 11 Alaska (Any numeral 1 through 0. KL9KAA-KL9KHZ is reserved for assignment to U.S. personnel stationed in Korea.)
- 12 Caribbean Insular area. (The numeral 1 indicates Navassa Island; 2 indicates Virgin Islands; 3 or 4 indicates Commonwealth of Puerto Rico except Desecheo Island; and 5 indicates Desecheo Island.)
- 13 Hawaii and Pacific Insular areas. (The numeral 1 indicates Baker or Howland Island; 2 indicates Guam; 3 indicates Johnston Island; 4 indicates Midway Island; 5 indicates Palmyra or Jarvis Island; 5 followed by suffix letter K indicates Kingman Reef; 6 or 7 indicates Hawaii except Kure Island; 7 followed by the letter K indicates Kure Island; 8 indicates American Samoa; 9 indicates Wake, Wilkes, or Peale Island; and 0 indicates the Commonwealth of Northern Mariana Islands.)

Licensee information is retained in the FCC's Amateur Service database for two years beyond expiration to provide a grace period during which persons who unintentionally fail to renew their licenses have additional time to do so.

Table I—Amateur station sequential call sign system (adapted from PR-5000 #206).

the appropriate starting gate opens will be dismissed. A public notice will announce the opening of each gate. They are:

#### •Gate 1

1. A primary station licensee of any class operator may request the call sign previously shown on the license.

2. Or on the primary, secondary, repeater, auxiliary link, control, or space station of a now-deceased close relative.

3. A club station licensee trustee of any class operator may request the call sign previously shown on the club station license.

#### •Gate 1(A)

A license trustee of a club station may request in memoriam the call sign previously shown on the station license of a deceased person who was a member of the club. The club must have held a club station license grant on March 24, 1995. The trustee's files

must include a letter from a close relative, as listed above, of the deceased confirming the deceased person's association with the club and show consent of the relative to the request.

#### •Gate 2

1. An Amateur Extra Class operator may request a Group A, B, C, or D call sign for his or her primary station.

2. An Amateur Extra Class operator may request, including request in memoriam, a Group A, B, C, or D call sign for the club station for which he or she is license trustee.

#### •Gate 3

1. An Advanced Class operator may request a Group B, C, or D call sign for his or her primary station.

2. An Advanced Class operator may request, including request in memoriam, a Group B, C, or D call sign for the club station for which he or she is license trustee.

#### •Gate 4

1. A General, Technician Plus, or Technician Class operator may request a Group C or D call sign for his or her primary station.

2. A General, Technician Plus, or Technician Class operator may request, including request in memoriam, a Group C or D call sign for the club station for which he or she is license trustee.

3. A Novice Class operator may request a Group D call sign for his or her primary station.

For further information, contact the FCC's Consumer Assistance Branch at 1-800-322-1117 or 717-337-1212, Monday through Friday, 8 AM to 4:30 PM Eastern time. (end quote)

### When Will The First Gate Open?

At press time the FCC had not yet issued the

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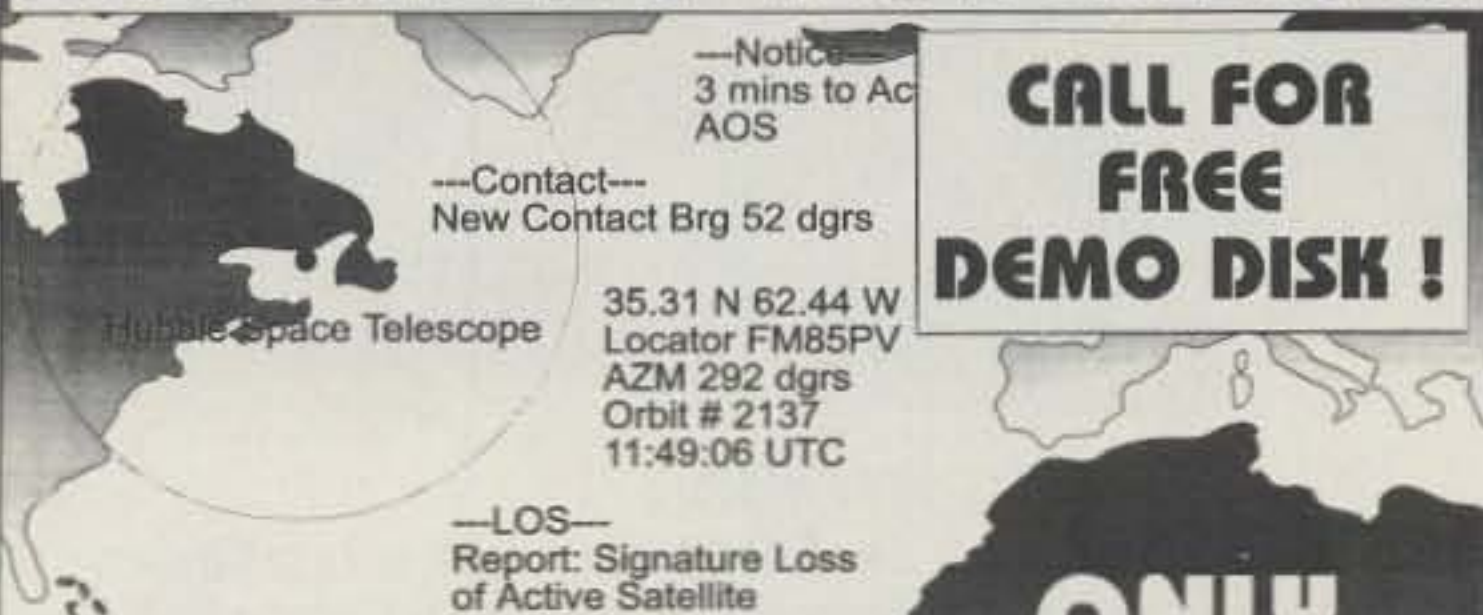
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FCC 610V - AMATEUR STATION VANITY CALL SIGN REQUEST  
CAREFULLY READ THE ATTACHED INSTRUCTIONS BEFORE FILING THIS FORM

FOR FCC USE ONLY

**SECTION 1 - TO BE COMPLETED BY ALL APPLICANTS**

1. Print or type call name, suffix, first name, middle initial. If a club, enter club name. 2. Date of birth.

3. Mailing Address City State ZIP Code

4. Payment Type Code  
W A V R

5. Fee Due \$

FOR FCC USE ONLY

6. I hereby request that the currently assigned amateur station call sign \_\_\_\_\_ be vacated.

7. I hereby apply for a vanity call sign under the following eligibility (make an X in the appropriate box and enter the required information):

7A.  FORMER PRIMARY STATION HOLDER: I request call sign \_\_\_\_\_ be shown on my primary station license. This call sign was previously shown on my primary station license. AVAILABLE UNDER ALL GATES.

7B.  CLOSE RELATIVE OF FORMER HOLDER: I request call sign \_\_\_\_\_ be shown on my primary station license. This call sign was previously shown on the primary station license of my deceased spouse, child, grandchild, stepchild, parent, grandparent, stepparent, brother, sister, stepbrother, stepfather, aunt, uncle, niece, nephew, or in-law. Enter your relationship to the deceased: \_\_\_\_\_ AVAILABLE UNDER ALL GATES.

7C.  FORMER CLUB STATION HOLDER: I request call sign \_\_\_\_\_ be shown on the license for the club station for which I am the license trustee. This call sign was previously shown on the license for the club station. AVAILABLE UNDER ALL GATES.

7D.  CLUB STATION WITH CONSENT OF CLOSE RELATIVE OF FORMER HOLDER: I request call sign \_\_\_\_\_ to be shown on the license for the club station for which I am the license trustee. The club was established prior to and was in existence on March 24, 1995. This call sign was previously shown on the primary station license of a person now deceased. I am acting with written consent of the deceased person's spouse, child, grandchild, stepchild, parent, grandparent, stepparent, brother, sister, stepbrother, stepfather, aunt, uncle, niece, nephew, or in-law. Enter the relationship to the deceased of the person giving consent: \_\_\_\_\_ AVAILABLE UNDER GATES 1(A), 2, 3 AND 4.

7E.  PRIMARY STATION PREFERENCE LIST: I request the first assignable call sign from my preference list in item 9 be shown on the license for my primary station. AVAILABLE TO AMATEUR EXTRA CLASS OPERATORS UNDER GATE 2; TO ADVANCED CLASS OPERATORS UNDER GATE 3; TO GENERAL, TECHNICIAN PLUS, TECHNICIAN, AND NOVICE UNDER GATE 4.

7F.  CLUB STATION PREFERENCE LIST: I request the first assignable call sign from my preference list in item 9 be shown on the license for the club station for which I am the license trustee.

8. Attach a photocopy of your current amateur operator/primary station license document (FCC Form 640) here. If you checked item 7C, 7D or 7F, attach a photocopy of the current club station license document (FCC Form 642) here.

**SECTION 2 - TO BE COMPLETED BY APPLICANTS WHO HAVE CHECKED ITEMS 7E OR 7F**

9. Select your preference list of vanity call signs very carefully. Give the exact prefix, numeral and suffix for each call sign.

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_  
6. \_\_\_\_\_ 7. \_\_\_\_\_ 8. \_\_\_\_\_ 9. \_\_\_\_\_ 10. \_\_\_\_\_  
11. \_\_\_\_\_ 12. \_\_\_\_\_ 13. \_\_\_\_\_ 14. \_\_\_\_\_ 15. \_\_\_\_\_  
16. \_\_\_\_\_ 17. \_\_\_\_\_ 18. \_\_\_\_\_ 19. \_\_\_\_\_ 20. \_\_\_\_\_

**SECTION 3 - TO BE COMPLETED BY ALL APPLICANTS**

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312(a)(1)), AND/OR FORFEITURE (U.S. CODE, TITLE 47, SECTION 503).

I CERTIFY THAT ALL STATEMENTS AND ATTACHMENTS ARE TRUE, COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND ARE MADE IN GOOD FAITH.

10. Signature of applicant (Do not print, type or stamp.) 11. Date signed 12. Daytime Telephone No.  
X \_\_\_\_\_ / / \_\_\_\_\_

NOTE:  
If none of the call signs that you requested are assignable, the call sign that you vacated will be shown on your station license.

Do NOT send this form to the FCC in Gettysburg, PA, Washington, DC, or any local Field Office. See attached INSTRUCTIONS for filing information.

NOTICE TO INDIVIDUALS REQUIRED BY THE PRIVACY ACT OF 1974 AND THE PAPERWORK REDUCTION ACT OF 1980  
The collection of personal information requested in this form is authorized by the Communications Act of 1934, as amended. The Commission will use the information provided in this form to determine whether grant of the application is in the public interest. In reaching that determination, or for law enforcement purposes, it may become necessary to refer personal information contained in this form to another government agency. In addition, all information provided in this form, as well as the form itself, will be available for public inspection. If information requested on the form is not provided, processing of the application may be delayed or the application may be returned without action pursuant to Commission Rules. Applicants need not comply with the collection of information if the form does not contain an OMB approval number. The foregoing notice is required by the Privacy Act of 1974, Public Law 93-502, December 31, 1974, 5 U.S.C. Section 552(a)(2).

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FCC 610V  
November 1995

FCC 610V  
November 1995

Fig. 1- This is the FCC Form 610-V that is used to request a specific call sign. You will be able to select an available station call sign of your choice based on your license class. The "vanity" call sign program will be phased in by the opening of five "starting gates."

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## **"The OMNI-VI has finally ended my search!"**

*"I have owned 18 different HF rigs including most high end models from your three competitors. I used each intensively, many side by side. I pick 2 to retain, then purchase another to run more comparisons - my personal quest to find the 'ultimate' rig. With high hopes, I purchased and then sold when each did not quite deliver. I thought I might be looking for something that did not exist. The OMNI-VI has*

*finally ended my search! If there were a word that defined better than superb, I would use it for the OMNI's receiver. It is a serious operator's rig - not a fashion designer's creation with little substance beneath the veneer."*

— Gregory Buhyoff, KN4FR

## **"Performance to cost ratio makes this radio a best buy."**

*"In my 40+ years of hamming, I have owned and operated most equipment that has been built. I am still a very active DXer. To say I am pleased with my OMNI-VI would be a wild understatement. Quietness, selectivity and dynamic range is the best I have seen. Performance to cost ratio makes this radio a best buy."*

—Ralph Napolitano, W9LKJ

## **"For the first time I am not bothered by strong adjacent stations."**

*"I dreamed for many years of having this type of performance and you have done it. For the first time I am not bothered by strong adjacent stations. Recently I was listening to a very weak station on 40 and only discovered after tuning up in frequency a little that an*

*80 dB over 9 was only 1.5 KHz away [we'll forgive Tom's enthusiasm, that's a BIG signal]. I was so impressed that I nearly jumped up and shouted. Thanks for such great performance."*

— Tom Jednacz, KA2G

## **"It truly does pull in the weak ones."**

*"I have to say I am pretty picky and spent considerable time making up my mind. My observation is that the OMNI-VI is 20% better than the competition which I had for 10 years. Easy to operate and the receiver is all I hoped it*



*would be. It truly does pull in the weak ones and in this down spiraling sunspot cycle being able to hear them is the competitive edge. The filtering exceeds my expectations. I now realize there is a stateside company that hams can still rely on. TEN-TEC staff have been extremely kind; a cheerful and helpful voice is just a phone call away."*

— Tommy Farr, WJ60.

## **"Nothing I have tried comes close to the receiver performance of the OMNI-VI."**

*"I spent several years being disappointed by the available transceivers. I like to work DX, contests, and most especially weak signal DX on the low bands. From the Mid-West there is no more demanding situation than 40 meters at contest time, each 1 KHz away, and trying to work the weak Europeans. On my OMNI, the Europeans are crystal clear and although very weak a pleasure to work. On the competitions' transceivers they are indistinct and confusing in the noise. Nothing I have tried comes close to the receiver performance of the OMNI-VI."*

— Bill Maxson, N4AR

## **Would I buy it again? I sure would!**

*"You may be interested in my response to a letter from a ham who saw my station pictured in QST. He asks if the OMNI-VI performs as well as advertisements say and, further, would I buy it again? 'I sure would! I have used TEN-TEC for 25 years and consider it tops. OMNI-VI is the best in a long line of transceivers. You just can't beat their service.' I know from personal experience."*

— John Thompson, W1BIH/PJ9JT

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Public Notice announcing the opening of the first gate. However, it is expected at any time, and may have already happened by the time you read this column. They did, however, issue both the FCC Form 610-V Amateur Radio Station Vanity Call Sign Request (application form, see fig. 1) and FCC Form 1070-V to their printer. This last form, entitled Notice of Fee Due for FCC 610V, details the steps to be taken to submit the Form 610-V application and fee.

Basically, the form states that the \$30.00 fee may be paid by check, bank draft, money order, or credit card. "If paying by check, bank draft, or money order, your remittance must be denominated in U.S. dollars, drawn on a U.S. financial institution and made payable to 'FCC.' No post-dated, altered, or third-party checks will be accepted. No checks will be accepted if issue date is older than six months. Do not send cash." An FCC Form 159, Remittance Advice, must be used when paying by credit card. The 610-V application package should be sent to: Federal Communications Commission, Amateur Vanity Call Sign Requests, P.O. Box 358924, Pittsburgh, PA 15251-5924. If you wish to hand-carry, courier, or overnight express your application to Pittsburgh, it should be enclosed in a sealed envelope with the appropriate Post Office address clearly marked on the outside. Send to the following address: Federal Communications Commission, c/o Mellon Bank, 525 William Penn Way, 27th Floor, Room 153-2713, Pittsburgh, PA 15259; Attn. Wholesale Lockbox Shift Supervisor. Deliveries are accepted 24 hours a day, 7 days a week. The formal filing date of an

application will be either the date it was delivered to Pittsburgh, if that day was a regular FCC business day, or the next regular FCC business day, if the delivery date was a weekend or FCC holiday.

### Where Do I Get The FCC Form 610-V?

You may obtain application forms from the FCC's Form's Distribution Center, 2803 52nd Avenue, Hyattsville, MD 20781 or by telephoning toll free 800-418-3676 (FORM). At this writing, however, the FCC had not yet received their shipment of forms. The government prints forms in federal prisons and the print master has been released to the prison. It is not known just how long it will be before the federal prison system gets to printing the FCC Form 610-V.

Anticipating that the amateur radio community would want to obtain the needed 610-V application form as soon as possible, we asked the FCC to forward us a print master so that we could print and distribute the form ourselves. The form consists of a two page form (See fig. 1) and two pages of instructions. We have now received the master and have had several thousand forms printed, which cost us several hundred dollars. It is available for immediate shipment. (A donation of \$1.00 will be appreciated, but is not necessary.)

If you want the 610-V Vanity Call Sign application form and instructions, please send a large business-size self-addressed stamped envelope to: The W5YI Group, Inc., FCC Form 610-V Request, P.O. Box

565101, Dallas, TX 75356-5101.

### How Do I Know What Call Signs Are Available?

The FCC said in their rule making that it anticipated that the private sector would make lists of assignable amateur station call signs available to the public. The W5YI Group offers a vanity call sign availability service. Basically, we have programmed a computer to print a custom computer disk file of every unassigned four- and five-character call sign on a particular day for a specific region. It can easily be read with any word processor or from DOS.

Our FCC database of assigned call signs is updated daily. We also take into consideration all call signs which are not available during the two-year grace period following expiration. Included on the disk are all 1x2, 2x1, 2x2, and 1x3 format call signs, but not 2x3 call signs since there are close to 9 million of them! We can, however, tell you if a specific 2x3 call sign has been assigned on the telephone. Please note our advertisement that appears elsewhere in this magazine. Cost is only \$15.95, and your custom call sign availability disk may be ordered via credit card toll free at 1-800-669-9594. We have already shipped hundreds of them!

Again, it is very important that no amateur file an application for a special "Vanity" station call sign until your eligibility "Gate" opens. Our best guess is that this should be sometime in late January 1996.

73, Fred, W5YI

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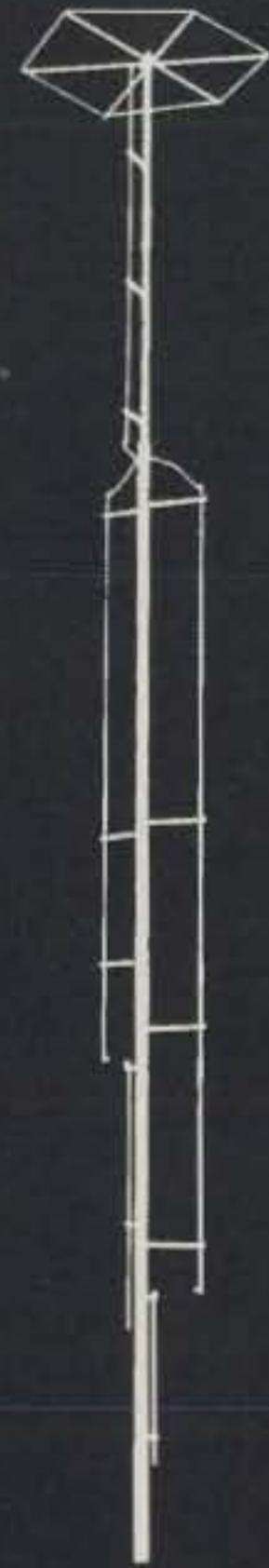
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# GAP: THE PERFECT ANTENNA

We at GAP realize there isn't a perfect antenna. No singular antenna will scream DX on 80 and be the best for local nets on 10. If anyone tells you there is, beware! The perfect antenna does not exist, but the right one for you may. If you want something to bust the pile on the low bands, then consider the Voyager. Just starting out in ham radio and need a great general coverage antenna, the Challenger is easy to assemble and for little effort will yield superior performance, especially on DX. Maybe you knowingly or unknowingly moved into one of those "restricted areas" where the Eagle's limited visibility, but unlimited ability is desired.



Voyager DX



Challenger DX



Eagle DX

This chart helps you select the right GAP antenna. When comparing GAPs, bandwidth is not a concern. With few exceptions, a GAP yields continuous coverage under 2:1 for the **ENTIRE BAND**.

All antennas utilize a GAP elevated asymmetric feed. A major benefit is the virtual elimination of the earth loss, so more RF radiates into the air instead of the ground. This feed is why a GAP requires **NO RADIALS**. Just as elevating a GAP offers no significant improvement to its performance, adding radials won't either, making set up a breeze.

**A GAP antenna has no traps, coils or transformers.** This is important. The greatest sources of failure in multiband antennas are these devices. Perhaps you heard someone discuss a trap that had melted, arced or became full of water. Improvements to these inherent problems are the focus of the antenna manufacturer, while the basic design of the antenna remains unchanged. **GAP improved the trap by eliminating it!** Removing these devices means they don't have to be tuned and, more importantly, won't be detuned by the first ice or rain. The absence of these devices improves antenna reliability, stability and increases bandwidth.

Another major advantage to a GAP antenna is its **NO TUNE** feature. Screws are simply inserted into predrilled holes with a supplied nutdriver.

The secret is out and people in the know say:

**CQ**—"The GAP consistently outperformed base-fed antennas...and was quieter."

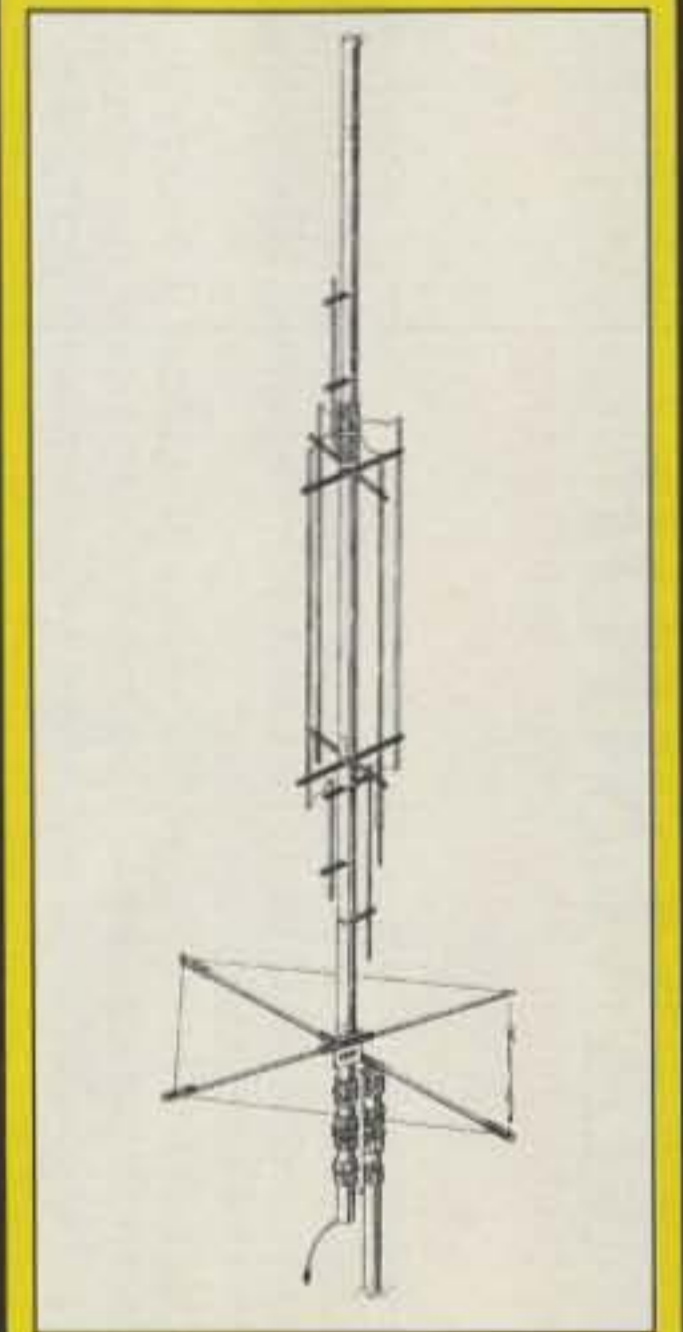
**73**—"This is a real DX antenna, much quieter than other verticals."

**RF**—"To say this antenna is effective would be a real understatement. Switching back and forth on 40m between another multiband HF vertical and the GAP, there was no comparison. Signals were always stronger on the GAP, sometimes by 5 units, not just DB's."

**Worldradio**—"These guys have solved the problem associated with verticals. That is, an awful lot of RF is wallowing around and dropping into the dirt instead of going outward bound. A half-wave vertical does need radials if it is end fed (at the bottom). But the same half-wave vertical does not (as much, hardly at all) if it is fed in the center."

**IEEE**—"Near field and power density analyses show another advantage of this antenna (asymmetric vertical dipole): it decreases the power density close to the ground, and so avoids power dissipation in the soil below it. The input impedance is very stable and almost independent of ground conductivity. This antenna can operate with high radiation efficiency in the MF AM standard broadcast band, without the classical buried ground plane, so as to yield easier installation and maintenance."

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This all purpose antenna is designed to operate 10m-80m, WARC bands included. It sits on a 1-1/4" pipe and can be mounted close to the ground or up on a roof. Its bandwidth and no tune feature make it an ideal antenna for the limited space environment as well as a terrific addition to the antenna farm.

MODEL	BANDS OF OPERATION											HT	WT	MOUNT	COUNTER-POISE	COST
	2m	6m	10m	12m	15m	17m	20m	30m	40m	80m	160m					
Challenger DX	■	■	■	■	■		■		■	■		31.5'	21 lbs	Drop In Ground Mount	3 Wires @ 25'	\$259
Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	\$269
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	\$289
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	\$399

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### SL SERIES



#### • LOW PROFILE POWER SUPPLY

MODEL	Colors		Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
SL-11A	•	•	7	11	2 3/4 x 7 3/8 x 9 3/4	12
SL-11R	•	•	7	11	2 3/4 x 7 x 9 3/4	12
SL-11S	•	•	7	11	2 3/4 x 7 3/8 x 9 3/4	12
SL-11R-RA	•	•	7	11	4 3/4 x 7 x 9 3/4	13

### RS-L SERIES



#### • POWER SUPPLIES WITH BUILT IN CIGARETTE LIGHTER RECEPTACLE

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RS-4L	3	4	3 1/2 x 6 1/8 x 7 1/4	6
RS-5L	4	5	3 1/2 x 6 1/8 x 7 1/4	7

### RM SERIES



MODEL RM-35M

#### • 19" RACK MOUNT POWER SUPPLIES

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RM-12A	9	12	5 1/4 x 19 x 8 1/4	16
RM-35A	25	35	5 1/4 x 19 x 12 1/2	38
RM-50A	37	50	5 1/4 x 19 x 12 1/2	50
RM-60A	50	55	7 x 19 x 12 1/2	60
• Separate Volt and Amp Meters				
RM-12M	9	12	5 1/4 x 19 x 8 1/4	16
RM-35M	25	35	5 1/4 x 19 x 12 1/2	38
RM-50M	37	50	5 1/4 x 19 x 12 1/2	50
RM-60M	50	55	7 x 19 x 12 1/2	60

### RS-A SERIES



MODEL RS-7A

MODEL	Colors		Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
RS-3A	•	•	2.5	3	3 x 4 3/4 x 5 3/4	4
RS-4A	•	•	3	4	3 3/4 x 6 1/2 x 9	5
RS-5A	•	•	4	5	3 1/2 x 6 1/8 x 7 1/4	7
RS-7A	•	•	5	7	3 3/4 x 6 1/2 x 9	9
RS-7B	•	•	5	7	4 x 7 1/2 x 10 3/4	10
RS-10A	•	•	7.5	10	4 x 7 1/2 x 10 3/4	11
RS-12A	•	•	9	12	4 1/2 x 8 x 9	13
RS-12B	•	•	9	12	4 x 7 1/2 x 10 3/4	13
RS-20A	•	•	16	20	5 x 9 x 10 1/2	18
RS-35A	•	•	25	35	5 x 11 x 11	27
RS-50A	•	•	37	50	6 x 13 3/4 x 11	46
RS-70A	•	•	57	70	6 x 13 3/4 x 12 1/2	48

### RS-M SERIES



MODEL RS-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
• Switchable volt and Amp meter				
RS-12M	9	12	4 1/2 x 8 x 9	13
• Separate volt and Amp meters				
RS-20M	16	20	5 x 9 x 10 1/2	18
RS-35M	25	35	5 x 11 x 11	27
RS-50M	37	50	6 x 13 3/4 x 11	46
RS-70M	57	70	6 x 13 3/4 x 12 1/2	48

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	@13.8VDC	@10VDC	@5VDC			
VS-12M	9	5	2	12	4 1/2 x 8 x 9	13
VS-20M	16	9	4	20	5 x 9 x 10 1/2	20
VS-35M	25	15	7	35	5 x 11 x 11	29
VS-50M	37	22	10	50	6 x 13 3/4 x 11	46
• Variable rack mount power supplies						
VRM-35M	25	15	7	35	5 1/4 x 19 x 12 1/2	38
VRM-50M	37	22	10	50	5 1/4 x 19 x 12 1/2	50

### RS-S SERIES



MODEL RS-12S

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MODEL	Colors		Continuous Duty (Amps)	ICS* Amps	Size (IN) H x W x D	Shipping Wt. (lbs.)
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RS-7S	•	•	5	7	4 x 7 1/2 x 10 3/4	10
RS-10S	•	•	7.5	10	4 x 7 1/2 x 10 3/4	12
RS-12S	•	•	9	12	4 1/2 x 8 x 9	13
RS-20S	•	•	16	20	5 x 9 x 10 1/2	18
SL-11S	•	•	7	11	2 3/4 x 7 3/8 x 9 3/4	12

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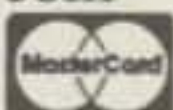
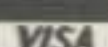
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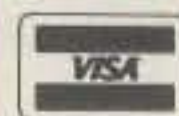


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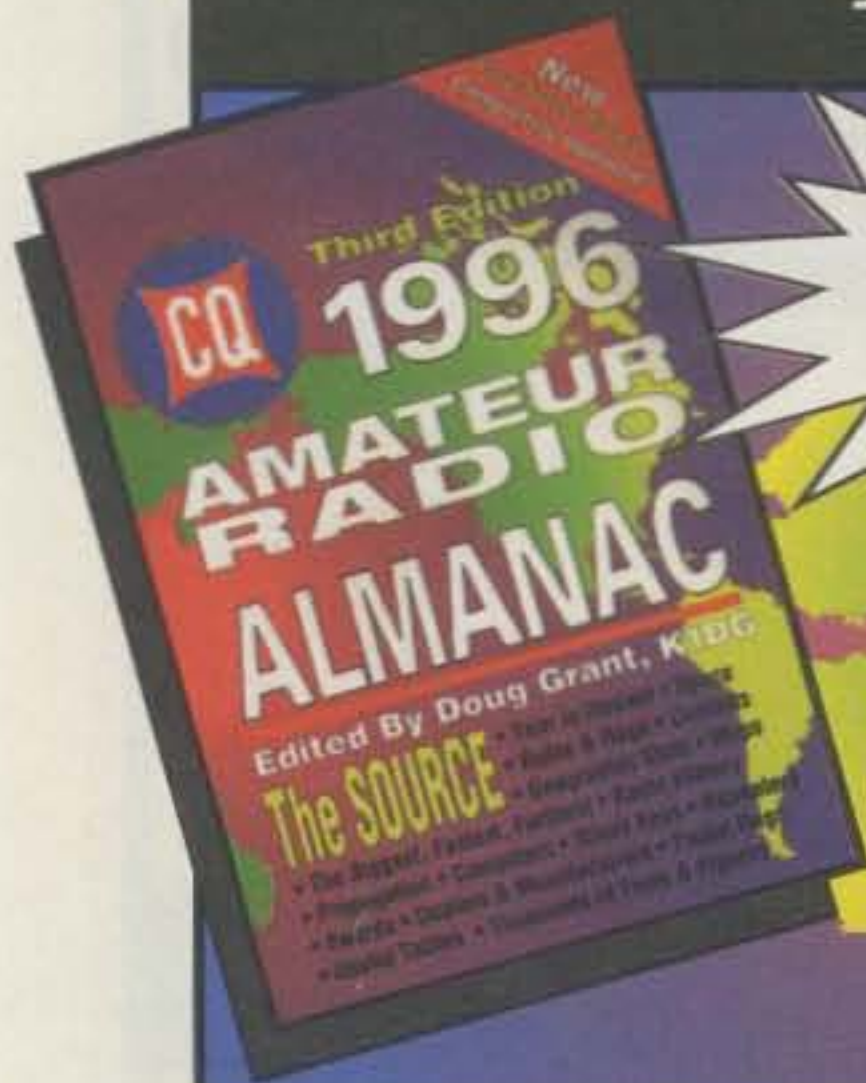
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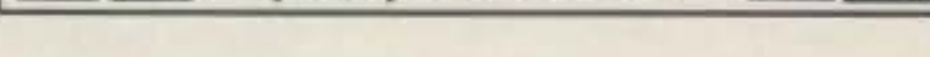
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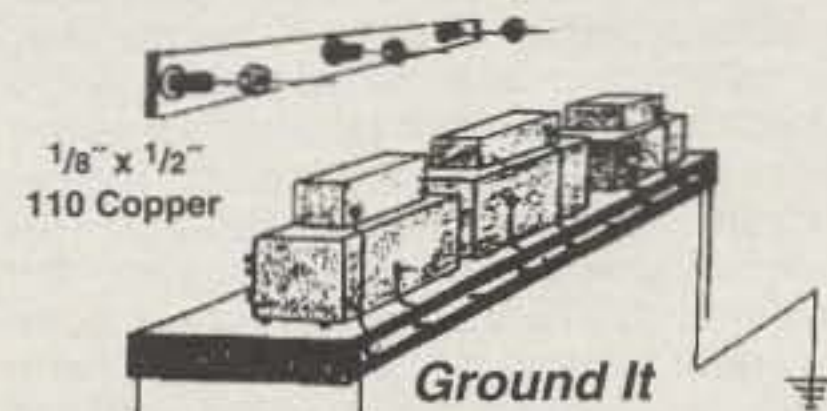
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## ANNOUNCEMENTS

(From page 8)

and Computer Show, Stall High School, North Charleston, South Carolina. Call Ed, KC4OOZ, at 803-871-4368; or Gary, AC4PL, at 803-766-3440. (Exams.)

Feb. 10, **15th Annual Midwinter Madness**, National Sports Center, Blaine, Minnesota. For more info, contact RARC, P.O. Box 22613, Robbinsdale, MN 55422 (612-537-1722).

Feb. 11, **Mansfield Mid-Winter Hamfest/Computer Show**, Richland County Fairgrounds, Mansfield, Ohio. For more information, send SASE to Pat Ackerman, N8YOB, 63 N. Illinois Ave., Mansfield, OH 44905; phone 419-589-7133 (after 6 pm EST).

Feb. 11, **Latrobe Winterfest Hamfest & Computer Show**, Latrobe American Legion, St. Latrobe, Pennsylvania. For information contact Chris Weiss, K3JDU, at 412-537-6068; or Carol Demosky, N3UVA, at 412-539-1552.

Feb. 17, **Algonquin ARC Flea Market**, Marlborough Middle School, Marlborough, Massachusetts. For info contact Anne Weldon, KA1PON, P.O. Box 258, Marlborough, MA; or call 508-481-4988 (before 9 pm EST).

Feb. 17, **Cherryland ARC 23rd Annual Swap-n-Shop**, Immaculate Conception Middle School, Traverse City, Michigan. Call Joe, W8TVT, at 616-947-8555; or Chuck, W8SGR, at 616-946-5312. (Exams.)

Feb. 17, **Orange County ARC Winterfest**, John S. Burke Catholic High School, Goshen, New York. For more information, contact Steve Voorman, KB2TRG, at 914-496-8710.

Feb. 17, **1996 Salem HamFair**, Polk County Fairgrounds, Rickreal, Oregon. For more information, contact Evan Burroughs, N7IFJ, at 503-585-5924.

Feb. 18, **The 25th Annual Davenport ARC Hamfest**, QCCA Expo Center, Rock Island, Illinois. For more information, send SASE to Kent Williams, K9UQI, 4245 10th Street, East Moline, IL 61244-4154. For exam info, send SASE to Roger Franke, K9AYK, 2506 E. 29th Court, Davenport, IA 52803. (Exams.)

Feb. 24, **Mid-Winter "Cabin Fever" Hamfest**, LaPorte Civic Auditorium, LaPorte, Indiana. For information, send SASE to LaPorte ARC, P.O. Box 30, LaPorte, IN 46350.

Feb. 24, **Northern Vermont Winter Hamfest**, Milton High School, Milton, Vermont. Contact WB2JSJ at 802-879-6589. (Exams.)

Feb. 24-25, **ARRL Great Lakes Division Convention**, Cincinnati Gardens Exhibition Center, Cincinnati, Ohio. For information contact the Convention Chairman, Stan Cohen, WD8QDQ, 2301 Royal Oak Court, Cincinnati, OH 45237, or call 513-531-1011.

Feb. 25, **The Burnaby ARC Annual Flea Market**, Vancouver, BC, Canada. For more information or tables, contact The Burnaby ARC net Monday nights at 2000 local time on 145.35, or write to the club at Box 72012, 4429 Kingsway, Burnaby, BC V5H 4P9, Canada.

Feb. 25, **42nd Annual Hamfest Computer Show and FleaMarket**, Emidio & Sons, Cuyahoga Falls, Ohio. For details call Carl, N8JLQ, 216-497-7047.

Feb. 25, **Livonia ARC Swap'n Shop**, Dearborn Civic Center, Dearborn, Michigan. Contact Neil Coffin, WA8GWL, Livonia ARC, P.O. Box 2111, Livonia, MI 48151 (SASE); phone 313-261-5486. (Exams.)

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**13B2  
Boomer**

**BOOMERS.** The contest winning **17B2** for EME, Tropo, SSB, CW or the **13B2** for FM, Packet or SSB over the whole 2 meter band. Both models have the new UltraMatch balanced feed system. Computer aided design gives you the cleanest pattern and the highest gain available

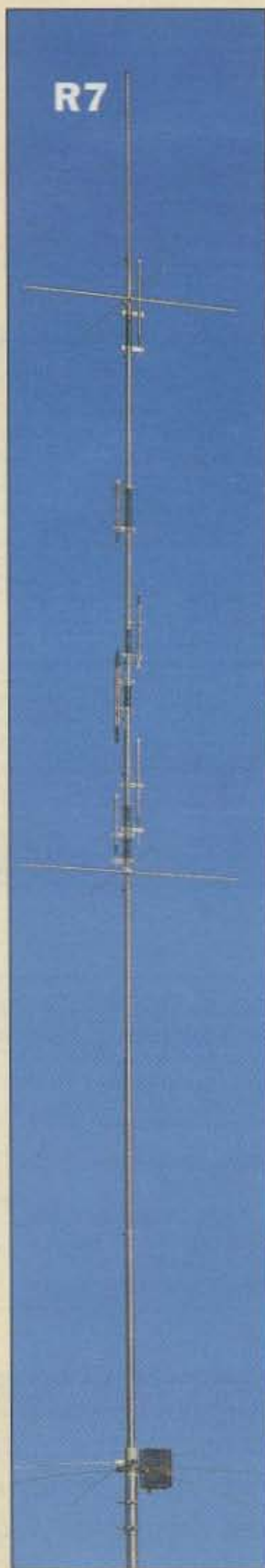


**A148-10S**

**PERFORMANCE AND VALUE LEADERS.** Our newest computer optimized 2 meter Yagis. **A148-3S**, a 3 element compact for Packet, FM or even portable use. Easily rear mounted. **A148-10S** is one of our best value designs with excellent gain and front-to-back. Great for FM or full band 2 meter operation.



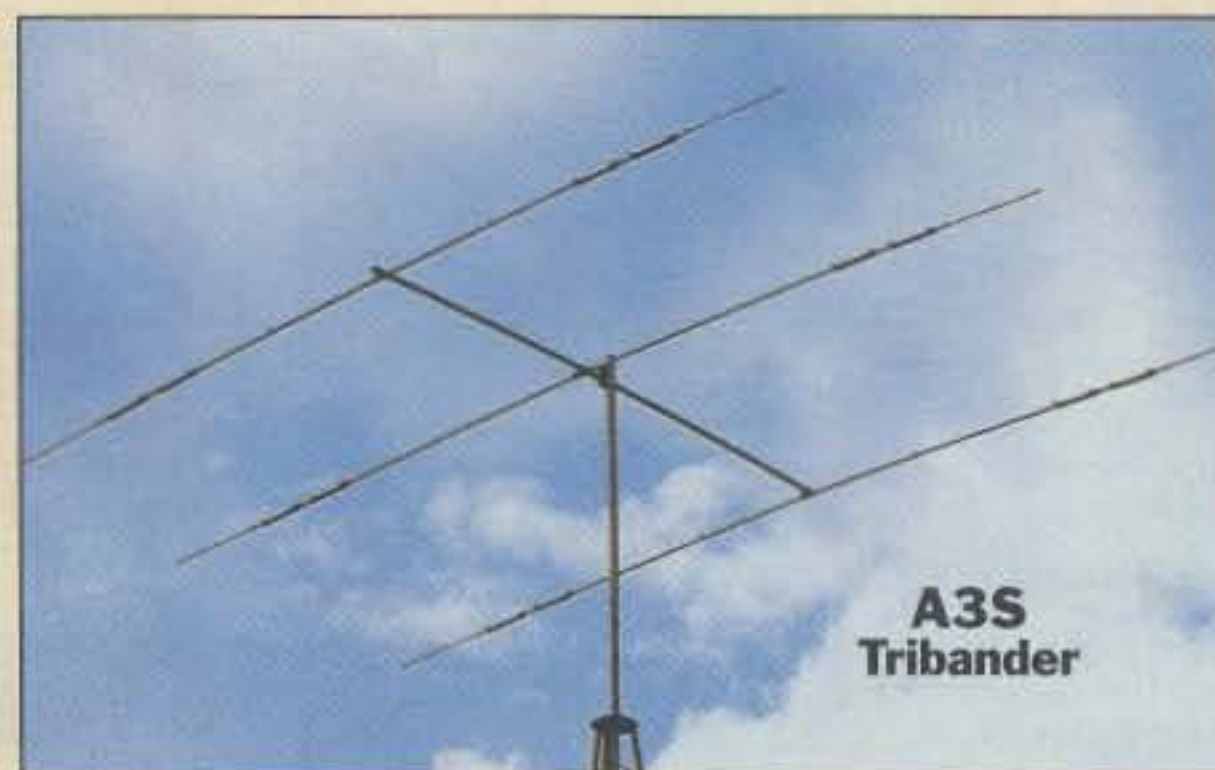
**40-2CD  
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**R7**

**SKYWALKER  
MONOBANDERS.**

10, 15, 20 and 40 meter Yagis for more contacts, less waiting and a better signal. Preferred by contesters and DX-peditions worldwide.



**A3S  
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**HF TRIBAND BEAMS.** **A3S** - The most popular compact 10, 15, 20 meter beam. **A4S** - A high performance 18' long wideband beam. Both models come with stainless steel hardware and have optional 40 meter add-on kits.

**Dual Band Mobile.**  
**CS-270M** - Designed for durability and great performance.



**CS-270M  
Dual Band  
Mobile**



**AR-270B  
Dual Band**

**Dual Band Ringos.** **AR-270** - Only 45 inches tall! A must for the new dual band transceivers covering 70 cm and 2m. **AR-270B** - This new dual band features high gain with a low angle of radiation and stands only 7.7 feet tall. **ARX-270U/N** - High performance, 16.5 foot, fiberglass with exceptional gain. Three piece construction assembles in minutes.

**R7 10, 12, 15, 17, 20, 30 & 40 METERS  
HALFWAVE VERTICALS**

Amateur radio's most popular vertical design now gives you 7 band performance including 30 & 40 meters, without ground radials. Only 22 feet tall, R7's small footprint and ground independence give you "mount anywhere" flexibility. R5, with the same great features as the R7, covers 10, 12, 15, 17 and 20 meters.

**RINGO RANGER II.** Still the world's favorite 2 meter, 70 cm or 220 MHz omni antenna, with more gain. A must for your FM or packet station. Models: **ARX-2B, ARX-220B, ARX-450B, ARX-450BN**



**Ringo  
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ADMS-1B  
COMPUTER  
PROGRAMMABLE

# Ultra Compact Handhelds FT-10/40R

FEATURES	Yaesu FT-10/A16D	Kenwood TH-22AT
Rugged MIL-SPEC Rates	Yes	No
DCS (Digital Coded Squelch) Built-in	Yes	No
Alphanumeric Display	Yes	No
True FM for Better Voice Clarity	Yes	No
Transmit Battery Saver	Yes	No
CTCSS Encode & Decode Built-in	Yes	Optional
ARTS (Auto Range Transpond System) <i>(Alerts you when a similarly programmed HT is out of range)</i>	Yes	No
Optional Digital Voice Recorder	Yes	No
Scans for DCS Tones	Yes	No
Computer Programmable w/ADMS-1B	Yes	No

## The Best vs "the rest."

### Features

- Frequency Coverage  
FT-10R  
2m: RX: 140-174 MHz  
TX: 144-148 MHz  
FT-40R  
70cm: RX: 420-470 MHz  
TX: 430-450 MHz
- Auto Range Transpond System™ (ARTS™)
- MIL-STD 810
- High Audio Output
- 12 V DC Direct Input
- Alphanumeric Display
- RX/TX Battery Savers
- Digital Coded Squelch (DCS)
- Digital Voice Recording System (DVRS) w/FTT-10/A16S
- True FM
- High Speed Scanning
- 2.5 and 5 W available
- Track Tuning Reduces Receiver Intermod
- Water Resistant Design
- Optional Keypads Available
- Full line of accessories



No other amateur handheld compares to the hot new FT-10/40R – the first amateur HT ever to be rated MIL-STD 810! Its built to tough, military spec commercial radio standards inside and out. The FT-10/40R is packed with more than 10 exclusive features not found on any other HT. Important, useful, exclusive features add real value to the FT-10/40R, and it's priced right! All this – and the FT-10/40R is small enough to pocket, too!

For manufacturing excellence, breakthrough design, and value, no one can touch Yaesu. And, no other radio can touch the FT-10/40R for exciting features, commercial-caliber toughness, and performance. Compare for yourself!

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— QST, January 1996



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**ICOM**

# IC-775 DSP

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WITH REVOLUTIONARY DSP  
TECHNOLOGY ON  
TRANSMIT AND RECEIVE**

ICOM next generation technology for HF operators is now available! The IC-775DSP is engineered from the ground up, using next generation design and components, offering a combination of features & performance you'll find nowhere else!

- **TRANSMIT DSP** Precise control of transmit signals at the modulation stage produces a high quality SSB transmit signal that analog methods can't match.
- **RECEIVE DSP** The digital signal processor separates the desired signal out from the noise before it enters the audio amplifier! Pull very weak signals right out of the noise!
- **ADVANCED INTERFERENCE REJECTION AND NOISE REDUCTION** Digital automatic notch, digital low/high pass filters, digital ultra-narrow CW filter, manual IF notch, manual audio peak filter, CW reverse mode and a noise

blanker (with adjustable level and width) are next generation features providing incredibly clear signals.

- **DUAL WATCH** Dual watch with 2 independent tuning knobs enables monitoring of 2 frequencies...simultaneously.
- **TWIN PASS BAND TUNING** Allows you to zero in on and isolate a signal from both sides of the pass band. Ideal for contests, nets, etc...!
- **200 WATTS** Power MOS FETs in all stages of the PA unit provide excellent signal quality, good IMD characteristics and reliable full-duty cycle operation.
- **BUILT IN ANTENNA TUNER** A high speed tuner is built in and matches the connected antenna in all ham bands, including 160 m.
- **NEW DDS** The new Direct Digital Synthesizer system uses a new PLL which operates without a mixer and uses a single crystal which provides very high stability.
- **CW FEATURES** CW enthusiasts will love the electronic memory keyer, CW pitch control, CW reverse, full break-in (QSK) and two key jacks.

## Features you've only dreamed of:

- ICOM DSP on Transmit and Receive
- Noise Reduction/Auto Notch
- Twin Pass Band Tuning
- Dual Receive
- 200W MOS FET PA with built-in Power Supply
- Digital Noise Reduction:
  - Digital Low and High Pass Filters
  - Digital Modulation/Demodulation
  - Digital Automatic Notch
  - Digital Ultra-Narrow CW Filter
  - Digital Automatic APF (Audio Peak Filter)
- Rx 100 kHz-29.990 MHz
- New Single Crystal Control DDS
- RTTY/DATA Mode
- HF Packet Ready
- IF Notch
- APF (Audio Peak Filter)
- Quick-Split Function
- Memory CW Keyer
- CW Pitch Control & CW Reverse Mode
- Two CW Key Jacks
- 1 Hz Tuning and Display
- Large LCD with new CFL Back Light
- Built-In Automatic Antenna Tuner
- Dual Antenna System
- Selectable Pre-Amp (2 Levels) and RF Attenuator (3 Levels)
- Triple Band Stacking Register
- Built-In Tone Encoder
- VOX
- 99 Memory Channels
- XFC
- Noise Blanker with Adjustable Level and Width
- AGC with Adjustable Time Constant
- RF Speech Compressor
- Optional SSB filters
- Optional Speech Synthesizer

The new IC-775DSP is the next generation rig you've been patiently waiting for. For more information about the IC-775DSP, visit your local ICOM dealer, contact ICOM Technical Support on the HamNet forum on CompuServe® @ 75540,525 (Internet: 75540.525 @ compuserve.com) or call ICOM's brochure hotline: (206) 450-6088.



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