Amateur Radio

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CQ

The Walvis Bay Story ... page 13

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WA4DRU

IO AMATEUR'S JOURNAL

KENWOOD

TS-950SD

"DX-clusive" HF Transceiver

The new TS-950SD is the first Amateur Radio transceiver to utilize Digital Signal Processing (DSP), a high voltage final amplifier, dual fluorescent tube digital display and digital meter with a peak-hold function.

The Ultimate Signal.

• Dual Frequency Receive Function. The TS-950SD can receive two frequencies simultaneously.

• New! Digital AF filter. Synchronized with SSB IF slope tuning, the digital AF filter provides sharp characteristics for optimum filter response.

• New high voltage final amplifier. 50 V power transistors in the 150-watt final section, resulting in minimum distortion and higher efficiency. Full-power key-down time exceeds one hour.

• New! Built-in microprocessor controlled automatic antenna tuner.

• Outstanding general coverage receiver performance and sensitivity. Kenwood's Dyna-Mix™ high sensitivity direct mixing system provides incredible performance from 100 kHz to 30 MHz. The Intermodulation dynamic range is 105 dB.

• Famous Kenwood interference reduction circuits. SSB Slope Tuning, CW VBT (Variable Bandwidth Tuning), CW AF tune, IF notch filter, dual-mode noise blanker with level control, 4-step RF attenuator (10, 20, or 30 dB), switchable AGC circuit, and all-mode squelch.

Complete service manuals are available for all Kenwood transceivers and most accessories.
Specifications, features and prices subject to change without notice or obligation.

DSP

Digital Signal Processing

• Digital Signal Processor. DSP is a state-of-the-art technique that maximizes your transmitted RF energy.

• High performance IF filters built-in† Select various filter combinations from the front panel. For CW, 250 and 500 Hz, 2.4 kHz for SSB, and 6 kHz for AM. Filter selections can be stored in memory!

• *Multi-Drive Band Pass Filter (BPF) circuitry.* Fifteen band pass filters are available in the front end to enhance performance.

• Built-in TCXO for the highest stability.†
• Built-in electronic keyer circuit.
• 100 memory channels. Store independent transmit and receive frequencies, mode, filter data, auto-tuner data and CTCSS frequency.
• Digital bar meter.

Additional Features: • Built-in interface for computer control • Programmable tone encoder • Built-in heavy duty AC power supply and speaker • Adjustable VFO tuning torque • Multiple scanning functions • MC-43S hand microphone supplied

Optional Accessories
- DSP-10 Digital Signal Processor *
- SO-2 TCXO* • VS-2 Voice synthesizer
- YK-88C-1 500 Hz CW filter for 8.83 MHz IF*
- YG-455C-1 500 Hz CW filter for 455 kHz IF*
- YK-88CN-1 270 Hz CW filter for 8.83 MHz IF
- YG-455CN-1 250 Hz CW filter for 455 kHz IF*
- YK-88SN-1 1.8 kHz SSB filter for 8.83 MHz IF
- YG-455S-1 2.4 kHz SSB filter for 455 kHz IF*
- SP-950 External speaker w/AF filter
- SM-230 Station monitor w/pan display
- SW-2100 SWR/power meter
- TL-922A Linear amplifier (not for QSK)

* Built-in for the TS-950SD
† Optional for the TS-950S

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KENWOOD

The DXpeditioner!

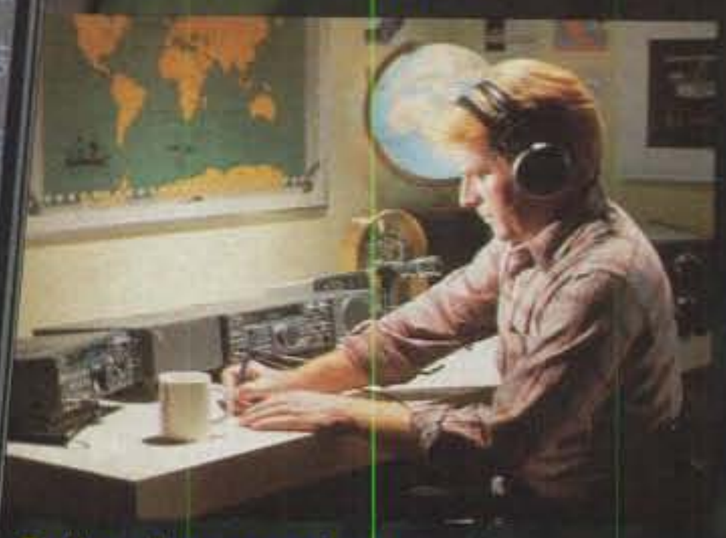
TS-440S

Compact high performance HF transceiver with general coverage receiver

Portable reliable performance and ease of use makes the TS-440S your obvious "low bands" choice. It is "Every Ham's" rig to go – ham shack, portable or mobile. But don't let the small size fool you – there's lots of "big rig" performance packed into this package. Built-in antenna tuner option. Continuous duty transmitter. Super DynaMix™ front end. Five filter functions. The TS-440S is at your service wherever you wish to operate.

- **Covers all Amateur bands**
  General coverage receiver tunes from 100 kHz–30 MHz. Easily modified for HF MARS operation.
- **Direct keyboard entry of frequency**
- **All modes built-in**
  USB, LSB, CW, AM, FM, and AFSK. Mode selection is verified in Morse Code.
- **VS-1 voice synthesizer (optional)**
- **Built-in automatic antenna tuner (optional).** Covers 80–10 meters.
- **5 IF filter functions**
- **Superior receiver dynamic range**
  Kenwood DynaMix™ high sensitivity direct mixing system ensures true 102 dB receiver dynamic range. (500 Hz bandwidth on 20 m.)
- **100% duty cycle transmitter**
  Super efficient cooling permits continuous key-down for periods exceeding one hour. RF input power is rated at 200 W PEP on SSB. 200 W DC on CW, AFSK, FM, and 110 W DC AM. (The PS-50 power supply is needed for continuous duty.)
- **Computer interface port**
- **Adjustable dial torque**
- **100 memory channels**
  Frequency and mode may be stored in 10 groups of 10 channels each. Split frequencies may be stored in 10 channels for repeater operation.
- **TU-8 CTCSS unit (optional)**

- **MC-43S UP/DOWN mic. included**
- **Superb interference reduction**
  IF shift, tuneable notch filter, noise blanker, all-mode squelch, RF attenuator, RIT/XIT, and opt. filters fight QRM.
- **Dual SSB IF filtering**
  A built-in SSB filter is standard. When an optional SSB filter (YK-88S or YK-88SN) is installed, **dual** filtering is provided.
- **VOX, full or semi break-in CW**
- **AMTOR compatible**



Optional accessories:

• **AT-440** internal auto. antenna tuner (80 m – 10 m) • **AT-250** external auto. tuner (160 m – 10 m) • **AT-130** compact mobile antenna tuner (160 m – 10 m) • **IF-232C/IC-10** level translator and modem IC kit • **PS-50** heavy duty power supply • **PS-430** DC power supply • **SP-430** external speaker • **MB-430** mobile mounting bracket • **YK-88C/88CN** 500 HZ/270 Hz CW filters • **YK-88S-88SN** 2.4 kHz/1.8 kHz SSB filters • **MC-60A/80/85** desk microphones • **MC-55** (8P) mobile microphone • **HS-4/5/6/7** headphones • **SP-41/50B** mobile speakers • **MA-5/VP-1 HF** 5 band mobile helical antenna and bumper mount • **TL-922A** 2 kw PEP linear amplifier • **SM-220** station monitor (no pan display) • **VS-1** voice synthesizer • **TU-8** CTCSS tone unit • **PG-2C** extra DC cable.

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Complete service manuals are available for all Kenwood transceivers and most accessories.
Specifications and prices are subject to change without notice or obligation.

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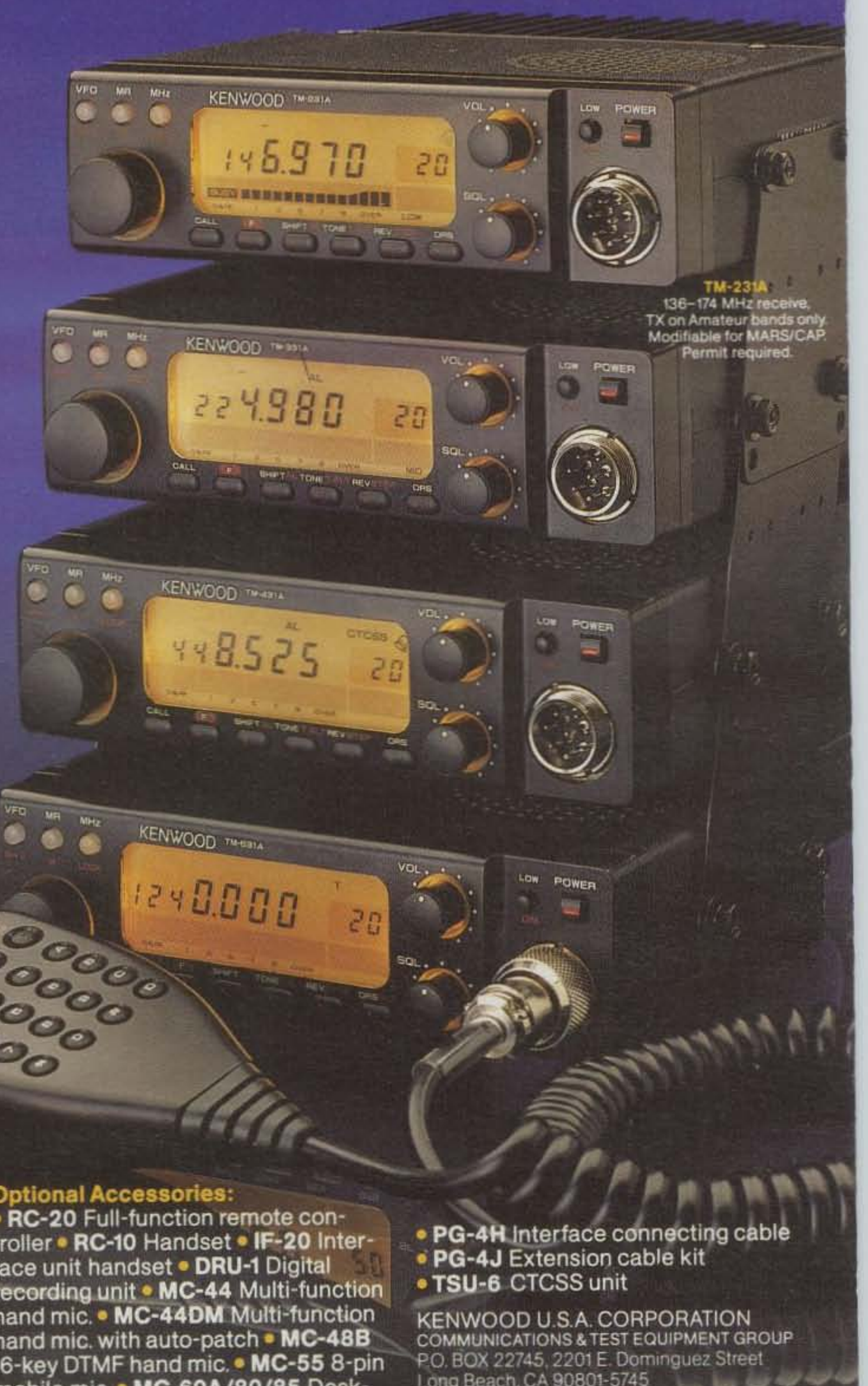
Stacked in your favor!

TM-231A/ 331A/431A/531A

FM Mobile Transceiver

Looking for a compact transceiver for your mobile VHF and UHF operations? KENWOOD has a compact rig for each of the most popular VHF/ UHF bands.

- **20 multi-function memory channels.**
- **High performance — high power! 50W (TM-231A), 35W (TM-431A) with a 3 position power switch.**
- **Optional full-function remote controller (RC-20).**
  A full-function remote controller can be mounted in any convenient location. Using the IF-20 interface the RC-20 may be connected to four mobile transceivers. (TM-231A/ 431A/531A or the TM-701A).
- **Multi-function microphone supplied.**
  Various controls are provided on the mic. for increased utility.
- **Auto repeater offset on 144 and 220 MHz.**
- **Built-in digital VFO allows selection of the frequency step.**
  (5, 10, 15, 20, 12.5, 25kHz; TM-531A: 10, 20, 12.5, 25kHz.)
- **Selectable CTCSS tone built-in.**
- **Tone alert system — for true "quiet monitoring"!**
  When enabled this function will activate a tone when squelch opens.
- **DRS (Digital recording system).**
  The optional DRU-1 can store received and transmitted messages for up to 32 seconds, allowing the operator to check or return any call using the tone alert system.
- **Automatic lock tuning function (TM-531A).**
- **Repeater reverse switch.**



TM-231A:
136–174 MHz receive,
TX on Amateur bands only.
Modifiable for MARS/CAP.
Permit required.

Optional Accessories:

- **RC-20** Full-function remote controller • **RC-10** Handset • **IF-20** Interface unit handset • **DRU-1** Digital recording unit • **MC-44** Multi-function hand mic. • **MC-44DM** Multi-function hand mic. with auto-patch • **MC-48B** 16-key DTMF hand mic. • **MC-55** 8-pin mobile mic. • **MC-60A/80/85** Desktop mics. • **MA-700** Dual band (2m/ 70cm) mobile antenna (mount not supplied) • **SP-41** Compact mobile speaker • **SP-50B** Mobile speaker • **PS-430** Power supply • **MB-201** Mobile mount • **PG-2N** Power cable • **PG-3B** DC line noise filter
- **PG-4H** Interface connecting cable
- **PG-4J** Extension cable kit
- **TSU-6** CTCSS unit

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The Radio Amateur's Journal

JUNE 1990 **VOL. 46, NO. 6**

ON THE COVER: *CQ*'s roving photographer catches Allen B. Harbach, WA4DRU of Melbourne, Florida hard at work on a little home-brew project. Neither Allen nor photographer Larry thought to mention what the gadget is, so it's left to the intrepid *CQ* reader to figure it out. (Photo by Larry Mulvehill, WB2ZPI)

FEATURES

DEPARTMENTS

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ZERO BIAS

EDITORIAL

I stand corrected. I was told recently, albeit indirectly, that the FCC is not doing away with the Novice and Technician classes of license and that my thesis is wrong. It's just that they won't issue any more of them, and those amateurs who hold those classes of license will still have them. However, to cloud the issue, the new Communicator class of license will feature the CW upgrade provision. So I guess if the holder of a Communicator class license upgrades, for lack of a better name, he/she upgrades to a nameless grade of license that isn't really given anymore. Makes perfect sense to me.

On the other hand, I guess that this also means that the entry-level HF license will now be the General class and that 13 WPM will be the basic "named" license standard for beginners. Sounds well thought out to me. After all, there were too many people lining up for the 5 WPM test as it is, so we have to be a bit more selective.

Perhaps we should have a contest to come up with names for these nameless plateaus. The proposal does include a slight inconvenience for upgraders—namely, a portable designator (/) followed by two additional letters. This I'm sure was designed to build character and encourage people to study and practice CW. Sure, eight or nine characters is a snap to send on CW.

Might I suggest for our nameless class the CIA License, inferring secrecy and standing for *C*ode *I*s *A*rbitrary. Also inferring secrecy but a bit more honest is the NSA License, standing for *N*ot *S*ure *A*tall. After all, we wouldn't want to make it too simple to explain just what these new positions really mean.

What is at stake here is more than poking fun at a rather confusing proposal. What is still in evidence is the overbearing weight placed on CW in relation to any other aspect of licensing requirement. It doesn't really matter whether or not you like CW or whether or not it is important. It is, in fact, only one aspect of amateur radio and only one aspect of amateur radio licensing. This one aspect, which has caused such a turmoil within amateur radio, is only there because of some obscure international requirement—namely, "a knowledge of the code."

To set the record straight for those who think the world is out to abolish CW *in toto*, and who think that there is this giant conspiracy to rid the airwaves of CW altogether, please rest assured that there is no such plot by anyone. It would be nice if CW went on forever, practiced by anyone who chooses to use it whenever he/she desires.

We have focused on CW to the point of aberration. We're looking and arguing about a point while the rest of the hobby slips by, decaying with age. We're looking to what we can trade off in bits and pieces for a no-code license in the hopes of a magic panacea, while the first ploy from the FCC is to put the entry-level HF licenses in retirement. The bargaining chips are in no way equal. We are forgetting the reasoning behind all of the work done to promote the concept of no-code. We want to keep amateur radio alive.

The FCC, I'm sorry to say, should know better. It has been evident for years that the international requirement for a knowledge of the code would be eliminated. At this point, the FCC would no longer have to reply to senators and congressmen when they ask why we still require Morse code proficiency tests. The FCC would no longer have to worry about Morse code requirements, enforcement of laws pertaining to Morse code, and any and all administrative costs associated with Morse code. The FCC could simply deregulate itself out of the Morse code business. People could still use all the Morse code they want; it would just be another mode of operation.

So while we continue to confront each other on the issue of CW and what it proves or doesn't prove, the rest of the world has apparently made that decision and is going on with real life. Real life means the ability to take nourishment and grow, neither of which are our strong points at the moment. According to some, Novice Enhancement didn't work. We didn't grow, they say. We didn't shrink either, and more people found out that they were alive, too. It was nourishing to almost half of the amateur population, many of whom opted to become active rather than drop out and some of whom even had the audacity to upgrade.

Now we have a basic proposal that states in effect that if we want a "Communicator" class of license we should be willing to trade off the Novice and Technician classes of license. The basic entry-level HF license will be the General class license. Somehow there's something wrong with that logic. It's also hard to picture entry-level "Communicators" modulating the family microwave in order to get on the air.

If we continue to fixate and narrow our focus with regard to what makes a good amateur or what makes a bad amateur, then there's a big toll to pay at the end of our tunnel vision. I do know that there is no correlation between the ability to copy code and manners, respect for others, a willingness to listen and learn, and a basic regard for the other person's rights. A lot of us still rail at Citizen Band operators for behavior they emulate on the amateur bands. It doesn't make sense, but they do it. We may tell ourselves that we're special, but we're not elite.

While we may not be elite, some of us fit the definition of elitist. The government has issued us a piece of paper. Therefore, we are better than some other group. Well, maybe we are, but we're the only ones who apparently know it or care about it. The thundering hoards didn't materialize when Novice Enhancement occurred simply because we didn't sell the product. It was still a success because suddenly the silent majority (pardon the pun) found its voice.

If we are going to continue to spin our wheels on the CW issue, then the rest of the world will pass us by. It's a non-issue except for us. The Communicator class of license as originally proposed is really hard to explain even to people who understand amateur radio to some extent. As it stands, it will not force us to coexist with millions of Communicators (if that is your greatest fear). In fact, if you think about it, why would anyone want to get one in the first place? It will, however, remove two viable classes of license, if only in name. It sounds real confusing to me.

In some ways it still is a great victory. Just getting a proposal for a code-free license is admitting something. To put all sorts of restrictions and codicils on it just to avoid offending some of our group's sense of just what an amateur is, is truly not facing the issue or the need. Maybe it's not really important to consider anything that may last beyond our individual lifetimes or that extends further than our interest span. I would hate to think that we're all so self-centered as to say that amateur radio should end with us.

If our sole amateur radio purpose is to continually upgrade in order to have meaning, we then should have many more classes of license to which to upgrade. Resting at any one plateau would become self-defeating. Over time we could eliminate the General and start our brand new amateur HF career as an Advanced. We could potentially upgrade from the secret CIA unnamed license to the new secret KGB (*K*armic *G*eneral *B*ehavior) unnamed license. Since these licenses wouldn't really exist, the FCC wouldn't feel responsible for expending funds for administration, enforcement, and monitoring. It would save a bundle of money in the long run.

Back to reality for a moment. Let's try to remember what the problem is and what we're trying to accomplish. I don't think that anyone really wants to trade one problem for another.

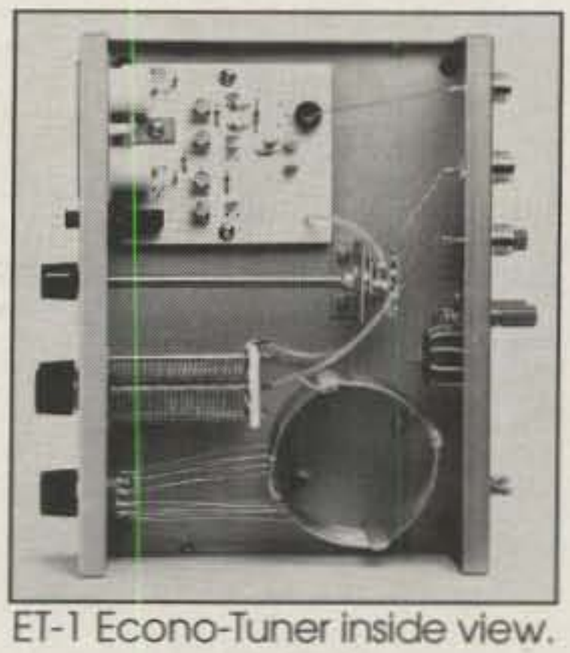
73, Alan, K2EEK

AEA's NEW ET-1 ECONO-TUNER™

Meet Your Match

Meet your match with AEA's new ET-1 Econo-Tuner. A quality, economical antenna tuner for under $150, the ET-1 is designed to match virtually any receiver, transmitter or transceiver from 1.8 to 30 MHz with up to 300 watts of RF power.

Versatile. The ET-1 is compatible with almost ANY antenna including verticals, dipoles, inverted vees, beams and mobile whips that are fed by coax cable, balanced lines or a single wire. For easy connection to balanced lines, a 1:4 balun is built-in.



ET-1 Econo-Tuner inside view.

Tuning Options. A front panel switch control allows you to switch between two coax-fed antennas (direct or through the tuner). You can also switch to a balanced line or wire antenna. The BYPASS position allows you to switch to a dummy load (such as AEA's DL-1500 dry dummy load) or a direct connected coax antenna. In the BYPASS position, COAX 1 OUT or COAX 2 OUT can be selected so that the tuner is bypassed, but not the meter circuit.

Dual-Movement Meter. The ET-1 features a precision dual- movement meter to simultaneously monitor power and SWR.

AEA Quality. Unique engineering designs have made AEA one of the leading innovators in the amateur radio industry. That same quality and superior technical support make the ET-1 your best deal for an antenna tuner.

AEA provides technical support from the factory or through your personal computer and modem on CompuServe's HamNet. If you are already a CompuServe member, just type GO HAMNET at any CompuServe prompt. For a free introductory CompuServe membership, call 1-800-848-8199 and ask for representative #48.

AEA Brings You A Better Experience.

Advanced Electronic Applications, Inc.

2006-196th St. SW/P.O. Box 2160 Lynnwood, WA 98036 206-775-7373

ANNOUNCEMENTS

•**Mail Call 1990** - Those interested in taking part in Christmas Mail Call 1990, a military morale program which last year was able to forward bundles of cards and letters to service men and women in more than 1,000 units and locations across the United States and abroad, may receive a copy of the 1990 brochure upon publication later in the year by sending a first-class postage stamp (no envelope) to: "Mail Call!", Box 817, Christmas, FL 32709-0817.

•**Michigan TASYLS 25th Anniversary** - The Auto State Young Ladies have a certificate available in honor of their 25th anniversary. Work 25 YLs, one of whom is a TASYL member, on any amateur frequency in 1990 (deadline is December 31). Submit log information, date, frequency, time, call, RST, and TASYL number to receive a certificate. The log must be dated and signed by the applicant and any of the following: two licensed amateurs General class or higher (non-family), one officer of a recognized radio club or organization, or notary public (must show call if any and full QTH). There is a fee of $2.50. Submit log information before January 31, 1991 to Elaine Matyjazek, KA8KAK, 1127 Hillcrest Drive, Boon, MI 49618.

•**Kids' Field Event** - Children between the ages of 8 and 14 accompanied by an adult relative may participate in a 43-hour field event starting at 5 PM June 10 following the National ARRL Convention, Watkins State Park, Lawson, Missouri. Activities include Morse code practice, study of radio theory, hands-on radio use, swimming, biking, boating, and historic tours. Accompanying adults who are hams may bring their own radio equipment. Limited number of camping spaces available. No fee other than state park fees. For more information, contact Chuck Bryan, Marlborough Communication Club, 1300 E. 75th St., Kansas City, MO 64131 (816-926-2134).

•**The following Special Events will take place during June:**

K2BSA/0, from Rendezvous 90 Scout Jamboree, St. Louis, MO; St Louis Area Council, BSA; 2200Z June 1 to 1700Z June 3; SSB 3.940, 7.290, 14.290, 21.360, 28.350, CW 3.590, 7.125, 14.070, 21.140, 28.190. For QSL send your QSL and SASE to Richard A. Grady, 5976, Keith Place, St. Louis, MO 63109.

W2RUI, from 1990 International Conference on Blacksmithing, Alfred, NY; 1400-2200Z June 30; SSB 7.275, 14.275, 21.375, 28.375. For certificate send QSL and large SASE to KA2LCR, 6562 Royal Parkway South, Lockport, NY 14094.

K4EG, from Fiddler's Picnic, Burlington, NC; Alamance ARC; 1300-2100Z June 9 and 1700-2000Z June 10; lower portion of the General 40 and 15 meter SSB and CW bands. For certificate send SASE to Alamance ARC, P.O. Box 3064, Burlington, NC 27215.

N4IYX & N4HID, from 100th year celebration of Woodmen of the World, Bowling Green, KY; Kentucky Colonel ARC; 1300Z June 6 to 2400Z June 10; General 15, 20, 40 meter bands and Novice 10 meter band. For certificate send QSL and 8½ × 11 SASE to Ed Gann, N4HID, 445 Elrod Rd., Bowling Green, KY 42104.

KO8O, from Ohio Wine Month, Madison, OH; Wireless Institute of Northern Ohio; 2300-0300Z June 2 on 7235 and 14235 kHz, and 1500-1900Z June 3 on 14235 and 21310 kHz. For certificate send legal-size SASE to KO8O—WINO Weekend, 10418 Briar Hill, Kirtland, OH 44094.

W8OG, for Springfield Peace School Theme, Springfield, OH; 1300-0100Z June 15; 40, 20, 15, and 10 meter Novice bands. For QSL send SASE to CLARA, P.O. Box 2696, Springfield, OH 45502-2696.

W8VM, from All Scouts Weekend, North Olmsted, OH; West Park Radiops; 0000Z June 2 through 1500Z June 3; 80-10 meters, all Novice CW on 80, 40, 15 meters. Send QSL and SASE to W8VM, c/o Glenn Williams, 513 Kenilworth Rd., Bay Village, OH 44140.

WK8N, from summer production of "Tecumseh," Chillicothe, OH; evening and weekend hours June through September; SSB lower 25 kHz of the 40, 20, and 15 General and 10 meter Novice phone bands.

(continued on p. 102)

The Best of the Best

Performance.

Performance. Yours and your radio's. They go hand in hand. To be a truly world-class competitor, you've got to have a truly world-class rig. And it's here, now. The versatile new FT-1000 from Yaesu.

The FT-1000 will blow away your competition with a spectacular combination of power and operating flexibility with such features and options as:

- **Direct Digital Synthesis (DDS),** two ten-bit DDS plus three eight-bit DDS for fast lock-up time and lower synthesizer noise than other traditional PLL systems.
- **High RF Power Output,** continuous adjustable output from 20 to a full 200 watts.
- **Dual Receive** utilizing two tuning knobs for easy spotting; with optional BPF-1 module allows cross-band dual receive.
- **Digital Voice Storage (DVS-2)** option provides instant playback of 16-second receive memory, plus two 8-second "CQ Contest" messages on transmit.
- **Automatic Antenna Tuner** built-in with fast action and 39 memories for quick band changes.
- **QRM Rejection Systems,** including a variety of cascaded filter selections, width control, IF shift, IF notch filter, all-mode squelch, dual-mode noise blanker and a CW audio peaking filter.

Additional Features: 108dB dynamic range • front panel RX antenna selector • built-in electronic keyer module • stereo dual receive • flywheel effect on main and sub VFO tuning dials • twin frequency displays • CW spot.

A product of three years of intensive research and design. This HF rig will allow you to achieve a position of competitive dominance.

See the exciting new FT-1000 at your Yaesu dealer today. It's the best of the best.

YAESU

Performance without compromise.

DDS Direct Digital Synthesis

OUR READERS SAY

World of Ideas Correction

In the "World of Ideas" column, March 1990 issue of *CQ*, fig. 1, the value of the resistor in the upper left-hand corner should be 100K, 1 watt.

Exchange of Interests

Editor, *CQ:*

I am a Czechoslovak radio amateur, 37, call OK3TFK. I am a radio officer on a Czechoslovak merchant ship often transmitting from there as OK4TFK/MM on the 14 MHz band, mostly CW, from the Mediterranean sea area. I am interested in corresponding with a radio amateur from the USA who prefers HF transmitting and technically progressive construction of HF equipment. I would like to exchange magazines concerning amateur radio. I can offer Czechoslovak magazine *Amaterske Radio* and special issues for constructors. I am interested in *CQ* magazine or *73*.

Frantisek Kiss, OK3TFK
Thalmannova 68
83103 Bratislava, Czechoslovakia

QSLing Via The Bureaus

Editor, *CQ:*

I am the QSL manager for XF1C and receive approximately 100 cards per month via the ARRL bureau. Ninety-five percent are for XF1C. However, about half of those are from stateside stations. As a result, about half of *my* postage and envelopes at the bureau get used for stateside QSLs. If these amateurs want to send their cards via a bureau, they should send them to the Mexican bureau; it doesn't cost any more. Many managers, including myself, do not answer QSLs from their country that are sent via their bureau. I only forward them to XF1C.

Because of the US stations using the US bureau in this way, the volunteer effort of being a QSL manager becomes a costly practice; in my case I typically purchase the QSL cards and also absorb the losses on postage and IRC shortages already. I think that this is enough contribution, not to mention the complaints that it takes too long to get a card (I seldom get logs that are less than 3 months old already). Personally, I have waited three years to receive one card direct from a ZP; some others I have sent to with SASE or IRCs have never QSL'd and probably never will.

I know more than one article has appeared in *CQ* on the subject of QSLing, but I propose that *CQ* explain the intention of a US bureau and the purpose of a QSL manager again to try to reach some of the uninformed amateurs. Specifically, it should be pointed out that QSL managers, in one's own country, should be dealt with by direct mail, and with an SASE.

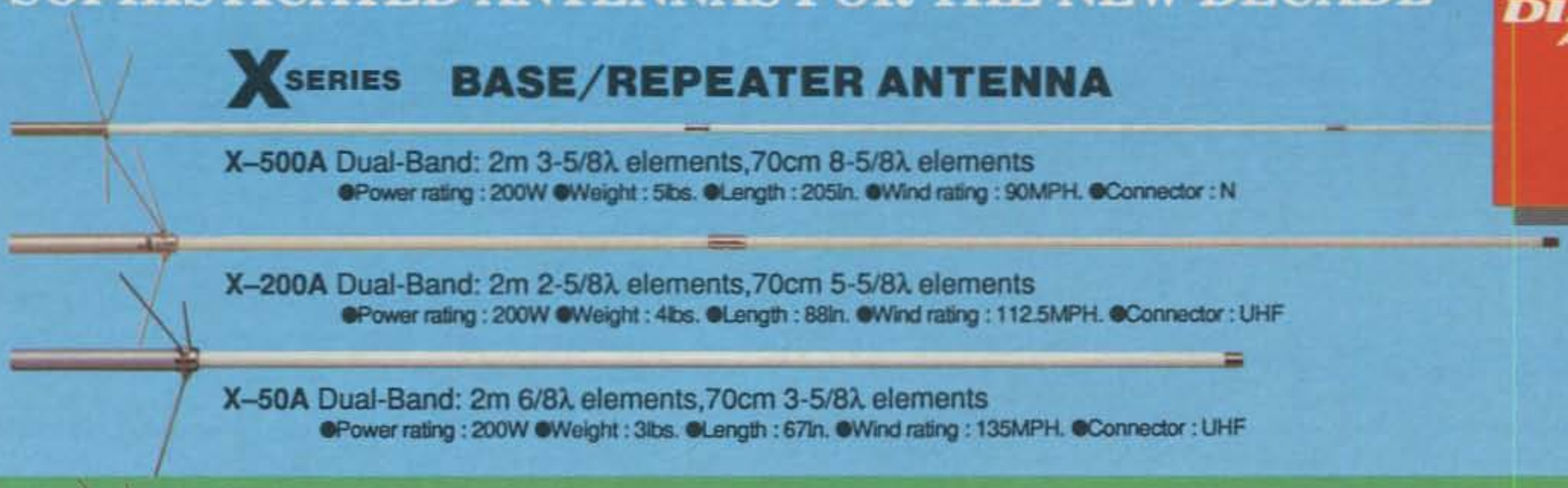
Your help in explaining the proper methods of QSLing will certainly help me and I'm sure several others. Luckily, most of the amateurs who QSL to XF1C through me do all the right things—SASEs, UTC times and dates, and nice little thank you notes (the latter is not required of course, but is quite welcome).

James Arther, Jr., WB6JMS
Atwood, CA

1990 IS A DIAMOND YEAR
SOPHISTICATED ANTENNAS FOR THE NEW DECADE

DIAMOND ANTENNA

X SERIES BASE/REPEATER ANTENNA

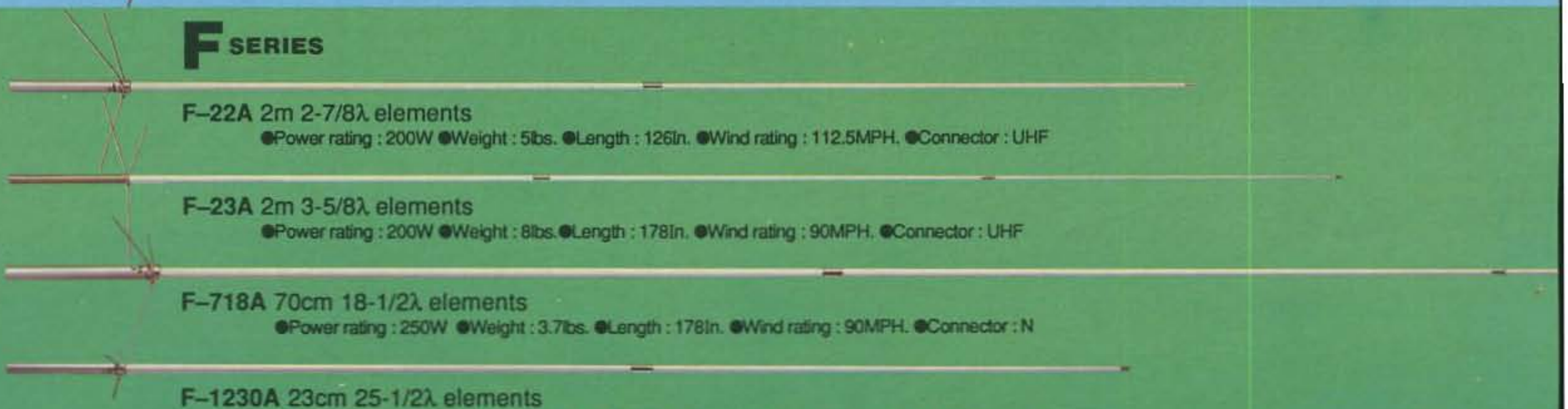


X–500A Dual-Band: 2m 3-5/8λ elements,70cm 8-5/8λ elements
●Power rating : 200W ●Weight : 5lbs. ●Length : 205In. ●Wind rating : 90MPH. ●Connector : N

X–200A Dual-Band: 2m 2-5/8λ elements,70cm 5-5/8λ elements
●Power rating : 200W ●Weight : 4lbs. ●Length : 88In. ●Wind rating : 112.5MPH. ●Connector : UHF

X–50A Dual-Band: 2m 6/8λ elements,70cm 3-5/8λ elements
●Power rating : 200W ●Weight : 3lbs. ●Length : 67In. ●Wind rating : 135MPH. ●Connector : UHF

F SERIES



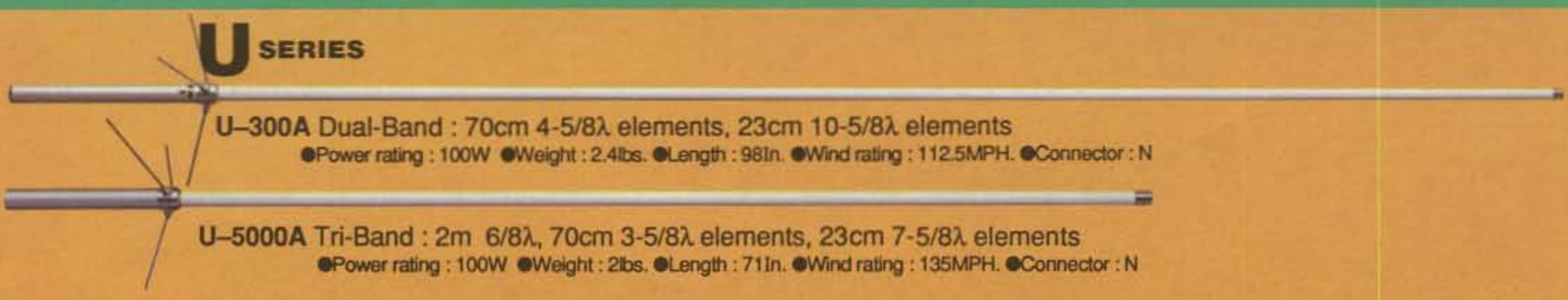
F–22A 2m 2-7/8λ elements
●Power rating : 200W ●Weight : 5lbs. ●Length : 126In. ●Wind rating : 112.5MPH. ●Connector : UHF

F–23A 2m 3-5/8λ elements
●Power rating : 200W ●Weight : 8lbs. ●Length : 178In. ●Wind rating : 90MPH. ●Connector : UHF

F–718A 70cm 18-1/2λ elements
●Power rating : 250W ●Weight : 3.7lbs. ●Length : 178In. ●Wind rating : 90MPH. ●Connector : N

F–1230A 23cm 25-1/2λ elements
●Power rating : 100W ●Weight : 2.5lbs. ●Length : 120In. ●Wind rating : 90MPH. ●Connector : N

U SERIES



U–300A Dual-Band : 70cm 4-5/8λ elements, 23cm 10-5/8λ elements
●Power rating : 100W ●Weight : 2.4lbs. ●Length : 98In. ●Wind rating : 112.5MPH. ●Connector : N

U–5000A Tri-Band : 2m 6/8λ, 70cm 3-5/8λ elements, 23cm 7-5/8λ elements
●Power rating : 100W ●Weight : 2lbs. ●Length : 71In. ●Wind rating : 135MPH. ●Connector : N

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MX-72N Duplexer with UHF connectors and N connector for HF, 2m and 70cm bands
●Coaxial cable : 5D2VS 35cm

MX-72D Direct connection type Duplexer with UHF connectors for HF, 2m and 70cm bands
●Coaxial cable : None

MX-72H Duplexer with UHF connectors for HF, 2m and 70cm bands
●Coaxial cable : 5D2VS 35cm

MX-72DN Direct connection type Duplexer with UHF connectors and N connector for HF, 2m and 70cm bands
●Coaxial cable : None

MX-3000N Triplexer with N connectors and UHF connector for HF, 2m, 70cm and 23cm bands
●Coaxial cable : 5D2VS 35cm

MX-3000DN Direct connection type Triplexer with N connectors and UHF connector for HF, 2m, 70cm and 23cm bands
●Coaxial cable : None

MX-3000 Triplexer with N connectors and UHF connectors for HF, 2m, 70cm and 23cm bands
●Coaxial cable : 5D2VS 35cm

MX-3000D Direct connection type Triplexer with N connectors and UHF connectors for HF, 2m, 70cm and 23cm bands
●Coaxial cable : None

For additional information, or the name of nearest Authorized Diamond Dealer, call:
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DR-510T

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The Alinco DR-510T has most of the outstanding features of it's sister the DR-570T, including 14 memory channels, cross band duplex and cross band repeat. The multi color LCD display, and simple tune control panel makes simplicity the key word. The DR-510T with 45/35 watts is the best, feature-packed dual bander on the Amateur market today. See the DR-510T along with the other Alinco "Magnificent" ones at your favorite dealer today!

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Best 2M Micro Value Anywhere!

The Alinco DJ-100T/DJ-120T is "Magnificent" for its tiny size, but stands up to the competition with power and capability. 10 memory channels store offsets and subtones. Has LCD readout with call channel and reverse at your fingertips. 500 mah battery with direct DC to DC is standard. 3W on standard battery, 6W on optional battery leaves the competition in the dust! DJ-200T for 220 MHz.

DJ-160T & DJ-460T

2M H T is here! And wow!

"Bells & Whistles" is a tame word to use for the new DJ-160T, newest "Magnificent" one from Alinco. Keyboard entry is just one of four ways to enter a frequency in the extended receiver (137-173. 995 Mhz) of the DJ-160T. You can store duplex/simplex pairs in any of 20 Memories, or Call Channel, with offsets, and any of 38 encoding subtones. Choose one of 3 scan modes, "Band" "Program" or "Memory" and one of five step ranges in VFO. Priority mode can be used in VFO, Memory or Call. "Dual Watch" allows the DJ-160T to scan 3 seconds alternately on CALL, VFO or one MEMORY. "Pager" is for group or single person alert. Other features include: Auto "Battery Save", Auto "Power Off", and 2-Memory Autodialer. Get 3-watts on stan-dard 700 mah battery, or increased power from built-in DC to DC, or optional 12V battery. The Alinco DJ-160T, now the "Top Gun" with the competition today! DJ-460T for 70 cm.

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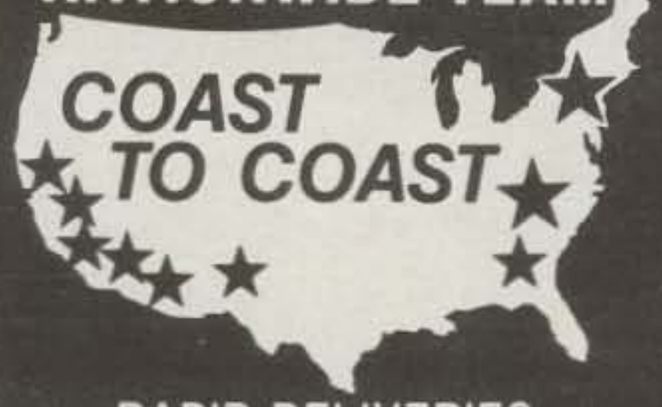

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Some folks think it a treat to go out to dinner and the movies for their birthday, but KC1AG got the ultimate birthday gift—a DXpedition to Walvis Bay.

A Birthday Trip To Walvis Bay
The ZS1IS Story

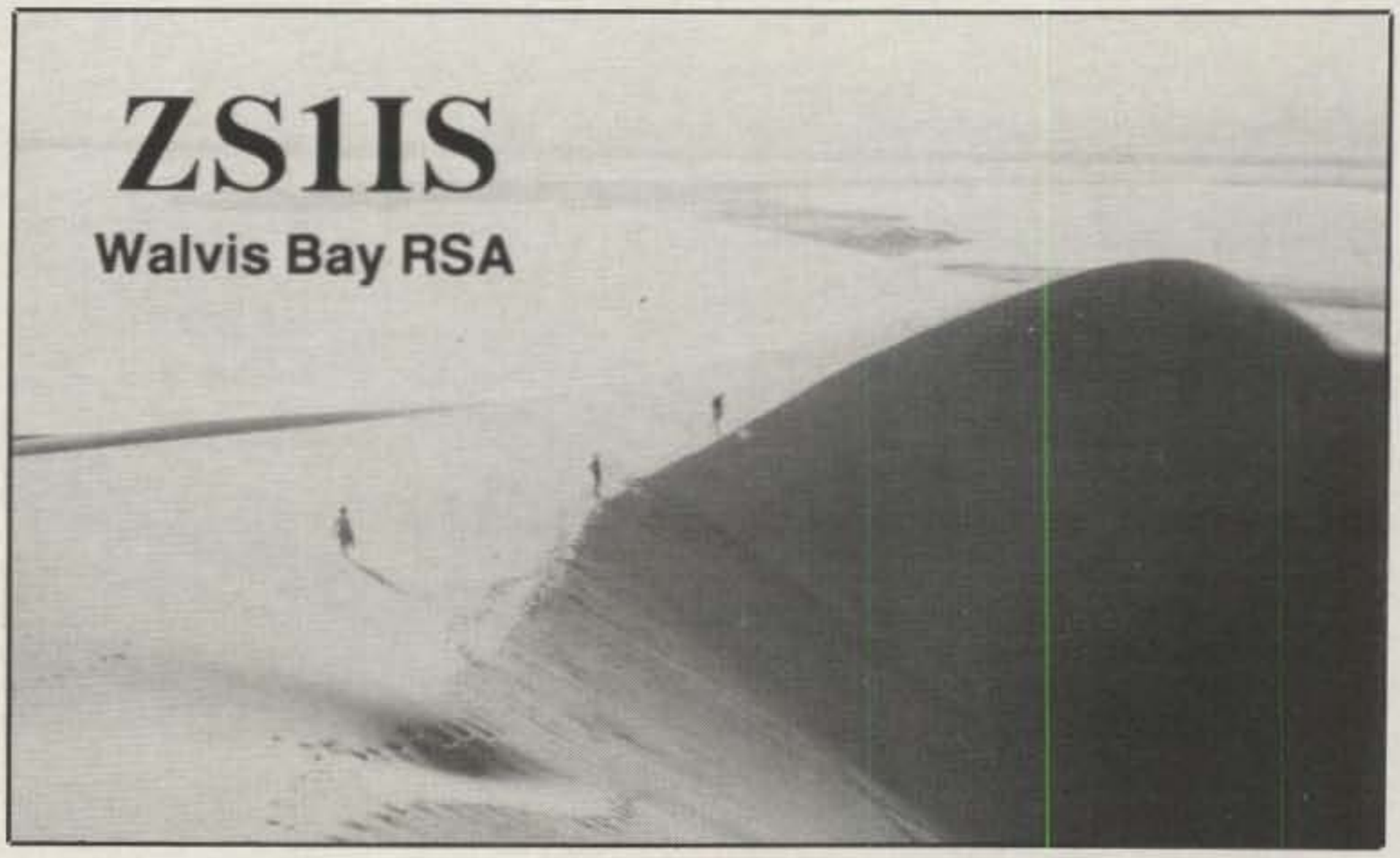
BY BILL SHIPP*, KC1AG

The South African Airline 747 was turning to the east as I awoke and looked across at Al Foskett, K1NTR. Al and I had been underway for the past 48 hours, and it was a relief to finally see the coast of Namibia. Minutes later, as we flew over the Namib Desert, there were no signs of life—nothing but sand and rock. Tomorrow we would be somewhere on the desert below heading west to Walvis Bay and our first DXpedition, if all went according to plan.

Six months before, when my wife, Jane, offered to give me a DXpedition for my 50th birthday, I had never even heard of Walvis Bay. I was looking for a challenging place to go, so I called Anita Keighley, KN2N, to discuss possibilities. "What about Walvis Bay? It's on the southwestern coast of Africa, and there has been talk that it might qualify as a New One," Anita told me.

The thought of a new DX country was fascinating, and I had never been to Africa. My research showed that it is a small enclave of the Republic of South Africa at the edge of the Namib Desert, a territory annexed by England in 1878 which became a part of the British Cape Colony in 1884. In 1919, as part of the Cape Colony, it joined the Union of South Africa. Today it is a fishing center and Namibia's only deep-water port. Walvis Bay seemed to satisfy all of the published criteria for a DXCC country, so I decided I would attempt to get it accepted and organize a DXpedition to go there.

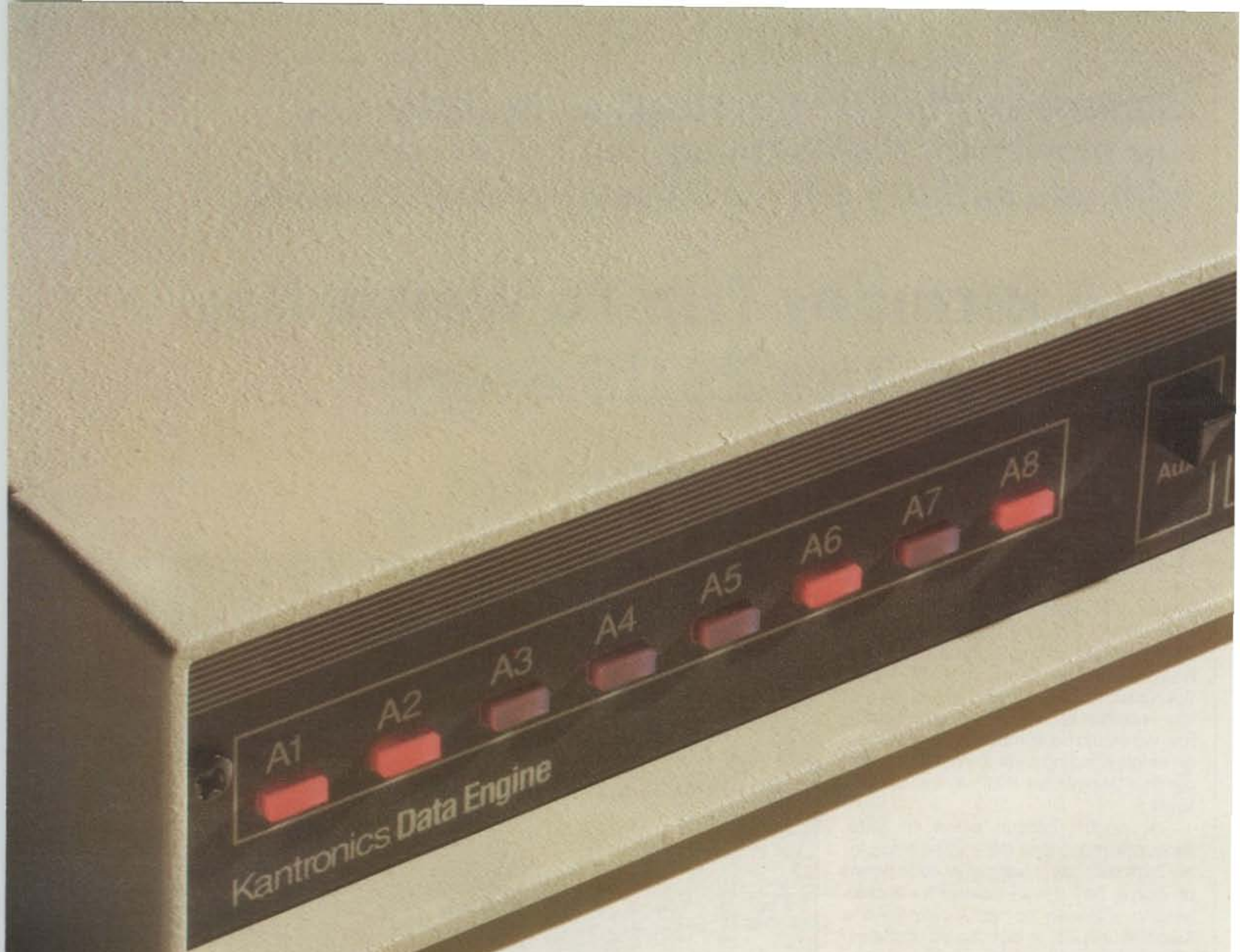
Most of the application to the DX Advisory Committee (DXAC) came together quickly, but there remained several questions which someone who understood the local situation would have to answer. I had the good fortune of establishing contact with the only active amateur in Walvis Bay, Ian Sutherland, ZS1IS (now ZS9A). With the help of Bob Elliot, NE1R,



Our QSL card features one of the giant sand dunes which continually move.

The intrepid crew (left to right) Bill, KC1AG; Ian, ZS9A; AL, K1NTR; and Pierre, F6HIZ.

*1195 Hill St., Suffield, CT 06078



TNC development platform

Designed with the requirements of today's rapidly changing communications environment in mind, the Kantronics DataEngine represents the state of the art in speed, adaptability, and programmability.

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A dual port, full duplex TNC, the DataEngine offers high speed capability and accommodates up to two internal or external modems. The DataEngine is shipped with a base configuration consisting of AX .25 firmware and one 1200 baud modem with three keyboard selectable carrier detect options.

A 16-bit V40 PC compatible microprocessor running at 10MHz provides the compute power essential for creating and managing custom programs. Additional features include a 85C30 communications controller, sockets for .5 Mb EPROM and .5 MB RAM, eight V40 controlled LEDs, technical developer's manual, and two dead-front windows for future devices requiring LEDs, making the Kantronics DataEngine "developer ready".

The DataEngine was designed to be fully compatible with existing communication networks as well as advanced enough for those yet to be designed. In line with this, each unit is shipped with end-user firmware including terminal mode, BBS mode and KISS mode. ROSE X.25, TCP/IP and G8BPQ code for the DataEngine are currently under development.

For a detailed technical specification sheet, call your Kantronics dealer or contact Kantronics direct.

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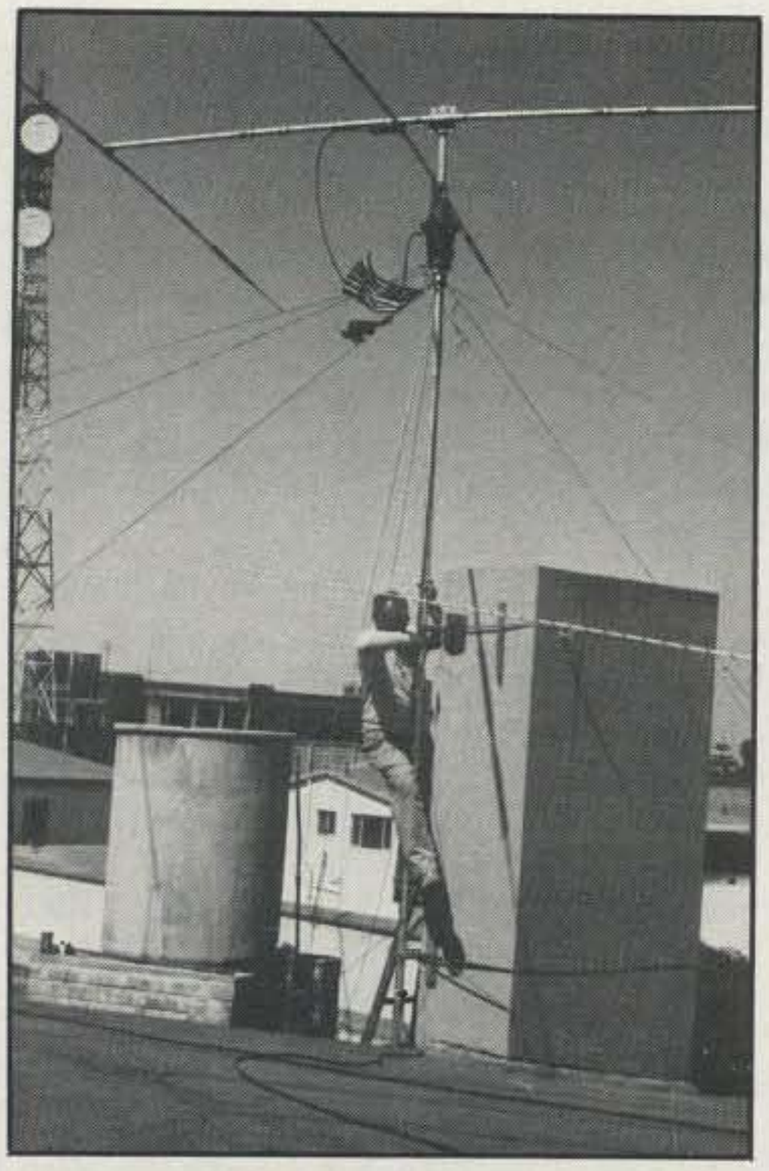


Here's Bill, KC1AG, tightening up the mast for the A-3. All of those guy wires were necessary, as we found out.

and Ian's good friend Derek Moore, ZS3DM (now V51DM), Ian and I set up weekly schedules to discuss the application and make plans for the DXpedition. After months of planning and making preparations, it was hard to believe we would soon be landing in Windhoek, the capital of Namibia, where I would finally meet Derek and Ian in person.

Except for numerous UN transports, Windhoek's international airport looked deserted when our plane landed. Al was getting ready to take a picture of our lonely 747 on the runway when he noticed a heavily armed security detail surrounding the plane and motioning us towards to the terminal building. Al couldn't understand a word they said, but the meaning was clear: "No photographs! Get moving!" The warning on a display of various land mines greeted us in the terminal, reminding us that Namibia had been in the midst of a bloody conflict not long ago. Now, however, things looked peaceful.

After our Namibian visas were checked, we headed to pick up our luggage to take through customs. We spotted two fellows standing at an exit with HTs. Sure enough it was Ian and Derek. Al and I were the last of the passengers, so they were worried. Ian was anxious to see his new KT-34A, which had been donated by the Heard Island DX Association and the Northern California DX Foundation. I joked with him that the KT-34A would be hard to lose, as it and our Cushcraft A-3 tribanders were carefully packed together in a very heavy, 2 meter long section of PVC sewer pipe. Getting this awkward piece of baggage through airport security in both Boston and Frankfurt had been a real challenge, and the excess baggage costs put a significant dent in our budget.

When the departure of our plane for Johannesburg was announced, Al and I realized the beams were missing. There was pandemonium as we tried to keep the 747 from taking off. With the help of a friend of Derek's in the airline cargo office, the plane was stopped on the runway and its cargo hold searched, but the antennas were not found.

As we drove to Derek's house, we thought about trying to contact Pierre Essinger, F6HIZ/HB9LA, who would be leaving France tomorrow to join us two days later in Swakopmund, a Namibian town just to the north of Walvis Bay. There was probably no way he could get a beam to Walvis Bay, but we decided to telephone him that afternoon and see if he could try. Al and I were exhausted, and the frustration over losing the beams made things all the worse. We decided to get a few hours of sleep before trying to contact Pierre.

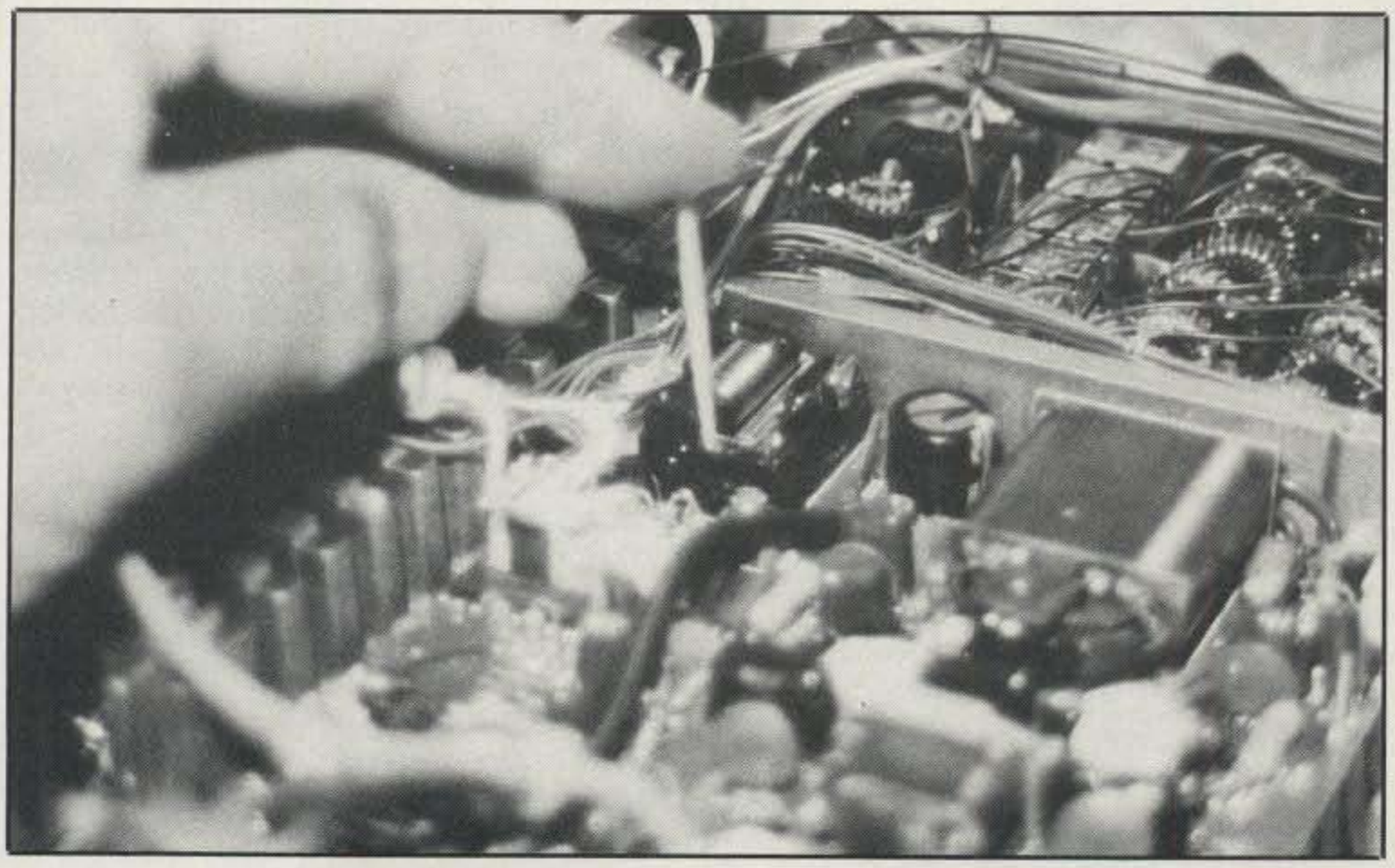
It was late afternoon when we finally woke up. Dianne, Derek's wife, greeted us with the news that the antennas had been found. They had been discovered under a pile of mail bags that had been left on the runway and Derek already had them at his office. We were happy troopers! We made our schedule that evening with Leon Katz, K2EWB, and my son Brad, KA1SVW, and let everyone know that we had made it to Namibia—with all of the antennas. Tomorrow, we were heading for Walvis Bay.

We said good-bye early the next morning to Dianne and Derek and got underway, loaded with our gear and the coax, masts, and other equipment that Derek was furnishing. Within a short while we left Namibia's central highland and headed into the desert. The Namib was even more awesome up close than it had looked from the air. Ian was an excellent guide, pointing out interesting sights along the way and telling us stories of his travels throughout South West Africa as a radio officer with the PTT. As we approached the coastal town of Swakopmund around noon, Ian suggested we pick up some food before heading south along the Atlantic to Walvis Bay, where we planned to have lunch.

Swakopmund is a pretty little coastal resort. Except for the palm trees and sand, it looks just like a German village—a carryover from the days when this was German South West Africa. Al and I were busily absorbing all the sights as Ian pulled up in front of a store. Having flown all the way to Namibia and just driven safely across the mighty Namib Desert, the last thing we expected to see was a Kentucky Fried Chicken! We felt right at home when the aroma of the chicken filled the car.

As we left Namibia we stopped at the Republic of South Africa's border post to have our South African visas checked. The 30 kilometer drive along the coast from Swakopmund to the town of Walvis Bay is impressive. It was along this stretch that we had our first close look at the Namib's famous drifting sand dunes. Ian explained that the dunes in this area are only 40 to 50 meters high, not like the 900 meter behemoths to our south, but extraordinary just the same. Ian remarked that the road crews we were passing are busy every day clearing sand off the roadway. "The Namib is forever trying to bury Walvis Bay," Ian said, "but it's too late in the year for sand storms; that's one experience you'll miss."

Upon reaching the town of Walvis Bay, it did not take long for Ian to show us the



Pierre's toothpick repair job kept us on the air.

Even with the window closed, sand managed to find its way into the room. We couldn't resist writing our call on the window ledge.

small downtown area, nor was it difficult to spot Ian's house with its tower and antennas. We met Ian's lovely wife, Phyllis, and then sat down for lunch. Somehow the Kentucky Colonel's secret mixture of herbs and spices was not the same in Namibia, but the chicken tasted pretty good all the same. After lunch we were off to the Mermaid Hotel, where we had reserved rooms and, most importantly, had permission to put up our antennas on the hotel roof.

The Mermaid staff gave us a warm welcome and helped us unload the gear. While surveying the roof for places to put antennas, Ian noticed the horizon to the southeast was turning tan. "We might get a little wind," he warned. It was such a beautiful day that Al and I paid little attention to Ian's remark. By the time we had emptied the car and the trailerful of gear, sand was blowing everywhere, and it was difficult to keep our eyes open or to breathe. We would have to wait until Pierre arrived to erect the antennas. Ian returned to his QTH for a schedule with K2EWB, and to let him know that we would be using his present call, ZS1IS. The official notice of the new ZS9 prefix that we tried so hard to get in time for the DXpedition had not arrived.

Ian picked up Pierre the next morning at the airfield in Swakopmund, and they soon joined Al and me back at the Mermaid. Assembling the A-3 tribander was the first order of business now that the entire team was together. The beam had been carefully cut into sections for carrying as baggage, so there were a few good-natured remarks about the pieces I had surely left behind. However, all of the many color-coded sections went together without a hitch. As Al and Ian completed the assembly of the beam, Pierre and I put up the Butternut HF6V vertical. Before long the wind picked up, and fine sand filled the air once again. After one futile attempt we decided the wind was blowing too hard to risk trying to put up the beam.

Al, Ian, and I finished off routing the coax from several dipoles into the two rooms we were using for operating, and Pierre went below to begin putting on coax connectors and making up power cords. As we re-joined Pierre, he pleaded with us to find some way to seal the windows. A layer of sand already covered all of the equipment, and fine sand was continuing to blow in through the spaces around every cable. Duct tape and plastic kitchen wrap are not standard DXpedition items, but they proved to be essential in Walvis Bay.

It didn't take long for the first problem to develop. The Yaesu rig Pierre borrowed had powered up perfectly, but it refused to light up a second time. Pierre finally diagnosed the problem: a relay in the power sequencing circuit was not

closing. Carefully jamming a piece of toothpick in the relay to hold it closed did the trick.

By 1800Z on the 27th of August our DX-pedition was finally on the air. The first stations we worked on 15 meters SSB were LU9DX, followed by NE8Z and W8CY. A few minutes later Al sent our first CQ on CW and worked SP2GUV, PA3CCF, and OH3JF on 20 meters. Some two hours later ZS1IS was heard on 20 in the U.S. as signals from Europe continued to come pounding in. Al worked John, K1AR, followed by many other W1's as DX reports went out on the YCCC Packet-Cluster. Before we lost propagation, some 250 CW and 150 SSB contacts were in the log. Everything was ready for erecting the A-3 the next day as we turned in for a few hours of much needed sleep.

It was dawn when I awoke, and I knew instantly something was wrong. My face felt like I was wearing a gritty mask, and my eye lids were glued together. Startled, I sat up and managed to pry open my eyes. The window over my bed had blown open during the night, and a good portion of a sand dune covered me and everything in my room. As I tried to brush off the sand I could hear Al down the hall working JA's on CW, so I knew at least one antenna had survived. It was calm and foggy outside as we began setting up the tribander and the other antennas. Ian cautioned us that all of the coax connectors had to be covered with coax sealant. When I spotted a new PL-259 connector I had forgotten to cover the day before, I understood why. The connector's shiny outer metallic coating was completely gone, leaving the metal underneath exposed and corroded. Walvis Bay, I later read, has the second most corrosive atmosphere in the world, and only high-quality stainless steel survives outdoors. (Luderitz, a Namibian port south of Walvis Bay, takes top honor for the most corrosive atmosphere.)

We spent the morning erecting the remaining antennas and getting the stations in order. As we paused to inspect our work, Walter, the barman and general factotum at the Mermaid, and Mrs. Waldemeyer, the hotel manager, joined us on the roof to see what we had accomplished. The sight of all of the antennas, especially the tribander on its 5 meter mast clamped to the chimney, must have been a shock to them. "If we get an easterly wind, you'll need more ropes," Walter cautioned. We added one extra line out of courtesy, but we could not believe that the wind would blow any harder than it had yesterday. We were wrong.

August 28th marked the first full day of operating. While we thought we had pile-ups the evening before, nothing prepared us for what we encountered. One simply has to experience a serious pile-up to appreciate what it is really like. Picking out *any* callsign was tough, except occasionally at the edges of our listening range. Working by country and call district helped some but not enough. Twenty meters was a nightmare. The combined signals were so strong they saturated the front-ends of the transceivers, even with 20 dB attenuation switched in. As the size of the pile-ups decreased slightly, and as we learned to operate under these conditions, we were eventually able to work from three to four a minute for periods of several hours. It was tiring but it was great fun, especially when people were considerate of one another.

Operating became a little more routine as we adapted to our tiring 24-hour schedule and got a feeling for propagation on the various bands. Meals were the only times we had to discuss problems and go over the logs, so we all tried to eat together whenever possible. The food was good, and there was plenty of it. Whenever spirits sagged or we lost propagation, Ian somehow managed to take

This sign in a shop window says it all.

us on a breathtaking ride around town in his yellow dune buggy. Ian swore he used the buggy only to go fishing, but we soon deduced that his secret ambition is to become a racing car driver.

"Better check the guylines," Ian announced early one morning as he joined us for breakfast. "It looks like we're in for a *real* storm!" We had enjoyed beautiful weather for several days, but Ian's forecast turned out to be correct. By 9 o'clock the local marine station reported winds of 120 kph with gusts to 160 kph (99 mph). We began to understand what Ian meant when he said that the Namib tries to bury Walvis Bay. From the nearby desert we could hear an occasional *c-r-r-r-r-ump!* as the dunes outreached themselves in their effort to swallow up the town, toppling under their own weight. When we looked about we could see dust devils swirling around *inside our room*. There was sand in our beds and in our baths, in our food and in our beer.

Climbing onto the roof to see how our antennas were behaving, one look was enough to convince me things were not good. We had to change the direction of the beam. Its elements were flapping around like mad, and already a guy on the mast had snapped. The force must have been terrific, since the guyline was thick parachute cord that had a breaking strength of 300 kg. Also, one of the three guylines on the vertical had been whipped off of its anchor point, and the remaining

Ian, ZS9A, in his dune buggy.

guys bent the antenna over to about 60° whenever the wind slacked. It would break any minute if we did not get the line replaced.

Everyone heard my call for help on 2 meters and soon struggled onto the roof. We managed to secure the guy on the vertical during a lull in the wind, but it was all we could do to crawl back along the ridge of the roof to shelter from the blasts. It was too dangerous to try to fix the other problems. We felt sure none of the antennas would survive, so we went back to make a few more contacts before everything let go.

With the beam perpendicular to the wind and pointing over the southernmost tip of South America, I did not expect to get any reply to my CQ. Within a few minutes, however, I was working JA long path on 10 meters. No matter where we had the beam pointed, it seemed, we heard those incredible stations in Japan calling us. As the storm continued, however, the QRN the sand generated as it struck the antennas became so strong that we had to call it quits.

The wind finally died down by the late afternoon. Our 160/80 meter dipole had taken a real beating, but damage to our other antennas was surprisingly minimal. However, all of the gutters had been blown off of the hotel, creating a real mess when they became entangled in our cables leading down to the rooms. All of the outside coax felt like sand paper: the wind had propelled the sand with such force that particles were imbedded in its covering. Metal surfaces on the windward side of the antennas were brightly polished—the real meaning of "sand blasted." Walvis Bay was covered with a fresh blanket of sand, and the surrounding dunes had changed their shapes yet again. Everyone was busily sweeping sand out of their houses and shoveling off driveways and sidewalks. One nearby store still had a sign hanging on its door: "Closed on Account of Wind."

Operating our equipment around the clock began to take its toll. First the power supply in Al's Kenwood TS-930 failed and couldn't be repaired. Next the TS-830 that Ian had been using at his home QTH died. We were down to two rigs—my TS-440 and Pierre's Yaesu with the toothpick in the relay. Perhaps the most frustrating failure was the new AES MorseMachine keyer that we had brought as a gift to Ian. After several hours of operation, it began keying the transmitter spontaneously and sending garbage. The only way to stop it was to completely reset it, which destroyed everything stored in the memories. After another hour or so, it would misbehave again.

Al had to return to his job on 5 September, leaving Ian, Pierre, and me to carry on until the 10th. There were three sand storms and two major solar flares, and the power lines to Walvis Bay were knocked out for two days. Nevertheless, the final tally showed we had made some 24,000 contacts—14,000 SSB and 10,000 CW. It was a decent showing for beginners, we decided.

Pierre and I spent our last two days in Walvis Bay helping Ian assemble his new KT-34A. John Smith, ZS6BNS (now ZS9S), who had just moved to Walvis Bay, doubling the active amateur population, gave us a welcome hand with the work. On our last night together Phyllis and Ian joined Pierre and me for our first African rock lobster—it was terrific. We talked for hours about our experiences and the fun we had had. When we returned to the Mermaid that night, there was only an eerie silence. It was strange not to be working the pile-ups, and we felt sad that our first DXpedition had come to an end.

Flying back over the Namib, I thought about what a wonderful present this birthday trip to Walvis Bay had been. It would certainly be fitting to give Jane a treat like this for her 50th birthday, I decided. All I had to do was find another New One before next September. Of course, it would be nice if Jane got a license so she could work the pile-ups, too. CQ

This month we begin a three-part series on basic antenna information written by our own Lew McCoy, W1ICP. Included will be some antennas you can build and helpful hints on improving your station.

Basic Antenna Information Part I

BY LEW McCOY*, W1ICP

From the mail I receive, I note that no matter how many times I write about basic antenna information or feed lines, I still get requests for more. A lot of the mail comes from new amateurs, plus there is the continued intense interest in antennas by just about everyone else. When I listen on the air, I find that while antennas seem to be the main topic of discussion, there is a lack of basic knowledge on the subject. So here is another round, plus some cheapy antennas worth trying.

Feed Impedance—What Is It?

Every antenna must be fed radio frequency energy (RF) from the rig in order for the antenna to radiate. (That statement is certainly basic!) Where we attach the feed line to the antenna is of course called the feed point (see fig. 1). The feed point contains three different properties (only two if the antenna is exactly resonant). One of these is the radiation resistance, which is not a true resistance, but is that part of the antenna feed point that couples the RF to space and results in radiation. The radiation resistance is the important part of the feed point.

Next we have ohmic resistance, which is real resistance. This exists in the antenna wire, plus any hardware directly in the antenna, and the resistance in such things as insulators (or traps). Ohmic resistance is strictly a loss as far as the antenna is concerned. Any power is dissipated as heat in the ohmic resistance.

The last item in the feed point is reactance, which is also expressed in ohms. Reactance only exists when an antenna is operated off resonance. In other words, an antenna that is purely resonant will have no reactance. However, we can normally think of an antenna as only being purely resonant on a kiloHertz or two.

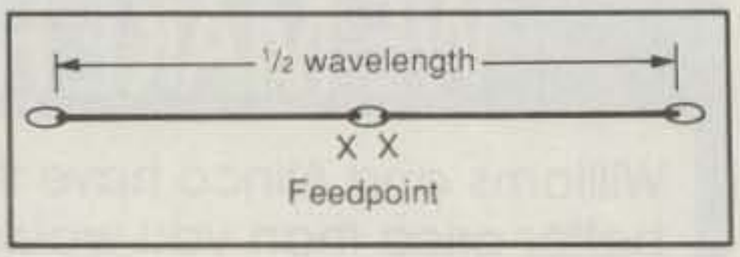


Fig. 1– This is a simple dipole. The feed point as discussed in the text is at X – X.

Whenever we change frequency from such a point, we introduce reactance, so the majority of the time we have reactance present.

If an antenna is too long for a frequency, it has inductive reactance; if it is too short, it has capacitive reactance. While reactance is expressed in ohms, you cannot dissipate power in a reactance. The reactance acts—in the simplest of language—as a gate or a door that stops the flow of power to the antenna. In order to get power into or through the impedance, you must introduce an equal amount of the *opposite* reactance into the circuit, which will cancel out the other reactance. This is called "tuning out the reactance." Once an amateur understands reactance, antennas and their feeding become much clearer.

Therefore, we find that the impedance of an antenna contains these three items, all listed in ohms. The exact value of the impedance will depend on many conditions, as we will see.

SWR—Standing Wave Ratio

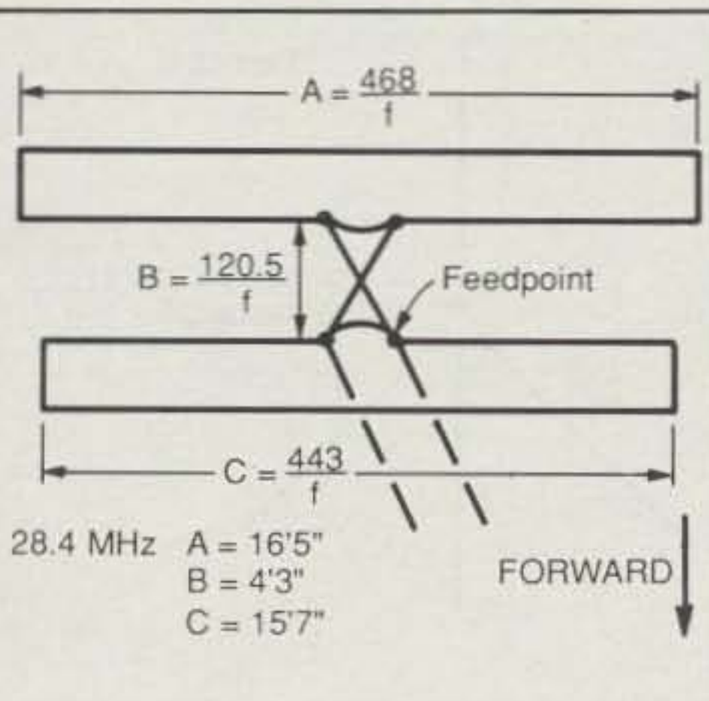
Probably the most popular subject heard on the air is that of SWR—standing wave ratio. Amateurs treat SWR as they would the health of their mother-in-law or the IRS—with lots of interest and respect. A feed line has what is called a "characteristic impedance," and this is determined by the size and spacing of the conductors plus the dielectric of the material used to separate the conductors. Because these items remain constant, the characteristic impedance of a feed line always remains the same.

The standing wave ratio is determined by the antenna feedpoint impedance (in ohms) and the impedance of the feed line (also in ohms). We calculate the SWR by dividing one impedance into the other. For example, a 100 ohm impedance fed by a 50 ohm line would have an SWR of 2 to 1 (100/50). In the October 1951 issue of *QST* I had an article called "The Monimatch," which was about a rather simple circuit that would measure standing wave ratios in coaxial lines. The methods of measuring standing wave ratios were known, but no one actually had built an inexpensive working device at that time. The Monimatch was an easy-to-build, inexpensive unit that immediately caught on with the amateur fraternity. It was reasonably accurate, but what was important about the device was that it really changed the course of amateur radio. Amateurs who had been working out without any serious problems and who were perfectly happy with their system suddenly had a way to measure SWR, and what they found drove many of them up a wall (or I should say tower, so to speak). From that time on everyone using coaxial feed lines was very unhappy if he or she didn't have an SWR of 1 to 1, or very close to it.

Up to that point in time, in fact, we had transmitters that could couple any mismatched antenna load because the method to do so was built in. But as time went on there was less and less homebuilt gear, and the commercial gear gradually became fixed tuned devices that required a fixed load, usually 50 ohms and a 1 to 1 SWR. That is what we have today.

In order for modern transceivers to work efficiently, the antenna system load must be near a perfect match—or more bluntly, be less than 2 to 1 mismatch. This is the load presented at the antenna terminal of the transmitter. Let's digress for a moment and go back to impedances.

Technical Editor, CQ, 200 Idaho St., Silver City, NM 88061



This is an antenna called the ZL-Special, which is a very excellent performer and to my knowledge has been around for many years. In fact, I used two different construction versions back in 1947. It consists basically of a driven element and reflector, both folded dipoles and both driven via a 135 degree phasing line. The antenna has a gain over a dipole of approximately 5 dB. Theoretically, and for a single angle, it could have an *infinite* front-to-back ratio. But in actual practice, in my own tests, I found it to be on the order of 20 dB—maybe slightly more (which is not a bad number by any means).

As people who know me can state, I love to make good-performing antennas. The ZL-Special can be constructed for relatively little cost. The antenna can be constructed from 300 ohm twin lead or 450 ohm open-wire line. Also, in the drawing are the formulas for each of the three pieces—the driven element, the reflector, and the phasing line. For example, the longest element is derived from 468 divided by the frequency (in megaHertz—468/28.5 MHz = 16.4 feet).

At the time I built mine bamboo fishing poles were common, so I merely taped the twin lead to the poles and then mounted the poles on some 2 × 2 wood supports. The boom was a 2 × 4. You could use the same techniques, but use PVC ½ inch diameter pipe to hold the twin lead. If you are only concerned about two directions, you can support the ends of the beam with two wooden or PVC rods and then flip the antenna over to change directions. Don't write and ask me how this antenna would work if it was suspended from one end, *a la* vertical. I don't know. If you try it that way (and it *should* work), write and let me know.

The feed-point impedance of this antenna is about 70 ohms. Certified Communications sells 70 ohm twin lead, so you could use that to the station and then a 1 to 1 balun into your rig. The 70/50 ohm mismatch is not worth worrying about. Still another method (and the one I used) is to feed with 300 ohm line (or the 450 ohm line), bring the feedline into the station Transmatch, and tune the system. The SWR in this case is not worth considering, and the system worked fine for me. This antenna, as I said, is an outstanding performer and costs very little.

Fig. 2– The ZL-Special, an outstanding performer which costs very little.

You know what the impedance is composed of by now, but what determines the value of the impedance?

There are many factors that control the impedance. The first and primary one is the length of the antenna. For example, an 80 meter half-wavelength antenna, about 130 feet long, would have a center impedance of 70 ohms (if the antenna was the correct height above a perfect ground). Of this 70 ohms about 68 ohms would be the useful radiation resistance, while only 2 ohms would be ohmic losses. This is very efficient. In fact, the simple half wavelength dipole is the most efficient antenna you can find. But instead of 80 meters, what happens to the antenna impedance when we go on 40? Here we have a full-wavelength antenna and the impedance goes up to 4000 ohms or so. With a 50 ohm coaxial feed this would mean an SWR of 80 to 1! I can guarantee your modern transmitter would be completely shut off with such a load.

We see therefore that the length of an antenna greatly affects the impedance. However (and keep this in mind as we discuss antennas), usually, regardless of the impedance, the bigger the antenna is for a given frequency, the better it is. There is an old joke in amateur radio about this: Always make your antenna as big as possible and put it up as high as possible. If it stays up, then it isn't big enough or high enough!

Another factor that controls the impedance is the height of the antenna above ground. Also, the antenna's proximity to trees, metal, power lines, etc. will affect the impedance. In a beam antenna the presence of the reflector and director greatly affect the impedance. I am not sure if it is *always* true, but usually the presence of other objects *lowers* the impedance. Also, shortening an antenna physically will always reduce the radiation resistance. For example, shortened verticals require matching devices to transform the impedance of the antenna to that of the feed line used.

The most startling example of a shortened antenna would probably be an 8 or 9 foot mobile whip used on 80 meters. The radiation resistance becomes a fraction of an ohm, while the ohmic resistance is on the order of a couple of ohms. Remember what I said at the start: The radiation resistance is the useful part of the impedance. Assuming you were running 100 watts into an 80 meter mobile whip, only a fraction of the power would be radiated because the ohmic losses would consume nearly all the power as heat. This is why it is so important to use good grounds in HF mobile work—just so you can reduce those ohmic losses and have a better ratio of ohmic to radiation resistance.

I don't want the uninitiated to be misled here. I am talking strictly about impedances of drastically shortened low-band verticals, not, for example, 20 meters and up, where full quarter-wavelength verticals are normally used. (On 20 meters a quarter wavelength is on the order of 16 feet or so.) In these cases the radiation resistance gets up to 30 ohms or so, meaning ground losses are not as pronounced.

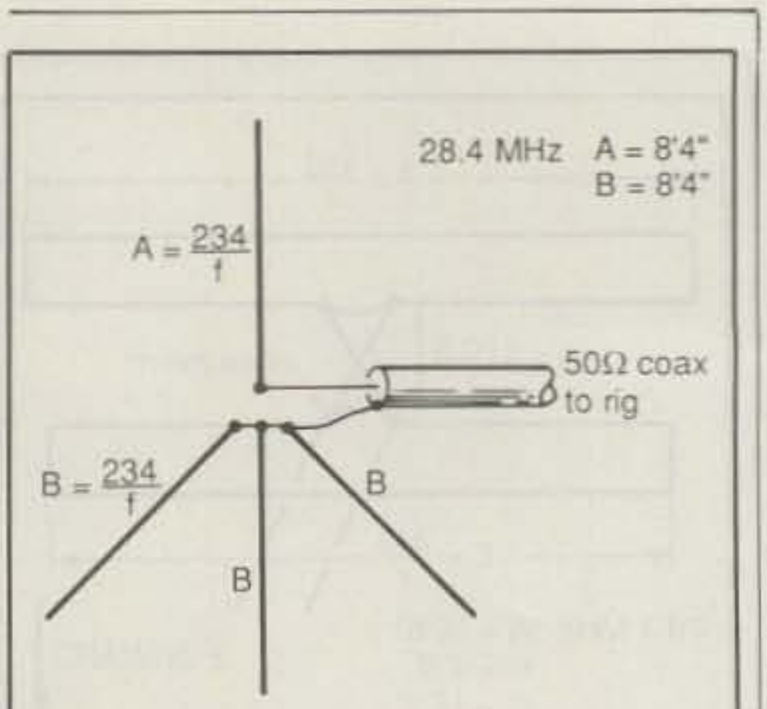
Antenna Gain— What Do We Mean?

One subject an amateur will hear probably more than any other is that of antenna gain. There are two basic ways in which we relate antenna gain, and now because of computers we are getting a third. The first is to rate gain of antenna as compared to an isotropic radiator. An isotropic radiator is really a theoretical antenna and does not exist in actual practice. Basically, an isotropic antenna is one which radiates equally well in *all* directions. The sun or a star would be a fairly good example of an isotropic radiator.

The second and more common method is to compare an antenna's gain with that of a common half-wavelength resonant dipole. When we compare antennas to an isotropic radiator, we rate them as decibels of gain over an isotropic, or dBi (when the antenna is compared to a dipole, dBd). The actual numbers are simple enough. Considering the isotropic to have zero gain, then a half-wavelength dipole has a gain of 2.14 dB compared to the isotropic radiator. (A half-wavelength dipole will have a figure-eight pattern with two main lobes, and it is these lobes which have the gain.) A three-element Yagi beam, for example, could have a gain of 7 dB over a dipole, or we could add 2.14 gain—9.14 dB gain over an isotropic.

The third measurement that is cropping up involves computer modeling. First let me state that with the advent of computers programs are now available which will completely analyze any antenna you can dream up. In this case we can have two ratings—(1) a thing called free space gain, which like the isotropic is a theoretical gain but is extremely useful in modeling and comparing antennas, and (2) the actual modeled gain over real ground.

In free space there is nothing to "modify" the antenna pattern unless you put something else directly in the antenna area when it is being modeled. When we model, say, a dipole over earth, we apply 3 dB gain to the antenna's major lobes. In addition, if the earth happens to be a perfect reflector, the sky signal is augmented by 3 dB with the signal reflected by the perfect earth. This is oversimplifying the explanation, but you could wind up with as much as 6 dB gain as compared to a free-space pattern. All this means is that there are three (or four if we count



This diagram shows a basic ground-plane vertical with three radials. This is one of the simplest antennas to build, and it is guaranteed to work. I use electrician's thin-wall ½ inch diameter tubing for the element. PVC is slipped over the base to make an insulated support. The formula for ¼-wave heights is given, and these lengths apply to both the vertical and the radials (wire).

As shown in the diagram, the antenna is fed at the base with 50 ohm coax, the inner conductor going to the vertical and the shield connecting to the three radials. The feed impedance of this antenna is on the order of 35 ohms, which is very close to a match. Having the radials slope downward raises the impedance, and at about a 45 degree slope the impedance will approximate 50 ohms. Many amateurs mount their verticals on wooden or insulated poles and then use the radials as part of the guying setup. The ends of the radials should be kept out of reach because of the possibility of RF burns. The antenna can be mounted at earth level, but performance always improves with height.

Fig. 3– A basic ground-plane vertical with three radials.

free-space modeling) methods of assessing gain.

To Match or Not To Match

You'll often hear the statement that the best antenna is a resonant antenna. I don't agree because the statement is misleading, and I will show you why. In the first place, as I pointed out in discussing impedance, an antenna is only going to be resonant for a very, very few kiloHertz. It would be fine if we were in the broadcast business and limited to a single frequency, but we are not. We QSY up and down the band or bands, many times with the same antenna, as the mood suits us. So raising your blood pressure over having a resonant antenna is pointless. What isn't pointless is that we must get the power into the antenna.

Our problem resolves itself down to a rather simple one: How much power can we get out of a modern solid-state transmitter before it shuts itself down, and/or

when does the antenna system become reactive? In some cases you can tolerate a 2 to 1 mismatch in the antenna system, but I have found from experience that modern rigs tend to shut down at about 1.5 to 1 or slightly higher.

Antenna impedances can vary widely, from as low as a fraction of an ohm to well over 4000 ohms, and with plenty of reactance present. As I mentioned earlier, an 80 meter half-wavelength dipole has an impedance of about 70 ohms on 80, but when used on 40 it becomes a full wave with an impedance of 4000 ohms. Unfortunately, coaxial feed lines do not like high SWRs because the losses go up, as does the danger of line breakdown when using high power.

The problem that many amateurs, particularly newcomers, have is understanding reactance, mismatches, and the role a Transmatch plays. It can be a very complex subject for any given system. However, it is possible to simplify the subject to a certain degree. First, let me dispose of a few erroneous conclusions many amateurs reach. Some amateurs believe that if you have a very high SWR, the feed line will radiate (and cause things such as TVI and BCI). This is erroneous thinking. Regardless of the SWR, the SWR will not cause a line to radiate. Keep in mind that all two-conductor lines as we know them (including coax) are essentially balanced lines. I realize that many amateurs will jump up and down and say that coax is an unbalanced line, but if you really think about it, you will see that the two conductors in coax are symmetrical, or balanced as to each other. The important point here, though, is that being symmetrical, the RF currents flowing in each conductor cancel any radiation from the line (or are supposed to). Sometimes RF from the antenna will be coupled back to the feeder, creating a condition called parallel standing waves, and in such a case the feed line will radiate. However, this is not supposed to happen. (Much more about this condition later.)

Also, without becoming too technical, any reactance present at the antenna will exist in the system load—or should I say "can" exist but may be a different value. What is important here is that regardless of how bad this mismatch is, or how much the reactance is, it is possible with a Transmatch to adjust the device so that you always present a perfect 1 to 1 load at the transmitter. And again, we make the *system* resonant. What we are able to do is tune out the system load reactance, step the impedance up or down to match the 50 ohm output of the transmitter, and thus get maximum transfer of energy and good efficiency.

Antenna Installation

Covering the subject of antenna installations could require an entire book, but there are some basics worth noting here. I am going to treat feed-line radiation later, so I'll only touch on it briefly here. If the antenna has a desired pattern, then it is imperative that the feed line does not radiate. One way to help avoid the problem is to make sure of the manner in which the feed line comes away from the antenna. In a beam installation where a tower is used, it is important that *all* lines are brought down straight from the beam at least one-quarter to one-half wavelength (lowest frequency) from the antenna. In fact, if the lines can be buried at the bottom of the tower and carried underground to the station, this will create the best possible installation. Of course, you cannot bury open-wire lines. Try to bring the feed line down from the antenna as straight as possible and far as possible before going to the station.

Probably the most common type of multiband antenna (80 through 10, or even including 160) is an inverted Vee. Usually the center of the antenna is hung from the tower or a high support and the ends brought down. Many amateurs go to great lengths to try to orient such antennas for 80 or 40 so that they *think* they are getting the maximum lobe in a desired direction, as determined from handbook antenna patterns. The only problem here is that in order to obtain the desired pattern on these bands, the antenna has to be on the order of at least 60 feet high on 40 and twice that on 80. As you approach the earth, the patterns on these bands tend to become omnidirectional, so in essence you have to accept the fact that the antenna will be omnidirectional on these bands. I might add this is also true of strictly horizontal antennas. It is true that there is some vertical low-angle radiation from inverted Vees, but such patterns are very difficult to predict. The best test here is to put 'em up and try 'em.

In part two of the series we will continue this discussion.

(to be continued)

Here's a report on packet radio as seen from the UK. G3LDI tells us what it's like from a European perspective.

Packet Radio From The Other Side of The Pond

BY ROGER J. COOKE*, G3LDI

Packet radio operation in the UK has been increasing steadily for the last five years. I first became interested in the mode in 1984 while using a computer made in the UK called the BBC-B. Several of us in East Anglia used a system developed at Cambridge University for this computer. Then an article appeared in an American journal describing a kit available from the Tucson Amateur Packet Radio Association (TAPR) called the TNC-1. Four of us sent for the kit, costing then in excess of what a ready-built TNC costs today. Such was our enthusiasm!

It took several weeks to obtain the "awkward" components, but within about two to three months we were all up and running locally on 2 meters, causing quite a few comments in the area regarding the "funny noises" on the band!

We had the usual teething problems, which in the early days, with no shoulders to lean on, we had to solve by ourselves. The most annoying one was the audio levels, and in my case the transceiver, the ICOM 271, which was far too good for packet! Transceivers with pre-emphasis and de-emphasis do not work too well on this mode. Then the TNC parameters had to be mastered. This took several evenings of reading and experimenting, during which time we must have connected and disconnected hundreds of times. However, with perseverance we were soon listening on HF on 14.103, where we had heard packet on several occasions. It was not long before contact was made with several countries, and such was the rarity of packet on HF that we called each other on the local 2 meter calling channel if a different station was heard.

Interest was gaining in momentum. It was not long before we were working other G stations on 2 meters and 80 meters and keeping a tally on countries worked. It was a local competition to see who could get to DXCC first! However, interests became diverse. I had lots of contacts with Jack, W3TMZ. I had found out that he was running a BBS and was interested. Jack arranged to bring over a Xerox 820. I took on the challenge, obtained a pair of 8 inch disk drives, and dived in at the deep end. There followed lots of late nights, lots of reading, and at the end, a BBS running on 2 meters, with the TNC-1, on 14 MHz with a TNC200 from PacComm and a real-time gateway, which was really fascinating. I then got the forwarding working, and Jack and I used to swap mail and bulletins on 14 MHz on a regular attended basis.

That was in 1986. Since then packet has really taken off here in the UK. Thousands of TNCs have been sold, and an integrated VHF network has evolved and is still evolving. Problems are inevitable, but not insurmountable. We now have a National forwarding system using a mixture of nodes and BBS (see fig. 1). This is updated regularly by Del, G4FQO, on information received. So if you wanted a message to go to Norwich in Norfolk, you could refer to this list and see that you have choice of four—GB7VLS, GB7LDI, GB7RMN, and GB7ZBA.

The setting up and maintenance of repeaters is a costly business, but having set up a network using a mixture of 2 meters, 70 cm, and 6 meters, traffic has increased such that the end-user has to wait. Moves are being made to put the nodes and forwarding onto 1296 MHz.

This photo was taken at one of the regular SYSOPs meetings. This one was held at the University of Surrey, and Paul, G4VLS, is shown at the command console for the Uosat DCE station, along with the BBS, GB3UP.

*The Old Nursery, The Drift, Swardeston, Norwich, Norfolk, NR14 8LQ, England UK

No-25-26

Last year the author, G3LDI (on the left), played host to visiting Russian packet enthusiast Leo, UA3CR. That's quite a tower in the background.

The group in East Anglia has organized the move of about five nodes and has called the group Eastnet. Site tests have been proved. The equipment we hope to use is by Cirkit, with a Mitsubishi "brick" PA giving 2 watts out and a 9600 baud modem by James Miller, G3RUH. The antenna has also been designed by G3RUH and is a helical. This should help to improve the whole system, allowing more time for the end-user on 2 meters and providing a much quicker forwarding on 1296.

SYSOP meetings are held regularly (about four per year) to allow discussions and sorting of problems on the network. They usually take place on a Sunday to allow as many people to attend as possible. One of the more interesting sites for the meeting was the University of Surrey, where the Uosat DCE station is located, with the BBS, GB3UP. Before the meeting started we were privileged to attend a tour of the command station. One of the accompanying photos shows Paul Turnham, G4VLS, admiring the impressive command console. Paul is the SYSOP of GB7VLS, located in Norwich. Traffic for VK, ZL, and ZS is routed to GB3UP, then via the DCE.

The HF scene is very busy. There are few GB7 stations on the HF bands. Consequently, the traffic through these stations is quite heavy. However, the main problem is the lack of a proper piece of each band for packet. IARU Region I, in their infinite wisdom, has decreed that packet shall remain in the RTTY subband, a completely intolerable situation. The STA that the North Americans enjoy stipulates that they shall stay above the RTTY section. This is a real help to the forwarding problem. However, I think we all take "operator's license" and try to solve the problem as best we can. The same problem existed with RTTY in the late 1950s, when it, too, was a "new mode." Nobody wanted those "jingle bells" on the amateur bands, and the RTTY segment was formed by occupation. I was in on that fiasco also, so the problem has come full circle, with packet now the "bad boy."

The amateur population has increased since the fifties, however, and it is a more difficult problem to solve. There are quite a few bulletins on the network which con-

Leo, UA3CR, at the G3LDI packet operating position while Pat, G3IOR, looks on.

BBS TERMINALS LISTING

The following is my own definition of BBSes as opposed to PBBSes for the purpose of this listing:

BBS: Those stations licensed to operate a BBS and who use the national forwarding network for the transmitting and receiving of all mail.

PBBS: a. Those stations who are licensed to operate a full BBS but by choice do not use the national forwarding network for the transmitting and receiving of all mail. These stations can accept third-party traffic if they choose to.

This listing lists those stations that meet my criteria of a BBS.

Those BBSes shown with an SSID (legend 's') are believed to be correct as they reflect the answers received or not received in reply to several bulletins I have sent out to SYSOPs.

STATUS ANNOTATIONS:

The legend 'n' indicates those BBSes that do not have user access but are dedicated to the forwarding of mail for an area.

The legend 's' indicates the use of a SSID of -2 for 2M.

The legend 'u' is used to indicate those BBSes that are licensed to have direct user access on frequencies other than 144.650 MHz using the GB7 callsign. Information on the other frequencies is covered in the notes below.

If the BBS is annotated 'u' but does not have a note it is assumed that the one callsign is used for user access on all the frequencies listed.

BBSes shown in the listing as operating on frequencies other than 144.650 do so using the SYSOPs own callsign plus maybe a SSID and not the GB7 callsign unless a Notice of Variation has been issued.

My listings are sent out addressed to SB LIST @ GBR and other listings in the series are:

NETWORK LISTING: Lists the Network nodes Netrom, TheNode, and TheNet.
K-A NODE LISTING: Lists stations operating the K-A node.

*** NOTES ***

GB3XP	G-L	GB3XP-1 TC/PIP
GB7AVM	OXON	70 CMS - GB7AVM-7
GB7HDS	DURM	USER ACCESS 6M
GB7HHH	HERT	USER ACCESS 2M AND 6M
GB7HQQ	HERT	USER ACCESS 2M AND 70CMS
GB7PLX	HANT	FORWARDING FROM HF AMTOR

GB7SCA DEVN AMTOR/PACKET LINK

LEGEND:

Band: 0 - 144.625; 1 - 144.650 Mhz; 2 - 144.675 Mhz; 3 - 3.5 or 7 Mhz; 4 - 70 Mhz; 5 - 14/21/28 Mhz; 6 - 50 Mhz; 7 - 430 Mhz; 8 - 13 Cms; 9 - 23 Cms

Status: n - NTS Only - No user access; s - SSID of -2 used; u - Licensed user access other than 144.650 Mhz. - See NOTES

TOTAL NUMBER OF TERMINALS LISTED: - 114

CALL-STAT	ALIAS	BAND	CODE	SYSOP	NAME	LOCATION	CTY
GB7BNI		1 5	_6112	GI4XFN	STEVE	BELFAST	ANTM
GB7TED	TEDBBS	1	_611	GI4AHP	TED	BELFAST	ANTM
GB7WRI s		1	_6111	GI4WRI	IVOR	RANDALSTOWN	ANTM
GB7IMB s	IMBBBS	1 4 7	_411	G8IMB	MARTIN	STOKE GIFFORD	AVON
GB7ZPU u		67	_211	G1ZPU	BOB	SUTTON NR.SANDY	BEDS
GB7BRK ns		1 7 9	_421	G1AWD	JOHN	MORTIMER NR.READING	BERK
GB7NEW	NEWBBS	1 7	_4215	G4XBA	MICK	THATCHAM NR.NEWBURY	BERK
GB7RDG u	RDGBBS	1 67	_4213	G4YFB	STEVE	READING	BERK
GB7VMR	MHDBBS	1	_4214	G3VMR	BOB	MAIDENHEAD	BERK
GB7WIR		1	_3221	G1LMI	JOHN	LANGLEY NEAR SLOUGH	BERK
GB7WOK		1 7	_4211	G3WGV	JOHN	WOKINGHAM	BERK
GB7JED s		1	_711	GM4UPX	IAN	JEDBURGH	BORD
GB7DDX	CAMBOX	1 7	_2111	G0DDX		HISTON	CAMB
GB7HXA u	HUNTS	1 6	_222	G4UXV	CHRIS	HUNTINGDON	CAMB
GB7PET		1	_221	G4PYR	ROBERT	PETERBOROUGH	CAMB
GB7CHS n	CHSBBS	1 7	_111	G3WCS	KEN	ANTROBUS NORTHWICH	CHES
GB7CRG	CRGBBS	1 7	_1112	G4WSD	PETER	MOBBERLEY	CHES
GB7KJL s		1	_11112	G0JNH		STOCKPORT	CHES
GB7NEM		1	_121	G8EIA	RICHARD	LINTHORPE	CLEV
GB7ABC		1	_511	GW3TMH	KEN	RHYL	CLWD
GB7PEN	PENBBS	1	_1612	G6BSK	DAVE	PENRITH	CUMB
GB7DAD	DADBBS	1 7	_231	G4NAD	RICHARD	MATLOCK	DERB
GB7LED	LED	1	_2312	G4XMH	MICK	LONG EATON	DERB
GB7GLP	GLPBBS	1	_442	G6GLP	TONY	IPPLEPEN NR.TORQUAY	DEVN
GB7PLY	PLYBBS	1 34 7	_441	G0BSX	PETER	PLYMOUTH	DEVN
GB7SCA		1 5	_4411	G4SCA	JOHN	PLYMOUTH	DEVN
GB7BNM	BBSBNM	1 34	_453	G4WPT	DAVE	VERWOOD	DORS
GB7SIG s	SIGBBS	1 6	_451	G6FPC	JIM	BLANDFORD FORUM	DORS
GB7HMI s		1	_632	GI3TLT		KIRCUBBIN	DOWN
GB7HDS us		67	_1711	G4HDS	PAUL	PETERLEE	DURM
GB7HAS	HASBBS	1	_3414	G1HSM	LEON	HASTINGS	E-S
EI1DF		1	_8112	EI1DF	EUGINE	MT.MERRION CO.DUBLIN	EIRE
EI3EG s		1	_851	EI3EG	AIDAN	BISHOPSTOWN CO.CORK	EIRE
EI5CI		1	_811	EI5CI	JOE	DUBLIN	EIRE
EI5WL		1	_841		DAVE	LIMERICK CITY	EIRE
EI6EH		1 3 5	_8111	EI6EH	TOM	KELLS CO.MEATH	EIRE

CALL-STAT	ALIAS	BAND	CODE	SYSOP	NAME	LOCATION	CTY
GB7ESX	ESXBBS	1 67	_311	G1NNB	GEORGE	WITHAM	ESSX
GB7SNE s		1	_741	GM8SNE	PHIL	DAIGETY BAY	FIFE
GB1KP	KUTBBS	1	_371	GB1LWY	TED	KINGSTON UPON THAMES	G-L
GB3XP s	KUTBBS	1	_3711	G8GGI	BOB	NEW MALDEN	G-L
GB7BST	BSTBBS	1 7	_32111	G0BST	BOB	NORTHWOOD	G-L
GB7DGK	DGKBBS	1 7 9	_322	G4DGK	JOHN	HILLINGDON	G-L

tain some very irate comments, so it really is about time something was sorted out.

We desperately need two separate segments, and the packet segment has to be wide enough to accommodate both the BBS stations for forwarding and the DX QSO, one-to-one type of contact. The forwarding itself has to be more organized, too. Up until now it has evolved worldwide on an ad-hoc basis. We have to limit the number of stations forwarding continent to continent, country to country, or we will be our own worst enemy. Listening one morning, trying to forward mail to W3IWI on 14.109, I counted no less than 17 different BBSes all trying (mostly in vain!) to forward. Under these circumstances it is virtually impossible to utilize the channel at all. The problem needs to be sorted out on a worldwide basis, not just a regional one. Comments from Tom, OD5NG, who operates both packet and RTTY are very poignant and they are produced here verbatim as sent in a message to me.

"This packet/RTTY controversy is a real hot potato, and if it was not for the copious amount of mail in general agreement to what I have said in the past, I would be inclined to drop the potato hi.

"Most of the adverse criticism seems to come from people who just do not understand the overall problem. I myself have been and still am very worried that an all out war will ensue on 20 meters, as I have read and been told that some RTTY operators are seriously considering putting up long beacon operating RTTY BBSes, which will be to everybody's detriment and was something I could see happening right from my very first bulletin in which I said chaos is on the way.

"I subscribe to the *RTTY Journal*, and most of the articles (columns) are very anti-packet below the 14.100 mark. I know this is a USA-biased journal, but the tone of the mail there is echoed from around the world.

"I do think Region I was in grave error in suggesting that packet expand downward on 20 meters without all regions concurring at that time, and they are really to blame for what has happened.

"As you know, Roger, 20 meters is a prime DX band for RTTY, and as the mode is being increasingly used, any loss of space is a serious problem. A lot of money is spent on DXpeditions to unusual places to operate RTTY.

"The pity is that packet on 20 meters is pretty useless. When you sit and look at the traffic from here, it consists mainly of retries with very little data being passed at all. Even AMTOR has difficulties at times, and this mode gets through when all others fail. I myself avoid 20 meter packet and have been for a long time, as I myself do not think packet with its present protocol is a 20 meter HF medium. All one seems to achieve is being the cause of additional QRM, something most digital ops worth their salt are always trying to avoid. From the general mail I have received, I am not alone in this respect.

"I am very pleased that on the whole 15 meters is being left out of the squabble. I hope this continues, but I would be pleased to see the one USA station move up where there is plenty of room above 21.100.

"The new protocol 'PACTOR' being developed may be the answer to HF packet on 20 meters, but only time will tell, as it will take a couple of years to get ac-

GB7GHU	GHUBBS	1	5	_32113	G4GHU	TERRY	PERIVALE EALING	G-L
GB7HIU	HIUBBS	1	7 9	_3211	G6HIU	NEIL	EDGWARE	G-L
GB7HSN	HSNBBS	1	67	_3212	G1HSN	DEREK	MOTTINGHAM BROMLEY	G-L
GB7NHU	NHUBBS	1	7 9	_32112	G6NHU	KEITH	PERIVALE EALING	G-L
GB7SRC us			6	_3311	G3ZPB	PETER	OLD COULSDON	G-L
GB7UWS u	UWSBBS	1	7	_321	G1UWS	PETER	ELTHAM	G-L
GB7GMX	EUBBS	1	5	_11113	G3VOM	DAVE	MANCHESTER	G-M
GB7NWP	NWPBBS	1	7	_1111	G1ULA	NIGEL	SWINTON MANCHESTER	G-M
GB7CQV		1		_751	GM0CQV	BRENDAN	ABERDEEN	GRAM
GB7GUR		1 3 5 7		_471	GU4YMV	CHRIS	VALE	GUER
GB7ERA	ERABBS	1 34	7	_241	G0DXX	PAUL	EVESHAM	H-W
GB7TCM	TCMBBS	1		_242	G8ADH	GRAHAM	UPTON UPON SEVERN	H-W
GB7AEU		1		_4812	G4AEU	MALCOLM	SOUTHAMPTON	HANT
GB7HJP	BBSHJP	1	7	_4813	G6HJP	PETER	PORTSMOUTH	HANT
GB7KCM	KCMBBS	1	9	_481	G4KCM	CLIVE	TOTTON SOUTHAMPTON	HANT
GB7PLX		1 3 5		_4814	G3PLX	PETER	GOSPORT	HANT
GB7TXA u	TXABBS	1	7	_4212	G4TXA	DAVE	HOOK NR.BASINGSTOKE	HANT
GB7XJZ	XJZBBS	1		_4811	G6XJZ	DAVID	CHANDLERS FORD	HANT
GB7HHH u		1	67 9	_331	G3OUF	DAVID	HEMEL HEMPSTEAD	HERT
GB7HQQ u		1	7 9	_333	G3XDV	MIKE	POTTERS BAR	HERT
GB7SPV		1	7	_332	G4SPV	ANDY	STEVENAGE	HERT
GB7AOB	AOBBBS	1		_763	GM8AOB	MARTIN	FORT WILLIAM	HIGH
GB7NOS	NOSBBS	1		_762	GM0HBI	JOHN	GOLSPIE	HIGH
GB7GBY	GBYBBS	1		_151	G4DXB	BRIAN	GRIMSBY	HUMB
GB7SEK s	SEKBBS	1	67	_341	G4IDX	DAVE	ASHFORD	KENT
GB7ZAA s	ZAABBS	1	7	_3411	G6ZAA	JOHN	HERSDEN CANTERBURY	KENT
GB7BPL		1	7	_1622	G4YVQ	RAY	MARTON BLACKPOOL	LANC
GB7FCI	FCIBBS	1		_161	G6FCI	CHRIS	BLACKPOOL	LANC
GB7LRG	LRGBBS	1	7	_251	G0CND	IAN	LEICESTER	LEIC
GB7GRN	GRNBBS	1	6	_2611	G4MQM	DAVE	HARLAXTON GRANTHAM	LINC
GB7LNX	LNXBBS	1	7	_261	G4GOU	MIKE	HORSINGTON	LINC
GB7LIV		1		_162	G4LBJ	LEN	LIVERPOOL	MERS
GB7OAR	OARBBS	1 4	7	_164	G4OAR	NEIL	OXTON BIRKENHEAD	MERS
GB7CYM	CYMBBS	1 4	7	_194	G1FTA	COLIN	COPMANTHORPE NR.YORK	N-Y
GB7EYM	EYMBBS	1	7	_1912	G4HRM	MALCOLM	NEAR SCARBOROUGH	N-Y
GB7KEV	KEVBBS	1	4567	_193	G3KEV	MALCOLM	SCARBOROUGH	N-Y
GB7AAA	AAABBS	1	4 67 9	_271	G0HWC	PAUL	NEAR NORTHAMPTON	NHAN
GB7NRC	RAYNET	1		_2711	G4JTY	NEIL	DAVENTRY	NHAN
GB7BMX	BMXBBS	1		_171	G1YAA	TOM	BILTON ALNWICK	NHUM
GB7TVM s		1	7	_172	G1HZI	IAN	STAGSHAW NEAR HEXHAM	NHUM
GB7LDI		1 3 5		_351	G3LDI	ROGER	E.CARLETON NORWICH	NORF
GB7RMN		1		_3523	G4RMN	MICK	NORWICH	NORF
GB7TLH	TLHBBS	1		_3522	G1TLH	DIRK	EAST DEREHAM	NORF
GB7VLS		1		_352	G4VLS	PAUL	NORW1CH	NORF
GB7ZBA		1		_3521	G4ZBA	PAUL	OLD CATTON NORWICH	NORF
GB7MUM	MUMBBS	1		_2311	G6HOQ	STEVE	BRINSLEY NEAR HEANOR	NOTT
GB7AVM u		1	7	_493	G0DFP	PAUL	CHINNOR	OXON
GB7AKE		1		_2821	G6AKE	EDWIN	NEAR SHREWSBURY	SHRP
GB7DQW n	DQWBBS	1	7 9	_282	G0DQW	CHRIS	SHREWSBURY	SHRP
GB7SAM		1	7	_1113	G3TJP	DAVE	NEWCASTLE-U-LYME	STAF
GB7FRI	FRIBBS	1	5	_782	GM0FRI	SCOTT	OBAN	STRD
GB7JSC		1	67	_7811	GM1VBE	STUART	BOTHWELL	STRD
GB7MAC		1 3 5 7		_781	GM4AUP	IAN	AIRDRIE	STRD
GB7SAN		1		_7812	GM3SAN	SIM	GLASGOW	STRD
GB7SRL s		1		_7813	GM4SRL		NETHERLEE GLASGOW	STRD
GB7CFB		1		_3611	G0CFB	RICHARD	HUNTINGFIELD	SUFF
GB7MXM s	#MXBBS	1		_361	G4GBA	CHAS	NEAR STOWMARKET	SUFF
GB3UP s		1		_372	PA3BHF	MICHAEL	GUILDFORD	SURR
GB7AWA		1		_791	GM4AWA	RON	PERTH	TAYD
GB7KAW s		1		_531	GW4KAW	BRIAN	SWANSEA	W-G
GB7SAU		1 4	7	_761	GM8SAU	BARRY	NORTH UIST	W-I
GB7MAX	MAXBBS	1	7	_2911	G4TEC	BILL	WOLVERHAMPTON	W-M
GB7SUT	SUTBBS	1	89	_291	G8AMD	HAYDEN	SUTTON COLDFIELD	W-M
GB7VRB s	VRBBS	1		_3412	G8VEH	RON	LANCING	W-S
GB7ZZZ	ZZZBBS	1		_3413	G1TDM	NIGEL	BURGESS HILL	W-S
GB7LDS u		1	6	_1914	G3WNR	KEN	LEEDS	W-Y
GB7WAM		1 4	7	_1951	G3SPX	KEN	WAKEFIELD	W-Y
GB7WRG	WRGBBS		9	_195	G0COA	PHIL	WAKEFIELD	W-Y
GB7YAX	YAXBBS	1 4	67 9	_191	G0EOJ	DOUG	HUDDERSFIELD	W-Y
GB7YHF		1	7	_1913	G4SEQ	DOUG	BATLEY	W-Y
GB7NUN		1		_2912	G1KBB	ALEC	CAMP HILL NUNEATON	WARK
GB7APC	APCBBS	1	7	_491	G1APC	PETER	SWINDON	WILT

CROSS REFERENCE IN CALL-SIGN ORDER

EI1DF	EIRE	GB7DGK	G-L	GB7LDI	NORF	GB7SIG	DORS
EI3EG	EIRE	GB7DQW	SHRP	GB7LDS	W-Y	GB7SNE	FIFE
EI5CI	EIRE	GB7ERA	H-W	GB7LED	DERB	GB7SPV	HERT
EI5WL	EIRE	GB7ESX	ESSX	GB7LIV	MERS	GB7SRC	G-L
EI6EH	EIRE	GB7EYM	N-Y	GB7LNX	LINC	GB7SRL	STRD
GB3KP	G-L	GB7FCI	LANC	GB7LRG	LEIC	GB7SUT	W-M
GB3UP	SURR	GB7FRI	STRD	GB7MAC	STRD	GB7TCM	H-W
GB3XP	G-L	GB7GBY	HUMB	GB7MAX	W-M	GB7TED	ANTM
GB7AAA	NHAN	GB7GHU	G-L	GB7MUM	NOTT	GB7TLH	NORF
GB7ABC	CLWD	GB7GLP	DEVN	GB7MXM	SUFF	GB7TVM	NHUM
GB7AEU	HANT	GB7GMX	G-M	GB7NEM	CLEV	GB7TXA	HANT
GB7AKE	SHRP	GB7GRN	LINC	GB7NEW	BERK	GB7UWS	G-L
GB7AOB	HIGH	GB7GUR	GUER	GB7NHU	G-L	GB7VLS	NORF
GB7APC	WILT	GB7HAS	E-S	GB7NOS	HIGH	GB7VMR	BERK
GB7AVM	OXON	GB7HDS	DURM	GB7NRC	NHAN	GB7VRB	W-S
GB7AWA	TAYD	GB7HHH	HERT	GB7NUN	WARK	GB7WAM	W-Y
GB7BMX	NHUM	GB7HIU	G-L	GB7NWP	G-M	GB7WIR	BERK
GB7BNI	ANTM	GB7HJP	HANT	GB7OAR	MERS	GB7WOK	BERK
GB7BNM	DORS	GB7HMI	DOWN	GB7PEN	CUMB	GB7WRG	W-Y
GB7BPL	LANC	GB7HQQ	HERT	GB7PET	CAMB	GB7WRI	ANTM
GB7BRK	BERK	GB7HSN	G-L	GB7PLX	HANT	GB7XJZ	HANT
GB7BST	G-L	GB7HXA	CAMB	GB7PLY	DEVN	GB7YAX	W-Y
GB7CFB	SUFF	GB7IMB	AVON	GB7RDG	BERK	GB7YHF	W-Y
GB7CHS	CHES	GB7JED	BORD	GB7RMN	NORF	GB7ZAA	KENT
GB7CQV	GRAM	GB7JSC	STRD	GB7SAM	STAF	GB7ZBA	NORF
GB7CRG	CHES	GB7KAW	W-G	GB7SAN	STRD	GB7ZPU	BEDS
GB7CYM	N-Y	GB7KCM	HANT	GB7SAU	W-I	GB7ZZZ	W-S
GB7DAD	DERB	GB7KEV	N-Y	GB7SCA	DEVN		
GB7DDX	CAMB	GB7KJL	CHES	GB7SEK	KENT		

This list was compiled by Del, G4FQO, to whom credit should go for an excellent job.

cepted. The principle on which it works would seem to address the problems we have with packet on 20 meters, so I wish them every success with the project.

"If you want to use anything of what I have said, please feel free, Roger. I have very broad shoulders and would be only too pleased to be wrong.—73s de Tom."

A resume on HF forwarding follows.

Chris, GU4YMV, operates GB7GUR in Guernsey. He forwards as follows:

OZ5BBS—all EU mail and bulletins

F6ABJ—all mail to France

IK4BLV—all EU mail plus Stateside mail and bulletins

LA6CU—Scandinavia and Germany

LA6HX—Scandinavia and Germany

EA4DYX—all EA

SV1IW—SV and 4X

Chris forwards on 14 and 3.5 MHz.

Roger, G3LDI, operates GB7LDI in Norwich and forwards as follows:

N4QQ-1—all USA, Canada, South America, mail, and bulletins

W9ZRX—all USA, Canada mail, some bulletins

W3IWI—all USA, Canada mail, some bulletins

4X1RU—Middle East, Italy, Russia, and EU

SV1IW—EU, Far East, Indonesia, Philippines

EK3AZO—Russia

3B8FP—3B8, ZS, VK, ZL, YB

IK4BLV—Italy

All these stations accept and send mail and bulletins.

In 1989 I had the pleasure of playing host to Leo, UA3CR, from Moscow. Leo is very interested in both packet and satellite operation, and the packet system is an ideal medium for the transport of satellite bulletins. N4QQ and W3IWI both being involved with AMSAT NA, news gets to Europe fairly quickly. Leo had a few problems back home, but was forwarding with GB7LDI for a month or so before temporarily closing down. I now get mail to Leo via EK3AZO at Moscow State University. The photos show Leo and yours truly, Roger, G3LDI at the foot of the G3LDI tower, and Leo and Pat Gowen, G3IOR, in the shack of G3LDI.

Most of the BBS stations in the UK, including myself, now run IBM clones. A mixture of XT, AT, and even 386 machines with upwards of a 20 mb hard disk are quite common nowadays. On the TNC front, the PK232 and the KAM together with other TNC2 clones are the most popular.

The software used ranges from the trusty RLI and MBL to some British BBS software developed over the last few years. There are some really good programs around in the UK which are also gaining in popularity worldwide. Steve, G4YFB, has written a BBS, as has Ken, GW3TMH. Brian, G1NNA, has just completed one using mail compression, which seems to be looking to the future. John, G8BPQ, has written a very popular piece of node software which is in use worldwide.

Lots of people are now getting set up for the PACSATs. This opens up a whole new era of packet radio which should be quite exciting. If we have come this far in just five years, what do the next five or ten hold in store? Judging by the progress in amateur radio in general during the last 20 years, I feel that I was born too early! There is certainly going to be one hell of a lot of action in the next 20 years! CQ

CQ REVIEWS:

The Outbacker Eight-Band HF Mobile Antenna

BY DAVE INGRAM*, K4TWJ

After featuring HF mobiling in my *CQ* "World of Ideas" column and writing a new mobile handbook, I received several inquiries concerning a new Australian-made antenna known as the "Outbacker." A quick scan through *CQ*'s advertisements revealed this multi-band whip from "down under" is now being imported to the U.S. by WD4FSY of Outbacker Antenna Sales. A brief call to 1-615-899-3390 resulted in descriptive literature and an Outbacker in our own driveway ready for review (WD4FSY was passing through our city at the time). Here is the story.

The Outbacker is made by Terlin Aerials, and its commercial counterpart has been used in the rugged outback of northern Australia for 15 years. Its neat appearance and quality construction are most impressive. This all-band antenna is available in a 6 foot solid or screw-apart model with or without super-heavy-duty base and spring, and a 4 foot "go anywhere" model. Both models consist of a continuous helical whip wound on a hefty fiberglass rod that is molded in epoxy resin and coated with a thick rubber outer cover. They have pretuned taps inside small covers for selecting 80, 40, 30, 20, 17, 15, 12, and 10 meter operation, and their tip rods are adjustable for fine-tuning SWRs. The whip's base and tip are nickel-plated brass, the band taps are solid brass, and the whole antenna is built like a battleship. The 6 foot model is rated at 300 watts standard and 500 watts on request. The 4 footer handles 150 watts.

Changing bands on the Outbacker involves moving its "Wander Lead" between taps. You insert one end of this lead into the whip's bottom socket and wind it counter-clockwise to a desired band's socket. Varying that winding spacing quick tweaks SWRs, or you can adjust the whip's tip rod for precise-frequency tuning. Winding the Wander Lead, incidentally, is surprisingly foolproof. I wound it several times when changing bands and the SWR always fell below 1.6 to 1 at my targeted frequency. If I owned the antenna and used it on a day-to-day basis, I am confident I would get the procedure down pat and attain an optimum SWR every time. Inexperienced newcomers or mobileers traveling in inclement weather should really like convenient and easy operation of this antenna.

The Outbacker eight-band mobile whip. Base-matching coils or capacitors are not required with this helical-wound antenna, and it is surprisingly broadbanded.

Technically speaking, the Outbacker's Wander Lead makes it a double-helical base and single-helical top-type mobile whip. Considering that aspect we can visualize how adjusting the Wander Lead's spacing fine-tunes feedpoint impedance. The effect of this double and single helical design on radiating RF is more complex, but the bottom line is it works, and works quite well for its short size.

My first on-the-air tests with the 6 foot Outbacker mounted on my car were conducted during the recent worldwide DX contest. The bands were incredibly active right from turn on, so I worked several Europeans and South Americans on 20 meters before catching my breath and checking the SWR. It was 1.4:1 at 14.250, dropping to 1.05:1 at 14,200, and rising to 2:1 at 14,100 and 14,300 MHz, or 200 kHz wide without readjusting. Switching to 10 meters, I measured a similar 200 kHz bandwidth between 2:1 SWR points. They fell between 28,100 and 28,300 MHz, so I slid a couple of the Wander Lead's turns closer together and the SWR curve moved up 80 kHz. I then worked a few South Americans and switched to 17 meters. This band is only 100 kHz wide, so SWR tuning was not necessary. Several stateside contacts confirmed the Outbacker was radiating a respectable signal. Its performance was down a good S unit compared to my tall-modified Hustler, true, but the Outbacker goes through low overpasses where I previously had to remove my 9 foot whip.

The Outbacker also turned respectable results on 30 meters, and SWR is no problem on this 50 kHz wide band. Since I am not a night driver, my observations on 80 and 40 meters would only be personal opinions (and biased). I will say, however, that the Outbacker fills my occasional or emergency needs on 40 and 75, and its 2:1 SWR bandwidth is approximately 50 kHz without retuning on each band.

The 4 foot Outbacker also checked out quite favorably. In fact, the small size and professional appearance of this model are ideal for mounting on the new family car. Performance is roughly one S unit below the 6 foot Outbacker, but you have all eight bands in one go-anywhere whip that stores in the smallest space. No more tripping over that pile of resonators and stingers on the back floor. This "shorty" should be mounted at or above car-trunk-lid level for good results. I checked the "4 footer" with a trunk-lid mount and worked 5 continents with it in 2

*4941 Scenic View Drive, Birmingham, AL 35210

hours. Furthermore, it went under my carport with an inch to spare! I definitely could not do that with my tall bumper-mounted whips.

All aspects considered, the Outbackers are good antennas for their purpose—that is, eight bands in one easy-to-use whip that looks good on your car and is short enough to duck low overhangs. They do not perform equal to a tall Bugcatcher, but there are no magical substitutes for actual physical height. That is simply a fact of life. Many mobileers, however, lose one S unit in poor-quality coax (switch to marine-grade RG-8X) and inefficient grounding (get a roll of flat copper foil and ground antenna mounting bracket, tailpipe, and transceiver's metal case directly to the car's frame). Use those facts to your advantage, activate your transceiver's speech processor, and you will have a good Outbacking mobile signal.

First import models of the 6 foot Outbacker had Australian threads for the heavy-duty mount you installed on your car. That model is still available, but present 6 and 4 foot Outbackers have standard 3/8-24 thread bases. You can also order them with up to 12 taps for MARS/CAP or marine use.

For more information on these rugged whips, contact Outbacker Antenna Sales, 330 Cedar Glen Circle, Chattanooga, TN 37412, or phone 1-615-899-3390.

To some imitation is the sincerest form of flattery. While this project is not quite imitation, it does flatter the original brass version, and W1OLP can be proud of his handiwork.

How To Build Your Own Mini Hand Key

BY GEORGE A. WILSON, JR.*, W1OLP

Some toys are irresistible! The case at hand is a small hand-key that I saw in the December 1988 issue of *CQ* on page 92. Dave Ingram, K4TWJ, in his "World of Ideas" column for that month featured holiday gifts for the amateur, and the first item was a small, beautifully machined hand-key made by a German company called Schurr.

Somehow I had to have one. However, I'm really not a CW operator, and most of my amateur friends would certainly wonder if they ever heard me on CW. No, it was just the beauty of the key and its size that set my imagination to work.

I'm a builder at heart, and soon a plan for a similar key began to take shape. The original version, Mr. Schurr's gem, is carefully machined from brass and quite simply was well beyond my shop's capability. More thought produced the less elegant version discussed here. I hope that Mr. Schurr will be pleased and complimented by my efforts.

To build your own mini-hand key you will need:

Tools

Drill press and number drills
Table saw with plywood blade
6-32 tap
Sander, preferably rotary

Materials

5/16" plexiglass or similar material (for all parts except the key arm)
3/8" bakelite or similar material (for the key arm)
1/4" O.D. tubing and 1/8" I.D. tubing (pivot axel)
6-32 machine screws
Relay contacts (salvaged)
Cyanoacrylate glue (Zap or similar brand)
1/8" spring (salvaged or from 1/32" piano wire)
Rubber stick-on feet

The plans are shown full size and may be scaled for the dimensional information you will need. The original Schurr key is 3½"L × 1½"W × 1¼"H. These dimensions may be varied to suit the materials and tools available. The rounded inside corners are made by drilling several holes first and sawing up to them. A jig or band saw is very handy for this, but a table saw or coping saw will do the trick.

Specific details of construction are omitted here in the belief that if you are capable of handling the necessary tools, the steps required should be obvious. The keying contacts were salvaged from a junk-box relay. I left pieces of the relay

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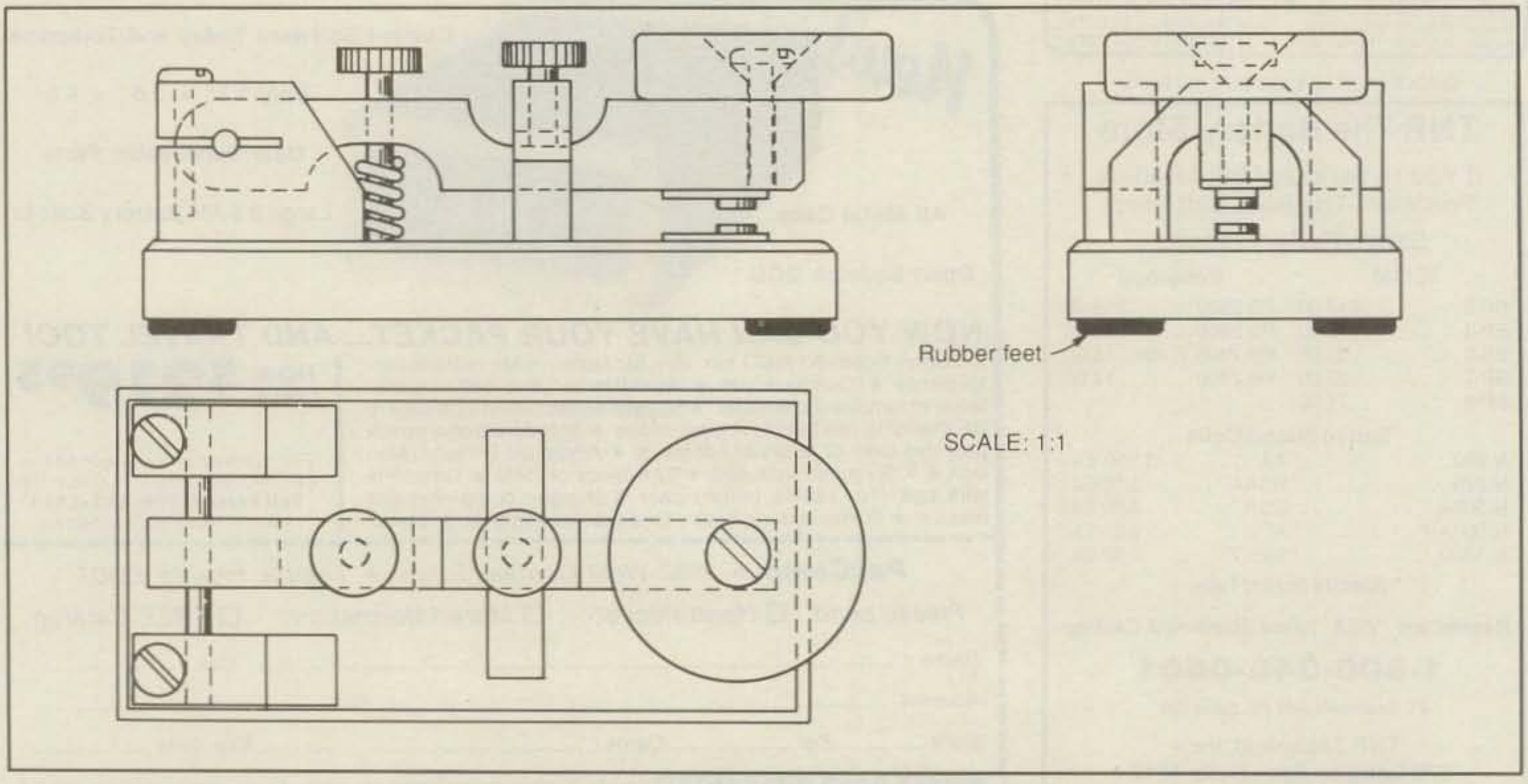
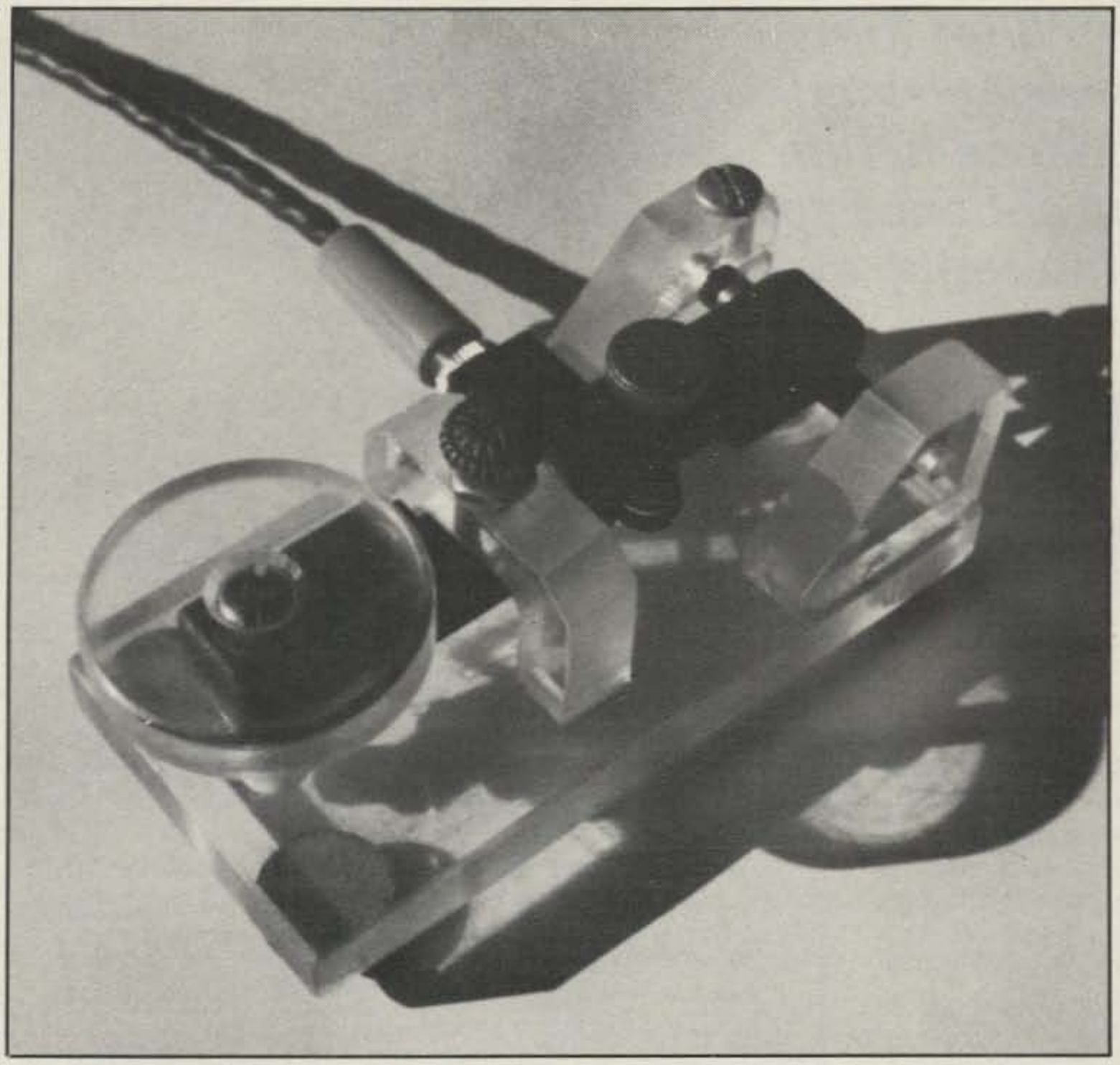


Fig. 1– The full-size drawing for the mini-key. You can size it up to suit your needs or to make templates for the project.



The finished mini-key is not only a pleasure to look at, but is also a pleasure to use.

arms attached, and drilled holes in these arms for mounting purposes, using small machine screws. My key includes an ⅛" phone jack for external connections.

The plexiglass parts were assembled using cyanoacrylate glue. Use the hobby-shop variety. There are several good brands commonly available. If your construction techniques are good, and your joints are relatively gap free, a *thin* cyanoacrylate glue will work very well. Just clamp the pieces together and put a small drop of glue on the edge of the joint. The glue will *creep* into the gap and you will have an immediate, strong joint. If your joints are uneven, use a *thick* cyanoacrylate glue, and apply it before clamping. This type of glue cures slowly (a minute or two) and will fill the voids in the joint.

The drawing omits the ⅛" I.D. tubing used to center the key arm. Cut two identical-size pieces of the larger diameter tubing, large enough to fit between either side of the key arm and the inside surface of the axel supports. These two small pieces fit over the inner axel during assembly and are used to center the key arm.

That's about all there is to the construction. The rest is up to you. Friends of mine who are CW operators and who have used the key agree with me in that despite its size, it is very comfortable and easy to use. CQ

Now that most of the satellites (birds) are scrambled, what happens to the backyard satellite dish and receiver? Here is your chance to turn "misfortune" into "good fortune," and enhance your station to the level of a "high-tech" monitoring system.

Deep-Dish Solar Pie

There's More Out There Than Meets The Eye

BY BUCK ROGERS*, K4ABT

Many of us found our way to amateur radio through twisting paths that most often included an avid interest in SWLing. Some of us still maintain that interest, probably a lot more than you think. If you take your own amateur radio activity, for example, you might compare the amount of time you spend listening versus the amount of time you spend talking. It's still SWLing, no matter what you call it. Manufacturers began to realize this years ago, and today it is a given that the amateur HF transceiver you purchase also includes a general-purpose receiver.

Although it is unlikely that you will exhaust the traditional HF possibilities for SWLing, I'm about to show you how to enhance and extend that range of possibilities. Many of you now own a Digital All-Mode (DAM) controller which you use for your packet work. A few of you are on the edge of buying one for some reason. If you look closely at the front panel, you will see the multi-mode switch or whatever that denotes what All-Mode really includes, and just what is controlled. These controllers allow us to use our home computers in conjunction with our receivers to decode many more signals than we ever before dreamed of. In fact, a new dimension of SWLing is opening up to us with the addition of these boxes.

Some of the ideas that I am about to relate to you do not require a Digital All-Mode (DAM) controller, but many of the digital modes on which we will be focusing do. Later in this article you will understand why it is a must to have one of these devices so that it can be utilized in conjunction with the home satellite receiving system.

The DAM controller works great when accompanied by a good-quality communications receiver. Here is a list of signals that can be decoded with most of the DAM controllers: packet, AMTOR, ASCII, RTTY, CW, Facsimile (FAX/WeFAX), NavTec, and slow-scan television.

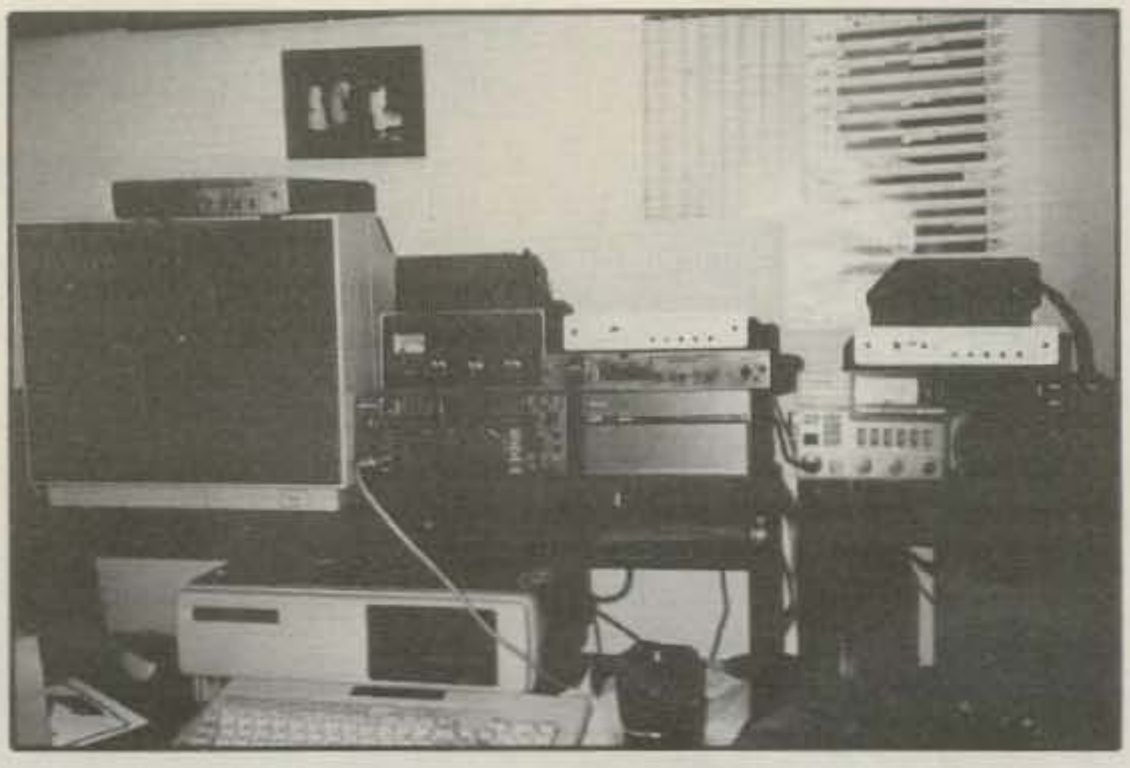
The various modes of reception will vary from one make to the other, but most of them will receive and decode the first six modes mentioned above. Here is a list of some of the Digital All Mode controllers. Underneath each I've included the names of a few of the terminal programs followed by the computers that are supported by the terminal software.

AEA PK-232 "PAKRATT" Multi-Mode Controller
AEA PAKRATT w/FAX—PC or clones
AEA COMPAKRATT w/FAX—Commodore C-64/128
AEA MACPAKRATT w/FAX—Macintosh

Kantronics All-Mode KAM
PACFILE—PC or compatible

MFJ-1278 Multi-Mode Data Controller
MFJ-1284 MFJCOM.EXE—PC or clones
MFJ-1287 MFJMAC—Macintosh
MFJ-1282—Commodore C-64/128
MFJ MULTICOM.EXE—PC or clone

*506 Pheasant Ridge Drive, Warner Robins, GA 31088



Here at K4ABT we monitor everything from DC to microwaves. Besides our busy packet schedule, we still maintain our interest in everything out there.

HF Equipment	Regular	SALE
IC-765 Xcvr/ps/keyer/auto tuner.....	3149.00	**2699**

IC-781 Xcvr/Rcvr/ps/tuner/scope	6149	**5295**

IC-751A 9-band xcvr/.1-30 MHz rcvr	1699.00	**1469**
PS-35 Internal power supply.....	219.00	**199.95**
FL-63A 250 Hz CW filter (1st IF).....	59.00	
FL-52A 500 Hz CW filter (2nd IF)....	115.00	**109.95**
FL-53A 250 Hz CW filter (2nd IF)....	115.00	**109.95**
FL-70 2.8 kHz wide SSB filter.....	59.00	
RC-10 External frequency controller	49.00	

IC-735 HF xcvr/SW rcvr/mic *(Special)*	1149.00	**969.95**
PS-55 External power supply	219.00	**199.95**
AT-150 Automatic antenna tuner	445.00	**389.95**
FL-32A 500 Hz CW filter.....	69.00	
EX-243 Electronic keyer unit.....	64.50	
UT-30 Tone encoder	18.50	
IC-725 HF xcvr/SW rcvr..... *(Special)*	949.00	**799.95**
AH-3 Automatic ant tuner .. *(Special)*	489.00	**379.95**
IC-726 10-band xcvr/6m/.5-30MHz rx	1299.00	**1129**

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IC-4KL HF 1KW out s/s amp w/ps.....	6995.00	**5995**
EX-627 HF auto. ant. selector *(Special)*	315.00	**269.95**
PS-15 20A external power supply	175.00	**159.95**
PS-30 Systems p/s w/cord, 6-pin plug	349.00	**319.95**
SP-3 External speaker	65.00	
SP-7 Small external speaker	51.99	
CR-64 High stab. ref. xtal; 751A, etc ...	79.00	
PP-1 Speaker/patch	179.00	**169.95**
SM-6 Desk microphone	47.95	
SM-8 Desk mic - two cables, scan	89.00	
AT-100 100W 8-band auto. ant. tuner...	445.00	**389.95**
AT-500 500W 9-band auto. ant. tuner ...	589.00	**519.95**
AH-2 8-band tuner w/mount & whip	758.00	**689.95**
AH-2A Ant tuner system, only .. *(Special)*	559.00	**469.95**
GC-5 World clock..... *(Special)*	91.95	**69.95**

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IC-375A 25w 220 FM/SSB... *(Closeout)*	1399.00	**799.95**
IC-475A 25w 440 FM/SSB/CW w/ps	1399.00	**1199**
IC-475H 100w 440 FM/SSB/CW *(Spec)*	1599.00	**1269**
IC-575A 25w 6/10m xcvr/ps *(Special)*	1399.00	**1099**
IC-575H 25w 100w 6/10m xcvr.....	1699.00	**1469**

VHF/UHF/1.2GHz mobiles	Regular	SALE
IC-28A 25w 2m FM, **TTP** mic *(Closeout)*	469.00	**379.95**
IC-28H 45w 2m FM, **TTP** mic *(Closeout)*	499.00	**389.95**
HM-14 Extra TTP microphone.....	59.00	
UT-28 Digital code squelch.....	39.50	
UT-29 Tone squelch decoder.....	39.50	
HM-16 Speaker/microphone.....	34.00	

IC-228A 25w 2m FM/TTP mic *(Special)*	509.00	**379.95**
IC-228H 45w 2m FM/TTP scan *(Special)*	539.00	**419.95**
IC-448A 25w 440 FM/TTP mic	599.00	**519.95**
UT-40 Pocket beep function.....	45.00	
IC-900A Transceiver controller	639.00	**449.95**

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UX-29A 2m, 25w band unit	299.00	**269.95**
UX-29H 2m, 45w band unit	349.00	**319.95**
UX-39A 220MHZ, 25w unit *(Special)*	349.00	**279.95**
UX-59A 6m, 10w band unit	349.00	**319.95**
UX-129A 1.2GHz 10w band unit.....	549.00	**499.95**
IC-901 2m/440MHz xcvr ..... *(Special)*	1199.00	**929.95**
IC-1200A 10w, 1.2GHz FM... *(Closeout)*	699.00	**589.95**
IC-2500A 35w, 440/1.2GHz FM mobile	999.00	**869.95**
IC-3210A 25w, 2m/440 FM .. *(Closeout)*	739.00	**499.95**
IC-2400A 2m/440 FM/TTP ... *(Special)*	899.00	**699.95**
AH-32 2m/440 Dual Band mobile ant	39.00	
AHB-32 Trunk-lip mount.....	35.00	
Larsen PO-K Roof mount	23.00	
Larsen PO-TLM Trunk-lip mount.....	24.70	
Larsen PO-MM Magnetic mount	28.75	
RP-1510 2m 25w repeater	1849.00	**1649**
RP-4020 440MHz 25w repeater	2299.00	**1999**

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IC-2SA 2m .. *(Special)*	419.00	**299.95**
IC-2SAT 2m HT/TTP	439.00	**389.95**
IC-3SAT 220 HT/TTP	449.00	**399.95**
IC-4SAT 440 HT/TTP	449.00	**399.95**
IC-2GAT 2m HT/TTP	429.00	**379.95**
IC-4GAT 440MHz, TTP	449.00	**389.95**
Special . .		
IC-32AT 2m/440 HT	629.00	**539.95**
IC-24AT 2m/440 HT	629.00	**549.95**
IC-12AT 1.2GHz FM HT/TTP... *(Closeout)*	473.00	**349.95**
IC-12GAT 1w 1.2GHz HT/batt/cgr/TTP	529.00	**469.95**

Aircraft band handhelds	Regular	SALE
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A-20 Synth. aircraft HT w/VOR.....	625.00	**549.95**

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Receivers	Regular	SALE
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RC-11 Infrared remote controller....	70.99	
FL-32A 500 Hz CW filter	69.00	
FL-63A 250 Hz CW filter (1st IF)	59.00	
FL-44A SSB filter (2nd IF).....	178.00	**159.95**
EX-257 FM unit.....	49.00	
EX-310 Voice synthesizer	59.00	
CR-64 High stability oscillator xtal	79.00	
SP-3 External speaker.....	65.00	
CK-70 (EX-299) 12V DC option.....	12.99	
MB-12 Mobile mount	25.99	

R-7000 25MHz-2GHz receiver.....	1199.00	**1029**
RC-12 Infrared remote controller....	70.99	
EX-310 Voice synthesizer	59.00	
TV-R7000 ATV unit.....	139.00	**129.95**
AH-7000 Radiating antenna	99.00	

R-9000 100KHz-2GHz all-mode rcvr ... 5459.00 **4699**

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5456 N. Milwaukee Avenue
Phone (312) 631-5181
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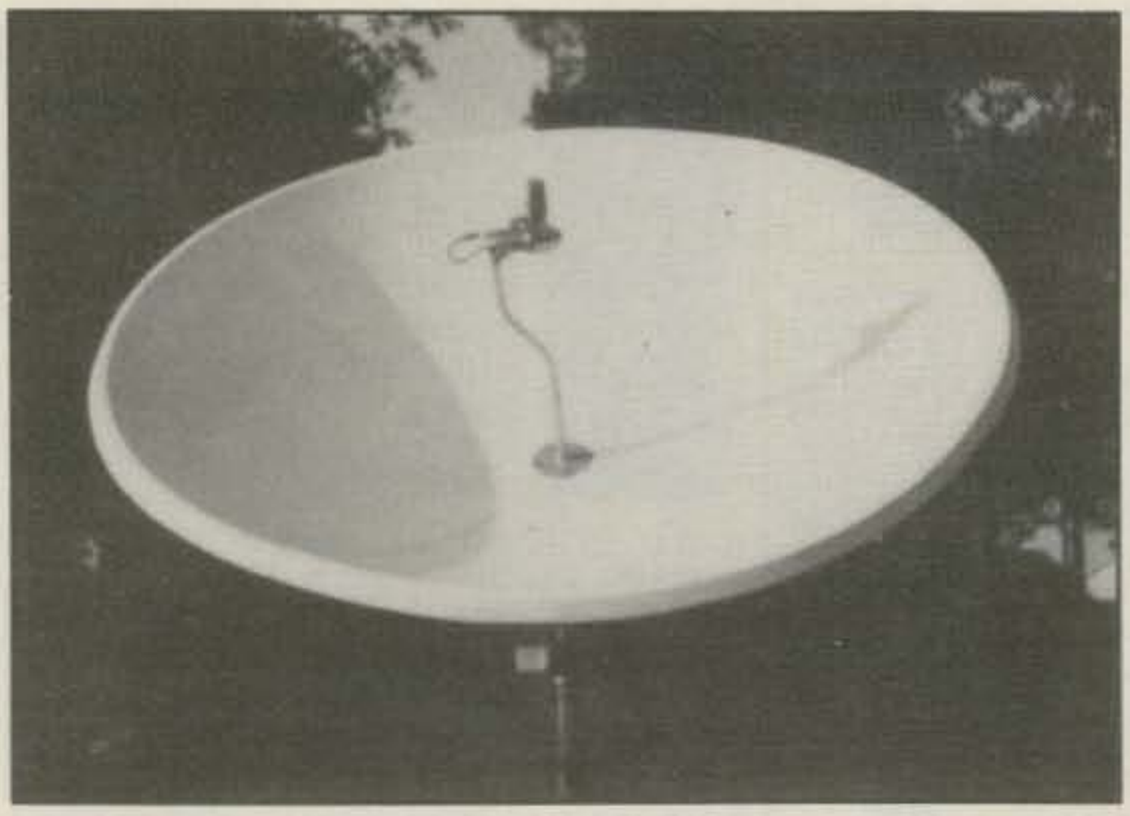
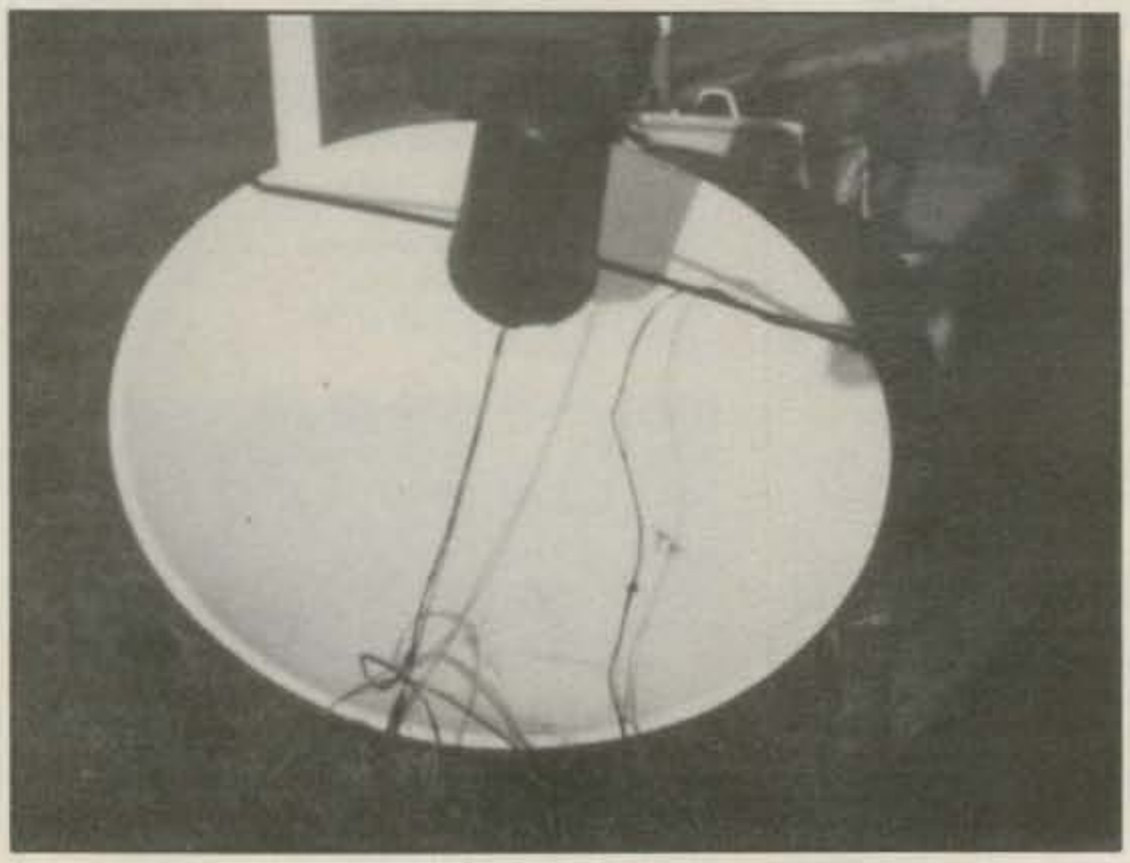




Whatever the size or shape may be, they can all unlock a whole new world of signals for you to listen to and "look" into. Prices on these antennas have come down in recent times, and they do show up along with satellite receivers at very reasonable rates at hamfest fleamarkets.

Satellite	Transponder	Frequency	Service
TELSTAR 303	3	5478 kHz	FAX
TELSTAR 303	4	3250 kHz	RTTY
TELSTAR 301	16	4640 kHz	RTTY
WESTAR 2	7	9070 kHz	ASCII
SATCOM 2R	17	338 kHz	FAX
SATCOM 2R	23	638 kHz	FAX
GALAXY 2	17	1959 kHz	WeFax

Table I- Basic satellite frequency information.

It is easy to interface these Digital All-Mode (DAM) controllers to your PC, compatible, or other home computer. The reason I mention the PC or clone is because later in this article we will address the compatible in relation to the kind of terminal software that exists for implementing some of the specialized modes within these controllers.

With all the scrambling of signals from the Television Receive Only (TVRO) satellites and the increasing trend toward VCR movie rentals, there are more and more home TVRO satellite systems beginning to sit idle. Weather Fax and news service bulletins are now being beamed across oceans and continents via the commercial satellites. The HF shortwave bands are being used for other services, too.

At this point you may wonder if I'm saying that the HF bands are being abandoned. Well, the answer is no. In fact, the HF bands are crowded with signals as it is. Some of the data, fax, and news services sometimes overlap one another. The sad truth is that much of the HF spectrum is being plundered by "poachers" of another kind.

As most of us are aware, more and more "pirate" stations are emerging on these precious frequencies, not to mention the licensing of foreign stations on frequencies that are already in use in another country.

I am not just an amateur radio operator. I am also a full-blooded, registered, and certified SWLer. I monitor everything from DC to microwaves. At my station there are two TVRO satellite systems. One system (a 6 foot dish) is used to monitor the "near" orbit satellite signals, and the other 12 foot dish is used to "look" at the geo-stationary "birds." This blend of "lookers" merges the system into a very usable and versatile combination when used in the manner I'm about to discuss.

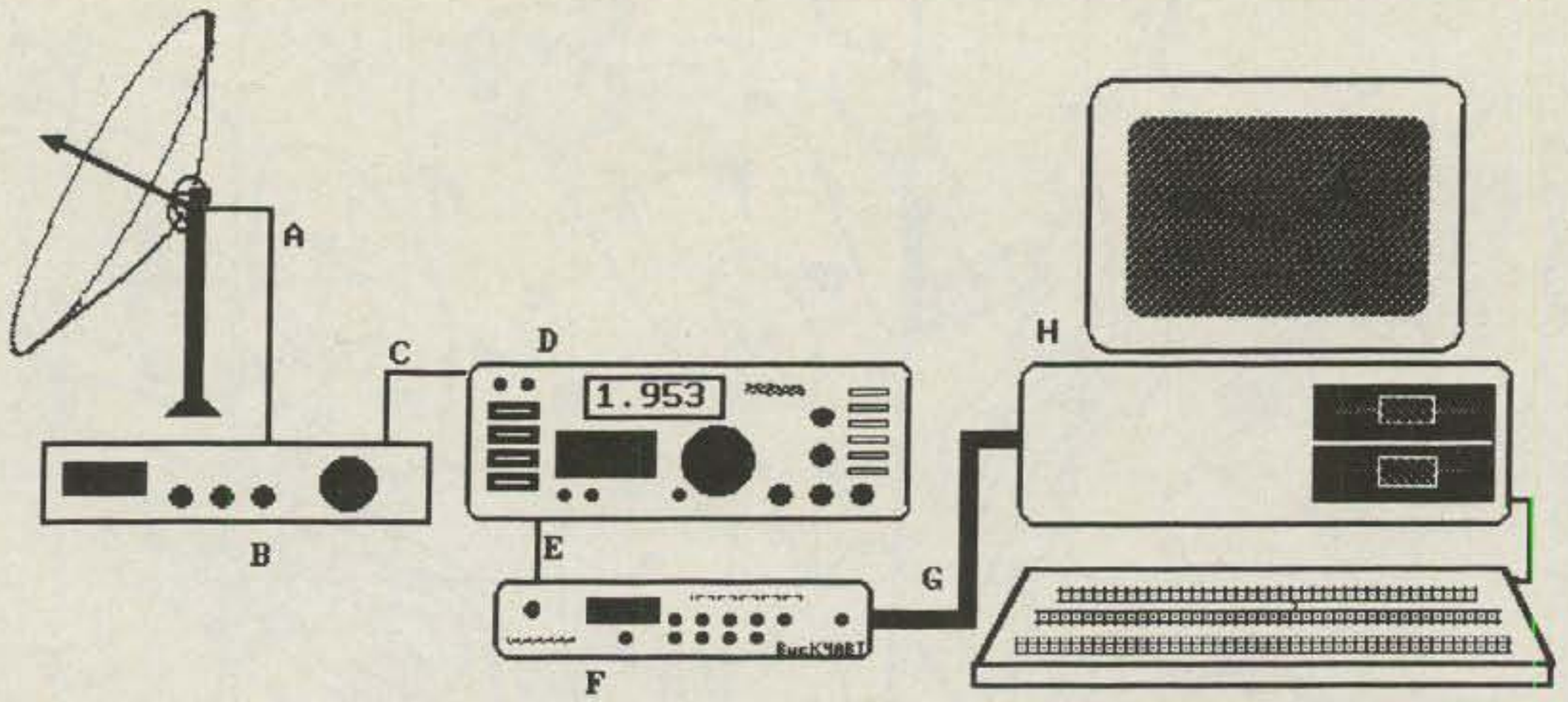
A Different Way To Listen (And Look)

Scrambling has sent some of us back to the major networks as it was before all the scrambling started. Cable has also become more affordable to us since they started competing with the movie rental houses. Just look at the cable nowadays. Everything we used to see on the bird is now on the cable, and we don't have to switch and turn all the gadgets from bird to bird and transponder to transponder. We can now see them all—HBO, Showtime, Cinemax, Movie-Channel, ESPN, A&E, CNN, INN, ABC, CBS, FOX, NBC, TBS, TNT, and much more—and all from the comfort of the easy chair through the use of the TV remote control.

Having said that mouthful, then what do we do with these now-dormant "bird-watchers" sitting idle in the backyard?

Let's turn that misfortune into an SWL "good fortune." Because of the very nature of the beasts that we SWLers are in the world of electronic eavesdropping, we can quickly come up with a reason to leave the super-bird-bath intact where it is, and at the same time make our SWLing "high-tech."

First we need to feed "baseband output" to a coaxial switch so we can switch the antenna input of our communications receiver from the outside antennas to the baseband output of our satellite receiver. We have just made the communications re-



A = 70 mHz from down-converter
B = Satellite receiver
C = Baseband out to Comm receiver
D = Communications receiver
E = Audio output to All-Mode controller
F = Digital All-Mode controller
G = RS-232 cable from controller to computer
H = PC or other computer with FAX capabilities (see text)

Fig. 1 - Block/flow diagram of K4ABT's satellite baseband monitoring system.

ceiver into a "tunable" subcarrier receiver, and the modes of subcarriers to be received are limited only by the number of receiving modes of which our communications receiver is capable.

Some satellite receivers do not provide a baseband output. If this turns out to be the case with the relic you wish to use, try to connect the raw video output to the communications receiver. You may have to search around for one of the inexpensive satellite receivers that will allow baseband connections. Many of the earlier Drake receivers such as the 324 had baseband outputs on the rear panel that serve this purpose well. Another one was the early Satec 5000 series.

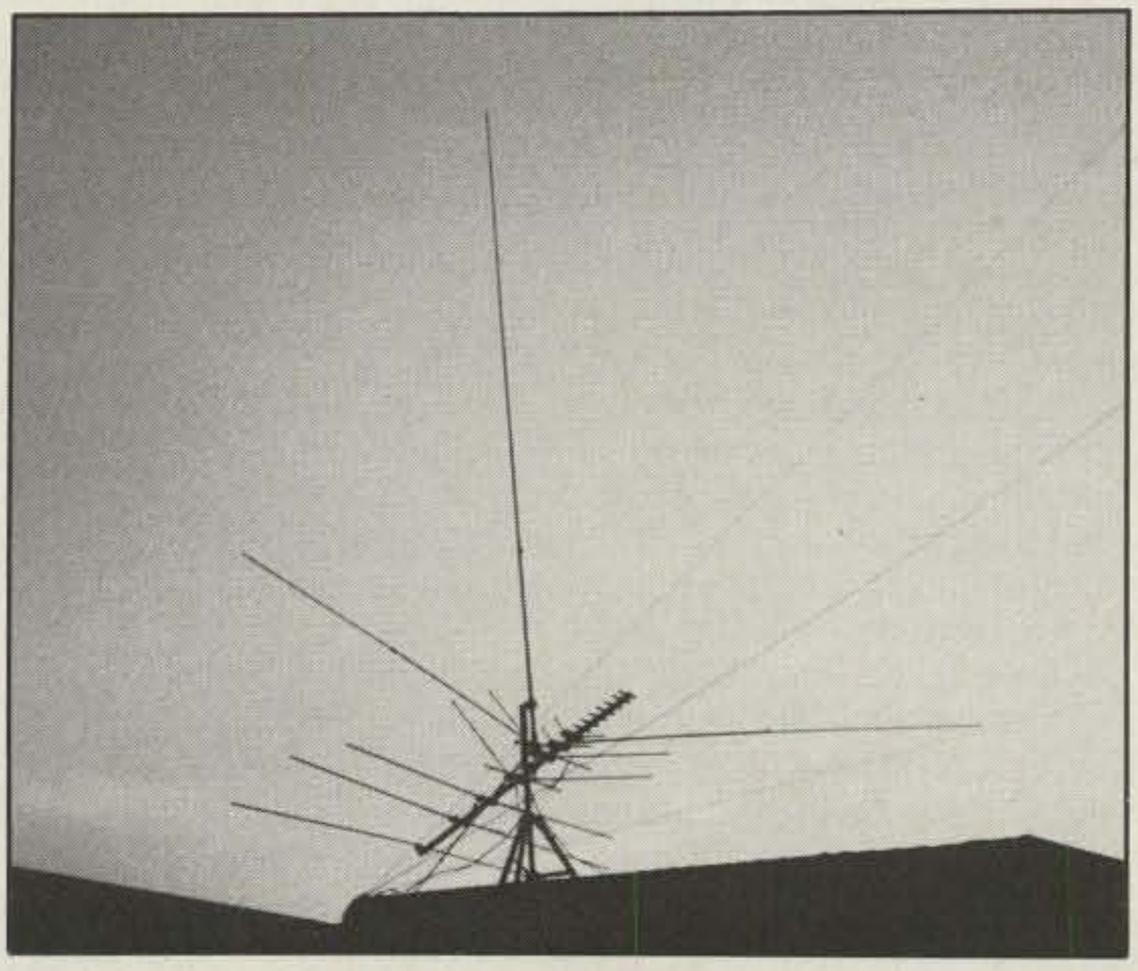
Check the fleamarkets and the "boneyards" at hamfests. I was able to find a mint condition Drake 324 receiver at a hamfest recently for $30.

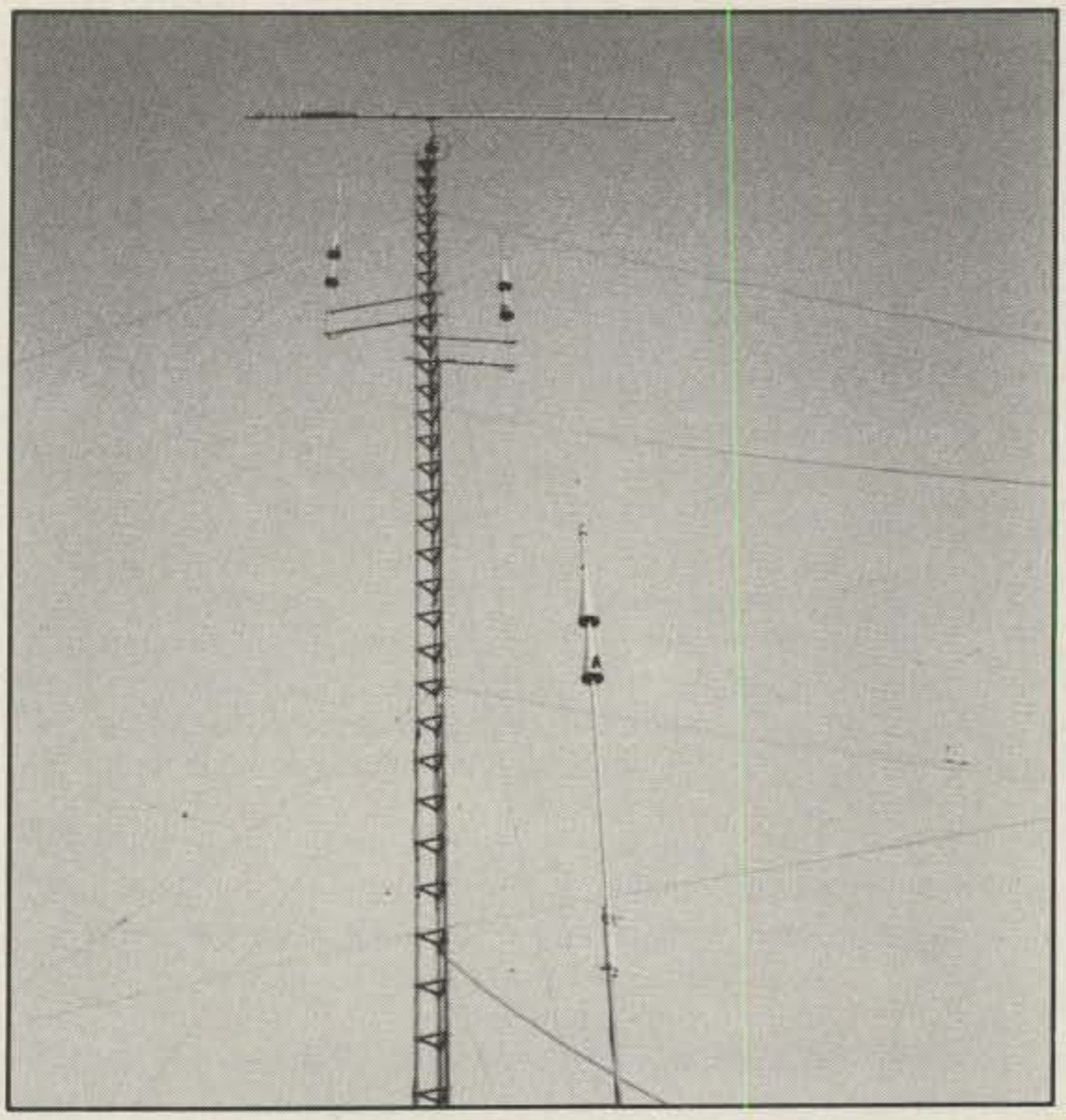
Next we couple this dynamic-duo to the Digital All-Mode (DAM) controller and interface it to the PC or clone. To add pleasure to the WeFax receiving, you will find the copy is virtually noise free.

You can find just about anything up there among the stars that you find on terra-firma with regard to monitoring the airwaves. The difference is in the quality of the signal component. Most of the signals are noise free, and moreover they are very stable. No QSB, fading, or varying in signal strength.

I use Telstar 301, Westar 5, and Comstar D4. There are many transponders (24 on each bird) and literally thousands of frequencies on each transponder. While listening around with the receiver connected to the baseband output of another Satec 5000 (picked it up for $25 at a local hamfest), I noticed several RTTY and ASCII/Baudot signals. The signal that caught my attention was the easily identified facsimile picture signal. I boot-

Somehow the antenna farm keeps on growing each year to improve what we have and to try to add something new.





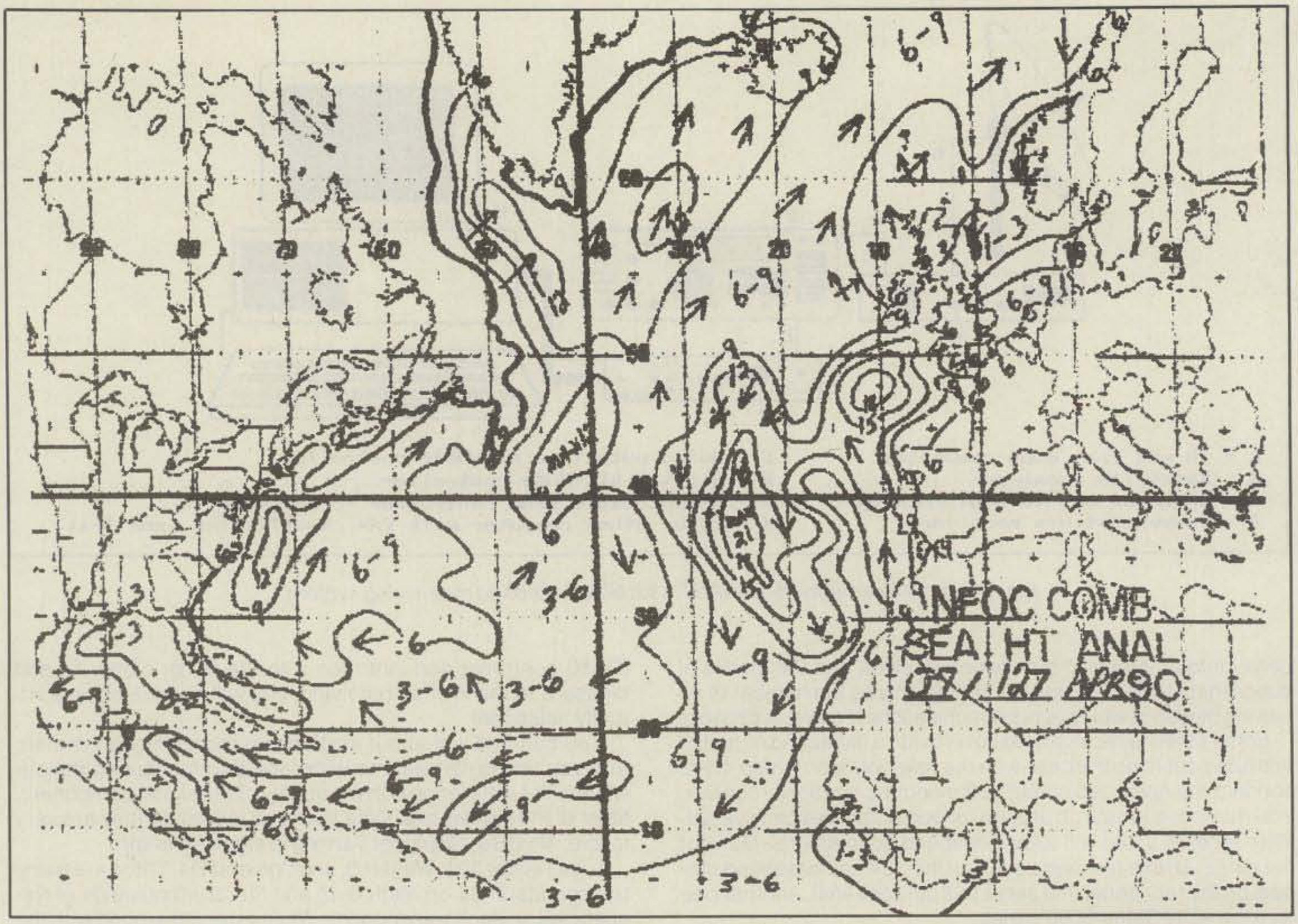


Fig. 2– A typical WeFax picture.

ed (run and execute) the terminal program, turned on the all-mode controller, and made sure that audio from the receiver was connected to the audio input of the all-mode digital controller. I set the parameters of the controller to those required for receiving facsimile on the controller, and finally I touched up the tuning.

The picture began to paint onto the screen. And to make the episode even more pleasing, I immediately noticed that the picture was different from the WeFax pictures of the HF bands. It didn't take long for me to realize the difference between these pictures and the ones I had received on HF.

This screen was so perfect in appearance that it seemed to have been cut out of a picture book and pasted onto the monitor —no fade streaks, no dropout, and smooth, clear geographic boundaries.

I began to search for more of the familiar facsimile sounds. It seems that many of us are developing insatiable appetites for all kinds of pictures that we can capture and print, whether they are WeFax pictures or digital image files. Some of the pictures I'm gathering are wire-service photos that you may appear in tomorrow's newspapers. In most all cases the pictures that are received from the satellites are in one of several facsimile formats which are easily covered by the DAM controller's facsimile parameters.

With many of the terminal programs that support data and facsimile receiving the fax file can be saved to disk for later viewing or printing to hard copy. Normally, supplied with the software is a utility program that can be used to view the pictures on screen, or print them to printer.

I monitor the baseband frequencies of Comstar D4, Satcom 4, and Satcom 2R more than the others, but this is not to say there are no fax stations on the other birds. There is so much up there on the birds to see in the form of data and fax that I'm content to use the few transponders with which I am familiar. The number of frequencies are so vast that I don't have room to list all of them, so I have listed a few to get you started. The rest you will soon discover for yourself (see Table I).

I can't promise they will be there when you tune to a specific frequency I have listed. However, if you tune around this area, you should be able to quickly find some of the signals we have discussed. The trend seemd to be for the data transmissions of this type to change frequency every month or so.

Fig. 1 will give you some indication as to how I have arranged my satellite baseband monitoring system. This block/flow diagram will describe the connections to the satellite receiver.

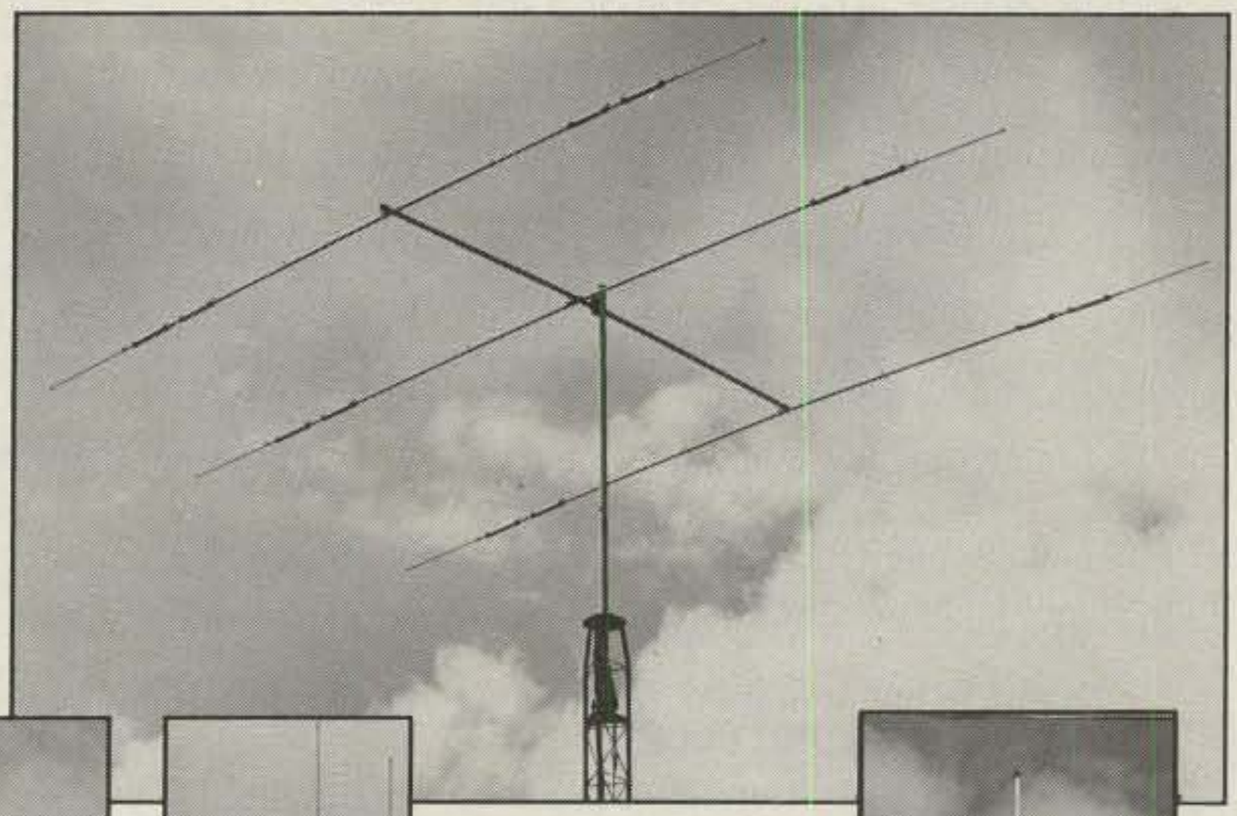
Note: Many 70 MHz baseband satellite receivers have the baseband, unclamped video output on them. I only mention the Drake 324 and the Satec 5000 because I use them for this application and I am familiar with the outputs on these receivers.

Another rewarding feature of this application of TVRO and communications receivers is the many other kinds of data transmissions being sent to ground stations all over the world. I have experimented with the many shifts and speeds of RTTY in my all-mode controller. I am able to copy data and news service messages, including ASCII, to 300 baudot. I have even discovered some interesting 1200 baud packet signals coming from above. One tiny problem, though. You must set the "PASSALL" or "MNONAX25" commands to "ON" because of a slight difference in the commercial and amateur X.25 protocols.

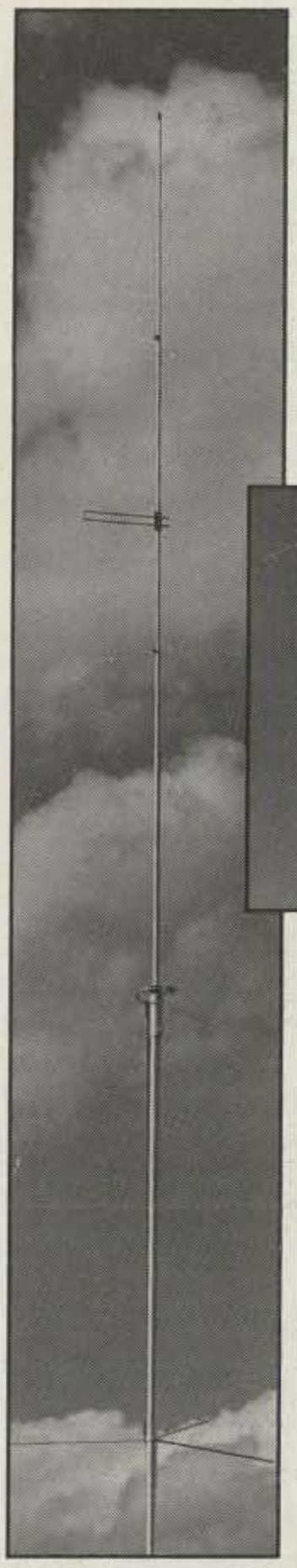
There are many interesting communications out there among the stars. Just don't forget to "return to earth" and listen to the other great fun on the HF, VHF, and UHF bands. CQ

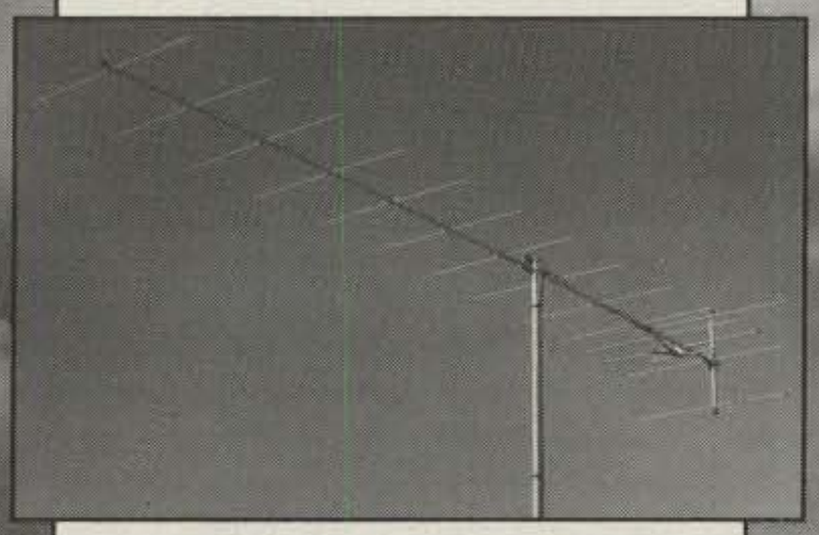
Tuned To The New World Of Amateur Radio

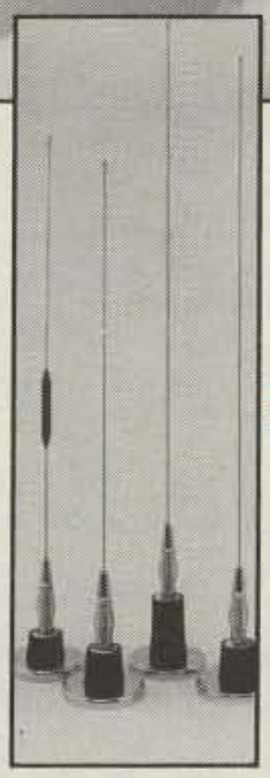
From Novice to Extra Class Cushcraft has the antenna you need.



Cushcraft offers high performance antennas to make every phase of your ham radio activity more satisfying. We have been creating innovative and exciting new products for more than 35 years. Call or write for a free copy of our full line antenna and accessory catalog or see your local dealer.







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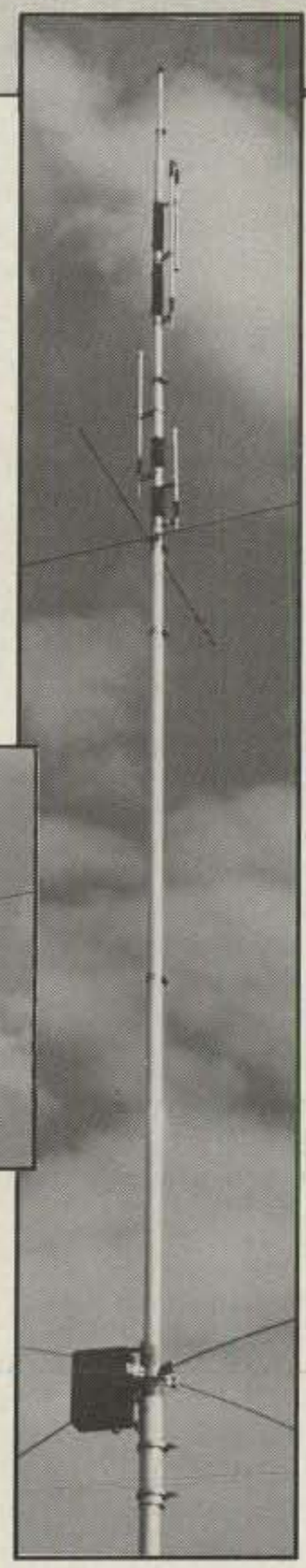
NEW **CUSHCRAFT/SIGNALS.** magnetic mount mobile for 10 meters. An ideal companion to the new 10 meter multi mode rigs. Model CS28M.

AP8 VERTICAL. Covering 10,12, 15, 17, 20, 30, 40, 80 Meters. Great choice for Novice to Extra class.



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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.

FAST ACTION GAS TUBE LIGHTNING ARRESTERS. Protect your valuable radio equipment. High and low power models with SO-239 or N connectors.

NEW ***10, 18, 24 MHz ROTATABLE DIPOLE.*** Mounts easily on the same mast as your tribander or other antennas. Bi-directional pattern gives excellent performance. Model D3W.

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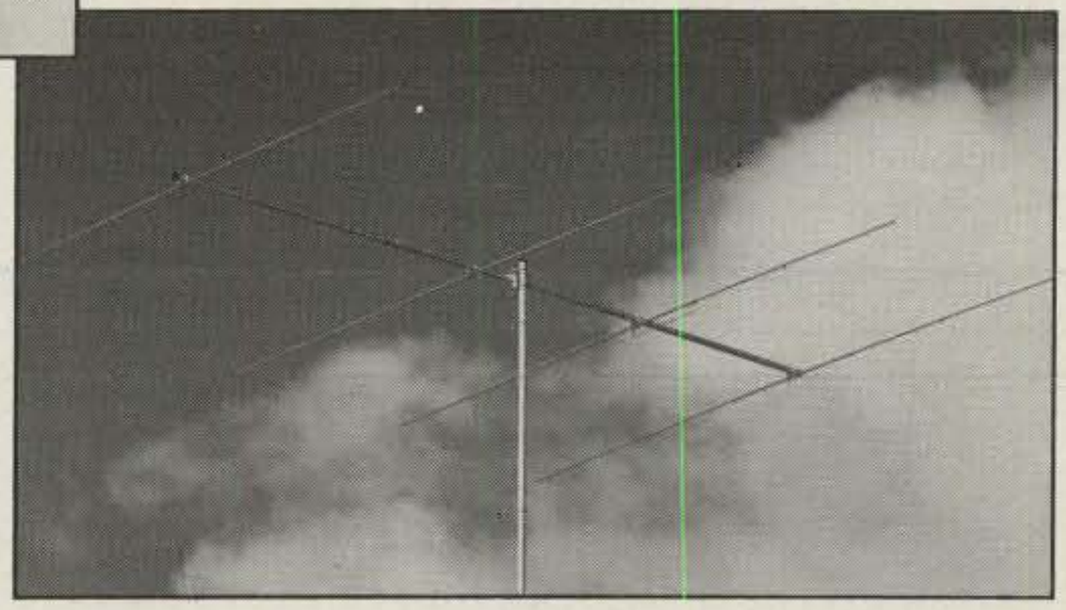
NEW ***R5 HALFWAVE 10, 12, 15, 17, 20 METER VERTICAL.*** Amazing DX performance in a small space without ground radials. Includes a solid state broadband impedance matching network. Model R5.

SKYWALKER MONOBAND. 10, 12, 15 and 20 meter Yagis for more contacts, less waiting and a better signal. Preferred by contesters and DX-Peditions.



cushcraft CORPORATION

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CIRCLE 50 ON READER SERVICE CARD

Ameritron gives you a full Kilowatt from a *quiet desktop* linear . . . for $995

Ameritron gives you a full kilowatt *output* of peak envelope power for only $995 -- from a whisper quiet linear that's perfect for your operating desk because it measures just 8¼" H x 14" D x 14¼" W.

You could spend over *twice* the money for a legal power limit amplifier *twice* the size -- and all you'll get is an additional 1/3 S-unit -- a difference you won't ever notice.

You also get 850 watts output on CW and even 500 watts on RTTY.

All Band Coverage

You get all band coverage: rated output on 160, 80, 40, 20 and 15 meters (10 meters with user mod/export) as well as 80% rated output on MARS and WARC bands.

Tuned Input lets solid state rigs deliver full output

The Ameritron AL-80A uses a direct switched, 100% shielded pi-network tuned input circuit that provides an excellent load for any rig. Even the fussiest solid state transmitter works flawlessly with the AL-80A.

Pi-L Output Tank

A carefully designed Pi-L output tank using the optimum Q for each band gives you exceptionally smooth tuning, extremely wide range load impedance matching and full band coverage -- even on 160 and 80 meters -- *plus* you get an extra 10 to 15 dB of harmonic suppression.

You also get peak performance at different power levels from one end of the band to the other.

Ball bearing vernier reductions drives on both the plate and load control makes tuning precise and easy.

3-500Z Tube in shielded RF compartment gives you nearly 70% efficiency

You get the rugged time proven 3-500Z tube with an estimated life of 20,000 hours ICAS. That's nearly 20 years operating 20 hours a week -- you may never have to replace your tube.

The AL-80A is built on a rugged steel chassis. It has a separate RF compartment that's fully shielded to keep unwanted RF from leaking out. This keeps RFI and TVI to an absolute minimum.

A superb RF design and layout, a Hi-Q tank circuit and commercially rated RF power components give you nearly 70% plate efficiency over the entire operating range. This puts maximum power into your antenna instead of heating up your amplifier.

A whisper quiet internal computer style fan draws in cool air over the power supply components and blows it around the 3-500Z tube. This removes excessive heat and gives you reliable performance.

Built-in adjustable ALC circuit keeps your exciter from overdriving your AL-80A. The result? A clean signal without flat-topping.

A standby switch prevents harmful thermal shock to your 3-500Z filaments by keeping them lighted when you're operating barefoot.

Gutsy Heavy Duty Power Supply

The guts of the AL-80A is its ***heavy*** duty power supply.

A husky 22 pound power transformer using a high silicone steel core, computer grade filter capacitors totaling 26 ufd, heavy duty bleeders and ten 3 amp, 1000 V power rectifiers give a stiff 2700 volts fully loaded.

Some competing high priced amplifiers using ***two*** 3-500Zs *can't* give you much more power output than the AL-80A. Why? Because their lightweight power supplies can't deliver enough high voltage for the tubes.

Step-Start Inrush Protection™

When you first turn on your amplifier, a massive inrush current flows.

Your house lights flicker as you hear a loud "thump" from your amplifier. This terrible inrush current stresses *all* your power supply components to their limits. Your cold tube filament suffers abusive thermal shock.

Eventually, this massive inrush current will damage your amplifier.

The AL-80A special ***Step-Start Inrush Protection™*** *stops* damaging inrush current.

By starting your AL-80A through a 10 ohm current limiting resistor, then shorting the resistor with a relay, the AL-80A gives you a start up sequence that is ***easy*** on your tube and power supply components.

Don't consider a linear amplifier without this

Multi-Voltage Primary protects your amplifier and gives you peak performance

Too high a line voltage stresses components and causes them to wear out and fail. Too low line voltage causes a "soft-tube" effect -- low output and signal distortion.

The Multi-Voltage Primary in the AL-80A transformer lets you compensate for too high or too low line voltage.

With the AL-80A you get the longest component life and peak operating efficiency -- regardless of your line voltage.

Before you buy an amplifier make sure it has a multi-voltage primary.

Dual Illuminated Meters

Two large meters give you a complete picture of the operating condition of your AL-80A. They let you know right away if there is a problem.

Grid current of the 3-500Z is monitored continuously by one meter. Grid Current indicates proper amplifier operation better than any other parameter.

You also get a multi-meter that measures plate voltage, plate current, ***peak*** RF watts output and drive power/ALC detector voltage.

Comes completely factory built, tested and guaranteed to work . . .
. . . *not a kit you have to build*

You get a full kilowatt right out of the box -- ready to plug in and bust through QRM in minutes.

A kit could actually end up costing you more than your best price on the AL-80A -- and leave you frustrated if you can't get it to work.

A factory built AL-80A has much higher resale and trade-in value than a kit. Why? Because Ameritron's reputation for consistent quality and workmanship is known by hams everywhere.

Two Year Warranty: Twice the protection of our nearest competitor

No other kilowatt amplifier on the market comes with a 2 year warranty. In the unlikely event that there are defects in materials or workmanship, we'll fix it free for 2 years from the date of purchase.

The 3-500Z is covered by the tube manufacturer's warranty.

Committment to Service

Even after the 2 year warranty period, Ameritron Customer Service Technicians are available to help you keep your AL-80A performing flawlessly -- no matter how long you have it. Just call 419-531-3024.

Call your dealer today

Bust through QRM with a full kilowatt from the Ameritron AL-80A -- right out of the box. Call your favorite dealer for your *best* price and order today!

Lightning Fast QSK Switch

The optional Ameritron PIN-5 QSK switch gives you lightning fast T/R switching for full CW break-in, AMTOR, Packet and other QSK modes for only $189.50.

It lets you switch the legal limit in microseconds into 2:1 VSWR loads with less than 0.5 dB receive attenuation.

Factory installation is available.

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CIRCLE 12 ON READER SERVICE CARD

With warm weather upon us, thoughts of mobile operation also pop up from time to time. Here's a neat little idea that can make that thought a reality in short order.

An Easy-To-Make Power Source For Mobile Operation

BY PAUL M. DANZER*, N1II

There it stands—a brand new car. Heavy-duty alternator and plenty of power for a new rig. Now let's see . . . according to the shop manual all we have to do is tap into the wire which comes from fuse number 1, and we can fire up the rig from the 12 volt source, nicely fused and controlled by the ignition switch.

Yes, all we have to do is tap into the wire, which of course seems to be located in the center of a 3 inch diameter cable tightly bundled together. Not to worry. We can tap into a spare fuse socket in the fuse block. What? No spare fuse socket?

Sound familiar? Well, with a new car the electrical system is virtually molded in place, and all of the old tricks to find a place to tap into the switched 12 volts seem to be destined to failure. The only sure place you can see and feel is the front of the fuse block, and there only to replace a fuse.

The device shown in the figure was the solution I used in my new car. Fuse F-1 was selected from Radio Shack assortment #270-1201. The one I used started out life as a perfectly good 2 amp fuse until I purposely blew it! A small motor cutting tool (Dremmel or Sears) or a hot soldering iron is used to cut away the plastic on the two top corners, and a few inches of wire are soldered to the corners. A dab or two from a hot glue gun reseals and insulates the corners.

Next an in-line fuse holder, such as Radio Shack #270-1213, is connected to the two leads. Solder and tape one of the connections and connect a 12 inch piece of #16 or #18 wire to the other junction before taping.

Generally speaking, the fuses in the fuse block are connected in groups, one group switched and the second group not switched by the ignition switch. I prefer the switched lines, since if I forget to shut off the rig when I park, power will be removed automatically as soon as the ignition key is turned off.

To use the power connector of fig. 1 all you have to do is remove one fuse, insert the blown fuse in its place, and place the original fuse in the in-line fuse holder. Notice that you can tap into the 12 volt line either before or after the original fuse, depending on which way you insert the blown fuse.

If you choose not to use the automotive fuse in series with the rig, make sure you supply your own series fuse. You will, of course, have to supply your own ground path.

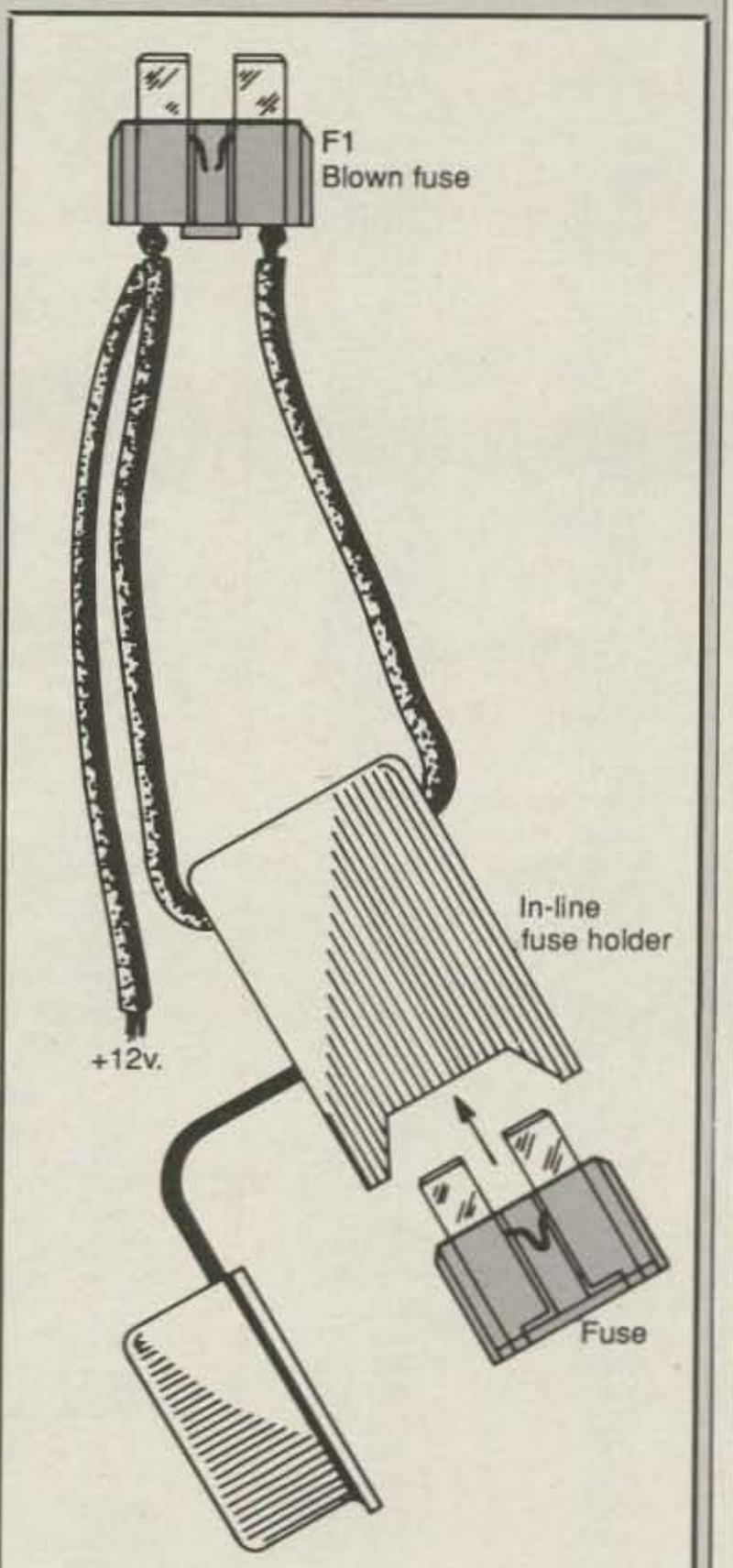


Fig. 1– This is all there is to it. A few parts from Radio Shack, a little bit of time, and you have instant 12 VDC (switched or unswitched) for your mobile installation.

*2 Dawn Rd., Norwalk, CT 06851

1989 CQ WW DX SSB High-Claimed Scores

The following are SSB high-claimed scores. These are raw scores only, subject to verification.

UNITED STATES
Single Operator
All Band

K3TUP	4,948,450
N6BV/1	4,619,916
K3OO	4,540,515
K3ZO	4,163,018
K1DG	4,153,380
K5ZD/3	4,147,902
N2LT	4,014,080
W3BGN	3,971,200
K1RU	3,954,090
K2DM	3,437,252
N4WW	3,354,639
N5RZ	3,218,804
W9RE	3,215,696
K4VX/Ø	3,115,200
K4ISV	3,114,700
N2IC/Ø	3,061,852
NA8V	2,837,423
N2BA	2,535,636
K7RI	2,302,005
KØRF	2,278,647
WM5G	2,244,325
WZ4F	2,191,140
WB3KXX/8	2,097,625
NN7L	1,955,764
ND3A	1,953,150
W1WEF	1,914,750
K8MR	1,887,918
K3WUW	1,815,981
N6AW	1,787,544
W1GD	1,768,452
K6HNZ	1,716,982
N3BJ	1,578,552
W1GIH	1,566,226
K3ZA	1,561,144
NI5M	1,483,700
W8TWA	1,428,742
K6NA	1,400,223
N7TT	1,398,495
W3GG	1,382,270
K2PS	1,316,252
KW5P	1,302,189
NI3P	1,299,338
K1CLN	1,289,972
K5XI	1,228,854
K2PH	1,145,538
W3VT/4	1,133,480
WR4K	1,126,428
NX9T/4	1,078,428
AA4UJ	1,058,229
N1GL/4	1,029,182

28 MHz

K5GA	983,433
KT4W	869,424
KS1L	825,727
K3ZJ/8	806,140
WØAIH/9	793,507
KM2P	733,040
KD2RD	689,653
NU4Y	649,440
N4ZZ	639,414
N4KG	633,880
KD6WW	616,791
KJ3L	562,848
W5VX	517,275
NA2G	461,390
K6SVL	453,750
K7IDX	444,467
KØEJ/4	427,728
W2HG	416,465
WØJLC	366,744
K4YYL	365,134
WA4SWY	362,100
N1TZ	323,070
NW7Q	318,096
KA2AEV	317,282
KJ6GQ	316,030
K9MDO	313,678
K5NW	311,688
K1EFI	310,880
WX6M	308,066
KEØOL	302,771
W1BWS	298,656
WA9CDY	290,070
KZ2I	265,221
K2MFY	251,304
K7HBN	247,142
KK9G	240,660
N8FEH	218,822
NX1P	211,211
KS1J	200,294

21 MHz

WB7RFA	727,518
NG2X	697,463
W6QHS	622,909
K7LR	600,300
K7LXC	514,514
N4CC/9	322,410
N4VZ	314,127
N8JEC	299,094
W6BSY	276,216
W7TJ	274,720
NA4M/5	272,553
WB1DXD	261,144
WB5UDX	244,530
KØLUZ/4	239,370
WG8M	239,294
KDØZR	235,366
WØAIH	202,440
K7LZJ	179,426
WC7S	164,116
WA4JJW	161,386

14 MHz

W1RR	706,986
K2HFX	604,945
NQ2D	535,068
KV4P	313,920
N9RD	283,500
WA2NHA	275,301
N8RA/1	266,850
N1ENN	229,252
KM7E	225,060
N4MO	221,776
W5FO	195,293
WØAIH	168,192
K9CLO	154,290
K2MGA	139,997

7 MHz

WQ2M	83,316
N6BFM/4	71,688
W2SC	69,930
KVØQ	61,635
AD8C	44,778
N6RJ	34,560
N4HOH	30,616
WD4KXB	26,424
KB4WQO	25,434

3.8 MHz

K4HJJ	32,882
W6RJ	30,848
W5EU	16,660
WØCD/8	16,043

1.8 MHz

K5UR	5,040
W2FCR	2,975
AA4MM	2,080

QRP

KD2TT	371,968
WØMHK/1	311,576
WØUO	297,591
N4IJ	244,651
W5VGX	117,990
AK5E	102,339

Single Operator
Unlimited All Band

K1ZM	4,051,728
WØZV	3,521,032
K3WW	3,066,792
AK1A	2,747,292
W2GD	2,549,488
KE3Q	2,335,325
AG1C	2,028,600

28 MHz

W9XT	603,598

Multi-Operator
Single Transmitter

KS9K	6,040,632
N4RJ	5,754,606
K1YR	5,743,854
K1NG	5,651,265
N3RS	5,474,560
KA1GG	5,091,177
WB8K	4,055,142
K1TO	3,917,100
W3XU	3,852,279
KU2C	3,608,478
W2HPF	3,473,055
K8AZ	3,436,629
K1IU	3,309,306
N8CXX	3,291,777
AA4NC	3,288,600
N6RO	2,856,546
W8FN	2,842,920
W2RR	2,810,291
NK7U	2,642,256
W6TMD	2,193,655
KØCS	2,192,070
KC5DX	2,180,844
WI9L	2,133,330
N2SS	2,053,083

Multi-Operator
Multi-Transmitter

W3LPL	15,026,970
N2RM	11,681,488
NB1H	11,623,745
N5AU	11,029,846
K5NA/2	9,255,843
KY1H	9,076,782
KO7N	7,373,912
K8CC	6,559,245
N6ND	5,966,397
NE3F	5,119,440
NQ4I	4,584,668
N6DX	4,159,148
NE9O	3,763,100
W3GM	3,152,358
WØKEA	3,053,086

WORLD
Single Operator
All Band

EA8RCT	9,668,988
ZB2X	6,914,560
YJØR	6,256,782
VP5T	6,134,480
VP2EXX	5,574,680
PI4DEC	5,567,302
KNØE/KH3	5,217,373
VE2ZP	5,111,140
WR6R/KH6	4,862,151
VO1MP	4,696,500
GW4BLE	4,058,880
HU1AA	3,965,010
OH6JW	3,891,888
CT4NH	3,796,716
PJ7A	3,758,120
KH8/SM7PKK	3,262,192
9M8XX	3,223,675
HV3SJ	3,198,285
CE3BFZ	3,000,492
V63DX	2,895,100
HK3BED	2,747,867
ZM1BQD	2,728,674
OH6YF/OHØ	2,723,970
SM5AQD	2,710,911
HK3JJH	2,669,501
G3SNN	2,578,834
KE9A/DU3	2,411,517
OH2PM	2,264,519
JA8RWU	2,258,215
JA1XAF	2,190,510

J88/W9NSZ	2,134,561
JA6LDD	2,114,550
OH7MA	2,064,260
DK2XX	1,834,105
DF0AT	1,830,010
LU9DBK	1,711,908
TF3CW	1,705,168
JG3KIV	1,673,660
C6A/N4FD	1,664,280
YB3ASQ	1,654,670
JE4VVM	1,623,780
HC5AN	1,599,936
F6AOJ	1,588,429
8P6SH	1,503,040
VE5FX	1,385,010
JY9SR	1,347,577
7P8DP	1,295,168
LY3BH	1,255,780
OH1BV	1,214,171
PA0AGA	1,201,760
GW0ARK	1,187,724
JF1SWK	1,180,552
OA4ZV	1,172,080
SK0LM	1,166,102
SP9FIH	1,163,800
Y22JJ	1,147,384
9N1MM	1,141,680
SP9MAL	1,139,530
DL3LU	1,114,308
9Y4BU	1,106,136
DJ5FT	1,081,897
DJ8UV	1,067,664
VE2AYU	1,046,136
CT4KQ	1,045,551
JA4YPE	1,007,193
OE1PPC	1,000,008

28 MHz

P40R	2,669,580
LR6ETB	2,486,304
KP2A	2,194,852
CW8B	1,545,460
CE4FXY	1,474,806
K6GSS/KH6	1,222,008
YZ6A	1,196,708
TX7A	1,159,088
DF0DX	1,147,031
ZZ5JR	1,127,584
DF9ZP	1,116,060
UR2RE	1,113,110
FF6KRC	1,074,045
JA6WFM/HR2	1,033,613
IU6A	1,005,888
G3LNS	1,005,585
JH7DNO	978,465
4N4A	956,736
I9BLB	949,960
LX/ON4AMT	945,828
XL3XN	915,926
CR2DTH	892,944
YU3C	892,320
DU9RG	809,842
OH1AU	770,965
6W7OG	748,020
JR1IJV	747,032
DF8WS	737,812
F6FIO	719,523
LZ1W	718,400
UW9CW	686,021
RB5IM	675,040
IN3QBR	664,020
UA0OGS	661,290
IH9/IV3BMV	642,447
IT9HBT	637,806
G4LJF	620,700
SK3LH	611,933
OH2BAH	574,056
LA9GX	572,859
IK2DZM	568,413
UA9AN/UI	564,816
JH1LBR	561,585
YV4YC	557,920
LU8A	535,316
CN8FC	522,873
SM6BJI	509,795
SP2FAP	499,992
YU1JW	471,168
LZ2KAD	462,560
JR1EEG/7	461,040
VE3FWQ	443,556
RO4OA	438,360
IG8R	437,242
UA6LQ	435,750
OK3CFA	432,600
SM5AOE	428,130
DK5WN	424,512
Y23DL	420,233
LZ2ES	419,520
VE7EIK	411,840
DJ8RI	400,375

21 MHz

EL2CX	2,242,968
N7DF/NH2	1,817,612
9Y4VU	1,760,520
HC1OT	1,713,761
FM5EB	1,242,759
CI7SV	1,158,780
NP4CC	1,057,081
ZS3UN/OH7NRW	946,092
CS1BOP	929,176
YU3PV	899,184
OH1AD	872,784
4N3E	829,584
JA5OVU	820,216
JA8SCD	765,567
YU7AV	740,088
JA8RUZ	717,320
JA0QNJ	705,120
JH0USD	697,368
JA1USO	671,652
LU1ICX	626,255
HA8IE	622,468
YT7W	548,520
F6HMQ	519,408
UB5IFZ	517,864
JK1OLT	492,936
DL8FBD	492,513
OH6NIO	480,766
EA8ALY	405,120

14 MHz

YW1A	1,509,840
CE6EZ	1,232,242
ZS6AOO	962,676
YU1KQ	865,100
4M5Y	651,637
F2EE	650,312
YT3E	643,656
DF8XC	624,102
KH6FKG	570,966
SM0AJU	503,595
JA7SGV	491,400
VK2APK	469,157
XE3XE	441,936
TI2OB	308,247
OH1VR	305,366
TI2KX	293,726
JH1OJU	290,832
UY5OO/RW6I	259,980
IT9NTT	254,508
OH3OJ	212,296
VE7UBC	210,330
Y41HL	202,089

7 MHz

OH2HE	531,185
DJ4PT	382,690
I2AOX	360,149
HA9RE	354,162
YY1C	253,053
YC0DB	243,680
JA8IXM	222,180
YV5LIX	214,076
DL8PC	197,208
OH2HE	182,520
JA2BAY	163,080
NP4P	127,114
HJ1SJL	113,815
YO3JF	112,931
IN3ZNR	107,910

3.8 MHz

YV3A	141,993
IH9A	127,264
HA8JV	105,468
RB5DX	100,800
DL2SAX	99,792
LY2ZA	91,300
KX6DC	71,921
UR2RME	64,657
DL8QS	60,965
LY3BHY	56,196
UR3RA	49,600
YT3M	48,396
OE4BKU	42,075
OK1JJF	36,905
JT1BY	36,456
I9TQH	32,452
AH6JR	31,413
OH4BEN	30,480

1.8 MHz

IH9/IV3PRK	81,344
OK1DWX	23,562
OZ7YY	20,608
LZ1KWZ	20,295
4M1A	12,499
OZ3SK	12,384
SP5INQ	11,613
HK4DUM	7,336

Y33VL	6,840
F6AML	5,738

QRP

YU2TY	758,523
4M1G	336,384
HB9ADD	303,552
UD6DFF	253,984
SM5CCT	196,409
YO5AVN/3	182,748
ON4AVG	175,000
I0KHP	155,200
OK1DKS	119,175
JR3RWB	227,799
JA1TLK	110,676
JA8RJE	105,994
LZ2EW	105,840

Single Operator Unlimited All Band

YT3AA	5,758,480
NY6M/KH2	2,119,095
JA1YDU	1,776,652

28 MHz

JH1AJT	1,097,235
JA7TQK	411,642

Multi-Operator Single-Transmitter

P40V	18,500,488
PJ9W	17,937,612
TI1J	14,224,848
4J5FV	13,313,208
FY0P	13,086,222
8P9X	13,057,308
PJ8T	11,019,008
GJ6UW	11,011,977
OH0AM	10,492,220
CN0A	10,317,114
OK5R	9,661,168
OL8A	9,651,300
IP4T	9,338,780
FV9NDX	9,104,528
HG6X	9,048,816
VE6OU/XL3	8,848,000
HG5A	8,816,322
VE1ASJ	8,533,900
IM8A	8,524,310
RL1P	7,696,274
HG6N	7,402,076
AZ4F	7,327,780
OH5NQ	6,775,048
GW8GT	6,171,984
KX6OI	6,095,628
UL8LYA	5,967,500
SM5GMG	5,628,010
HG5C	5,594,105
ON6NL	5,364,644
AH2BE/KH9	5,316,876
R0C	4,921,095
UP1BZG	4,864,870
HB9H	4,845,681
4Z7M	4,499,340
DK6NP	4,338,468
LZ1KXA	4,308,535
V47QQ	4,303,408
YT3T	4,130,719
LY2WW	3,943,218
VP9LR	3,870,000
VE7SZ	3,761,044
XL3CPA	3,700,200
OE2XEL	3,674,816
UR1RWX	3,489,474
VK9LV	3,209,808
ON4AAQ	3,160,954
OQ7LR	3,149,870
DF0RR	3,109,692

Multi-Operator Multi-Transmitter

PJ1B	50,827,792
ZW5B	35,830,544
VP9AD	32,003,945
LX7A	26,578,978
V47K	17,543,514
IU3A	15,596,691
KL7Y	11,999,515
J37DX	9,786,634
OZ9EDR	9,446,073
L8H	8,508,969
KL7RA	8,491,392
FS/KC1F	8,385,653
JE2YRD	7,871,248
JA9YBA	7,378,590
UP1BZO	7,256,860
DF2RG	7,066,920
HB0/HB9AON	6,600,328
VE7ZZZ	6,214,546
JA1YFG	5,718,278
4U1VIC	5,565,680
ZM2K	5,500,782

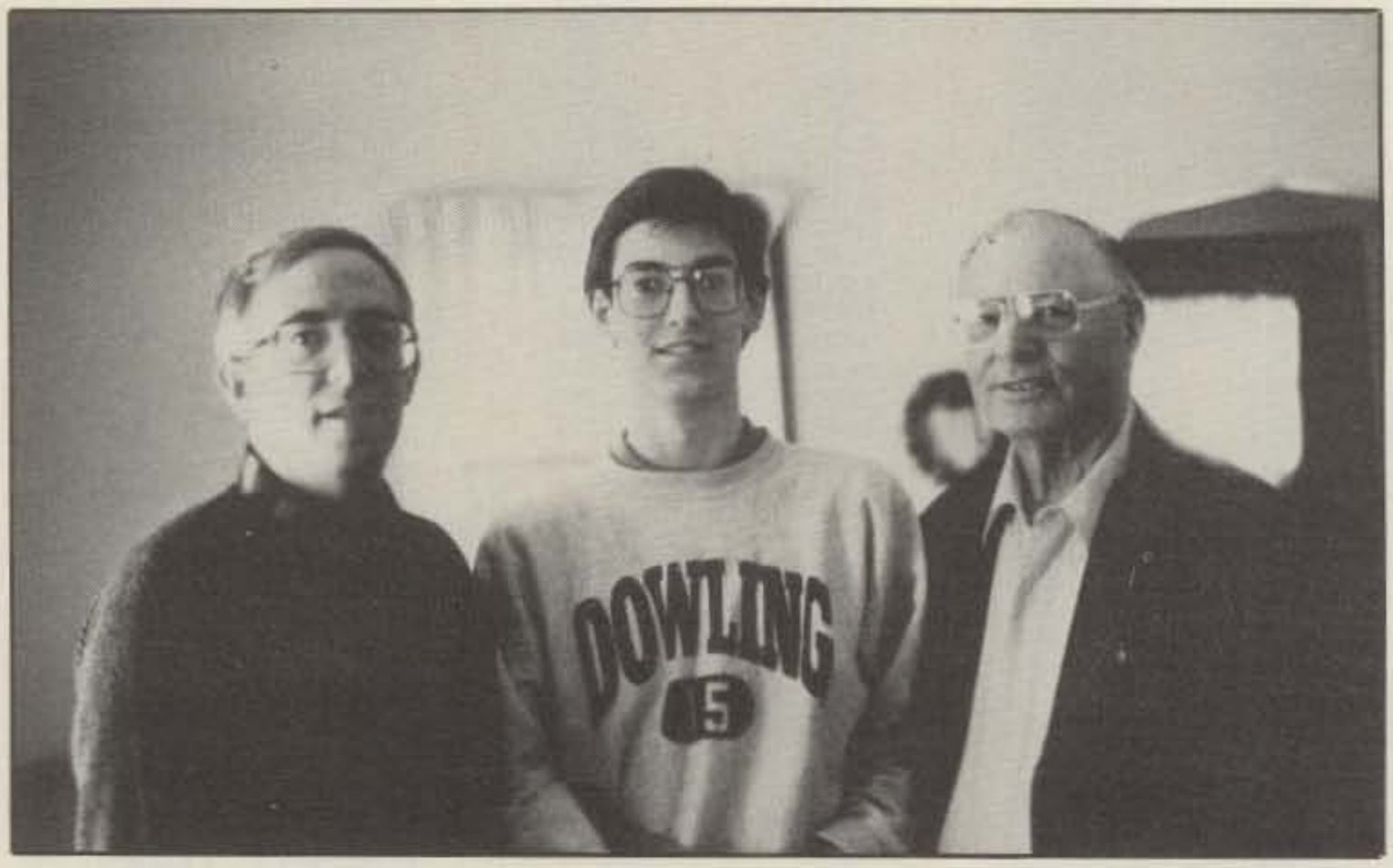
BILL'S BASICS

BY BILL WELSH, W6DDB

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Military Affiliate Radio System—Part II, Conclusion

The first part of this article appeared in last month's issue of *CQ*. It covered MARS history, objectives, callsigns, modes, frequencies, nets, repeaters/VHF, gateway stations, messages, and benefits.



Here are three generations of amateurs in the Greiner family. Keith, AKØQ, is shown at the left and Aaron, KBØBDY, is in the middle. They live in Des Moines, Iowa. Keith's father (Aaron's grandfather) is Loren, WØGTW, of Emmetsburg, Iowa. Loren is at the right in this picture. They are 41, 16, and 81, left to right.

Eligibility

Amateurs who are at least 14 years old are eligible for acceptance in the MARS program. MARS membership is not restricted to U.S. citizens. Amateurs who have been legally admitted to the United States for permanent residence (per Chapter 12 of Title 8, U.S. Code) are also eligible to join MARS. Physical handicaps do not disqualify people from being accepted as MARS members. Each applicant must possess a valid amateur radio license, which is usually issued by the FCC. MARS operates from many parts of the world. In some cases a Status of Forces Agreement dictates that the U.S. Military issues amateur radio licenses on behalf of host nations. Naturally, MARS recognizes and accepts applications from such licensees.

Each applicant must also possess a station that can be operated on at least two MARS high frequencies (actually, 2 to 30 MHz).

Navy-Marine Corps MARS accepts applications from Coast Guard Auxiliary members who have the "RADIO" endorsement on their licenses. These people are required to participate as regular MARS members. Navy-Marine Corps MARS also accepts membership applications from clubs. A MARS club station trustee must be designated to be responsible for proper operation and administration of such a MARS station. Also, the club station trustee and at least two more club members must be members of Navy-Marine Corps MARS for such an application to be acceptable.

Novice Eligibility

DoD regulations require MARS members who joined MARS while holding Novice licenses to upgrade their class of license within 18 months of joining the MARS program; if they fail to meet this requirement, they are dropped from MARS. All three MARS groups meet this DoD requirement, but their time spans differ. The Navy-Marine Corps, Air Force, and Army MARS programs allow 6, 12, and 18 months, respectively, for Novices to upgrade.

45527 Third Street East, Lancaster, CA 93535-1802.

Joining MARS

Applicants may request membership in the organization of their choice. Veterans tend to join the MARS group of the military branch in which they served. One is not allowed to be a member of more than one service group at the same time. In other words, if you are a Navy-Marine Corps MARS member (as an example), you cannot also be a member of either Air Force MARS or Army MARS. However, one can resign from one MARS group and then join another MARS group.

Any local MARS member or military installation MARS station should be able to provide appropriate information. The area/region coordinator or the state director of MARS is the logical first contact for potential MARS members.

When an application has been accepted, the applicant is issued an appropriate MARS (military) callsign and she/he is assigned to a training net.

Air Force MARS

An Air Force MARS application can be obtained from almost any local person or group associated with USAF MARS. If you do not know a local contact, material (data sheet and application) can be requested by writing to (or calling) the Air Force MARS Chief, Headquarters AFCC/DOYX, Scott AFB, IL 62225-6001 (telephone 618-256-6522).

Air Force MARS is divided into ten geographical regions. Each stateside region is run by a Regional Communications Manager (RCM), an affiliated MARS member appointed by the USAF MARS Chief. Each state in the first six (stateside) regions has a State MARS Director (SMD), another affiliated MARS member appointed by the USAF MARS Chief. Each SMD is responsible to her/his associated RCM.

The USAF MARS regional breakdowns are as follows:

- The first region consists of CT, DE, IN, MA, MD (including DC), ME, MI, NH, NJ, NY, OH, PA, RI, and VT.
- The second region consists of AL, FL, GA, KY, NC, SC, TN, VA, and WV.
- The third region consists of IA, IL, KS, MN, MO, ND, NE, SD, and WI.

• The fourth region consists of AR, LA, MS, OK, and TX.

• The fifth region consists of CO, ID, MT, OR, UT, WA, and WY.

• The sixth region consists of AZ, CA, NM, and NV.

• The seventh region is Europe.

• The eighth region is the Pacific, including Hawaii.

• The ninth region is Alaska.

• The tenth (Ø) region is Central and South Americas.

Each overseas region (7–0) is managed by an overseas military headquarters.

Army MARS

An Army MARS application can be requested by writing to (or calling) the Director serving your area. The four Army MARS Directors in the continental U.S. (CONUS) and Hawaii, plus the areas they serve, are listed in the following paragraphs.

The Central Area Army MARS Director serves AR, IA, IL, IN, KS, LA, MI, MN, MO, NE, NM, OH, OK, TX, and WI. The mailing address is Director, Central Area Army MARS, Fort Sam Houston, TX 78234-5000; Attention ASQN-OP-RC-SHN. The telephone number is 512-221-5061.

The Eastern Area Army MARS Director serves AL, CT, DE, FL, GA, KY, MA, MD, ME, MS, NC, NH, NJ, PA, RI, SC, TN, VA, VT, and WV, plus Puerto Rico and the U.S. Virgin Islands. The mailing address is Director, Eastern Area Army MARS, Fort Detrick, Frederick, MD 21701-5016; Attention ASQN-OP-R-EA, Building 810, Room B-2. The telephone number is 301-663-2793.

The Western Area Army MARS Director serves AK, AZ, CA, CO, ID, MT, ND, NV, OR, SD, UT, WA, and WY. The mailing address is Director, Western Area Army MARS, Fort Lewis, WA 98433-5000; Attention ASQN-OP-RC-WM. The telephone number is 206-967-7997.

The Pacific Basin area Army MARS Director serves the Hawaiian Islands, plus the U.S. Trust Territories, Guam, and the Philippines. The mailing address is Commander, 1116th U.S. Army Signal Battalion, Fort Shafter, HI 96858-5415; Attention ASQP-HSB-K (MARS). The telephone number is 808-655-4934.

Overseas Command Army MARS Directors are located in Germany, Japan, and Korea. The mailing address for the Command Army MARS Director-Germany is Commander 5th Signal Command, Attention ASQE-OP-MARS, APO New York 09056-0134. The mailing address for the Command Army MARS Director-Japan/Okinawa is Commander 1104th U.S. Signal Brigade, Attention ASQJ-PO-OD, APO San Francisco 96343-0059. The mailing address for the Command Army MARS Director-Korea is Commander 1st Signal Brigade, Attention ASQK-OT-MARS, APO San Francisco, CA 96301-0044.

MARS members intending to operate from an overseas command must first meet the licensing requirements of the host country, as well as the requirements of the USA's FCC.

An Army MARS data sheet and application can also be requested by writing to the Chief, Army MARS, Headquarters U.S. Army Information Systems Command, Fort Huachuca, AZ 85613-5000; Attention ASOP-HF. The telephone number is 602-538-6277.

Navy-Marine Corps MARS

A Navy-Marine Corps MARS application can be obtained from almost any local person or group associated with Navy-Marine Corps MARS. If you do not know a local contact, the desired material can be requested by writing to Chief, Navy-Marine Corps MARS, Naval Communication Unit, Washington, DC 20397-5161.

Navy-Marine Corps MARS is built around the following seven regions, each having an active-duty Navy Director.

• Region One: CT, DE, ME, MA, NH, NJ, NY, OH, PA, RI, and VT. Director, Navy-Marine Corps MARS, Naval Station, Building 6, Philadelphia, PA 19112-5098.

• Region Two: AL, DC, FL, GA, KY, MD, MS, NC, SC, TN, VA, and WV. Antarctic, Atlantic areas, Caribbean, Europe, Iceland, Puerto Rico. Director, Navy-Marine Corps MARS, Naval Base, Code N355, Charleston, SC 29408-5100.

• Region Three: AR, LA, NM, OK, TX, and Panama. Director, Navy-Marine Corps MARS, Naval Air Station, Box 14, Dallas, TX 75211-9523.

• Region Four: CO, IL, IN, IA, KS, MI, MN, MO, NE, ND, SD, WI, and WY. Director, Navy-Marine Corps MARS, Camp Barry, Building 153, Great Lakes, IL 60088-5705.

• Region Five: AZ, CA, NV, and UT. Director, Navy-Marine Corps MARS, 937 North Harbor Drive, San Diego, CA 92132-5100.

• Region Six: AK, ID, MT, OR, and WA. Director, Navy-Marine Corps MARS, Naval Base, Code N3111, Seattle, WA 98115-5012.

• Region Seven: Hawaii, Pacific Ocean areas, and Indian Ocean areas. Director, Navy-Marine Corps MARS, 530 Peltier Avenue, Honolulu, HI 96818-3753.

Participation

Continued MARS membership requires continued active participation. The minimum acceptable activity requirements are low, but members are expected to put in more than these required minimum operating times.

Air Force and Army MARS members are required to participate at least 12 hours per calendar quarter (3-month segment). At least 6 of the 12 hours must be operation in one's high-frequency net assignment.

Navy-Marine Corps MARS members are required to participate at least 18 hours per calendar quarter. At least 12 of the 18 hours must be operation in one's area or region high-frequency net.

Resigning

If you decide that you do not have the time and/or desire to remain active in MARS, you can resign at any time. You do not have to state a reason for resigning, but such information could be useful. Our commitments change with shifts in family status, job responsibilities, and physical condition. Previous MARS members are welcome to return to the MARS program when they can again be active.

Summary

MARS has something to offer to all amateurs, and it can be particularly beneficial to new amateurs. MARS provides excellent training in message word count, message handling, net operation, and military communications. Technical nets and correspondence courses enable members to upgrade their technical knowledge. On-the-air operating experience is a confidence builder of relatively inexperienced amateurs.

If a national emergency arises, only MARS and RACES (Radio Amateur Civil Emergency Service) stations would be allowed to continue operating; amateur radio operation would be halted.

The Navy Headquarters Station (NAV/K4NAA) is located in Building 13 of NAVCOMMU, which is 15 miles southeast of Washington, DC. NAVCOMMU is on Route 5, and it is near Andrews Air Force Base. Visitors are welcome at K4NAA/NAV. The station's telephone number is 202-238-2266/2267.

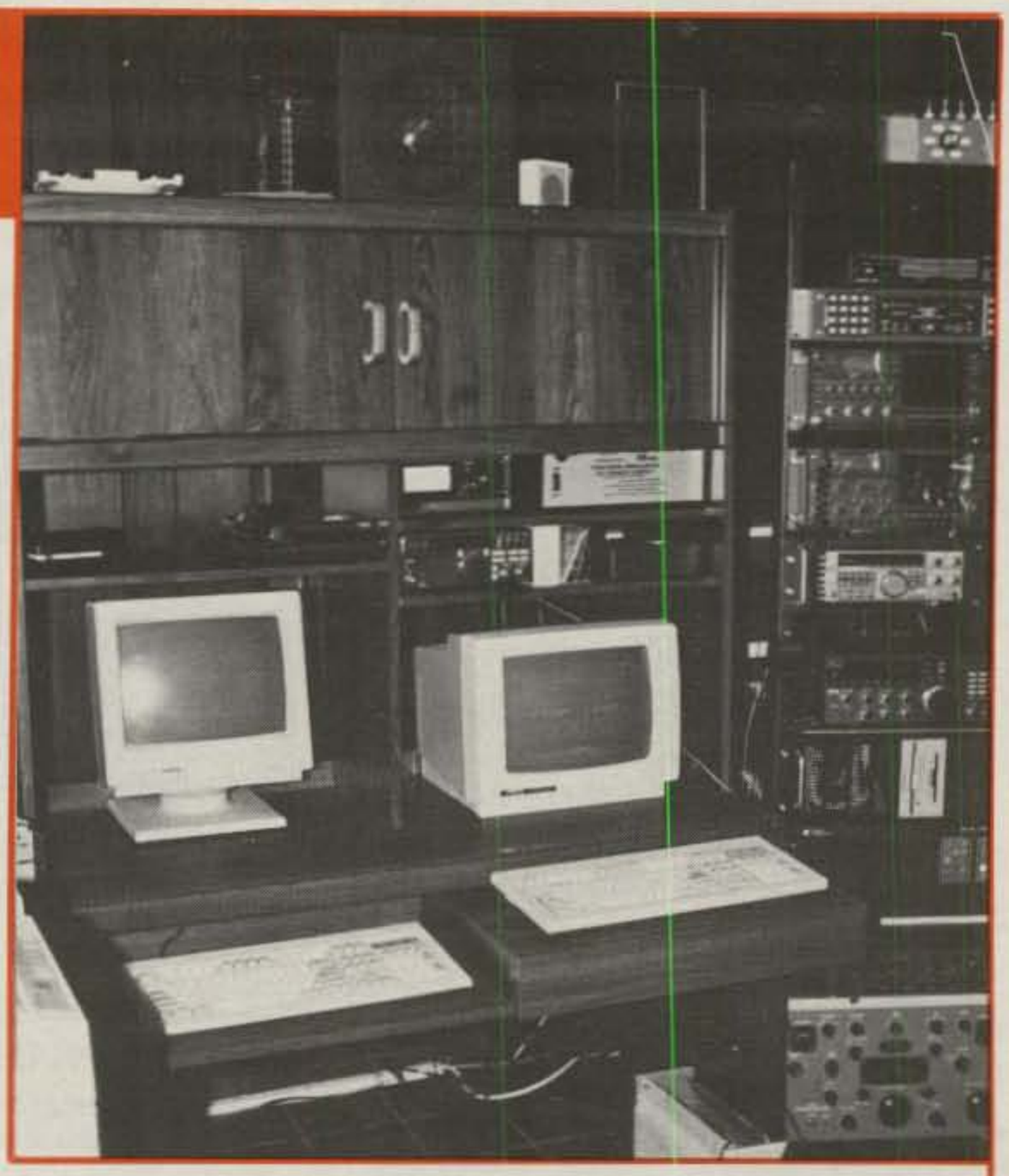
I appreciate the assistance I received from H.R. (Ray) Collins, AGA3C, Robert D. Loe, N4FFW/NNN0ASA, and Bob Sutton, AAA9A, in preparing this article. Respectively, they are the Chiefs of the Air Force, Navy-Marine Corps, and Army MARS programs.

Printed Aids

Previous Novice columns contain 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

COMPUTERIZE YOUR SHACK



Control up to eight digital radios simultaneously from your MS-DOS microcomputer! We offer a series of software/hardware packages that interface with most current synthesized rigs.

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KENWOOD: TS-940, 440, 140, R-5000, 680, 711, 811
YAESU: FT-767, 757 GXII, 757 GX, 747, 9600, 736 212, 712
JRC: NRD 525
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Knowledge of MS-DOS is not necessary - the installation program does it all! Datacom allows complete control of your rig from the keyboard. Move your cursor to the desired frequency and the radio will be set automatically.

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- **Adds sweep and scan to radios that don't allow this from front panel.**
- **Adds unlimited memories. Stores frequency, description call sign, sked time, and comments for each frequency, limited only by disk storage.**
- **Allows radio to be tuned from keyboard by use of arrow keys.**
- **Tabular screen display of all of the channels stored in memory, along with a full description of each including: MODE (LSB, USB, FM, etc.), eight character alphanumeric description, call sign, sked time, comments. Data files may be sorted by frequency, description, call sign, time, etc.**
- **Full featured logging utility allows searching for previous entries by call sign. Separate log for each service.**
- **Able to automatically log hits while sweeping or scanning.**
- **Color coded program for easy use (will run on a monochrome system).**
- **Menus for amateur, AM-FM broadcast, television broadcast, S/W, aviation, marine, FAX, satellite with most popular frequencies stored. Menu maker utility allows custom menus defined by user.**
- **50 page comprehensive user manual.**
- **Optional radio direction finder allows bearing information to be logged automatically.**

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SPECTRUM ANALYZER MODULE.....(CALL FOR PRICE)
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COMSET ALLOWS OPERATION ON COM3 AND COM4.....25.00
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DIGITAL VOICE RECORDER OPTION!
ICOM UX-14 INTERFACES IN STOCK
COMPLETE SYSTEMS (RADIOS, INTERFACE, & COMPUTERS)..(CALL)
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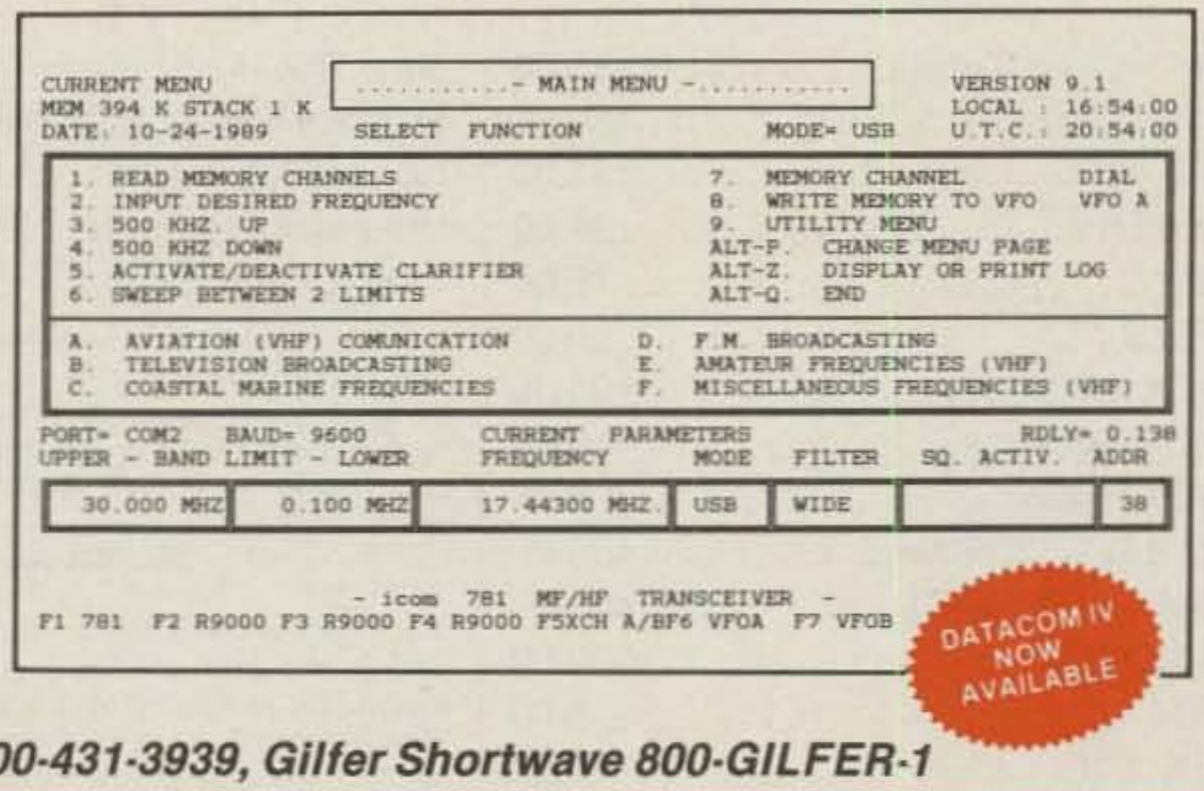

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CQ SHOWCASE

W & W Associates Kenwood Replacement Batteries

W & W Associates has announced its new line of Kenwood replacement batteries for Kenwood transceivers models TH25AT, TH45AT, TH55AT, TH75AT, TK320, and TK220. Replacement batteries for the KNB-5, PB6, KNB-6, PB-7, KNB-7, and PB-8 meet or exceed the original equipment's manufacturer's specifications.

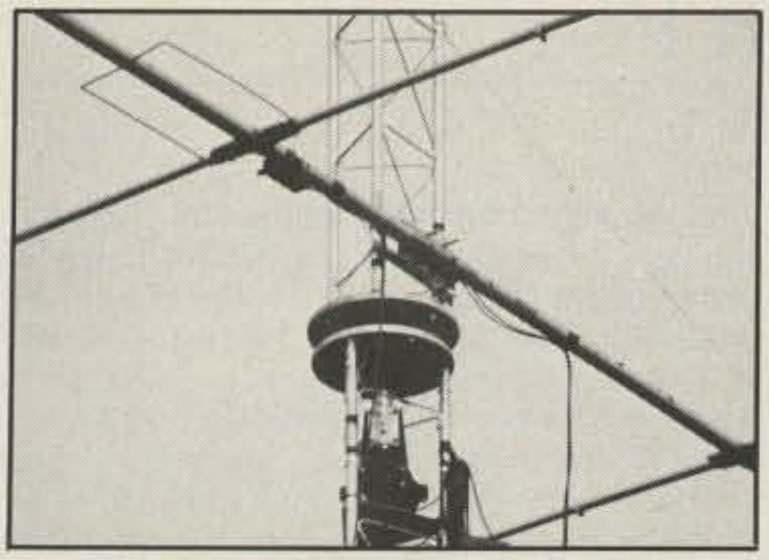
For more information, contact W & W Associates, 29-11 Parsons Blvd., Flushing, NY 11354, or circle number 108 on the reader service card.

Ashton Aries-2™ Multi-Tasking Amateur Radio Program

The Aries-2 amateur radio program from Ashton ITC ties together multi-mode terminal units, computer capable transceivers, and a real-time logging function. In addition to reading frequency and mode data from transceivers, Aries-2 adds computer control of these units and supports most rigs manufactured by ICOM, Kenwood, Ten-Tec, and Yaesu. This control includes the ability to do a timed log scan (while optionally recording scanned TU input) based on Aries-2 search capabilities.

Both Aries-1 and 2 programs control AEA PK-232 and Kantronics KAM terminal units with key presses or mouse clicks. The electronic logbook in both products features fast data search capability along with automatic entry of date and time from the computer's clock. Frequency and mode are also automatically entered into the log when using a compatible transceiver. Both products support a contest mode which offers instant dupe checking. Both programs include sample message files, a demo-log, and printed user's guide. They are available on 5¼ or 3½ inch disks and run on IBM PC, XT, AT, PS-2, or compatibles with at least 256K of memory. For

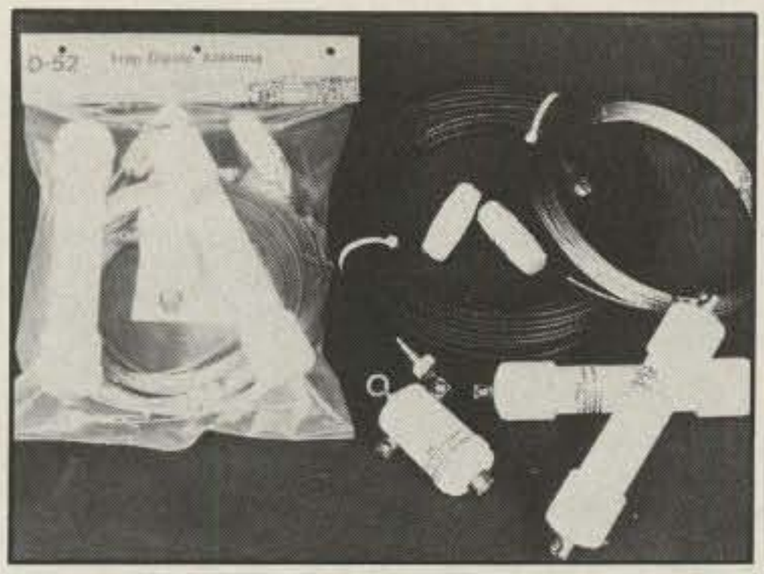
Aries-2 a minimum of 640K memory and a hard disk drive are suggested. The user price of Aries-2 is $89.95; Aries-1 is $69.95, both plus shipping and handling. For more information, contact Ashton ITC, P.O. Box 1067, Vestal, NY 13851, or circle number 101 on the reader service card.



RTS Guy-Wire Bearings, Rotating Base Assemblies

Rotating Tower Systems, Inc. has announced the availability of guy-wire bearings and rotating base assemblies designed especially for use with Rohn 25 tower. This hardware will allow the construction of a rotating tower using the Rohn 25 tower sections and companion rotators. The design of this hardware results in immunity to ice and snow conditions while retaining ease of installation and maximum service life. Rotating stacks of smaller monobanders, stacked tribanders, large VHF/UHF arrays, etc., are applications suited for a rotating tower made from these components. In addition, component design allows the rotating base unit to be mounted at any tower height, minimizing the number of guy-wire bearings.

For more information contact Rotating Tower Systems, Inc., Box 44, Prosper, TX 75078, or circle number 107 on the reader service card.



Spi-Ro Multi-Band Trap Antennas

Spi-Ro Manufacturing offers a complete line of multi-band trap antennas, both dipole and vertical "sloper" types. They are lightweight, sealed and weatherproof, and feature no-rust solid brass terminals that require no soldering or jumper wires. The antennas handle full power and work multiple bands with a single antenna, with automatic band switching. Units have the standard SO-239 receptacle.

They come factory assembled or in kit form. Prices start at $38.95. A catalog is available showing the various models. For more information, contact Spi-Ro Manufacturing, Inc., P.O. Box 1538, Hendersonville, NC 28793, or circle number 104 on the reader service card.

ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

From the Notebook—Part V

Last month we focused on a variety of Antennas & Accessories topics, including looking at the LTA Championship Monobanders. We also caught up on a good deal of reader mail, highlighting condominium and deed restrictions and limited-space antenna ideas. We updated our December column's treatment of the accomplishments of radio pioneer Reginald Aubrey Fessenden, and also touched on some excellent hamshack software, including WN4AZY's comprehensive logging program, LOGic, and the MufMap II propagation prediction software. We also profiled the C-SAT Public Access Data (PAD) service, took note of the *Radio Operator's World Atlas*, and described K2RR's exhaustive technical reference guide.

This month more antenna and software news and views. Let's get started.

Antenna Notes

Coax Hint de WA0KKC. Richard Mollentine, WA0KKC, opens the column with a helpful cold-weather suggestion. He notes that in bitterly cold weather, coaxial cable can crack and separate when twisted as on a beam, where the slack coax may tend to twist.

His solution: Wrap the coax with electrical heat tape, then encase it in a plastic insulating material, finally wrapping it with waterproof tape. Richard suggests pre-heating for about 10 minutes before doing any twisting. The attached photos show his procedure better than words can.

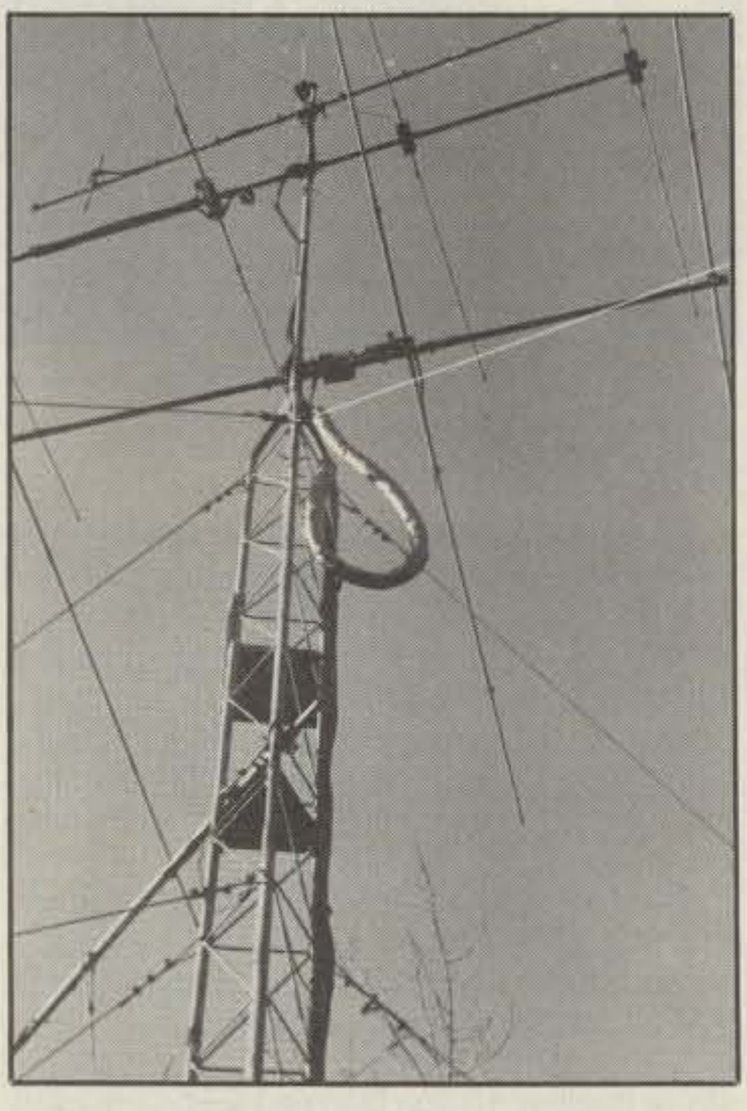
If you need more details on his procedure, write to Richard Mollentine, WA0KKC, 7139 Hardy, Overland Park, KS 66204.

AAE Followup. In the October 1989 issue we mentioned the Bandmaster Quads from Alabama Amateur Electronics. A note from Bill Levey, WA4FAT, of AAE followed in which he indicated that he and Jay Ross, AB4MX, planned to expand the product line in the coming year beyond the nine 2- to 6-element quads for 10 meters through 70 cm that they currently offer. Bill notes that although not reflected on his product sheet, AAE has delivered custom antenna systems for 12, 15, and 17 meters, and plans to have dual-band and multiband quads available soon.

Fig. 1 shows a typical radiation pattern from one of AAE's more popular quads, the Q-144-6, a 6-element 2 meter system of all-fiberglass construction that weighs in at 4 lbs.

For more information, contact Alabama Amateur Electronics, 3164 Cahaba Heights Road, Birmingham, AL 35243.

Telrex Catalog. A recent beam antenna catalog and looseleaf data sheets from Telrex Labs features this old-line antenna supplier's heavy-duty beams, inverted Vee kits, rotators, utility-pole hardware kits, support masting, and other accessories. I see that prices have been "discounted" considerably in the catalog, and rotators are available at deep discounts if purchased along with an antenna system.



Beam-and-tower photo shows an overall view of coax wrapped in the fashion suggested by Richard Mollentine, WA0KKC, to help prevent coax cracking and twisting. (Photo courtesy WA0KKC)

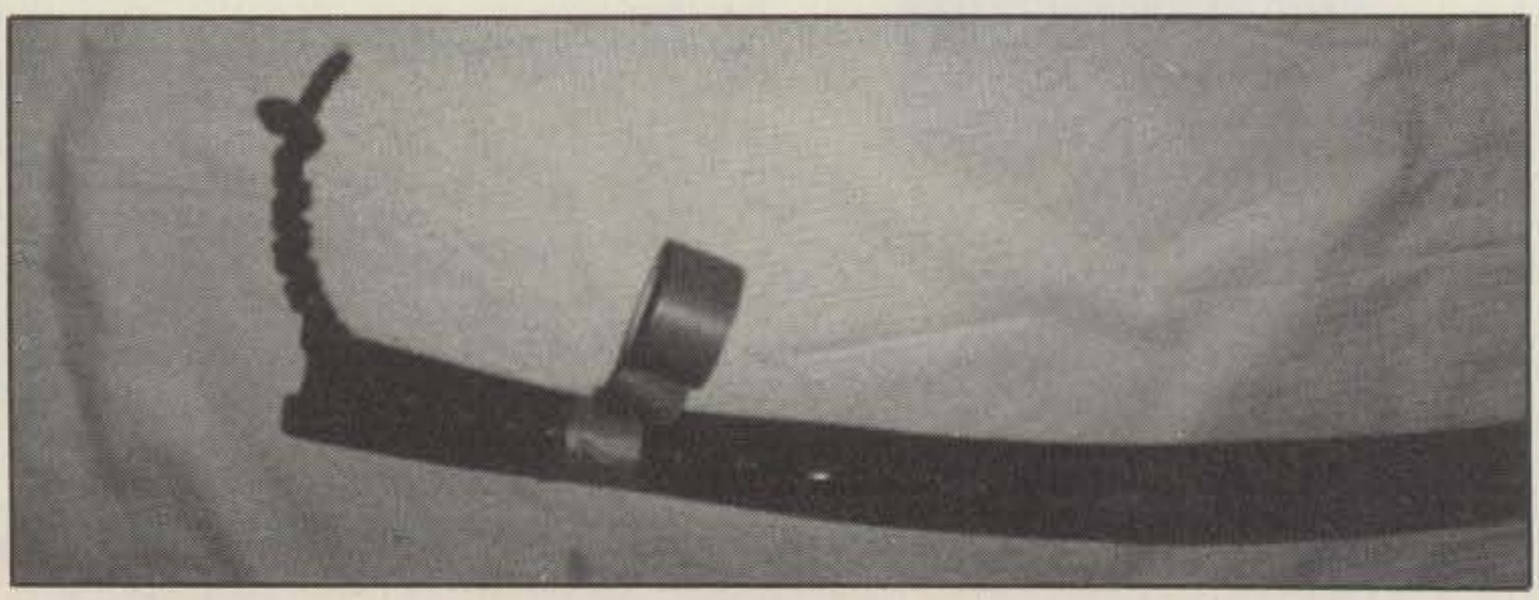
Included in the Telrex catalog is technical information on the firm's single-band arrays (20 meters through 420 MHz); 10-15 meter duo-banders; several triband arrays; a top-of-the-line ($2900) four-band HF array; and 2- and 3-band inverted Vee kits.

According to the manufacturer, all of the antennas offered by Telrex, including custom-order arrays for as low as 2 MHz, are developed full-size at frequency at the firm's specially designed antenna laboratory building, situated on a noise-free, non-contaminated site. Custom-designed hydraulic lifting rotatable masts and other devices, along with near- and far-field target ranges, are used to help make antenna evaluations. Two labs are situated away from the main plant, forming a triangulated-situated system for testing, measuring, checking on-the-air performance, and conducting stress, strain, and weathering studies.

For a catalog and data sheets, contact Telrex Labs., Inc., PO Box 879, Asbury Park, NJ 07712.

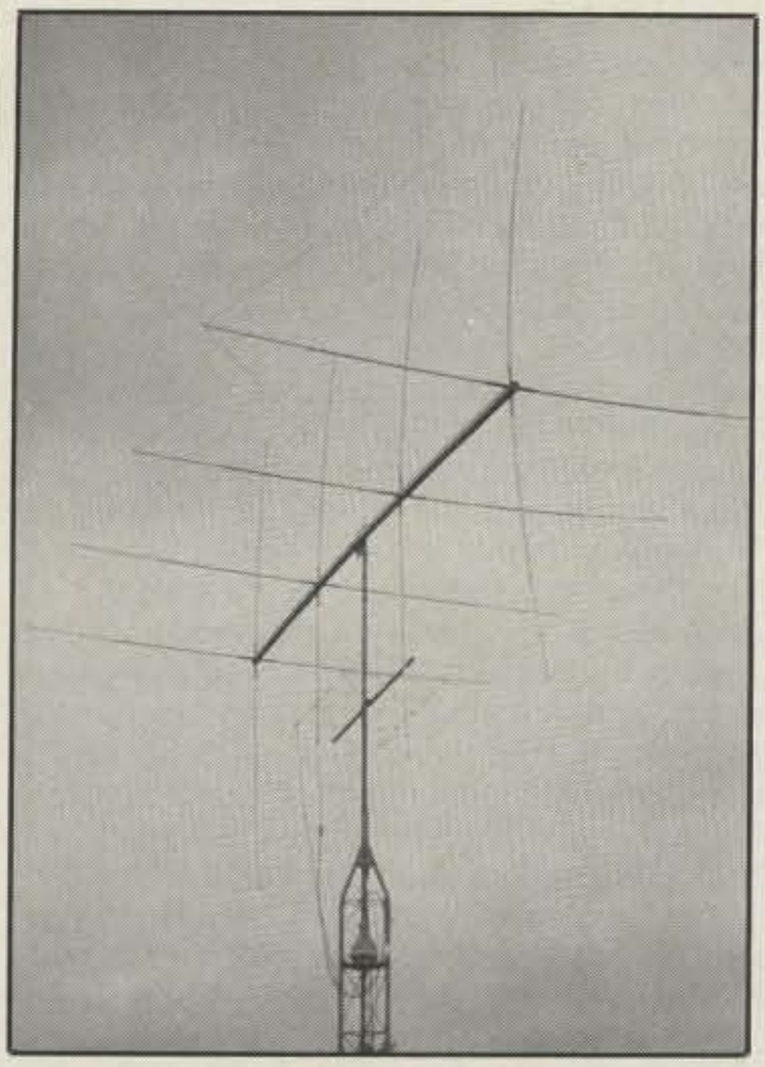
Universal Towers Catalog. This Warren, Michigan firm's catalog of free-standing aluminum towers is something of an education in determining tower requirements and selecting the proper tower for your antenna. It includes a handy matrix table showing the proper tower in their product line for various antenna wind-loading and tower-height parameters. Also included is a wind-loading chart of the United States, along with a short and to-the-point procedure for properly installing a tower.

As noted in the catalog, the first thing to do is to determine the area of the antenna system that you intend to mount; usually, this figure is included in the technical data that comes with the antenna. Small VHF and UHF antennas may be but 2 to 5 square feet in area, while large 20 and 40 meter beams or multiple arrays may be 26 square feet or larger. The catalog points out that when using a rotator, a rule of thumb is to add 1 square foot plus an additional 1 square foot for the mast, to whatever size antenna you plan to use, and try to avoid exceeding 6 feet above the top of the tower with any antenna configuration. The tower height is selected next, with 10 foot sections being the norm. The matrix table included in the catalog makes it easy to select the proper tower for your planned setup.



A closeup of the wrapped coax as suggested by WA0KKC to prevent cracking and twisting when feeding a rotatable beam. (Photo courtesy WA0KKC)

317 Poplar Drive, Millbrook, AL 36054



Two of AAE's tower-mounted quads. AAE offers a variety of lightweight, all-fiberglass quads for 10 meters through 70 cm. Dual-band and multiband quads are on the way. (Photo courtesy Alabama Amateur Electronics)

For a copy of the catalog, contact the Universal Manufacturing Co., 12357 E. 8 Mile Road, Warren, MI 48089.

New Telewave Catalog. Operating out of Mountain View, California, Telewave's focus is on heavy-duty 25-1600 MHz commercial antennas and antenna systems engineering services especially for cellular-telephone applications. In addition to a number of VHF/UHF collinears and other verticals and Yagis, Telewave offers a wide variety of isolators, filters, cavities, coax, power detectors, alarm systems, combiners, preselectors, and intermod suppression kits. Although the company's product focus is on commercial and cellular-telephone operations, they offer many items of interest to amateur club and repeater groups who want to go first class with their installations.

For more information, contact Telewave, Inc., 1155 Terra Bella, Mountain View, CA 94043.

RDFs from Doppler Systems. If radio direction finding is your "thing," Doppler Systems has two series of professional-quality RDF systems. The 4000 series provides an economical solution to VHF and UHF direction finding by including the antenna mixing circuitry with the processor and display unit. It's recommended for applications over the 136 to 150 MHz range where antenna feed length is 45 feet or less. Four processor/display models (the DDF4001 through DDF4004) and two antenna systems (the DDF4050 and the DDF4060) are available.

One antenna system, the DDF4050, is a mast-mounted antenna for 136-180 MHz that consists of four stainless steel whips mounted on an X-frame which also acts as the ground plane. The other, the DDF4060, is a set of four matched quarterwave whips covering 136–500 MHz that are supported on magnetically mounted bases for mobile operation.

Doppler Systems explains the system's theory of operation in terms of familiar Doppler shift: As an antenna rotating at the end of an arm moves toward the RF source, the apparent frequency increases, while as the antenna recedes from the source, the apparent frequency decreases. This Doppler shift occurs at the same rate at which the antenna rotates, and the phase of this shift contains the desired bearing information.

In a quasi-Doppler system, multiple antennas are electronically combined to simulate a physically rotating antenna. The patented technique used by Doppler Systems' equipment combines four antenna outputs in a way to prevent desensitizing the receiver. When used with a Narrow-Band FM (NBFM) receiver, the up-down frequency shift is detected and can be heard as a 300 Hz "commutation tone" at the output. The direction finder processes this tone to display the bearing. Although FM signals are normally of interest, the system can also be used with AM receivers, since interaction between the four antennas used causes the received signal to be both amplitude and frequency modulated at the commutation frequency.

Another product line, the 5000 series, features expanded frequency coverage (108-1000 MHz) using remote RF summing circuits. Details and pricing are available from Doppler Systems, Inc., P.O. Box 31819, Phoenix, AZ 85046.

Antenna Supermarket SWL Antennas. Jim Meadow of the Antenna Supermarket sent me his product sheet, which lists three HF receiving antennas, several gas tube lightning surge arrestors, and various SWL accessories.

The antennas Jim offers include the two "Eavesdropper" 8-trap, 42 foot long dipoles that cover all of the major international shortwave broadcast bands from 11 to 75 meters with one feedline; both twinlead and coax feedline versions are offered. A third antenna is a 67 foot, end-fed, coil-loaded sloper covering the AM broadcast band and 120 through 13 meters. Each antenna is priced at $79.95.

Along with his product sheet, Jim includes a short but useful beginner's tutorial on receiving antenna selection, installation, lightning protection, and weather protection. Contact the Antenna Supermarket, P.O. Box 563, Palatine, IL 60078 for a copy.

Cable and Connector Selection Guide. According to sales administrator Hilda Manten, Nemal Electronics is still offering its free, 41-page Cable and Connector Selection Guide. The guide is akin to a standard reference that provides detailed electrical and physical specs on more than 1500 cable and connector types. Also included are details on fiber-optic products, cable ties, patch panels, heat-shrink tubing, and various adapters and cable assemblies, and there's even an index of selected military specs and an index to NEC code articles. If you need esoteric cables such as diesel locomotive, triaxial, and plenum cables, this is evidently the place to get them!

For a copy, contact Nemal Electronics International, Inc., 12240 N.E. 14th Ave., North Miami, FL 33161.

Software News and Views

Antenna Trap Designing Program. Larry East, W1HUE, offers a BASIC program used to design antenna traps using coaxial cable, available both for the IBM PC and the Apple II.

You can obtain a copy of his program by sending Larry a self-addressed, postpaid disk mailer along with a blank, formatted disk in the proper format (5.25 or 3.5 inch) for Apple ProDOS or IBM high- or low-density formats, or a 5.25 inch disk for Apple DOS 3.3 format. Contact Larry East, W1HUE, 119-7 Buckland St., Plantsville, CT 06479.

EC-4023 Programmable Calculator Program. B.O. Lowery, W4NLG, offers a one-page listing of a program he wrote for the Radio Shack EC-4023 programmable scientific calculator that is used to compute antenna bearings and distance. The program listing is available for the price of a SASE to B.O. Lowery, W4NLG, 1809 Brickell Ave., Miami, FL 33129.

HandyCODE AR. Debra Gorgens of Microsystems Software sent us a demo of the most unusual HandyCODE AR package, a program that falls into a unique category—that of Morse Code input software.

Based on the very reasonable premise that Samuel F.B. Morse didn't create his code with a computer keyboard in mind, the product's main function is to interpret Morse code input and convert it to PC keyboard input. HandyCODE AR grew out of a product known as HandyCODE, initially developed as "alternate access software" for individuals with severe physical disabilities to use in connection with single- or double-switch PC input. The product I was sent addresses the general amateur market and is similar but does not have the speech output capability of the original HandyCODE.

HandyCODE AR is designed both for CW enthusiasts who would like to improve their CW skills and beginners who would like assistance in learning Morse. It works with the IBM PC, XT, AT, PS/2, and compatibles to enable you to improve CW skills while running practically any popular PC software—including the "biggies" such as Lotus 1-2-3, Microsoft Word, WordStar, and others; it also works with most PC network arrangements.

The software developers have extended the standard Morse code assignments to include the extra keys on the PC's keyboard, and they have provided a powerful facility to generate user-definable macros. The macros are shortcuts for frequently used keystrokes, such as loading application programs or inserting a frequently used sentence or name list into your wordprocessor. The macros can be used to load programs, input a text string, or automate any series of keystrokes. Rig control options are also provided. One-key, keyer, and "bug mode" operation are all supported. A practice code utility is included to help you learn Morse and practice to increase input speed. There's also a remarkable utility that allows you to play any standard ASCII text file in "perfect Morse."

According to the manufacturer, the product allows adapted control of a PC with a level of speed and convenience that can almost rival keyboard entry. Entry speeds of 10 to 15 words per minute are typically reached within the first week of use, and with practice speeds of 50 WPM are possible. Using some ingenuity, you could connect a PC to your rig and do off-the-air copy or keyboard-to-CW control, or even set up an unattended CW bulletin board. The standard interface to the PC is through a provided 25-pin connector to the PC's printer port.

Although I must consider HandyCODE AR

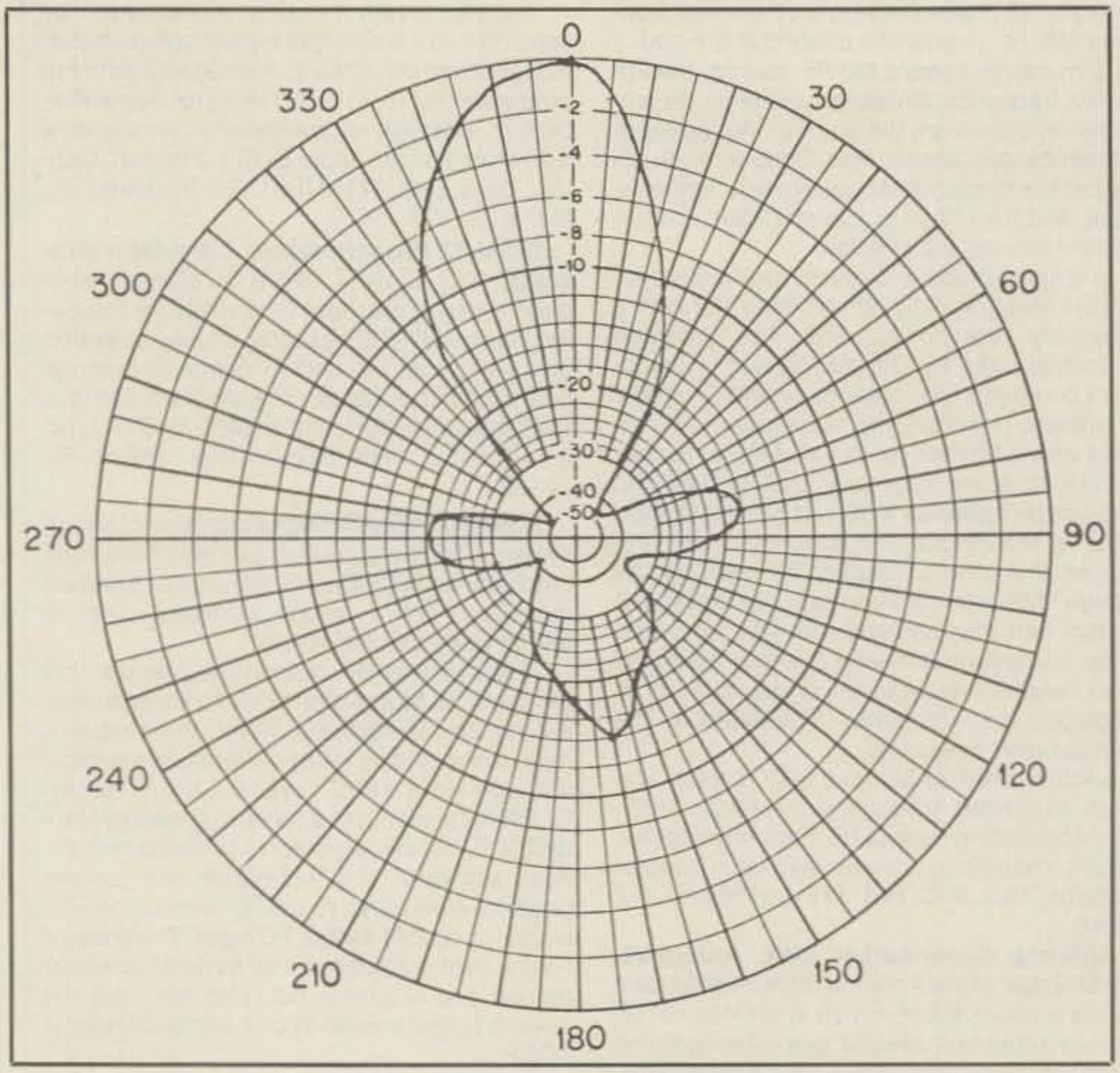


Fig. 1 - Shown here is a typical radiation pattern from the lightweight, fiberglass AAE Q-144-6 six-element 2 meter quad, tower mounted at 64 feet.

something of a novelty for most amateurs, it and its bigger sibling, HandyCODE (with its speech output capability), would be superb for the handicapped amateur and PC user. The product is priced at $89 ($149 with "rig control" option) from MicroSystems International Corporation, 600 Worcester Road, Suite B2, Framingham, MA 01701.

Atari ST Public Domain Disk. Fred Gehricke, KG6QV, tipped us off to what he considers to be an excellent disk of public domain (PD) amateur radio software for the Atari ST. The disk is "Ham Radio Programs"; it includes complete programs for packet terminal, RTTY and Morse Code transmission and reception, logging, and satellite orbital prediction applications. I don't have a price on the disk, but Fred advises that it's offered as Disk No. 727 by BRE Software, Suite 104, 352 W. Bedford Ave., Fresno, CA 93711.

HAMLOG. Although the program's name isn't too exciting, KA1AWH's 18-module amateur logging program is far from generic. HAMLOG is a menu-driven program that provides full feature editing to enable you to create, append, change, search, update, retrieve, and sort all of the necessary files to maintain a running log of all of your on-the-air contacts. WAS and DXCC records are stored and segregated automatically to enable you to build files supporting the various ARRL awards and certificates.

HAMLOG enables you to search and retrieve by callsign, country, state, RST, date, name, band, QTH, and other criteria, using either single or multiple disk drives. A continual summary update is available for DXCC or WAS status reference.

Interestingly, HAMLOG is available not only for the IBM PC, but also for the Apple series and in CP/M format for over 140 different computers, including the Commodore 128 (in CP/M mode), Kaypro, Zenith, NEC, Morrow, and many others. The program is priced at $24.95 for the IBM PC version ($26.95 for a 3.5 inch disk); the same price applies to CP/M format disk. The Applesoft Basic version is $19.95.

For more details, write Ernest J. Sandoe, KA1AWH, P.O. Box 2015, West Peabody, MA 01960.

SquareNote 3.0. We've been an enthusiastic user of SquareNote, a powerful but easy to use personal information manager for the IBM PC for several years; you'll see our writeups in the November 1987 and October 1988 columns. Now version 3.0 is on the street, and it's even more powerful and useful than the earlier versions we liked so well.

SquareNote, nicknamed "the Idea Librarian," is a menu-driven, free-form database touted as an answer to one's messy desk, cluttered drawers, and stuffed briefcases. Devoting a few minutes a day to the program's maintenance, you can get control of your notes, magazine article clippings, correspondence, and other documents, locating any papers or notes that you've referenced in the database in seconds. The program lets you write, edit, store, retrieve, and maintain notes in much the same way as you would a stack of 3" × 5" index cards. But the program goes far beyond a box of low-tech paper index cards.

SquareNote lets you make and edit notes that are as long as ten printed pages. The program files the notes under subjects or keywords that you type in. You can have thousands of subjects, and you can file any note under as many as 100 of them at any time. The only limit to the total number of notes you can have is available disk space. When you want to look at one or more notes, you tell the program to gather those notes into a stack by subject or combination of subjects. Notes in the stack can be edited, deleted, removed, or sent to your wordprocessor.

As we noted in previous writeups, we find SquareNote to be excellent for tracking subjects in this column. For example, when a reader inquires about a particular subject, we can search for and instantly locate all issues in which we covered the subject. We can also search by subject area to reply to readers who can't remember the exact issue or issues in which a particular subject appeared. SquareNote would also be of use to those who maintain back issues of magazines such as *CQ* and *QST* and who would like to have a reliable way of locating individual construction or technical articles.

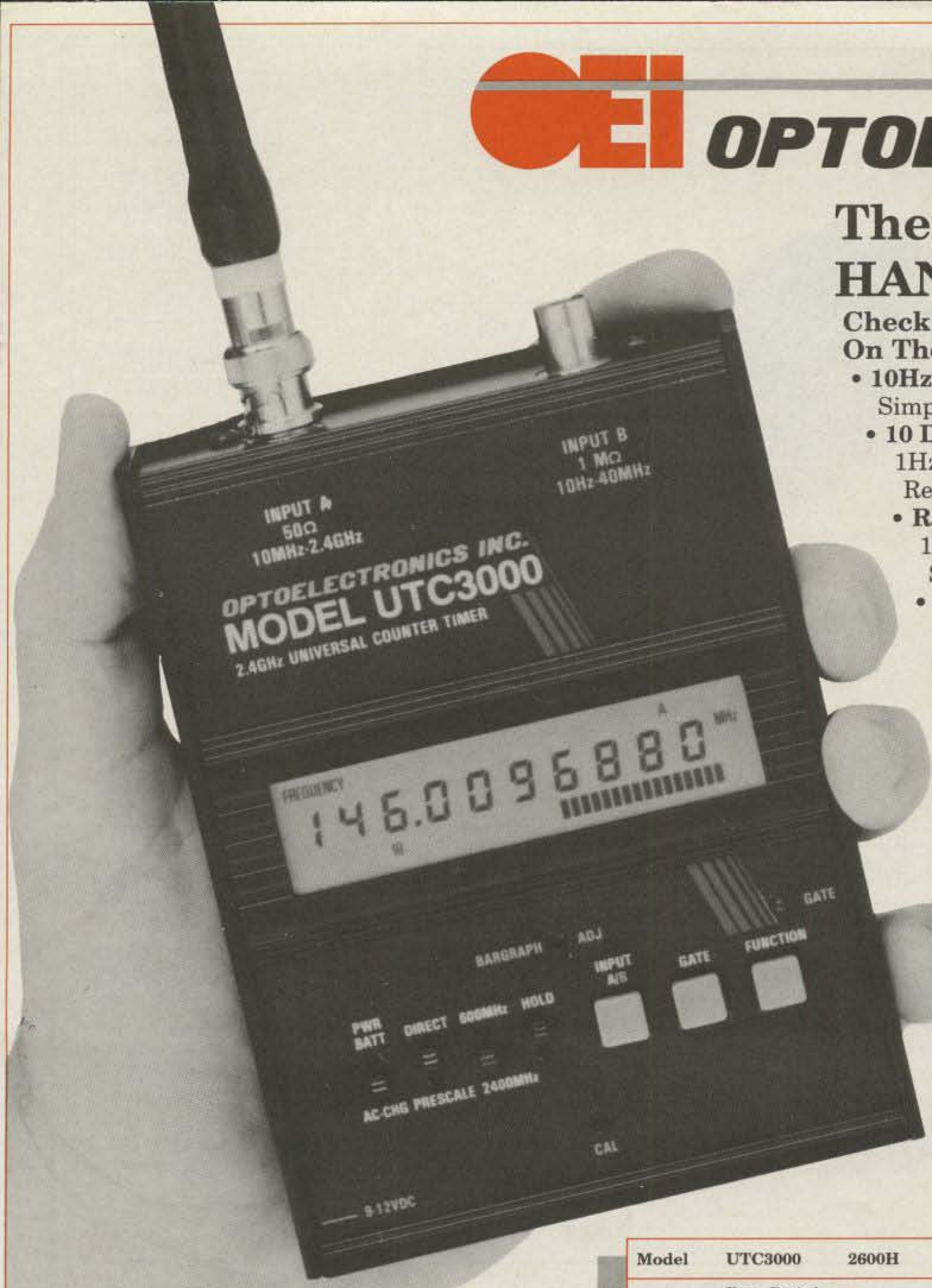
The new version has a number of improvements over prior versions, including enhanced color support, easier to use and better printing and report options, faster and more sophisticated subject searches, and improved file import facilities. The new edition also has a built-in "write-through" RAM cache to use available memory to minimize disk access.

While it was love at first sight for me as far as SquareNote is concerned, there are a few drawbacks. One is that while the program does a very good job of managing large quantities of mixed information and thus represents a very simple and straightforward approach to managing personal data, you may find that entering much often-repeated data to be tedious—suggesting that a more conventionally structured database is what you might really need. Also, I'd like to see the program include a memory resident option to allow me to pop out of another program (such as the wordprocessor on which I'm typing this column) and directly into SquareNote to search for and retrieve a data tidbit needed for the column. Also, while the program is well worth the new (and higher) list price of $199, SquareNote may have priced itself out of the market for casual users, though the firm runs specials and offers bargain-priced upgrades to current users.

For more information, contact Union SquareWare, 27 St. Mary's Court, Brookline, MA 02146.

PC Globe 3.0 and PC USA. The PC Globe series of geography-based programs is no stranger to the column. We first described PC Globe in January 1989 and followed up with an update on its successor, PC Globe Plus, in the July 1989 column. (How did I know just when I featured them? I did a quick search using SquareNote, found and stacked the notes for the two dates, then pulled out the paper copies from my ragged and bulging files of more than nine years' worth of Antennas & Accessories columns.)

PC Globe (formerly Comwell Systems, Inc.) is now available in version 3.0, which adds a host of "bells and whistles"—among them point-and-shoot capabilities, enhanced graphics, and updated country information. In case you're not familiar with it, PC Globe 3.0 is a simple to use, computerized atlas that provides you with instant profiles of 177 coun-



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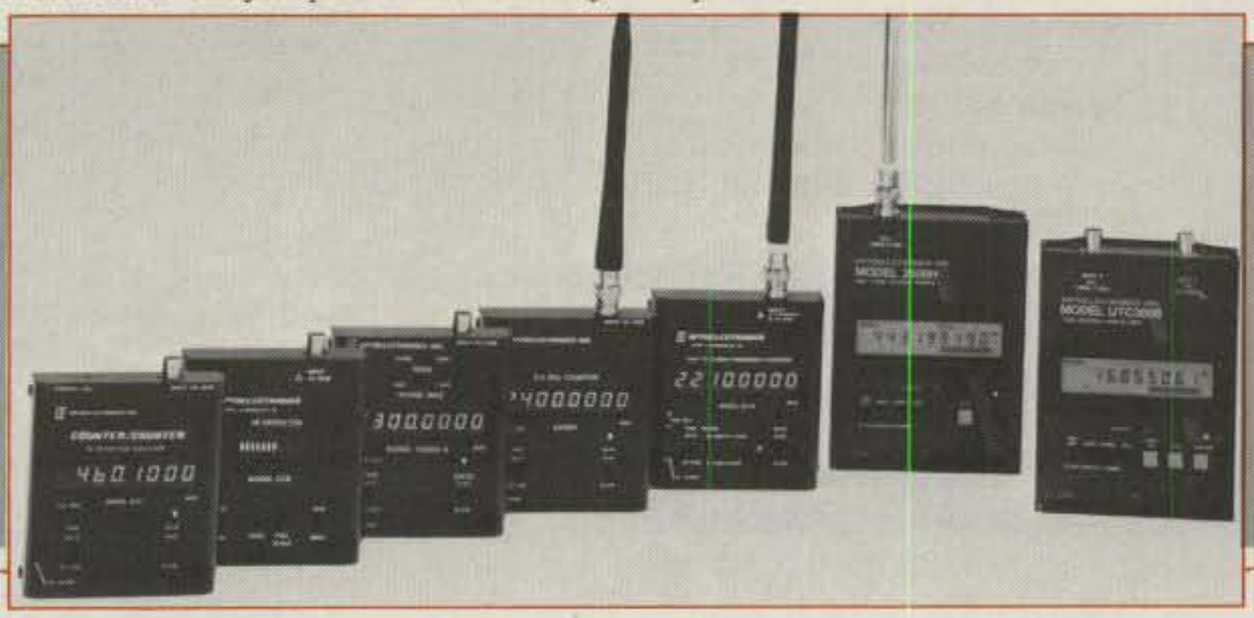
Display	10 Digit LCD w/Function Annunciators	10 Digit LCD	8 Digit LED	8Digit LED	8 Digit LED	8 Digit LED	•
RF Signal Strength Indicator	16 Segment Adjustable Bargraph	16 Segment Adjustable Bargraph	•	•	•	LED with Adjustable Threshold	10 Segment Adjustable Bargraph
Price	$375.	$325.	$239.	$179.	$189.	$299.	$119.

Sensitivity: <1 to <10mV typical. Time Base: ± 1.ppm.; ± .5ppm. add $75 - LED Models; ±.2ppm add $80. - LCD Models. Nicads & AC charger/adapter included. (9v Alkaline - CCB.) Carry Case, Antennas and Probes extra. One year parts & labor warranty on all products.



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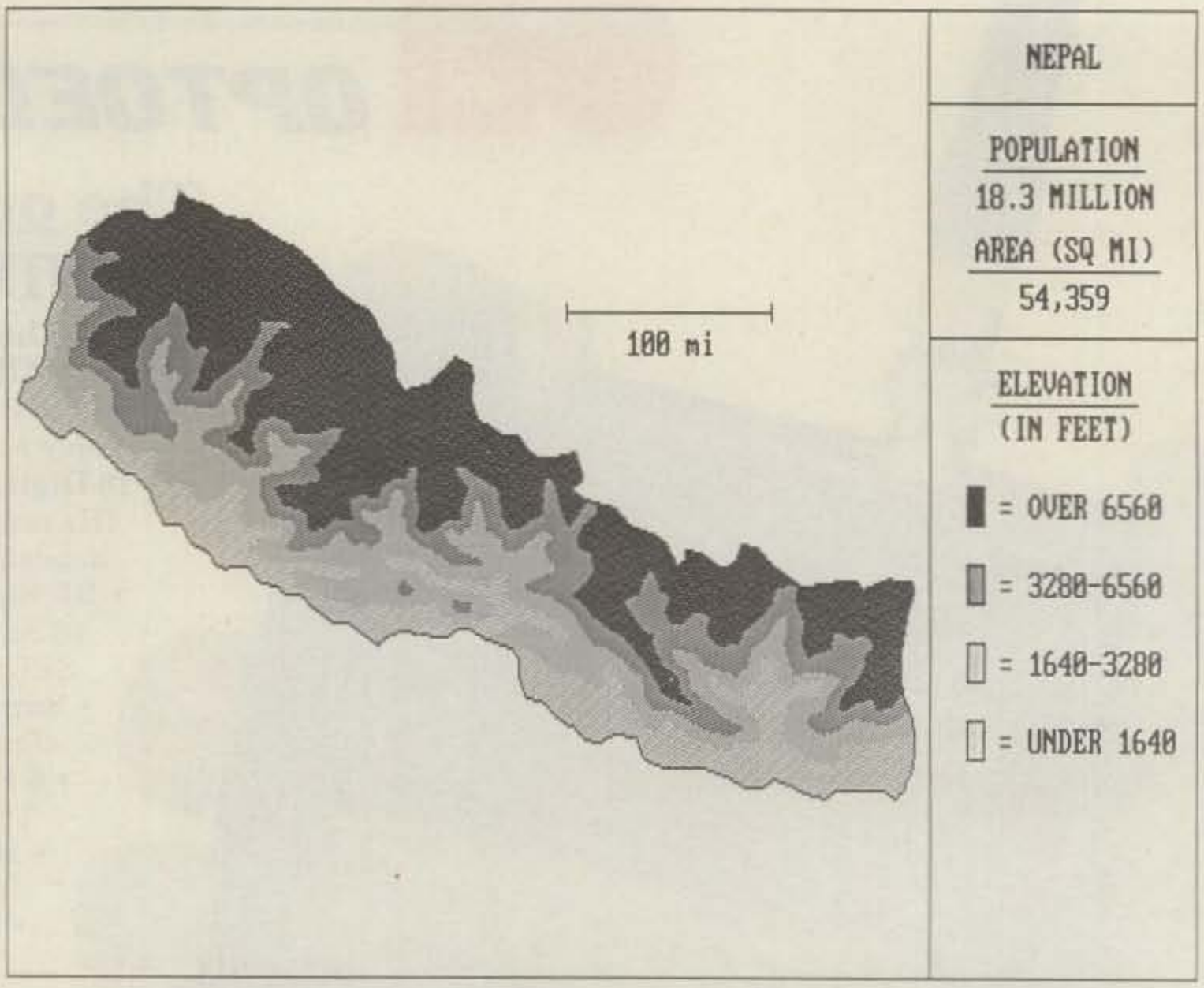

Fig. 2- Printout depicts an elevation map of Nepal, one of the 177 countries included in the database of PC Globe 3.0, a comprehensive computerized atlas for the IBM PC and compatibles.

tries. In a single PC-based source, detailed maps, graphics, facts, and figures are all available to you with a few keystrokes. The program allows a variety of users, including businessmen, educators, travelers, geography students, and of course DX-oriented amateurs, to easily cross-compare data between any of the 177 countries.

The PC Globe maps are particularly useful, and they include world, continent, and country presentations showing cities and major world organizations. The country maps also can outline elevations, cities, lakes, rivers, mountains, and other geographical features. There is also a large database of country data, including population demographics, economic and trade details, telephone, telex, and other data of interest to radio amateurs.

Rounding out the package are some utilities which include automatic currency conver-

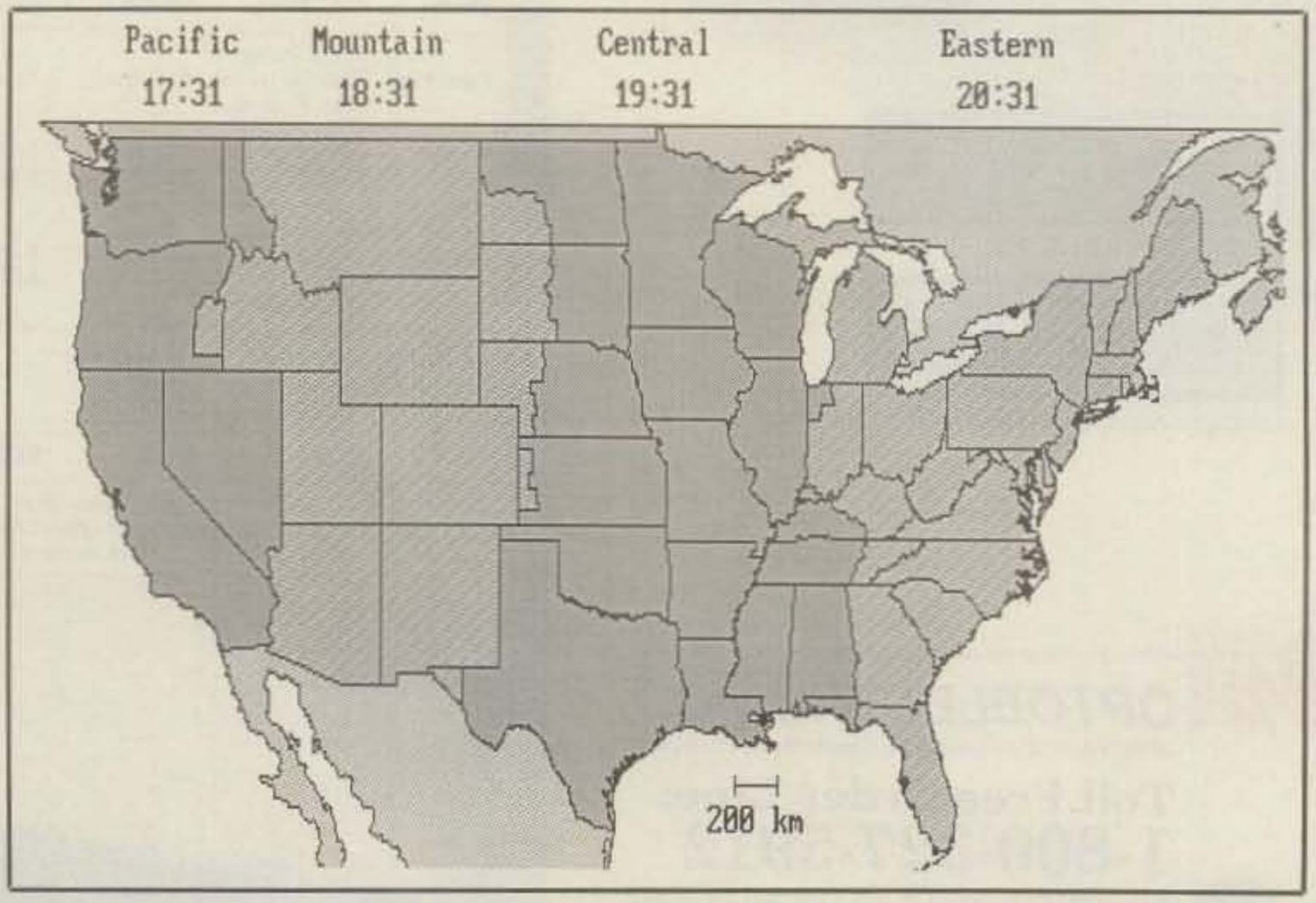

Fig. 3- A time-zone map of the USA is one of the many map-based graphic data options offered by PC USA, a geography program similar to PC Globe 3.0 focused on the 50 states and Puerto Rico.

sion, time zones for major cities, point-to-point distances, and a miles/kilometers toggle. Both graphics and data can be exported to word-processing, graphics, and desktop publishing programs. It's priced at $69.95.

A relatively new companion program is PC USA, which provides comparable instant-profile features of the 50 states and Puerto Rico. It includes maps of the United States, individual states, and major regions, and it displays point-to-point distances and bearings between all major US cities.

PC USA has an extensive database of information for each state. You can instantly generate bar charts comparing all data between the different states and regions, and you can make state comparisons on the country and regional maps. A sophisticated time zone map shows the time in every state, and a special utility allows users to identify the locations of area codes and Zipcodes.

As with PC Globe 3.0, PC USA offers a great deal of flexibility, with the ability to change screen colors and to see maps with or without state names, state borders, and latitude/longitude markings. It's also priced at $69.95.

I found both programs to be very comprehensive in their contents, and certainly both were easy to use; their color graphics display was outstanding. I had early versions of both, which at the time had limited support for the newer 24-pin printers, but the firm has improved support of 24-pin printers in later revisions. Both programs are designed for use with the IBM PC or PS/2 and compatibles with a minimum of 512K of RAM. Both support Hercules monochrome, CGA, EGA, and VGA displays. For more information, contact PC Globe, 4435 South Rural Road, Building 5, Suite 333, Tempe, AZ 85282.

Fig. 2 shows a PC Globe 3.0-generated elevation map of Nepal (just in case it's on your DXpedition itinerary), while fig. 3 depicts a time zone map of the United States produced by PC USA.

Short Bursts

New Computer in the Hamshack. We finally took two sad steps: relegating our beloved Commodore 128 to the outlands and making the trusty but s-l-o-w, green screen Cordata PC XT clone a standby machine. We had to take these steps in order to make room for a new Gateway 2000 Multiperformer 80386SX computer that would help us enter the 90s in "computing style" as something of a so-called "power user."

The new PC is a dream to use with its manyfold speed increase over the XT, lots of memory (including 1 MB of so-called "expanded memory"), a fast 65 MB hard disk drive, dual 1.2 MB and 1.44 MB floppy drives, extra communications ports, and many other amenities. The machine's 80386SX architecture allows it to do almost everything a true 80386 machine can do, including multitasking, at a price equivalent to that of machines built around the older 80286 microprocessor. These high-speed machines can make many applications, especially graphics programs, number crunching routines, and databases (such as logging and contesting programs) move along very, very smartly.

If you're looking to move from a Commodore or older PC to a newer and faster machine, take the time to check out the slick PC ads in *PC Magazine*. Whether you opt for the tried-and-true 80286 style AT, the hybrid 386SX (my choice), a true 386, or a futuristic 486 machine, you'll find the magazine's editorial coverage and ads will get you pointed in the right direction. The January 30, 1990 issue is particularly useful, with its review of 31 new 386SX machines, including some high-value/price ratio machines such as my own Gateway 2000 386SX and PCs from Austin Computer Systems, Zeos International, and many others.

This discussion leads us directly to our next topic, which is:

Buying a PC. Buying a PC, especially for the first time, can be a frustrating experience. It certainly was for us when we bought our first PC, a Commodore PET, in 1979. More of the same frustration resurfaced when we successively moved to the Vic-20, Commodore 64, Commodore 128, Cordata XT, and now the Gateway 2000 386SX.

One of the first steps you should take is to determine just *why* you're buying a PC: find out just what you want to do with it, assessing your needs both now and in the future. Determine the *capability* you really need, not the specific hardware or software you might see advertised and which you might want to use.

Next figure out what combinations of hardware and software will likely meet these needs. Determine what the minimum configuration is that will allow you to meet your present needs, and try to determine how much expandability there is in the hardware and software you might start out with. Consider whether you're able to add on to a particular system, and whether or not data from your starting software is easily transferred.

You should shop around, visiting a number of stores that sell a variety of computer brands, checking on the complete hardware and software package—both the minimum system you determined and future expansion. Try to *run* some of the software on the actual system you're considering for purchase, and find out about returns, warranties, customer service, and maintenance support. Don't hesitate to develop long lists of detailed questions to ask the vendor about the prospective system.

When you've narrowed down your choices, have some skull sessions, putting together your notes and making comparisons of all the factors you consider important. Be sure to resolve any reservations or concerns about areas that are not clear to you as well as features of the system which seem to be irritating. If possible, thoroughly discuss your tentative choices with users of similar PC systems and members of a local computer users' group to get their opinions *before* plunking down hard-earned cash.

An important point: I'm a strong fan of mail-order buying, but there is a lot to be said for supporting local dealers if they offer reasonable prices and good support. This is especially true if this is your first PC purchase, in which case you'll likely require a good deal of hand-holding in getting the system up and running. Obtaining technical support by telephone is fine if you're an intermediate or expert computer user, but it can leave the computer novice frustrated and discouraged.

Mobile Installation Guidelines. The General Motors Engineering Center has available a free set of guidelines on installing radiotelephone and mobile radio equipment on GM vehicles. These guidelines go beyond the traditional concepts of vehicular noise suppression to cover a variety of "electromagnetic compatibility" issues such as adverse effects on the vehicle's operation, including engine performance and driver information, entertainment, and electrical charging systems.

The four-page GM brochure includes suggestions on transmitter location, antenna installation, antenna cable routing, antenna tuning, radio wiring and routing, interconnections, and troubleshooting. Illustrations of suggested transceiver installations are included.

The guidelines are available for free from the Electrical Engineering Center, General Motors Proving Grounds, Milford, MI 48042. Ask for the "Radio Telephone/Mobile Radio Installation Guidelines."

Wrapping It Up

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

Overheard: People who think nothing is impossible have never tried to settle an account with a computer.

73, Karl, W8FX

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2m/70cm Dual Band HT

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2m, 5 watt HT
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HF "PERFORMANCE" RIG
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- Built-in Power Supply and Automatic Antenna Tuner
- SSB, CW, FM, AM, RTTY • QSK to 60 wpm

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RS12A	9	12	79
RS20A	16	20	99
RS20M	16	20	119
RS35A	25	35	159
RS35M	25	35	179
RS50A	37	50	229
RS50M	37	50	249

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HD-1250	Grid Meter	
HDP-1396	Headphones	
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	LIST		LIST
AL82	$1,995.00	AL1500	2370.00
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30W in = 170W out
LIST $299.00

Model	Band	In-Out	List Price
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2-417	2M	45-170W	$279.00
3-22	220	2-20W	$129.00
3-211	220	2-110W	$319.00
3-312	220	30-120W	$279.00

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PARAGON
Gen. Coverage HF Transceiver, Multiprocessor Controlled
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DJ-500T Dual Band HT
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AMPS
ELH 230G 2M, 2W in 30W out
ELH 230D 2M, 2W in 30W out, w/pre-amp
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KAM ALL MODE TNC $289.95
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Only $239.95

1278 Multi Mode TNC	$249.95
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202/204 Antenna Bridges	$59.95/$79.95
250 Oil Load	$49.95
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MBV-A 3KW Tuner

- Low Pass Pi-Network Tuning
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- Totally self-supporting—no guys needed

Model	Height	Load	Sale Price
HG37SS	37 ft	9 sq ft	$CALL
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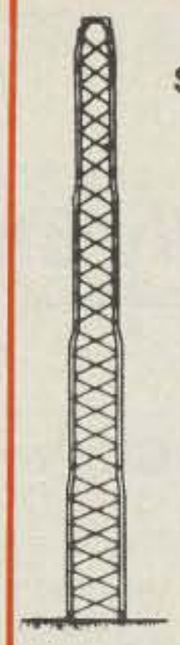
Masts—Thrust Bearings—Other Accessories Available—Call! Prices Shown Are Your Total Delivered Price In Continental U.S.A.!



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- All Steel Construction—Rugged
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HBX48	48 ft	10 sq ft	303	$589
HBX56	56 ft	10 sq ft	385	$699
HDBX40	40 ft	18 sq ft	281	$569
HDBX48	48 ft	18 sq ft	363	$689

***Your Total Delivered Price Anywhere in Continental 48 States. Antenna Load Based on 70 MPH Wind.**

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70'	999	1719	2159
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90'	1289	2039	2579
100'	1369	2199	2989
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120'	1669	2619	3429

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Check these features:
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MA550 mast	22'	50'	10 sq ft	999
TX438	22'	38'	18 sq ft	919
TX455	22'	55'	18 sq ft	1385
TX472	23'	72'	18 sq ft	2279
HDX555	22'	55'	30 sq ft	2079
HDX572	23'	72'	30 sq ft	3559

Note-US Towers Shipped Freight Collect From Visalia, CA Factory

***Note-towers rated at 50 mph to EIA specifications**

RG-213U

$.39/ft $379/1000 ft. Up to 600 ft via UPS

- RG-213/U—95% Bare Copper Shield
- Mil-Spec Non-contaminating Jacket for longer life than RG8 cables
- Our RG-213/U uses virgin materials.
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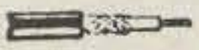

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- Same specs as Belden 9913
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Coaxial Cable Loss Characteristics (DB/100 ft)

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RG8X	52	.8	1.2	3.5	5.8
9086	50	.4	.64	1.7	3.1
½" Alum	50	.3	.5	1.2	2.2
½" Heliax	50	.2	.4	.9	1.6
⅞" Heliax	50	.1	.2	.5	.9

HELIAX® CONNECTORS

Cable Type	UHF FML	UHF MALE	N FML	N MALE
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COAX CONNECTORS

Amphenol Silver PL259	$1.50
UG21B N Male	$3.50
9086/9913 N Male Connector	$4.95

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Stranded Copper 14ga	$.10/ft.
Dog bone end insulator	$.79 ea.

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1:1 Balun	$15	Center Insulator	$8
Dipole Kits		D80 $31.95/D40	$28.95
Short Dipole Kits		SD80 $35.95/SD40	$33.95
All-band Dipole w/ladder line			$29.95
G5RV all band antenna			$49.95

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A3 3-el Tribander	
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A743 & A744, 30/40 mtr KIT for the A3 & A4	
R5 20-10 mtr Vertical	
AP8 80-10 mtr Vertical	
AV5 80-10 mtr Vertical	
D40 40 mtr Dipole	
40-2CD 2-el 40 mtr Beam	
A50-5 5-el 6 mtr Beam	
215 WB NEW 15-el 2 mtr Beam	
230 WB NEW 30-el 2 mtr Beam	
4218 XL 18-el 2 mtr Beam	
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424B 24-el 432 MHz Beam	
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DX 88 New HF Vertical Antenna	
Discoverer 2-el 40-mtr Beam	
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EXPLORER-14 SUPER-SPECIAL	
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V2S 2-mtr Base Vertical	
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TH5MK2S Broad Band 5-el Triband Beam	
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TH3JRS 3-el Triband Beam	
205BAS 5-el 20-mtr Beam	
155BAS 5-el 15-mtr Beam	
105BAS 5-el 10-mtr Beam	
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12 AVQ 20-10 mtr vertical	
14 AVQ 40-10 mtr vertical	
18 AVT/WB 80-10 mtr Vertical	
18HTS 80-10 mtr Hy-Tower Vertical	
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25BS 5-el 2 mtr Beam	
28BS 8-el 2 mtr Beam	
214BS 14-el 2-mtr Beam	
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5BDQ 80-10 mtr Trap Dipole	
BN86 80-10 mtr KW Balun W/Coax Seal	

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6BTV 80-10 mtr Vert	$149	5BTV 80-10 mtr Vert	$129
4BTV 40-10 mtr Vert	$99	G7-144 2-mtr Base	$129
G6-144B 2-mtr Base	$89		

Mobile Resonators	10m	15m	20m	40m	75m
400W Standard	$16	$17	$19	$22	$26
2KW Super	$20	$22	$25	$29	$39

Bumper Mounts - Springs - Folding Masts in Stock!

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- Full Legal Power
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Accessories:

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HF6V HF2V

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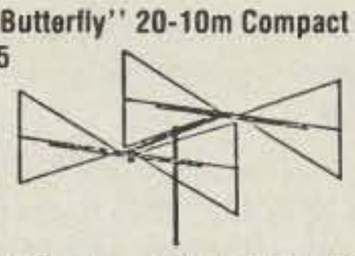
HF5B "Butterfly" 20-10m Compact Beam $259.95



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Telex HAM 4 (15 sq. ft. rating)	$Call
Telex Tailtwister (20 sq. ft. rating)	$Call
Telex HDR300 Heavy Duty (25 sq. ft. rating)	$Call
Yaesu G500A Elevation Rotor	$229.95
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Standard 8 cord cables $.25/ft. (vinyl jacket 2-#18 & 6-#22 ga)

Heavy Duty 8 Cond cable $.45/ft (vinyl jacket 2-#16 & 6-#18 ga)

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10 FT. STACKED SECTIONS

20G	$54.50	45G	$153.50
25G	$65.50	55G	$197.50

ALL ACCESSORIES IN STOCK—CALL

ROHN FOLDOVER TOWERS

Model	Height	Ant. Lead*	Price
FK2548	48 ft.	15.4 sq. ft.	CALL FOR PRICES
FK2558	58 ft.	13.3 sq. ft.	
FK2568	68 ft.	11.7 sq. ft.	
FK4544	44 ft.	34.8 sq. ft.	
FK4554	54 ft.	29.1 sq. ft.	
FK4564	64 ft.	28.4 sq. ft.	

25G Double Guy Kit	$299.
45G Double Guy Kit	$319.

*Above antenna loads for 70 mph winds w/guys at hinge and apex. All foldover towers shipped freight prepaid in 48 states. Prices 10% higher west of Rockies.

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1/4 EHS Guywire (6650 lb rating)	$.18/ft
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3/16 CCM Cable Clamp (3/16" or 5/32")	$.45
1/4 CCM Cable Clamp (1/4" Cable)	$.55
1/4 TH Thimble (fits all sizes)	$.45
3/8EE (3/8" Eye & Eye Turnbuckle)	$6.95
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1/2 x 9EJ (1/2" x 9" Eye & Jaw Turnbuckle)	$10.95
1/2 x 12EE (1/2" x 12" Eye & Eye Turnbuckle)	$12.95
1/2 x 12EJ (1/2" x 12" Eye & Jaw Turnbuckle)	$13.95
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3/16" Preformed Guy Grip	$2.49
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6" Diam - 4 ft Long Earth Screw Anchor	$19.95
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This Is The New Phillystran Guy Cable, No Longer Requiring Potted Cable Ends. CALL FOR DETAILS!

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Heavy Duty Steel Masts 2 in OD - Galvanized Finish

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CIRCLE 52 ON READER SERVICE CARD

CONTEST CALENDAR

BY JOHN DORR, K1AR

NEWS/VIEWS OF ON-THE-AIR COMPETITION

When Does The Contest Really End?

A quick look at a set of contest rules should answer this month's topic for discussion. After all, we all know that the *CQ* WW Contests end at 0000Z, the ARRL SS at 0300Z, ARRL Field Day at 1800Z (unless you're one of those crazy groups that begin setting up at the beginning of the contest), and so on. However, with the increased attention paid to callsign accuracy in recent times it seems reasonable that more of us are looking for the competitive edge that makes our "perfect" logs even more so. This desire for perfection has recently spawned some interesting debate.

When do contests really end? Has a contest run its course when we power down our stations on Sunday evening? Many will argue that the contest is not really over until we have completed our paperwork and handed the final package to the local postmaster. Although there are many views on this subject, they generally fall into two categories:

Scenario I: The contest ends with the last QSO. The log may only be modified to remove duplicates and identify unclaimed multipliers.

Scenario II: Although the "physical" time has expired for the contest, other methods may be employed to "sanitize" the log prior to submission.

Many of the contesters I've spoken to recently agree that the Scenario I crowd has a very small group of supporters. This is further substantiated by the input I received from last year's *CQ* Contest Ethics survey. In fact, over 60% of the respondents clearly leaned towards Scenario II.

Over the past few weeks I've been assembling a collection of methods contesters use when choosing the second scenario. If you haven't thought about this issue in great depth, I guarantee you will now. What follows are just a few examples.

1. Tape record the entire contest and correct incorrectly copied callsigns/exchanges.

2. Manually scan through an entire log and remove/correct incorrectly copied callsigns/exchanges.

3. Compare your log to another and remove/correct potential errors (note that this can be easily accomplished electronically).

4. Compare your log to a computerized "master database" derived from other contests to remove/correct potential errors (either during or after the contest).

5. Utilize the growing availability of computerized callsign lists (e.g., callbook listing, assigned FCC/foreign callsigns) to remove impossible callsign combinations.

When studying this topic, I uncovered more questions in my mind than answers. For example, if you utilize the aforementioned techniques, how should you use the new information? Is it fair to eliminate QSOs that retain high error potential? Or more importantly, is it even ethical to correct identified errors and take credit for QSOs that were invalid as originally logged?

I believe that contest sponsors have just begun to see one of the downside examples of computer technology in contesting. Any measure of enforcing guidelines (if in fact that is even needed) becomes quickly impossible to administer. Can you imagine disqualifying someone's log for being too accurate? The resolution to this debate must remain with the individual contributor. It persists as a personal standard you wrestle with as you weigh your "real-time" operating ability against the pressures of winning.

2 Baldwin Street, Windham, NH 03087

Calendar of Events

May	**26-27**	**CQ WW WPX CW Contest**
June	2-3	RSGB Field Day
June	2-3	ANARTS RTTY Contest
June	9-10	ARRL VHF QSO Party
June	9-10	South America CW Contest
June	10	CWC SSB Sprint
June	10	Portugal Day Contest
June	16-17	All Asian Phone Contest
June	16-17	SMIRK (6M) Party
June	23-24	ARRL Field Day
July	1	Canada Day Contest
July	**14-15**	**CQ WW VHF WPX Contest**
July	14-15	IARU HF World Champ.
July	20-21	World Radiosport Team Chp.
Aug.	4-5	ARRL UHF Contest
Aug.	18-19	New Jersey QSO Party
Aug.	25-26	All Asian CW Contest
Oct.	**27-28**	**CQ WW SSB DX Contest**
Nov.	3-5	ARRL CW Sweepstakes
Nov.	10-11	OK-DX Contest
Nov.	17-19	ARRL SSB Sweepstakes
Nov.	**24-25**	**CQ WW CW DX Contest**

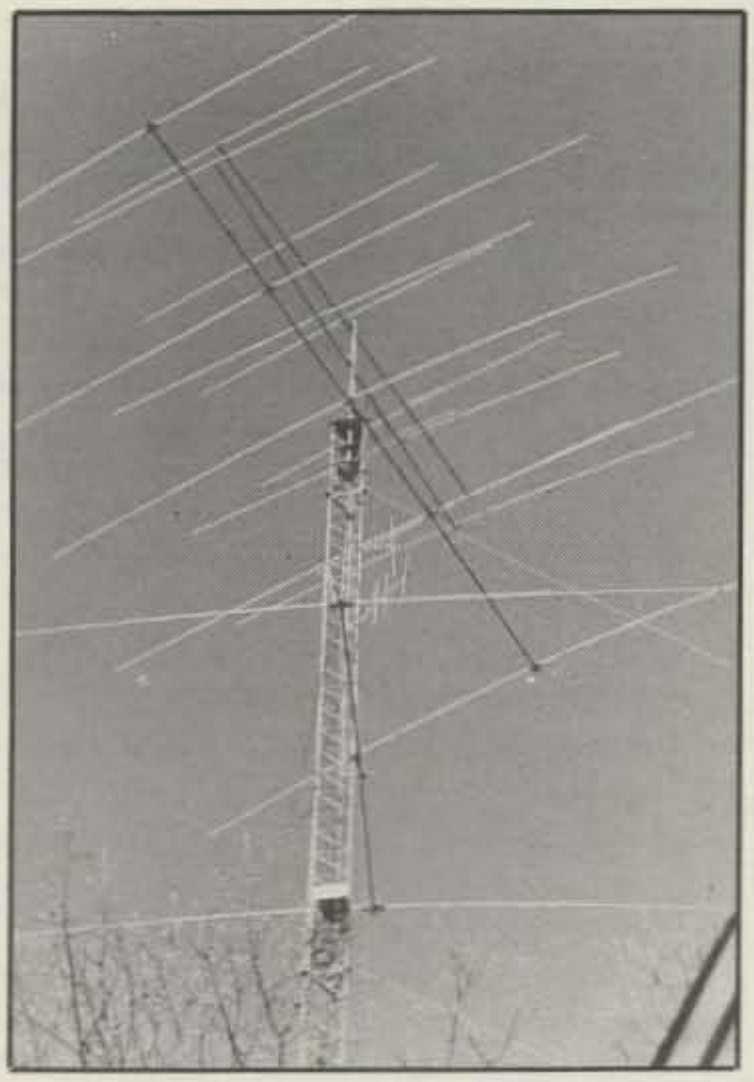
CQ Profiles: Ken Wolff, K1EA

There is an elite group in our amateur fraternity that I label "the do-ers." They are the ones who give back to the hobby much more than they take. The contributions by Ken Wolff, K1EA, easily fit this mold. Ken was originally licensed in 1962 as WN2CPV (remember the days of WN calls?). He later held WB2CPV and WA1UIK, and his present callsign is K1EA.

Ken's entry into the hobby started in a manner very familiar to most of us—interest derived from a brother's crystal radio kit. Although he never had the advantage of an "elmer," he shared the enthusiasm of a good friend, Howie Cahn, WB2CPU. Together Ken and Howie experienced amateur radio, quickly rising through the ranks from Novice through Extra. The locals often referred to them as the "CPU twins." In those days there was a two-year eligibility period for non-Extras to qualify for the hobby's highest license. After qualifying for their General licenses, Howie and Ken were on the FCC's doorstep exactly two years later ready to take their Extra exams.

Most 1960's amateurs had modest stations, and Ken's was no exception. He

Ken Wolff, K1EA.



A few of the many antennas at K1EA.

160 Meters	Inverted Vee at 120′
80 Meters	4-element ¼-wave Vertical Array Dipole at 100′
40 Meters	4-element KLM at 90′
20 Meters	4/4/4 Cushcraft Skywalkers at 40′, 80′, 120′
15 Meters	4/4/4/4 Cushcraft Skywalkers at 30′, 60′, 90′, 120′; and 3-element South Yagi at 65′
10 Meters	4/4/4/4 Cushcraft Skywalkers at 35′, 55′, 75′, 95′; and 3-element South Yagi at 45′
VHF	Various Antennas
Station	IC-781, TS-940S, TS-930S, AL1200, Alpha 78
Computers	Zenith 16 MHz 386, 10 MHz PC XT, 12 MHz PC AT

Fig. 1 - K1EA station description.

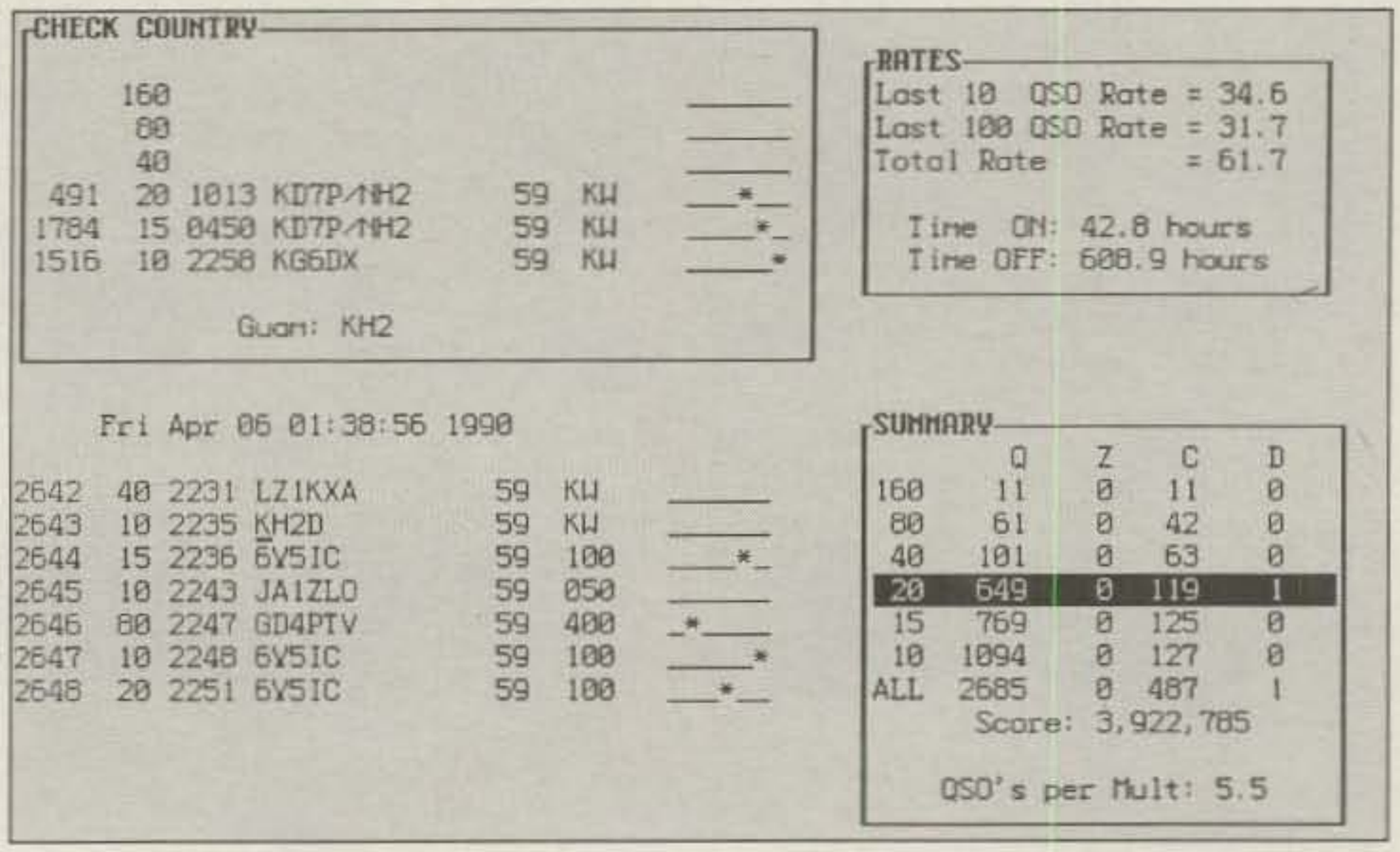


Fig. 2- Screen shot of K1EA CT contest logging program.

was the proud owner of a Heath DX-40 and a Lafayette bug. Those of you who savor amateur radio trivia will be interested in knowing that the manager of the Lafayette Radio store near Ken's QTH was Pete Chamilian, K2UTV (now W1RM). Pete, in fact, sold Ken his first bug!

For about six years (62-68), Ken specialized in traffic handling. He found it to be one aspect of the hobby that he could enjoy from his tiny station. However, Ken had frequent exposure to a bigger station when he cleverly managed to be available for babysitting duties for a nearby neighbor and amateur radio operator. Ken recalls how captivated he became with pileups of JAs and Europeans using Collins equipment and a tribander at 60 feet.

College and other interests took over the next few years, and it wasn't until 1975 that Ken was introduced to "big-time" contesting by Fred, K1VR, during an operation at W1ZA. After Ken made his first 100-hour into JA, he never wanted to leave the operating chair again!

Since the mid-70s Ken's entire focus in amateur radio has revolved around DX contesting. His interest in contesting stems from his intensely competitive nature. Ken's accomplishments are exceptional in that he has a unique ability to apply practical technological solutions to complicated amateur radio problems. Clearly, Ken's most recognized achievement is the development of his CT contest logging program. I can think of few examples where an individual's contribution to contesting had such rapid and broad impact. Although many think of Ken as contesting's "computer guru," he also possesses outstanding operating skill as evidenced by winning the 1987 *CQ* WW CW USA Single Operator category and numerous multi-operator efforts in more recent years.

One can't be an active participant in this hobby for nearly 30 years without one or two humorous stories to share. Ken had the pleasure to operate at one of the VP2VCW *CQ* WW expeditions a few years back. Unfortunately, the operators shared the experience with a swarm of bugs. Over a period of time the "bug patrol" left its 3 AM trail of destruction in the form of a smoking CX7A. More notable was a contest first—KQ2M left his operating position and ran for cover (perhaps a new Single Operator strategy has been born?).

Ken shares a growing concern by many over the future of contesting. Given the lack of fundamental change from our present course, he sees contesting reaching its peak over the next ten years. In particular, Ken feels that contesting needs fresh blood and will be the victim of the "baby boom" decline without the influx of new talent. In today's environment Ken is excited about the ever-growing QSO rates and interesting propagation openings. However, he is troubled by the extraordinary attention being paid to logging accuracy of late and feels a strong need to mediate between our desire for accuracy and trust in our fellow contester.

Ken, 41, is married to his wife, Jan, and has three children, Adriana 4, Elena 2, and Jesse 4 months. Professionally Ken is an Engineering Manager and manages to find limited time to pursue his non-amateur interests in computers and photography. There's only one thing better than meeting Ken or using his CT software, and that is sitting in a nearby chair and operating a contest with him. Keep up the good work, Ken!

Closing Remarks

In New England we are just putting away our snow shovels and beginning to think about an exciting summer of new antennas. This summer should be very interesting as we see the worldwide gathering of contesters at the July Goodwill Games (see May 1990 Contest Calendar). Remember, the deadline for the September column is July 1.

73's, John, K1AR

Results of the 1989 CQ World-Wide VHF WPX Contest

SINGLE OPERATOR UNITED STATES

NR1E	A	13,260	148	78
K3ZO	A	11,242	154	73
KM4MP	A	5,415	95	57
N0LL	A	5,376	75	64
WB2ODH/6	A	3,740	80	44
W6PFE	A	1,664	64	26
KA1CDZ	A	910	35	26
NJ7A	A	720	28	24
KD8SI	A	448	24	16
KA2MCU	A	24	4	4
N0BSH/9	50	17,724	211	84
WA1TRE	50	6,820	124	55
WD5K	50	4,950	99	50
K0CS	50	3,950	79	50
W0KEA	50	3,690	82	45
WB5RUS	50	3,362	82	41
KC7IJ	50	1,870	55	34
KK6C	50	1,025	41	25
WB8RDY/4	50	483	23	21
NT8V	50	208	16	13
KA0TLJ	144	7,400	148	50
NA9N	144	756	36	21
KB5ECK	144	435	29	15
ND1V	144	340	20	17

PORTABLE OPERATION

WA4PGM	144	1,222	47	26

LOW POWER

WA2FUZ	A	10,833	116	69
WA2UDT	A	2,562	52	42
N8AXA	A	1,160	32	29
N4KWX	A	748	34	22
AA4LE	50	1,457	47	31
KS9J/0	50	63	9	7

MULTI-OPERATOR MULTI-BAND

N2BJ	41,987	257	125
W5TEX	10,076	175	44
NW7O	7,800	115	50

MULTI-OPERATOR SINGLE BAND

KM5X	50	15,400	211	73
N7AMA	50	9,548	154	62

DX

YU3ZO	A	22,344	219	84
IV3VFP	A	3,780	105	36
JI3BFG	A	1,728	49	32
JN1GKZ	A	198	12	9
YC0UVO	A	189	14	9
YU3DBC	144	33,681	327	103
DL2OM	144	26,215	245	107
OK1MG	144	5,487	177	31
OK5SRR	144	2,697	96	29
EB7NK	144	1,600	50	32
SP6ASD	144	1,102	58	19
OK2BMU	144	1,098	91	12
EA7CPW	144	1,050	42	25
YD1UJU	144	460	46	10
EA5DIT	144	286	27	11
EA1BFZ	144	264	22	12
CT1DIZ	144	95	16	6

PORTABLE OPERATION

JH7VIB/7	50	4,608	96	48
VE3KRP /VE3	50	198	18	11
OK1MAC/P	144	50,078	511	98
OK1VFA/P	144	26,151	379	69
OK2VIA/P	144	18,630	270	69
OK1ORA/P	144	10,976	224	49
HG6VV/P	144	7,105	145	49
OK2BPN/P	144	3,828	132	29
OK1DWD/P	144	2,226	159	14
OK2KHF/P	144	1,365	92	15
OK3AUI	144	294	42	7

MULTI-OPERATOR MULTI-BAND, PORTABLE

OK1KPA/P	MM	23,115	345	67
VE2UMS	MM	198	33	6

LOW POWER

ZX5C	A	133	19	7
G4UPS	50	1,053	39	27
OK1ADS/P	144	58,617	501	117
OK2ZU	144	540	36	15
YD1TQH	144	35	7	5
ON8WN	144	6	3	2

FM ONLY

JP1DMX /HI8	144	4	4	1
JG7LBN	144	1	1	1
JK1REJ	432	4	2	1

MULTI-OPERATOR MULTI-BAND

DF0BV	133,777	559	203
JA1YAD	43,080	385	60
JA1ZEO/1	30,960	329	72
EA6VQ	25,160	288	74
HG2P	22,869	254	77

MULTI-OPERATOR SINGLE BAND

F6IFR	144	195,041	1309	149
PA2TMS	144	87,508	668	131
DL0WW	144	49,654	407	122
4N2Y	144	23,030	329	70
HG8KAX	144	640	32	20
JA1WYG	432	9,760	305	16
OK1KEI	1296	240	10	6

RSGB National Field Day

1500 to 1500Z Sat.–Sun., June 2–3

Activity for this CW-only Field Day is not confined to Great Britain. You will also hear some portable activity out of Germany and Switzerland.

Although overseas stations are not directly eligible, they are invited to participate and submit a report of the stations worked.

A certificate will be awarded to the overseas station in each continent that shows the most contacts. Send your logs to: RSGB HF Contest Committee, P.O. Box 73, Lichfield, Staffs., WS13 6UJ England.

ARRL VHF Contest

1800–0300Z Sat.–Mon., June 9–10

Action will be found on the 50, 144, 220, and 420 MHz bands, and even higher up in the spectrum.

The scoring varies with the different bands used, and there are certain requirements and restrictions in the rules. Working WAS on 6 meters is a possibility. Complete rules will be found in the May issue of *QST*.

I strongly recommend that you write to ARRL Headquarters for official forms. Include an SASE with your request to: ARRL VHF Contest, 225 Main St., Newington, CT 06111.

South American CW Contest

1500Z Sat. to 1500Z Sun., June 9–10

Sponsored by *Electronica Popular* magazine of Brazil, this is an annual affair the second weekend of June.

It's still a CW contest only, but you can work stations in other continents as well as South America. Use all 6 bands, 1.8 through 28 MHz.

Classes: Single operator both single and all band, multi-operator, single transmitter, all band only and SWL.

Exchange: RST plus a QSO number starting with 001.

Points: Contacts with stations in own country zero points but okay for multiplier credit. Other countries but same continent, 2 points. Countries in other continents, 4 points. Contacts with South American stations, 8 points. (For stations outside of S.A.)

Multiplier: Different countries (DXCC list) plus the different South American prefixes worked on each band.

Final Score: Total QSO points times the sum total multipliers from each band.

Awards: Certificates to the three top-scoring stations in each country in each class.

Use separate log sheets for each band and a summary sheet showing the scoring and other essential information. Include an SAE with return postage for a copy of results.

Logs must be received no later than July 31st and go to: WWSA Contest Committee, P.O. Box 2673, 20001 Rio de Janeiro, RJ, Brasil.

Portugal Day Contest

0700Z to 2400Z Sunday, June 10

To commemorate Portugal Day (June 10), R.E.P. (RDED dos Emissotes Portugueses) is sponsoring the 1990 Portugal Day Contest. Contest operation is SSB only and open to participants worldwide.

Operating Class: Single Operator, All Bands.

Exchange: Portugal—RS plus two-letter county name. All others—RS plus serial number beginning with 001.

Scoring: DX to DX 1 point; DX to Portugal/Spain 2 points; Portugal/Spain to Portugal/Spain 1 point (40/80 meters only). Same station may only be worked on each band for QSO points. Contacts within same country only count for multiplier.

Multipliers: Each Portuguese county (18), DXCC country, and continents (only count multipliers once, not each band). Final score is total QSO points times multiplier.

Awards: Plaques will be awarded to the top five overall scores and each DXCC country leader (depending on the number of entries/country). Certificates will be issued to any entry with more than 50 QSOs.

Use separate logs for each band and include the usual summary sheet with signed declaration. Mailing deadline is July 30th, 1990 to: REP Contest Manager/DP90, Apartado 2483, 1112 Lisboa Codex, Portugal.

CWC Worldwide SSB Sprint

1800 to 2400Z Sunday, June 10

This is a new one sponsored by Canadian CWC Contest Club and is only 6 hours long. Operation is limited to 10-15-20 meters SSB and is open to single operator contesters throughout the world.

Exchange: RS plus serial number beginning with 001.

Multipliers: Each DXCC country and U.S./Canadian call area, plus VY1, and VO1/VO2.

Scoring: Score 5 points for QSOs outside your continent. All others (including you own country) count 3 points. Credit 50 bonus points for working club station

VE1CWC. Final score is total QSO points times sum of multipliers.

Awards: A plaque will be awarded to the overall contest winner. Certificates will be sent to the top five finishers in North America, top three in Europe, and the top finisher in other continents.

Entries are due by July 10, 1990 and are to be sent to: VE1CWC, 19 Marlborough Dr., Sydney, NS B1S 1W7, Canada.

SMIRK (6 Meter) QSO Party

0000Z Sat. to 2400Z Sun., June 16–17

This is the 15th annual QSO party sponsored by the Six Meter International Radio Klub (SMIRK). The party is open to all, members and non-members, but it seems to be geared for membership participation.

Cross-band contacts are not permitted and competition is for single-operator only. Operation, of course, is confined to the 6 meter band.

Exchange: SMIRK number and grid square.

Scoring: Two points for each SMIRK contact; 1 point with non-members. Multiply total QSO points by number of different grid squares worked.

Awards: Certificates for winning scores in each ARRL section, foreign state, province, prefecture, United Kingdom shire/county/region, and country.

The new official log forms must be used. A large SASE to KA0NNO will get you detailed information and the new log forms.

It is strongly recommended that all contacts between stations in the contiguous 48 states take place above 50.125. Only contacts with stations outside the 48 states should take place below 50.125. This will help eliminate QRM to overseas stations.

Send your entries no later than July 6th to: Lisa Lowell, KA0NNO, P.O. Box 307, Hatfield, AR 71945.

All Asian DX Contest

Phone: June 16–17 C.W.: Aug. 25–26
0000Z Sat. to 2400Z Sun.

This is the 31st year of this activity sponsored by the JARL. The exchange is between Asian countries and the rest of the world.

Classifications: Single operator, both single and all band. Multi-operator, both single and multi-transmitter, all band only (one signal per band only).

Club stations are classified as multi-operator and each operator will give his age in the exchange.

Exchange: For OM's—RS(T) plus age of operator. For YL's—RS(T) and 00.

Scoring: 3 points for contacts on 160; 2

points for contacts on 80; 1 point on all other bands. (KA contacts do not count.)

Multiplier: For Asians the multiplier is determined by the number of different countries worked on each band (DXCC list). For non-Asians it is determined by the number of different Asian prefixes worked on each band (*CQ* WPX list).

Final Score: Total QSO points from all bands times the sum of the multiplier from each band.

Keep in mind that non-Asians use Asian prefixes as their multiplier, not countries.

Note: JD1 stations on Ogasawara (Bonin and Volcano) are in Asia, and JD1 stations on Minamitori Shima (Marcus) are in Oceania.

Awards: Certificates to the top scorers, both phone and CW, in each country and each U.S. call area. In each class, both single band and all band, up to the fifth rank, depending on the number of returns. Medals to the all-band continental leaders, both single and multi-operator.

Logs: Keep all times in GMT. Use a separate column for the country or prefix multiplier, and fill in only the first time it is worked. Use a separate log for each band. Include a summary sheet showing the scoring and other information, and a signed declaration that all rules and regulations have been observed.

There is a strict disqualification clause for taking credit for duplicate contacts in excess of 2% of the total on each band, as well as other infractions.

Logs must be received no later than Sept. 30th for the Phone section, and Nov. 30th for the CW section. They go to: JARL Contest Committee, P.O. Box 377, Tokyo Central, Japan.

Asian Country List: A4; A5; A6; A7; A9; AP; BV; BY; CR9; EP; HL/HM; HS; HZ/7Z; JA-JR; JD1; JT; JY; OD; S2, TA; UA/UK/UV/UW9-Ø; UD6; UK6C, D, K; UF6/UK6F, O, Q, V; UG/UK6G; UH8/UK8H; UI8/UK8A, G, I, L, O, T, Z; UJ8/UK8J, R; UL7/UK7; UM8/UK8M, N; VS6; VS9M/8Q; VU; VU (Andaman & Nicobar); VU (Laccadive); XU; XV/3W; XW; XZ; YA; YI; YK; ZC4/5B4; IS (Spratly); 4S; 4W; 4X/4Z; 70 (S. Yemen); 70 (Kamaran); 8Z4; 9K; 9M2; 9N; 9V; (Abu Ail).

ARRL Field Day

1800–2100Z Sat.–Sun., June 23–24

Without a doubt this activity generates more stateside participation in manpower than any other amateur radio activity. It is mostly a club-organized activity, and requires that the coordinator be knowledgeable about what is required.

Entries are separated into many classes. Rules and requirements are quite extensive and will be found in the May issue of *QST*. It is advisable that you read them thoroughly.

Official log forms are a must. Direct your request with a large SASE to the ARRL, ARRL Field Day, 225 Main St., Newington, CT 06111.

Canada Day Contest

0000 to 2400Z Friday, July 1

Sponsored by the Canadian Amateur Radio Federation, this contest is open to all amateurs. Everyone works everyone on both sides of the border.

Classes: Single operator—All Band, CW, SSB, and both modes. Single band, CW/SSB. Multi-operator—Single transmitter and multi-transmitter, all band only.

Exchange: Name, RS(T), QSO no., province, territory, state, or country. Multi-multi stations use separate QSO no. for each band.

Scoring: 10 points for each Canadian contact, 4 points for contacts with stations outside of Canada, and 20 points can be claimed for working each official station using the VCA or TCA suffix.

Multiplier: Each Canadian province/territory worked on each band and mode.

Frequencies: 1825/75, 3525/3775, 7075/70/155, 14025/150, 21025/250, 28025/500.

Awards: Certificates to winning stations in each class, in each province/territory, DX country, and each US call area. Trophies for top scorers, all band, CW, SSB, and both modes. Single band 14 and 7 MHz. And multi-single and multi-multi stations.

Include a summary sheet with your entry showing the scoring, etc., and the usual signed declaration that all rules and regulations have been observed.

Mailing deadline is July 30th to: CARF Contest, Att: John Clarke, VE1CCM, 16 Keefe Ave., Sydney, Nova Scotia, B1R 2C7 Canada.

MorseMan Plus - the complete IBM-PC based Morse Code trainer

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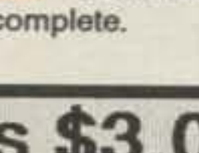

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10 or more - $2.50 each
(3.5" disks - add $1.00 each)

761 FORTRAN Library - 142 Routines for Microsoft/Lahey compilers.

778, 779 EasyCASE (2 disks) - computer aided software engineering (CASE) tool. (EGA req'd)

780 VMix - top-notch multitasking UNIX-like shell. Run up to 4 tasks at once, even remotely! Like DESQview.

783, 784 - JORJ (2 disks) - a 58,000 word, on-line dictionary. Beats most commercial system!

1050-1052 World Digitized (3 disks) - Over 100,000 points outlining natural and man made borders. Great for making your own map applications.

1081 Ham Radio 1 - MiniMUF (compiled version) propagation forecaster and satellite tracking (CGA req'd).

1082 Ham Radio 2 - Packet-related - YAPP 2.0 and PackTalk terminal programs.

1084 Ham Radio 4 - Handy programs for the ham. All counties, antenna design and more (requires BASIC)

1085 Ham Radio 5 - antenna analysis, RF engineering & HF/VHF propagation, Smith chart & CW decoder.

1086 Ham Radio 6 - Sunrise/Sunset predictions, RF/circuit analysis tools and tropospheric loss prediction.

1087 Ham Radio 7 - QSL maker, SEVERAL engineering programs, grid square calculation AND MORE!

1089 Mapper - an EXCELLENT world map that shows grayline, MUF, LUF, shortpath, beam headings & more.

1090 MiniProp 2 - The king of propagation forecasting. Gives detailed conditions. Easy to use.

1097 RD-SSTV - easy way to receive SSTV pictures with the PC. Hook up via serial port & speaker output.

1099 Kenwood Rig Control - control your TS440 and TS940 with your PC. Even works on the TS140.

1110 DX Contest Logger - version 4.25 of the legendary K1EA contest logger.

1120 Total Ham! - a popular multi-purpose, all-in-one utility program. Simultaneous logging, beam headings, awards, counties & other record keeping.

1121 Amateur Radio Logbook - a great little logbook program written in C. Uses FAST indexing and generates full reports.

1130 Scan-dB scanner users database - great for scanner & shortwave buffs. Tracks frequencies with detailed comments. Yields dBase compatible files.

1131 HAMFEST - a great mailing list system for hamfest attendence. Many, many features!

1137 RTP - terminal program for packet. Includes WEFax program for the PK232 TNC.

1140 W0RLI Packet BBS - the dominant packet radio BBS program. Complete with all information. (order #1141 for WA7MBL packet BBS).

1142 PMB Mail Box - personal mail box for older Kantronics TNC's that don't have a built-in mail box feature. Similar to the mailbox on the KAM, KPC2, ect.

1143 KAM RTTY - A dedicated RTTY/ASCII/AMTOR/CW program for the Kantronics KAM. Even includes the Turbo Pascal source code.

1144 MFJ Terminal Program - dedicated to the MFJ line of TNC's Rivals commercial versions.

1145 PK232 Terminal Program - for the AEA PK232

1148 PicPro/WeFAX - WeFax and packet pictures via your Kantronics TNC (EGA req'd for WeFAX)

1149 GeoClock - Real-Time grayline map of Earth. Like DX-Edge. (CGA/Herc) -for EGA/VGA version order #1150.

1155 USN Floppy Almanac - US Naval Observatory yearly directory of astronomical data.

1156 SKYGlobe - EXCELLENT star "gazer" system. Shows 89 constellations plus MUCH more!

1202, 1203 Tracker (2 disks) - Top notch hurricane tracker with great graphics.

1249 World 29 - good world-view map system. Even allows you to zoom in on any location.

1250 World Atlas - nice public domain atlas program.

1031-1303 Brother's Keeper (3 disk set)- very complete genealogy system. Complex, but easy to use.

1311-1318 On-Line Bible (8 disk set) - The King James version of BOTH Old and New Testaments. Has online browse and search facilites.

renaissance software library

RSL

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box 640 - killen - alabama - 35645

1989 CQ WW DX CW High-Claimed Scores

The following are CW high-claimed scores. These are raw scores only, subject to verification.

DX
Single Operator
All Band

P40GD	7,945,619
D44BC	7,093,080
TU4B	6,669,850
8P9HT	6,571,184
HC8U	6,032,598
9Y4H	5,710,159
ZB2X	5,632,014
OH0MM	5,448,744
SU1RR	5,275,185
PJ4U	5,026,080
FG5R	4,874,535
UZ9AYA	4,350,181
UW0LT	4,131,000
UA9SA	4,008,620
G3FXB	3,983,282
YT3AA	3,855,332
CR2A	3,820,320
LY3BP	3,319,866
9M6NA	3,307,764
OZ1LO	3,269,467
OH4NRC	3,226,329
JA5DQH	3,220,154
GW4BLE	3,177,044
VE6OU/3	3,148,977
VS6BG	2,961,739
UB4MM	2,857,946
G3XTT	2,843,998
9Q5DX	2,840,992
KE9A/DU3	2,788,612
VO1MP	2,731,830
OH6YF	2,663,952
LY3BA	2,497,584
OK2SSS	2,477,856
JH7WKQ	2,472,093
OH2PM	2,397,664
VK2DXI	2,389,240
YU3BO	2,362,830
OH7MA	2,348,160
KL7RA	2,309,204
RZ9UA	2,302,790
JH1AEP	2,216,950
OK3DX	2,156,000
XE1RYQ	2,045,868
JA1NUT	2,045,340
JA8YBY	2,039,262
JA8RWU	2,038,300

28 MHz

OH0XX/EA9	2,069,172
ZP0Y	1,692,429
CW8B	1,520,484
YV3A	1,518,230
LT8WW	1,490,512
YU3VM	1,178,857
KH0AM	994,544
J79DX	859,360
VK8XX	848,990
OH2BBF/0	735,264
KH2D	716,800
JH1DTC	704,736
LZ1KDP	699,515
AH6/W1WEF	646,806
JA5BJC	613,312
C56/OH7XM	612,596
I3JSS	587,412
UZ9CO	572,976
UA9AN/UI	563,178
IT9TQH	559,790
OH2BA/EA	556,376
IO3VJW	552,015
G3TXF	542,572
UC2OL	542,160
F6AUS	531,675
G4CNY	512,584
G3HCT	490,050
LZ1W	481,800
LY2PCI	474,150
U5WF	449,328
YB0TK	444,500
LZ1KAZ	442,152
SM6BJI	434,601
VE2LJ	425,972
OH6NIO	421,960
F6BBJ	403,254

21 MHz

N7DF/NH2	1,233,625
9Y4VU	1,058,772
EA8BPW	986,368
UB5WE	980,001
CE3DNP	916,020
KH0/JF2SKV	831,546
YU1AO	813,233
VE7SZ	802,032
OH6MCW	775,620
AL7CQ	741,394
YZ3A	695,959
OH6AC	693,438
OH5BM	632,548
LZ1V	519,225
OY3QN	507,111
4N4I	478,125
DL0IU	455,884
UR2RGN	455,280
YV4ABR	448,455
4N3E	447,876
UT4UZ	426,283
F6HSV	425,658
JP1DMX/HI8	416,053
LZ1A	409,596

14 MHz

4Z8DX	1,198,476
VE2ZP	807,234
YU2W	791,365
UA1DZ	765,545
SM0AJU	638,312
VE7CXR	559,773
YT3T	556,792
DF0DX	555,660
4N4GD	483,664
VK2APK	476,631
JA2NDQ	465,885
UV1AA	436,450
JA7SGV	430,344
F6FYA	423,738
OZ7HT	371,070
OH1VR	311,874
UY5ZM	262,866
UA9UFB	245,120
SP4HKB	240,005
VE3NBE	239,447
YU4BR	228,872
HI8WA	221,728
UC2ACZ	219,096
UL8GB	202,613

7 MHz

YW1A	750,078
ON4UN	623,070
YT7A	398,790
JW8XM	334,338
OH3UU	291,755
Y21NE/A	231,030
UC2OE	221,280
OK1FUA/P	204,355
OZ1FTE	197,472
UA9XHT	186,300
UF6FAL	182,496
G3IGW	169,074
JA0UMV	165,825
SM0CCE	157,976
UA6LTI	156,120
SM5IMO	147,075
OK1FKM	138,303
JH1GTV	133,634
JA0KAZ	125,048
YU3QI	120,225

3.5 MHz

TA2BK	371,365
LY2WR	241,250
UT5UGR	221,556
YT9V	179,653
LZ2KRU	170,156
OH1AD	169,613
UR2RMC	102,790
UA9CI	86,175
UC1AWW	80,940
RF6FO	74,048
YU3OJ	71,682
I3VHO	65,380
OK2BGD/P	65,264
UQ2GIZ	61,523
OZ1HZI	56,146
RB5NC	55,063
LY3BS	53,746
JA1SYY	52,516
UA9WS	51,300

1.8 MHz

LY2BTA	97,524
YT2R	48,576
OY9JD	47,854
OK3TPV	39,195
UA6LIG	34,440
OK1DQW	34,320
VE1ZZ	29,448
CT1AOZ	23,660
UA9AQN	20,120
UC2LDW	17,184
UW1TB	13,536
F6AML	11,286
VE3DO	11,268
OK1DRU	10,580
OK1DWJ	10,476

Multi-Operator
Single Transmitter

4J5FV	11,951,812
EA9EA	11,771,550
EA8AGD	10,935,254
LZ9A	10,017,368
OL8A	9,283,904
IQ4A	8,311,245
RQ7W	8,198,411
CN0A	7,767,192
4U1UN	7,707,828
OK5R	7,380,535
VP5Q	7,084,207
HG0X	6,869,716
EA3VY	6,793,544
UR1RWX	6,508,294
OK5W	6,439,885
TX5A	6,196,608
SN3A	6,130,701
LY2WW	5,132,160
UP1BZG	5,104,000
KC6AA	5,044,520
IP4T	4,948,979
G3LNS	4,587,840
Y35L	4,504,830
ZW0F	4,463,316
HG5C	4,261,362
JA7YAA	4,244,868
Y41CM	3,906,648
JA1YDU	3,899,928
HB9CIP	3,583,346
SK5EU	3,466,974
IY2A	3,408,016
DL0WU	3,281,894

UL8CWW	3,181,155
YU3AI	3,167,640
KX6OI	3,077,625
LY1BYK	3,014,283
UZ0QWA	2,893,449
UZ4WWY	2,875,470
JA3YBF	2,780,955
DF0RR	2,734,191
YT2D	2,694,176
G3SZA	2,352,114
UB4WZA	2,279,448
UB4QWW	2,229,843
CE1LDS	2,227,386
OK3RJB	2,201,342

Multi-Operator Multi-Transmitter

CT3M	34,045,936
LX7A	23,718,825
NL7G	19,008,588
RB8M	18,805,310
4U0ITU	17,392,463
J6DX	15,807,015
PA6DX	13,840,008
OH1AA	10,897,280
JE2YRD	9,125,388
UP1BZO	8,116,850
VE7ZZZ	7,784,920

Single Operator Assisted (Unlimited)

K1DG	5,087,610
K3WW	4,602,728
KE3Q	3,652,453
N3AD	3,363,936
N4KG	3,158,204
K1VR	3,068,040
W2REH	2,764,152
KR2J	2,589,552
K8MR	2,570,184
NN3Q	1,862,728
AK1A	1,834,854
K9RS	1,775,559
WB3JRU	1,758,500
W0CG	1,695,778
AA3B	1,505,770

QRP All Band

W2TZ	994,889
G4BUE	928,440
YU3OH	848,046
K7SS	693,034
YU2TY	641,950
F1BEG	595,680
K1CGJ	585,365
7J6CAM	574,938
UB5PAG	564,335
SM0DJZ	515,478
UL7JW	513,454
SM5CCT	472,230
KE7X	460,600
AD1C	450,182
HB9ADD	427,944
UD6DFF	389,367
N7IR	379,088
N1AFC	322,272
UA4YJ	309,118
LZ1KHB	300,120

USA Single Operator All Band

K3TUP	5,575,913
K1CC	4,694,664
W9RE	4,661,853
W1KM	4,524,637
N5AU	4,395,825
N2LT	4,205,460
N5RZ	4,044,612
K3NA	4,010,743
AA1K	3,996,243
N6BV/1	3,988,500
W3BGN	3,861,102
K3ZO	3,562,120
W0ZV	3,534,810
N4AR	3,416,300
K4PQL	3,376,892
K1XA	3,208,127
N2BA	3,173,121
W4RX	3,139,272
N6AR/4	3,087,472
WZ4F	3,026,844
K5MM/7	2,898,266
NN7L	2,715,012
KU2C	2,676,711
W1PH	2,608,848
WX4G	2,589,498
W3UM	2,570,910
K2SX/1	2,555,808
AI7B	2,509,713
AD5Q	2,384,348
W3VT/4	2,321,984
K2KIR	2,207,802
WB3KKX/8	2,185,668
K3VW	2,083,585
W1WAI	2,013,264

28 MHz

K1ZM	767,428
K4XS	604,035
N8CXX	553,868
W9SU	550,565
N4ZZ	541,926
W4XJ	509,048
K9UWA	504,594
N2AU	495,276
WB9YXY	491,253
N2DT	490,200
KD2RD	489,552
W6YA	454,358
KC9T	453,620
K3UA	453,065
W0JLC	437,822
KI2P	434,973
W6NV	427,481
K0ZX	421,820
K1BW	415,152
K5RX	406,464
K6PU	405,426
W8WA	397,437
NK2D	396,606
W8FJ/3	393,965
KT7G	352,674

21 MHz

W7WA	772,146
N6RO	677,754
KJ9D	553,888
K9BG	536,148
N4RR/9	508,944
NB2P	490,390
K9PPY	485,742
N4VZ	456,489
KM1X	434,160
N7RO	332,670
N3JT	275,493
WB5UDX	264,795
NF7P	249,480
K1RM	247,832
N2DTW	245,700
W2FXA	242,570
K7LXC	239,444
K4TKM/6	204,255

14 MHz

K2EK	903,200
W1RR	716,550
N5CR	700,135
WY7I	609,980
W5FO	477,636
W1YN	341,187
K9UIY	338,985
WB0O	239,196

7 MHz

K1NA	422,272
W3GG	332,904
K2ZJ	321,408
N6RJ	260,145
WZ4Z	237,998
KS9O	226,791
N4IJ	209,076
AA4V	197,640
W6PU	186,381
K9AY/0	173,224
N4UA	168,187
WA4JTI	163,248
N6BFM/4	162,890
WF5E	161,650
WM5K	155,208

3.5 MHz

W1FV	175,145
KC7EM	90,072
N2KK/6	53,898
W0CD/8	41,904
KB0G	34,080
KG4W	26,320
WB9Z	23,572
K0II	15,120

1.8 MHz

K5UR	14,718
K4TEA	13,068
KV0Q	7,224
AB4RU	3,952
NO4J	1,740
KG9N	578
K0CS	522

Multi-Operator Single Transmitter

K1AR	9,383,458
N2RM	8,612,840
N4RJ	7,811,622
N3RS	7,681,856
K8AZ	6,458,385
K1IU	5,763,520
K0RF	5,544,000
W3XU	4,932,900
W8FN	4,589,244
N3BB/5	4,281,903
WD8LLD	3,747,600
WB8K	3,712,467
W6BA	3,414,970
K2SG	3,350,880
N3LR	2,610,186
K0RWL	2,607,864
N2NU	2,488,569
KC5DX	2,356,608
W0RLX	2,146,799
W0ZZ/6	2,111,690

Multi-Operator Multi-Transmitter

W3LPL	17,077,751
KY1H	12,974,178
K1ST	12,679,525
NR5M	12,422,015
K4VX/0	12,044,760
K5NA/2	11,377,640
W0AIH/9	10,412,790
N6ND	7,889,579
KO7N	7,798,665
N6DX	7,684,000
K6UA	7,207,821
W3GM	6,980,436

AWARDS

BY DOROTHY JOHNSON, WB9RCY

NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for June is:

Al Cornwall, W7HZL
USA-CA All Counties #618
All CW, 5-10-89

"My first radio was a crystal set. The coil was a 'Quaker Oats' box. I was ten years old. The man across the street was a radio amateur who guided me in making it.

"I took radio up again after I was discharged from the Navy in 1957. I attended the local radio club and learned CW from W6MLZ, Ray Meyers. He let me use an old Army tape machine and a bunch of tapes. I passed my Novice exam in October 1957 and upgraded to General class very soon thereafter. Later I went to Extra class.

"By the time I made Extra class I had already become a DX hound. I met Bill, W7GHT, on the Idaho-Montana traffic net. He invited me to a mini-convention at his QTH. I met a great bunch of county hunters there and Bill gave me a county map book. I obtained my county record books and had 600 counties already worked on CW. I was off to a good start. The 21st cycle was going out fast, so the time was right to chase counties. There are a few spots in the U.S.A., Hawaii, and Alaska that take time and a little patience to work. I have copied them at least twice.

"County hunting is fun and one makes many friends. I am grateful to *CQ* magazine for giving me the opportunity to earn this award. I thank all of the dedicated operators and the great CW people out there: W1TEE, N0CYB, WA6VJP, NF0X, W3XE, NG0T, and many more. The beautiful certificate calls to mind the beautiful people who have made this possible. Last but not least I want to thank Dorothy Johnson, WB9RCY, custodian of the County Hunters Awards program, whose excellent work is immensely helpful to all of us.

"I will continue to run counties in Oregon, Washington, and Northern California.—Very 73, Al Cornwall, W7HZL."

Al Cornwall, W7HZL, proud holder of USA-CA All Counties #618, and an array of other fine awards.

Awards Issued

Howard Clark, WA4KER, made a clean sweep of it by claiming USA-CA All Counties #655, USA-CA 3000 #683, USA-CA 2500 #758, USA-CA 2000 #828, USA-CA 1500 #912, USA-CA 1000 #1107, and USA-CA 500 #2396, Mixed, dated 2-3-90.

Donald L. McMinds, WD7X, also filed a completely filled record book and received USA-CA All Counties #656, USA-CA 3000 #684, USA-CA 2500 #759, USA-CA 2000 #829, USA-CA 1500 #913, USA-CA 1000 #1108, and USA-CA 500 #2397, All 20M SSB Mobile, dated 2-3-90.

Leonard A. Postage, N4UMR, updated his good record by claiming USA-CA 2500 #760, and USA-CA 2000 #830, All SSB, dated 2-17-90.

Jack D. Cale, N8FEB, collected another group of confirmations and qualified for USA-CA 2500 #761, All SSB, dated 2-23-90.

USA-CA 500 certificates went to:

Howard Clark, WA4KER, USA-CA 500 #2396, Mixed, 2-3-90.

Donald L. McMinds, WD7X, USA-CA 500 #2397, All 20M SSB Mobile, 2-3-90.

Sally E. Butzow, KB9AFA, USA-CA 500 #2398, Mixed, 2-20-90.

Walter Page Pyne, WA3EOP, USA-CA 500 #2399, Mixed, 2-24-90.

George A. Graikos, SV1NA, USA-CA 500 #2400, Mixed, 2-28-90.

333 South Lincoln Ave., Mundelein, IL 60060

USA-CA Special Honor Roll

Howard Clark, WA4KER
USA-CA All Counties #655
Mixed, 2-3-90

Donald L. McMinds, WD7X
USA-CA All Counties #656
All 20M SSB Mobile, 2-3-90

USA-CA Honor Roll

3000		1500	
WA4KER	683	WA4KER	912
WD7X	684	WD7X	913
2500		**1000**	
WA4KER	758	WA4KER	1107
WD7X	759	WD7X	1108
N4UMR	760		
N8FEB	761	**500**	
		WA4KER	2396
2000		WD7X	2397
WA4KER	828	KB9AFA	2398
WD7X	829	WA3EOP	2399
N4UMR	830	SV1NA	2400

The total number of counties for credit for the United States of America County Award is 3076. The basic award fee for subscribers to *CQ* 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 Communications, 76 North Broadway, Hicksville, NY 11801, U.S.A. for $1.25. To qualify for the special subscriber rate please send a recent *CQ* mailing label with your application. To be eligible for the USA-CA, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated April 2, 1985. A complete copy of the rules may be obtained by sending an SASE to Dorothy Johnson, WB9RCY, USA-CA Custodian, 333 South Lincoln Avenue, Mundelein, IL 60060, U.S.A. DX stations must include extra postage for airmail reply.

MFJ TUNERS

Here is the finest 3 KW Tuner money can buy with roller inductor, dummy load, *new* peak reading meter, antenna switch, balun plus more ... $349.95

The MFJ-989C is not for everyone.

However, if you do make the investment you get the finest 3 KW PEP tuner money can buy - one that will give you a lifetime of use, one that takes the fear out of high power operation and one that lets you get your SWR down to absolute minimum.

The MFJ-989C is a compact 3 KW PEP roller inductor tuner with a new **peak** reading Cross-Needle SWR/Wattmeter. The roller inductor lets you get your SWR down to absolute minimum.

With **three continuously** variable components - two massive 6 KV capacitors and a high inductance roller inductor - you get precise control over SWR **and** the widest matching range possible from 1.8-30 MHz.

MFJ-989C **$349.95**

You get a **new** lighted **peak** and average reading Cross-Needle SWR/Wattmeter with a **new** more accurate directional coupler.

You get a giant two core balun wound with teflon wire for balanced lines and a 6-position antenna switch with extra heavy switch contacts.

Its compact 10¾x4½x15 inch cabinet fits right into your station.

You get a 50 ohm 300 watt dummy load for tuning your exciter, a tilt stand for easy viewing and a 3-digit turns counter plus a spinner knob for exact inductance control. Add $10 s/h.

2-knob *Differential-T*™ Tuner

MFJ-986 **$289.95**

The **new** MFJ-986 Differential-T™ 2-knob Tuner uses a differential capacitor to make tuning foolproof and easier than ever. It ends constant re-tuning with broadband coverage and gives you minimum SWR at only **one** best setting. Covers 1.8-30 MHz.

The roller inductor lets you tune your SWR down to absolute minimum. 3-digits turns counter lets you quickly return to your favorite frequency.

You get MFJ's **new** peak and average reading Cross-Needle SWR/Wattmeter with a **new** directional coupler for more accurate readings over a wider frequency range. It reads forward/reflected power in 200/50 and 2000/500 watt ranges. Meter lamp uses 12 VDC or 110 VAC with MFJ-1312, $12.95.

A **new** current balun for balanced lines reduces feedline radiation and forces equal currents into antenna halves that are not perfectly balanced for a more concentrated, stronger signal. Add $10 s/h.

MFJ's *Fastest Selling* Tuner

MFJ-941D **$109.95**

The MFJ-941D is MFJ's fastest selling 300 watt PEP antenna tuner. Why? Because it has more features than tuners costing much more and it matches everything continuously from 1.8-30 MHz.

It matches dipoles, vees, verticals, mobile whips, random wires, banlanced and coax lines.

SWR/Wattmeter reads foward/reflected power in 30 and 300 watt ranges. Antenna switch selects 2 coax lines, direct or through tuner, random wire, balanced line or tuner bypass. Efficient airwound inductor gives lower losses and more watts out. Has 4:1 balun. 1000 V capacitors. 10x3x7 inches.

MFJ's *Random Wire* Tuner

MFJ-16010 **$39.95**

You can operate all bands anywhere with any transceiver when you let the MFJ-16010 turn any random wire into a transmitting antenna. Great for apartment, motel, camping operation. Install a wire anywhere! Tunes 1.8-30 MHz. 200 watts PEP. Ultra small 2x3x4 in.

MFJ's *Deluxe* 300 Watt Tuner

MFJ-949D **$149.95**

The MFJ-949D gives you lower SWR than **any** tuner that uses two tapped inductors. Why? Because you get two **continuously** variable capacitors that give you infinitely more positions than the **limited** number on switched coils.

This gives you the precise control you need to get your SWR down to a minimum. After all, isn't that why you need a tuner? Covers 1.8-30 MHz.

You get MFJ's **new** lighted 2-color **peak** and average reading Cross-Needle SWR/Wattmeter, dummy load, antenna switch, and 4:1 balun - all in a compact 10x3x7 inch cabinet. Meter lamp uses 12 VDC or 110 VAC with MFJ-1312, $12.95.

With MFJ's **deluxe** 300 watt PEP tuner you get an MFJ tuner that has earned a reputation for being able to match just about anything - one that is highly perfected and has years of **proven** reliability.

MFJ's *Mobile* Tuner

MFJ-945C **$89.95**

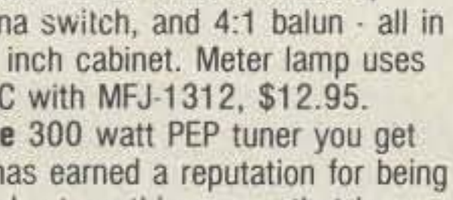
Don't leave home without this **mobile** tuner! Have an uninterrupted trip as the MFJ-945C **extends your antenna bandwidth** and eliminates the need to stop, go out and adjust your mobile whip.

You can **operate anywhere in a band and get low SWR.** You'll get maximum power out of your solid state or tube rig and it'll run cooler and last longer.

Small 8x2x6 inches uses little room. **SWR/ Wattmeter and convenient placement of controls make tuning fast and easy while in motion.** 300 watts PEP output, efficient airwound inductor, 1000 volt capacitors. Mobile mount, MFJ-20, $3.00.

144/220 MHz VHF Tuners

MFJ-921 **$69.95**



MFJ's new VHF tuners cover both 2 Meters and the 220 MHz bands. They handle 300 watts PEP and match a wide range of impedances for coax fed antennas. SWR/Wattmeter. 8x2½x3 in. **MFJ-920, $49.95.** No meter. 4½x2½x3 inches.

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Box 494, Miss. State, MS 39762
(601) 323-5869; TELEX: 53 4590 MFJSTKV

MFJ ... making quality affordable

MFJ's *Artificial* RF Ground

$79.95 MFJ-931

You can create an artificial RF ground and eliminate RF "bites", feedback, TVI and RFI when you let the MFJ-931 resonate a random length of wire and turn it into a tuned counterpoise. The MFJ-931 also lets you electrically **place a far away RF ground directly at your rig** -- no matter how far away it is -- by tuning out the reactance of your ground connection wire.

Barefoot/1.5 KW Linear Tuner

MFJ-962C **$229.95**

For a **few** extra dollars, the MFJ-962C lets you use your barefoot rig now and have the capacity to add a 1.5 KW PEP linear amplifier later. Covers 1.8-30 MHz

You get two husky **continuously** variable capacitors for maximum power and minimum SWR. And lots of inductance gives you a wide matching range.

You get MFJ's **new** peak and average reading Cross-Needle SWR/Wattmeter with a **new** directional coupler for more accurate readings over a wider frequency range. It reads forward/reflected power in 200/50 and 2000/500 watt ranges. Meter lamp uses 12 VDC or 110 VAC with MFJ-1312, $12.95.

Has 6-position antenna switch and a teflon wound balun with ceramic feedthru insulators for balanced lines. 10¾x4½x14 7/8 inches. Add $10.00 s/h.

MFJ's *smallest* Versa Tuner

MFJ-901B **$59.95**

The MFJ-901B is our smallest -- 5x2x6 inches -- (and most affordable) 200 watt PEP tuner --when both space **and** your budget is limited. Good for matching solid state rigs to linears.

It matches whips, dipoles, vees, random wires, verticals, beams, balanced and coax lines from 1.8-30 MHz. Efficient airwound inductor. 4:1 balun.

FOR YOUR NEAREST DEALER OR TO ORDER

800-647-1800

• 1 year **unconditional** guarantee • 30 day **money back** guarantee (less s/h) on orders from MFJ • Free catalog • Add $5.00 s/h (except as noted)

CIRCLE 3 ON READER SERVICE CARD

Awards Available

KARL Awards Program. The following types of Korean Amateur Radio League (KARL) awards are available to HLs and all hams/SWLs outside Korea. A current listing of KARL Awards follows.

HLA (HL Award). HLA will be issued to all hams/SWLs who received QSL cards from any HL stations (except HL9s), depending on the number of contacts made (heard) with (from) HL stations (except HL9s). Depending on the number of contacts, one or more of the following classes may be claimed.

Class K—5 QSLs required
Class O—10 QSLs required
Class R—20 QSLs required
Class E—30 QSLs required
Class A—50 QSLs required

Stickers for affixing to certificates endorsing additional credits are available in multiples of 50 upon submission of QSL cards.

AKA (All Korea Award). AKA will be issued to hams/SWLs who received QSL cards from HL stations—at least one from each of seven (7) different call areas—i.e., 1, 2, 3, 4, 5, 8, and 0.

KDN (Korean District Number Award). KDN will be issued to hams/SWLs who received at least one QSL card from HL stations located in each of the 50 different cities, Guns, or Gus in Korea.

The awards will be issued in multiples of 50 (KDN 50, 100, 150) upon submission of cards with list prepared in order of KDN reference numbers.

APA (All Province Award). APA will be issued to hams/SWLs who received QSL cards from HL stations located in each of the different special cities and provinces in Korea. Area codes for each city and/or province are: 1—city of Seoul; 2—Inchon City, Kyonggi-do, Kangwon-do; 3—Chungchongnam-do, Chungchongbuk-do; 4—Chollanam-do, Chollabuk-do, Cheju-do; 5—Pusan City, Taegu City, Kyongsangnam-do, Kyongsangbuk-do.

General rules and requirements are as follows.

Eight IRCs will be charged per award and 4 IRCs for each HLA sticker. If QSL cards are submitted, sufficient IRCs for return postage must be included. Endorsements for such operating distinctions as bands, modes, and QRP may be applied for. Proofs of contacts/receptions made with any HL stations (except HL9s) on or after February 3, 1959 will be acceptable. Proofs of contacts/receptions made with U.S. Army stations in Korea (HL9 call area) will not be acceptable. All contacts must be made within the same call area.

Mail your application to Korean Amateur Radio League, C.P.O. Box 162, Seoul 100, Korea.

WIA Antarctic Award. The WIA Antarctic Award is sponsored by The Wireless Institute of Australia. Applicants must have confirmed contacts with ten amateur stations conducting valid operations in Antarctica, and these must include stations authorized by at least six different national licensing authorities, one such station to be a VK0. Antarctica is defined as the land mass, including islands, and permanent ice shelf below latitude 60 degrees south.

QSOs may be made on any amateur band, including 10, 18, and 24 MHz, but crossband contacts are not eligible. All modes, except use of terrestrial repeaters, are acceptable, and endorsements will be given for particular bands and modes. QSOs with aircraft or with ships underway, or capable of being put underway, are not eligible.

Contacts must have been made after 0001 UTC, February 23, 1988, the 75th anniversary of the first two-way radio communication between the Antarctic continent and the outside world. This was on February 23, 1913, when the exploration team led by Australian geologist Douglas Mawson sent messages to the Governor-General of Australia and to King George V. The messages went via a relay station on Macquarie Island which the Mawson expedition set up enroute to Commonwealth Bay in Antarctica.

The normal WIA verification rules apply (i.e., cards need not be sent if two amateurs certify that they have personally inspected them). However, the WIA Awards Manager reserves the right to call for the cards and/or photocopies of them.

The cost of the award is US $5.00 postpaid. It is also available to SWLs.

Send applications to K.D. Gott, WIA Federal Awards Manager, 38A Lansdowne Rd., St. Kilda, Vic. 3183, Australia.

WD4CNZ Awards Program. The WD4CNZ Awards Program is for Novices and other new operators. Its purpose is to bridge the gap between the initial excitement of the first contacts to the upgrading to a higher license class. The awards are to help sustain a keen interest over the time to upgrading to another license class.

While many other awards are directed to the higher license classes with only a few available directly to Novices (and new operators) and SWLs in other countries who must verify a specified number of monitored "contacts" as part of their own country's license requirements), the WD4CNZ awards program serves the Novice directly.

These awards serve to maintain interest and develop operating skills by being within the reach of the new operator and also being challenging enough to give positive goals to work toward.

Certain separate awards in this program are available at cost of mailing to DX stations anywhere in the world as an incentive to work the Anerican Novice bands and further encourage the new/Novice operator to sharpen communicative skills so he/she will be a better operator when upgrading.

The fees for the awards are set at cost of printing and mailing only, and are not designed as a profit-making operation.

Complete details for all awards in this program are available by sending a large SASE to Bob Dockery, WD4CNZ, 8 Busbee View Road, Asheville, North Carolina 28803, U.S.A.

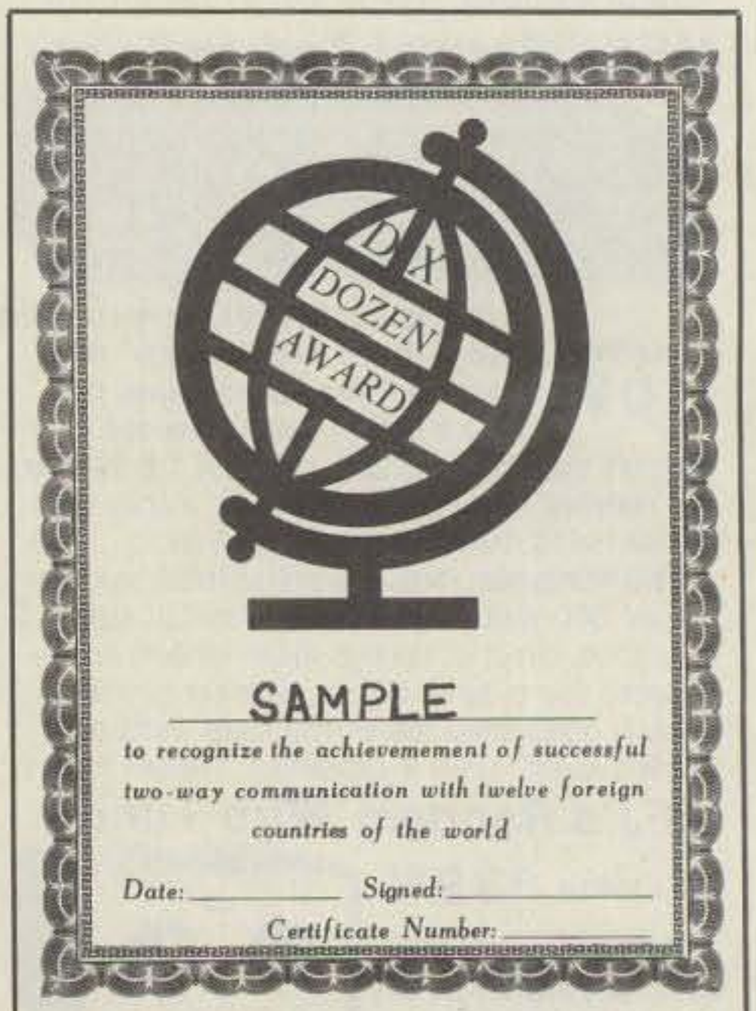
Novice DX Dozen. The purpose of this award is to recognize the first twelve DX contacts made and QSLs received as verification. A secondary purpose is to encourage Novice operators to sharpen their CW or SSB skills by making contacts with operators in other countries.

Contacts for this award must be made (or must have been made) while the applicant is a Novice. Persons who have upgraded can apply for this award by submitting log data for contacts made during their time as a Novice operator.

All applicants must submit the following information taken from the station logbook: (1) Date of QSO, (2) Time of QSO (in UTC only), (3) Callsign of station worked, (4) Frequency band (must be American Novice bands), (5) QTH of station worked, (6) name of operator of station worked.

Applicants must obtain verification that they have the necessary QSL cards in their possession by including a statement from another radio amateur of General class or higher (GCR rule).

A special endorsement is available for making all twelve DX contacts on the same band; a special sticker if all twelve



Novice DX Dozen Award offered by Bob Dockery, WD4CNZ.

MFJ gives you *all 9* digital modes

and *keeps on* bringing you state-of-the-art advances

. . . while others offer you *some* digital modes using 3 year old technology

MFJ-1278

$279.95

No 3 year old technology at MFJ!

Using the latest advances, MFJ brings you 9 exciting digital modes and *keeps on* bringing you state-of-the-art advances.

You get tons of features other multi-modes just don't have.

Only MFJ gives you *all 9* modes

Count 'em -- you get 9 fun modes -- Packet, AMTOR, RTTY, ASCII, CW, FAX, SSTV, Navtex and full featured Contest Memory Keyer.

You can't get all 9 modes in *any* other multi-mode at *any* price. Nobody gives you modes the MFJ-1278 doesn't have.

The best modem you can get

Extensive tests in ***Packet Radio Magazine*** prove the modem used in the MFJ-1278 copies HF packet more accurately than all other modems tested.

MFJ-1278 is the *only* multi-mode with a ***true*** DCD circuit for HF. This dramatically reduces sensitivity to noise and dramatically increases completed QSOs.

Exclusive Built in Printer Port

Only the MFJ-1278 has a dedicated printer port that lets you plug in your printer.

You don't need to buy an optional $40 cable just to plug in your printer.

New Easy Mail™ Personal Mailbox

You get MFJ's new Easy Mail™ Personal Mailbox with soft-partitioned memory so you and your ham buddies can leave messages 24 hours a day.

20 LED Precision Tuning Indicator

MFJ's unequaled tuning indicator makes it really easy to work HF packet.

And unlike others, you use it exactly the same for all modes -- not differently for each mode. Just tune your radio to center a single LED and *you're precisely tuned in to within 10 Hz* -- and it shows you which way to tune!

Multi-Gray Level FAX/SSTV Modem

You'll see tomorrow's news today when you copy outstanding FAX news photos with crisp, clear details.

MFJ-1278 is the *only* multi-mode with a built-in multi-gray level modem. It lets you transmit *and* receive high resolution multi-gray level FAX/SSTV pictures with an appropriate terminal program.

New MFJ-1278T *Turbo*

with *fast* 2400 baud modem

MFJ-1278T

$359.95

The new MFJ-1278T *Turbo* gives you *fast* 2400 baud packet -- *twice* the baud rate of any other multi-mode. By communicating faster you'll reduce chances for error, lessen congestion and more efficiently utilize our ham frequencies. You'll also get 1200/300 baud for compatibility with older TNCs. The 2400 baud modem is also available separately. Order MFJ-2400, $79.95, for any MFJ and most other TNCs.

One FREE Upgrade!

When you buy your MFJ-1278 *today*, you don't have to miss new modes and features that come out *tommorow*.

Why? Because your MFJ-1278 comes with a coupon good for one ***free*** eprom upgrade exchange that'll add new features.

Plus More . . .

Plus you get . . . 32K RAM (not 16K), ***free*** AC power supply, Host mode that lets MFJ-1278 serve as a KISS interface or dumb modem, fast throughput anti-collision technology, independent transmit level for each radio port, random code generator, lithium battery backup, RS-232 *and* TTL serial ports, *standard* 850 Hz RTTY shift, socketed ICs, tune up command, peripheral I/O port, automatic serial numbering, programmable message memories, dual radio ports (*each* HF or VHF), CW key paddle jack, speaker jack that lets you monitor CW sidetone, transmit and receive audio and packet connect bell, ***new*** fully intergrated instruction manual with *Fast Start*™ instructions and more in a 9½ x 9½ x 1½ inch cabinet.

Get on the air instantly Just plug it all in

All you need is an MFJ-1278, your rig, computer and program.

With an MFJ Starter Pack you just plug it all in, wire up your mic connector, and you're on the air.

Order MFJ-1284 for IBM compatibles (includes Picture Passing); MFJ-1287 for Macintosh; MFJ-1282 (disk) for C-64/128; MFJ-1283 (tape) for VIC-20, $24.95 each.

No Matter What™ Guarantee

You get MFJ's one year No Matter What™ Guarantee.

That means we will repair or replace your MFJ multi-mode (at our option) *no matter what* happens to it for a year.

Others give you a *limited* warranty. What do you do when *they* say, "Sorry, your *limited* warranty doesn't cover *that*?"

Get 9 new ways of having fun

Don't settle for 3 year old technology.

Choose the only multi-mode that gives you the latest advances and all 9 modes.

Get 9 new ways of having fun *today!*

What the ham magazines say about the MFJ-1278:

QST Magazine: *"**I was especially impressed** by the new '1278s DCD (data carrier detect) circuit performance. This function, vital to HF packet-radio operation, performs admirable . . . . Refinements such as this go a long way toward improving the viability of HF packet-radio operation with a multimode!"*

*"**FAX reception is so good** that it is irresistible to tune around for interesting FAX transmissions. The current '1278 provides good copy on all seven supported FAX formats . . . . I most enjoyed copying news-photo transmissions. Some of these were outstanding, with crisp, clean reproduction and a surprising amount of detail."* **September, 1989.**

CQ Magazine: *"**I found the '1278 did an excellent** job (copying CW), even with bad operators. I've checked lot of CW 'copiers' in my time, and certainly this unit was as good or better than most."*

*"**I switched the terminal mode to HF packet** . . . . I was very impressed, because with the tuning indicator I immediately received (good) packet copy . . . I (tried) a connect with an east coast station. Before I knew it I had a QSO going and even handled break-in stations anxious to log New Mexico."* **May, 1989.**

73 Magazine: *"**If you think I enjoyed using** (the MFJ-1278) you are right. It was easy and fun to use . . . Overall, I found the MFJ-1278 to be . . . a good multi-mode controller at a reasonable price. You won't be disappointed."* **April, 1989.**

Worldradio Magazine: *"**Bottom line: Excellent value** for the money. Solid performer. Easy to use. **Easiest** of the top three to get on line . . . . "* **September, 1989.**

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CIRCLE 157 ON READER SERVICE CARD

DX contacts were made on the same day (i.e., contest operation). The award is available to licensed amateurs throughout the world (SWLs on a "heard" basis—all other requirements met).

The fee is $3.00 US (cost includes award, processing, and mailing via first class).

Countries are as listed in the ARRL DXCC country listing in force at the time of award application.

Note: In the rare event that someone becomes a licensed amateur without spending any time as a Novice operator, that person can still apply for this award upon adding a statement to the application. All other requirements for the award must be met.

Novice Milestones. The purpose of this award is to encourage and acknowledge those important steps for the Novice (or new) radio amateur. This award is open to any Novice/new operator (also available to SWLs on a "heard" basis) anywhere in the world.

A radio amateur who has upgraded can apply for the award by showing the contacts made during the time that he was a Novice or new operator.

There are ten steps (milestones) which must be completed to qualify for this award:

1. QSO your first state (other than your own if USA; any state if DX).
2. QSO your first country (other than your own).
3. Make your first QSO on 80 meters (CW).
4. Make your first QSO on 40 meters (CW).
5. Make your first QSO on 15 meters (CW).
6. Make your first QSO on 10 meters (CW or SSB).
7. QSO your first island (other than your own, if applicable).
8. QSO your first licensed amateur of Extra class.
9. QSO your first YL or OM (your opposite, as applicable).
10. QSO your first portable or mobile station (i.e., field day, etc.).

Wild cards: These may be substituted for any of the above milestones and must be indicated as such substitutions on the application form.

WC1: QSO your first maritime mobile station;

WC2: Make your first repeater contact (220 MHz or above).

Special Note: All milestones must be made separately. Example: A 40 meter QSO with a YL in another country on CW will count for only one milestone of your choice, not three.

All contacts must be (or have been) made on the American Novice bands only.

Milestones Award, one in a series offered by Bob Dockery, WD4CNZ, to Novices and new operators.

Applicants must complete an application form which contains the necessary logbook information for these milestones. (Application forms are available via SASE from WD4CNZ, Callbook address.) Log data should be verified by another licensed amateur (such as your "Elmer") or any amateur radio club officer. The fee for the award is $3.00 US.

Note: In the rare event that an operator began his or her amateur radio career with a license class higher than Novice, that person can still apply for the award as long as all of the above requirements are met.

Giant Step Award. The purpose of this award is to thank the station operator who was your first contact as a licensed radio amateur. It is special in that it enables you to remember that operator's help and patience while you were making your first contact.

This award cannot be given to yourself but rather requested by you for the operator of the station of your first contact. You may have the award mailed directly to that operator by including the correct address on the award application form. If this is not indicated on the application, the award will be sent to the applicant's address.

This award is open to all licensed radio amateurs throughout the world regardless of license class. The requesting station must include the following information (to be placed on the award): (1) Call of First Contact Station, (2) Date of QSO, (3) Your name and call, (4) Time of QSO.

No QSL is required; the application is evidence of the purpose of this award.

The fee is $3.00 US (fee includes the award, processing, and mailing first class).

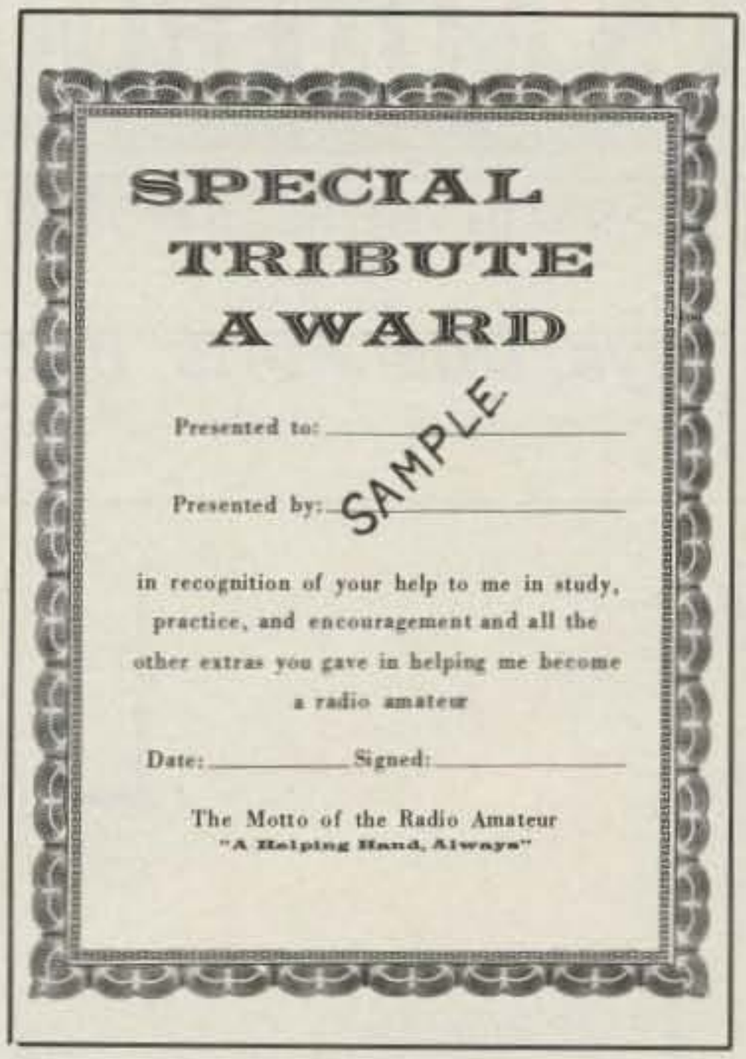
Special Tribute Award. The purpose of this award is to recognize the person who helped in study, practice, encouragement, and all the other necessary extras given to you to help you obtain your amateur radio license (any class). The award is an excellent way to remember that person's patience, understanding, time, and sacrifice to help you make those important steps in becoming a licensed radio amateur. It is a way to say "thank you" which will be remembered each time you get on the air!

This award will be sent to the applicant or directly to the recipient, as requested on the award application. The following information will be placed on the award and must be included on the application form: (A) Name of recipient, (B) Callsign of recipient.

The fee is $3.00 US (or equivalent in IRCs). The fee includes printing, processing, and mailing first class (in USA) or airmail (if DX). This award is available to all licensed radio amateurs throughout the world.

Royal Flying Doctor Service Award. This award is sponsored by the Ten-Ten International Net, "Twenty Eight" Chapter. It seeks to recognize the great work being done by the Royal Flying Doctor Service, and to acknowledge the assistance given, especially in its formative years, by amateur radio operators, and today many radio amateurs are involved in its operation.

For the Rev. John Flynn, the establishment of the service in 1928 was the fulfillment of a dream—to spread "a mantle of safety over the people of the Inland," combining the use of aviation, medicine, and radio.



Special Tribute Award, fourth in a series offered by WD4CNZ.

Flynn maintained that the effectiveness of the service was 75% due to radio, today too the people of the Inland area rely to a large extent on radio to communicate with each other and the rest of the world. "The School of the Air" helps bring education to the children of these isolated settlers.

The "Twenty Eight" Chapter of 10-10 International offers this award to any radio amateur or shortwave listener in the world. Requirements are as follows.

The award will be available *annually* (different certificate each year) between February 8th and August 2nd. All contacts/stations heard must take place on the 10 meter (28 MHz) band, within the restrictions of the license (if any) held. Using as many letters as you wish from the prefix and/or suffix of station callsigns worked/heard from anywhere in the world, make up the words "ROYAL FLYING DOCTOR SERVICE." Each callsign can be used *once* only each year, but may be used for successive years. *If you work a VK station that worked for, or relies on the RFDS for normal contact with the world, this will count as an "instant qualifier" for the award.*

List all contacts, including date, station worked, location, and LETTERS USED. SWLs list (and can use) both stations heard.

Cost of certificate: $5.00 each ($A in VK, $USD for DX stations). Of this, $1.00 or enough for return postage only will be taken; the remainder will be sent to the RFDS. (If you wish to send more, only the postage will be taken.) A receipt will be issued on request; mark the bottom of your log/list with a capital letter R enclosed in a circle.

Post applications to P.O. Box 1073, Subiaco WA 6008, Australia. This is an excellent chance for radio amateurs to help the work of the Royal Flying Doctor Service.

See you next month!

73, Dorothy, WB9RCY

The Giant Step Award available from WD4CNZ.

PACKET USER'S NOTEBOOK

BY BUCK ROGERS, K4ABT

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

Building Nodes, Gateways, Dual-Ports, Backbones, and Trunks

Recently I've noticed a significant increase in the mail requesting information about the support services for packet communications. Not only do I get requests for the "how-to-do-its," but I also get requests for the actual drawings and illustrations that portray the interconnecting of nodes and gateways, and most recently, the interest in backbone and trunk information has increased in a quantum leap.

As many of you who wrote to me discovered, it took a month to turn out those drawings. It was not easy to do, since my AUTOCAD is an older version, and it runs slower than the new versions, so it takes a little while to allow the "REDRAW" function to complete. This prompted me to rethink the manner in which I'm handling this situation. The mail load has now grown to a paramount endeavor just to answer it, much less do a lot of specialized drawings.

With all this in mind, It seems more logical for me to compile all these requests into one article and put it into print, and save a lot of time and postage for us all. As I mentioned a couple of times in the past, I can only respond to mail that includes an SASE. There is another problem that is arising out of all this mail and the SASEs. If you send a letter or disk mailer, please include enough postage. I am receiving a lot of mailers with only one 25 cent stamp on them, and the return will require 85 cents worth of postage. This has become a bit of a financial burden for me when responding with the requested information or data. When it was only four or five return letters a week, it was not a large sum, but that number has increased many times over, and if your arithmetic is working at the moment, you can see where my problem lies.

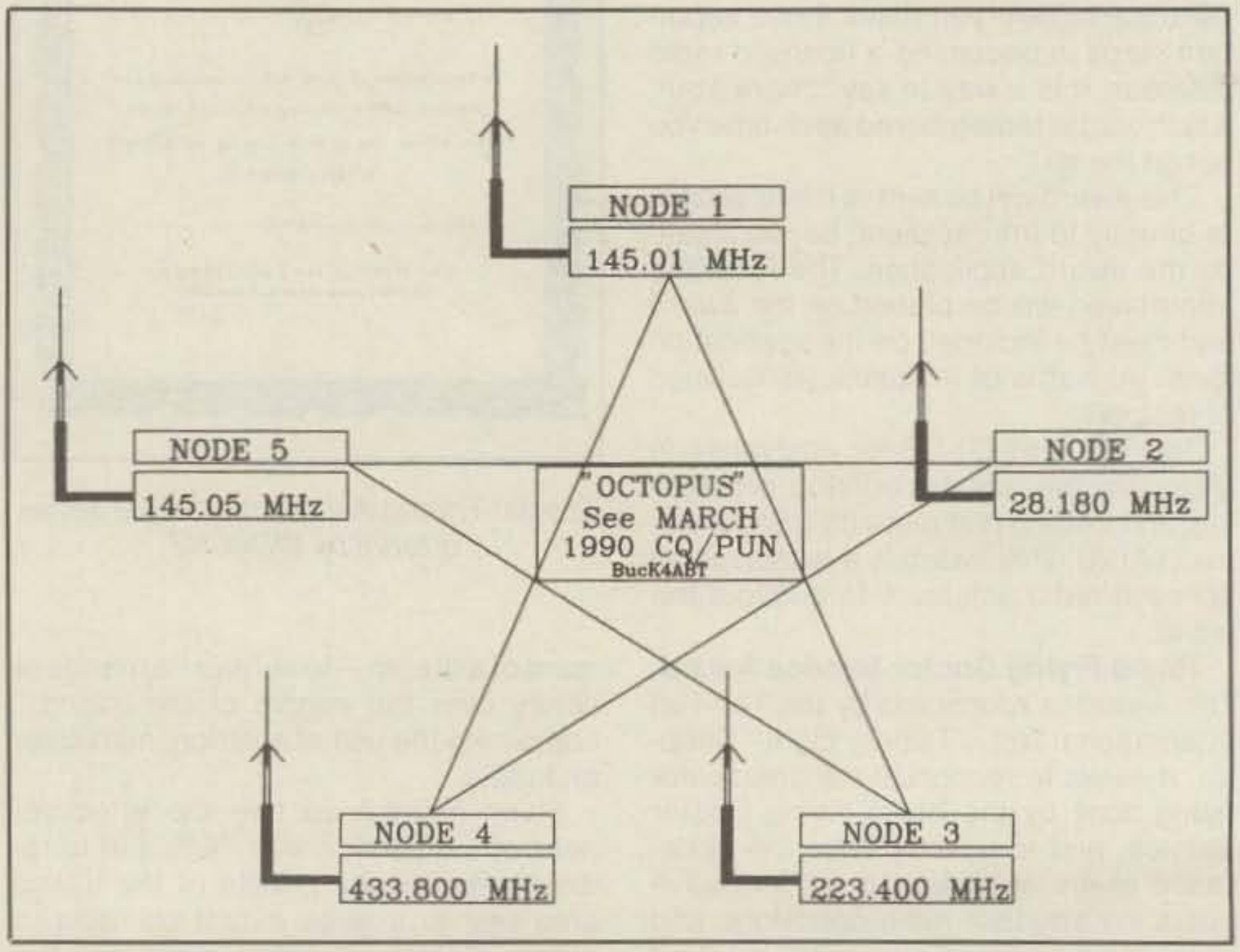


Fig. 1- By using the "star" configuration, multiple nodes and gateways can enable access to several frequencies with only one connection.

Let's Get Busy!

In addition to the node and gateway interest, there is an upswing of interest in the backbone and CONFERENCE nodes. The concern for the CONFERENCE nodes is generally centered around how to include one on the LAN frequency. I'm not trying to set policy for the LANs coast to coast, but it would be good to consider how the CONFERENCE node will be used before implementation on an active LAN frequency. I can assure the prospective CONFERENCE node sysop (as I have before), that a CONFERENCE node, when active, can bring a LAN to its knees.

We will cover in this article the manner in which a CONFERENCE node can be used in conjunction with a GATEWAY, although I do not recommend this application of the CONFERENCE node. Only if the frequency is one which has a limited (small) number of users can a CONFERENCE node and a gateway node survive. A CONFERENCE node should be placed on a seldom-used frequency, and away from gateway nodes. As many of the sysops who are reading this know, a CONFERENCE node will find a way to the node lists of neighboring nodes. Once this happens, "the fat's in the fire."

Remember this: Every packet that is sent to the CONFERENCE node will be sent to every station who is connected to the roundtable, and every packet station will receive and "ACK" packet. Likewise, the CONFERENCE node will send an ACK to every station connected. *Now that makes for a busy frequency!* In other words, if four stations are connected to the CONFERENCE node, then eight packets are generated by one packet sent to the node. If the connection(s) are through a gateway or a second node, then consider multiplying the just-mentioned packets by four. This means 32 packets have now been generated by one packet sent. Wow!

Now let's get real, Buck. What if . . . careful now . . . What if just one packet is missed in all this jumble and a second try is needed? Bingo! You've got it—mass collisions.

By now I've made my point about placing a CONFERENCE node on a clear frequency or LAN that is set aside expressly for the purpose of the roundtable nets or Weather-Watch Conference sessions.

There Are Other Nodes

When a system begins to grow, the user loses sight of how and where the packets go after they leave the Local Area Net-

506 Pheasant Ridge Drive, Warner Robins, GA 31088

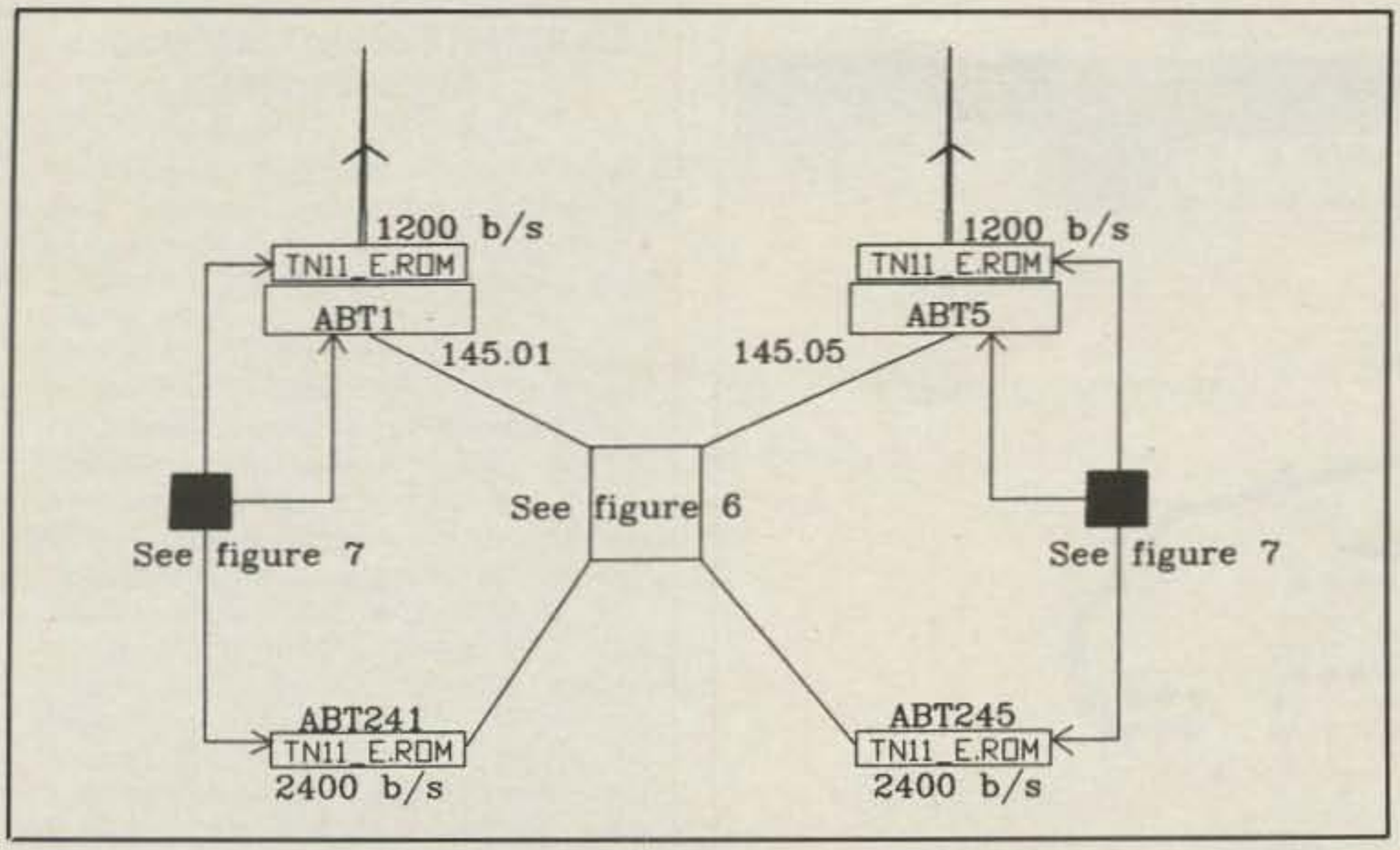


Fig. 2- Complex node and gateway configured with both 1200 and 2400 b/s.

work (LAN) frequency. The sysop is the only one who really has some notion of what happens to the packet(s) outside the LAN. Here is where the plot seems to thicken. When packet was in the embryonic development stages, it was no problem to keep track of how the data was handled.

In the last couple of years there has been such a large increase in packet use that the sysop has had to improvise just to keep his LAN going, or, as in a few cases, he has just ceased to be a sysop altogether. The reason lies with the lack of available information that would enable the sysop to upgrade his system.

I can hear a few of the sysops who just asked themselves, "Is Buck kidding?" No, I'm not. My incoming mail has spoken loud and clear! Information that we sysops take for granted is not in great supply in most regions of our great country. For this reason I am going to answer a lot of sysop mail, and I will attempt to do it in this one issue of *CQ*.

Questions about nodes, gateways, node complex, backbones, and trunking are but a few of the topics we will cover in this month's "Packet User's Notebook." No, I'm not omitting the digipeater, but why cover something that all TNC manuals have covered many times over?

Let's outline what we are about to cover so that you can determine which one of these items will best fill your needs or application.

I. NODE

a. Usually a TNC equipped with a network EPROM which enables level 3 hierarchy combined with some level 2 features. The primary advantage to network "nodes" is the automatic routing capabilities.

II. GATEWAY(s)

a. The gateway is exactly what the term implies. The user is provided with intercommunications between different frequencies, different LANs, and different baudrates. Multiple node/gateways can be enabled that will give access to many other nodes or gateways in a star configuration. (See fig. 1.)

b. As a matter of fact, the gateway will perform in any of the above-mentioned configurations while acting independently as a single node. This heading will also cover the node complex and node clusters. (See fig. 2.)

III. BACKBONES

a. The backbone is usually constructed with access from LANs along its route. If possible, the backbone should have a faster baudrate than that of the ingress LANs in order to move data more effectively.

b. The backbone frequency will bear a resemblance to the standard "throughput" frequency, except that it is usually on a UHF channel, and provides limited access by end users. This access is only allowed at the Local Area Access Ports (LAAP) along its path. The difference between the backbone and the "trunk" will soon become apparent. (See fig. 3.)

IV. TRUNKS

a. Trunks differ from the backbone in two ways. Trunks are designed with point-to-point or dedicated nodes at each end. The trunk does not allow "end user" direct access.

b. Access to a trunk is possible only through routing to or from backbone nodes at the level 3 access points. The routing is never acquired via digipeaters. In many cases the routing is "fixed" by the sysops, and therefore only limited access to the trunk is allowed from the "fixed" routing within the backbone nodes.

c. The firmware in the EPROM of the trunking node is developed for the exclusive purpose of restricting user access. The end user is given indirect access to a trunking link via the nodes and the backbone.

d. At this writing I know of only one type. It is the TN11-I.EPR. Do not confuse this code with the TN11-E.EPR.

e. Many trunks which support this type of link will have a much higher baudrate than the LAN or backbone nodes.

NOTE: The firmware does not set priorities with regard to the amount of ingress and egress traffic.

Now that we've learned what they are, let's get busy with the task of building them. Select the one which best suits

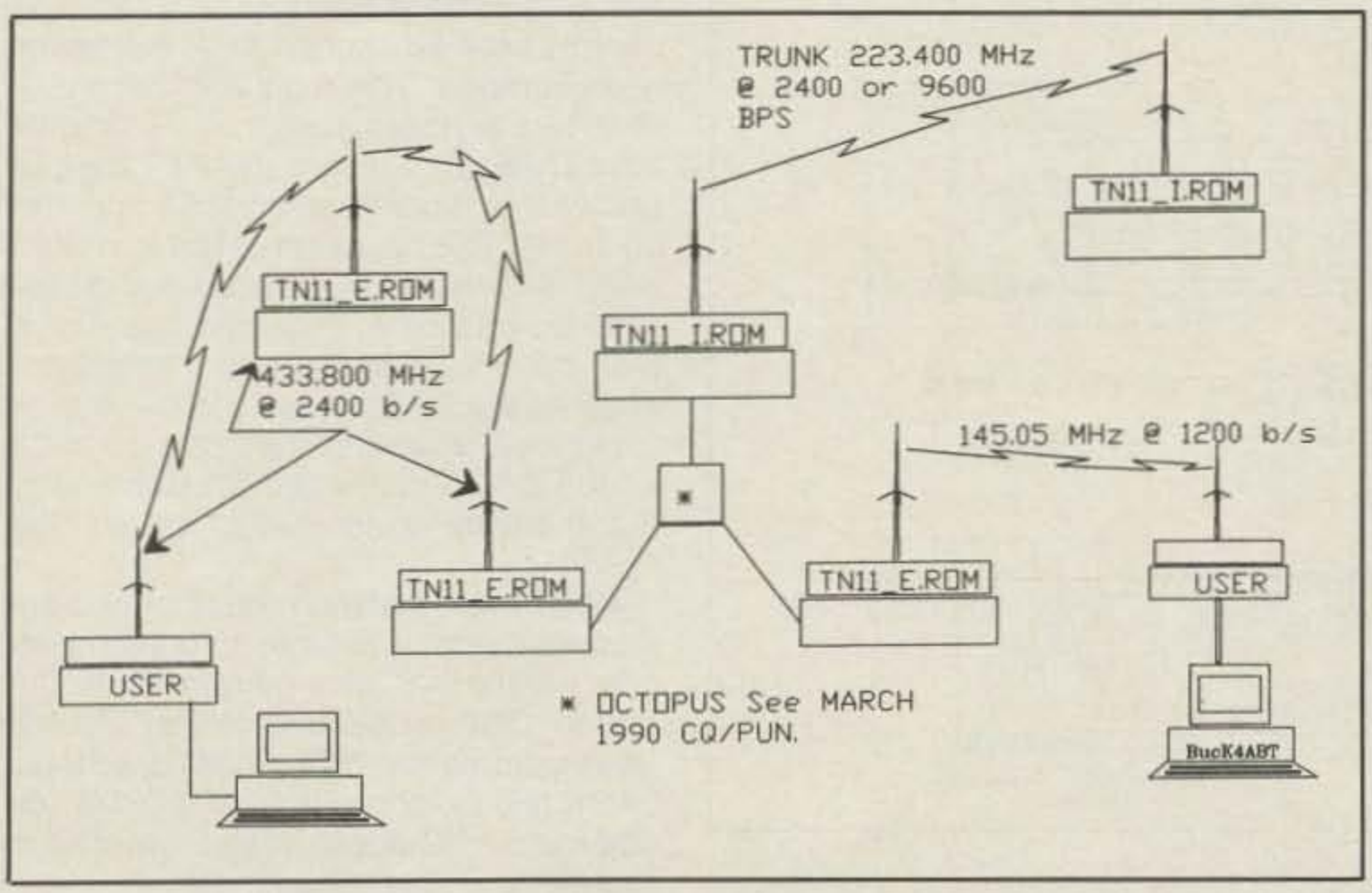


Fig. 3- This illustrates the user/LAN/backbone/trunk relationship. (Note OCTOPUS.)

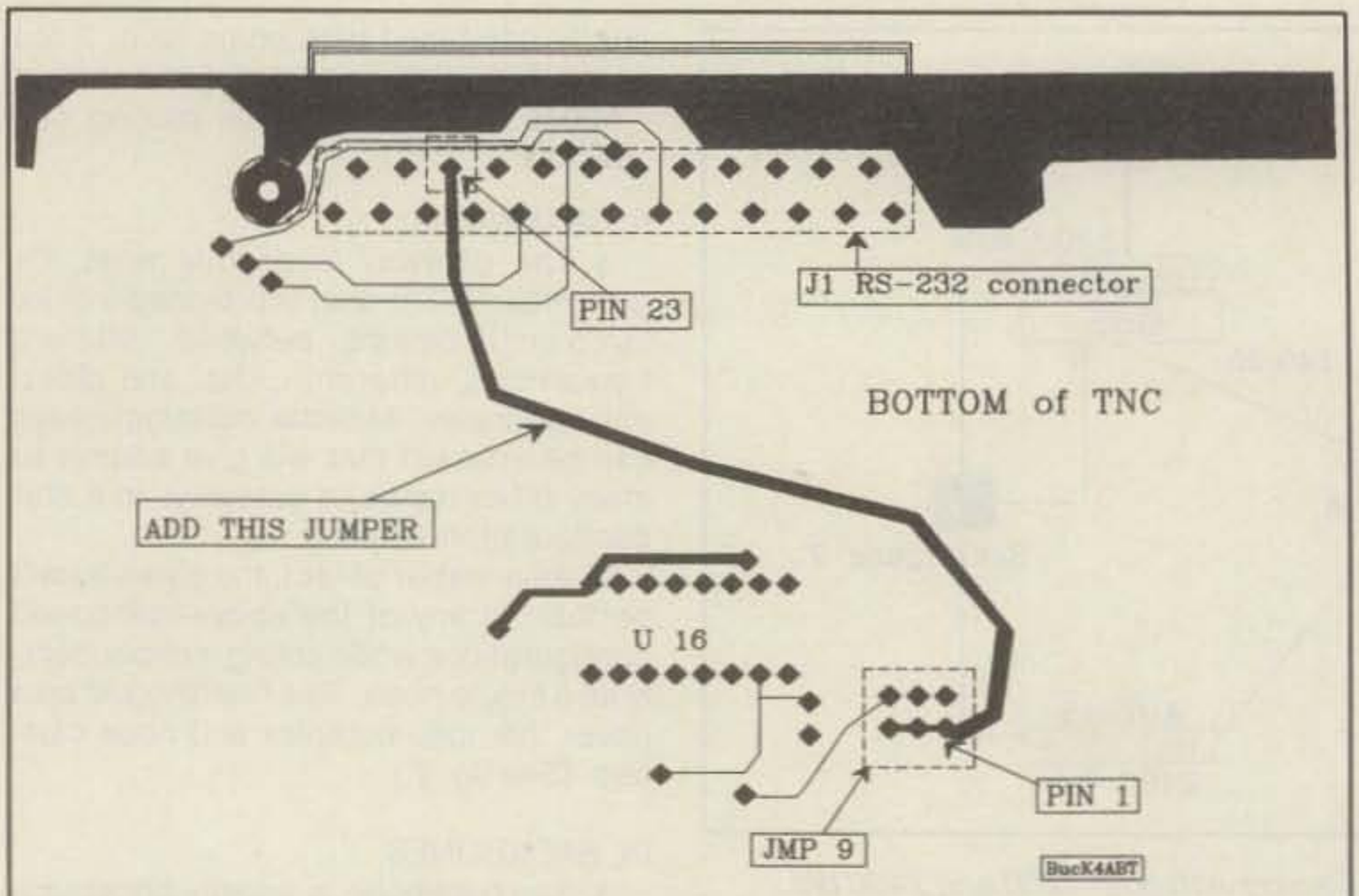


Fig. 4- This minor modification enables flow control when two or more TNCs are configured in a gateway or node cluster. (See text.)

your requirements or application and go to that section of this month's article and have at it. The only special requirement is the NETWORK NODE EPROMS. There are several sources from which you may obtain the firmware. Other sysops in your area may provide more information. I cannot supply the firmware.

The TAPR TNC2 and clones that are of recent manufacture can be used with most of these systems. It is necessary that most of the TNCs used in these applications have the correct memory and mods that make it NET/ROM or TheNet EPROM ready. Pac-Comm and MFJ TNC2 clones are now produced with all the current mods that make them "NETWORK EPROM" ready.

The TNCs which I used to develop this article were the latest production units. There is one additional modification which is required in the TNCs that are to be used in the node clusters, or in a node complex.

So that I may prevent confusion in my system at a later date, I make the above-mentioned modification to all the TNC at the time they are prepared for node service. The reason is that I may later add more nodes or switches to the complex, whereupon it becomes necessary that I add this additional jumper modification inside the TNC.

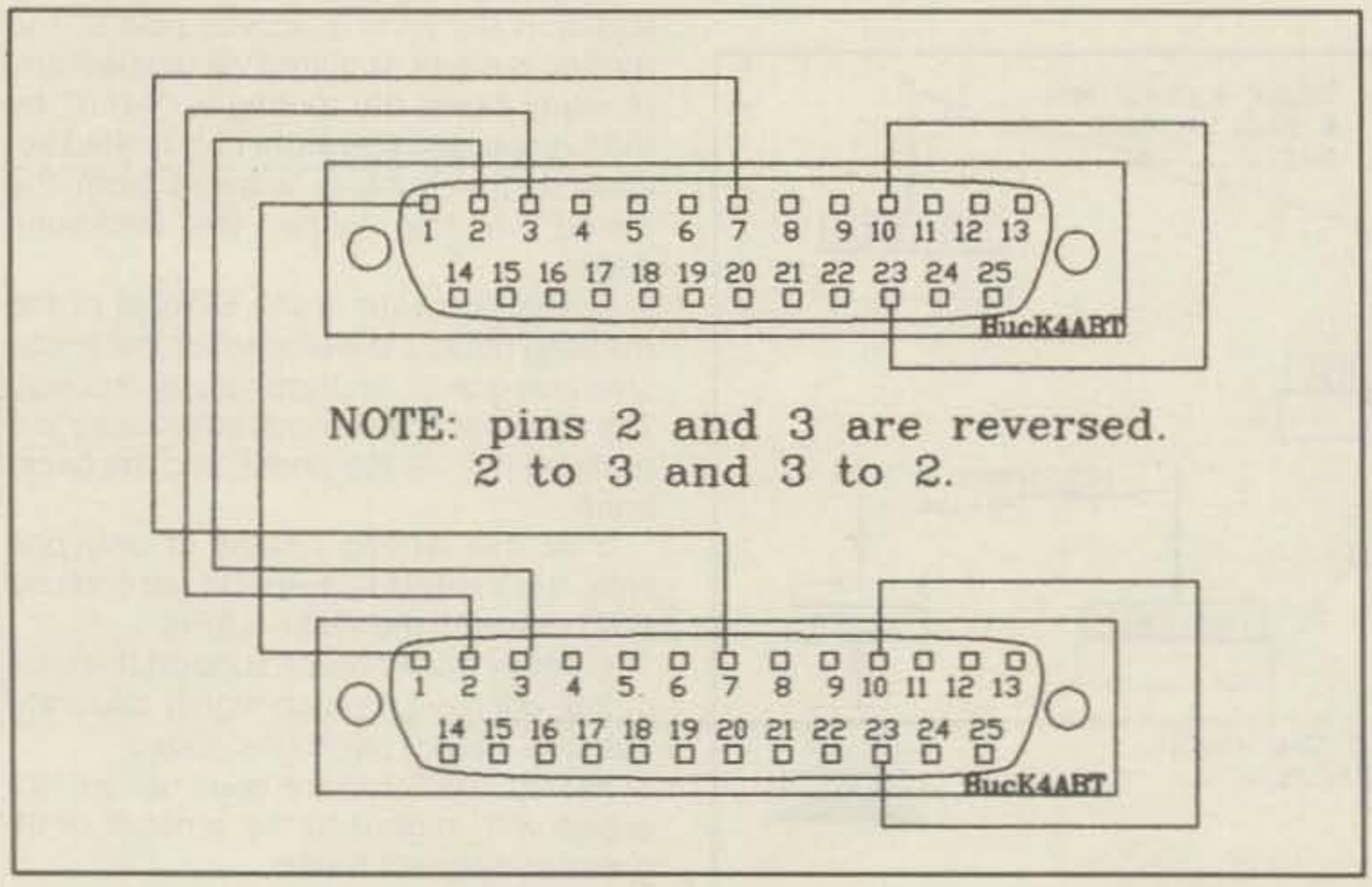


Fig. 5- When using only two nodes in a dual-channel configuration, use this special RS-232 cable.

This modification is minor and involves the addition of a jumper connected between the RS-232 connector, pin 23, and pin 1 of JMP 9. The jumper enables a special kind of node handshaking and flow control between nodes in a cluster or node complex. This mod also helps prevent two or more nodes in a complex from trying to activate the PTT lines to two radios operating on adjacent frequencies. This jumper **must be installed** when the TNC/NODE is to be used in conjunction with other nodes and gateways that communicate with a "neighbor" node via the RS-232 port. (See fig. 4.)

Notice the jumper from pins 10 to 23 on the DB-25 connector at each end of the specially wired RS-232 cable. (See fig. 5.)

When more than two nodes are used in a cluster, it is necessary to build the diode matrix that was mentioned in the March 1990 installment of the "Packet User's Notebook." The mailing address information to obtain the "OCTOPUS" diode matrix PC board is also covered in that same article. (See fig. 6.)

Each time another node is added to a

SouthNet Packet Conference And Hamfest

The Albany, Georgia Amateur Radio Club will be host to the annual SouthNet Packet Conference and Hamfest, June 1–2, 1990. The SouthNet Conference at Albany is committed to bringing the packeteers of the southeast comprehensive packet radio information. There will be forums with speakers who will be speaking on all facets of Packet communications including packet networking, switching, backbones, trunking, speeds/baudrates, BBS session for the BBS sysops, and future generations of packet technologies. Tom Moulton, the author of the ROSE Switch, will provide a forum on one facet of packet networks. Speakers from AMSAT and PACSAT will present sessions on satellite packet communications. Bob Slomka, the author of many software packet packages, will be demonstrating the latest in digital technology to another packet forum, and there will be discussions on the 56 KB modems.

Representatives from major packet TNC manufacturers will have exhibits and booths to provide the latest technology, information, displays, answers, and demonstrations for the packeteer or the prospective packet user. Prizes will be awarded, including an ICOM IC-726 transceiver, MFJ-989C antenna tuner, DRSI PCPA/2, and more.

For more information, contact the Albany Amateur Radio Club at 912-883-7910, or write to Albany Amateur Radio Hamfest Committee, P.O. Box 1205, Albany, GA 31702.

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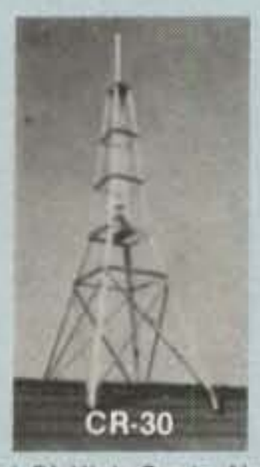

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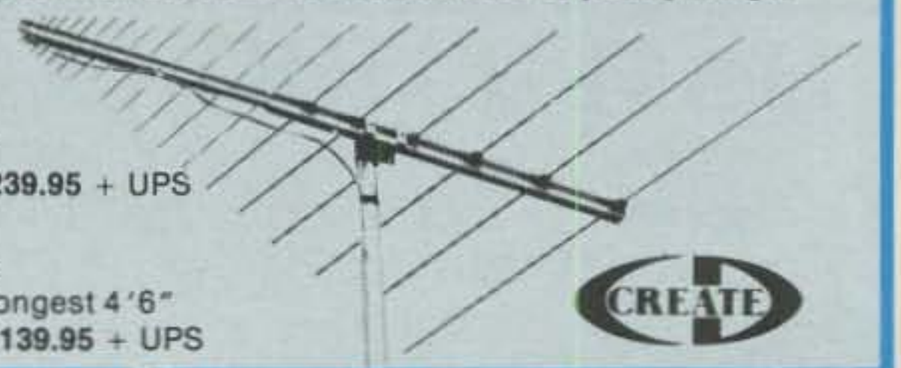

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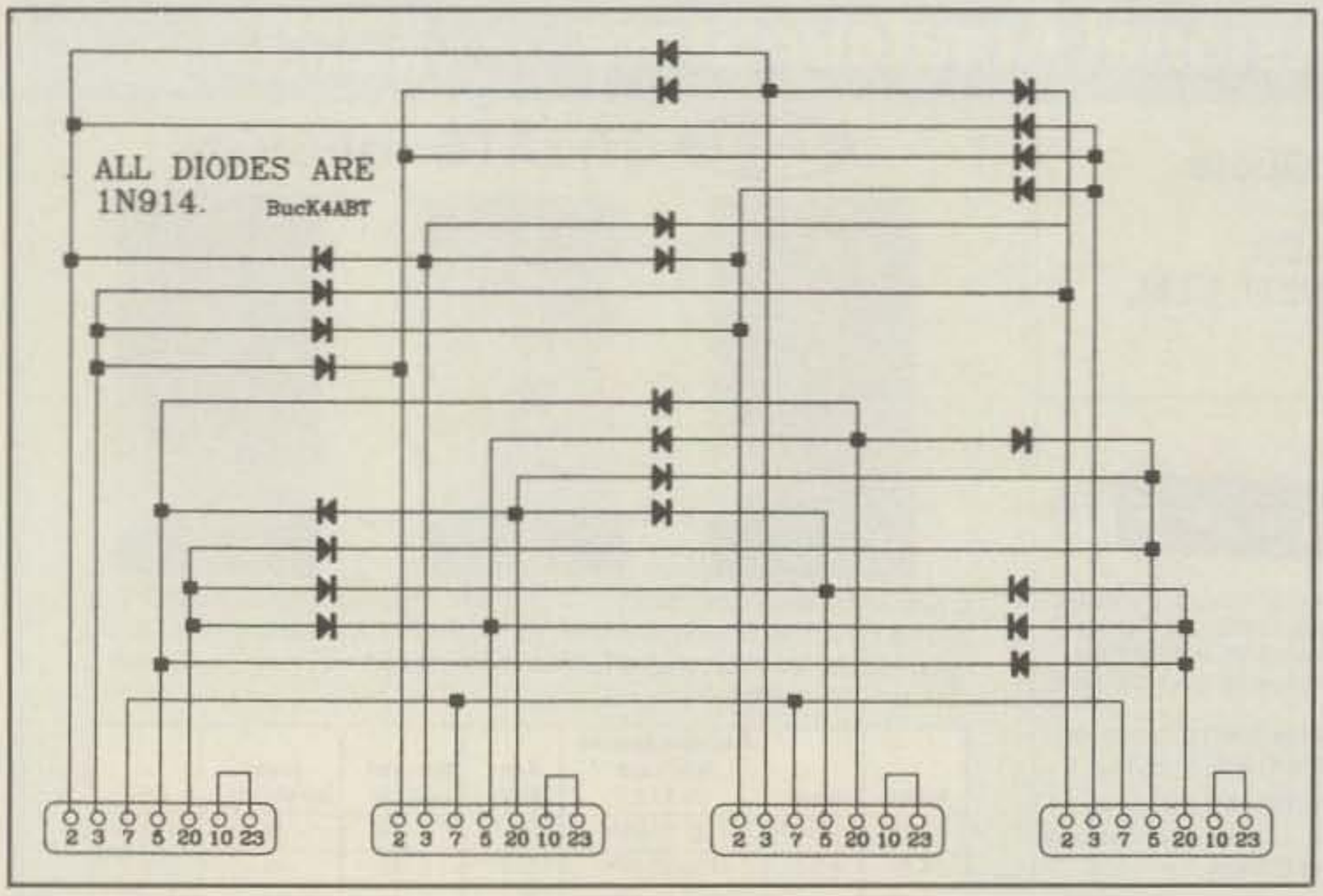

Fig. 6- When more than two nodes are used in a cluster, it is necessary to build the diode matrix shown in this illustration. (See March 1990 "Packet User's Notebook.")

cluster of nodes the internal software commands will need to be modified to accommodate the additional nodes, gateways, or switches. We will cover these software changes later in this article.

Nodes, Gateways, & Backbones With 2400 b/s Modems

With the sudden interest in 2400 b/s PSK and the many users who are moving up to 2400 b/s, there will more than likely be a need to update or modify your present nodes. You will need to provide both gateway and node capability for the LAN users who are rapidly moving up to 2400 b/s. This is really easier than it sounds. The addition of one TNC equipped with 2400 b/s and the cable described in fig. 7 may be all that is required to give your system "both" of these enhancements.

If your application requires the addition of the 2400 b/s modem, then see the May 1990 installment of the "Packet User's Notebook" column. Some TNC2 clones can now be purchased with the 2400 b/s modems already installed.

An Illustration is Worth 10,000 Bytes

For the benefit of the new sysops who are about to venture into the world of node, gateway, and backbone construction as a result of this article, you will be pleased to discover that I have drawn most of the illustrations so that you can feel comfortable when building your system just by looking at the "pictures."

I drew the illustrations with much of the information contained in the graphics. This way you will have a better understanding of the node parameter configuration that we are about to undertake.

Setting The Parameters, Or "A Likely Story"

This part of the node, gateway, and backbone building is that portion which gets the most attention, and the least understanding. I speak with the utmost authority on this very touchy subject. Even the writers of the firmware code are at odds as to how the parameters should finally be set. Any configuration that I include herein may be changed to suit your needs, application, or your own personal wishes. I am not about to impose my node configuration tables on any newcomer, much less on the likes of some of the old-timers who jump sky-high each time I make a new node change to our LAN.

The parameters that are supplied with the network code you decide to use will be a guide to begin with. I have found that many times the sysops who make changes to other parameters will sooner or later return to the original setup.

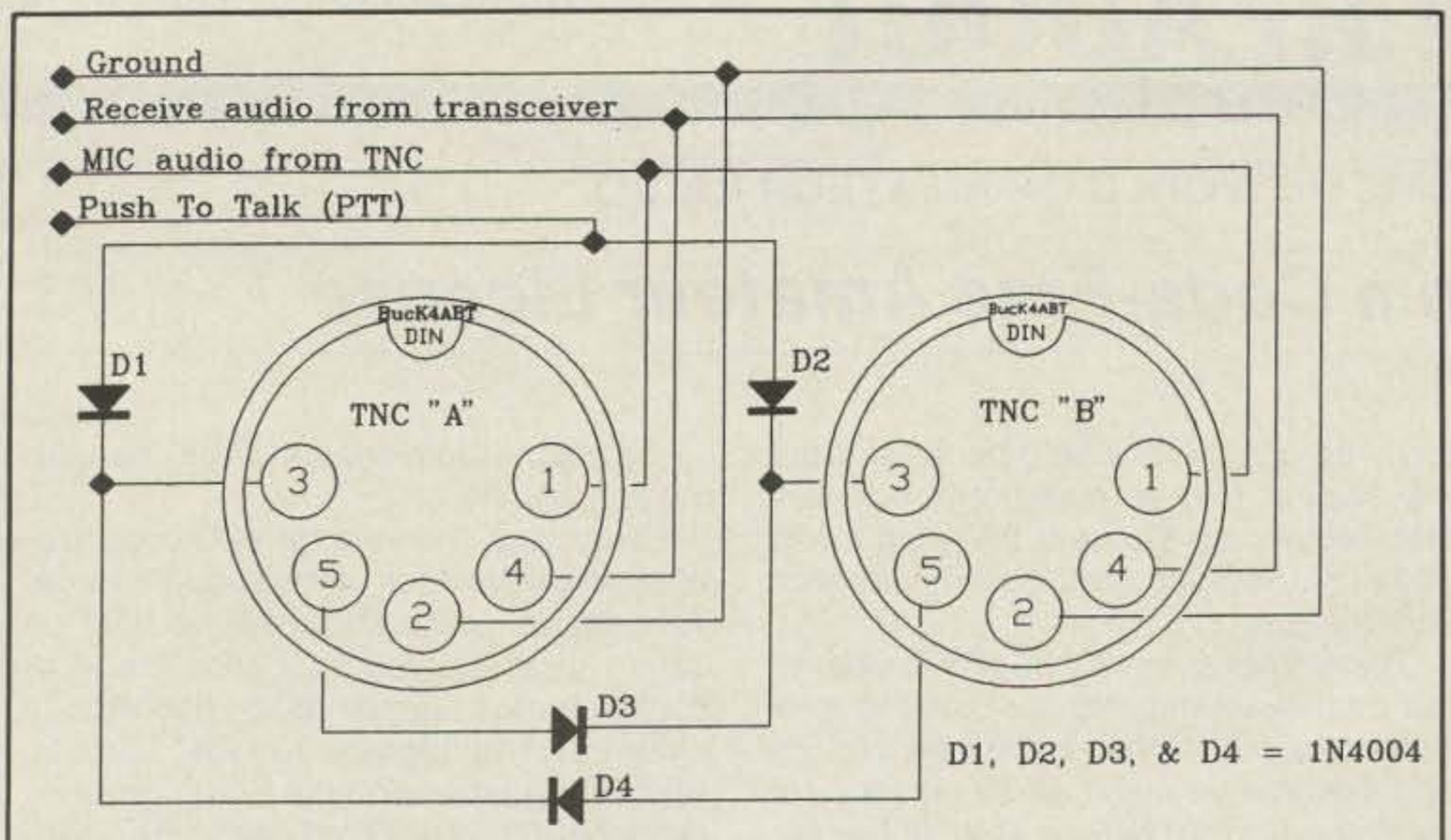

Fig. 7- Use this special radio port cable when adding a 2400 b/s node to an existing 1200 b/s node. This configuration will not allow both TNCs to activate the PTT at the same time. It is also useful when adding CONF node to network node.

Gentlemen, Start Your Engines

After you've made the necessary hardware modifications, connect the TNCs to a terminal and turn on the power. Be sure you get the correct "network ROM" sign-on message. Verify the callsign of each node, as each node should have a different SSID embedded within the sign-on message. Confirm that the callsign is correct.

Connect to the node using the **ESC-C** command and <enter>. The node should respond with "Connected to" etc. Enter the Node Identifier using the **IDENT** or **INFO** command. Carefully follow the instructions in your network node manual.

You may wish to use the local airport identifiers, or you may do as I have and use a portion of your callsign (for example, TNC A is "ABT1" and TNC B is "ABT5").

Other than for the obvious reason, there is more reasons for using separate callsigns on the nodes. Once you are connected, configured, and have the correct callsigns installed, you should be able to "GATEWAY" between the two nodes.

Finally, check the password by executing the **ESC-P** command. The password string can contain up to 80 characters. There should not be any spaces, line feeds, or carriage returns. The longer the password, the better, but stay within 80 characters or less.

Completing The Node

Do an **ESC-D** to disconnect. Then **ESC-Y-0** (zero) will disable the host connections. And finally, remove the terminal. I would recommend operating the system in a "test" environment for a few days or until you are happy with the behavior and operation of your setup. Double-check all wiring and connections.

Have Fun Packeting!

73, de BucK4ABT

WASHINGTON READOUT

BY FREDERICK O. MAIA, W5YI

REGULATORY HAPPENINGS FROM THE WORLD OF AMATEUR RADIO

Opinions on a Code-Free Amateur License

The FCC's recent Notice of Proposed Rulemaking suggested a code-free entry into amateur radio. Right now we are in the public comment period. The government is very interested in your views on their proposed Communicator class license. Comments close on August 6.

The FCC's recommendation was based on four objectives:

1. The Communicator license would be an *entry level* amateur radio class offered to persons who find the telegraphy requirement a barrier to entering the amateur service;

2. The parameters of the Communicator class must be able to be *implemented quickly*;

3. There *must not be any negative effect* upon present licensees, upon the work of the volunteer examiners, or upon the Commission's workload or resources;

4. The FCC's existing computer-aided application *processing system must be used "as is."* That means any amateur service renovation must:

a. make use of some or all of the six existing license classes that are currently programmed into the Gettysburg, Pennsylvania computer and;

b. utilize the current Call Sign Assignment System which systematically assigns callsigns by group.

The six classes are Communicator, Novice, Technician, General, Advanced, and Extra class. While the Communicator class has never been implemented, the FCC did make a computer programming provision for it during an earlier proceeding several years ago.

The Communicator Proposal

Basically, the FCC suggested that a new class of license would be established which allows entry-level operators all emission types above 222 MHz. The power level would be limited to 200 watts PEP. To obtain the license, applicants would have to answer 45 out of 60 questions correctly before three volunteer examiners (VEs). Knowledge of the Morse code would not be required.

These VEs would have to be at least an Advanced class amateur and accredited by a VEC (Volunteer Examiner Coordinator). The questions would be taken from the current Novice question element 2 and Technician Element 3A, plus a few additional questions of as yet unspecified content.

The Commission proposed to abolish the two-examiner Novice testing program and not further issue new Novice and Technician class amateur operator licenses. Current Novice and Technician operators would be able to renew their licenses indefinitely, however. Only four license classes would remain: Communicator, General, Advanced, and Extra class.

Although no FCC license would be issued, Communicator class licensees would obtain the present privileges of the Technician class simply by passing a code test. Operation on a segment of the 10 meter phone band plus certain CW portions of 80, 40, 15, and 10 meters would be authorized by the volunteer examiners who administered the telegraphy test to the applicant.

Communicators with the telegraphy endorsement would append their callsigns with the letters "/AC" when operating on this spectrum. The FCC also asked if it would be beneficial to allow newcomers to operate on small segments of the HF spectrum limited to domestic communications only.

Privileges for all existing licenses would remain unchanged. Current Novice-level licensees would have credit for 30 of the 60 questions required of the Communicator class. Novices would only be required to pass a 30-question test relating to VHF operation to upgrade to the Communicator class with code endorsement.

Questionnaire Prepared

The Communicator no-code proposal raised several interesting questions. Whatever is ultimately adopted, it will be the VECs (Volunteer Examiner Coordinators) who will be putting it into effect. The FCC no longer produces or implements any amateur testing programs.

It is the VEC's Question Pool Committee (QPC) who develops the questions and provide their examiners (VEs) with testing materials. Your author, Fred Maia, heads up the W5YI-VEC organization, second in size only to the American Radio Relay League. I am also Vice Chairman of the QPC. The FCC specifically asked for information from the testing community.

Every year the various VEC organizations meet for their annual conference. This year's conference will be held on June 15th in Gettysburg, Pennsylvania. A committee was appointed by conference chairman Tom Ingram, K4OOV, to make recommendations on the Communicator class to the assembled VECs. The VEC Recommendations Committee consists of Fred Maia, W5YI, Ray Adams, N4BAQ, and R.C. Smith, W6RZA.

The committee felt it would be important to get input from the testing community. A questionnaire was generated and mailed to more than a thousand VEs, VECs, amateur class educators, and various amateur radio groups. The questionnaires have been returning, and we pretty much know how everyone feels. By no means, however, are people in total agreement.

We thought you would be interested in some of the comments received. It may help you with your own perspective to the FCC. Keep in mind that the questionnaire was sent to predominantly Extra and some Advanced class VEs.

Is a Code-Free Amateur Class Appropriate?

We received a wide variety of responses to all of the questions we asked. Some amateurs thought that a code-free amateur license would result in amateur band congestion, while others thought that the Morse code was indeed a barrier and other alternatives should be tried. They wanted it done right the first time.

One amateur objected to the answers of the examination questions being published beforehand and allowing immediate retesting of failed examinations. There was even a comment ". . . if we cannot make ham radio alive and active without the necessity of dangling carrots, maybe FCC should consider taking some of our frequencies to be of greater use to others."

Several had the view that Morse code is easier to learn than most who resent it believe; others, ". . . it was part of our heritage that we should not forget." By and large, however, most amateurs felt the time had come for a code-free entry into amateur radio and concentrated their thoughts on how it could best be implemented.

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101

Some quotes on amateur radio growth:

"Growth is an indicator of health. The image of amateur radio is fading . . . the amateur ranks are thinning."

"Some sort of change to encourage growth is necessary. The ham population is greying and getting set in its opinions. The hobby has never stayed constant. It will not survive as we now know it. The emphasis has changed from just getting something to work to a multi-faceted hobby . . . ."

"Look around at the attendees at any ham club or convention. Where are the young faces? Where is industry going to get technical (especially RF) people in the future?"

"Due to the fact that many commercial entities are showing significant interest in the radio spectrum, we need to protect the amateur spectrum. Growth is definitely necessary for Amateur Radio to survive."

"...we need to get other new blood into the hobby and I think the current system is causing otherwise well qualified people to be excluded from the amateur service."

"...we are stagnating because we are not training in technology, we are training in an ancient, but honorable, type of transmission. We need to quit chaining everyone to one type of communication that is not mainstream any more."

Remove Code From The Novice Class?

Simply removing the code requirement from the Novice class was an alternative that the FCC asked the amateur community to consider in their Notice of Proposed Rulemaking. This would allow newcomers to operate repeaters and simplex in the 220 and 1270 MHz bands.

The above suggestion was pretty much turned down on the basis that few Novices initially operate on 220 and almost none go to the 1270 MHz band, even in areas where activity on those bands exists. In most of the country, however, there is little or no activity on this spectrum. The general feeling was there would be little or no incentive to want to become a ham.

Most newcomers, it seems, first go to the Novice 10 meter portion, which requires code knowledge. Most respondents felt previous Novices who had passed the 5 wpm code would not resent new Novices who had not, especially since these Novices would not have access to the 10 meter band.

There were, however, some amateurs who felt that the FCC should authorize the 10 meter spectrum to newcomers even though they were not code proficient. This raises an interesting question. Japan, which has more amateurs than any country in the world, does allow its

newcomers HF phone communication. Although seemingly illegal under ITU guidelines, they do it on the basis that it does not cause interference to other nations—an international loophole. While it does not appear the FCC would consider HF no-code phone operation, they did ask in the NPRM if it would be a good idea to allow domestic-only code practice on the high-frequency bands by beginners.

High-Frequency CW Operation By Beginners?

The FCC suggestion of allowing code operation before an applicant has passed the 5 word-per-minute code requirement was overwhelmingly turned down by the testing community. They thought it was the height of foolishness to allow domestic-only on-the-air code practice on the HF bands.

Many compared it to the 150 mile limit of the Citizen's Radio Service. "Radio waves are notorious for not stopping at political boundaries." They felt ". . . domestic only contacts would be as enforceable as the 'no hobby use' provisions of the Citizen's Band."

Some said there is very little slow-speed code on the HF bands anyway, and the situation would be intimidating for beginners. Still it might not be if the communications were confined to the existing Novice CW segments. "Not many students learn the CW, on the air, by sending," one said.

"Code tapes are a better choice," and ". . . students simply aren't ready to get on the air with CW before they learn the code," were other opinions. "With the serious limitations placed already on the FCC, we need not suggest anything that is going to require more supervision or interaction on their part," seemed to be the general consensus.

There were several suggestions that if on-the-air code practice was indeed desirable by code-free Communicators, it should be confined to local VHF/UHF simplex frequencies.

Entry Into The Amateur Radio Service

How newcomers should enter the amateur service drew a lot of controversy. Some agreed that the FCC was right in eliminating the Novice and Technician classes, since the Communicator class had similar requirements and privileges. Others simply wanted to add the no-code Communicator class while retaining the existing Novice and Technician levels.

There seemed to be agreement that two separate 30-question written Communicator examinations would be easier to pass than the current Novice theory and 5 wpm code tests. A single 60-question written test would be harder, however, and would result in no growth, especially among the young. The general feeling was that a 600-plus question pool would be too much to absorb all at one time.

It was pointed out that two tests would be necessary anyway, since Novices would need to be further examined to upgrade to the Communicator level. There was agreement that the Communicator route would be the more widely accepted entry into amateur radio if it were perceived by newcomers as being easier.

Additional questions were proposed by the FCC, so we asked volunteer examiners what they thought the new questions should cover. Good operating practices, regulations, safety, and courtesy were the most mentioned, along with more questions on new VHF/UHF technology. Many thought we did not need any additional questions, since test elements 2 and 3A already covered VHF and higher frequency operation.

Retaining the current Novice entry program seemed to be important due to the existence of classroom programs already in place. "Why abolish the current recruiting program before we know if its successor will work?" There was a general objection to the lack of additional FCC licensing when a Communicator passed the 5 wpm telegraphy examination. The FCC had proposed that Communicator upgrades to all privileges now enjoyed by current Technicians be authorized under the certificate issued to an applicant showing he had passed a telegraphy examination rather than by a new license.

Six and Two Meters To Communicators?

The effect of excluding Communicators from operating on the 2 and 6 meter bands was by far the most controversial. There were *very strong* feelings on both sides!

Those opposed to code-free operation on these bands generally cited possible interference to TV channel 2 and the current congestion on 2 meters, especially in the larger cities. It would lead to more closed repeaters, they said.

On the other hand, in many, perhaps most, parts of the country all VHF bands maybe underutilized. "In Maine, the Communicator class will be useless. There is almost no activity above 2 meters," said one New Englander. From Colorado: "Isolation of new amateurs from the mainstream would create a climate for CB-type operations to begin. Many parts of the country have no activity above 2 meters."

Many amateurs were concerned about possible consequences to existing packet and satellite operation by new-

comers who would not be aware of, or experienced in, these newer modes. Others cited the need to have an incentive to upgrade and that access to 6 and 2 meters would provide just that. Some objected to the unfairness of allowing privileges that others before them had to work for.

We also examined the effect of requiring code proficiency by the elderly and handicapped. Again the views were split. Some thought the rules should be flexible enough to allow telegraphy waivers, while others believed age and disabilities were not a factor in learning the code.

Other views: "CW is one of the leisure activities. Code is often a block to recreational radio. Observation of VHF operations shows Morse code is not used for recreational radio," and "There are lots of homebound people here in my community in Hawaii who would like to become hams just to have somebody to talk with. They are held back by the CW requirement."

Those in favor of allowing Communicators to operate on all frequencies above 50 MHz agreed it would be advantageous to immediately blend newcomers into the most popular VHF bands where there is considerable mainstream amateur radio activity.

"It has and always will take the involvement of the experienced ham to set the examples of the traditions of amateur radio," was a comment. Another: "I am much more concerned about developing good amateur operating habits among the newcomers . . . something that can only happen if they are included in the mainstream. We are talking about a new amateur radio operator here, not granting coexistence privileges to the CB service. If we want them to feel and act like amateurs, then we should treat them accordingly."

A feeling generally existed that code proficiency was not a realistic sole prerequisite for Communicators obtaining 2 and 6 meter band operation. More quotes: "I have taken part in several local emergency and public service events . . . Novices are locked out because almost always the work takes place on 2 meter FM. Morse code does have a place, however. It is the signalling method of the last resort. Keep code for the licenses with HF privileges."

"While the 2 meter band does not suffer from lack of participation and activity, the exclusion of the Communicator class is highly illogical. We are trying to encourage young people to become amateurs by stimulating their curiosity about high-technology techniques such as satellites and computers. This band is the common input for satellite communication, and yet we propose to preclude them from participating. The bulk of computer-to-computer packet communications is on this band, yet the NPRM proposes to deny access to the very people we are trying to attract to the hobby."

"I would allow all privileges above 30 MHz. The test should reflect the operation allowed and should not even mention code. It's as logical as asking an automobile driver's license applicant about landing an airplane. Let's drop artificial 'trials by fire' and concentrate on producing good operators who know how to operate properly, and how to stay out of harm's way."

Amateur Radio Classes and Tests

Most countries do not seem to have as many amateur license classes and examinations as we do in the United States. Canada is in the process of adopting four amateur classes granted by only four examinations—a basic and advanced written theory examination and a 5 and 12 wpm telegraphy test. Passing 60 out of 100 questions will allow 250 watt code-free operation above 30 MHz. We decided to inquire how the testing community felt about less license classes and examinations.

Many amateurs thought the number of license classes could be reduced from the current five. One even suggested a single class of "Operator." Several compared the current incentive system to de-

Please send all reader inquiries directly.

grees or diplomas awarded for academic achievement. "Qualification for privileges is as inherently 'American' as 'democracy,'" said one, "as witnessed by military rank, academic rank, pilot rank . . . business rank, etc." And "It is no different than gaining ranks and merit badges in the Scouts," commented another.

Another suggested three classes—"Amateur III, Amateur II, and Amateur I. These three classes could authorize all amateur operation in any form with the usual expanding frequency privileges tied to any level. Code proficiency could be recognized by a VEC endorsement on an FCC issued ticket, whatever the class. We must de-sophisticate the system of licensing and level of detail in the exams, particularly at the lower levels in order to recover the growth in the amateur community."

We got all sorts of suggestions for eliminating or rearranging the various code tests, including dispensing with them entirely and making the 13 wpm telegraphy examination to fastest speed examined. One amateur wanted the Extra class code speed *increased* to 25 wpm. Most people answering the questionnaire, however, wanted to retain the 20 wpm telegraphy exam and said it was not a burden to the testing community.

Code-Free Operation Cause a CB Chaos?

Many amateurs have expressed fear that elimination of the telegraphy requirements would open the door to the chaos exhibited in the CB Radio Service, the implication being that the act of learning telegraphy automatically makes one a responsible citizen on the amateur bands.

Others maintain that whether code is required or not, the quality of citizenship on the bands will be unaffected. They claim that the problems originate in the society at large, and that amateur radio is merely a reflection of that society. We asked the testing community to elaborate on these premises. And that they did! Some responses follow.

"The argument that code proficiency in Morse Code makes a better amateur is ridiculous. Remember Bouvet?"

"Anyone who listens to 14.313 can hardly believe that we have prevented undesirables from entering the amateur service. Morse code and tough questions were not the answer. Self-discipline is not licensed."

"The fears of some that the ham bands will turn into the mess that is found on the CB channels seem unjustified to me. Irresponsible, unethical and illegal operating is a human failing unrelated to being able to converse in Morse code . . . Elmering, peer pressure and proper legal action, when needed, can address the lack of responsibility, technique and skill of the socially unacceptable."

"Many of our most active hams today started in CB. Most became good hams because they wanted to fit into our community. I don't think code has the slightest bearing on this issue. What concerns me is that we give newcomers something positive to fit into, and that means the mainstream."

". . . well crafted written examinations that require some technical knowledge of the rules will probably serve as a deterrent to many of 'those guys.' But the current garbage on 14.313 tends to belie that statement."

"All you have to do is tune across the 80m band to determine that learning telegraphy is not an automatic road to responsible citizenship. Perhaps the problems on 20m are another example."

". . . CW proficiency does not keep out the undesirables nor does it provide a state-of-the-art form of communication. It does, however, root the radio amateur operators in the tradition of the history of radio communications."

"The chaos in the 11 meter band was the result of no test whatsoever. No technical ability, no practical ability, no anything. Additionally it was enhanced by the total lack of policing by the members themselves or the FCC."

"Will someone tell me why we are making all this fuss over a codeless amateur license exam when anyone with the price of a postcard can send away for a Third Class Radiotelephone Operator's Permit which allows them to operate and repair a 240 kilowatt broadcast television transmitter? No test is required, technical or otherwise. Times are changing. The spark-gap transmitter is no longer with us. Why must we be proficient in its use?"

". . . if we really want a CB culture within our bands, then privileges restricted to 220 and up is probably the best action we could probably take toward achieving it!"

Recommendations On Filing Comments at FCC

Communicate! It is of monumental importance to the future of amateur radio that you let your views be known. Keep your comments short and to the point. FCC staff will have to read hundreds and maybe thousands of comments. If you agree or disagree with the concept of a no-code license, state your position in the first paragraph. If you believe that the FCC's Communicator license proposal should be modified, explain as briefly as possible the changes you recommend. Think twice before mailing the FCC a lengthy ragchew.

Please ID. State who you are (some commenters forget to do this). Give your name and callsign. Sign all copies. If you believe you have special background that is relevant to this NPRM (such as being a VE, teacher or Elmer, non-licensed person interested in ham radio), state this!

Neatness counts. Do not handwrite your comments. They must be easy to read! People often file comments that are illegible. Use a good ribbon in your dot-matrix printer, use a laser printer, a typewriter, etc., but ensure that all copies are readable.

Format for comments. It is not necessary to use an official format to file comments, although it is good to use the heading "COMMENTS BY [YOUR NAME] ON A NOTICE OF PROPOSED RULEMAKING." It *is absolutely* necessary to state "PR Docket 90-55" at the top of your comments, and preferably on all pages. (PR stands for Private Radio, which is the service category to which amateur radio belongs.) FCC clerical personnel use this docket number to identify which proceeding your comments apply to. It is unnecessary to use any "RM" numbers on your comments. PR Docket 90-55 is not a petition (RM).

We recommend that comments be double spaced, with wide margins, on 8.5″ × 11″ paper only. You must send at least a signed original and four copies. If you want each Commissioner to have a personal copy of your comments, send an original and nine copies. NOTE: This does not obligate a Commissioner to retain or even read a copy of your comments.

Sending comments. You must meet the deadline of August 6, 1990 for comments and September 7, 1990 for replies. Comments must be received by the FCC by the close of business on those days. It is okay to use Express Mail or Federal Express. DO NOT send your comments on PR Docket 90-55 to the Private Radio Bureau. They are not equipped to handle them. (This does not apply to certain other proceedings.) Send your comments to this address: The Secretary, Federal Communications Commission, Washington, DC 20554.

Clubs and groups. The FCC welcomes comments from individuals and groups. However, comments from an amateur radio club or other group indicate the consensus of more than one person. I highly recommend filing comments that reflect the group's official position. These should be filed on the organization's letterhead, with the signature of the club president or other officer. It is not necessary to have all club members sign.

Non-licensed persons. The FCC is concerned with the opinions of licensed amateurs, but it should also hear from those who may want to enter the amateur service through a no-code license. You don't have to be a amateur to file comments!

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ANTENNAS

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THE AMATEUR RADIO VERTICAL HANDBOOK by Cpt. Paul H. Lee, USN (Ret.), N6PL
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EASY-UP ANTENNAS for Radio Listeners and Hams by Ed Noll W3FQJ
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MICROWAVE UPDATE 89 - Oct. 5-8, 1989

Some of the most up-to-date work in microwave communication was presented at the Arlington, Texas conference. A partial listing of the papers includes: 900 MHz transverter, TVRO EME operation, LNA update, No tune transverter for 2304 MHz, High power tube amplifiers for 2304 MHz, 10 GHz slot antenna, and more. A total of 30 papers from some of the best UHF operators in the country -- all in one book! ©1989, 1st edition, 214 pages.

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1989 CENTRAL STATES VHF SOCIETY 23rd CONFERENCE
proceedings July 1989

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BY GEORGE JACOBS, W3ASK

THE SCIENCE OF PREDICTING RADIO CONDITIONS

Sunspot Cycle 22 Stalled!

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What does this mean about the future of Cycle 22? That is what the world's experts are puzzled over. Many are now lowering their estimates of the peak level expected for this cycle. Thought originally to be one of the highest cycles to be recorded, possibly reaching close to the 200 level, many experts are now predicting that Cycle 22 is unlikely to exceed 180, and more likely may be in the range of 170. There is also the possibility that the peak of Cycle 22 may have occurred late last year rather than this past March.

On the other hand some experts point out that in several past cycles there have been periods of three months or so when a cycle did not increase, and then continued to rise to higher values. They believe that the present plateau may be such a case and that it may actually prolong the present period of high solar activity, causing the present cycle to peak later than expected.

This is again a reminder that there is still very much that we do not yet know or understand about the sun and its radiations. But time and patience will eventually reveal the true course of Cycle 22!

A smoothed sunspot number in the range of 155, plus or minus 20, is forecast for June 1990.

June Forecast

The exceptionally high level of solar activity expected during June should produce some pleasant surprises on the shortwave bands, particularly on *10, 12, 15, 17,* and *20* meters.

Although normally dead for DX during the summer months, expect considerable DX on the *10* meter band this June and throughout the summer months of 1990. True, there will be fewer east-west openings than took place during the winter and spring months, but there should be plenty of good openings to more southerly and tropical areas. DX conditions are expected to be best during the late afternoon, and the band should remain open until shortly after sundown.

Look for some nice surprises on *12, 15,* and *17* meters. Expect the bands to open for DX shortly after sunrise and to remain open well into the evening hours. These should be the best DX bands during the hours of daylight, with openings possible to just about all areas of the world. Peak conditions should occur during the late afternoon hours, and to many parts of the world expect the *15* and *17* meter bands to remain open to midnight! It's been a long time since *15* meters has been a *nighttime* DX band, but expect it to be this June and during the summer months as well.

What's the surprise on *20* meters? Well, while this band is often thought as *the* daytime DX band, this June it will provide the best in *nighttime* DX. While the band will open for DX shortly after sunrise, conditions are expected to be spotty until the late afternoon. Then like a switch being thrown on, the band should come to life, with signal levels becoming louder and louder as sundown approaches. Expect conditions to peak an hour or two after sundown, and to remain excellent to most parts of the world to midnight and beyond. From sundown to well past midnight you are likely to hear DX signals on *20* meters like you haven't heard in nearly 20 years!

Fewer hours of darkness and an expected sharp seasonal increase in static levels will mask any improvement on *30, 40, 80,* and *160* meter DX propagation conditions. Yet some excellent openings can be expected this month on *40* and *30* meters to many parts of the world during the hours of darkness. The bands won't sound as good as they did during the spring months, but signals will often be exceptionally strong. DX openings to many areas of the world are forecast for *80* meters this June during the hours of darkness, but signals will often be weak and noisy. Not much DX is expected on *160* meters until the fall, but an occasional opening may be possible during the hours of darkness, with chances best just before sunrise on the *eastern* terminal of a path.

Expect plenty of *short-skip* openings on the shortwave bands this month. For distances less than 250 miles, try *40* and *80* meters during the day and *80* and *160* meters at night. For openings between 250 and 750 miles, *30* and *40* meters should be best during the day, with *20* meters a close second. Try *80* meters at night, with *40* meters a second choice. *Twenty* meters should be best for daytime openings between 750 and 1300 miles, with *30* and *40* meters best at night, backed up by *80* meters. Between distances of 1300 and 2300 miles, use *20* meters during the day, with *17* and *15* as a

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for June 1990

Propagation Index	Expected Signal Quality (4)	(3)	(2)	(1)
Above Normal: 1, 7-8, 22, 28-29	A	A	B	C
High Normal: 2, 6, 23-27	A	B	C	C-D
Low Normal: 4-5, 9, 12-15, 18-20	B	C	D	D-E
Below Normal: 3, 10, 16-17, 21, 30	C	C-D	D-E	E
Disturbed: 11	C-D	D	E	E

Where expected signal quality is: **A—Excellent opening, exceptionally strong, steady signals greater than S9.**

B—Good opening, moderately strong signals varying between S6 and S9+, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S0 and S3, and with considerable fading and noise.

E—No opening expected.
3 dB per S-Unit.

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 day of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be excellent (A) on June 1, good (B) on the 2nd, fair-to-poor (C-D) on the 3rd, good-to-fair (B-C) on the 4th and 5th, good (B) on the 6th, etc.**

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 (10 through 80 Meters) for a particular DX region, as shown in the left hand column of the Charts. An * indicates the best time to listen for 160 meter openings.

3. The *propagation index* is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of *days* during the month on which the opening is expected to take place as follows:
(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days
Refer to the "Last Minute Forecast" at the beginning of this column for the actual *dates* on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

4. Times shown in the Charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M. wetc. Appropriate *daylight* time is used, *not* GMT. T convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts c.w., or 1 kw, p.e.p. 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 10dB 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.

June 15 to August 15, 1990 Time Zone: EDT EASTERN USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	16-18 (1)	08-09 (1) 09-12 (2) 12-15 (1) 15-17 (2) 17-18 (3) 18-19 (2) 19-21 (1)	09-15 (1) 15-16 (2) 16-18 (3) 18-00 (4) 00-03 (3) 03-05 (2) 05-07 (3) 07-09 (2)	20-21 (1) 21-22 (2) 22-23 (3) 23-01 (4) 01-02 (3) 02-03 (2) 03-04 (1) 21-22 (1)* 22-23 (2)* 23-00 (3)* 00-01 (2)* 01-02 (1)*
Northern Europe & European USSR	15-17 (1)	11-15 (1) 15-18 (2) 18-19 (1)	09-15 (1) 15-17 (2) 17-19 (3) 19-22 (4) 22-01 (3) 01-03 (2) 03-06 (1) 06-09 (2)	21-22 (1) 22-23 (2) 23-00 (3) 00-01 (2) 01-02 (1) 22-01 (1)*
Eastern Mediter-ranean & Middle East	16-18 (1)	11-13 (1) 13-17 (2) 17-18 (3) 18-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	12-16 (1) 16-18 (2) 18-20 (3) 20-00 (4) 00-01 (3) 01-03 (2) 03-06 (1) 06-08 (2) 08-09 (1)	20-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Western Africa	11-13 (1) 15-17 (1) 17-19 (2) 19-21 (1)	10-12 (1) 12-15 (2) 15-17 (3) 17-23 (4) 23-03 (3) 03-04 (2) 04-05 (1)	14-16 (1) 16-17 (2) 17-18 (3) 18-03 (4) 03-04 (3) 04-05 (2) 05-07 (1)	20-22 (1) 22-00 (2) 00-02 (1) 22-00 (1)*
Eastern & Central Africa	17-19 (1)	09-12 (1) 12-14 (2) 14-17 (3) 17-19 (4) 19-22 (3) 22-23 (2) 23-00 (1)	14-16 (1) 16-18 (2) 18-20 (3) 20-00 (4) 00-02 (3) 02-03 (2) 03-05 (1)	21-00 (1)

second choice. *Thirty* and *40* meters are expected to be best for this distance range at night. Frequent short-skip openings, resulting from an expected seasonal increase in sporadic-E ionization, should also be possible on *10, 12, 15,* and *17* meters over distances ranging between approximately 450 and 1300 miles. As its name implies, sporadic-E ionization can occur at any time, but it is usually most prevalent between 10 AM and 2 PM and again between 6 and 10 PM local daylight time.

This month's *CQ* Propagation Charts contain DX predictions for the period June 15 through August 15, 1990. Short-Skip Charts for June, for openings between 50 and 2300 miles, and from Hawaii and Alaska, appeared in last month's column.

VHF Ionospheric Openings

Sporadic-E ionization is also expected to result in some fairly frequent *6* meter short-skip openings over a range from 1000 to 1400 miles. During intense and widespread sporadic-E ionization, two-hop openings well beyond 1300 miles may also be possible at times. An occasional sporadic-E opening on *2* meters can occur, particularly when ionization is very intense, over distances between approximately 1200 and 1400 miles.

Two minor meteor showers are expected during June, the *Herculids* and *Scorpiids*. They may produce enough meteor ionization between June 3 and 5 to permit some meteor-type openings on the VHF bands.

There is usually a seasonal decline in T.E. propagation during the summer months, but some *6* meter openings may still be possible during June. T.E. openings must cross the geomagnetic equator at or near a right angle, and the best time for such openings is between 8 and 11 PM, local daylight time. Conditions favor openings deep into South America from the Central American and Caribbean areas in this hemisphere, as well as from the southern tier states in the USA. Openings can, however, extend at times into more northern states as well. Similar north-south T.E. openings are possible in other areas of the world.

73, George, W3ASK

Southern Africa	10-13 (1)	08-10 (1) 10-11 (2) 11-12 (3) 12-13 (4) 13-14 (3) 14-15 (2) 15-16 (1) 01-03 (1)	23-01 (1) 01-03 (3) 03-05 (2) 05-08 (1) 14-15 (1) 15-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	21-22 (1) 22-00 (2) 00-02 (1) 23-01 (1)*
Central & South Asia	NIL	09-10 (1) 10-12 (2) 12-13 (1) 17-19 (1) 19-22 (2) 22-23 (1)	17-20 (1) 20-23 (2) 23-03 (1) 03-06 (2) 06-08 (1)	19-21 (1) 04-06 (1)
Southeast Asia	NIL	10-14 (1) 14-16 (2) 16-19 (1) 19-21 (2) 21-22 (1)	06-07 (1) 07-09 (2) 09-11 (1) 16-19 (1) 19-21 (2) 21-23 (1) 23-02 (2) 02-03 (1)	04-06 (1)
Far East	NIL	09-10 (1) 10-12 (2) 12-18 (1) 18-20 (2) 20-22 (1)	06-07 (2) 07-09 (3) 09-10 (2) 10-12 (1) 18-21 (1) 21-23 (2) 23-02 (3) 02-04 (2) 04-06 (1)	04-06 (1)
South Pacific & New Zealand	16-18 (1) 18-20 (2) 20-22 (1)	09-11 (1) 14-16 (1) 16-18 (2) 18-19 (3) 19-21 (4) 21-22 (3) 22-00 (2) 00-01 (1)	18-20 (1) 20-23 (2) 23-01 (3) 01-04 (4) 04-05 (3) 05-06 (2) 06-09 (3) 09-10 (2) 10-12 (1)	01-03 (1) 03-05 (2) 05-06 (3) 06-07 (2) 07-08 (1) 04-06 (1)*
Australasia	18-19 (1) 19-21 (2) 21-22 (1)	10-12 (1) 17-18 (1) 18-20 (2) 20-22 (3) 22-23 (2) 23-00 (1)	21-23 (1) 23-01 (2) 01-03 (3) 03-05 (4) 05-07 (2) 07-09 (3) 09-10 (2) 10-11 (1) 16-18 (1)	03-04 (1) 04-06 (2) 06-07 (1) 04-06 (1)*
Caribbean, Central America & Northern Countries of South America	09-13 (1) 13-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	08-09 (2) 09-12 (4) 12-14 (3) 14-21 (4) 21-01 (3) 01-03 (2) 03-08 (1)	06-07 (3) 07-10 (4) 10-11 (3) 11-15 (2) 15-17 (3) 17-03 (4) 03-05 (3) 05-06 (2)	19-20 (1) 20-21 (2) 21-23 (3) 23-03 (4) 03-04 (3) 04-05 (2) 05-06 (1) 22-23 (1)* 23-04 (2)* 04-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	10-14 (1) 14-16 (2) 16-17 (3) 17-18 (4) 18-19 (3) 19-21 (2) 21-22 (1)	07-08 (1) 08-11 (2) 11-15 (1) 15-16 (2) 16-17 (3) 17-23 (4) 23-01 (3) 01-02 (2) 02-03 (1)	10-16 (1) 16-18 (2) 18-19 (3) 19-02 (4) 02-04 (3) 04-07 (2) 07-09 (3) 09-10 (2)	20-21 (1) 21-22 (2) 22-02 (3) 02-04 (2) 04-05 (1) 22-03 (1)*
McMurdo Sound, Antarctica	15-17 (1)	16-18 (1) 18-21 (2) 21-22 (1)	17-19 (1) 19 22 (2) 22-03 (3) 03-05 (2) 05-06 (1) 07-09 (1)	02-05 (1)

Time Zones: CDT & MDT (24-Hour Time) CENTRAL USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	NIL	11-15 (1) 15-17 (2) 17-18 (3) 18-19 (2) 19-20 (1) 23-01 (1)	05-08 (2) 08-15 (1) 15-17 (2) 17-18 (3) 18-22 (4) 22-02 (3) 02-03 (2) 03-05 (1)	20-23 (1) 23-01 (2) 01-02 (1) 22-00 (1)*
Northern & Central Europe & European USSR	Nil	10-15 (1) 15-17 (2) 17-18 (1)	02-06 (1) 06-09 (2) 09-15 (1) 15-18 (2) 18-19 (3) 19-21 (4) 21-00 (3) 00-02 (2)	20-21 (1) 21-23 (2) 23-00 (1) 21-23 (1)*
Eastern Mediterranean & Middle East	15-17 (1)	11-16 (1) 16-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	13-16 (1) 16-18 (2) 18-20 (3) 20-22 (4) 22-23 (3) 23-00 (2) 00-02 (1) 07-09 (1)	21-23 (1)
Western Africa	10-12 (1) 15-16 (1) 16-18 (2)	10-12 (1) 12-15 (2) 15-17 (3)	14-15 (1) 15-16 (2) 16-18 (3)	20-00 (1) 22-00 (1)*
	18-20 (1)	17-21 (4) 21-00 (3) 00-02 (2) 02-03 (1)	18-00 (4) 00-02 (3) 02-04 (2) 04-06 (1)	
Eastern & Central Africa	16-18 (1)	10-14 (1) 14-16 (2) 16-17 (3) 17-18 (4) 18-19 (3) 19-20 (2) 20-22 (1)	15-17 (1) 17-18 (2) 18-19 (3) 19-22 (4) 22-00 (3) 00-02 (2) 02-04 (1)	21-23 (1)
Southern Africa	09-12 (1)	08-10 (1) 10-11 (2) 11-12 (4) 12-13 (3) 13-14 (2) 14-15 (1) 00-02 (1)	23-00 (1) 00-02 (3) 02-04 (2) 04-06 (1) 12-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	21-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Central & South Asia	NIL	09-11 (1) 11-12 (2) 12-13 (1) 15-18 (1) 18-21 (2) 21-23 (1)	17-19 (1) 19-22 (2) 22-02 (1) 02-06 (2) 06-08 (3) 08-09 (2) 09-10 (1)	19-21 (1) 05-07 (1)
Southeast Asia	NIL	10-11 (1) 11-14 (2) 14-19 (1) 19-22 (2) 22-00 (1)	07-09 (2) 09-11 (1) 16-18 (1) 18-20 (2) 20-23 (1) 23-00 (2) 00-01 (3) 01-02 (2) 02-03 (1)	03-05 (1)
Far East	NIL	09-11 (1) 13-15 (1) 17-19 (1) 19-20 (2) 20-22 (3) 22-23 (2) 23-01 (1)	05-07 (2) 07-09 (3) 09-10 (2) 10-12 (1) 20-22 (1) 22-00 (2) 00-03 (3) 03-04 (2) 04-05 (1)	04-05 (1) 05-06 (2) 06-07 (1) 04-06 (1)*
South Pacific & New Zealand	14-16 (1) 16-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	13-16 (1) 16-18 (2) 18-20 (3) 20-22 (4) 22-23 (3) 23-00 (2) 00-01 (1)	17-19 (1) 19-23 (2) 23-02 (4) 02-05 (3) 05-07 (2) 07-09 (4) 09-10 (3) 10-11 (2) 11-13 (1)	23-01 (1) 01-03 (2) 03-05 (3) 05-07 (2) 07-08 (1) 01-04 (1)* 04-06 (2)* 06-07 (1)*
Australasia	16-17 (1) 17-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	14-15 (1) 15-17 (2) 17-19 (1) 19-20 (2) 20-21 (4) 21-22 (3) 22-23 (2) 23-00 (1)	22-00 (1) 00-01 (2) 01-04 (4) 04-05 (3) 05-07 (2) 07-09 (4) 09-11 (2) 11-12 (1)	01-03 (1) 03-07 (2) 07-08 (1) 03-06 (1)*
Caribbean Central America & Northern Countries of South America	10-12 (1) 12-14 (2) 14-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	08-09 (2) 09-10 (3) 10-12 (4) 12-14 (3) 14-19 (4) 19-23 (3) 23-01 (2) 01-08 (1)	03-05 (2) 05-07 (3) 07-09 (4) 09-11 (3) 11-15 (2) 15-17 (3) 17-01 (4) 01-03 (3)	19-20 (1) 20-21 (3) 21-23 (4) 23-00 (3) 00-03 (2) 03-05 (3) 05-06 (1) 20-22 (1)* 22-04 (2)* 04-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	09-13 (1) 13-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	07-08 (1) 08-10 (2) 10-14 (1) 14-15 (2) 15-16 (3) 16-22 (4) 22-00 (3) 00-01 (2) 01-02 (1)	10-15 (1) 15-17 (2) 17-18 (3) 18-01 (4) 01-03 (3) 03-07 (2) 07-09 (3) 09-10 (2)	20-21 (1) 21-22 (2) 22-02 (3) 02-03 (2) 03-05 (1) 20-03 (1)*
McMurdo Sound, Antarctica	15-18 (1)	14-16 (1) 16-17 (2) 17-18 (3) 18-19 (2) 19-21 (1)	17-19 (1) 19-22 (2) 22-02 (3) 02-04 (2) 04-07 (1) 07-09 (2) 09-10 (1)	02-06 (1)

Time Zones PDT (24-Hour Time) WESTERN USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	NIL	08-09 (1) 09-11 (2) 11-15 (1) 15-17 (2) 17-18 (1) 21-23 (1)	23-01 (3) 01-06 (1) 06-08 (2) 08-14 (1) 14-16 (2) 16-21 (3) 21-23 (2)	20-23 (1)
Central & Northern Europe & European USSR	NIL	07-09 (1) 13-14 (1) 14-16 (2) 16-17 (1)	13-15 (1) 15-19 (2) 19-00 (3) 00-01 (2) 01-06 (1) 06-08 (2) 08-10 (1)	20-22 (1)

Eastern Mediterranean & Middle East	NIL	07-09 (1) 11-15 (1) 15-17 (2) 17-18 (1) 22-00 (1)	13-16 (1) 16-20 (2) 20-22 (3) 22-00 (2) 00-02 (1) 06-08 (1)	20-21 (1)
Western & Central Africa	09-14 (1) 14-16 (2) 16-18 (1)	07-11 (1) 11-13 (2) 13-17 (3) 17-19 (2) 19-21 (1)	13-15 (1) 15-17 (2) 17-19 (3) 19-22 (4) 22-00 (3) 00-04 (2) 04-08 (1)	20-22 (1)
Eastern Africa	NIL	09-14 (1) 14-16 (2) 16-17 (3) 17-18 (2) 18-19 (1) 00-02 (1)	15-17 (1) 17-19 (2) 19-22 (3) 22-00 (2) 00-02 (1)	NIL
Southern Africa	09-12 (1)	08-10 (1) 10-11 (2) 11-12 (3) 12-14 (2) 14-15 (1)	14-15 (1) 15-17 (2) 17-18 (1) 22-23 (1) 23-00 (2) 00-02 (3) 02-03 (2) 03-06 (1) 06-08 (2) 08-10 (1)	20-23 (1)
Central & South Asia	NIL	08-10 (1) 10-12 (2) 12-14 (1) 17-19 (1) 19-22 (2) 22-23 (1)	05-07 (2) 07-09 (3) 09-10 (2) 10-11 (1)	05-07 (1) 19-20 (1)
Southeast Asia	11-15 (1)	08-09 (1) 09-11 (3) 11-13 (2) 13-16 (1) 20-22 (1) 22-00 (2) 00-02 (1)	23-01 (1) 01-03 (2) 03-05 (3) 05-07 (2) 07-09 (3) 09-11 (2) 11-14 (1)	03-07 (1)
Far East	14-16 (1)	09-10 (1) 10-12 (2) 12-15 (1) 15-17 (2) 17-19 (3) 19-21 (2) 21-23 (1)	19-21 (1) 21-23 (2) 23-01 (3) 01-04 (4) 04-06 (3) 06-07 (2) 07-09 (3) 09-11 (2) 11-14 (1)	01-02 (1) 02-03 (2) 03-05 (3) 05-06 (2) 06-07 (1) 03-05 (1)*
South Pacific & New Zealand	12-14 (1) 14-16 (2) 16-18 (3) 18-20 (4) 20-21 (2) 21-22 (1)	11-13 (1) 13-15 (2) 15-18 (3) 18-21 (4) 21-22 (3) 22-23 (2) 23-01 (1)	17-19 (1) 19-21 (2) 21-03 (4) 03-05 (3) 05-07 (2) 07-09 (3) 09-11 (2) 11-13 (1)	22-23 (1) 23-01 (2) 01-06 (3) 06-07 (2) 07-08 (1) 23-02 (1)* 02-05 (2)* 05-06 (1)*
Australasia	14-17 (1) 17-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	07-09 (1) 13-17 (1) 17-19 (2) 19-22 (3) 22-00 (4) 00-01 (3) 01-02 (2) 02-03 (1)	20-22 (1) 22-00 (2) 00-05 (4) 05-07 (3) 07-09 (4) 09-10 (2) 10-13 (1) 13-15 (2) 15-17 (1)	22-00 (1) 00-01 (2) 01-05 (3) 05-06 (2) 06-08 (1) 01-04 (1)*
Caribbean Central America & Northern Countries of South America	09-11 (1) 11-12 (2) 12-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	08-09 (2) 09-10 (3) 10-12 (4) 12-14 (3) 14-19 (4) 19-21 (3) 21-00 (2) 00-08 (1)	08-11 (3) 11-15 (2) 15-17 (3) 17-01 (4) 01-04 (3) 04-05 (2) 05-06 (3) 06-08 (4)	19-21 (1) 21-22 (2) 22-00 (3) 00-03 (2) 03-04 (3) 04-05 (2) 05-06 (1) 21-23 (1)* 23-03 (2)* 03-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	09-12 (1) 12-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-16 (3) 16-23 (4) 23-00 (3) 00-01 (2) 01-02 (1)	09-15 (1) 15-17 (2) 17-18 (3) 18-01 (4) 01-03 (3) 03-06 (2) 06-08 (3) 08-09 (2)	20-21 (1) 21-00 (2) 00-02 (1) 02-03 (3) 03-04 (2) 04-05 (1) 02-04 (1)*
McMurdo Sound, Antarctica	17-19 (1)	14-16 (1) 16-17 (2) 17-19 (3) 19-21 (2) 21-22 (1)	16-18 (1) 18-19 (2) 19-02 (3) 02-04 (2) 04-06 (1) 06-08 (2) 08-10 (1)	00-23 (1) 23-01 (2) 01-04 (1) 04-06 (2) 06-07 (1)

*Indicates best times to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2), or higher.

**Indicates best times to listen for F-2 layer openings on meters.

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.

CIRCLE 61 ON READER SERVICE CARD

CIRCLE 126 ON READER SERVICE CARD

No-91-92

DX

BY CHOD HARRIS, VP2ML

NEWS OF COMMUNICATION AROUND THE WORLD

Islands On The Air

The premier DX awards are closed-ended. That is, there are clearly defined limits to the total entities that qualify for the award, and it is possible to "work 'em all." The Worked All Zones Award from *CQ* magazine, for example, provides recognition for working 40 zones. Once the DXer has worked (and confirmed) all 40 zones, that award offers no more challenges. The ambitious DXer can always work toward the most difficult of all the major awards, 5-Band Worked All Zones, but again, once the 200 band-zones are worked and confirmed, the DXer is left without a goal.

The same holds for the DX Century Club. While it is very difficult to "work 'em all," it is a straightforward process. The active and well-informed DXer, by not missing any of the occasional operations from and DXpeditions to rare countries, can keep up to date, and need only read a DX newsletter to keep track of operations from the very rare countries. True, the DXCC country list changes from time to time, but only very slowly. The six additions to the DXCC list in the past few years constitute the most dramatic change in the DXCC country list in many years. (The six new countries are Western Sahara, M-V Island, Rotuma, Banaba, Conway Reef, and Walvis Bay.) So the active DXer gets to the 290 level in a couple of years of serious operating, and then waits for DXpeditions to activate the remaining countries. Aside from the five-band and single band awards, the DXCC program offers few challenges to that DXer.

There is one major, open-ended award: the Worked All Prefixes (WPX) Award from *CQ*. There is a constant flow of new prefixes available, thanks to the FCC's system of issuing callsigns, and the fact that some countries' telecommunications departments are generous in granting special callsigns—notably Brazil, Canada, and the USSR. However, thanks to the FCC's hard-nosed attitude about special-event callsigns, US amateurs have great difficulty in coming up with "new ones" for WPX, except through new Extra class licenses. (The only active special-event callsign issued by the FCC is the NN3SI station at the Smithsonian Institution in Washington, DC.)

P.O. Box 50, Fulton, CA 95439

YU4MP will be operating with the callsigns 4O0T and 4O0TROYA from Lastovo Island (EU-99 for IOTA) to May 25.

There is one open-ended award program in which US amateurs can be "rare," and maybe even activate a "new one." That program is the Islands On The Air (IOTA) program, currently handled by the Radio Society of Great Britain (RSGB). IOTA consists of a basic award for working and confirming stations on 100 off-shore islands, and a dozen or so additional awards for working more islands, or islands in particular parts of the world, such as the West Indies.

The IOTA program was started by DX Hall of Famer Geoff Watts in 1964. Geoff was then editor of the weekly newsletter "DX News Sheet" and had noted that DXers were "retiring" after the superb conditions in the late 1950s had given many DXers all available DXCC countries. Geoff provides the rationale behind the IOTA program:

"Now that propagation conditions are poor, DX getting scarce, the possibility of 'brand new' DXCC countries eventually becoming extremely remote, top DXers 'retiring' because there is nothing left to work, it is proposed that an entirely new DX-achievement 'yardstick' come into being, the All Islands of The World Award, to promote more activity and interest among DXers, many of whom could then go on a 'brand new island' DXpedition themselves, for there are few countries where amateurs could not make trips to several islands which could never count under present DXCC rules."

For many years the IOTA program enjoyed a limited popularity outside of Europe, where it was considered one of the top awards. During the years when the DXCC list stagnated, and few of the rarer DXCC countries came on the air, many US DXers began to get involved in the IOTA program. Today there are hundreds of active, dedicated IOTA chasers, and dozens of island DXpeditioners who activate many of the rarer islands. Thousands more DXers collect islands more casually.

The complete rules for the IOTA award program, and a directory of current and possible IOTA islands, is available for North American DXers for $4.00 postpaid from The DX Bulletin, P.O. Box 50, Fulton, CA 95439. (DXers in other parts of the world can obtain their IOTA directory from IOTA Award Administrator Roger Balister, G3KMA, La Quinta, Mimbridge, Choham, Woking, Surrey, GU24 8AR, England. Cost is 2 British pounds or US $4.00 or 7 IRCs in Europe, or US $5.00 or 9 IRCs outside of Europe.)

US DXers seeking the basic, 100-island award may send photocopies of both sides of their QSLs cards to the US IOTA checkpoint, Dewitt Jones, W4BAA. (Dewitt winters in Florida [Box 1, Captiva Island, FL 33924] and summers in Michigan [Box 379, Glen Arbor, MI 49636]; check where he is before sending your application to avoid delays.) There are other checkpoints for other parts of the world. Actual QSL cards are required for all but the basic award.

There are about 500 islands on the current IOTA list. Some have resident amateurs and are easy to work. Others are activated on a regular basis by visitors. However, there are dozens of other islands and island groups that have never been activated for the IOTA program. These will count as "new ones" when ambitious DXers put them on the air for the first time.

Separate Islands On The Air have an IOTA designation consisting of the continental abbreviation and a serial number. Thus, Montserrat is (NA-103) and Western Samoa is (OC-97). The "DX News Sheet" and "The DX Bulletin" regularly list stations currently active from some of the rarer IOTA islands, as well as news of up-coming DXpeditions to "new ones." Other DX newsletters occasionally mention IOTA activity. Also, there are several on-the-air gathering places for IOTA enthusiasts; 14260 kHz at 1300Z and 21250

The WPX Program

Mixed

1437	IK2FCZ	1442	EI6FR
1438	W9GCH	1443	W2FXA
1439	WJ7H	1444	K9QFR
1440	DL9OE	1445	IK3HHL
1441	EA7CP		

SSB

2129	IK2ECN	2135	EA3EJI
2130	W9GCH	2136	EA9PY
2131	I2GGJ	2137	EA7CP
2132	CE7ZK	2138	SV0FC
2133	YT2IJ	2139	EA7EYX
2134	IK8BMW		

CW

2621	NF0X	2624	K9QFR
2622	I2MQP	2625	JH4CHV
2623	EA3FTJ		

Endorsements

Mixed: 450 IK2FCZ, WJ7H, DL9OE, EA7CP, W2FXA, K9QFR, IK3HHL. 500 IK2FCZ, IK5EXV, DL9OE, W2FXA, K9QFR, IK3HHL. 550 IK2FCZ, IK5EXV, DL9OE, W2FXA, K9QFR. 600 VE7CXN, IK2FCZ, IK5EXV, DL9OE, W2FXA, K9QFR. 650 IK2FCZ, DL9OE, W2FXA, K9QFR. 700 IK2FCZ, DL9OE, W2FXA, K9QFR. 750 IK2FCA, DL9OE, W2FXA, K9QFR. 800 IK2FCZ, DL9OE, W2FXA, K9QFR. 850 IK2FCZ, K9EC, DL9OE, W2FXA, K9QFR. 900 IK2FCZ, W9MYG, K9EC, DL9OE, W2FXA, K9QFR. 950 IK2FCZ, W9MYG, DL90E, W2FXA, K9QFR. 1000 IK2FCZ, W9MYG, DL9OE, W2FXA, K9QFR. 1050 W2FXA, K9QFR. 1100 KA7FFN, W2FXA, K9QFR. 1150 SM4-3434, W2FXA, K9QFR. 1150 SM4-3434, W2FXA, K9QFR. 1200 SM4-3434, W2FXA, K9QFR. 1250 W2FXA, K9QFR. 1300 W2FXA, K9QFR. 1350 W2FXA, K9QFR. 1400 W2FXA, K9QFR. 1450 WFXA, K9QFR. 1500 W2FXA, K9QFR. 1550 W2FXA, K9QFR. 1600 W2FXA, K9QFR. 1650 W2FXA. 1700 W2FXA. 1750 W2FXA. 1800 W2FXA. 1850 W2FXA. 2150 SM3EVR. ??00 SM3EVR. 2250 SM3EVR. 2400 I2PJA. 2450 I2PJA. 2500 I2PJA. 2700 WA2HZR. 2750 WA2HZR. 2800 WA2HZR.

SSB: 350 IK2ECN, DF7YN, I2GGJ, CE7ZK, YT2IJ, IK8BMW, EA9PY, EA7CP, K9QFR, SV0FC, EA9EYX. 400 IK2ECN, I2GGJ, CE7ZK, IK8BMW, EA9PY, EA7CP, K9QFR, SV0FC, EA9EYX. 450 IK2ECN, I2GGJ, K2EEK, CE7ZK, IK8BMW, EA9PY, K9QFR, SV0FC, EA7EYX. 500 IK2ECN, I2GGJ, CE7ZK, IK8BMW, EA9PY, YC1RED, K9QFR. 550 IK2ECN, CE7CK, IK8BMW, EA9PY, YC1RED, K9QFR. 600 IK2ECN, WM0G, CE7ZK, IK8BMW, EA9PY, YC1RED, K9QFR. 650 CE7ZK, IK8BMW, EA9PY, K9QFR. 700 CE7ZK, IK8BMW, EA9PY, K9QFR, W5ILR. 750 K9EC, CE7ZK, IK8BMW, EA9PY, K9QFR, W5ILR. 800 K9EC, IK8BMW, EA9PY, K9QFR, W5ILR. 850 EA9PY, K9QFR, W5ILR. 900 IK8DBB, EA9PY, K9QFR. 950 IK8DBB, K9QFR. 1000 IK7DBB, I2WZX, IN3QCI, IT9JKY, K9QFR. 1050 I2IAU, IW2ZX, IN3QCI, K9QFR. 1100 I2IAU, OK2ON, IN3QCI, K9QFR. 1150 OK2ON, IN3QCI, AC3T, K9QFR. 1200 OK2ON, YV1CP, AC3T, K9QFR. 1250 NF0X, K9QFR, KE6KT. 1300 K9QFR. 1350 KD9OT, K9QFR. 1400 KD9OT, K9QFR. 1450 K9QFR. 1650 W3ARK, EA8AKN. 1700 W3ARK, EA8AKN. 1750 EA8AKN, WF4V, K8MFO. 1800 EA8AKA, WF4V. 1850 VE7WJ, WF4V. 1900 VE7WJ, WF4V. 2400 I2PJA. 2450 I2PJA. 2500 I2PJA.

CW: 350 NF0X, IV3PVD, OK1DCE, K9QFR. 400 DK8NB, NF0X, IV3PVD, OK1DCE, K9QFR. 450 DL1FU, WJ7H, NF0X, IV3PVD, K9QFR. 500 NF0X, IK0ADY, K9QFR. 550 YU2RR, NF0X, IK0ADY, K9QFR. 600 YU2RR, NF0X, IK0ADY, K9QFR. 650 WA3GNW, YU2RR, NN7Z, K7DBV, NF0X. 700 NN7A. 750 IS0FIC. 800 IS0FIC. 1050 OK2PO. 1100 OK2PO. 1150 OK2PO. 1200 OK2PO. 1250 OK2PO. 1300 OK2PO.

10 Meters: OK2PO, IV3PVD, K9EC, IN3QCI, EA3EJI, K9QFR, KS3F, WE2L
15 Meters: IK2FCZ, YV1CP, IN3QCI, K9QFR, VE3DUS
20 Meters: IK2FCZ, NK3U, K9QFR, VE3DUS
40 Meters: K9QFR
80 Meters: NK3U, K9QFR
160 Meters: OK2PO, K8MDU, K9QFR

Asia: UJ2FCZ, ONL-2169, KD9OT, K9QFR, AI6Z
Africa: I2IAU, IK2FCZ, IV3PVD, I2MQP, IN3QCI, K9QFR
No. America: IK2FCZ, ONL-2169, K9QFR, VE3DUS
So. America: I2IAU, I2MQP, K9QFR
Europe: IK2FCZ, ONL-2169, DK8NB, W9LCR, K9QFR, VE3DUS
Oceania: I2IAU, IK2FCZ, I2MQP, IN3QCI, K9QFR

Award of Excellence: K9QFR, YU2NA

Award of Excellence with 160 Meter Bar: K9QFR

Award of Excellence Plaque Holders: W9NUF, N4NX, SM0DJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, K6JG, N4MM, I8YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DE0DXM, DK4SY, UR2**, AB9O, FM5WD, I2DMK, W4BQY, I0JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, HI8LC, KA5W, K0JN, W4VQ, KF2O, K3UA, HA8XX, HA8UB, W8CNL, K7LJ, W1JR, F9RM, W5UR, WB8ZRL, SM3EVR, CT1FL, K2SHZ, UP1BZZ, W8RSW, WA4QMQ, EA7OH, K2POF, DJ4XA, IT9TQH, W8ILC, K2POA, N6JV, W2HG, ONL-4003, VE7DP, K9BG, W5AWT, KB0G, HB9CSA, F6BVB, W1BWS, YU7SF, G4BUE, N3ED, DF1SD, K7CU, I1POR, LU3YL/W4, NN4Q, KA3A, YB0TK, VE7WJ, VE7IG, K9QFR, YU2NA, N2AC.

Award of Excellence Plaque Holders with 160 Meter Endorsement: G4BUE, LU3YL/W4, I4EAT, VE7WJ, W9NUF, N4NX, VK9NS, DE0DXM, VE7IG, K9BG, AB9O, FM5UD, SM0DJZ, DK5AD, SM6CST, I1JQJ, W3ARK, HI8LC, KA5W, UR2**, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM0AJU, KF2O, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, KB0G, F6BVB, W4BQY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR, W8RSW, N4KE, I2UIY, YB0TK, W8ILC, W1BWS, VE7WJ, YB0TK, W8ILC, W1BWS, VE7WJ, K9QFR, NN4Q.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if air-mail desired) to CQ WPX Awards, P.O. Box 1351, Torrance, CA 90505-0351 U.S.A.

Droshn Vishnoff, HK3HFQ, passed away in February. Droshn was 70 years old when he starting chasing DX in 1984, and had managed to confirm 257 countries since then, ranking him 10th on the DXCC Honor Roll of the Liga Colombiana de Radioaficionados.

kHz at 0000Z on weekends are good places to start.

The nature of the IOTA program encourages short, simple DXpeditions, especially on weekends. Many islands without resident amateurs are within driving distance of groups of amateurs, and in the summer many IOTA enthusiasts pack up for a weekend mini-DXpedition to a rare island. Thanks to bridges and ferries, IOTA DXpeditioners can put many islands on the air without getting out of their car. Mount Desert Island in Maine, Martha's Vineyard, Chesapeake Bay islands, Hatteras islands, the Florida keys, the San Juan islands, and the Channel islands are examples of IOTA entities within the reach of any amateur. Other rarer islands may require more planning, but are still readily accessible. Marsh Island off Texas was activated for the first time by The Acadiana DX Association. One IOTA entity lies within sight of thousands of amateurs, but has never been on the air for IOTA. The Farallons at the mouth of San Francisco Bay are protected as a wildlife refuge, and although they are visited regularly by scientists, all efforts to operate an amateur radio station from the Farallons have failed. Many more IOTA islands await the DXpeditions. Will you be the next DXer to put a "new one" on the air for IOTA?

The Art of QSLing: Card Design

Successful QSLing begins with selection

5 Band WAZ

As of March 1, 1990, 261 stations have attained the 200 zone level.

New recipients of 5 Band WAZ Award with all 200 zones confirmed:

K6SIK
I6FLD
I1ZEU
ON5WQ

The top 25 contenders for 5 Band WAZ are:

1. N4WW, 199
2. UQ1GXX, 199
3. W7OM, 199
4. K1MEM, 199
5. N2MF, 199
6. SP9PT, 199
7. NY2E, 199
8. K6YRA, 199
9. K5UC, 199
10. K5TSQ, 199
11. SP9CZ, 199
12. K2UU, 199
13. YU2CBM, 199
14. LA4HW, 199
15. PY7ZZ, 199
16. K9JF, 199
17. DL9WW, 199
18. HA8XX, 198
19. NA0Y, 198
20. K7UR, 198
21. I8IGS, 198
22. VE7DX, 198
23. W0PGI, 198
24. SM6AHS, 198
25. HA0MM, 198

642 Stations have attained the 150 zone level as of March 1, 1990.

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (65 cents) size 4½ × 9½ to the WAZ Manager, Jim Dionne, K1MEM, 31 De Marco Rd., Sudbury, MA 01776. Applicants should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is $4.00 for subscribers and $10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest *CQ* mailing label with your application.

of a good QSL card design. Your choice of a QSL card can significantly improve your QSL return percentage. A distinctive card will stand out from the masses of nearly identical commercial cards. Here are some of the factors to consider when designing your card.

1. Use a one-sided card, or put your callsign on the back with the QSO infor-

The WAZ Program

10 Meter Phone

350	K3UA	352	WA2UUK
351	JA0CVW		

15 Meter Phone

326	JA8RY	330	JA7WTU
327	KE9U	331	N3CWP
328	I6FLD	332	IN3QCI
329	N4RR		

20 Meter Phone

787	EA9PY	789	ON7LX
788	ON5FP	790	ON7TK

80 Meter Phone

53	PY1OL

10 Meter CW

76	K4PR	77	OZ5UR

15 Meter CW

173	JR4ISK	175	PY1OL
174	NY5L	176	W1WAI

20 Meter CW

356	WI8A	359	W1WAI
357	K8SW	360	ON6HE
358	NZ0R		

40 Meter CW

116	ON7FK	118	PA0CLN
117	KC7V		

ALL BAND WAZ SSB

3507	DL3TU	3520	I1GMF
3508	JS6CEU	3521	WO6R
3509	N6GAH	3522	IT9ZXX
3510	W8URM	3523	IT9PKO
3511	WQ5Y	3524	EA5EFV
3512	N8BEF	3525	EA3ELM
3513	W5USM	3526	EA7DLC
3514	EA9PY	3527	CT1BWW
3515	EA5CR	3528	KZ2W
3516	EA2BUF	3529	SV0FC
3517	W1CUX	3530	JI1QGX
3518	JW6WDA	3531	IK8HVH
3519	TI2SAH	3532	DK9CR

Phone/CW

6737	KD9HT	6751	I0TXW
6738	JF1JTQ (CW)	6752	WC5N (CW)
6739	JF4PXF(CW)	6753	G4IUF
6740	VE3GFN	6754	JA3APU
6741	K8SW (CW)	6755	YU1TR
6742	I6KYL	6756	JA8UBH (CW)
6743	JH1GTR (CW)	6757	K9ADJ
6744	KF5PE (CW)	6758	JF2WXS
6745	EA7CIW (CW)	6759	W8NJR (CW)
6746	9V1XI	6760	DJ7RD (CW)
6747	JA3BVJ (CW)	6761	LA5KV (CW)
6748	K8SWC	6762	KI4FW (CW)
6749	PY6BG (CW)	6763	WX6D (CW)
6750	I0TXW (CW)		

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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 to confirm present total. If no up-date, file will be placed into "inactive" until next up-date. Lifetime Honor Roll fee $2.00 (U.S.) for each mode, with no fees required for up-dates.

MIXED

3782	YU2AA	2170	YU7SF	1718	SM6DHU	1300	VE1ACK	1036	VE3NUP
3658	F9RM	2160	YT7DX	1695	N6JM	1290	YB0TK	1029	YU7RU
3415	K2VV	2102	N6CW	1687	W4UW	1285	I0AOF	1005	YU1PJ
2871	VE3XN	2091	I6SF	1680	K2POF	1276	YU7DR	960	K1BAZ/DV1
2801	K6JG	2085	KA5W	1676	YU2TY	1257	DF6EX	943	K9BQL
2727	EA2IA	2074	K9BG	1665	K9LJN	1242	JA6GWU	939	W9IAL
2715	W4BQY	2064	I2UIY	1623	K8LJG	1241	YU1GR	917	YB0EMJ
2656	PY1APS	2059	W9NUF	1609	WE2L	1239	K7CU	907	NX9H
2650	N4NO	2046	PY4OD	1564	K9QFR	1228	AI6Z	905	I5ZTC
2622	N6JV	2042	IN3ANE	1560	I1POR	1224	NE6I	858	OE1KJW
2612	K6XP	2039	K5UR	1558	W8UMR	1202	JA1WJ	831	YU3PG
2570	N4MM	2027	YU2NA	1553	W6OUL	1201	NV9S	816	N6IBP
2558	W9DWQ	2025	HA0DU	1545	YU2CQ	1199	K5DB	798	JA7XBG
2495	WA8YTM	2012	I2MQP	1542	DK5AD	1184	F1HWB	797	F6CDJ
2473	K0BLT	1977	4X4FU	1509	K2OLG	1158	WD9IIC	761	NJ1T
2472	I2PJA	1955	IT9QDS	1488	YT7WW	1145	PY2DBU	777	RB5MP
2436	YU1AB	1947	I1EEW	1458	SM6CST	1130	KS0Z	776	W4WKQ
2377	N9AF	1945	DJ4XA	1450	4N7ZZ	1115	I2EAY	748	W4USW
2243	PA0SNG	1935	W0SFU	1402	AC2J	1107	WB3DNA	746	IK2BHX
2239	YU7BCD	1880	KF2O	1387	WB8ZRL	1100	YU3NU	734	YU7FT
2225	I8YRK	1851	SM0AJU	1374	I2EOW	1098	5H3RB	710	W6LC
2221	SM3EVR	1834	HA8XX	1370	HA0IT	1095	DF4ZL	650	WM0G
2214	N2AC	1749	KL7AF	1345	W9IL	1037	CT1QF	638	DL7UQ
2192	YU7BPQ	1740	I2DMK	1325	GM4OBK	1036	G4SDJ	607	WK0B
2176	SM7TV	1737	N6AW						

SSB

3589	F9RM	1871	I2MQP	1420	PY4OY	1097	AG2K	875	NE6I
3256	I0ZV	1811	YU7BCD	1419	EA4KK	1084	DK5WQ	873	GM4OBK
3030	ZL3NS	1801	WF4V	1403	KD9OT	1072	I8LEL	850	IT9ONV
2983	YU2TW	1795	EA8AKN	1402	AC2J	1059	I2WZK	834	K9BQL
2955	K2VV	1757	I2UIY	1378	I2EOW	1044	K2POF	815	WB6SRK
2669	K2POA	1742	I1EEW	1374	PY4OD	1041	IK8GCS	813	CT1DIZ
2548	VE1YX	1741	K5UR	1364	CT1BY	1041	K8LJG	805	KB2DE
2527	K6JG	1712	W3ARK	1349	KL7AF	1033	WA2FKF	797	LU8DWN
2478	I2PJA	1709	WA4QMQ	1338	IK5ACO	1029	YB3CEV	792	AI6Z
2349	I0AMU	1702	KA5W	1302	I1POR	1029	G4SDJ	776	5Z4BP
2348	WD8MGQ	1690	HA8XX	1246	N6FX	1022	KB0C	776	KB4HU
2338	N4MM	1626	W9NUF	1242	KE6KT	1017	EA1AK	758	HR1FC
2328	K6XP	1608	KF2O	1234	K9LJN	1009	CX6BZ	749	EA3FHT
2227	W0YDB	1596	EA3AQC	1220	LU8ESU	1001	W3GXK	748	KA0ZFX
2171	CT4NH	1594	G4CHP	1214	YU7SF	997	IT9JKY	744	IK0EIM
2169	I4ZSQ	1590	CT1FL	1205	YV1CP	995	IK7DBB	702	IK2AEQ
2073	ZP5JCY	1587	YU2NA	1199	F6BVB	989	WN5MBS	698	A41JV
2062	W4BQY	1586	IT9TQH	1197	I2TZK	989	KS0Z	697	A4XJV
2061	I6ZJC	1574	W4UW	1194	AB9O	959	WB6GFJ	696	IK7BDN
2006	N4NO	1554	I5ZJK	1184	F1HWB	951	HK6BER	662	KA5YCM
2004	OZ5EV	1537	WE2L	1181	CT1AW	941	W6OUL	661	NM5Y
1990	WA8YTM	1535	I8KCI	1171	N2AC	940	K3IXD	643	EA3EQT
1976	PA0SNG	1523	K5RPC	1169	SM6DHU	910	IK2DUU	631	KA5RNH
1965	I8YZP	1521	KC8YM	1153	PY4VX	909	W5ILR	630	SM6CST
1957	EA2IA	1507	CT4UW	1149	EA2AOM	895	N2AIF	612	DV1/K1BAZ
1933	I8YRK	1482	G4CPJ	1136	KC8CC	894	NK2H	612	KA9MOM
1932	I4CSP	1464	SM0AJU	1121	WB8ZRL	878	HA0IT	607	I6KYL
1888	NJ0C	1453	K9QFR	1106	I8WYD	876	I3ZSX	602	K5HT
1878	W9DWQ	1440	XE1OX						

CW

2803	K2VV	1711	N4MM	1274	SM0AJU	1106	YU3NU	817	WB8ZRL
2717	WA2HZR	1630	VO1AW	1240	F6HKD	1088	HA8XX	813	JA2GCW
2602	N6JV	1611	K5UR	1236	W1WAI	1053	AK9Z	803	W0JIE
2579	ON4QX	1609	W9NUF	1234	KF2O	1052	ZS6BAR	803	VS6UW
2324	N4NO	1517	DJ4XA	1205	I7PXV	1047	OH3TQ	801	KA1CLV
2301	VE7CNE	1515	N4YB	1203	I8YRK	1039	SM5DAC	762	OE1KJW
2206	W3ARK	1504	JH3CXL	1194	OK1CZ	1024	NN4Q	758	I1EEW
2126	W4BQY	1497	IT9TQH	1181	YU2CQ	1008	HA5LZ	754	DV1/K1BAZ
2116	W9DWQ	1497	IT9VDQ	1166	SM6DHU	1004	OZ5UR	753	NJ1T
2091	K6JG	1476	KA7T	1161	TI4SU	995	NF5Z	744	IS0FIC
2087	EA2IA	1444	I2DMK	1151	LA9XG	994	DL2HBX	728	YU3PG
2049	YU7SF	1437	KA5W	1150	DJ1YH	993	VE4CE	710	YU1PJ
2042	I1YRL	1374	I2UIY	1144	G4UOL	985	AI6Z	707	W9IAL
1980	N2AC	1371	K9LJN	1142	G4SSH	972	GM4OBK	704	K6UXO
1971	K6XP	1346	N6FX	1139	G3VQO	965	I2EAY	700	WE2P
1859	WA8YTM	1341	SM6CST	1134	N2AIF	917	EA1AK	660	RB5MP
1857	LX1XL	1334	K2POF	1128	W6OUL	845	NE6I	623	WB5MTV
1840	I6SF	1326	YU2NA	1128	HA0IT	838	JJ1FSK	618	PY4WS
1809	YU7BCD	1322	VE1ACK	1127	EA7OH	830	YU2GIJ	603	KA9GZM
1766	PY4OD	1299	KL7AF	1123	K8LJG	826	G4MVA	600	4X6DK
1741	4X4FU	1292	W9PWM						

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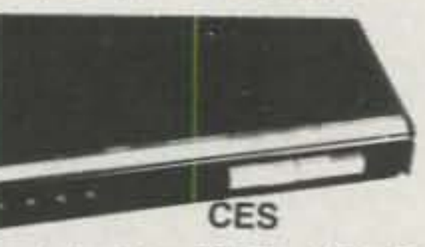

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YAESU	ICOM
FT-23	IC2/3/4SAT
FT411-811-911	IC02AT/32AT
FTC-1903/1123	IC2/4GAT/24AT
FTH-2008/7008	IC-A20/U16

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IC-32AT

IC-H16/U16

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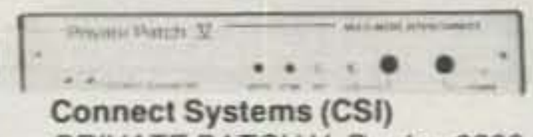

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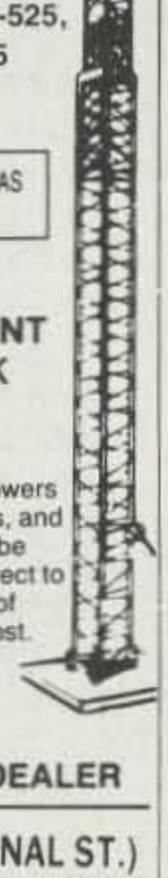

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A welcome event in March for the return to the ham bands of Bangladesh, as S21U made 1,100 contact with 21 countries in two days. The demonstration station was set up in the office of the National Broadcasting Authority, for the purpose of resuming amateur radio in the country. Look for more S2 stations soon. (Thanks to Yoshi Hayashi, JA1UT, for the photo.)

The S21U crew setting up the antennas.

mation. QSL managers and DXpeditions who handle thousands of QSL cards hate the two-sided card. The person answering the card has to note the callsign, flip the card for the QSO data, flip it back to confirm the call, and flip it again when filling out the return QSL. Flip, flip, flip, flip. Soon the manager wants to flip all two-sided cards into the trash can. If you must have a two-sided card, put your call in large letters on the back as well as on the front.

2. Include all basic information. The card should contain your callsign in large, easily read letters. This means avoiding the fancy typefaces such as pseudo-script and Gothic. The card should also contain your name, full mailing address, exact QTH (if different from mailing address), and DXCC country. Your grid square is very important if you operate above 30 MHz.

3. Use a large block-format for QSO data. QSO data should provide sufficient space for the DX station's callsign, the UTC date, UTC time, frequency (not band), RS(T), and mode, marked "2X." The words "confirming QSO" should precede the QSO data.

4. Optional information can include a list of amateur awards you have earned, former callsigns, ITU and CQ zones, membership in societies and foundations, and even equipment and antennas. Be careful about the latter, however, as many amateurs change rigs and antennas frequently. Don't put so much information on the card that it looks cluttered.

5. Use a standard card size. Cards smaller than 5½" × 3½" cannot be mailed in the US. Cards much larger than normal won't fit in a standard #6 envelope. Use a card stock heavy enough to survive mailing without an envelope, but not so thick that it increases your postage costs.

Thanks to sophisticated word-processing and graphics programs, many amateurs can design their own QSL cards for that personal touch. Quick-print shops can turn out a short run of a few hundred cards in a matter of days. Do you have a unique QSL card that follows the above suggestions? Send a sample to P.O. Box 50, Fulton, CA 95439, and the best one will win a free one-year subscription to "The DX Bulletin." Send your cards by June 30.

DX Happenings

What will be the next country to be deleted from the DXCC list? Many amateurs were betting on East and West Germany, based on the re-unification of the two governments. However, another 'country' will drop off the list even sooner. The Abu Ail islands in the Red Sea have been under the control of the Red Sea Lights Company for many years. Since the islands were not under the control of nearby Yemen, they counted as a separate DXCC entity. However, as of April 1, 1990 the Yemen Arab Republic assumed control of the islands and upkeep of the lighthouses on them. Since the islands don't lie far enough away from Yemen to qualify under the DXCC country criteria, they will have to be deleted from the DXCC under the DXCC Deletion Criteria.

South Sandwich and South Georgia Islands were discussed in the February DX column. Although the 3Y0B operation never made it to these British islands (nor to Bouvet), DXers have another shot at these two rare spots. An international team of experienced DXers is planning a major DXpedition to both island groups in November. The major stumbling block for this DXpedition is funding. Total costs for the trip will exceed $200,000. Even with help from major DX foundations and equipment manufacturers, this DXpedition will need a great deal of assistance from individual amateurs to become a reality. DXers who want to help may send their contributions to Jerry Branson, AA6BB/7, 93787 Dorsey Lane, Junction City, OR 97448. If the DXpedition must be cancelled, all donations will be returned.

The International DX Association has a new mailing address: INDEXA, c/o W4UNP Secretary/Treasurer, P.O. Box 607, Rock Hill, SC 29731.

June Activity

Two Massachusetts amateurs are planning a different sort of Field Day. Paul Kokoszyna, KA1TRF, and Jim Ussailis, W1EQO, will operate from the mouth of the Pinware River on the coast of Labrador, Canada, June 22-28. Watch 28450, 21350, and 14320 kHz. They will also pack 6 meter gear to this rare grid square (GO11) and operate near 50.1 MHz. QSL to home callsigns with the usual self-addressed, stamped envelope (SASE).

Earlier in June several South Carolina DXers will operate from Great Abaco Island (NA-80 for IOTA) in the Bahamas, /C6A, June 6-12. They will concentrate on VHF, including 6 and 2 meters, and 432 MHz. Watch the international 6 meter coordination frequency of 28885 kHz for complete information during the DXpedition.

Two special-event stations will be active from Scotland in June. GB2RBC will be on the air June 9-10 from the Royal Balmoral Castle. The following weekend GB2STB will be active from Ayrshire cele-

CQ DX Awards Program

SSB

1754	TI4SAH	1756	EA7LP
1755	EA9PY	1757	EA4KK

CW

783	JF1DLY	785	NV4O
784	IK0ADY	786	LA9XG

SSB Endorsements

320	W9DWQ/323	300	WB6OKK/307
320	I0ZV/323	300	KA9TNZ/304
320	EA4DO/323	300	WA2FKF/302
320	ZL1AGO/322	275	EA4KK/296
320	W2SUA/321	275	TI2JJP/292
320	EA2IA/321	275	K3NEE/283
320	N4MM/321	200	K2EEK/200
310	I0AMU/319	150	EA3EJI/157
310	VE7WJ/318	Mobile	N4MM
310	LA7JO/318	28 MHz	EA7CP
310	NY5L/317	28 MHz	EA9PY
310	K2JLA/316	28 MHz	K3NEE
310	G4ADD/311		

CW Endorsements

320	K4CEB/323	300	WA4JTI/305
320	ON4QX/322	300	W0JLC/301
320	N6AV/321	275	LA9XG/297
310	N4MM/318	275	NY5L/295
310	EA2IA/313	200	GM3TRI/211
310	WA2HZR/313	150	LA7JO/193

Total number of active countries is 323. 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 Information

3C1EA to EA4CJA
3D2WZ to G3WZ
3X1SG to ON7GV
4J1FS to OH5NZ
4K2OIL to UA9MA
4K2OT to UB5KW
4K2PGO to RA9LA
4K3BB to RB5CB
4K4BA to RB5FO
4K4BCU to RA3YG
4K4QQ to RA1QX
4N4MX to YU4EXA
5H3TW to K3ZO
5N0ELT to G4OHX
5T5CK to DL1HH
5T5FA to IK3GES
5U7NU to F6FNU
5W1HK to SM7PKK
5Z4FO to KB4EKY
6W1QB to DK3NP
7J1AEF to K5AQ
7J6CAQ to NK7W
7P8EG to K0JZM
8P6RY to KU9C
8P9EM to G3VBL
8Q7AH to HB9TL
8Q7DF to DL6ZBE
8Q7DG to W5ODD
8Q7DP to JA4VUQ
8Q7DR to JA4VUQ
8Q7JC to DJ0MBU
8Q7KM to DJ0MBU
8Q7MT to JI3DBQ
9J2BO to W6ORD
9K25DB to 9K2MJ
9K25KS to ON7LX
9L1CM to N4DW
9L1SL to WA8JOC
9L1US to WA8JOC
9M2AX to JA5DQH
9M8FH to 9M2FH
9Q5BG to F5JT
9Q5PL to OE7MCJ
9Q5TE to SM0BFJ
9S5G to KD3P
9X5NH to DJ2EA
A22FN to W1CQQ
A35SA to KB7QC
A41KB to ON6BY
A61AC to ON7LX
A92QL to YASME
AH3C to K9UIY
AT0U to WA4FVT
BV2DA to DL7FT
C53EB to FD1MXH
C6/WL7BHT to WL7BHT
CF25A to VE3XN
CF3RB to VE3RBG
CN8FC to WA4QMQ
CO2HQ to XE1XF
CO6CG to CM6CG
CR0M to CT1CWT
CR2UW to CT4UW
CY0SAB to VE1CBK
D68WB to WV4F
DA0CW to DF6EX
DA0SPY to DF6IC
DF5WA/H44 to DF5WA
DK1CE/H44 to DJ9ZB
DL5UF/H44 to DL5UF
DU3/KE9A to WB9XXY
EA6WX to N7RO
ED7TDP to EA7CZR
EL2CX to N2AU
EL2MR to WA8LKS
EL2WK to G3OCA
ES4RZ to UR2RZ
ES4XB to UR2RND
FG5/KA3DSW to KA3DSW
FG5CL to FG4CL
FH5EF to F6EZV
FK8GJ to F6CXJ
FM5WD to F6FNU
FO0IGS to F6EEM
FO0MGZ to FE1MGZ
FO4NR to F6ELE
FO5FO to F2BS
FR4FD to F6FYA
FR5CN to FR4CN
FS7/K4LSP to K4LSP
FT5XA to F6ITD
FT5XH to F2CW
G4TEN/9Y to G4TEN
G4WYG/ST2 to G4OHX
GU4ARI to G4ARI
H73A to SM0KCR
HB0/DF5UL to DF5UL
HB0/DL2MEH to DL2MEH
HC1OT to W2KF
HG4P to HA4ZZ
HI3JH to F6FNU
HI9LSP to K4LSP
HK/SM5HV to SM5HV
HK0/N3JT to W2GHK
HL9BR to KB6ZXL
HR1LW to JA1LW
HR2JEP to WB6QPG
HS0E to K9EL
HZ1AB to K8PYD
IB0JN to I8JN
IJ1M to I1RBJ
IY0A to I0JBL
J34A to W5PWG
J34LTA to W5PWG
J34PJ to K4PJ
J34YL to N4FKO
J37AH to WB2LCH
J37XD to WB2LCH
J39AA to WB2LCH
J39BS to WB2LCH
J39CM to WB2LCH
J6LSN to KJ8G
J88BN to WA4WIP
JW4MQ to LA4MQ
JW5NM to LA5NM
JX8KY to LA7ZO
JY9MO to WB2OQY
JY9SR to W3FYT
K1DQV/KP2 to K1DQV
K4LSP/HI4 to K4LSP
K4LSP/VP5 to K4LSP
K8GG/J3 to K8GG
KE9A/DU3 to WB9XXY
KG4UN to K8UNP
KH0AC to K7ZA
KH8/SM7PKK to SM7PKK
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PJ6/W4OVU to W4OVU
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PJ9M to OH6RM
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PZ1DV to W9GW
PZ5DX to K3BYV
PZ5JR to K3BYV
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RD8D to LZ1KVZ
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RH1Y/UA4HVV to RA4PF
RH6W/UW4HX to UA4HTX
RH6Y/UW4HX to RA4PF
RH7W/RA4PF to RA4PF
RT9U/UB4MM to UB4MM
S42U to ZS2U
S79MST to G4IRG
ST4/WZ6C to W4FRU
T30NAD to JO1CRA
T32AF to K7EHI
T32BN to W9GW
T48RCT to CM8CO
T77V to W3HNK
TA3C to DL5YCQ
TA3F to DL5YCQ
TG9VT to W3HNK
TI10E to TI4SU
TK/DL7HZ to DL7HZ
TL8JL to K4UTE
TL8WD to DL8CM
TR8CJ to G3ORC
TU2PA to KE0LS
TU2VE to WB4UBS
TY1DX to IK6FHG
TY9SI to DJ6SI
TZ6PD to KB6ORK
TZ6VV to N0BLD
UA0QT/U0K to UB5VFT
UA9ZL to UA9YAB
UD6DKW to W3HNK
UD7ODJ to UD6DJ
UF6FJ to UF6FFF
UG7GWG to UG6GAT
UH2Y/UA4PAZ to RA4PF
UH8EA to RA3AR
UI8IF to UI8IAJ
UI9IWA to UI8IAJ
UM8MAA to W3HNK
US1GB to UK3A
UW8V/UA0UBG to UA9AB
V2/KA3PMK to KA3PMK
V29A to W4FRU
V29C to W2GBX
V31DX to KA6V
V47KL to KB9LI
V63AA to KB3R
V63AO to KC6IN
V73AQ to KX6BU
V73AS to KK4QY
V73AT to K2CL
V73AU to N8BZ
V73AX to KX6BU
VK9LA to DJ5CQ
VK9TR to VK5FG
VP2EE to KA3DBN
VP2ENC to AA4NC
VP2EXX to KC8JH
VP2EZD to JA2MNB
VP2VI to AB1U
VP5M to WB6CJE
VP5P to WN5A
VP5VPX to W4NPX
VP8BUB to G4YLO
VQ9DM to N5DM
VQ9HB to AA6BB
VQ9LW to WA2ALY
VQ9NS to NV7S
VQ9QM to W4QM
VR2OOPI to KB6ISL
VR6JR to G3OKQ
VS6WS to GPO Box 1373
VS6WV to K0TLM
VU2GI to N2HOS
VU2NBT to WA4FVT
VU2NUD to VU2NRJ
VY2RS to VE1ATP
XE2GPD to N6EK
XF1C to WB6JMS
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Y90LMM to Y25TM
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YJ0AUS to DJ9ZB
YJ8NMB to SP5DYO
YL2LW to UQ2GLW
YL3GG to RQ2GG
YN3JG to NT7S
YS1GMV to W3HNK
YT1V to YU1EBC
Z24JS to W3HNK
ZB2/F2JD to F6AJA
ZD7KM to G3JKB
ZD8IAN to G4KJD
ZD8Z to W6CF
ZF2KE to K9QVB
ZF2OY/ZF8 to W2WCE
ZF8/ZF2NB to KA8DSS
ZK1XL to DL3MDJ
ZL0AKH to YASME
ZM0AEM to NW4Y
ZS3E to K8EFS
ZS9/DK7PE to DK7PE
ZV7SY to PT7CQ
ZZ5SZ to PP5SZ
3B9FR to Bob Felicite, P.O. Box 31, Rodriguez Island, Indian Ocean
3DA0BK to Box 122, Eveni, Swaziland
3W3RR to Box 308, Moscow 103009
4S7KG to Box 80, Colombo
4S7WP to Box 80, Colombo
5B4SA to Box 1531, Nicosia
5N6YBC to P.O. Box 66, Jos Nigeria
6W1AAD to Box 10315, Dakar, Senegal
6W1AE to Jean-Paul, Box 3013, Dakar
6W1PZ to P.O. Box 2053, Dakar
7P8EB to Rick, P.O. Box 1668, Maseru 100, Lesotho
7X3DA to Box 1033, Laghouat 2000, Algeria
8Q7DL to Box 370, Iberlin 15, West Germany
9K2IC to P.O. Box, 14406 Faiha 72855
9L1EY to P.O. Box 1085, Freetown, Sierra Leone
A41KJ to P.O. Box 741, Muscat, Oman
A45ZP to Box 50202, Muscat, Oman
AP2JZB to P.O. Box 7282, Bagdad, Pakistan
BZ4BR to Box 085-227, Shanghai
CE0FFD to Box 4, Easter Island
CE0MTY to Box 4000, Santiago
D44BS to P.O. Box 101, Praia, Cape Verde
EL7X to Willy Lameree, Box 538, Bon Liberia Africa
FH5EJ to P.O. Box 161, Mayotte
GM9OCC to Box 599, Glasgow
HI3MTU to Box 1464, Santiago
HL9HH to Box 3695, APO SF 96366
JY5IN to I Brahim, Box 925677, Amman, Jordan
KG4SM to Steve McDaniel, FTG, Box 621, FPO NY 09593-0055
LY1BD to P.O. Box 36, Telshiay 235610
PP5AVM to Box 48, Sao Francisco do Sul SC Brazil
PZ1DW to Box 2242, Paramaribo
RC2CR to Yuri, Box 49, Soligors 223710 Minsk USSR
RM8MA to P.O. Box 1790, Frunze 720 023 Kirghiz USSR
SV0CJ/5 to Box 349, Rhodes
SV5TS to P.O. Box 7, Paradissi 85106, Greece
SV9AHZ to P.O. Box 92, Hania 73120 West Crete, Greece
SV9AKI to Box 33, Souda 73200 Crete, Greece
SV9BAI to John, P.O. Box 92J, Chania 73100 Crete
T30JH to Box 299, New South Wales 2112 Australia
T5GM to P.O. Box 1608, New York, NY 10163-1608
TA3D to P.O. Box 963, Izmir
TJ1MR to Box 691, Doula Cameroon Africa
TL8PS to Box 265, Nasurnau, France F67500
UA2WJ to Box 5353, Kaliningrad 236041
UA6XGJ to P.O. Box 97, Nalchik 360004
UC2OAV to P.O. Box 49, Gomel 246049
UD7ODFF to Box 720, Baku 370169
UD7ODKW to Box 220, Baku 370000
UF6OAZ to Andy, P.O. Box 63, Batumi City, Georgia 384500
UH7W/UY5SO to Box 12, Pavcograd 323000
UM8MO to P.O. Box 1870, Frunze Kirghiz 720000 USSR
UQ2GA to Box 18, Riga 226083
UT2J/UB5JMR to Box 18, Simferopol 333053 Ukraine USSR
UT7J/UB4HVV to Box 13, Simferopol 333038
UZ4FWD to P.O. Box 104, Penza 440600
VP8BXG to Box 260, Port Stanley, Falkland Islands
VS6VO to P.O. Box 12727, Hong Kong
VU2NTA to Box 4250, Bangalore
YK1AS to Box 245, Damascus
YN3/HK3FDO to P.O. Box 3107, Managua
ZD7DP to Box 86, St Helena
ZD7VC to Box 58, St Helena
ZF2NT to Box 1311, Grand Cayman
ZK1BW to Box 702, Rarotonga
ZS3PH to Box 9080, Windhoek Namibia
ZS9A to Box 2327, Walvis Bay
ZS9S to Box 2480, Walvis Bay 9190

brating the final day of Beith Civic Week. QSL both operations to GM3MTH.

Looking farther ahead, the 1990 Northwest DX Convention will be held in Portland, Oregon, July 21-22. The host club is the Willamette Valley DX Club. The Convention includes well-known guest speakers, a banquet and breakfast, prizes, etc. Some of the operators from the World Radiosport Team Championships in Seattle will also be present. Location is the Monarch Motor Hotel. For registration information, contact the club at P.O. Box 555, Portland, OR 97207.

QSL Notes

Victor, UH8EA, in Turkoman USSR reports that his local post office is removing IRCs and stamps from his incoming mail. He suggests QSLs be sent to his manager, RA3AR, Toivol, P.O. Box 459, Moscow 127349.

Gene Egem, WB2LCH, is the QSL manager for J37AH, J37XD, J39AA, J39BS, J39CM, PJ2VR, PJ2/WB2LCH, PJ4CR, PJ4/WB2LCH, PJ4/KA9IBG, PJ9RJ, V44KAC, V44KAR, V44KG, V44KW, V44KLC, V47KLC, VP2M, VP2MCH, VP2MO, and VP2MN. He is *no longer* QSL manager for HI8CH, HI8RAU, J6LT, OE3FAC, OE3YHU, VP2MLD, VE1GU, VE1XA, and 9Y4RX. Gene's address is Box 64, Gloucester, NJ 08030.

N7RO handles cards for **EA6WX**, starting January 1990.

YB3CN cannot handle **XW8KLP** QSLs. QSL direct Inh Siphachanh, Box 310, Vientiane, PDR Laos, with two IRCs.

QSL the **8Q7DG** Maldive DXpedition to W5ODD or AA5HI.

LY2WW is ex-UP2BKW. QSL direct to Gintas Sakenas, Box 2237, Vilnius 232050, Lithuania.

QSL the new V73 Marshall Islands prefixes as follows. **V73AS** via KK4QY; **V73AZ** ex-KX6DC: Roi Namur Radio Club, P.O. Box 997, APO San Francisco 96555; **V73AU** ex-KX6GL via N8BZ; **V73AT** ex-KX6HE via K2CL; and **V73AQ** ex-KX6OI via V73AX ex-KX6BU, Kwajalein Radio Club, P.O. Box 44, APO San Francisco 96555.

YL1WW is ex-UQ1GWW. QSL this club station via Igor Kuzhelev, P.O. Box 418, Riga 226001, Latvia USSR.

Bernhard, DL2GAC, island-hops in the Far East and the Pacific almost every year, activating dozens of "new ones" for Islands On The Air. Here he hitches a ride into town in the Polillo Islands in the Philippines (OC-91).

RX0C is the special call of club station UZ0CWA. QSL via UA0CN or direct to P.O. Box 1273, Khabarovsk 680051 USSR.

Eddie Palmer, K4LSP, handles cards for his **K4LSP/HI4, HI9LSP, FS7/K4LSP,** and **K4LSP/VP5.**

Arne Kass, ES7RGN, QSLs via Box 146, Viljandi 202900 USSR.

N2OO reports that all direct cards for XX9OO, XX9AF, XX9IS, and XX9JG have been answered. However, the **9M6OO** cards will be delayed. Please be patient.

ON7LX says he handles cards for: **YI1BGD**, operator Samy *only*; **A61AC; 9K2KS**, after November 11, 1989; **JY4YJ**, after March 1989; and **JY8LX**, in January 1989.

The **J6DX** cards from *CQ* WW CW are out. QSL to W8UMD, P.O. Box 91, Greenville, OH 45331.

JA8RUZ reports that cards for **VP2E/N8JPH** and **FS/N8JPH** are being printed. Don't send follow-up requests.

The CRRL *out-going* QSL bureau has moved. Its new address is Box 56, Arva, ON N0M 1C0. New manager is VE3HFT. The CRRL *in-coming* bureau remains at the same address: P.O. Box 51, St. John, NB E2L 3X1, Canada. The Halifax address is out of date.

QSL the Estonia Central Radio Club **ES9A** to Box 125, Tallinn 200125, Estonia. QSL ES1QG, ex-UR2QD, to Vello Priimann, Box 2259, Tallinn 200035, Estonia, USSR, with two IRCs or US $1.00.

KH6IO reminds DXers to read the Callbook carefully; he's getting lots of QSL cards for **AH**6IO/T32IO.

And in an interesting twist, W9HR sent a Finnish airmail stamp and address label to OH2KI for a **ZB2X** card. He got back a "confirmation" scribbled on an index card, with a note, "please SASE, no more, tnx." At least the card will count for DXCC.

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ARX-2B Ringo Ranger II
A147-11 11-el 146-148MHz
215WB 15-el wide band 2M
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4218XL 18-el 2M Boorner
424B 24 el. 432 MHz
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G7-144 2 mtr base antenna..124.95

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TH5 Mk2: 5-el tribander
Explorer-14: tribander
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204BAS: 4-el, 20 M. beam
155BAS: 5-el, 15 M. beam
105BAS: 5-el, 10 M. beam
18HTS: 80-10 M. vertical
18ATV/WBS: 80-10 M. vertical
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Announcing

(from p. 6)

For commemorative QSL send QSL and no. 10 SASE to Ron Cade, WK8N, 711 East Main St., Chillicothe, OH 45601.

N9IPA, from Haynes-Apperson Automobile Festival, Kokomo, IN; Wildcat ARS; 1300-2100Z July 1; 28.450 MHz plus or minus QRM. Send QSL, SASE and QSO number to Wildcat ARS, 1745 S. Indiana Ave., Kokomo, IN 46902.

VE3CNE, from The Canadian National Exhibition, Toronto, Ontario, Canada; operated by volunteers from clubs across the province; Aug. 15 to Sept. 3 10 AM to 10 PM EDST on various frequencies and modes depending on propagation. Amateurs are invited to send "ham" photos for display in the station booth. Prizes will be awarded for the most interesting pictures. Black-and-white or color prints no smaller than 4 × 6 are requested and should be sent to VE3CNE HAMFOTOS, Box 307, Stn. H, Toronto, Ontario M4C 5J2 Canada. (Prints will only be returned if accompanied by an SASE.)

VE3CRC, from Highland Games, Chatham, Ontario, Canada; Sertoma Club; June 2; General phone portion of all bands. From Festival of Nations, Chatham, Ontario; June 28-30; General phone portion of all bands. For a certificate for each event send QSL to VE3CRC, Box 284, Chatham, Ontario, N7M 5K4 Canada.

•The following hamfests, etc., are slated for June:

June 1-2, **1990 ARRL Georgia State Convention,** Heritage House Motel and Convention Center, Albany, GA. Contact Albany ARC, P.O. Box 1205, Albany, GA 31702 (912-883-7910, Monday-Friday 9-5. (Exams.)

June 2, **1990 Knoxville Hamfest,** Knoxville Convention Center, Knoxville, TN. Contact Radio Club of Knox County, P.O. Box 124, Knoxville, TN 37901. (Exams—reservations call N4BAQ, 615-687-5410.)

June 2, **Central Ontario Amateur Radio Flea-market,** Bingeman Park, Kitchener, Ontario, Canada. Contact Ray Jennings, VE3CZE, 61 Ottawa Cres., Guelph, Ontario, N1E 2A8 Canada (519-822-8342).

June 2, **Athens Radio Club Hamfest,** Sandy Creek Park, Athens, GA. Contact Joe Londeree, KC4EJY, 404-353-8196 after 6 PM EST.

June 2, **Pine State ARC Hamfest,** Hermon Elementary School, Hermon, ME. Contact Roger Dole, KA1TKS, RR 2 Box 730, Bangor, ME (207-848-3846). (Exams.)

June 2-3, **Apple City ARC Hamfest,** Rocky Reach Dam, Wenatchee, WA. Contact Bob Lathrop, 919 N. Woodward Dr., Wenatchee, WA 98881. (Exams Saturday at 2 PM at Powerhouse.)

June 3, **Lancaster Hamfest,** Joseph's Country Manor, Buffalo, NY. Contact Lancaster Hamfest 1990, c/o Matt Gorski, 6117 Broadway, Lancaster, NY 14086.

June 3, **Newington Amateur Radio League Ham Radio and Computer Fleamarket,** Newington High School, Rt. 173, Newington, CT. Contact NARL Fleamarket, P.O. Box 165, Pleasant Valley, CT 06063 (SASE), telephone 203-523-0453. (Exams contact KM1O, 203-666-1615.)

June 3, **Hall of Science ARC Hamfest,** New York Hall of Science parking lot, Flushing Meadow Park, Queens, NY. Contact Steve Greenbaum, WB2KDG, 718-898-5599, or Phil Kubert, N2HYE, 212-777-8648. (Exams at 10 AM.)

June 3, **Chelsea Swap 'n Shop,** Chelsea Fairgrounds, Chelsea, MI. Contact Robert Schantz, 416 Wilkinson St., Chelsea, MI 48118 (SASE), telephone 313-475-1795.

June 3, **Starved Rock Radio Club Hamfest,** Bureau County Fairgrounds, Princeton, IL. Contact Pete Jacobsen, AA9R, 19 Briarcliff Dr., Spring Valley, IL 61362-1001 (815-664-5580).

June 3, **Manassas, Virginia Hamfest & Computer Show,** Prince William County Fairgrounds, south of Manassas, VA. Contact Rosemary, KI4VO, 703-361-5255. (Wheelchair accessible.)

June 3, **Breeze Shooters Hamfest,** Butler County Farm Show Grounds, Butler, PA. Contact H. Rey

Whanger, RD 2 Box 8, Cheswick, PA 15024 (412-828-9383).

June 9, **Independent Repeater Assn. Hamfestival,** 44th Street Armory, Grand Rapids, MI. Contact The Independent Repeater Assn., 562 92nd St. SW, Grand Rapids, MI. (Exams at 9 AM.)

June 9, **CMARA Hamfest,** Midland Community Center, Midland, MI. Contact CMARA Hamfest, P.O. Box 67, Midland, MI 48640 (SASE), or call 517-631-9228 evenings and weekends. (Exams.)

June 9, **Forsyth ARC Hamfest, Computer and Electronics Fair,** Benton Convention Center, Winston-Salem, NC. Contact Jim Rodgers, N1DRI, W-S Hamfest, P.O. Box 11361, Winston-Salem, NC 27116 (SASE), or call 919-760-2493 9 AM to 10 PM. (Exams by preregistration only; wheelchair accessible.)

June 9, **WCSN Ham, Computer, SWL, Swap & Trade Fair,** Greenbush, ME. *(No contact given.)*

June 9-10, **Wyoming Hamfest,** Holiday Inn, Cheyenne, WY. Contact Fred Dumire, N7JPR, P.O. Box 6262, Cheyenne, WY 82003. (Exams.)

June 10, **Egyptianfest,** Egyptian Radio Club Grounds, Chouteau Place Road, Granite City, IL. Contact Carl Waller, WB9YDK, P.O. Box 562, Granite City, IL 62040, or call 618-345-6469. (Exams.)

June 10, **Six Meter Club of Chicago Hamfest,** Santa Fe Park, Willow Springs, IL. Contact Mike Corbett, K9ENZ, 606 South fenton Ave., Romeoville, IL 60441.

June 10, **Goodyear ARC Hamfest & Family Picnic,** Wingfoot Lake Park, near Akron, OH. Contact William F. Dunn, W8IFM, 4730 Nottingham Lane, Stow, OH 44224 (216-673-8502).

June 10, **Central Pennsylvania Ham & Computer Fest,** Winfield Fireman's Fairgrounds, PA. Contact Jerry Williamson, WA3SXQ, 10 Old Farm Lane, Milton, PA 17847 (717-742-3027). (Exams preregistration only.)

June 15-17, **Red Deer Annual Picnic,** sponsored by the Central Alberta Radio League. *(No location or contact given.)*

June 16, **Raritan Valley Radio Club Hamfest & Computer Show,** Watchung Hills High School, Warren, NJ. Contact Dave, KA2TSM, 201-763-4849. (Exams—send Form 610, photocopy of current license, check for $4.95 payable to ARRL/VEC to RVRC, P.O. Box 192, Martinsville, NJ 08836 by May 31. No walk-ins.)

June 17, **Frederick ARC Hamfest,** Frederick County Fairgrounds, Frederick, MD. Contact Ernie Hansen, K3VVV, P.O. Box 589, Mt. Airy, MD 21771.

June 17, **Central Wisconsin Radio Amateurs Swapfest,** University Center, University of Wisconsin, Stevens Point Campus, Stevens Point, WI. Contact Art Wysocki, N9BCA, 3356 April Lane, Stevens Point, WI 54481 (715-344-2984). (Exams; wheelchair accessible.)

June 17, **Lake County ARC Father's Day Hamfest,** Industrial Bldg., Lake County Fairgrounds, Crown Point, IN. Contact Ken Brown, KE9TC, 918 Chippewa, Crown Point, IN 46307, or call 219-663-5035. (Exams.)

June 17, **Santa Maria Amateur Radio Swapfest & Barbecue,** Union Oil Company Newlove Picnic Grounds, south of Santa Maria, CA. Contact Esther Miller, P.O. Box 5117, Vanderberg AFB, CA 93437, or call 805-937-8878. (Exams.)

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GIGANTIC K1BV DIRECTORY. Complete rules describing 1367 certificates from 110 countries, $16.10. Ted Melinosky, 525 Foster Street, South Windsor, CT 06074-2936.

QUADS 10–15–20 meter $265.00. Lightning Bolt Antennas, RD #2, Rt. 19, Volant, PA 16156 (412-530-7396).

QSL SALE! 100 QSL cards $8. 200/$11, 1000/$33. Guaranteed correct! Shipping included. Write or phone for samples. Shell Printing, KD9KW, Box 50, Rockton, IL 61072 (815-629-2193).

THE WORLD RADIOSPORT TEAM CHAMPIONSHIP

BE A PART OF HISTORY

In July and August, 1990, 2,500 invited world-class athletes from around the world will gather in Seattle for the 1990 Goodwill Games™. "Uniting the world's best™" is the motto of these Games.

In keeping with the spirit of the Goodwill Games, a similar competitive event with world class amateur radio contesters has been planned. The World Radiosport Team Championship, held in cooperation with the Goodwill Exchange Program of the 1990 Goodwill Games, is endorsed by the Radio Sport Federation in the Soviet Union and the American Radio Relay League in the U.S.

On July 20th, 1990, up to 23 international teams of the world's best HF contesters will participate in the historic World Radiosport Team Championship.

By contacting these teams you too can be part of history. Make 5 contacts during this ten hour event with the World Radiosport Team Championship contesters and you will receive an official WRTC participation certificate, contact 30 of the official teams and receive a WRTC commemorative pin, and the top 500 scores submitted will win the official WRTC T-shirt FREE!

"In all my years of contesting, there have always been geographic advantages that couldn't be overcome no matter how hard you tried," comments Operating Event Chairman, Martti Laine, OH2BH. "For the first time, all of the competitors will be gathered in the same area and will play on a level playing field to establish the true champions."

In addition to the four US and four USSR teams, competitors have been invited from Japan, Canada, Spain, Yugoslavia, Hungary, Bulgaria, England, Sweden, Finland, Italy, France, Germany, Czecheslovakia, Brazil and Argentina. All teams will use fully equipped ICOM stations.

Members of the American team include K1AR, KQ2M, K7JA, K1DG, KRØY, W9RE, W7EJ and AA4NC. The Honorary U.S. Team Captain is Katashi Nose, KH6IJ, and the alternates are K1CC, N2AA and KNØE. The international teams are now being finalized.

The ten-hour competition begins on July 20, 1990, at 2100 UTC. All standard contest bands from 80-10 meters will be used on both CW and SSB. Official WRTC stations will be identified by having /WG (World Games) after their call. Check the July issue of most ham magazines for complete rules.

In addition to our sponsors, the WRTC is also supported by CQ Magazine & Joe Mullan, W3RLR.

Be a part of history! For more information and log sheets, send an SASE to: WRTC, 4821 - 51st SW, Seattle, WA 98116. We'll see YOU on the air!

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WORLD RADIOSPORT TEAM CHAMPIONSHIP

Sponsored by:

NORTHERN CALIFORNIA DX FOUNDATION, INC.
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US TOWER CORPORATION
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To meet the competitors, plan on attending the Pacific Northwest DX Convention in Portland, OR, July 20-22.
For more information, write to PNW DX Convention, c/o W7ZR, Rt. 1, Box 518, Beaverton, OR 97007.

RTTY JOURNAL: Published ten times per year. Covering the digital modes of RTTY, AMTOR, FAX, PACKET, plus technical and other interesting articles about this fascinating phase of Ham radio. $12.50 per year USA, foreign slightly higher. RTTY JOURNAL, 9085 La Casita Ave., Fountain Valley, CA 92708.

FREE Ham Gospel Tracts. SASE. Steve Forst, N3FTT, 5133 Gramercy, Clifton Heights, PA 19018.

WANTED: Ham equipment and other property. The Radio Club of Junior High School 22, NYC, Inc. is a nonprofit organization granted 501(C)(3) status by the IRS, incorporated with the goal of using the theme of Ham Radio to further and enhance the education of young people nationwide. Your property donation or financial support would be greatly appreciated and acknowledged with a receipt for your tax deductible contribution. Meet WB2JKJ and the "22 Crew" at the Knoxville, Tennessee Hamfest on June 2. Joe Fairclough will be the featured speaker telling the incredible story of the first 10 years of Education Thru Communications at the core of the Big Apple. Write to us at: P.O. Box 1052, New York, NY 10002. Round-the-clock hotline: (516) 674-4072.

FULL COLOR QSL CARDS made on Kodak paper from your negative, slide or print. $32.95 per 100. Request samples (enclose $1.00). BIZCARD CO., Box 191-C, Stevensville, MI 49127.

WANTED: BUY and **SELL** All types of Electron Tubes. Call toll-free 1-800-421-9397 or 1-612-429-9397. C & N Electronics, Harold Bramstedt, 6104 Egg Lake Road, Hugo, MN 55038.

The *World Ham Net Directory* lists special interest ham nets for DXers, missionaries, weather watchers, retired persons, and many other interests. $9.95 plus $2 shipping ($3 foreign) US funds from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147. Catalog $1.00, free with order.

Ready to explore VHF/UHF operating? Get Ed Noll's *Basic Guide to VHF/UHF Ham Radio*. Covers equipment, antennas, propagation, repeaters, contesting, band plans, and more. All the basics you need! Just $6.95 plus $2 shipping ($3 foreign) US funds from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147. Catalog $1.00, free with order.

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1990 IDAHO HAM DIRECTORY: Calls, Counties, Phone Numbers, Names, Addresses, $10.00. R.A.I.D., Box 434, Nampa, Idaho 83653.

COMMODORE 128, 1571, cassette deck, star SG-10 Printer, Commodore 64, Super Disk Drive, Commodore Vic-20, Microlog AIR-1, Commodore Vic-20 New, 10 cartridge games new, all power supply & manuals, hundreds of programs, best offer over $600 or trade for IBM compatible. Dick Ricart, 6655 Hillcroft 220-421, Houston, TX 77081 (713-774-1020).

Contest Code is your ticket to CW Contesting and DXing! This powerful series of **hypnosis cassette tapes** teaches you to copy the essentials for working DX and contests. Code recognition is conditioned at 30/40 WPM on the **High Speed** cassette and at 50/60 WPM on the **Ultra High Speed** cassette. In no time at all, you will be slugging it out with the best of them! **Subliminals** boost your speed. Only $14.95 each ppd. in US (specify which program you want) or $27.95 for both. (NY residents add 7.5% sales tax.) **PASS Publishing**, Box 570, Stony Brook, NY 11790.

WANTED: Hammarlund HQ-150 receiver, manual. State price. 69 Swan Street, Labertville, NJ 08530.

KAY LAB Micro Miker, range 0–240 microHenries and 0–1000 mmFd, $15. Heath Mod. CO-1015 auto ignition analyzer with tachometer and strobe light, $165. Two meter car whip with gutter clip, $5.00. Waterman 3 inch pocketscope (needs new CRT), $5.00. Signal Corps Low Impedance headphones, $3.00. Radio Amateurs Handbooks 1930, 1957, 1958, 1959, and 1967 editions, $6.00 each. ARRL Hints & Kinks Vol. 5, $2.00. U-pay shipping. T.K. Brown, 813-385-6486.

Hewlett Packard Mod. 400 AC voltmeter, range .001 thru 300 VAC, $20., Heath Burgular Alarm, $15., James Biddle Megger insulation tester, new cond., $395. Cornell Dubilier capacitance decade .1 thru 1 mF, $5.00. Industrial Instruments Wheatstone bridge, $20. Heath oscilloscope probes, one peak-to-peak, one RF, one demodulator, $5.00 each. Simpson 30 KV probe, read to 30,000 volts on your VOM, $15. Type 200B 1A Variac, $10. V-5 5A Variac, $25. Heath V6 vacuum tube voltmeter with probes, $25. Blitz Bug coax lightning arrestor, $5.00 each. Type SO239 UHF chassis connector, female, $.45 each. Type PL-259 UHF cable male connector, $.60 each. Type PL-258 UHF coupler, double female, $.85 each. Minimum $5.00 order on connectors and couplings. Mix or match. U pay shipping. T.K. Brown, 760 Killarney Dr., Sebring, FL 33872.

FCC UPGRADE TESTS? Your C64/128 can drill you on the questions and answers. Full screen diagrams, instructions. Your call on 5¼" disk and on printed summary you make. Tech, General $19.95. Advanced, Extra $24.95. Postpaid Ralph Parlette, WB6JOY, 27 Morning Sun, Mill Valley, CA 94941 (415-383-0507).

EXOTIC QTH in the Florida Keys. **PRIVATE CHARTER** a 58 foot Hatteras luxury yacht, daily or weekly, 110/220 volt, 3 staterooms, fully air-conditioned, TV, stereo, generators. Call 305-294-8055.

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SURVEILLANCE/COUNTERSURVEILLANCE devices catalog. Cameras, bug detectors, video camera detectors, transmitters, communications, and much more. Catalog $3.00. DSP, P.O. Box 1275-CQ, Redondo Beach, CA 90278.

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THE NEWLY FORMED Jewish Community Center of Metropolitan Detroit Radio Club is looking for donations of Amateur Radio and SWL equipment for its station. Your donation will be greatly appreciated and acknowledged with a confirmation of your tax deductible contribution. Contact: The Jewish Community Center of Metropolitan Detroit, 6600 W. Maple, W. Bloomfield, MI 48322 (Attention: Marty Oliff).

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HI-TECH TRADER, A National buy, sell, trade publication for Amateur Radio and related equipment and services. Published twice monthly and mailed first class. Annual subscription rate $13.00 (24 issues). Send for sample issue. New subscribers receive one free ad (50 words maximum, please). **HI-TECH TRADER,** P.O. Box 1152, Norwalk, CA 90651-1152.

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STAINLESS STEEL U-Bolts, Turnbuckles, Eye Bolts, Screw Eyes, Bolts, Screws. Small quantities, free catalog. Elwick, Dept. 776, 230 Woods Lane, Somerdale, NJ 08083.

WANTED: Yaesu FT404R and/or accessories. Any Condition. WA1WYC, 451 Buckminster Drive, Apt. 208, Norwood, MA 02062 (617-769-6328).

CRYSTAL CALIBRATOR kit features three outputs for HF through UHF. The "Tri-Mark" receiver marker/injector is compact and battery operated. Kit with circuit board, all parts and switches, only $19.95 plus $1.25 shipping. NY residents add $1.45 sales tax. SASE brings info. Two Fox Electrix, POB 721, Pawling, NY 12564-0721.

FOR SALE: TS-940S w/AT, as new, $1400. Henry Linear 2K Classic X Export Console, 80–10 m, as new, $1400. Nye Viking MBV A Tuner, excellent, $450. MFJ-945C Tuner, $140. MFJ-931 Artificial Ground, $45. Drake 1 KW Low-Pass Filter, $20. ICOM PS55, as new, $100. Shure 444D, as new, $45. Heil Boomset, complete, $50. Astron RS20A, excellent, $45. Tempo RBF 1A, SWR/PWR meter, $20. Metz 2 meter Antenna w/mag mount, as new, $35. GAP 6 band Vertical Antenna, disassembled, excellent, $135. Complete station above, $3285, or individual items as listed. Paul, N5OKD, (601) 264-4983.

FOR SALE: Di-Acro 36 inch metal shear, Di-Acro 18 inch Box Brake, both $600. EFJ KW Variable Ind., 2 Var. Condensers and turns counter, $125. Hy-Gain Thunder Bird Antenna TH3MK3, 3-element 20, 15, 10, $90. Packet-64 with manual, $75. Small Prop Pitch Motor, with extra motor, sel-syns installed, $100. Hallicrafter Viking Challenger Xmitter, $75. DX-160 5 Band Solid State Comm. Receiver, $90. McElroy Wheatstone Code Perforator (antique), $75. HeathKit Grid Dipper, $17.50. The above plus shipping. Metal shear and brake, TH3MK3, pick-up. Call Len Jezorek, Juneo Beach, 626-1126 after 4 PM.

HEATH AC power supply for HW-202/206 radios $20, Hickok 890 Transistor test set $35. K6KZT, 2255 Alexander, Los Osos, CA 93402 (805-528-3181).

WANTED: Old plastic or bakelite AM broadcast radios. Please write with description, condition, and price. Gerry Skloot, 2923 Mandalay Beach, Wantagh, NY 11793.

GIANT POWERSTAT VARIABLE transformer, 240V input, 0–280V output, 28 amps, 7.8 KVA, $145. Also 120V unit, 0–140V, 20 amps, $75. Joseph Cohen, 200 Woodside, Winthrop, MA 02152 (617-846-6312).

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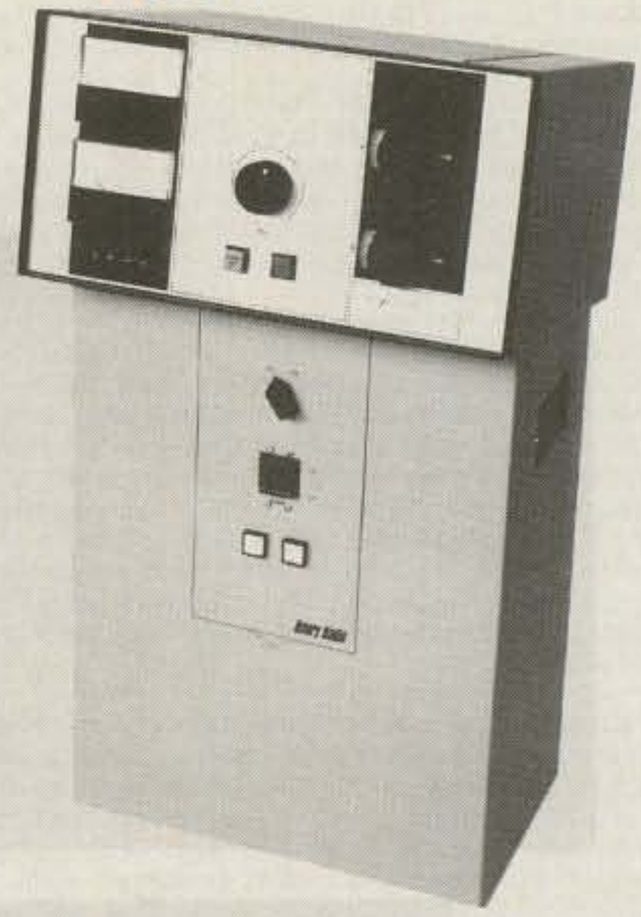

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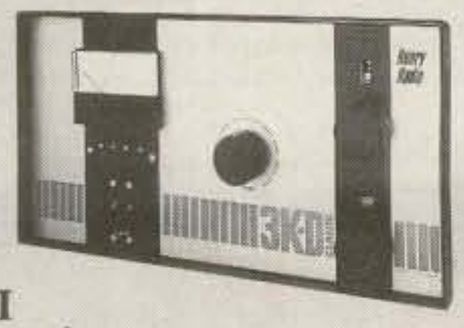
The FT-767GX, a wholly new concept in convenience, control and reliability. Receives from 100kHz to 29.99999 MHz continuously and transmits on all amateur bands. The 2K Classic X is a rugged, durable 2000 watt amplifier that was designed and built to push your signal to the limit. . .with almost no effort.*



FT-757GX II and the 3KD Classic

A substantial upgrade of it's predecessor, the FT-757GX II offers easier operation and more features. It includes dual VFO's and ten memories with programmable memory scanning. Yaesu's CAT system and all accessories are built in. The 3KD Classic is destined to become a true "classic". It employs Eimac's remarkable 3CX-1200D7 ceramic triode, a Pi-L plate circuit with silver plated tank coil. 1500 W PEP nominal output SSB and CW. 1000 W ICAS, RTTY and FM.*

the 747GX and the 2KD Classic

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(Continued on page 115)

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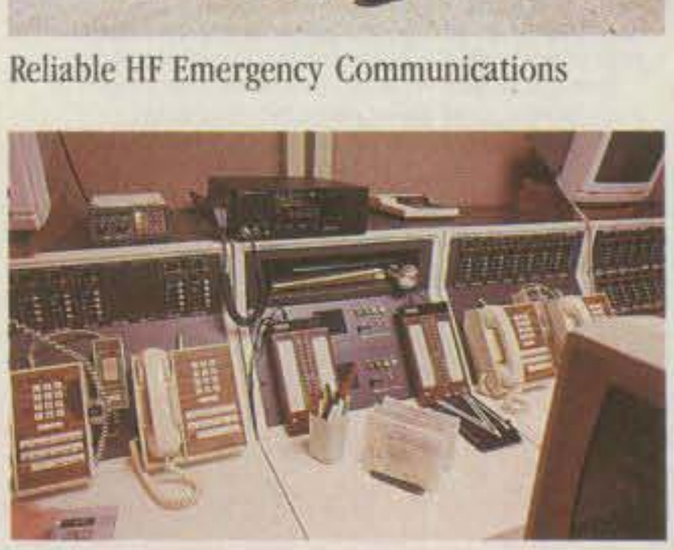

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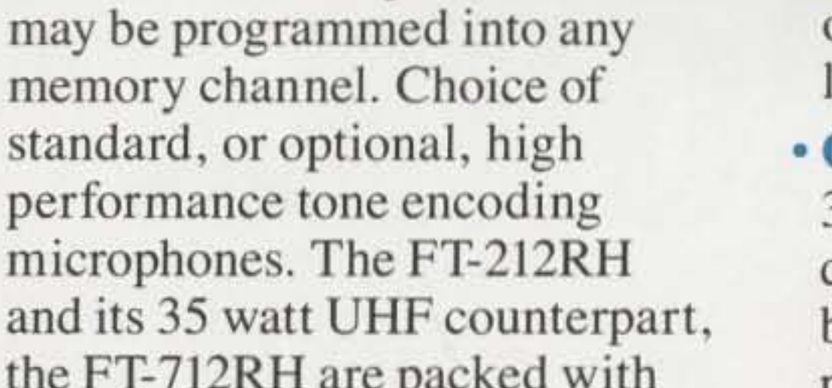
- **Digital Voice System (DVS-1):** Optional sytem which allows local and remote digital voice recording and playback.



FT-4700RH

Dual Band VHF/UHF Trunk Mountable FM Transceiver

- **Frequency Range:** 140-174 MHz on 2m (modifiable for MARS and CAP); 430-450 MHz on 70cm. • **Power Output:** 50 watts on 2m; 40 watts on 70cm. Selectable 5 watts low power on both bands. • **Full Duplex Cross Band Operation:** • **Dual Receive:** • **CTCSS Encode/Decode:** • **Remote Control Kit Included:** • **Amber Backlit LCD Display** and controls with dimmer switch. • **20 Memories:** • **Dual Antenna Ports:** • **Programmable Scanning:** • **MH-15C8** Mic standard: **MH-15D8** Mic optional.

For information on these and Yaesu's full line of products, call our literature desk toll-free at **1 (800) 999-2070.**

YAESU

Performance without compromise.

ICOM

IC-901 FM Mobile

Fiber Optic Modular **OPTION 1**

BAND UNITS
Can be installed **in your trunk.**
Optional Band Units include:
- 10 W/10 meters
- 25 W/220MHz
- 10 W/6 meters
- 10 W/1.2GHz
- 2 meter/SSB/CW
- 440MHz
- Broadband Receiver

Select band units according to your interests.

THE WORLD'S MOST VERSATILE MOBILE

ICOM'S NEW IC-901 OFFERS THREE EASY-TO-OPERATE TRANSCEIVER CONFIGURATIONS

The IC-901 can be (1) field-combined as a fully separated and fiber optic-linked system with multiple trunk-located band units, (2) a single-cabinet transceiver for dashmounting or (3) a remote-controlled unit for underseat installation. (OPC-243 cable not included.)

Compact Transceiver **OPTION 2**

Control head is installed directly to the interface unit, making one compact unit.

Entire unit may be mounted **in dash.**

Under the Seat **OPTION 3**

Dual band and interface unit can be installed **under seat.**

Remote Control **on visor.**

The IC-901 is supplied with 50 watts 2-meter and 35 watts 440MHz FM band units covering 138-174MHz Rx and 140-150MHz Tx plus 440-450MHz Rx/Tx. Adding more band units is a snap. They install easily out-of-sight in your trunk for security!

Outstanding Features Include: Full duplex operation, simultaneous dual band reception, ten memories per band, programmable band and memory scanning with skip function, any Tx offset, and much more.

The IC-901 also features a clever new **DTMF Calling System** which silently monitors a busy frequency or repeater for stations calling you. Squelch automatically opens when a signal with the same DTMF code you present is received.

Optional Pager Function. When activated, your IC-901 transmits a six-digit DTMF code to call others. Its last three digits identify you as the calling station.

ICOM America, Inc., 2380-116th Ave. N.E., Bellevue, WA 98004
Customer Service Hotline (206) 454-7619
3150 Premier Drive, Suite 126, Irving, TX 75063
1777 Phoenix Parkway, Suite 201, Atlanta, GA 30349
ICOM CANADA, A Division of ICOM America, Inc.,
3071 - #5 Road, Unit 9, Richmond, B.C. V6X 2T4 Canada

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