ICD 08241

Amateur Radio

SERVING AMATEUR RADIO SINCE 1945
AUGUST 1985 $2.00
CANADA $2.50

CQ

ANTENNA SPECIAL

0 74820 08241 08

THE RADIO AMATEUR'S JOURNAL

KENWOOD

...pacesetter in Amateur radio

NEW!

"DX-cellence!"

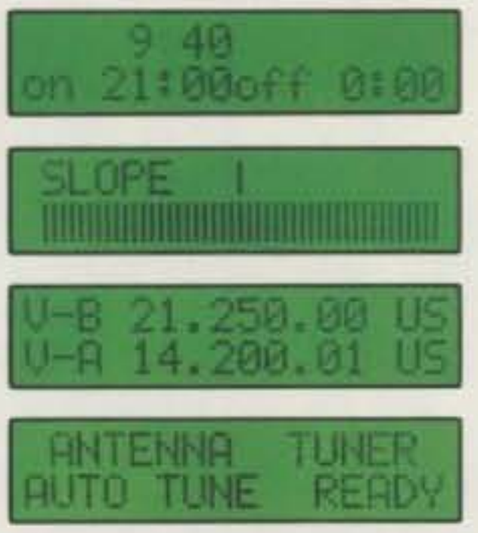
TS-940S

The new TS-940S is a serious radio for the serious operator. Superb interference reduction circuits and high dynamic range receiver combine with superior transmitter design to give you no-nonsense, no compromise performance that gets your signals through! The exclusive multi-function LCD sub display graphically illustrates VBT, SSB slope, and other features.

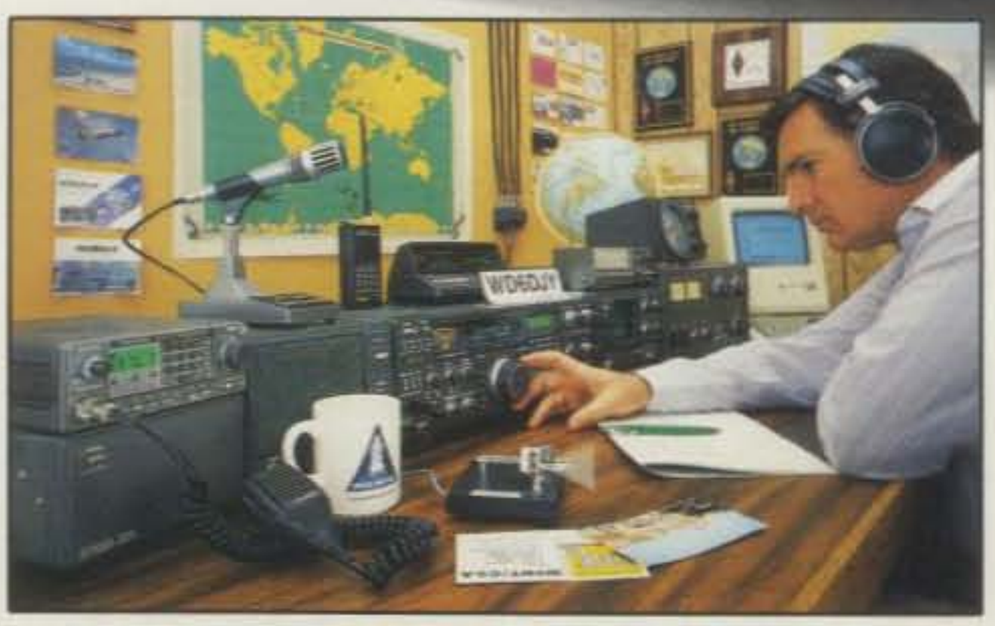
- **100% duty cycle transmitter.** Super efficient cooling system using special air ducting works with the internal heavy-duty power supply to allow continuous transmission at full power output for periods exceeding one hour.
- **Programmable scanning.**
- **Semi or full break-in (QSK) CW.**
- **Low distortion transmitter.** Kenwood's unique transmitter design delivers top "quality Kenwood" sound.
- **Keyboard entry frequency selection.** Operating frequencies may be directly entered into the TS-940S without using the VFO knob.
- **Graphic display of operating features.** Exclusive multi-function LCD sub-display panel shows CW VBT, SSB slope tuning, as well as frequency, time, and AT-940 antenna tuner status.
- **QRM-fighting features.** Remove "rotten QRM" with the SSB slope tuning, CW VBT, notch filter, AF tune, and CW pitch controls.
- **Built-in FM, plus SSB, CW, AM, FSK.**

Optional accessories:

• AT-940 full range (160-10 m) automatic antenna tuner • SP-940 external speaker with audio filtering • YG-455C-1 (500 Hz), YG-455CN-1 (250 Hz), YK-88C-1 (500 Hz) CW filters; YK-88A-1 (6 kHz) AM filter • VS-1 voice synthesizer • SO-1 temperature compensated crystal oscillator • MC-42S UP/DOWN hand mic. • MC-60A, MC-80, MC-85 deluxe base station mics. • PC-1A phone patch • TL- 922A linear amplifier • SM-220 station monitor • BS-8 pan display • SW-200A and SW-2000 SWR and power meters.



- **High stability, dual digital VFOs.** An optical encoder and the flywheel VFO knob give the TS-940S a positive tuning "feel."
- **40 memory channels.** Mode and frequency may be stored in 4 groups of 10 channels each.
- **General coverage receiver.** Tunes from 150 kHz to 30 MHz.
- **1 yr. limited warranty.** Another Kenwood First.



More TS-940S information is available from authorized Kenwood dealers.

KENWOOD

TRIO-KENWOOD COMMUNICATIONS
1111 West Walnut Street
Compton, California 90220

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

KENWOOD

...pacesetter in Amateur radio

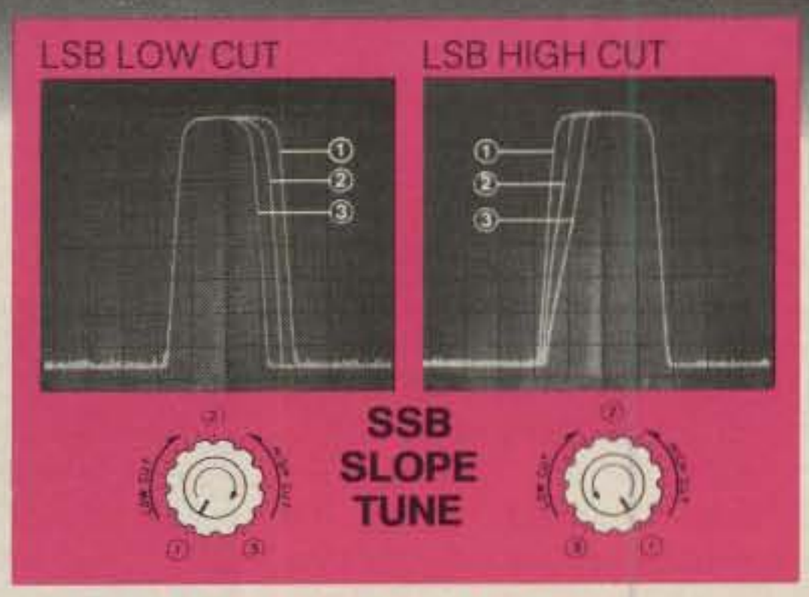
"DX-traordinary"

TS-930S

All band HF transceiver/ general coverage receiver.

The TS-930S (with or without automatic antenna tuner) is a high performance DX and contest transceiver delivering superior features and field-proven performance. Compare the TS-930S with other HF rigs in its price class and see why no other rig comes close!

- **160-10 meters, with 150 kHz-30 MHz general coverage receiver.**
  An innovative, quadruple "UP" conversion digital PLL synthesized circuit provides superior frequency accuracy, stability, plus greatly enhanced selectivity.
- **Non-volatile operating system.**
  Kenwood transceivers retain all micro-coded operating functions even when the lithium memory back-up batteries fail.
- **Easily modified for HF MARS and CAP operation.**
- **All solid-state, 28 volt final amplifier for lowest intermodulation distortion.**
- **Power input rated at 250 watts on SSB, CW, FSK, and 80 watts on AM.**
- **Full break-in or semi-break-in CW.**
- **CW VBT and pitch controls.**
  CW Variable Bandwidth Tuning control tunes out interfering signals. The CW pitch control shifts the IF passband and simultaneously changes the beat frequency pitch.



- **SSB slope tuning—Another Kenwood First!**
  Allows independent adjustment of the low and/or high frequency slope of the IF passband, for best interference rejection.
- **IF notch filter.**
- **Tunable audio filter built-in.**
- **RF speech processor.**
- **Dual mode noise blanker.**
- **Dual digital VFOs.**
- **Eight memory channels.**
- **AC power supply built-in.**
- **Built-in automatic antenna tuner (optional).**
  Covers 80-10 m. *Another industry first by Kenwood!*
- **Fluorescent tube digital display.**
- **Excellent receiver dynamic range.**
- **One year limited warranty.**

Optional accessories:

- AT-930 automatic antenna tuner
- SP-930 external speaker, with selectable audio filters
- YG-455C-1 (500 Hz) CW filter
- YG-455CN-1 (250 Hz) CW filter
- YK-88C-1 (500 Hz) CW filter
- YK-88A-1 (6 kHz) AM filter (all plug-in type)
- SO-1 commercial stability TCXO
- MC-60A, MC-80, MC-85 desk microphones
- TL-922A linear amplifier (not for CW QSK)
- SM-220 station monitor
- PC-1A phone patch
- SW-2000, SW-200, SW-100 SWR meters
- HS-4, HS-5, HS-6, and HS-7 headphones.
- LF-30A low-pass filter

More TS-930S information is available from authorized Kenwood dealers

KENWOOD

TRIO-KENWOOD COMMUNICATIONS
1111 West Walnut Street
Compton, California 90220

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

KENWOOD

...pacesetter in Amateur radio

"Digital DX-terity!"

TS-430S

Digital DX-terity—that outstanding attribute built into every Kenwood TS-430S lets you QSY from band to band, frequency to frequency and mode to mode with the speed and ease that will help you earn that dominant DX position from the shack or from the mobile!

- **Covers all Amateur bands**
  160 through 10 meters, as well as the new 30, 17, and 12 meter WARC bands. High dynamic range, general coverage receiver tunes from 150 kHz to 30 MHz. Easily modified for HF MARS operation.
- **Superb interference reduction**
  Eliminate QRM with the IF shift and tuneable notch filter. A noise blanker supresses ignition noise. Squelch, RF attenuator, and RIT are also provided. Optional IF filters may be added for optimum interference reduction.
- **Reliable, all solid state design.**
  Solid state design permits input power of 250 watts PEP on SSB, 200 watts DC on CW, 120 watts on FM (optional), or 60 watts on AM. Final amplifier protection circuits and a cooling fan are built-in.
- **Memory channels.**
  Eight memory channels store frequency, mode and band data. Channel 8 may be programmed for split-frequency operation. A front panel switch allows each memory channel to operate as an independent VFO or as a fixed frequency. A lithium battery backs up stored information.
- **Programmable, multi-function scan.**
- **Speech processor built-in.**
- **Dual digital VFOs.**
- **VOX circuit, plus semi break-in with sidetone.**

Optional accessories:

- PS-430 compact AC power supply • SP-430 external speaker • MB-430 mobile mounting bracket • AT-130 compact antenna tuner covers 80-10 meters, incl. WARC bands • AT-250 automatic antenna tuner covers 160-10 meters, incl. WARC bands • AT-230 base station antenna tuner • FM-430 FM unit • YK-88C (500 Hz) or YK-88CN (270 Hz) CW filters • YK-88SN (1.8 kHz) narrow SSB filter • YK-88A (6 kHz) AM filter • MC-42S UP/DOWN hand mic. • MC-60A deluxe desk mic., with UP/DOWN switch • SW-2000 SWR/power meter • SW-100A SWR/power/volt meter • PC-1A phone patch • HS-4, HS-5, HS-6, HS-7 headphones

KENWOOD

TRIO-KENWOOD COMMUNICATIONS
1111 West Walnut Street
Compton, California 90220

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

A4

cushcraft CORPORATION

A4, with wideband performance, easy installation, 4 band operation and moderate price will give you more enjoyment and satisfaction from your hobby. You'll like the 40 meter operating possibilities with the A744 add-on kit.

A4 is designed with you in mind because it has fewer parts to assemble, less weight and minimum wind load on your tower. With the 18 ft. boom, A4 gives excellent gain and front-to-back ratio. If your interest is rag chewing, DX-ing or contesting, A4 is the perfect 4 band beam for you.

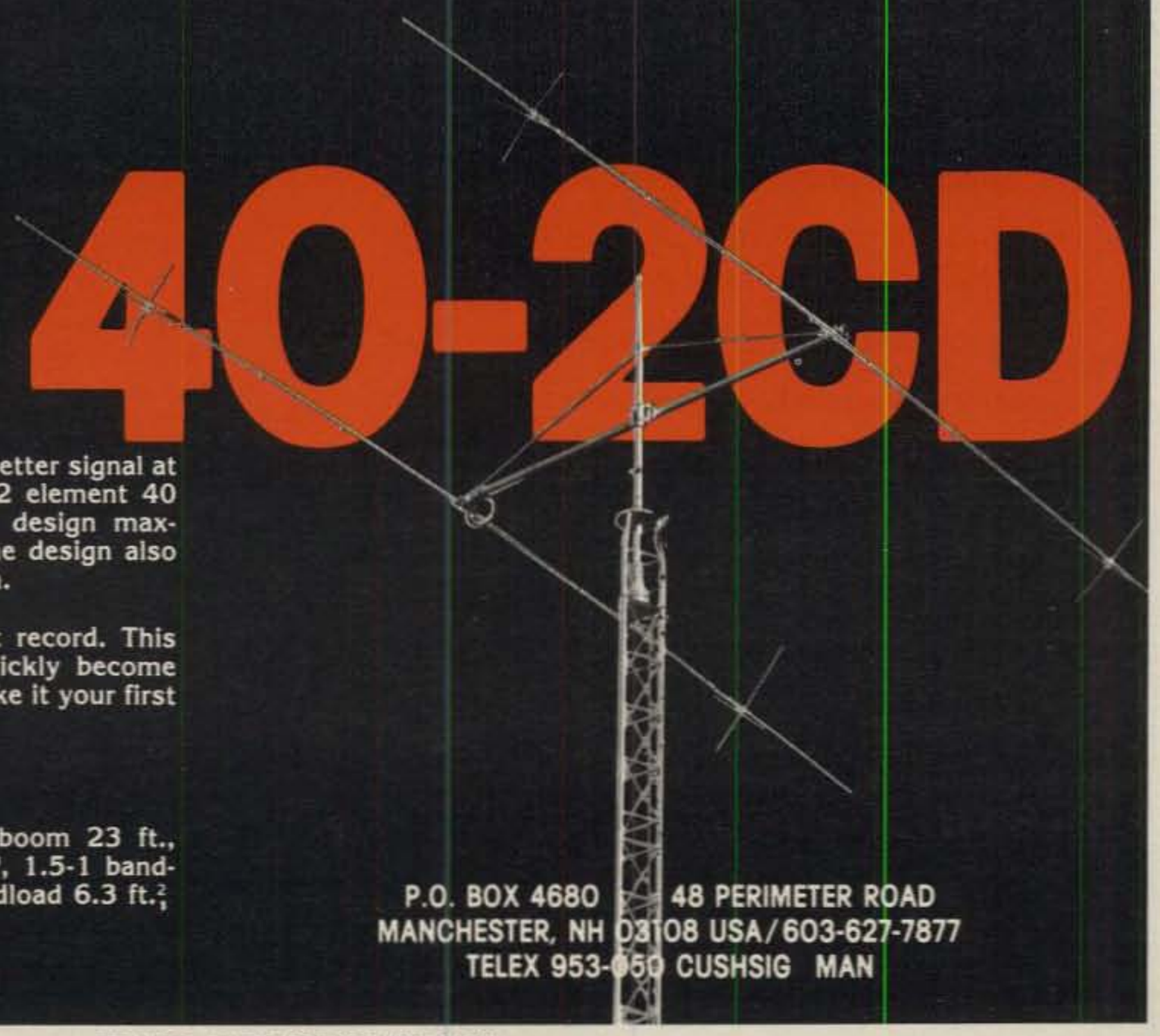
MODEL A4 10, 15, 20 METERS

MODEL A744 40 METER ADD ON KIT

SPECIFICATIONS F/B ratio 25 dB, SWR 1.2-1 bandwidth 500 +KHz, boom 18 ft., longest element 32 ft., wind area 5.5 ft.², turn radius 18.4 ft., weight 37 lbs. Excellent gain.

MORE CONTACTS, MORE SATISFACTION WITH *CUSHCRAFT BEAMS*

40-2CD



More contacts, less interference and a better signal at the receiving end are yours with this 2 element 40 meter Skywalker Yagi. The computer design maximizes gain and reduces side lobes. The design also gives low SWR with excellent bandwidth.

Holder of the North American contact record. This compact two element antenna has quickly become "the most wanted" 40 meter beam. Make it your first choice.

MODEL 40-2CD 40 METERS

SPECIFICATIONS F/B ratio 20 dB, boom 23 ft., longest element 42 ft., beamwidth 70°, 1.5-1 bandwidth 180 KHz, turn radius 24 ft., windload 6.3 ft.², weight 40.7 lbs. Excellent gain.

P.O. BOX 4680 48 PERIMETER ROAD
MANCHESTER, NH 03108 USA/603-627-7877
TELEX 953-050 CUSHSIG MAN

TITAN

A 1.5 KW output HF linear amplifier built to last a lifetime.

- Full legal output of 1.5 KW
- Uses two 3CX800A7 Eimac triodes
- All Amateur HF band coverage 1.8 - 23 MHz (easy modification for 28MHz and authorized WARC bands)
- Ten element bargraph of peak power
- Separate plate current meter
- Metered plate voltage, grid current, forward and reverse power
- Plate dissipation: 1600 watts
- Drive required 65–100 watts
- Automatic level control
- AMTOR compatable
- Full break-in (QSK)
- Overdrive indicator
- Compact, matches modern transceivers
- Separate power supply for easy station layout
- Four status indicators
- High efficiency, tape wound transformer
- Tilt-up bail
- One year warranty
- UPS Shippable
- Made in USA

A lifetime investment in SUPER COMMUNICATION. The TITAN 425 Linear Amplifier delivers the full new legal power limit of 1500 watts PEP ssb output and 1500 watts of full break-in power for QSK cw, or AMTOR. This cool running dependable design delivers the punch to be heard under any band condition. And it is brought to you by the leading American supplier of hf Amateur equipment with the same kind of reliability you've come to expect from TEN-TEC gear.

Commercial version available on special order.

SEE YOUR DEALER OR WRITE

HOME BREW ? . . . . . .
Write For TEN-TEC Enclosure Catalog .

TEN-TEC, INC.
SEVIERVILLE, TENNESSEE 37862

MASTHEAD

EDITORIAL STAFF
Alan M. Dorhoffer, K2EEK
Editor
Gail M. Schieber
Associate Editor
Lew McCoy, W1ICP
Technical Representative

CONTRIBUTING STAFF
Frank Anzalone, W1WY
Contest Chairman
John A. Attaway, K4IIF
Chairman, CQ DX Committee
Steve Bolia, N8BJQ
WPX Contest Director
Larry Brockman, N6AR
Robert Cox, K3EST
W.W. Contest Directors
Hugh Cassidy, WA6AUD
DX Editor
Theodore J. Cohen, N4XX
Washington Commentary
Leo Haijsman, W4KA
WAZ Awards Manager
Dave Ingram, K4TWJ
Amateur Specialties
George Jacobs, W3ASK
Propagation Editor
Dorothy H. Johnson, WB9RCY
USA-CA Director
Steve Katz, WB2WIK
VHF Editor
Norman Koch, K6ZDL
WPX Award Manager
Donald McClenon, N4IN
160 M. Contest Director
Karl T. Thurber, Jr., W8FX
Antennas
Adrian Weiss, K8EEG/0
QRPp Editor
Bernie Welch, W8IMZ
Contest Advisor
Bill Welsh, W6DDB
Novice Editor
Billy Williams, N4UF
CQ DX Awards Manager

BUSINESS STAFF
Richard A. Ross, K2MGA
Publisher
Dorothy Kehrwieder
General Manager
Arnie Sposato, KA2TYA
National Advertising Manager
Tori Hazlett
Sales Assistant
Jack M. Gutzeit, W2LZX
Advertising Consultant
Arlene Caggiano
Accounting
Cheryl Chomicki
Customer Service

PRODUCTION STAFF
Dorothy Kehrwieder
Production Manager
Elizabeth Ryan
Art Director
Barbara Scully
Artist
Pat Le Blanc
Richard Kishanuk
Phototypographers
Hal Keith
Illustrator
Larry Mulvehill, WB2ZPI
Contributing Photographer

Offices: 76 North Broadway, Hicksville, NY 11801. Telephone: 516 681-2922. CQ (ISSN 0007-893X) is published monthly by CQ Publishing Inc. Second Class postage paid at Hicksville, NY and additional offices. Subscription prices: Domestic—one year $16.00, two years $29.00, three years $42.00; Canada/Mexico—one year $18.00, two years $33.00, three years $48.00; Foreign—one year $20.00, two years $37.00, three years $54.00; Foreign Air Mail—one year $73.00, two years $143.00, three years $213.00. Entire contents copyrighted CQ Publishing Inc. 1985. CQ does not assume responsibility for unsolicited manuscripts. Allow six weeks for change of address. Printed in the United States of America.
Postmaster: Please send change of address to CQ Magazine, 76 North Broadway, Hicksville, NY 11801.

The Radio Amateur's Journal

ON THE COVER: The sun creates some unusual effects at the impressive antenna site of K2GL. Photo by Larry Mulvehill, WB2ZPI.

AUGUST 1985 **VOL. 41, NO. 8**

FEATURES

DEPARTMENTS

Zero Bias AN EDITORIAL

I was reading an article recently in a business publication that dealt with the differentiation between a "problem" and a "condition." A *problem* was a situation that had possible solutions or remedies and a *condition* was, according to the article, a situation that "was." The *condition* exists with no possible solution in sight.

If we relate that to amateur radio, we can either take the view that there are "problems" or that the present state of amateur radio is a "condition" for which there is little hope. I don't think that any of us would truly accept the latter, so let's just assume that we have "problems." Keep in mind that we are talking about problems with the emphasis on the *s*. Also keep in mind two stereotypical quotes, "If you're not part of the solution, you're part of the problem" and from Walt Kelley's *Pogo*, "We have met the enemy and he is us!" In other words, we hold the keys, we have held the keys, and we will hold the keys to the solution.

At present, we are concerned with two major problem areas within the amateur radio service: (1) continued growth and (2) median age of amateur radio operators themselves (that's us). Lest we draw up actuarial tables as to when the last of our species will bite the dust, we do have to, in a sense, work at perpetuating the amateur race.

Continued Growth

Let's start off with a negative comment from a reader received just today. *"My personal feelings are this. Amateur Radio is crowded as it is. So who wants the population to increase? Not me! Even at the risk of losing it all."* This reader's sentiments are not unique and he's not alone in his feelings. There are a lot of people out there who feel pretty much the same way. To them, growth means being crowded out of an existing technology. Also, to some, growth is simply a "hype" brought on by avaricious commercial interests who are only looking to line their pockets from this new source of revenue.

Nothing in the world stays the same. If you don't grow, you shrink. From the minute your parents get your birth certificate, the data from your death certificate is being collated. There is a finite time *only* for your involvement with the process; the process goes on only if there are people to continue it. So, as I've said here and many of you have echoed, amateur radio is worthwhile and should be perpetuated for future generations. With that as a major premise, it follows that new must follow and/or coexist with old.

The *new* is an insurance policy for the "younger" of us oldtimers so we have a place to hang out for the next 20 or so years. On the other hand, the *new* also bring the promise of new technology, new ideas, and new ways of dealing with amateur radio. So the probability does exist, and not simply as an abstraction, that new people will bring positive values too, and not be the thundering hoards of scimitar wielding band-fillers that some people foresee.

With growth, we do have a corresponding growth within the amateur radio industry. With that growth we have an increased demand for goods and services. That promotes money for R&D, which is the basis for all the new products that some of us take for granted. As I and others have said countless times before, without the CB boom, none of us would be enjoying the HTs and transceivers that abound. That boom created the demand and R&D necessary to provide the technology for creating new and exciting products. If you want to face facts, that boom also separated "the men from the boys" so to speak with regard to personal expertise in electronics. How many of you out there could fix your own HT or modern day transceiver if a problem arose? Would you know where to look or what to look for? Don't tell me "I don't have the right test equipment," ask your self why not? No, its more likely to be a case of returning the equipment to the dealer or manufacturer and getting mad at him for not fixing it quicker or making the product more foolproof so you wouldn't have to be inconvenienced. It's "their" responsibility to fix things, not yours.

Well, if our ranks shrink to a point that it is unprofitable to manufacture, support, and distribute all these wonderful products, then we are going to have to go back to the roll-your-own state of equipment. You should be able to fix anything you are able to build, theoretically that it. However, if there isn't sufficient revenue in it, there won't be the proliferation of books around telling you how to build your own. There won't be the magazines and probably there won't be the League, so eventually the whole thing becomes academic. Right now, we are heavily involved in that process. Our "State-Of-The-Art" equipment has evolved to the best that can be *bought*, not the best that can be designed and built by the average amateur. So, without placing a value judgment on whether this situation is right or wrong, we do have to look at it realistically and admit that this is the way it is.

We have evolved into a hobby of communicators. There is a segment of the amateur radio population that is highly competent technically, but most of us do not fall within that segment. We reap the benefit of that technology, we may even use it with increasing skill, and we may to some small degree modify and improve upon it, but we don't develop it. We are consumers of this technology and expertise without fully appreciating what went into it. Even if our ranks doubled, and that small segment doubled, it would still be a minority of amateurs who represent the leading edge of technology. But the rest of us would provide the where-with-all to make it happen, and continue to happen.

The Famous Median Age

The median age is one of those tricky statistics that apply in selective reasoning. The physical fact of a rising median age is stated as a given. What that means varies to some. There is a logic out there that young people can't afford anything (with the exception of computers, cars, stereos, videotapes, motorbikes, fad clothing, fast foods, and lots of controlled substances). On the other hand, old people are also in a position whereby they can't afford anything since they are on fixed incomes (with the exception of retirement homes, condos, motor homes, and gold equipment). Young adults dare not spend a penny on anything but basic subsistence and setting money aside for Junior's college education (with the exception of all the wonderful things that "yuppies" buy). So that leaves the rational for the 50ish median age doing everything, and spending everything. With that as a basis, when the large 50ish median age amateur reaches age 65, it's all over for amateur radio. We can all kiss it goodbye in 15 years or so.

From a strictly egocentric point of view, that's what will happen if there aren't enough young people around to take up the slack after us. For the "I've got mine" club member that may be okay, but for a lot of us it really isn't a viable alternative to doing something to change it. There isn't any real consensus of what should be done to attract younger people to amateur radio. There are probably a minimum of 50 things that could be tried out. The big thing, however, is to actually see the need.

The "code-free" license was only one thing, and that raised the hackles of a lot of people. There is talk about more privileges for Novices (if you take a close look at the proposal, the extra benefits are minimal and barely usable for the next few years). There are all sorts of ideas milling about and, if we all live long enough, some of them may actually be put into the works. If, however, we put ourselves into the position that whatever is put forth *must* be acceptable to each and every one of us, then in truth nothing will happen except that the median age will take a significant leap. Whatever must happen will cause some discomfort to those of us already here. Things must change, simply because what *is* isn't working.

Giving people harder and harder tests doesn't seem to logical either. This seems true in the light of the materal being tested having little or no relationship to what is actually being performed. What is being performed, with great regularity, is *communication*. Give a test on that. Otherwise, consider a three year moratorium on repair services (outside of the warranty period). If your rig breaks down, you either learn enough to fix it or stay off the air. How's that for incentive. After all, what's the use of learning theory if you can't put it into practice. We could also consider mandating an emergency CW rig at each amateur radio QTH—this rig to be used (tested out) on a regular basis and logs maintained that would be used as a prerequisite for license renewal. If we believe our own hype, these things should be a snap and present no problem at all for the average amateur today. Don't panic, the above considerations are strictly hypothetical.

The Answer

You and only you are the answer. A committee or board of directors never really solved anything. Committees and boards of directors are designed to protect their own special interests and needs, and that of the body that pays them. They don't specialize in altruism. If you don't mind sharing bands, even when your

(Continued on page 108)

TIME FOR AN AEA BREAKTHROUGH

The high quality of AEA products is appreciated long after the price paid is forgotten.

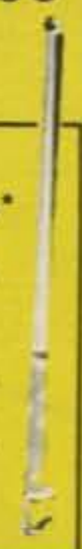
No Antenna
No Radio
No TVI

$99.95

THE FANTASTIC DOCTOR DX™
CW Band Simulation That Is So Real You Won't Believe It!

- Will improve the operating skills of ANY CW operator!
- More fun than ANY Morse Code trainer yet devised.
- Use with a C-64, TV set, and key (or keyer).
- Experience the thrill of a "DXpedition" to anywhere in the world.
- Operate anytime you want, ideal for travelers.
- Impressive award certificates available for verified performance.
- On-going contests: 8-hour sprint and 24-hour marathon.

HOT ROD™ $24.95*
½ Wave Telescope Antenna



- Fewer telescopic sections than any ⅝ wave whips.
- Shorter and lighter than all ⅝ wave whips
- Better performance than a ⅝ wave whip when mounted on a handie talkie.
- Special matching network designed by Professor D.K. Reynolds (co-inventor of Isopole™ antenna).

- Most gain attainable for length of antenna—3 dBd (0 dBd for JR models).
- Best decoupling of any commercial VHF base station antenna available.
- More gain than many antennas claiming up to 7 dB gain—don't be fooled by misleading claims!
- Zero degree angle of radiation.
- Factory-tuned matching network.
- Greater bandwidth than any competitive product.
- DC grounded for static discharge protection.
- Documented cases of wind survival in 140+ mph hurricanes.
- Easier than any competitive antenna to assemble.

Mast Not Included

ISO = 144 or 220— $49.95

ISO = 440— $69.95

ISOPOLE ANTENNA™

CP-1 $239.95*
Computer Patch™ Interface

- Better performance than any competitive product
- Dual channel filtering with auto threshold correction
- Variable shift
- 117 VAC power supply included

NEW!

DOCTOR QSO™ $79.95
Morse Code Trainer

- Makes Morse Training Fun, Fun, Fun!!!
- Plug-in Cartridge For C-64 Computer
- Simulates Real Morse Ragchews
- Can Operate With Only C-64 and TV Set

PKT-1 Packet Controller $499.95

- Multitasking - Can receive information from the keyboard and off the air at the same time.
- Uses TAPR circuitry and firmware.
- Senses squelch to detect busy channel.
- Send computer files error free.
- Data detect (DCD) for HF operation.
- Digital radio communications for computer to computer.
- Every PKT-1 is a digipeater
- Operates from 9-15 VDC

GET YOUR FIRST HAM RADIO LICENSE, OR INCREASE YOUR CODE SPEED SO YOU MAY UPGRADE!

NEW!

+

= **AMATEUR RADIO STARTER KIT $39.95**

- Includes Morse University™, Morse code training software.
- Morse training routine teach you the Morse code a character at a time.
- Proficiency routine helps you increase code speed, and upgrade your license class.
- Receiving audio/video game gives you code practice under pressure.
- Sending analysis routine helps you improve your sending ability.
- Keyboard input allows you to compose your own code practice sessions.
- More complete than any Morse code trainer now available.
- Includes the ARRL book "Tune in the World" to help you get your first license.
- Club and license information for your area.
- Use with a C-64 (or C-128) & T.V. set.

NEW!

MP-1 MICROPATCH™ $159.95*

- Morse/Baudot/ASCII/AMTOR
- Use any AEA software
- Compact and Economical
- Operates from 12-16 VDC.

NEW!

ATU-1000 ADVANCED TERMINAL UNIT

$1195

- World's most advanced terminal unit/computer interface
- 32 poles, active filtering
- Set filters & AFSK tones to one Hertz
- TTL, RS-232, loop keyer incl

NEW!

CP-100 COMPUTER PATCH™ $369.95*

- 170/425/850 or variable shift
- Front-panel squelch
- Built-in monitor speaker
- Discriminator-style tuning for AMTOR

Unmatched Software For C-64 And VIC-20 Computers

MBA-TOR™—The most advanced software written for Morse-Baudot-ASCII-AMTOR including mail drop.

MARSTEXT™—A special Morse-Baudot-ASCII package written especially for MARS and other traffic operators.

SWLTEXT™—The most sophisticated software available for the shortwave listening enthusiast. Automatic data analysis: Morse, Baudot, ASCII, AMTOR and SITOR.

AEA also offers Morse, Baudot, and ASCII software for the following computers: Apple II, II+, IIe; IBM-PC.

**Retail Prices*

Advanced Electronic Applications, Inc.
P.O. BOX C-2160 • LYNNWOOD, WA 98036
(206) 775-7373 • TELEX: 152571 AEA INTL

AEA **Brings you the Breakthrough!**

Our Readers Say:

Do Our Reciprocal Licenses Give Too Many Privileges?

Editor, *CQ:*

Recently I became a ham radio operator, and after talking to a few alien radio operators living as residents in this country, I found out that many of them only have the equivalent of Novice and technician licenses in their countries, but are operating in the U.S. with all the Extra class privileges.

The FCC should look more closely at licenses when they are submitted with form 610-A to find out what type of license it is before they issue the reciprocal permit, and they should write in the *Special Conditions* section the equivalent of the U.S. license the applicant is entitled to operate within.

I think it is very unfair to the U.S. ham operators with Extra class licenses—who have had to struggle to get those few extra 25 kHz in the bands, by learning code and having to pass the 20 wpm code and theory tests—to let these people operate as Extras by filling in an application form, and then take for granted the Extra class privileges.

The reason why I am writing this is because in many countries all it takes to get a ham radio operator's license is not knowledge, but a few well-placed bucks in the pocket of the government official issuing the licenses.

L. F. Zuleta, KG6QC
Grenada Hills, CA

The "Delta Dummy"

Editor, *CQ:*

As the "originator" of the "Dummy Dipole" and the "Delta Dummy" (see *QST*, April 1985 issue, p. 51), I particularly enjoyed Lew McCoy's commentary on the "DLA" antennas in the May 1985 issue of *CQ*. I would like, however, to point out that the most successful edition of my DLA was the full-wave 80 meter "Delta Dummy" rather than the dipole configuration. This is a triangular 260 foot long horizontal loop fed with RG8U and terminated at the antenna feed point with the 50 ohm noninductive resistor. This configuration seems to work as well as a resonant half-wave dipole on 75–80 meters and is, of course, usable from 1.8 to 144 MHz.

In the dipole configuration with two 50 foot wires across the 50 ohm resistor, performance is pretty good on the lower frequencies but falls off on the higher frequencies, as Lew indicated. I'm still not certain that using resonant antennas in DLAs will improve performance, since the two 50 foot elements are not resonant on, nor harmonically related to, the commonly used ham frequencies, and, apparently, were chosen by commercial manufacturers of similar systems for that reason. I am quite convinced that when a full-wave loop is used on the band of choice, it will approximate the performance of a resonant dipole on that band and will be usable with an almost negligible SWR on all other ham bands. My suggestion, therefore, would be to use a full-wave loop on the band where most operating is done—i.e., 260 ft. for 3.8 MHz, 130 ft. for 7.2 MHz, 65 ft. for 14.2 MHz, etc. The loop can be square, round, or triangular, depending upon the "geography" of one's backyard, and can be used as a clandestine or hidden antenna run around the perimeter of an attic or roof. The beauty of the system is that it will present a very low SWR to a solid state transceiver on all bands, although, as freely admitted, there will be some loss of RF energy in the resistor, depending upon antenna impedance, the frequency used, and several other factors mentioned in my correspondence with Lew.

In any case, I was very pleased to read Lew's article in *CQ*. I've gotten more fun out of my "invention" and reaction to it than I've had in my almost 50 years as a ham.

Mort Slavin, K3FGB
West Palm Beach, FL

QSL, Send Butter?

Editor, *CQ:*

To paraphrase a couple of old sayings, "The First Story Teller Doesn't Stand A Chance" and "There Is Nothing New In Ham Radio," I am prompted to write in response to W3GXK's letter concerning "different" QSLs such as spoons and flags.

In 1940, operating as W7FGE from a small town in Oregon, I worked W7AUH (80 CW) in White Salmon, Washington, a community about 150 miles distant up the Columbia River from my QTH. In the course of the QSO, when I learned that AUH operated a creamery, I jokingly said, "How about a cube of butter instead of a QSL?" Imagine my surprise when two days later the postman delivered a pound of butter and a QSL card. I still have the QSL and a wrapper from one of the cubes of butter!

Who says the high cost of QSLing is killing the practice? Imagine the cost to AUH for that QSL, butter at about 40¢ a pound plus postage!

There must be a bunch of stories out there about "crazy" QSL cards! I have an old (1939) QSL made from cedar shaved thin, printed, and mailed as a 1¢ postcard.

Perhaps W3GXK's letter will bring other responses which may be of interest to your readers.

Mick McDaniel, W6FGE
San Diego, CA

Yaesu has serious listeners for the serious listener.

Yaesu's serious about giving you better ways to tune in the world around you.

And whether it's for local action or worldwide DX, you'll find our VHF/UHF and HF receivers are the superior match for all your listening needs.

The FRG-9600. A premium VHF/UHF scanning communications receiver. The 9600 is no typical scanner. And it's easy to see why.

You won't miss any local action with continuous coverage from 60 to 905 MHz.

You have more operating modes to listen in on: upper or lower sideband, CW, AM wide or narrow, and FM wide or narrow.

You can even watch television programs by plugging in a video monitor into the optional video output.

Scan in steps of 5, 10, 12½, 25 and 100 KHz. Store any frequency and related operating mode into any of the 99 memories. Scan the memories. Or in between them. Or simply "dial up" any frequency with the frequency entry pad.

Plus there's more, including a 24-hour clock, multiplexed output, fluorescent readout, signal strength graph, and an AC power adapter.

The FRG-8800 HF communications receiver. A better way to listen to the world. If you want a complete communications package, the FRG-8800 is just right for you.

You get continuous worldwide coverage from 150 KHz to 30 MHz. And local coverage from 118 to 174 MHz with an optional VHF converter.

Listen in on any mode: upper and lower sideband, CW, AM wide or narrow, and FM.

Store frequencies and operating modes into any of the twelve channels for instant recall.

Scan the airwaves with a number of programmable scanning functions.

Plus you get keyboard frequency entry. An LCD display for easy readout. A SINPO signal graph. Computer interface capability for advanced listening functions. Two 24 hour clocks. Recording functions. And much more to make your listening station complete.

Listen in. When you want more from your VHF/UHF or HF receivers, just look to Yaesu. We take your listening seriously.

YAESU

Yaesu Electronics Corporation
6851 Walthall Way, Paramount, CA 90723
(213) 633-4007

Yaesu Cincinnati Service Center
9070 Gold Park Drive, Hamilton, OH 45011
(513) 874-3100

CIRCLE 19 ON READER SERVICE CARD

Dealer inquiries invited.

Prices and specifications subject to change without notice.
FRG-9600 SSB coverage: 60 to 460 MHz.

Announcing

• **Amateur Radio Motorcycle Club Net** - *The AMATEUR RADIO MOTORCYLE CLUB Net* meets each Thursday night (Friday morning UTC) on 3.888 kHz in the winter and 7.2375 kHz in the summer at 0300Z. They also have an eastern net at 0200Z on 3.967 year round. Both groups have an annual get-together during the summer. They welcome all types of riders, all brands of motorcycles. More information is available for a business-size SASE sent to Gary McDuffie, AGØN, Route 1 Box 464, Bayard, NE 69334.

• **Great Circle Shortwave Society** - This is probably the only SWL club in the world devoted to shortwave listening in the 1950s and 1960s. GCSSers are keeping the period alive with a newsletter devoted to tube-type equipment, nostalgia, and even present-day longwave, medium-wave, and shortwave news and loggings. Special emphasis is placed on SWLs who were active during the period between the Korean and Vietnam Wars and who hold *Popular Electronics* "WPE" shortwave monitor "callsigns." For a sample newsletter and information on GCSS, send an SASE to Richard A. Arland, WPE7BYR, Secretary, Great Circle Shortwave Society, 2042C Flyer Drive, Bethel Manor, Langley AFB, VA 23665.

•**Amateur Radio Training Programs** - Amateur radio training programs are scheduled to start in the fall in four northern New York areas. All Novice courses include an FCC licensing examination. Technician courses consist of element 3, theory and regulations. General courses consist of element 1B, 13 wpm code. All courses require pre-registration at least one week prior to the start of the course. For additional information, contact the program coordinator, Al Lapier, W1CSF, Daune Road, Mountain View, NY 12963, phone 1 (518) 483-0046.

•**Morgan City, Lousiana** - The St. Mary Amateur Radio Transmitting Society, SMARTS, will operate NT5K to commemorate the 125th anniversary of the founding of Morgan City. This day is designated Friendship Day by the city and will be held Sunday, August 4, 1985, from 1600–2200, and frequencies will be 7.255 ± 10 kHz, 14.275 ± 10 kHz, and 146.52 simplex. Three-color certificate will be sent to all contacts. SASE to Jackie Price. KA5LMZ, 708 Front Street, Morgan City, LA 70380.

• **Friendship, New York** - Allegany Highlands ARC will operate KW2J from 1300 to 2100Z August 4 in observance of National Friendship Day. Frequencies: CW 3.745, 7.145, 14.060, 21.145; phone 3.880, 7.280, 14.280, 21.380; RTTY 14.280. Certificate for QSL and SASE via P.O. Box 373, Friendship, NY 14739.

• **World Police/Fire Games Special Event** - The San Jose State University ARC will operate W6YL to commemorate the 1985 World Police/Fire Games from 1900Z August 4 to 0700Z August 5; 1900Z August 5 to 0700Z August 6; and 1900Z August 6 to 0700Z August 7. There will also be some operation August 7 through August 11. Frequencies will be 3.870, 7.240, 14.270, and 147.555 for phone; and 7.125 and 14.040 for CW. For a special certificate, send a large SASE to SJSU ARC, c/o Student Programs and Services, Box 2, San Jose State University, San Jose, CA 95192.

• **Brookfield Zoo Country Fair Days, Brookfield, Illinois** - The Chicago Suburban Radio Association will operate a Special Event amateur radio station, N9BAT, from one of the largest zoo's in the United States to celebrate their Annual Country Fair Days. Amateur radio operation will be on August 10th and 11th from 1500Z to 2300Z on the phone 146.55 MHz, 14.250 MHz, and 7.250 MHz. A special QSL card will be sent to all stations that reply with their QSL card and a #10 business-size SASE to: N9BAT Special Event, Post Office Box 88, Lyons, IL 60534.

• **W9DUP From Chicago** - The DuPage Amateur Radio CLub will operate in honor of the 40th anniversary of VJ Day. Operation will be Sunday, August 18 from the deck of the submarine *U.S.S. Silversides* in Chicago. Operating hours will be 1300Z August 18th until 0200Z August 19th. Frequencies will be 14.240 and 7.240 MHz. For a special QSL card, SASE to W9DUP, P.O. Box 71, Clarendon Hills, IL 60514.

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

Aug. 2–4, **Austin Summerfest,** Austin, TX. Contact Austin Summerfest, P.O. Box 13473, Austin, TX 78711.

Aug. 3–4, **12th Annual Greater Jacksonville Hamfest,** Jacksonville, FL. Contact Jacksonville Hamfest Assn., P.O. Box 23134, Jacksonville, FL 32241.

Aug. 4, **WA9SNT ARC Swapfest,** Indianapolis, IN. Contact Dave Johnson, K9HDQ, c/o ITT Technical Institute, 9511 Angola Court, Indianpolis, IN 46268 (317-875-8640).

Aug. 10–11, **BARC International Hamfest,** Charlotte, VT. Contact WA1OZE, Box 312, Burlington, VT 05402.

Aug. 10–11, **Computerfest 85,** Dayton, OH. Contact Computerfest 85, 143 Schloss Lane, Dayton, OH 45418-2931, or call Mark Hanslip at 513-268-7225.

Aug. 10–11, **11th Annual PARC-Golden Spread Hamfest,** Canyon, TX. Contact Rusty Jessup, NU5P, Box 1524, Amarillo, TX 79105 (806-383-0818 evenings).

Aug. 11, **Valley of the Moon ARC Breakfast and Swapmeet,** Sonoma, CA. Contact Darrel Jones, WD6BOR, at 707-996-4494, or write to 358 Patten St., Sonoma, CA 95476.

Aug. 11, **6th Annual Grant County ARC Hamfest,** Marion, IN. Contact WB9EAP, 2202 South Boots St., Marion, IN 46953 (SASE).

Aug. 11, **Charleston Area Hamfest & Computer Show,** South Charleston, WV. Contact Mac McMillian, 2537 Larwood Dr., Charleston, WV 25302 (304-346-6006).

Aug. 11, **St. Cloud ARC Hamfest,** St. Cloud, MN. Contact SCARC, Box 141, St. Cloud, MN 56302.

Aug. 11, **Central Kentucky ARRL Hamfest,** Georgetown, KY. Contact Scott Hackney, KI4LE, 629 Craig Lane, Georgetown, KY 40324 (SASE).

Aug. 11, **Hamfesters 51st Annual Hamfest,** Willow Springs, IL. Contact Hamfesters, P.O. Box 42792, Chicago, IL 60642.

Aug. 17, **PEARL Electronics Extravaganza,** Brewster, NY. Contact R. Dillon, N2EFA, RFD #7, Noel Court, Brewster, NY 10509.

Aug. 17–18, **Huntsville Hamfest,** Huntsville, AL. Contact Huntsville Hamfest, 2804 S. Memorial Parkway, Huntsville, AL 35801.

Aug. 17, **Green Bay Mike & Key CLub Swapfest,** Green Bay, WI. Contact Green Bay Mike & Key CLub, c/o Bill Johnson, N9CNO, 2177 Orrie Lane, Green Bay, WI 54304 (414-494-8948).

Aug. 18, **Tioga County ARC Hamfest,** Blossburg, PA. Contact Durwood Learn, WB3DKZ, 11 Bryden St., Wellsboro, PA 16901 (717-724-5613).

Aug. 18, **WARA Hamfest,** Warren, OH. Contact WARA, P.O. Box 809, Warren, OH 44484 (SASE).

Aug. 18, **Tippecanoe ARA Hamfest,** Lafayette, IN. Contact Lafayette Hamfest, Route 1, Box 63, West Point, IN 47992.

Aug. 24, **Finger Lakes Hamfest,** Ithaca, NY. Contact David Flinn, W2CFP, 866 Ridge Rd., Lansing, NY 14882 (607-533-4297).

Aug. 25, **Bluefield Hamfest,** Bluefield, WV, Brushfork Armory/Civic Center. Contact Jim Perdue, KC8NG, Rt. 5, Box 457, Bluefield, WV 24701.

Aug. 25, **Central PA Repeater Assoc. Hamfest/Computerfest,** Hershey, PA. Contact Paul W. McDonnell, N3BKI, 717-697-1880.

Aug. 25, **Hamfest 85,** St. Charles, MO. Contact WDØCZE, 121 Barkwood Trail, St. Charles, MO 63303.

• **Candlewood ARA Hamfest,** September 15, Edmond Town Hall, Newtown, CT. Contact Gene Marino, W1IDH, Valley View Rd., Newtown, CT 06470, (203) 426-8852.

• **Warrington, PA** - The Mid-Atlantic Amateur Radio Club announces its annual Hamfest to be held on Sunday, August 11, 1985 from 9:00 A.M. to 4:00 P.M., rain or shine, Bucks County Drive-In Theatre, Warrington, PA. For further information write MARC, P.O. Box 352, Villanova, PA 19085 or call Bob Josuweit, WA3PZO, 215-449-9727.

• Aug. 10, **Jackson County ARC Hamfest,** Jackson County Junior Fairgrounds near Ripley, WV. Contact Les Shockey, WB8SNO, RFD #2, Box 36, Sandyville, WV 25275.

•**Waterford, Connecticut** - The Tri-City ARC will operate special events station KA1BB from the Waterford, CT I-95 weigh station to promote safe Labor Day holiday auto travel. QSL via Tri-City ARC, P.O. Box 686, Groton, CT 06340.

• **Ohio (Lima) October 3** - The Lima Hamfest will be held at the Allen County Fairgrounds. One mile east of Rte. I-75 exit 125a on Rte. 309 and Rte. 117. For reservations send SASE and check to NOARC, P.O. Box 211, Lima, Ohio 45801. AMATEUR EXAMS: Novice thru Extra will be given. Send your completed FCC 610 form, a check for $4.00 payable to ARRL/ VEC, and a photocopy of your current license to: *Amateur Exams,* NC8F, P.O. Box 211, Lima, Ohio 45802. An SASE is REQUIRED. NO WALKINS. Applications MUST be received by September 13.

hy-gain®

Beat the Decline in Sunspot Activity

The declining sunspot cycle is severely affecting HF communications. You only have two alternatives to beat this problem. And only one of these alternatives is a viable solution.

Alternative #1

Increase Amplifier Power

- Doesn't improve reception
- Creates QRM interference for others
- 1500 watts max limit (250 watts on novice bands)

Alternative #2

Install Beam Antenna

- Improves transmission and reception
- Concentrates energy so the effective radiated power (ERP) is many times the operating power
- Creates minimal QRM interference

Obviously #2, a beam antenna, is your best alternative. One of the famous Hy-Gain monoband or triband beams, famous because they reach all corners of the world.

MONOBAND BEAMS

105BAS	10 m	204BAS	20 m
155BAS	15 m	205BAS	20 m
203BAS	20 m	Discoverer 7-2	40 m

TRIBANDER BEAMS

TH2Mk3S	10/15/20 m	Explorer 14	10/15/20 m
TH3JRS	10/15/20 m	TH7DX	10/15/20 m
TH5MK2	10/15/20 m		

Complete technical details and performance specifications are available at your amateur radio dealer or write Amateur Radio Department, Telex/Hy-Gain, 9600 Aldrich Ave. So., Minneapolis, MN 55420.
Or call us toll free at

800-328-5652.

In Minnesota call 612-887-5528.

TELEX® hy-gain®

TELEX COMMUNICATIONS, INC.

HAM RADIO OUTLET

6 STORE BUYING POWER!

■ **TOLL-FREE PHONE: 800-854-6046**
INCLUDING ALASKA AND HAWAII CALIF. AND ARIZONA CUSTOMERS CALL OR VISIT STORE NEAREST YOU

■ **FREE SHIPMENT**
MOST ITEMS. U.P.S. SURFACE.

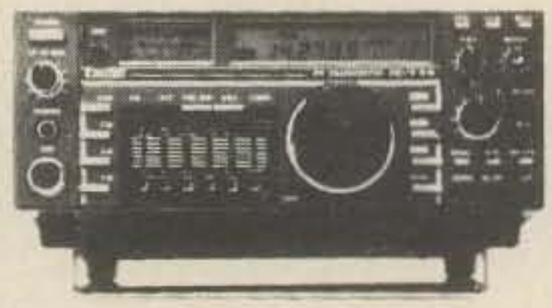
ICOM HAND-HELDS
AT GREAT LOW SUMMER PRICES

IC-02AT
IC-04AT

IC-2AT
IC-4AT

IC-3AT

ICOM IC-735
A BRAND NEW HF TRANSCEIVER



WITH ALL THE FEATURES THAT MAKE IT A TRULY OUTSTANDING B U Y!

CALL FOR PRICE AND INFORMATION

ICOM IC-37A

220 MHz's BEST BUY!
REGULAR $449
***SALE!* $299.95**

ICOM *LATEST EDITION*
IC-3200A DUAL BANDER
COVERS BOTH 2 METERS and 70CM

NEW!
CALL FOR PRICE AND INFORMATION

ICOM

Regular $799
***SALE!* $629.95**

R-71 A
SUPERIOR GRADE GENERAL COVERAGE RECEIVER

PERSONALIZED SERVICE
BOB FERRERO W6RJ
JIM RAFFERTY N6RJ
GEORGE, W6GDSV
DON, N6IPE
BOB, K7RDH
GLENN, K6NA
AL, K6YRA

800-854-6046

CALIF. AND ARIZONA CUSTOMERS CALL OR VISIT NEAREST STORE

PHONE HOURS: 9:30 AM to 5:30 PM PACIFIC TIME.
STORE HOURS: 10 AM to 5:30 PM Mon. through Sat.

FREE SHIPMENT

VISA · master charge

ANAHEIM, CA 92801
2620 W. La Palma,
(714) 761-3033, (213) 860-2040,
Between Disneyland & Knotts Berry Farm.

BURLINGAME, CA 94010
990 Howard Ave..
(415) 342-5757,
5 miles south on 101 from San Fran. Airport.

OAKLAND, CA 94609
2811 Telegraph Ave.,
(415) 451-5757,
Highway 24 Downtown. Left 27th off-ramp.

PHOENIX, AZ 85015
1702 W. Camelback Road,
(602) 242-3515,
East of Highway 17.

SAN DIEGO, CA 92123
5375 Kearny Villa Road,
(619) 560-4900,
Highway 163 and Clairemont Mesa Blvd.

VAN NUYS, CA 91401
6265 Sepulveda Blvd.,
(818) 988-2212
San Diego Freeway at Victory Boulevard

AEA • ALLIANCE • ALPHA • AMECO • AMPHENOL • ANIXTER MARK • ANTENNA SPECIALISTS • ARRL • ASTRON • BASH • BELDEN • BENCHER • BIRD • BUTTERNUT • B & W • CALLBOOK • CENTURIAN • COLLINS • COLUMBIA • CURTIS • CUSHCRAFT • DAIWA • DRAKE • DX EDGE • EIMAC • GILFER • HAL • HUSTLER • HY GAIN • ICOM • JSC • J W MILLER • KANTRONICS • KENWOOD • KLM • LARSEN • LUNAR • METZ • MFJ • MICRO LOG • MINI PRODUCTS • MIRAGE • NYE • PALOMAR • ROHN • SHURE • SIGNAL ONE • STONER • TEMPO • TEN TEC • TRISTAO • TRI EX • VAN GORDON • VOCOM • VIBROPLEX • WEST • YAESU and more

Prices, specifications, descriptions subject to change without notice. Calif. and Arizona residents please add sales tax.

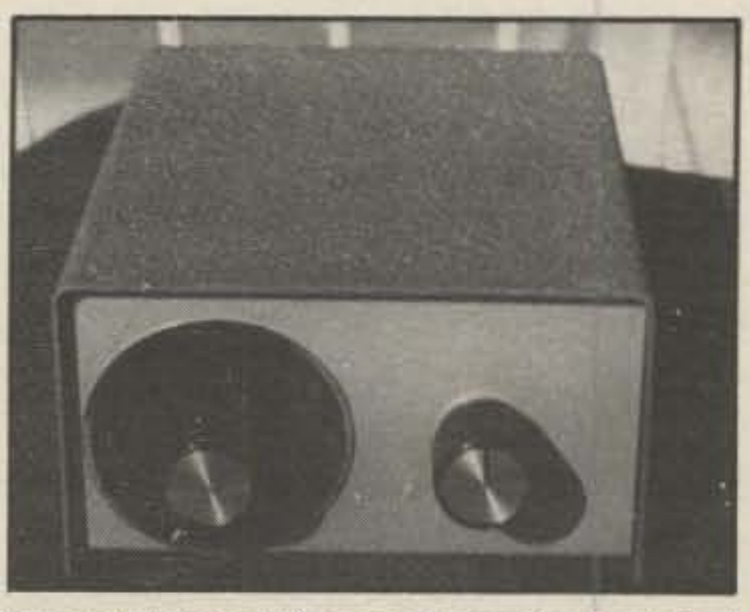
Here's a trio of antenna tuners you can build for portable work or make into an ideal club project for newcomers.

A Trio Of Homebrew Antenna Tuner Possibilities

BY JOHN J. SCHULTZ*, W4FA

It seems to me that constructing one's own antenna/tuner unit for the HF bands can still be an interesting and enjoyble project. Such construction usually doesn't entail any sophisticated wiring or metal working techniques. It mainly requires just a bit of planning and patience. Besides being a relatively easy project for a newcomer, the construction of a tuner can be very worthwhile from an economic viewpoint. Depending almost entirely upon how fortunate one is at locating the main components for the tuner at the "right" price, one can construct the equivalent of a commercial tuner for less than the cost of a commercial unit.

This article presents a selection of three tuners out of many designs that I have constructed over the years. Each tuner is a bit different in terms of features, matching range, power handling capability, size, *etc.* Most of the components used are readily available or, at least, equivalent components can be found or constructed. One might wish to essentially duplicate one of the designs or take some ideas from one or more designs to come up with one's own custom designed tuner.

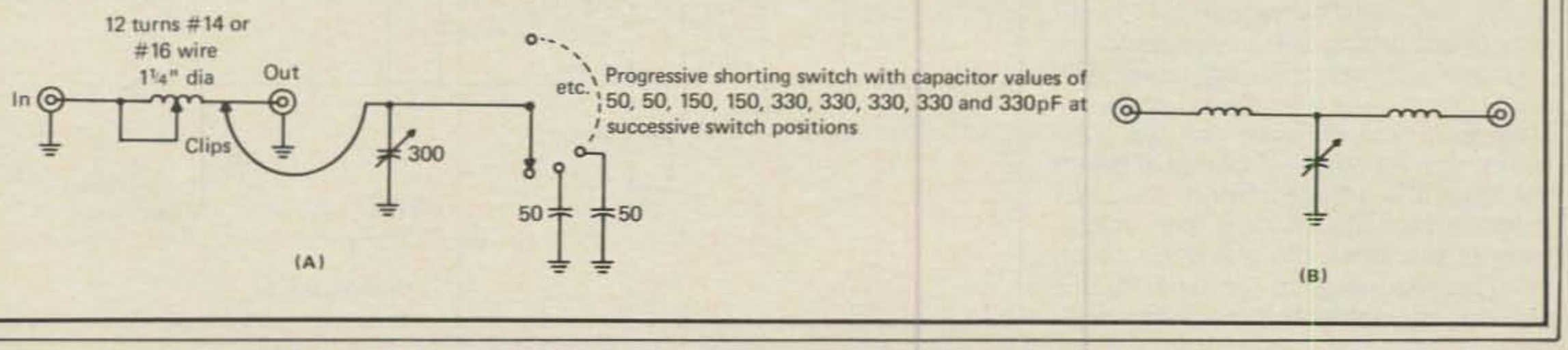


The Multiband Manual Tuner is mounted in a standard Radio Shack enclosure with the capacitor switch on the left and variable capacitor tuning next to it.

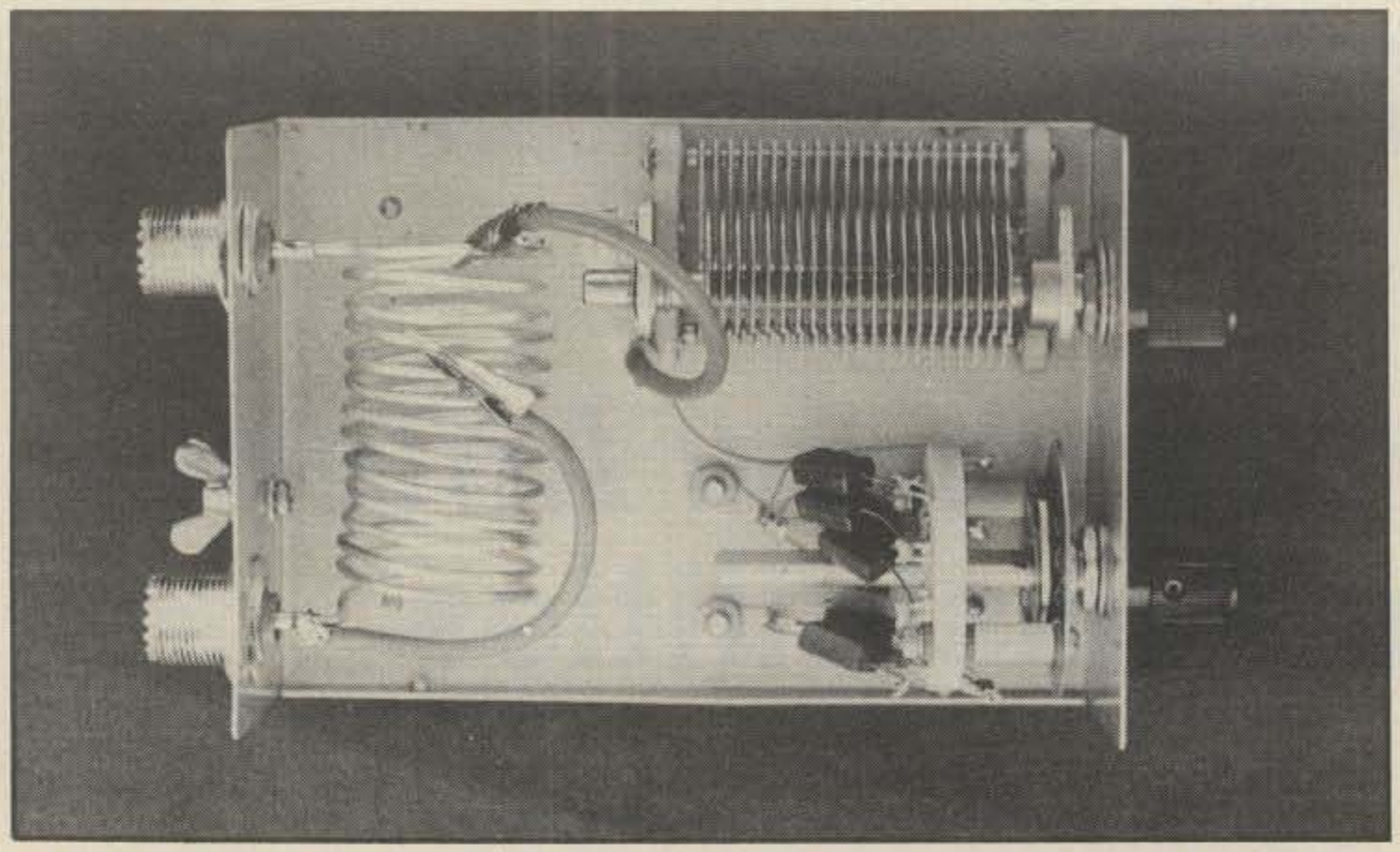
A Multiband Manual Tuner

This little tuner is an extremely basic type although it can couple a 100 watt transmitter into a surprising variety of loads. The diagram of the tuner is shown in fig. 1(A). The circuitry is basically that of a reversible LC network. One variable capacitor is used and fixed capacitors are switched in parallel with it so the total capacitance can reach a value of roughly 1800 pf. The dimensioning of the components is such that it will accommodate almost any reasonable load over the 80–10 meter range. The use of clips may seem a bit old-fashioned but they have some significant advantages. The left hand clip is used to short out as many coil turns as necessary to achieve proper tuning. The clip associated with the variable/fixed capacitor bank can be moved to either the input or output terminal of the network to form either a LC or CL network. One can access half or even quarter turns on the coil with the shorting clip and this is often very useful for precise matching. But, the greatest bonus to the use of clips is that one can also form the T network shown in fig. 1(B). To form this network, the shorting clip is used as usual but the capacitor-bank clip is placed somewhere along the unshortened portion of the coil. This neat little trick can't be done even by tuners having a roller inductor and the T network is capable of matching various loads that a simple LC

Fig. 1– Circuit of the Multiband Manual Tuner.



*c/o CQ Magazine



A look inside the tuner shows its extremely simple construction. The coil can be easily wound or commercial coil stock can be used.

network cannot handle (mainly because of stray capacitance/inductance effects).

Construction of the tuner is illustrated by one of the photographs. The enclosure measures about 4 × 2½ × 6 inches and is a Radio Shack No. 270-252. The variable capacitor and the capacitor switch are located on the front panel. The input and output coaxial connectors plus a ground connections (machine screw with a wing nut) are located on the rear panel. The coil is soldered in place between the two coaxial connectors and, except for some very simple wiring, that is all there is to the construction of the unit. The only real expense involved in the tuner is for a variable capacitor which should have a range of up to 300 pf. A broadcast band air variable can be used, but for a few dollars more one can obtain a quality surplus transmitting type (e.g. from Fair Radio, PO Box 1105, Lima, Ohio 45802). The capacitor shown in the photograph is a Hammarlund MC-325 and sold for $5 as brand new surplus. The fixed capacitor switch should ideally be a progressively shorting type. But, if one cannot locate such a switch, a simple alternative is to use a regular one pole, 12 position switch (e.g. Radio Shack No. 275-1385) and then choose the capacitor value placed at each position such that the effect is the same as though one had used a progressively shorting type switch. By the way, if one has a hand-held metal punch and a reamer that goes up to ⅝", all the metal work can be done without any drilling being necessary.

Usage of the tuner is very straightforward. One simply tries the LC or CL arrangement and different coil tap positions until a 1:1 SWR is obtained between the tuner and a transceiver. If the SWR shows a pronounced drop with adjustment of the tuner, but still won't reach 1:1, reconfiguration of the tuner to a T network, as previously mentioned, will allow the SWR to reach an absolute 1:1. Besides its obvious usefulness as a tuner for portable operation, this tuner can also serve as a "test bed" for a bandswitched tuner that one might want to develop. If one doesn't expect to change antennas often, one can use the tuner with its clip arrangement to find different coil taps for different bands and then hard wire in a bandswitch. The tuner can then also be upgraded to any desired power level by using heavier duty components.

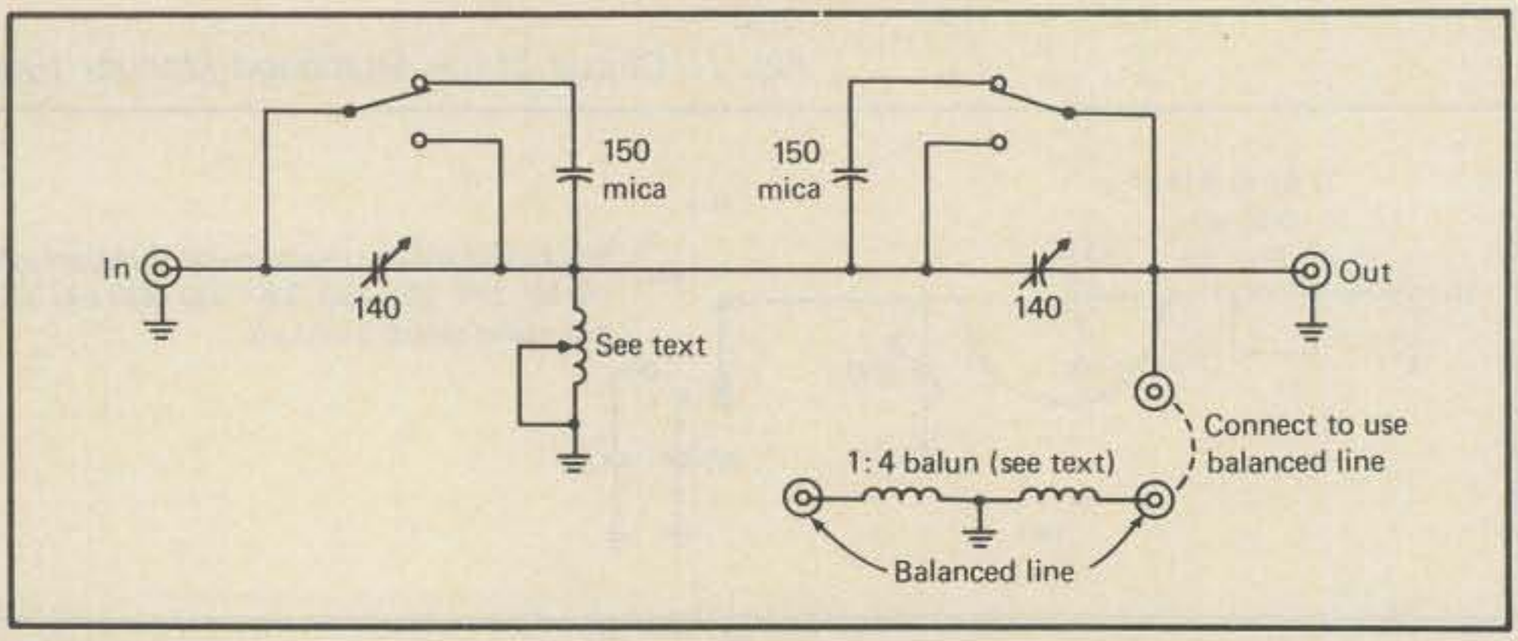
The Multiband T Tuner

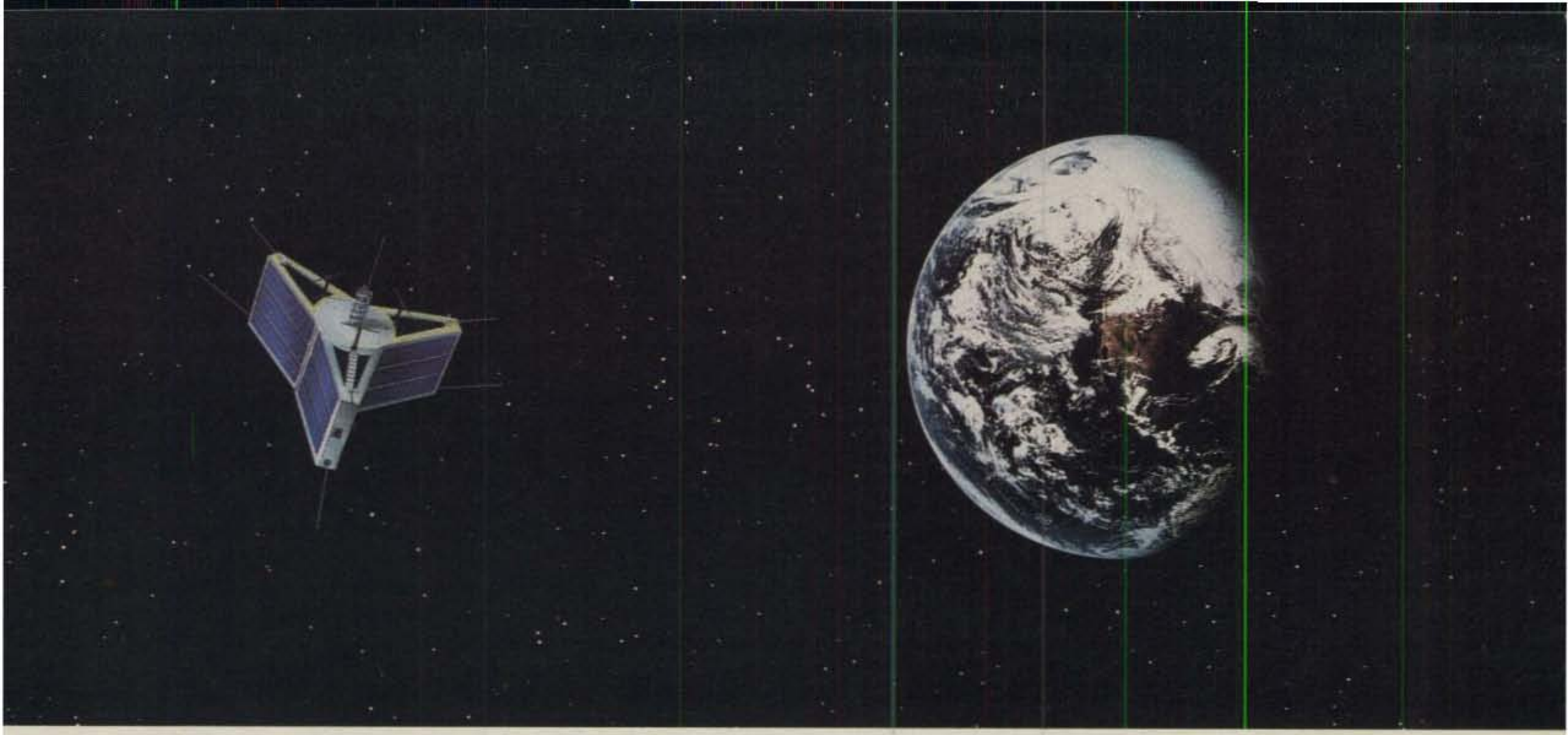
This tuner is similar to the foregoing one in that it is compact and excellent for use with the usual 100 watt output class transceiver. It covers 160 to 10 meters, will match just about any normal load without the use of external components and can be configured to incorporate an SWR meter. As shown in fig. 2, it uses an inductor with multiple, switched taps so it is "bandswitched."

The circuitry is that of the usual T network with independently variable capacitor arms. Each capacitor has only a 140 pf range but a fixed 150 pf capacitor can be switched across each variable. The fixed capacitors are only necessary for 160/80 meter operation. Note that by the use of toggle switches which have a "center-off" position for the fixed capacitor switching, one can also set up a tuner configuration such that the capacitor arm on either side of the inductor is completely shorted. This latter feature only has limited usefulness, however, and can be disregarded if toggle switches with a center-off position cannot be readily obtained.

The tuner is constructed in a small aluminum enclosure measuring about 4½ × 4 × 3 inches although any one of a wide variety on inexpensive utility type enclosures will suffice. The photographs give a pretty good idea of the construction used. The two variable capacitors are mounted on either side of the tapped inductor and controlled from the front panel via insulated shaft couplers. They are mounted to the floor of the enclosure via nylon screws for insulation. They are both surplus receiving type which were found for about $1.50. If one can find single section, *air insulated,* 300 pf broadcast band variables, they can be substituted for both capacitors and one can also do away with the toggle switch and fixed capacitors. Unfortunately, such capacitor buys come and go on the surplus market and one has to check the situation at any given time. For instance, EMI, 715 Armour Road, N. Kansas City, MO 64116, was recently selling a package of five such variables for $3.99! The tapped inductor coil is a specialty item from Ten-Tec and provides for 47 evenly spaced tap positions but one can easily home-brew a reasonable substitute. A 2¼ inch diameter torodial core is wound with about 50 turns of #18 bare wire (after insulating the core with tape) and a multiple position switch used to select turns. A suitable core (T-225, Mix 2) is available from Amidon, 12033 Otsego Street, N. Hollywood, CA 91607 for $4.00 plus $2.00 shipping. If a tap switch is used, one should tape the coil in progression at 1, 2, 3, 5, 7, 9, 13, *etc.* turns for as many switch positions as are available. Leaving the last one or two switch positions connected to wire leads with coil clips at their ends is a good idea in case one has to experiment to find a suitable tap position on

Fig. 2– Circuit of the Multiband T Tuner.





The DX is better out here. Ask anyone who owns an FT-726R.

It's true. Linking up to OSCAR 10 is the one sure way to bring the world into your ham shack. No matter where your shack is.

FT-726R owners know. You'll find them working the world from their apartments. Attics. And from their antenna-restricted neighborhoods.

They'll even boast of a signal quality and DX potential that would make any 20-meter operator envious. Regardless of where we are in the sunspot cycle.

In fact, the FT-726R is the world's most popular link to OSCAR 10.

And for good reason. This 2-meter, 10-watt rig gives you full cross-band duplex capability. Simply plug in two optional modules, one for 435-MHz operation, another for cross-band duplex.

You can set up your earth station just about anywhere. All you need is the 726 and two Yagi antennas: 435-MHz for transmit and 2-meters for receive.

Even as a conventional base station, the FT-726R is a real standout.

You can choose from three operating modes: SSB, FM or CW. Expand to three-band operation with your choice of optional modules for 10 meters, 6 meters, 430-440 MHz and 440-450 MHz.

Then store your preferred frequencies and modes into the eleven memories for instant recall. With pushbutton transfer capability to either of two VFO registers. And versatile scanning functions you'd expect from a Yaesu radio.

Plus you get a lot more extras, including a built-in speech processor, all-mode squelch and a noise blanker.

So no matter where your shack is, let Yaesu's FT-726R introduce you to OSCAR 10. The world is waiting.

YAESU

Yaesu Electronics Corporation
6851 Walthall Way, Paramount, CA 90723
(213) 633-4007

Yaesu Cincinnati Service Center
9070 Gold Park Drive, Hamilton, OH 45011
(513) 874-3100

CIRCLE 136 ON READER SERVICE CARD

Prices and specifications subject to change without notice.

SPECTACULAR SIMPLICITY

KDK FM-240

2M – 25 WATT FM TRANSCEIVER

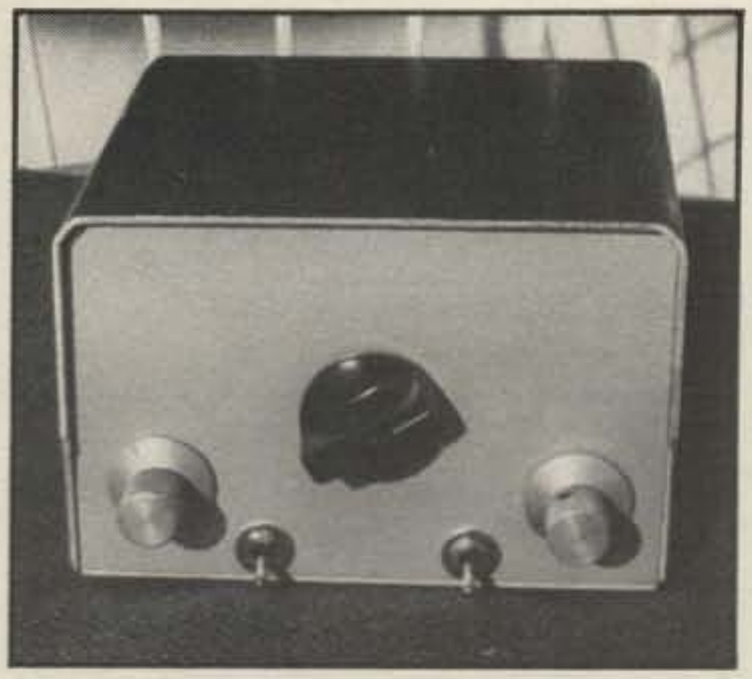
- Superior features, simpler to use for 2 meters, MARS, CAP
- Compact size for better fit in today's automobile
- 16 fully programmable memory channels, plus priority call channel, plus 2 VFOs for today's user
- Subaudible encode and decode standard for today's 2 meter bands
- Subaudible frequency programmed by freq, no chart needed
- Speech synthesis option for voice VFO
- Superior man machine interface—one knob and one button, program all of the features easily—alphanumeric LCD prompts
- 16 button speaker/mic with UP/DN lock-out switch

This radio does every single thing we asked the design staff to make it do, and it does it in an easy to use, simple manner. It is truly spectacular to operate such a radio in the 2 meter band. For example, the FM-240 has two VFO modes—one called VFO, the other QSY. So if you are on your favorite channel and want to QSY, simply push QSY and tune the main knob to the new frequency. To return, simply push QSY again. The entire radio follows this simple but spectacularly effective engineering formula. ONE BUTTON + ONE KNOB, SIMPLY SPECTACULAR SIMPLICITY.

ENCOMM

2000 Avenue G, Suite 800, Plano, Texas 75074
Phone (214) 423-0024 TLX 79-4783 ENCOMM DAL

ENCOMM



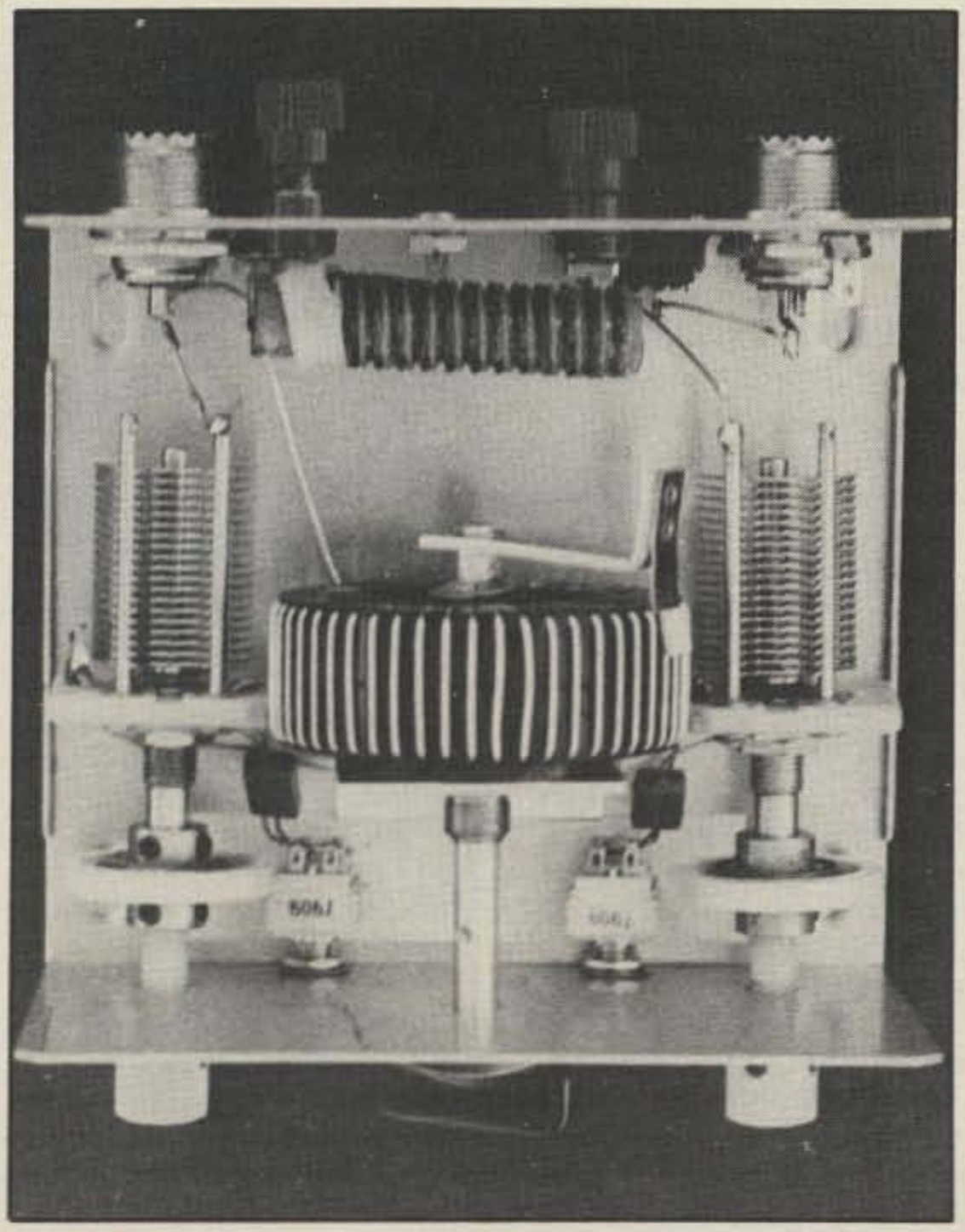
The plain appearance of the Multiband T Tuner sort of belies its functional versatility. Later on a 1¼" meter was added for SWR monitoring and with some lettering it turned out to be a "sharp looking" unit.

the coil. One might even want to mount the coil horizontally using suitable insulation (plastic Checker game pieces above and below the core center with a long mounting screw work fine). The coil turns will then be more accessible for wiring to a front panel coil tape switch.

The rear panel of the tuner simply contains the in/out coaxial connectors and a ground post. However, it is a simple matter to add an internal balun so one can also work into balanced transmission lines. The balun shown in the photo of the tuner was wound on a ⅜ inch diameter by 2 inch long ferrite rod using 12 × 2 turns of parallel run hookup wire and connected, as shown in fig. 2, to binding posts. Later on, a simple slide switch was added so one did not have to make the jumper connection between binding posts to use the balun.

In use, this type of tuner will match a very wide range of loads. The tuning can be rather sharp at times so one has to go through the capacitor settings slowly. The best method of setting up the tuner seemed to be to set both capacitors at mid-range and then change the coil taps until some indication of a SWR dip between a transceiver and the tuner took place. Then the capacitor and coil settings were refined for the lowest possible SWR. If capacitor arcing takes place, it probably indicates the load impedance is high and voltages are being developed which the capacitors in the tuner cannot handle. There is not much choice in such a situation but to reduce the power level or to vary the antenna length, since such a condition usually occurs with a random wire antenna, until the tuner accepts the load under full power.

Later on, an internal SWR metering circuit was added to the tuner and this really made it a pleasure to use for portable applications since one didn't have to rely on an external SWR meter. A 1¼ inch round, 200μ amp meter was mounted on the front panel in the upper left hand corner and the pick-up circuitry of fig. 3 placed in the enclosure just after the input coaxial connector. The extremely simple circuitry can only indicate relative reflected power but usually that is the only indicator necessary as one adjusts the tuner for a minimum reading on the meter. The pick-up element uses an old, simple idea. A length of insulated #22 or #24 wire is inserted under the shield of a length of RG-174 by removing the outer jacking and bunching up the shield. The shield is then extended back in place and shrink tubing used to cover the assembly around the areas where the pick-up wire protrudes from the shield. The small length of cable was easily looped around the rear interior of the enclosure and the diode and other components mounted on perforated board stock. A shielded lead should be used to the meter. The terminating resistor shown as 120 ohms in fig. 3 may have to be varied a bit if the meter does not read essentially zero with a 50 ohm resistive load on the output of the tuner. Values between 82 and 150 ohms are typical. No sensitivity control is provided for the meter since the normal tune-up procedure is to slowly increase a transceiver's output power as the tuner is



The tuner inside has a reasonable amount of free space so the components are not unduly crowded. The ferrite rod balun is shown just inside the back panel.

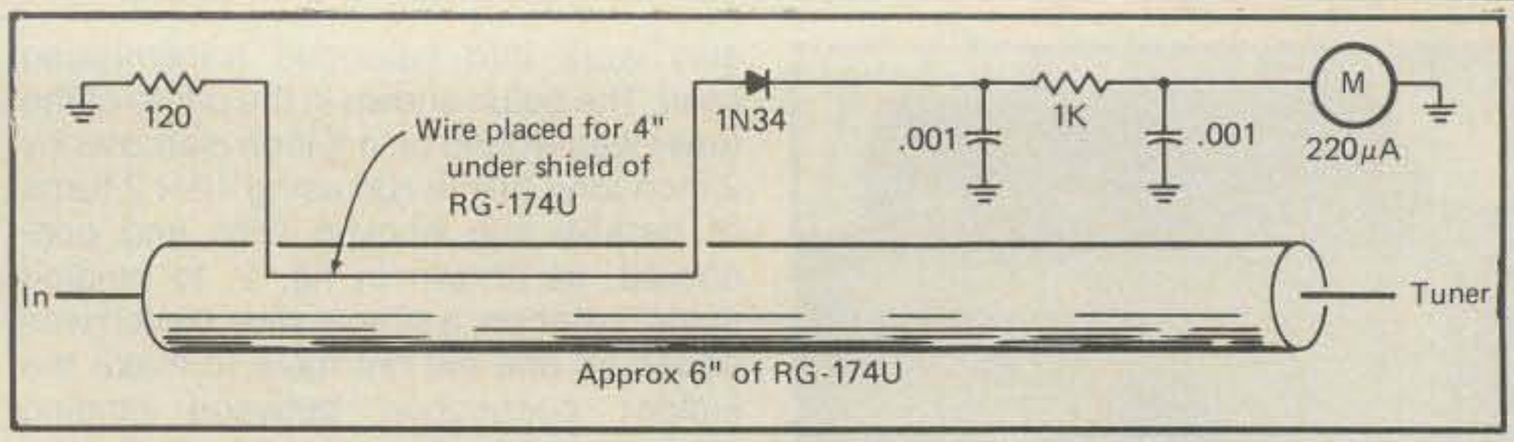


Fig. 3– Simple but effective SWR circuit for use with the Multiband T Tuner. As shown, the meter will indicate relative reflected power only. Only five watts or more of output power are necessary to get a good indication on the meter.

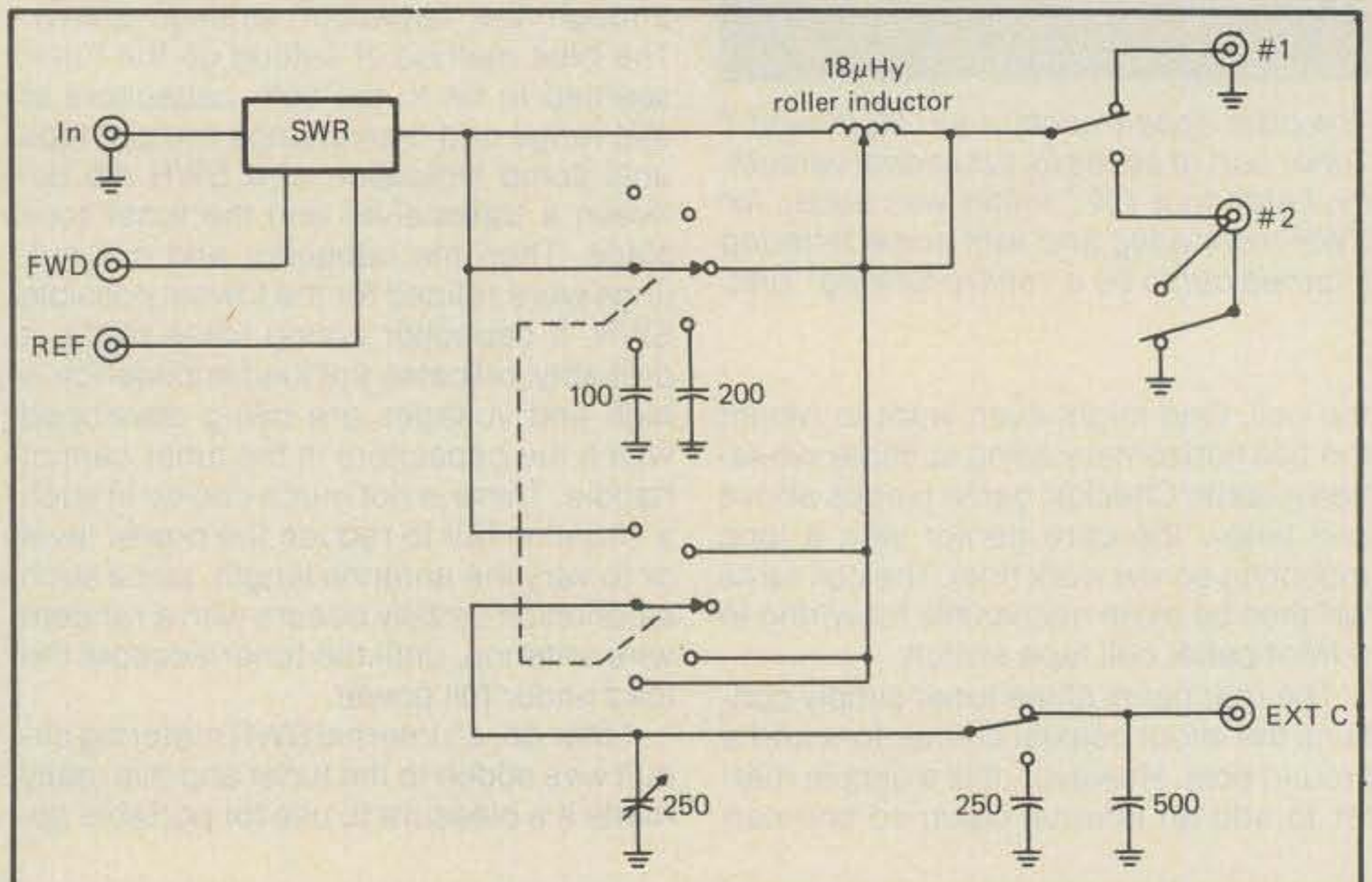


Fig. 4– Circuit of the Mini-Powerhouse Tuner. Note that coaxial output connector #2 is mounted so it is insulated from the rear panel of an enclosure. See text for discussion of component ratings.

adjusted to keep the meter reading at zero.

The Mini-Powerhouse Tuner

This tuner is actually a slightly reworked version of one I described in the December 1983 issue of *CQ* and which has been in almost constant use at my station. Since then, some ways were found to simplify the circuitry and the switch component used in the tuner while simultaneously increasing its versatility a bit. The diagram of the tuner is shown in fig. 4.

Essentially, the tuner is a pi-network type but the input capacitors are fixed rather than variable. The output capacitor is variable with a provision for placing either of two fixed capacitors and an external capacitor across it. The switch used is a normal 2P5P wafer type (ceramic, if possible). The wiring to the rotary switch is a bit cleverly arranged such that the single switch can be used to form a CL network (variable capacitor input), a pi-network with a choice of no input capacitor or either of two fixed input capacitors or it can be used to bypass the tuner. Slide switches are used to choose two antennas and also if the coaxial shield

The Mini-Powerhouse Tuner has a very compact front panel for a KW level tuner. The top center rotary switch controls the circuit configuration while the bottom center toggle switch (unmarked) is for switching additional fixed capacitance parallel to the variable tuning capacitor.

connection on one antenna should go to ground or be lifted from ground and shorted to the inner conductor of the coaxial cable. The latter function may sound a bit unusual but it has often proved very handy for temporarily operating a coax-feed dipole as a random wire working against ground on a much lower frequency band than that for which the di-

You may not be able to solve the world's problems. But at least you can listen.

RF-B600

The Panasonic Command Series.™ With double superheterodyne tuning, you'll hear the world loud and clear.

Now it's easy to listen in on the world's hot spots. With the Panasonic RF-B600 Command Series FM/LW/MW/SW receiver.

Its advanced microcomputer-controlled tuner lets you preset up to nine different frequencies. And reach them at the touch of a button. Or, press the appropriate buttons and tune in any desired frequency with direct-access digital tuning. It'll lock right in to every signal with a PLL quartz-synthesized tuner. Once tuned in, the Panasonic double superheterodyne system helps deliver a clean, consistent signal.

There's even built-in auto-tuning to let you scan the shortwave band automatically, as well as manually. All this means you can tune in Berlin, pick up Paris, or locate London in an instant. Without dialing all over the band.

Both the RF-B600 and the RF-B300 are packed with features and built to go anywhere.

The Panasonic Command Series offers something for everyone. With equipment sophisticated enough to impress the most avid enthusiast, and automatic features that get you where you want to be. Fast.

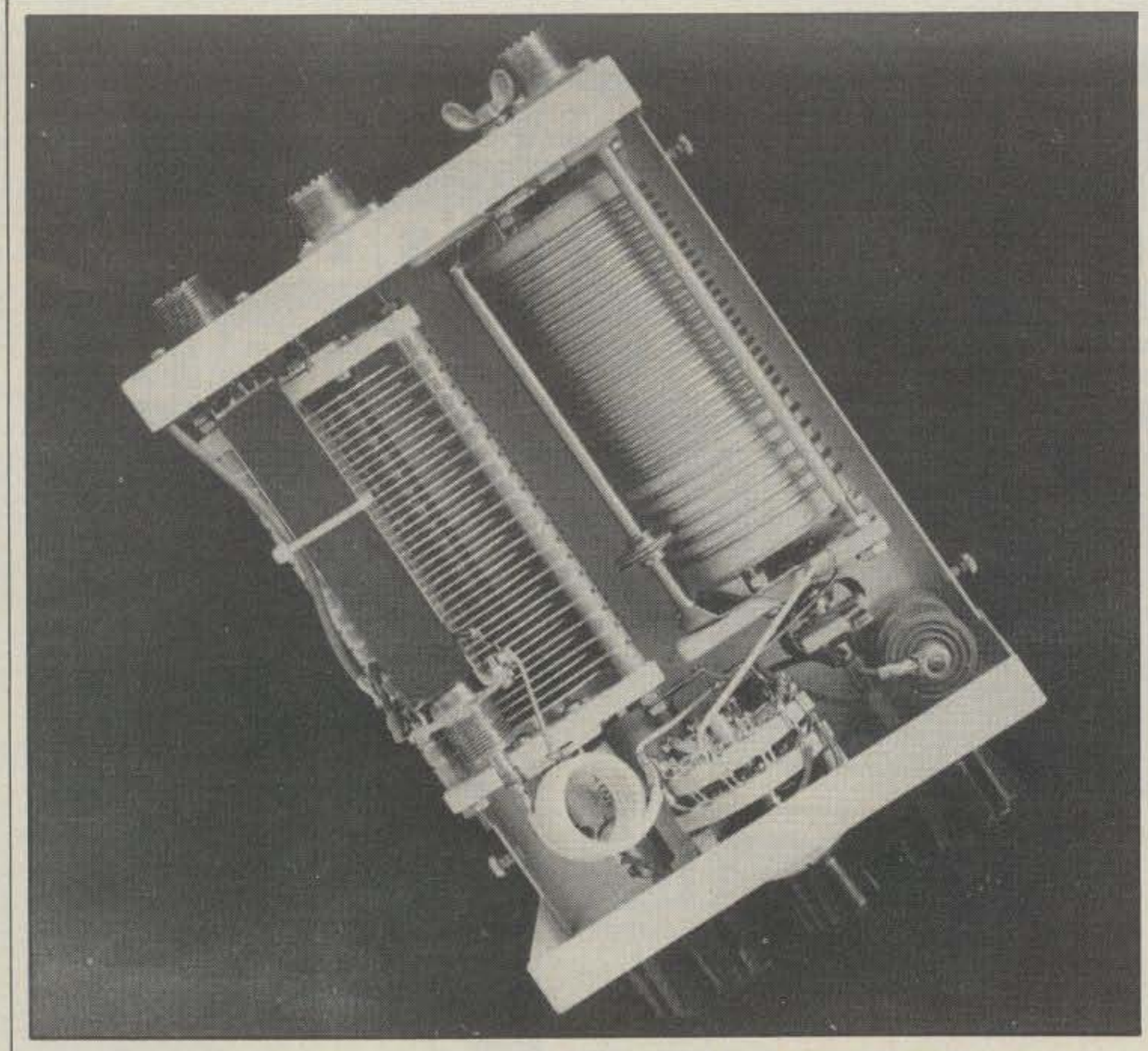
There's a whole world out there that's waiting to be heard. Tune in to it with the Panasonic Command Series.


RF-B300

Batteries not included.

Panasonic®
just slightly ahead of our time.™

CIRCLE 80 ON READER SERVICE CARD



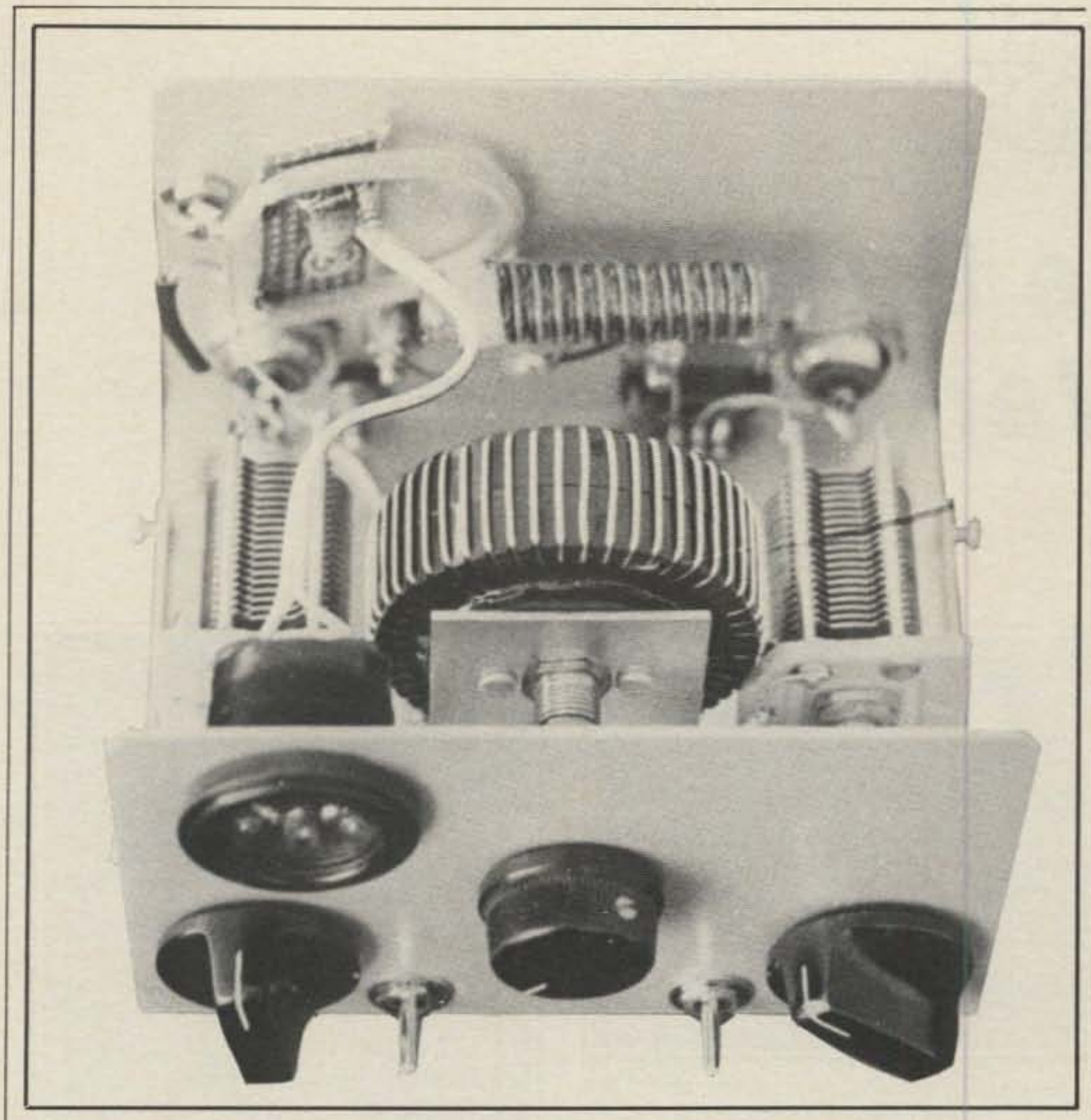
The tuner packs KW power level components inside but construction is not overly difficult. The reflectometer coupler is shown on the left, above the variable capacitor. The rear panel contains the usual coax in/out connectors, antenna selector switches, SWR meter connections and a ground terminal.

SWR meter follies. One advantage of having the reflectometer circuitry inside the tuner but the meter external is that one can experiment with different style meters. Here, a rather giant size meter is being used almost half as large as the tuner itself.

pole antenna was dimensioned (e.g. a 20 meter dipole on 40 or 80 meters provided the dipole has a reasonably long feedline). A toggle switch with a center off position is used to switch either of two fixed capacitors across the main tuning capacitor. The SWR circuitry is not shown in detail since it was simply removed from a $10 class, run-of-the-mill, 3–30 MHz, 1 KW level SWR bridge and placed in the tuner. However, the SWR meter was not placed in the tuner and the forward/reflected meter outputs wired to jacks on the rear of the tuner. The reason for doing this was to allow the external use of any desired size or style of meter or even separate meters for the forward/reflected readings.

The construction is fairly clear from the photographs since there are relatively few components to be mounted. The enclosure used measured about 9 × 6 × 4½ inches and is relatively quite compact for a KW level tuner. One may wish to use a slightly larger enclosure for convenience during construction although there should be no difference as regards electrical performance. The only construction point one must note if the circuitry of fig. 4 is to work properly is that the roller inductor has to be wired such that the coil turns are unshortened with clockwise rotation of the front panel inductor control knob (active number of coil turns increases). This point will be obvious once one has a roller inductor in hand to examine, but it is important since the coil-to-roller arm shorting strap on the inductor may have to be moved from one end of the intruder to the other end. The roller inductor must also be mounted using an insulated shaft to the front panel control knob. If one does use a larger enclosure and wants to embellish the tuner a bit, the addition of a turns counter for

Please send all reader inquiries directly.



The SWR circuitry of Figure 3 was later added to the Multiband T Tuner. The circuit components were mounted on perforated board stock and can be seen to the left rear of the tuner. A 1¼ inch round meter was added to the front panel.

the roller inductor and a gear reduction drive for the variable capacitor might be considered although neither item is a "must." Unless one encounters an unusual tuning condition, it is usually sufficient to set the tuning capacitor to its predetermined position and then rotate the roller inductor until the SWR drops without worrying about exactly how many coil turns are being used.

Using the commonly available 18 μh, 5 ampere rated roller inductor, a variable capacitor with 3 KV spacing and 5 KV "doorknob" capacitors for the fixed capacitors, the tuners will easily handle the output of any 1 to 1.5 KW input linear under normal load conditions (e.g. up to a few hundred ohms resistive and/or reactive). One could upgrade the tuner a bit by using a 4.5 or 6 KV rated variable capacitor. The main 2P5T rotary switch can be a standard ceramic type (e.g. Centralab PA2000 series) with two wafer sections wired in parallel to increase the current handling capability. As always, building this type of tuner becomes an interesting proposition only when one can find the components needed at a reasonable price. Fortunately, this can be done. A quick glance at the Fair Radio catalog will show that most of the major components can be obtained for less than $50 total.

Since the tuner has only two tuning controls, its usage is basically simple. With the variable capacitor set at mid-range, the roller inductor is adjusted for some indication of an SWR dip. Then, the capacitor is tuned and the roller inductor once again adjusted for minimum SWR. This procedure may have to be repeated for the various switch positions which provide for different configurations of the tuner circuitry but eventually settings should be found which provide a perfect match. Resetability is fast and easy once one has developed a log for the control settings.

Summary

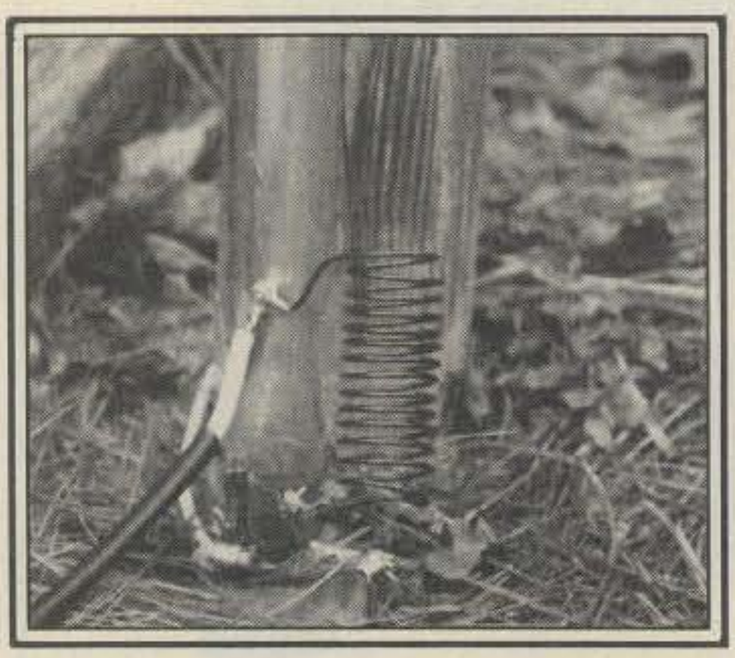
As was mentioned before, one may wish to duplicate one of the tuners described or develop a design which borrows some ideas from the tuners described. The incorporation of a dummy load or more elaborate antenna selection switching may also have appeal. In any case, building your own tuner can be an interesting, satisfying project that I would recommend. CQ

CQ REVIEWS:

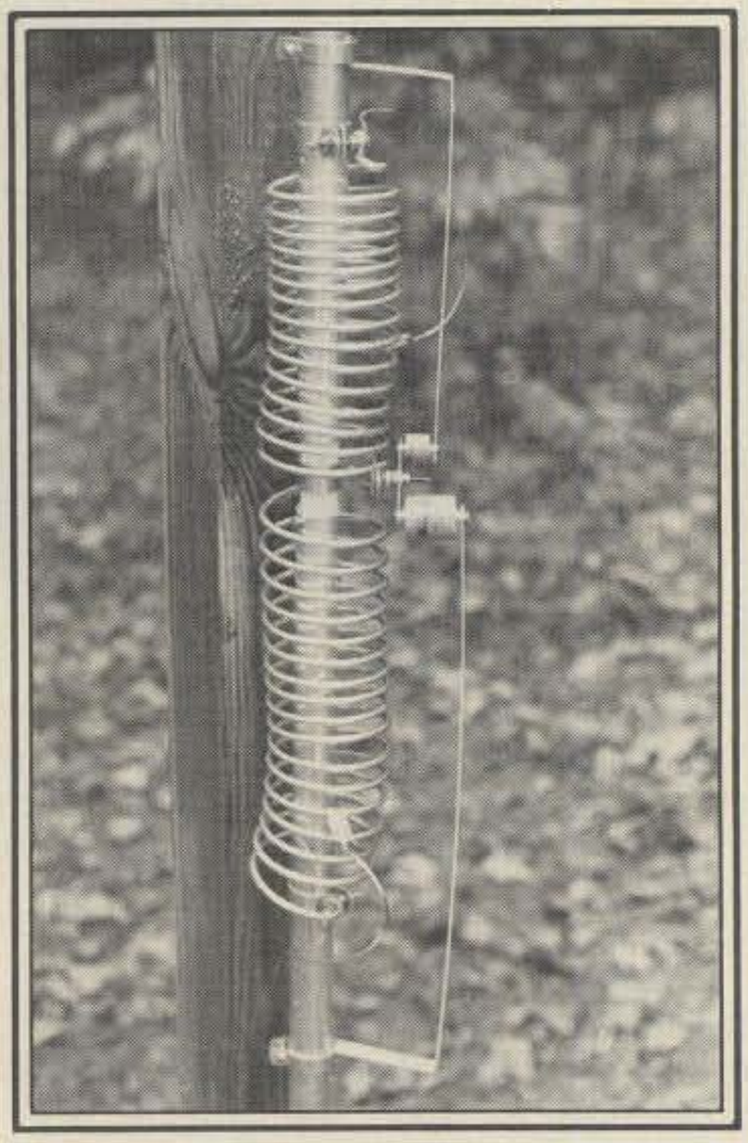
BY JERRY HAGEN*, N6AV

The Butternut HF2V Vertical Antenna

I was glad to hear that Butternut Electronics was producing a 40 and 80 meter vertical which could also be loaded on 160 meters. With the sunspot plunge, a good signal on the low band will be a must during the next few years. As a satisfied user of one of the original HF5V Butternut 5 band verticals I hoped that the HV2V would have the same quality with improved performance on the low bands. Even with a fairly good radial system, my HF5V was not as competitive on 75 and 80 meters as it was on 40 meters and the other bands. The HF2V was designed to provide the improved performance desired during the sunspot minimum.



The base mounting coil. This raises the impedance up to 50 ohms.



The HF2V loading coils and capacitor assembly. Note the shorting straps which are provided to tune the antenna.

Concept And Specifications

To gain an understanding of the Butternut loading concept, reading the review of the HF5V antenna by John Schultz, W4FA, is essential. It was published in the April, 1982 issue of *CQ*[1]. John explains that the entire length of the Butternut HF5V is active on all bands, and that the antenna does not have the conventional traps used by most multiband verticals. This results in better bandwidth and excellent performance on all bands. The concept in the new HF2V is to improve the low band performance by increasing the length of the antenna from 26 to 32 feet and provide a way to top load the antenna for even greater efficiency. The antenna is designed with large aluminum inductor coils and ceramic capacitors which provide appropriate capacitive and inductive reactance which loads the antenna as a quarter wave on both 80 and 40 meters. The loading devices are *not* traps. The instructions are excellent and a brochure entitled *Notes on Grounding/Radial Systems* is also available and is well worth the effort to read. The power rating for the HF2V is 2 KW PEP or 1 KW CW (DC) input (which is assumed to be to the final amplifier) and the wind survival is 60 mph.

Assembly And Installation

The antenna is shipped in a 4 × 4 × 66 inch cardboard box by UPS and consists of a base mounting section (1 ¼ ″ OD tubing) antenna bottom section with insulator (also 1 ¼ ″), coil assembly (2 coils), capacitor assembly, base loading coil and 7 four foot aluminum tubing sections ranging from 1⅛″ to ⅜″ in diameter. Appropriate hardware was included, although screws and nuts to secure the shorting straps has been omitted from my particular package. The mounting and antenna base sections have been "double walled" to provide strength for unguyed installations. The instructions look complicated but the antenna is easy to assemble thanks to outstanding detail in easy-to-understand language. My only problem was that I skipped the part where Butternut advises assembly in the garage, and a piece from my socket wrench set fell into an area of rocks and gravel along the driveway and has not been retrieved as of this date! All the tubing slots and holes has been de-burred and matched perfectly. Within one hour the antenna was ready to erect.

Some care must be used in installing the base section so as not to damage the fiberglass insulating section. If the soil is hard clay such as in my local, it can require some effort to drive the section in, unless there has been some rain. My only critical comment on the mechanical design was that the wingnuts used to adjust the coils were a bit small, making them difficult to turn by hand. However, they are stainless which is a nice improvement over the HF5V. After assembly the antenna is easily lifted into the vertical plane and attached to the base insulator.

Tuning

The tuning instructions are very complete and easy to follow. Prior to tuning it is necessary to install the 40 meter shorting clip to short out 7 turns of the top (40 meter) coil. The coils were then set as specified and tuning was initiated on 75 meters. The resonant point was close to

*9407 White Hemlock Lane, Matthews, NC 28105

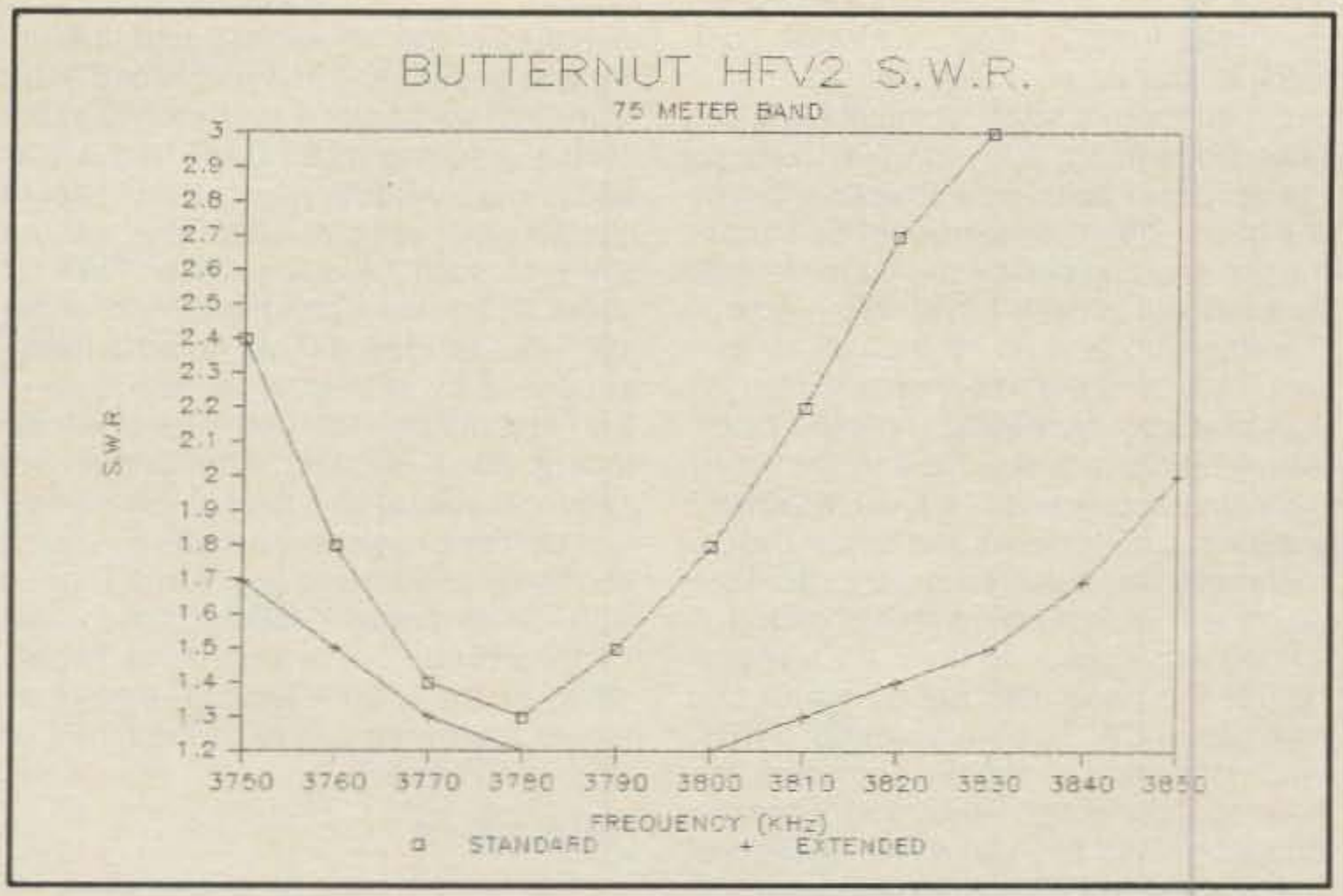


Fig. 1– SWR curve for the 75 meter band.

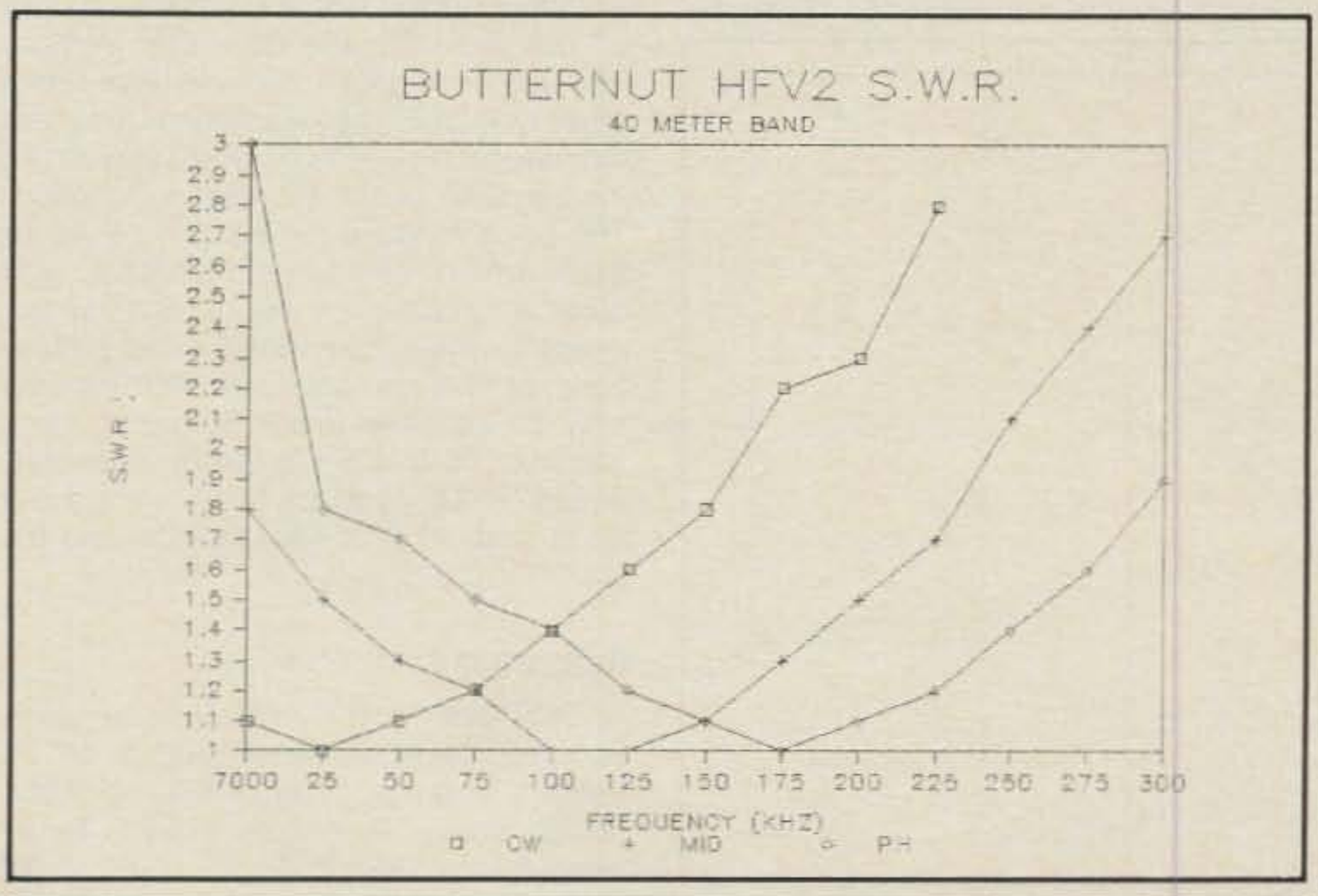
3750 kHz but the SWR was over 2.0:1 (the instructions had stated this would probably happen). It was the necessary to adjust the base matching coil (15 turns of #12 enameled copper wire 1⅛" in diameter, and 3 inches long) for the best SWR. As the installation had 27 radials, less inductance was required. It was necessary to cut several turns off of the coil as suggested by the instructions. The SWR curve is shown in fig. 1 and the 2.0:1 points are approximately 60 kHz as specified by the manufacturer.

As the HF2V is nearly a full quarter-wave length on 40 meters, tuning is not as critical as on 75 meters. The resonant point seemed to be way below the band so it was necessary to change the tap to short out eight turns rather than seven. By adjusting the 40 meter coil it is possible to set the antenna to favor portions of the band as shown in fig. 2. The CQ WW Phone Contest was at hand and I chose the phone setting for initial operation. During the contest the vertical performed well with all continents being worked on 40 meters (including Mellish Reef - VK9MR) and a number of European contacts on 75 meters.

Top Loading

One excellent feature of the HF2V is that top-loading[2] may be added to increase the 75/80 meter bandwidth and efficiency without severely affecting 40 meter operation. The Butternut instructions provide a full page on the subject, plus a diagram and bandwidth specifications for adding 4 twelve foot top-loading wires to the vertical. With this arrangement the bandwidth increases to 100 kHz on 75/80 meters and to 25 kHz on 160

Fig. 2– SWR curve for the 40 meter band.



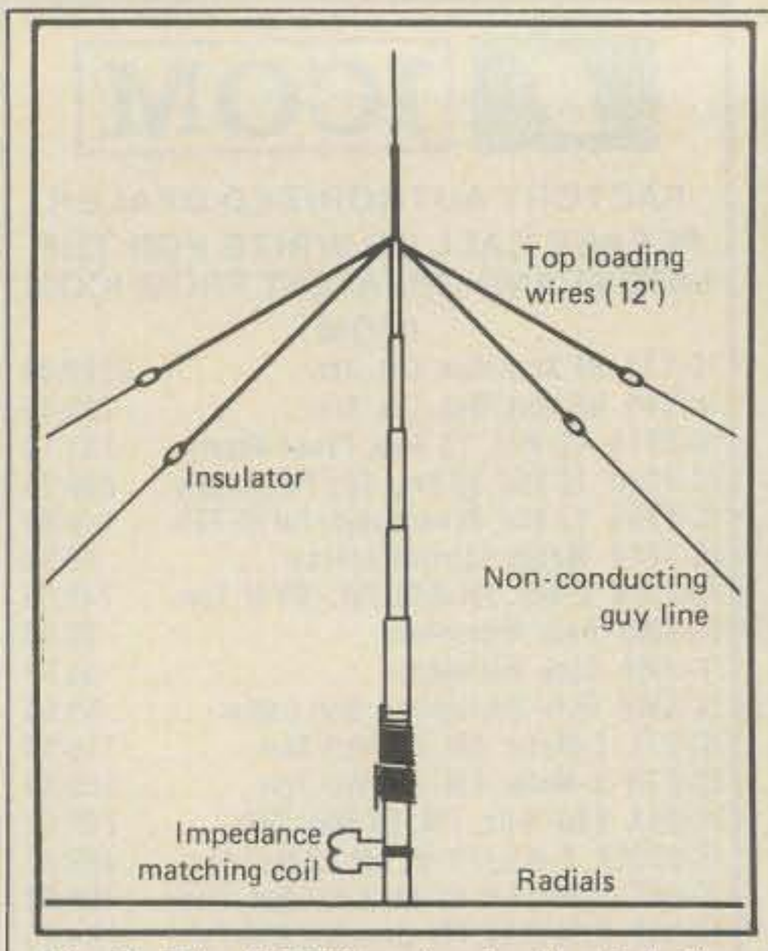


Fig. 3– The HF2V top-loaded installation.

meters (when the appropriate loading coil is used). From reading the instructions it was surmized that top-loading would have some effect on 40 meter operation which I found to be true. Fig. 3 shows the top loading suggested by Butternut.

As my installation was attached to a 10 foot high 4″ × 4″ post left over from a 75 meter vertical, I decided to replace the four foot section of ⅞″ tubing with a 12 foot length making the vertical 40 feet. This extension was used instead of top loading. With the bottom 10 feet secured to the post, the antenna is self supporting and no guy lines are needed. The tuning procedure was begun by shorting out 3 turns of the 80 meter loading coil as the inductance needed would be decreased. My guess was lucky and there was a nice SWR null at 3850 kHz. The coil compression was adjusted to place the null at 3800 kHz and a SWR curve was plotted as shown in fig. 1. The 70 kHz of 1.5:1 SWR is exactly what was desired.

On 40 meters the best initial SWR obtained was about 2.2:1 at 70001 kHz so the resonant point was obviously below the band. This was corrected by changing the shorting clip on the 40 meter coil to short out eleven turns. After experimenting with several settings on 40 meters, I realized that the increased length was probably increasing the impedance above 50 ohms and exhibiting the broad band characteristics of a ⅝ wave vertical antenna. I also noted that when the 75 meter coil was adjusted for 80 meters the 40 meter resonant point also changed. A setting was chosen to favor the CW portion of the band with the 80 meter coil also set for CW. To obtain a better SWR it was necessary to slightly compress the base matching coil which degraded the 80 meter SWR slightly. A comparison of the un-modified vertical vs extended vertical SWR on 40 meters is shown in fig. 4.

160 Meter Operation

After several weeks of using the HF2V I was anxious to try "top band" operation, so the 160 meter coil was ordered (TBR-160-S). The unit consists of a large coil (similiar to the 80 meter coil), two 200 PF ceramic capacitors, and a bracket to attach the unit to the base of the HF2V. The instructions state that the coil provides inductive reactance in series with the feedpoint to load the antenna, and that the coil produces capacitive reactance on 80 and 40 meters that raised the resonance point about 300 kHz on those bands. The instructions warn that 160 meter bandwidth is limited to 15–35 kHz and that the SWR will probably not be much less than 2:1 without affecting the other bands.

The coil was assembled and installed in less than an hour with the instructions again being excellent. The coil was set as specified in the instructions and the tuning was begun. The first try yielded a terrible SWR so the coil was stretched about 1 inch resulting in an SWR of 2.5:1 at 1800 kHz. Another half inch stretch placed resonance at 1815 kHz with an SWR of 1.8:1. A satisfactory SWR of about 2.4:1 was obtained from about 1808 kHz to 1833 kHz. As noted in the instructions it was then necessary to lower the resonant point on both 80 and 40 meters by about 300 kHz. After adding two 135 foot radials (for a total of 29) the final coil taps points were: 40 meters - 9 turns shorted and 80 meters - 2 turns shorted with the extended (loaded) antenna set for the CW portions of each band. The addition of the 160 meter coil has not affected the performance of the HF2V on 80 and 40 meters.

Performance

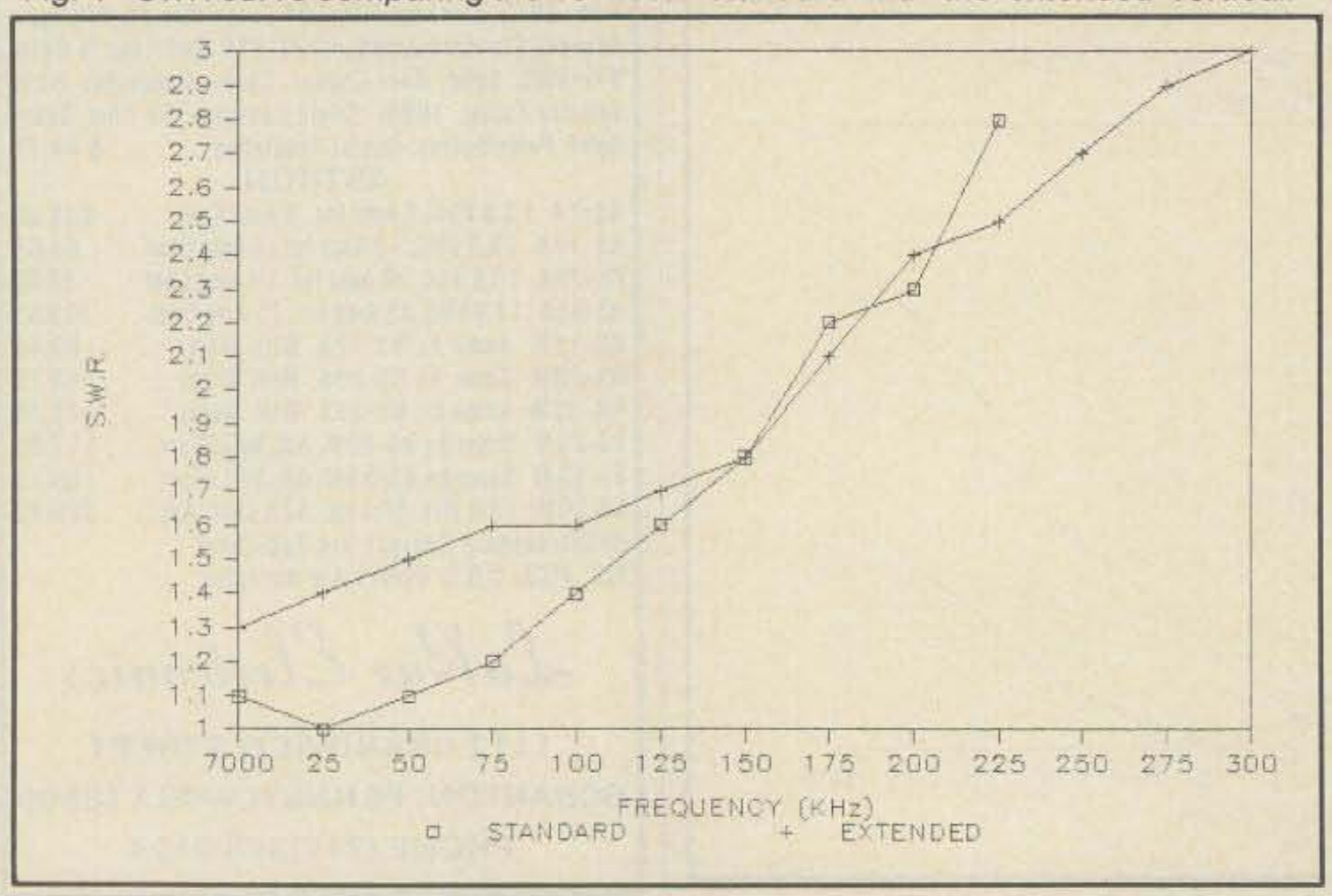
After several months of operation, results seem to be excellent. Several good contacts have been made over the 40 meter long path and coverage of the USA and Caribbean have also been good. The length extension has helped to make the HF2V a very competitive antenna on 80 and 75 meters where Europeans and the Pacific have been worked. On 160 meters, the West Coast, Canada, and the Caribbean were worked easily during the CQ WW CW Contest with 100 watts output.

The only disadvantage to using the antenna is that it does not cover both the 75 and 80 meter portions of the band without readjusting the coil, however other verticals do not even *have* the adjustment feature.

Conclusions

The HF2V vertical is an outstanding product with its main feature being versatility. It could be used as a primary antenna for 80 and 40 meters and can also operate on 160, 30 and 20 meters with available add-on kits. It could be used as an efficient 160 and 80 meter vertical with top-loading for those who have some other type of 40 meter antenna. It can be top-loaded in several different ways to fit the constraints of the operating location. The price range if the HF2V is $110 to $125 which compares favorably with other verticals. The HF2V vertical appears to meet or exceed all specifications of the manufacturer. Information may be obtained from Butternut Electronics, 405 E. Market Street, Lockhart, Texas 78644. If you are considering a low band vertical, this may be the one for you!

Fig. 4– SWR curve comparing the 40 meter standard with the extended vertical.



References

[1]CQ Reviews, The HF5V Vertical, John Schultz, W4FA, *CQ*, April 1982, p. 44.

[2]Top Loading, The ARRL Antenna Hand Book, American Radio Relay League Inc., 1980, p. 61.

HF Equipment	Regular	SALE
IC-735 Xcvr/SW rcvr/mic	849.00	**749.95**
PS-55 Power supply	TBA	
AT-120 Automatic antenna tuner	TBA	
FL-32 500 Hz CW filter	59.50	
EX-243 Electronic keyer unit	50.00	
IC-730 8-band 200w PEP xcvr w/mic	829.00	**569.95**
FL-30 SSB filter (passband tuning)	59.50	
FL-44A SSB filter (2nd IF)	159.00	**144.95**
FL-45 500 Hz CW filter	59.50	
EX-195 Marker unit	39.00	
EX-202 LDA interface; 730/2KL/AH-1	27.50	
EX-203 150 Hz CW audio filter	39.00	
EX-205 Transverter switching unit	29.00	
SM-5 8-pin electret desk microphone	39.00	
HM-10 Scanning mobile microphone	39.50	
MB-5 Mobile mount	19.50	
IC-720A 9-band xcvr/.1-30 MHz rcvr	1349.00	**799.95**
FL-32 500 Hz CW filter	59.50	
FL-34 5.2 kHz AM filter	49.50	
SM-5 8-pin electret desk microphone	39.00	
MB-5 Mobile mount	19.50	
IC-745 9-band xcvr w/.1-30 Mhz rcvr	999.00	**779.95**
PS-35 Internal power supply	160.00	**144.95**
EX-241 Marker unit	20.00	
EX-242 FM unit	39.00	
EX-243 Electronic keyer unit	50.00	
FL-45 500 Hz CW filter (1st IF)	59.50	
FL-54 270 Hz CW filter (1st IF)	47.50	
FL-52A 500 Hz CW filter (2nd IF)	96.50	**89.95**
FL-53A 250 Hz CW filter (2nd IF)	96.50	**89.95**
FL-44A SSB filter (2nd IF)	159.00	**144.95**
HM-10 Scanning mobile microphone	39.50	
SM-6 Desk microphone	39.00	
HM-12 Extra hand microphone	39.50	
MB-12 Mobile mount	19.50	

IC-751 9-band xcvr/.1-30 MHz rcvr	1399.00	**1199**
PS-35 Internal power supply	160.00	**144.95**
FL-32 500 Hz CW filter (1st IF)	59.50	
FL-63 250 Hz CW filter (1st IF)	48.50	
FL-52A 500 Hz CW filter (2nd IF)	96.50	**89.95**
FL-53A 250 Hz CW filter (2nd IF)	96.50	**89.95**
FL-33 AM filter	31.50	
FL-70 2.8 Khz wide SSB filter	46.50	
HM-12 Extra hand microphone	39.50	
SM-6 Desk microphone	39.00	
CR-64 High stability reference xtal	56.00	
RC-10 External frequency controller	35.00	
MB-18 Mobile mount	19.50	

Options: 720/730/745/751	Regular	SALE
PS-15 20A external power supply	149.00	**134.95**
EX-144 Adaptor for CF-1/PS-15	6.50	

ICOM

Options - continued	Regular	SALE
CF-1 Cooling fan for PS-15	45.00	
EX-310 Voice synth for 751, R-71A	39.95	
SP-3 External base station speaker	49.50	
Speaker/Phone patch - specify radio	139.00	**129.95**
BC-10A Memory back-up	8.50	
EX-2 Relay box with marker	34.00	
AT-100 100w 8-band automatic ant tuner	349.00	**314.95**
AT-500 500w 9-band automatic ant tuner	449.00	**399.95**
AH-1 5-band mobile antenna w/tuner	289.00	**259.95**
PS-30 Systems p/s w/cord, 6-pin plug	259.95	**234.95**
OPC Optional cord, specify 2 or 4-pin	5.50	
GC-4 World clock (Closeout!)	99.95	**79.95**

HF linear amplifier	Regular	SALE
IC-2KL w/ps 160-15m solid state amp	1795.00	**1299**

VHF/UHF base multi-modes	Regular	SALE
IC-551D 80 Watt 6m transceiver	699.00	**599.95**
EX-106 FM option	125.00	**112.95**
BC-10A Memory back-up	8.50	
SM-2 Electret desk microphone	39.00	
IC-271A 25w 2m FM/SSB/CW xcvr	699.00	**569.95**
AG-20 Internal preamplifier*	56.95	
IC-271H 100w 2m FM/SSB/CW xcvr	899.00	**759.95**
AG-25 Mast mounted preamplifier*	84.95	
IC-471A 25w 430-450 SSB/CW/FM xcvr	799.00	**699.95**
AG-1 Mast mounted preamplifier*	89.00	
IC-471H 75w 430-450 SSB/CW/FM xcvr	1099.00	**969.95**
AG-35 Mast mounted preamplifier*	84.95	

For a Limited time!
With the purchase of IC-271A/H or IC-471A/H get the matching Preamp* for just $1.00 extra.

Common accessories for 271A/H and 471A/H		
PS-25 Internal power supply for (A)	99.00	**89.95**
PS-35 Internal power supply for (H)	160.00	**144.95**
PS-15 External power supply	149.00	**134.95**
CF-1 Cooling fan for PS-15	45.00	
EX-144 Adaptor for PS-15/CF-1	6.50	
SM-6 Desk microphone	39.00	
EX-310 Voice sythesizer	39.95	
TS-32 CommSpec encode/decoder	59.95	
UT-15 Encoder/decoder interface	12.50	
UT-15S UT-15S w/TS-32 installed	79.95	

VHF/UHF mobile multi-modes		
IC-290H 25w 2m SSB/FM xcvr, TTP mic	549.00	**479.95**
IC-490A 10w 430-440 SSB/FM/CW xcvr	649.00	**579.95**

VHF/UHF/1.2 GHz FM	Regular	SALE
IC-27A Compact 25w 2m FM w/TTP mic	369.00	**319.95**
IC-27H Compact 45w 2m FM w/TTP mic	409.00	**359.95**
IC-37A Compact 25w 220 FM, TTP mic	449.00	**299.95**
IC-47A Compact 25w 440 FM, TTP mic	469.00	**419.95**
UT-16/EX-388 Voice synthesizer	29.95	
IC-3200A 25w 2m/440 MHz FM xcvr	549.00	**489.95**
IC-120 1w 1.2 GHz FM transceiver	499.00	**449.95**
ML-12 10w amplifier	339.00	**299.95**

6m portable	Regular	SALE
IC-505 3/10w 6m port. SSB/CW xcvr	449.00	**399.95**
BP-10 Internal Nicad battery pack	79.50	
BP-15 AC charger	12.50	
EX-248 FM unit	49.50	
LC-10 Leather case	34.95	
SP-4 Remote speaker	24.95	

Hand-held Transceivers

Deluxe models	Regular	SALE
IC-02AT for 2m	349.00	**289.95**
IC-04AT for 440 MHz	379.00	**289.95**
Standard models	Regular	SALE
IC-2A for 2m	239.50	**189.95**
IC-2AT with TTP	269.50	**199.95**
IC-3AT 220 MHz, TTP	299.95	**239.95**
IC-4AT 440 MHz, TTP	299.95	**239.95**

Accessories for Deluxe models	Regular
BP-7 425mah/13.2V Nicad Pak - use BC-35	67.50
BP-8 800mah/8.4V Nicad Pak - use BC-35	62.50
BC-35 Drop in desk charger for all batteries	69.00
BC-60 6-position gang charger, all batts **SALE**	359.95
BC-16U Wall charger for BP7/BP8	10.00
LC-11 Vinyl case	17.95
LC-14 Vinyl case for Dlx using BP-7/8	17.95
LC-02AT Leather case for Dlx models w/BP-7/8	39.95

Accessories for both models	Regular
BP-2 425mah/7.2V Nicad Pak - use BC35	39.50
BP-3 Extra Std. 250 mah/8.4V Nicad Pak	29.50
BP-4 Alkaline battery case	12.50
BP-5 425mah/10.8V Nicad Pak - use BC35	49.50
CA-2 Telescoping 2m antenna	10.00
CA-5 5/8-wave telescoping 2m antenna	18.95
FA-2 Extra 2m flexible antenna	10.00
CP-1 Cig. lighter plug/cord for BP3 or Dlx	9.50
DC-1 DC operation pak for standard models	17.50
LC-2AT Leather case for standard models	34.95
RB-1 Vinyl waterproof radio bag	30.00
HH-SS Handheld shoulder strap	14.95
HM-9 Speaker microphone	34.50
HS10 Boom microphone/headset	19.50
HS-10SA Vox unit for HS-10 & Deluxe only	19.50
HS-10SB PTT unit for HS-10	19.50
ML-1 2m 2.3w in/10w out amplifier **SALE**	79.95
SS-32M Commspec 32-tone encoder	29.95

Shortwave receiver	Regular	SALE
R-71A 100 kHz-30 Mhz digital receiver	$799.00	**659.95**
RC-11 Wireless remote controller	59.95	**49.95**
FL-32 500 Hz CW filter	59.50	
FL-63 250 Hz CW filter (1st IF)	48.50	
FL-44A SSB filter (2nd IF)	159.00	**144.95**
EX-257 FM unit	38.00	
EX-310 Voice synthesizer	39.95	
CR-64 High stability oscillator xtal	56.00	
SP-3 External speaker	49.50	
CK-70 (EX-299) 12V DC option	9.95	
MB-12 Mobile mount	19.50	

MasterCard VISA

Order Toll Free - Use your Credit Card!

HOURS • Mon. thru Fri. 9-5:30; Sat. 9-3
Milwaukee **WATS** line: **1-800-558-0411** answered evenings until 8:00 pm Monday thru Thursday.
Please use WATS lines for Ordering
use Regular lines for other Info and Service dept.

Order Toll Free: 1-800-558-0411 *In Wisconsin (outside Milwaukee Metro Area) 1-800-242-5195*

AMATEUR ELECTRONIC SUPPLY® Inc.

4828 W. Fond du Lac Avenue; Milwaukee, WI 53216 - Phone (414) 442-4200

AES BRANCH STORES — **Associate Store**

WICKLIFFE, Ohio 44092
28940 Euclid Avenue
Phone (216) 585-7388
Ohio WATS 1-800-362-0290
Outside Ohio 1-800-321-3594

ORLANDO, Fla. 32803
621 Commonwealth Ave.
Phone (305) 894-3238
Fla. WATS 1-800-432-9424
Outside Florida 1-800-327-1917

CLEARWATER, Fla. 33575
1898 Drew Street
Phone (813) 461-4267
No In-State WATS
No Nationwide WATS

LAS VEGAS, Nev. 89106
1072 N. Rancho Drive
Phone (702) 647-3114
No In-State WATS
Outside Nevada 1-800-634-6227

CHICAGO, Illinois 60630
ERICKSON COMMUNICATIONS
5456 N. Milwaukee Avenue
Phone (312) 631-5181
Outside Illinois 1-800-621-5802

Here's a good weekend project that will get you up and running on 30 meters.

How To Build a 80 And 30 Meter Trapped Dipole

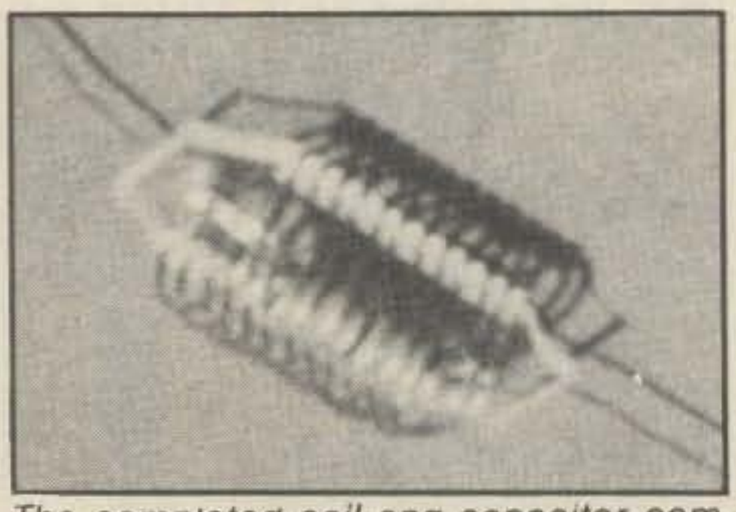
BY CHARLES C. BURKE*, WA2SLK

A few weeks ago I picked up my soldering pencil and went to work on my rig to add the 10 MHz, 30 meter band to it. The conversion was a success, but now an antenna was needed to go with it. I tried running it on my 80 meter dipole, using a tuner, but the results left a great deal to be desired. So, out came the reference texts and a calculator and within a few minutes a trap was designed which, if it worked, would permit operation on both 80 and 30 meters without a tuner. From the calculations it appeared that a good trap could be fabricated by building a tank circuit that would resonate on 10 MHz. This called for an 80 pf capacitor and a 3.2 uh coil. With these figures in mind an expedition was launched into the archaelogical junk heap which is made up of old parts and items one buys at hamfests, then can't figure out what to do with them later. Armed now with a fist full of parts, and the plan, a simple prototype trap was fabricated and installed on the 80 meter dipole. The results were good and after a few trial runs the SWR readings were around 1.5-1 on both 30 and 80 meters. The unit was then encapsulated in plastic tubing and installed permanently on the dipole. The total cost ran under $7.00 and actual fabrication time ran around two hours. Even if you had to buy everything the entire project could be completed for under $15.00.

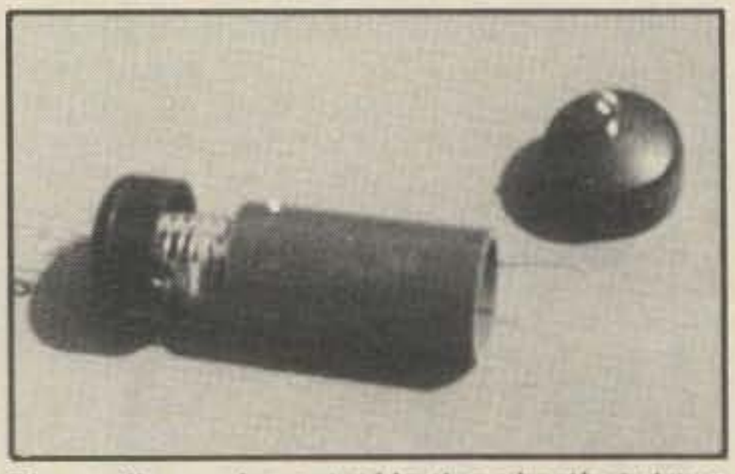
The steps needed to build the traps are simple and can be altered to meet the parts you have on hand. Start off by laying out the pattern on the ¼" plexiglass. The ½" radius cuts are added only to make treading the coil onto the form easier. Care should be taken to get the grooves even and safety glasses should be worn when doing the actual cutting. I made the slots on a table saw with a blade that was ⅛" wide. The coil is fabricated by wrapping the wire tightly around a 1 ⅝" cyclinder. The wire was obtained by stripping some 14 gauge Romex house-wire and the winding form was a bedpost in my daughters room. It is suggested that you get the wire as straight and as smooth as possible, as the coil will be hard to form if the wire is kinked. One way to get it smooth is to pull it over a slightly round edge several times. once you have made about 15 turns let the wire go and it should spring open just a bit. If the coil has about a 1 ¾" inside diameter then you're in the ball park.

The coil can be easily threaded onto the plexiglass-form by simply turning it. If it doesn't go on easily, try winding the coil in the opposite direction. Once it is in

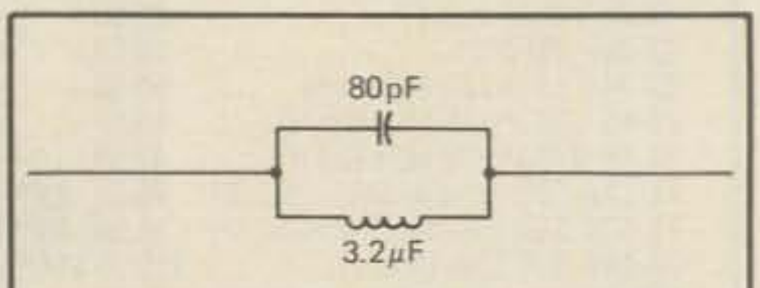
*RR1 Box 164A
Farmingdale, NJ 07727



The completed coil and capacitor combination.



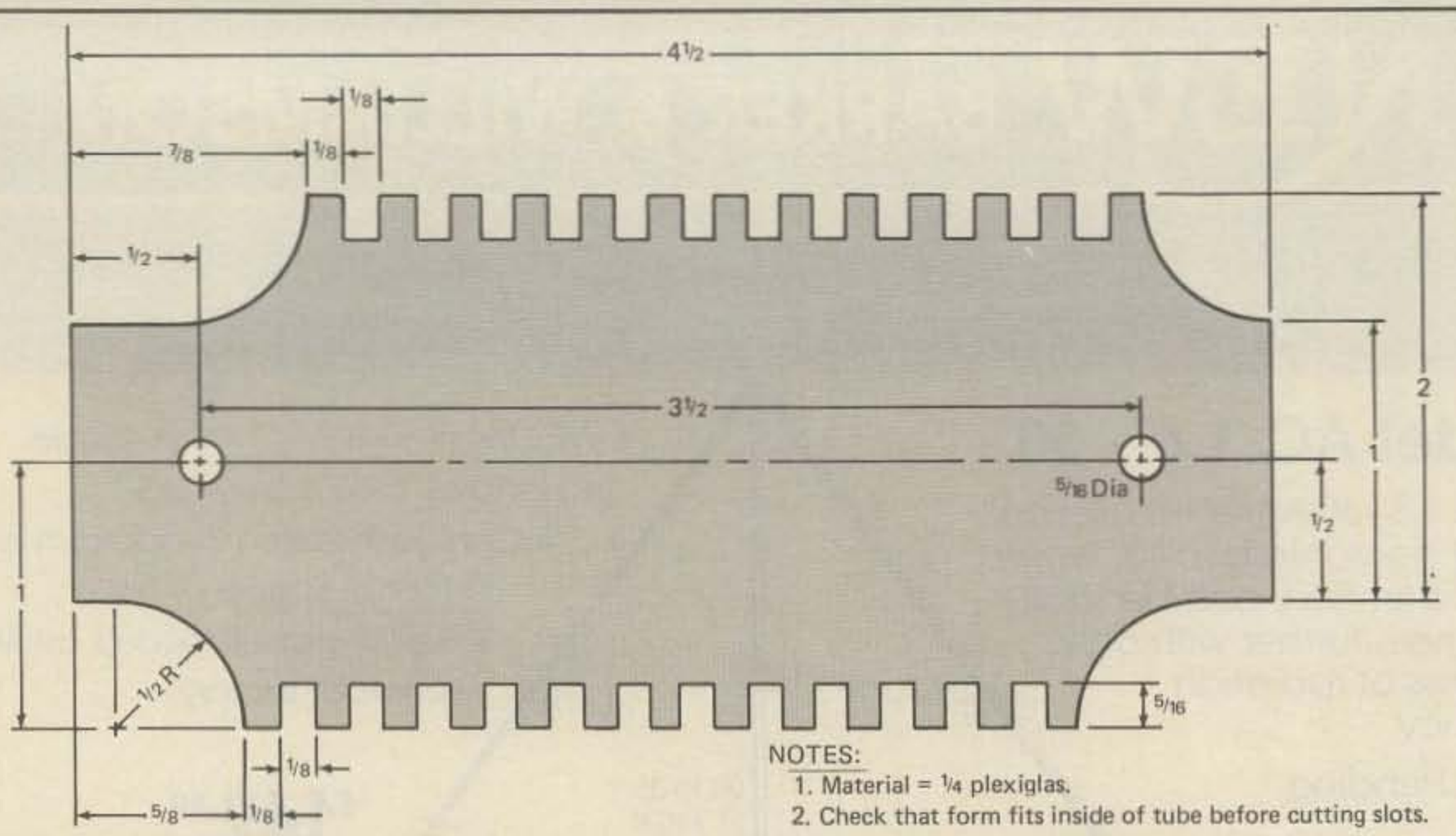
The coils are inserted in the plastic tubing as shown.



BILL OF MATERIALS

2–¼" × 4½" × 2" plexiglass
2–80 pf, 1.5 KV or higher transmitting capacitors (in the unit I built I used a 200 pf and a 150 pf capacitor in series to get approximately 80 pf. This is why two are seen in the picture.)
2–4½' lengths of 14 gauge copper wire, solid.
4–#6-32 × 1" round or pan head screws
4–#6-32 nuts
4– #6 flat washers
4–6" lengths of wire about the same gauge as your antenna wire
2–4" length of 2" ID plastic pipe
4–End caps for 2" plastic pipe AR-Pipe cement
4–#8 eye bolts and nuts

Fig. 1– Schematic diagram for the antenna trap. Two traps are required.



NOTES:
1. Material = ¼ plexiglas.
2. Check that form fits inside of tube before cutting slots.

Fig. 2– Mechanical drawing of the coil form. Two forms are required.

place, bend the ends down flat and turn a loop in the end. This loop will be wrapped around the machine screw used to fasten all of the parts together. It should be noted that both ends came out on the same side of the plastic so if they don't, check to make sure you have 11½ turns. Now insert the capacitor and tie the ends to each end of the coil using the #6-32 machine screws, nuts, and washers. At this point the tank circuit is complete but you might want to check it out with a grid-dip meter to see just where it is tuned to. Remember, if the circuit is tuned too low, you can increase the resonant frequency by making the coil shorter. So you might want to fine tune it by adjusting the coils length. If you don't have a grid-dip meter but follow the directions carefully, you should be close enough to get good results. Before tightening up the screws you should add a 6" piece of wire to the screws. These will be used to attach the trap to the actual antenna wire.

The unit should be tested on the antenna and if it is working, you can then proceed to encapsulate it. to check it out, measure about 26 feet down from the feed point on your dipole. Install the trap and begin testing it at that point. you will probably find that you will have to adjust it to a shorter length, but it is better to start out too long and cut off any excess once you find the correct length for you. With the help of my daughter, Lori, KA2SHN, the process took about 20 minutes to get the SWR reading to about 1.5 to 1. The length of the 80 meter portion can be cut down since the coil in the trap will electrically add length to the antenna. This will mean you not only have a dipole for both 30 as well as 80 meters but the whole thing will be a few feet shorter.

When you have the antenna tuned-up, the traps can be encapsulated to prevent the elements from attacking the components. This is done by cutting a 4 ½" length of 2" ID plastic pipe and sliding the trap inside of it. The holes are drilled into the end-caps and the eye-bolts attached. The caps are then pushed onto the pipe and the wire fed through the smaller holes on each end. If the fit looks good, add the cement and press both caps into place. By adding a drop of sealant such as GE silicon around the wire hole the unit should n ow be water tight. At this point you should be able to complete the installation by soldering the antenna wires to the trap wire. For a good mechanical fit the antenna wires should be looped and tied to the eye bolts. CQ

The completed traps.

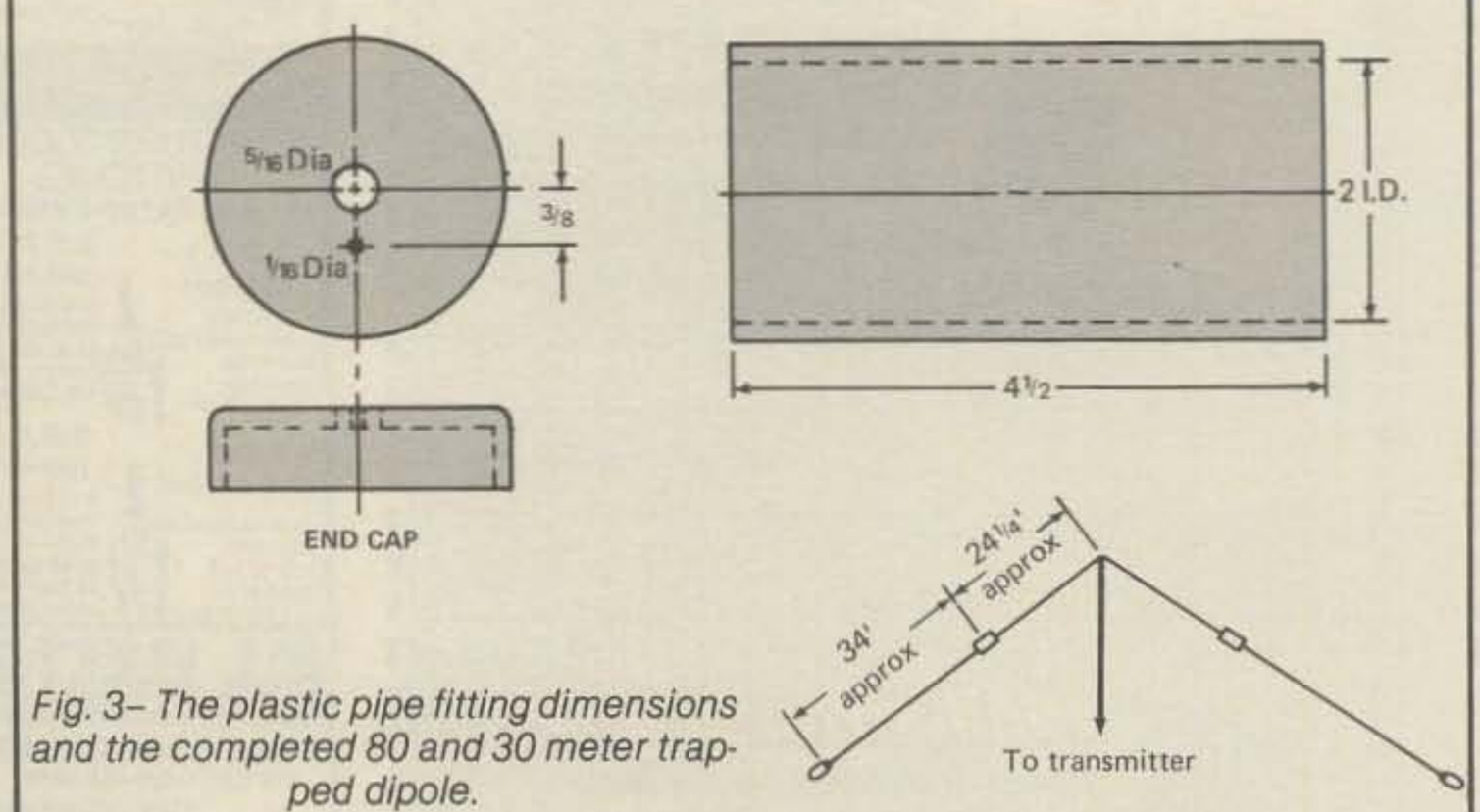


Fig. 3– The plastic pipe fitting dimensions and the completed 80 and 30 meter trapped dipole.

THE NEW MADISON AD.

PART TWO

New rigs and old favorites, plus the best essential accessories for the amateur.

EQUIPMENT

KENWOOD

TH21AT, 2 Mtr HT, shirt pocket size..... In Stock
TH41AT 70 Cm HT,
Companion to TH21AT ..... In Stock
Accessories for TH21 & TH41..... In Stock
TS711A, 2m, All Mode 25 Watt ..... Call
SM220 Station Monitor..... Call
TR7930, TR7950..... Call
TM211A, TM411A..... Call
R1000, R2000 Gen. Cov. Receivers ..... Call
TR2600A, Spare PB26,
Battery Pack free w/Purchase..... Call
HMC-1 Headset, with TR2600A only 19.95

OTHER EQUIPMENT

ICOM R71A..... 649.00
ICOM IC02AT 299.95
Tentec 2591..... 269.00
Mirage amps ..... less 12%
Ameritron RCS-8 remote coax switch 119.00
Dentron GLT1000C Tuner, 1KW, PEP.... 175.00
YAESU FT203R ..... Call

SERVICES

Alignment, any late model rig..... 50.00
Flat Fee Collins rebuild..... Call

ACCESSORIES

HEIL HC3/HC4/HC5 ..... Stock
HEIL SS-2 Powered Spkr 49.50
HEIL BM10-Boom Mike/Headset 53.95
HEIL HCS Control Box/Interface 89.95
CES 510 Smart Patch 349.00
FLUKE 77
auto-ranging digital multimeter..... 115.00
Alpha Delta MACC-8 Surge Protector 73.00
Nye 8 wire phone patch 82.00
Shure 444D Mic..... 49.95
Bird 43 Wattmeter + accessories ..... In stock
Bird 4240-300 Adaptor/Connector Kit 70.00
Daiwa CN620B, 20-200, 2000W 109.95
Tripplite PR25 Regulated PS,
25A/16A Continuous 99.95
Tripplite PR40 25A Continuous..... 149.95
Gordon West Code Tapes 9.95
Collins 500Hz Filter, F455J05, new..... 95.00
Sanyo AA Nicads..... 2.00

KEYS

Bencher & Vibroplex ..... Less 10%

AEA

New Products In Stock
MP-1 CW-RTTY-AMTOR Interface..... 134.95
CP-100 (More features than CP-1)..... 319.95
ATU-1000
Military/Commercial Interface 1199.95
Dr. DX 89.95
Dr. QSO 79.95

Alpha Delta MACC..... 73.00
Master AC Control Console for Control of Entire Station or Independent Circuits. Eliminates Wear of Equipment Switches. Best circuit protection of any industry unit. Surge/Transient Protection Built-in.

OPTIONS

MBA-TOR (Includes Amtor & features)..... 30.00
SWL Text (Special SWL Software) 30.00

TI-I Tuning indicator..... 84.00

BOOKS

Hayden, Computer Programming
for Amateur Radio..... 16.95

TUBES

GE6146B 11.95
GE572B 62.00
Eimac 3-500Z..... 99.95
GE Industrial Tubes..... Call
GE 12BY7A..... 6.00

ANTENNAS

AR2XB, V2S, 2MCV-5, ISOPOLE..... 44.95
A3 ..... 219.95
A4 ..... 289.95
402CD 279.95
Omni 2J,
2M 1/2 Wave Mobile/Portable 39.95
Omni 400 1/2 Wave Mobile/Portable 39.95
Hustler 6BTV 129.95
G7-144..... 119.95
Cushcraft A147-11 ..... 49.95
215WB New, 15L, 2M Beam 79.95
A147-4 ..... 29.95
AOP-1, Complete Oscar Antenna..... 149.95
Butternut HF6V, 80-10 Vertical 125.00
HF2V, 80 & 40 Vertical 125.00

BARKER & WILLIAMSON

All Band B & W Dipoles..... Less 10%

HY-GAIN

HG52SS..... 1099.00
Ham 4 Rotator..... 219.95
Ham T2X 269.95
HY-Gain accessories shipped prepaid from the factory with tower orders.

KLM

KT34A..... 349.95
JV2X 2 Meter Vertical 32.00
2M13LBA..... 79.95
2M14C..... 88.00
2M22C..... 119.95
2M16LBX..... 99.95
432-30LBX..... 96.00
435-18C..Incl. CS-2 ..... 116.95
435-40X 159.95
432-16LB..... 68.00
HF World Class Series Antennas..... Call Don

OTHER ANTENNAS

Larsen Kulduck 17.00
Larsen Cellular Antenna ..... Stock
Valor 75-10M complete mobil antenna 79.95
Avanti ASP151 3G thru glass 2M 33.00
Anteco 2M, 5/8, Mag. Mount, Comp. 25.00
Metz SW-1, SWL Ant. 5Hz. – 54Mhz. 59.95

SURPLUS

CDE 2 Pole DT Relay,
10 Amp. Enclosed (New)..... 5.00
2.5A/1000PIV
Epoxy diode.....29c. Each or 19.00/100
Grainwheat 12V Lamps ..... $ .50
.0015/10KV..... $1.95
455 KHZ IF Transformer..... .49
3N201..... .95

BELDEN

9528RG8X ..... .19/ft
9913 low loss, solid center,
foil/braid shield ..... 50c/ft.
8214 RG8 Foam..... 43c/ft.
8237 RG8 ..... 40c/ft.
8267 RG213 ..... 52c/ft.
8000 14Ga stranded copper ant. wire..... 13c/ft.
8448 8 conductor rotor cable..... 31c/ft.
9405 Heavy duty, 2-16 Ga. 6-18 Ga. ..... 52c/ft.
9258 RG8x..... 19c/ft.
8403 Mic Cable, 3 condctr & shield..... 80c/ft.
100 Feet 8214 w/ends installed..... 45.00

ROHN

FK2548, 48ft, with guy bracket, rotor shelf,
eave bracket and M200H mast. 999.00
1/4" E.H.S. Guy cable,
Rohn US, 1000 ft. 250.00
3/16" E.H.S. cable 210.00
1/4" Guy Cable, 6100# 7x7 strand 15c/ft
3/16 Guy Cable, 3700# 7x7 strand 12c/ft
Premax Ground Rods, Heavy Copper Plating,
3/8, 1/2, 5/8, 3/4 Inches dia.
4-8 ft. in Length..... Stock
3/8 x 6 E&J Turnbuckle..... 7.95
3/16" Wire Rope Clips..... .40
1/4" wire clips ..... .50
Porcelain 500D Guy Insulator (3/16)..... 1.69
Porcelain 502 Guy Insulators (1/4) 2.99

USED EQUIPMENT

All equipment, used, clean, with 90 day warranty and 30 day trial. Six months full trade against new equipment. Sales price refunded if not satisfied. Always Excellent Used Collins.

POLICIES.

Minimum order $10.00. Mastercharge, VISA, or C.O.D. All prices FOB Houston, except as noted. Prices subject to change without notice. Items subject to prior sale. Call anytime to check the status of your order. Texas residents add sales tax. D'ats all, folks.

DON'S CORNER

This month, Madison moves to newer and more luxurious quarters, with our new address at 3621 Fannin St. in Houston. Those of you who visited us at our old location on McKinney will greatly appreciate the increased parking, etc. etc. We'll miss our "legendary" McKinney location, but new times demand new store space, and we fully intend to keep up with the times.

New times also demand new modes of communicating to you, our customers, and so we continue to work on our MADISON/LINE Bulletin board. We're running a little behind on getting phone lines installed, and hardware up-and-running because of the move, but we should have all that ironed out shortly.

In the meantime, if you have any questions

DON

MADISON
Electronics Supply
3621 FANNIN
HOUSTON, TEXAS 77004
CALL FOR QUOTES **1-800-231-3057**
NEW TEXAS NUMBER: **1-713-520-7300**
(AFTER JUNE 1)

CIRCLE 146 ON READER SERVICE CARD

With 160 meters becoming very popular, W3ESU shows us what can be done with antennas using experimentation and ingenuity.

The Minipoise

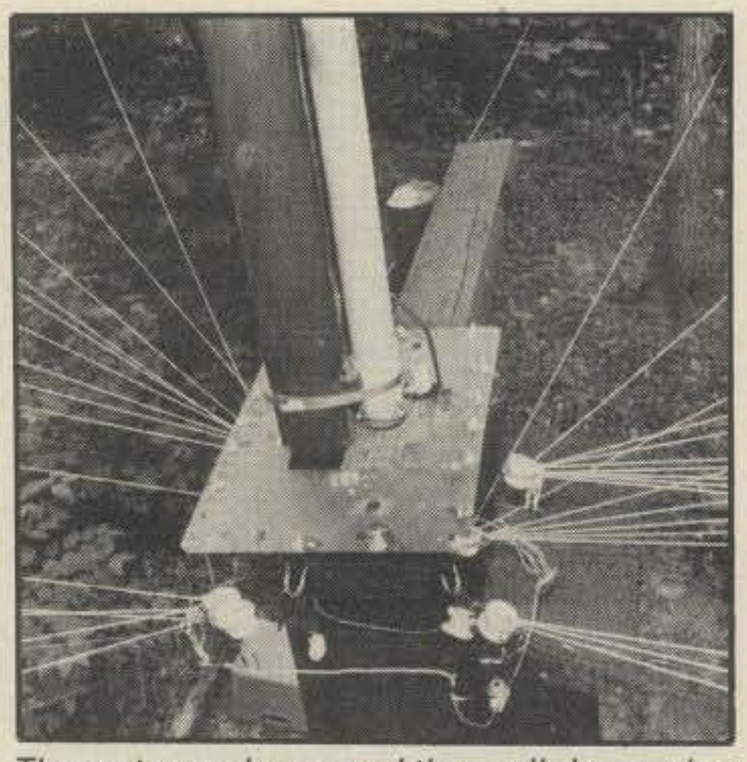
A Small But Efficient Low Frequency Antenna

BY JOHN A. FREY*, W3ESU

Information was presented in the April 1984 issue of CQ on the results of an extensive test program that found elevated ground systems to be unusally efficient when used with vertical antennas.

The "Minipoise"– a short vertical antenna operated with a small counterpoise ground system– has now been constructed, using the technology derived from that test program. This produced an antenna that is ideal for suburban yards.

The following material presents the results of technical and on-the-air testing of the Minipoise, and gives construction data for 40, 80 and 160 meter versions of this highly efficient small antenna.



The antenna base and the radials coming into it.

The wooden support system also has a control box as described in the text.

Many amateurs avoid our lower frequency bands because conventional wisdom holds that the required antenna dimensions and ground system for those bands far exceed the limits of the average back yard.

Specifically, a classic vertical antenna is ¼ wavelength high— over a ground system of 120 buried radials, each radial being ¼ wavelength or more in length. Cost, available space and aesthetic questions present overriding limitations on installations of this type.

A recent reexamination of available theoretical and experimental data, old and new, provides hope for the city or suburban amateur with an interst in the lower bands. This is particularly important now, as the sunspot trend reduces activity on higher frequencies.

Design Options and Criteria

Investigation of improved ground systems for vertical antennas at Fletcher, North Carolina employed a 65 foot high, top loaded, vertical (later increased to 130 feet) with radials totaling 7,400 feet in length[1].

160 meters was chosen as the design and investigation band for that research program for two reasons: first, it was the worst-case condition (lowest frequency), and second, it suited the operating intersts of the investigators.

While efficient, this installation represents a greater investment in time, real estate and money than is available to the average Amateur. The research involved in that test program, however, led to the development of the Minipoise antenna system.

At the inception of the program it was decided that the design criteria for the Minipoise would include:

- Ease of erection
- Use of readily availble materials
- Low cost
- No special tools or construction skills.
- The antenna should be reasonably unobtrusive and "neighborhood acceptable."
- Electrical design would closely follow the work done on the full sized Fletcher antenna.
- The radial system would be limited to a square 100 feet on a side, or an approximately equal area fitted within the available lot.
- Designed to use commercially available trap vertical antennas.

With the above in mind, the Minipoise antenna system was designed on the basis of the following considerations:

Ground Radials: The return current distribution found in the (one and one half acre) elevated ground system of the Fletcher antenna suggested that excellent results might be obtained with a radial system of much shorter wires than previously thought possible. Only small levels of induced current ("return currents")

841 Greenwood Drive
Hendersonville, NC 28739

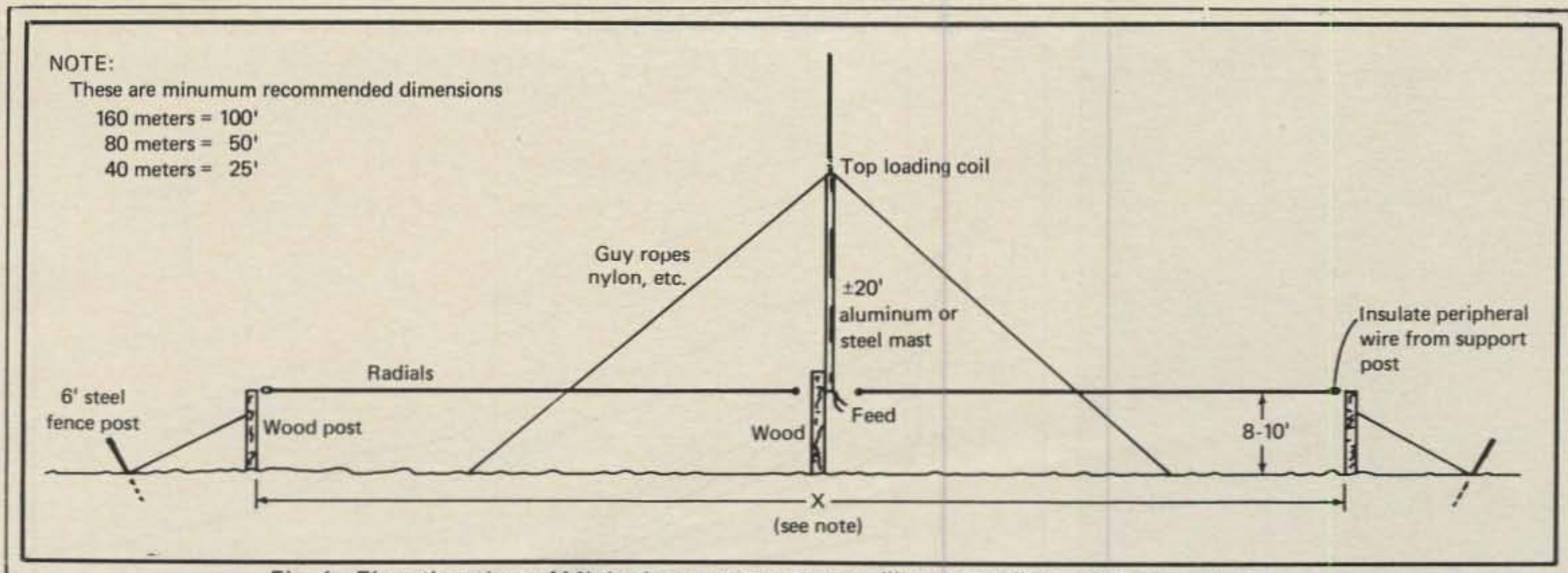
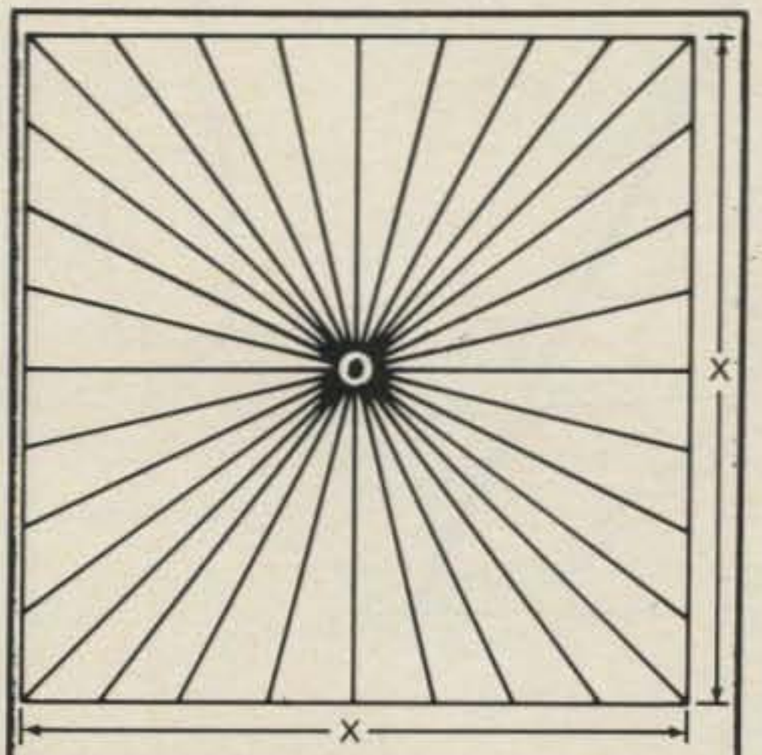


Fig. 1– Elevation view of Minipoise antenna system illustrates dimensions for antenna and counterpoise system.



NOTES:

1. Center ring and peripheral wire are # 12 or # 14 copperweld.
2. Radial wire is copper or copperclad wire. Not critical.
3. Entire structure is 8' to 10' above ground, and insulated from ground.
4. All radial wires soldered to peripheral wire and to center ring.

Fig. 2– Plan view (from above) of counterpoise. See fig.1 for "X" dimensions.

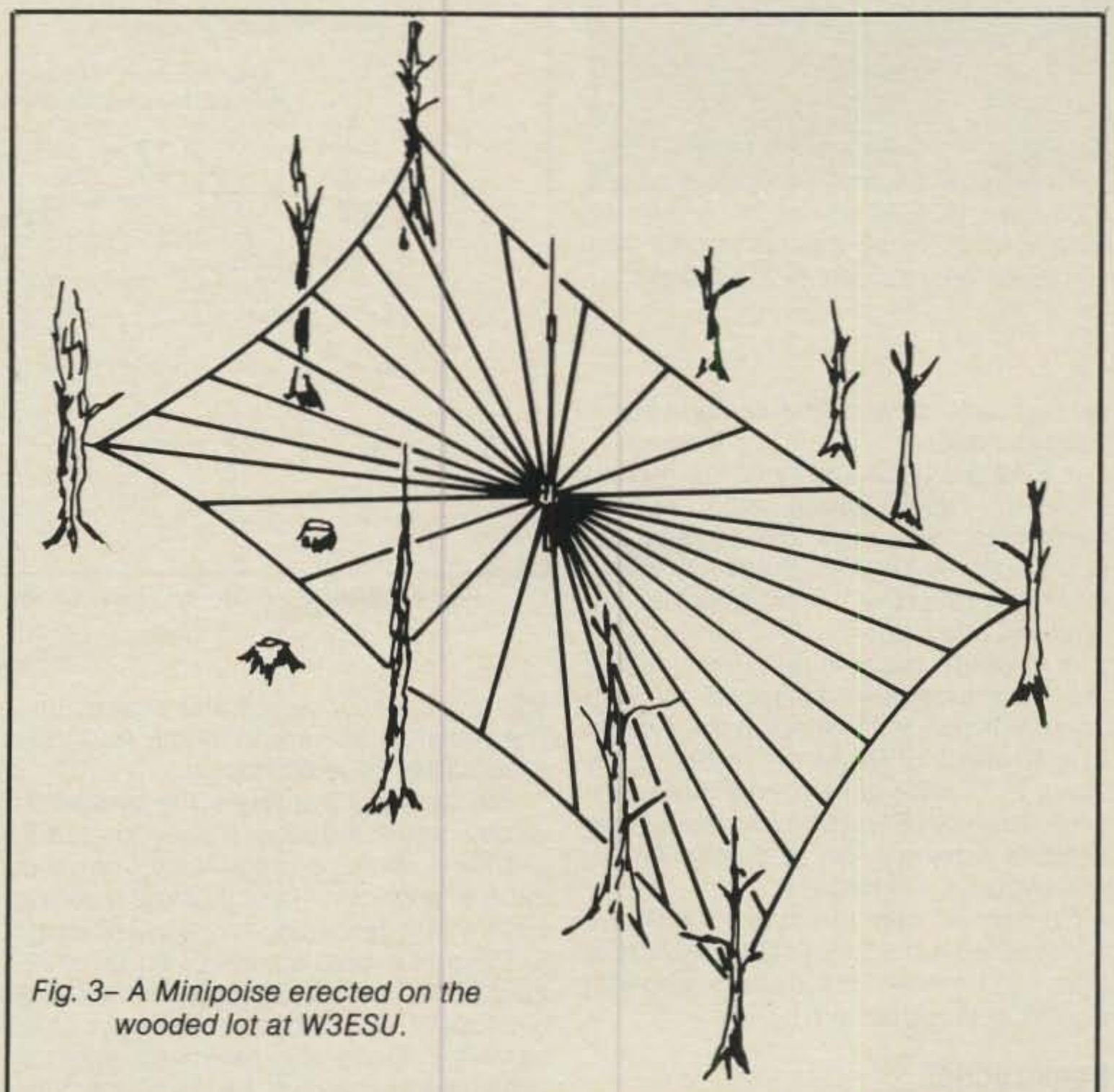


Fig. 3– A Minipoise erected on the wooded lot at W3ESU.

were noticed on most of the wires further than 50 to 75 feet from the antenna (ie, about ⅛ wavelength). This suggested that a good portion of the radials were not "working" to collect return currents, and that their length might thus be reduced.

The previous study also showed that a counterpoise or ground screen of less than 50 radials provided a very efficient return path for displacement currents, and might offer performance substantially equal to that of the conventional 120 buried radials.

Antenna: Much has been written about short vertical antennas. Brown[2] in 1937, found that "...an antenna of infinitesimal length, subject to no losses, yields a field strength which is only 4.25 per cent less than the field from a quarter-wave antenna." Short vertical radiators, however, present loading and feedline problems as well as very restricted bandwidths in practical use.

Site: Ideally, the test Minipoise would have consisted of a short vertical radiator erected in the center of a level piece of land. For 160 meter operation, as shown in figs. 1 and 2, tha radial wires should, ideally, have covered an area 100 × 100 feet. The back yard at W3ESU, however, is not of the ideal dimensions; it contains numerous trees and shrubs and it is on a 13 degree slope!

Therefore, compromises had to be made in the size and shape of the radial system, as illustrated in fig. 3.

Testing

Instrumentaion was employed during construction of the antenna to check the performance of the system and to:

- Determine the practical minimum number of radials needed.
- Find the length of radials required for acceptable performance.
- Determine the advantage, if any, of a counterpoise (insulated) radial system

John Frey, W3ESO on the left and Harry Mills, K4HU, taking measurements and making adjustments to the system.

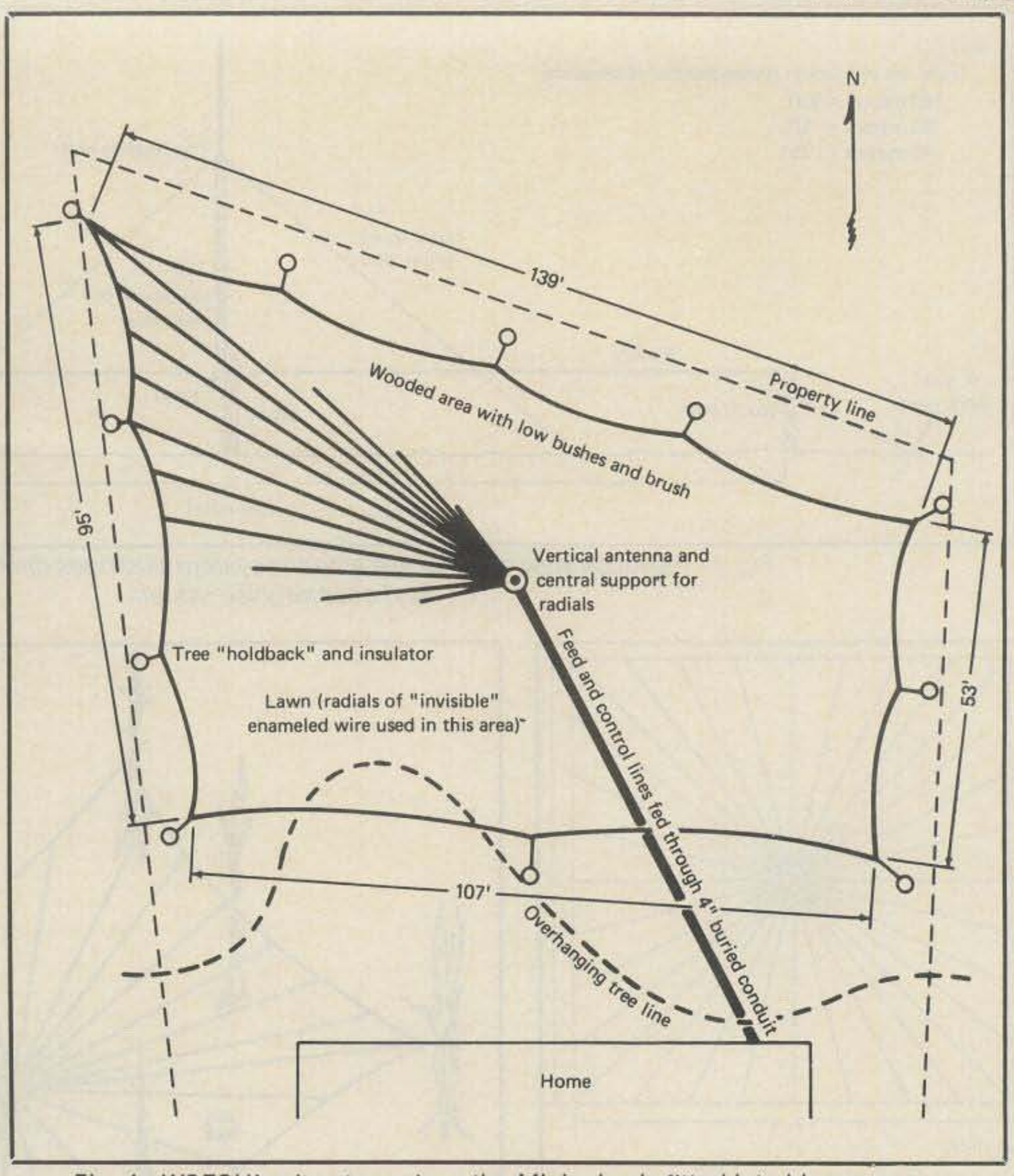


Fig. 4– W3ESU's site shows how the Minipoise is fitted into his property.

vs. a ground screen (the same system, but grounded).

• Find the conductivity of the ground under the radial system using Sevick's method[3] (but with the additon of an isolation transformer in the 120 volt A.C. line to improve reliabilty, reproducibility of readings and safety).

• Measure radial wire currents using the magnetometer described by Ken Carr, W0KUS[4], while feeding the system with 10 watts of RF at the resonant frequency. Incidentally, measurements taken less than 5 feet from the base of the antenna were too low to be significant, and were not charted.

All on-the-air testing occured with the antenna fed with 95 feet of RG-8AU cable from an "L match" in the shack, and with a SWR or less than 1.2:1.

Construction

Ground System: As mentioned previously, W3ESU's back yard site required that the radial ground system fit into an oddly shaped and sloping area.

Fig. 4 shows the dimensions and construction techniques used for the counterpoise. As shown, the 400 feet of perimeter wire for the ground system was supported and insulated from a number of convenient trees and formed a trapezium covering approximately 8,000 square feet (less than one fifth of an acre).

The vertical antenna is mounted on a central wooden frame which also supports the inner ends of the radial wires, and a shelter for relays and equipment. The radial wires vary in length from approximately 35 to 90 feet.

The base of the antenna, the perimeter wires and the radials are all supported 8 to 10 feet above, and insulated from, the earth's surface. Thus they do not interfere with gardening and lawn mowing.

The radial wires are either No. 20 or 22 gauge (B&S) insulated copper wire (used because it was found at low cost at a hamfest). Since the perimeter wire is quite heavily stressed, No. 19 gauge copper clad steel electrical fence wire ($12 for a quarter mile) was used. All connections are soldered.

Enameled copper wire was later substituted for the insulated wire over lawn areas because it was found to be almost invisible— a great improvement as far as the XYL and the neighbors are concerned!

No concerted effort was made to prevent radial wire contact with leaves and branches, although when greenery grew too thick, a bit of pruning was done here and there.

Vertical Radiator: Much has been written about easily constructed, short, top loaded vertical antennas. One outstanding article by Barry Boothe, W9UCW[5] provides design, construction and adjustment information for various heights and situations. The Minipoise radiator was built in accordance with this basic design.

160 Meters

We made the 160 meter version of the Minipoise from a 24 foot length of 2 inch aluminum tubing left over from an old tribander. However, EMT conduit, "TV Masting", 4 inch galvanized downspouting or similar materials are suitable.

The length of the supporting mast up to the coil and resonator is up to the builder. The higher the better, consistant with cost, safety considerations, aesthetics and available material. Fig. 5 provides details of the installation.

The supporting framework uses 4″ × 5″ × 8′ treated "landscape timbers," spliced as necessary, bolted together and set in ready-mix cement.

One upright is probably sufficient, but the second upright and top crossbar stabilizes the mount and provides a convenient platform for mounting the radiator, as well as a secure place bet-

No-33-34

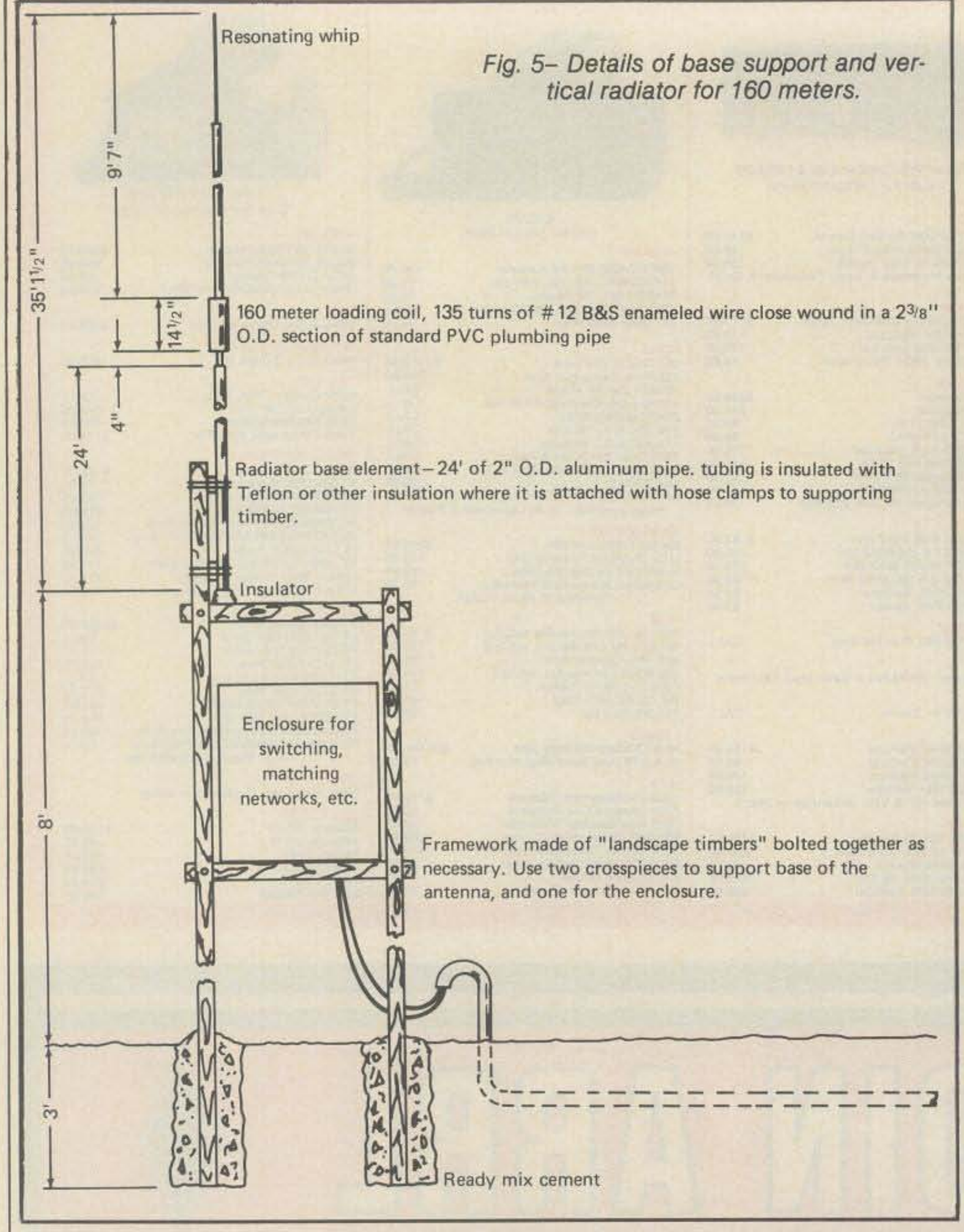


Fig. 5– Details of base support and vertical radiator for 160 meters.

The equipment used to make ground conductivity measurements described by Sevick.

ween the two for an enclosure. This is a handy place to locate the matching networks for additional bands, and for grounding and lightening protection devices.

160, 80, 40 Meter Tribanders

After reviewing this article Barry Boothe, W9UCW, has suggested top loaded vertical antenna designs for 80 and 40 meter versions of the Minipoise. Details of these designs are shown in fig. 6. It should be noted that any good commercial trap vertical antenna that covers 160, 80 and 40 meters can be used in placed of the "home brew" radiators described.

Matching

While no problem was encounterd in feeding the short vertical antenna, frequency adjustment of the matching network is required if the SWR is to remain below 2:1 as one moves down the band (2:1 points are at approximately plus and minus 10 kHz).

Coordinated work on a "folded unipole" configuration of vertical antennas by the author and others indicates that this design provides considerably greater bandwidth for both electrically short and ¼ wavelength, verticals. Since the base of a vertical folded-unipole radiator is grounded, no base insulator is needed (allowing easy application of its feed system to existing antennas). Better protection form lightning damage is also a real advantage. The basic folded unipole vetical is described in some detail by Capt. P.H. Lee, N6PL[7].

Test Results

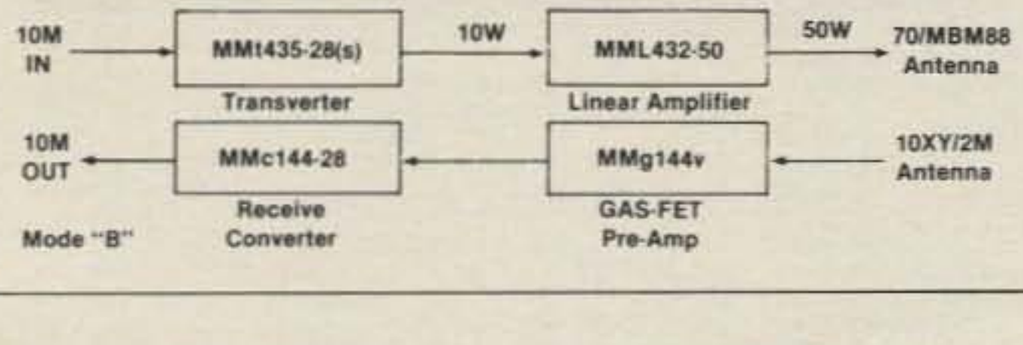
While reporting on the behavior of an antenna system, and evaluation of on the air performance is both subjective and difficult, careful control during testing permitted some reasonable conclusions to be drawn:

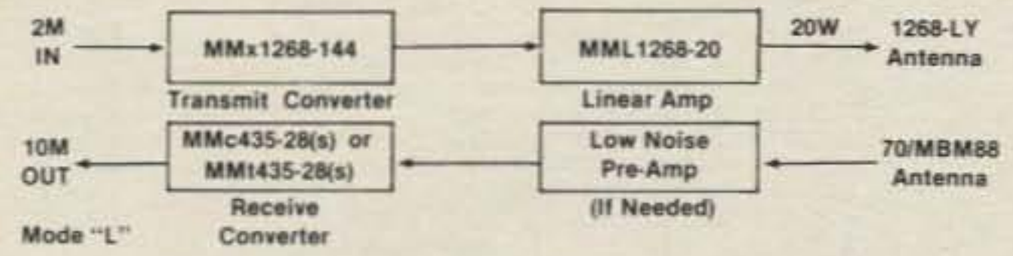
• During the first part of the test program the radial wires were operated, for comparison purposes, insulated from the peripheral wire. Later they were soldered to that wire. It was determined that connecting all radials to the peripheral wire definitely improves performance.

• The radials were for a short time, connected into four distinct quadrants (NE, SE, SW and NW) and relay controlled so that all quadrants, or any combination, could be used. Careful testing with this configuration showed that attempts to "skew" (point) the radiation pattern by switching radial quadrants were generally ineffective.

• Current distribution was measured along the radials. Fig. 7 shows the interesting return current distribution found. As the result of these measurements, it was concluded that the highly variable pattern of radial return currents found in the larger Fletcher antenna was again ev-

OSCAR SYSTEMS
From Spectrum International





MMg 144v	$ 49.95	10XY-2M	69.95
MMc 144-28	59.95	70/MBM88	89.95
MMc 435-28(s)	89.95	1268-LY	49.95
MMt 144-28	179.95		
MMt 435-28(s)	289.95		
MMx 1268-144	249.95		
MML 432-50	199.95		
MML 432-100	369.95		
MML 1268-20	ask		

Send 44¢ (2 stamps) for detailed specifications on all VHF/UHF products.

Spectrum International, Inc.
Post Office Box 1084Q
Concord, MA 01742 USA

CIRCLE 63 ON READER SERVICE CARD

AMATEUR TELEVISION

KPA5 1 WATT 70 CM ATV TRANSMITTER BOARD

- **APPLICATIONS:** Cordless portable TV camera for races & other public service events, remote VCR, etc. Remote control of R/C airplanes or robots. Show home video tapes, computer programs, repeat SSTV to local ATVers. DX depends on antennas and terrain typ. 1 to 40 miles.
- **FULL COLOR VIDEO & SOUND** on one small 3.25x4" board.
- **RUNS ON EXTERNAL 13.8 VDC** at 300 ma supply or battery.
- **TUNED WITH ONE CRYSTAL** on 426.25, 434.0, or 439.25 mHz.
- **2 AUDIO INPUTS** for a low Z dynamic and line level audio input found in most portable color cameras, VCRs, or home computers.
- **APPLICATION NOTES** & schematic supplied for typical external connections, packaging, and system operation.
- **PRICE ONLY $159** delivered via UPS surface in the USA. Technician class amateur license or higher required for purchase and operation.

WHAT IS REQUIRED FOR A COMPLETE OPERATING SYSTEM? A TV set with a TVC-2 or TVC-4 420-450 mHz to channel 3 downconverter, 70 cm antenna, and coax cable to receive. Package up the KPA5, add 12 to 14 vdc, antenna, and any TV camera, VCR, or computer with a composite video output. Simple, eh?

CALL OR WRITE FOR OUR COMPLETE CATALOG & more info on atv downconverters, antennas, cameras, etc., or who is on in your area.

TERMS: Visa, Mastercard, or cash only. UPS COD by telephone or mail. Telephone orders & postal MO usually shipped within 2 days, all other checks must clear before shipment. Transmitting equipment sold only to licensed amateurs verified in 1984 Callbook. Calif. include sales tax.

CIRCLE 118 ON READER SERVICE CARD

(818) 447-4565 m-f 8am-6pm pst.

P.C. ELECTRONICS
Tom W60RG Maryann WB6YSS

2522 Paxson Lane
Arcadia CA 91006

QUATRON

NEW

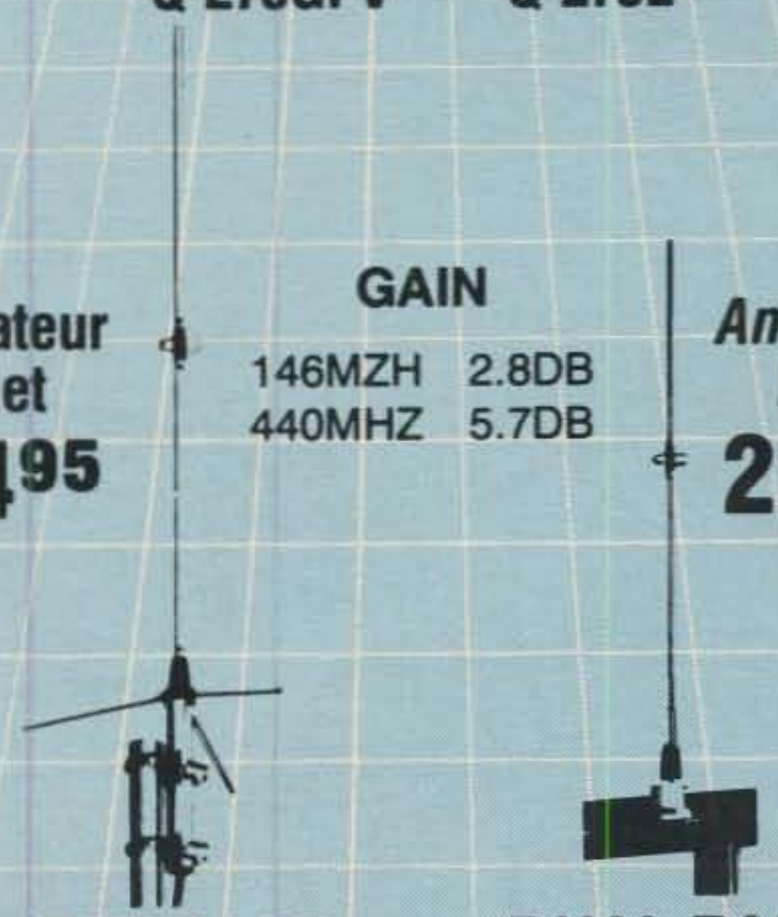
DYNAMIC DUO **** BANDERS

Great Combo For New Dual Band Rigs
Q-270GPV Q-270E

Amateur Net 54.95

GAIN
146MZH 2.8DB
440MHZ 5.7DB

Amateur Net 22.99



FIRST BASE STATION DUAL BANDER

DUAL BAND MOBILE

NEW PRODUCTS AND ACCESSORIES

GPV-23	146 MHZ TRIPLE 5/8 WAVE 7.8DB
Q-GSS	GUTTER MOUNT
Q-HS770	DUPLEX BOX 146/440 MHZ
Q-70E	440 MHZ MOBILE
Q-2NE	146MHZ 5/8 MOBILE
Q-2MM	1/4 WAVE MAG MOUNT
Q-MG5C	MAG MOUNT
Q-RG4M	HOLE MOUNT

TO ORDER OR FOR YOUR NEAREST DEALER CALL:

QUATRON
485 EAST MILL ST.
LIBERTY, MO. 64068
816-587-5300

CIRCLE 79 ON READER SERVICE CARD

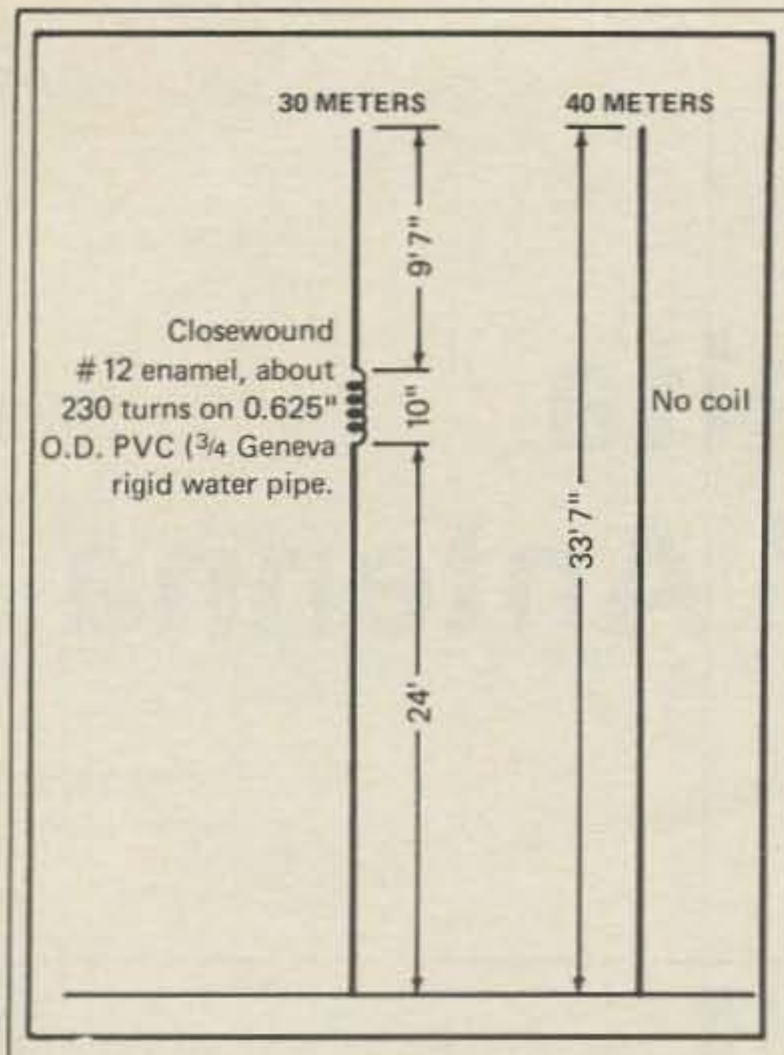


Fig. 6– Vertical Radiators for 80 meters and 40 meters.

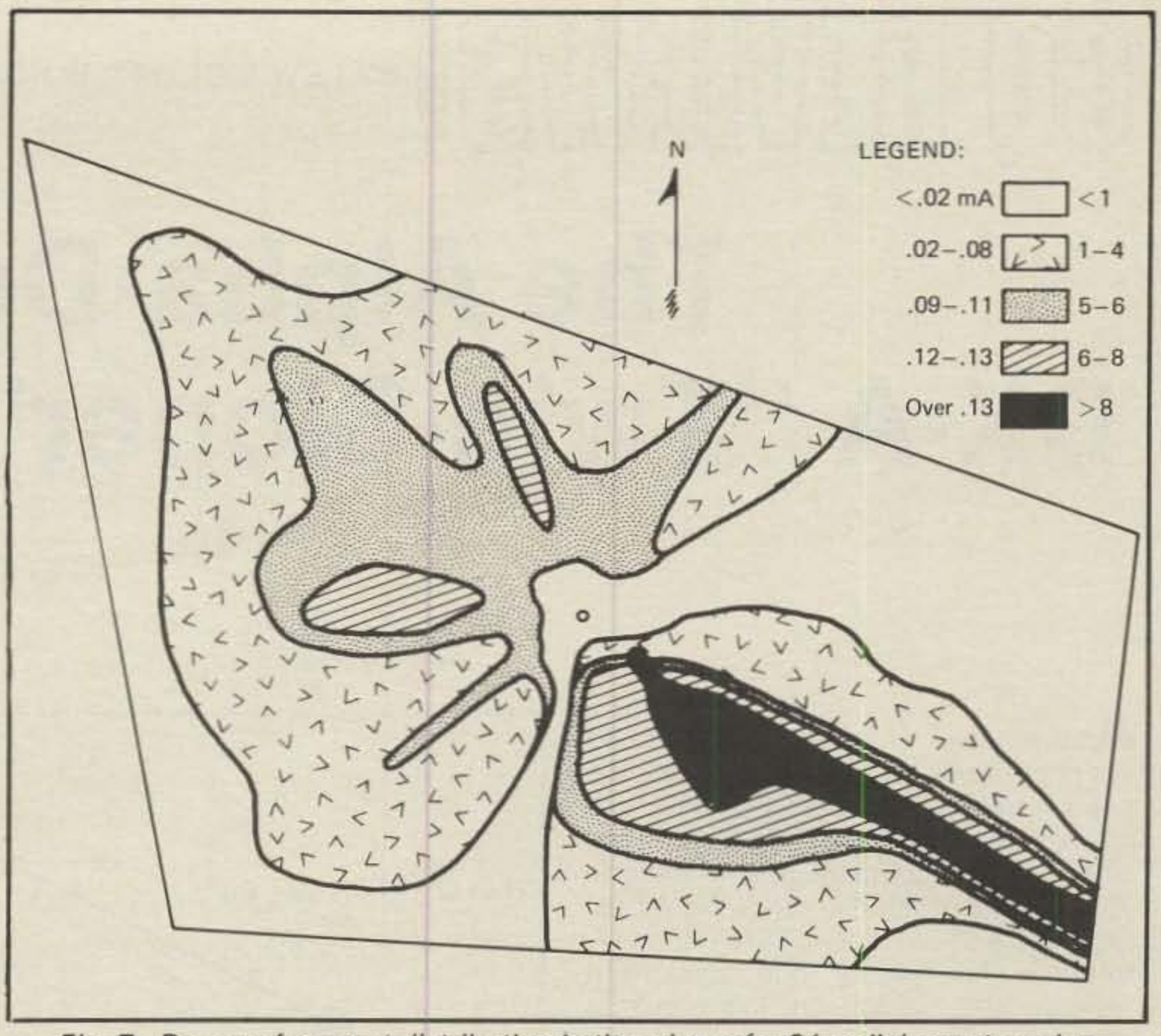


Fig. 7– Range of current distribution in the wires of a 64 radial counterpoise.

Table I

Current flowing in the radials of an elevated counterpoise as a percentage of total radiator current. Note: Currents were measured using RF ammeters at the antenna system feed point.

Number Of Radials	Lineal Feet Of Radials	Return Current As A % Of Antenna Current
0*	—	83
0**	—	82
2	160	67
4	285	74
6	360	80
8	480	82
16	940	95
32	1845	96.5
48	2755	98+
64	3655	99+

*Two 8 foot ground rods at base of antenna
**No ground, but connected to a single 134 foot (¼ wavelength) wire, 8 to 10 feet high.

ident. Also the correlation between higher radial currents over areas of higher ground conductivity was again found, and, as was noted in the full sized Fletcher system the radial currents were found to be surprisingly low at the antenna's base—when contrasted with the levels found in buried radials.

• Measurements taken at the feed point of the vertical antenna with the maximum radial system in place gave an impedance of 43 ohms (resistive) at the resonant frequency o 1806 kHz.

• While the antenna was being built, tests were conducted to determine the current being supplied to the antenna, and the current collected and returned to the antenna's feed point by the radial system. The results, shown in Table I, indicate that 40 radial wires appears to be a practical minimum number limit for efficient elevated ground systems. Note, work reported on by Doty[6] in *CQ* provides additional evidence that the use of: elevated radial wires, insulated radial wires lying on the ground, and insulated radial wires buried an inch or so.

Collect antenna return currents more efficiently than do conventional buried radials. Thus the radial wires shown in figs. 1 and 2 need not be elevated, but can be on, or under, the ground— as long as insulated wire is used. This provides useful options to the builder in coping with terrain, neighborhood aesthetics or family preferences.

Conclusions:

The carefully conducted test program using the Minipoise antenna described here has shown both technically and operationally that short vertical antennas with elevated radial systems using relatively short, random length wires are efficient.

From a practical standpoint the following points can be made:

• The 160 meter version of the Minipoise described here has provided superior performance.

• If the radial system described for 160 meters is used with resonant vertical antennas on 80 or 40, performance will be even better.

• If the radial system is scaled down to 40 meters, it will be only 25 × 25 feet—a size that will fit on many roofs.

• Installing any of the commercially available trap vertical antennas for the radiator should result in a really economical, easy-to-erect and efficient all-band antenna system.

Acknowledgements

Sincere thanks are extended to Arch Doty, K8CFU, Harry Mills, K4HU, and R.B. Frey, K4XU, for their physical and mental efforts in the construction and testing of the Minipoise—as well as their time reviewing and critiquing this article.

Special thanks to Barry Boothe, W9UCW, for his contribution of 80 and 40 meter vertical antenna data.

Footnotes

[1]Doty, Frey and Mills, "Efficient Ground Systems for Vertical Antennas", QST, February, 1983, pp.20-25.

[2]Brown, Lewis and Epstein, "Ground Systems as a Factor in Antenna Efficiency", Proceedings of the IRE, June, 1937.

[3]J. Sevick, "Measuring Ground Conductivity", QST, March, 1981, pp.38, 39.

[4]K.F. Carr, "Ground Currents Measuring", Ham Radio, June 1979.

[5]B.A. Boothe, "The Minooka Special", QST, December, 1974, pp.15-19.

[6]A.C. Doty, Jr. "Performance of Conventional Buried Wire Radials Versus Elevated/Insulated Radial Wires Used as Ground Systems for Vertical Antennas", CQ Magazine, April, 1984, pp.24-31.

[7]Capt. P.H. Lee, "Vertical Antenna Handbook", CQ Publishing Inc., 2nd edition, 1984, p.112.

CQ REVIEWS: BY LEW MCCOY*, W1ICP

The Alpha-Delta DX-A "Twin-Sloper" Antenna

At the Dayton Hamfest this year I had the opportunity of discussing one of the newer offerings in the antenna field with its designer, Don Tyrrel. This is a tri-band sloper, covering 160, 80 and 40 meters. The name of the antenna is the Alpha-Delta DX-A "Twin-Sloper." Don kindly offered to let me try one and do a review—and that is what this article is about.

Essentially, the antenna consists of two legs, one is 35 feet long, a quarter wavelength on 40 meters, and the other is 80 feet long, with a very rugged loading coil (not a trap) which covers 80 and 160 meters. Refer to fig. 1 for the physical layout of the antenna. Fig. 1 is a page from the instruction manual of the antenna and it shows most of the installation information plus tuning details.

Much has been written about slopers and if the reader would like some basic information, I would refer him to Doug DeMaw's article in October 1981 *QST*, called, "More Thoughts on the Confounded Sloper." A sloper can be a half-wavelength or quarter wavelength long antenna and is neither vertical nor horizontally polarized but really a combination of both. For horizontally polarized half-wave dipoles, one must consider great antenna heights in order to get good low-angle radiation for long distance DX work on the low bands. For example, in order to achieve a low angle of radiation, the bare minimum on 80 meters would be suspending the dipole at least 150 feet in the air. Two such supports plus the real estate are pretty hard to come by for the average amateur. However, excellent DX results have been obtained with the sloper type of configuration because it does have some low-angle components.

The DX-A requires a metal tower or mast at least 25 feet high and the support must have a good ground. In other words, the mast or support must be tied to earth ground. Alpha-Delta recommends a height of 25 to 40 feet for the installation. The antenna I tested was installed at 40 feet on a grounded tower. A mounting bracket is provided that is bolted to the tower via a U-bolt. The bracket also has an SO-239 coax fitting mounted on it for the feed line, which should be 50-ohm coax.

For best performance from the system, the two legs of the sloper should be installed as close to 180 degrees apart as possible and the ends should be at least eight feet above earth ground. The ele-

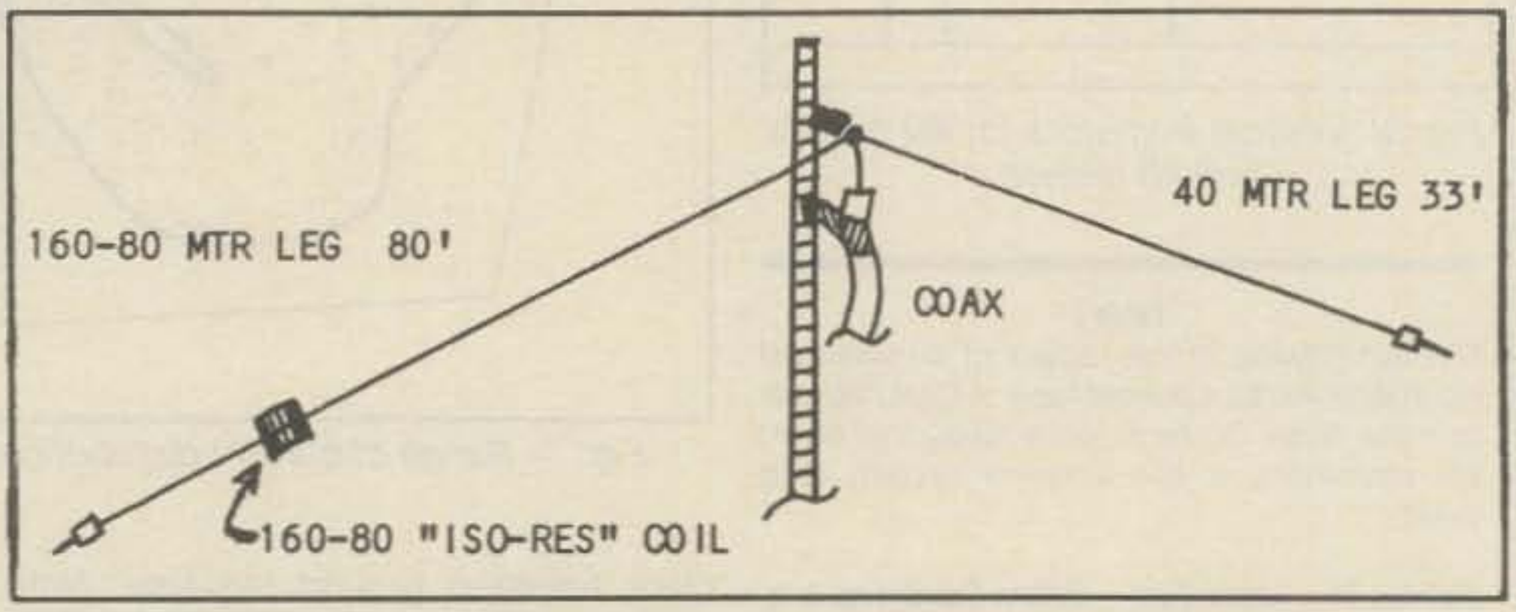
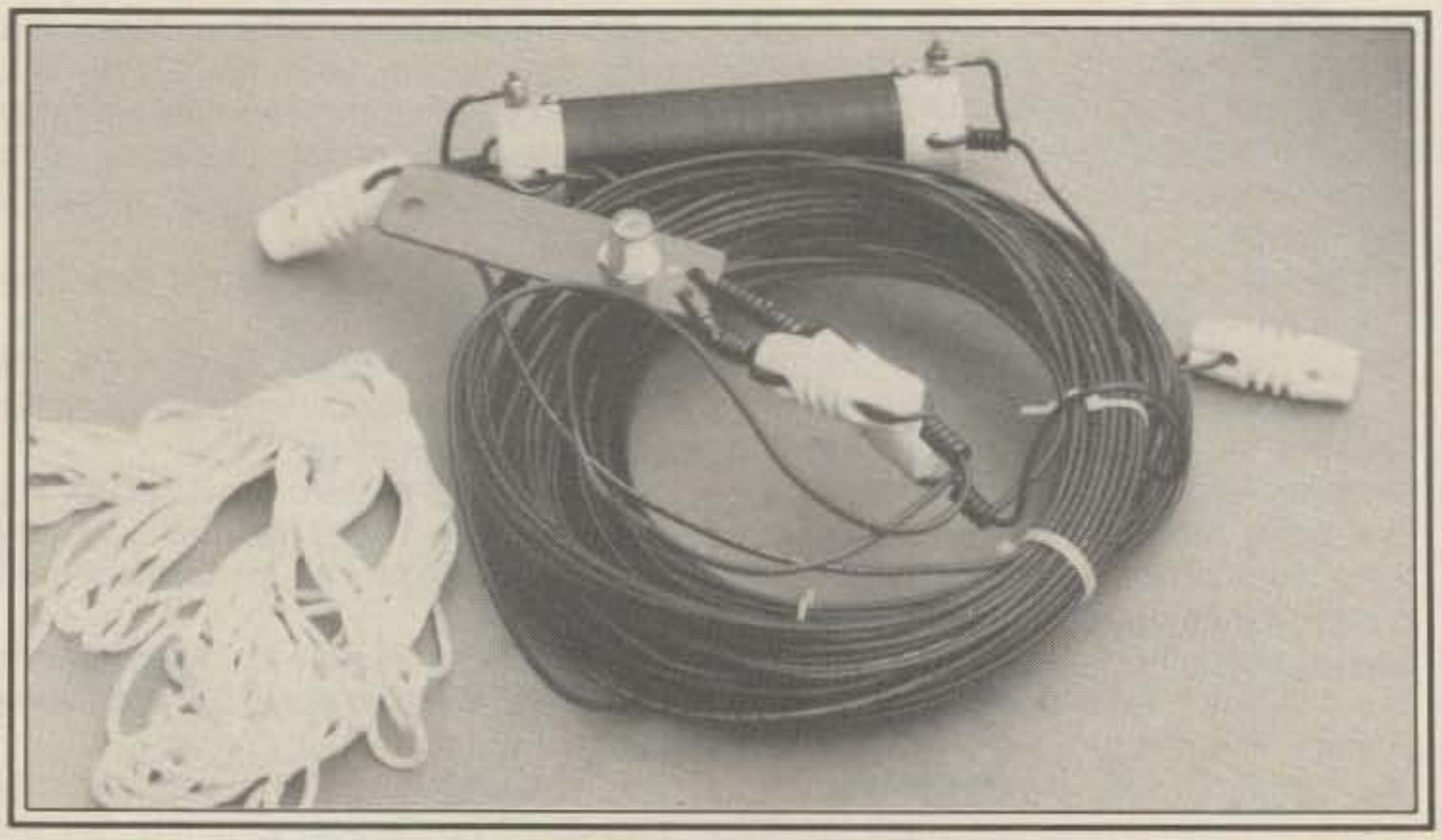


Fig. 1– This is a drawing taken from the instruction manual and it provides all pertinent details.

This photo shows the antenna as it comes out of the carton. The mounting bracket with the SO-239 coax fitting needs another u-bolt hole drilled. The u-bolt is used for securing the bracket to the tower or mast.



*Technical Consultant, CQ
200 Idaho St., Silver City, NM 88061

ment ends have end-insulators and a special nylon rope is provided for tieing off the insulators.

The instructions are quite clear and precise on the tune-up procedure. The manufacturer states that when tuned, the VSWR is less than 2 to 1 across the entire 40 meter band. They also state that on 80, a bandwidth of 200 kHz for under 2 to 1. A bandwidth of 80 kHz for less than two to one on 160. My measurements were not quite that good. With the antenna installed at 40 feet I found the lowest, or resonant point, SWR was 1.4 on 40 meters, at 7150 kHz. The SWR went to about 2.5 to 1 at the band edges. On 80, my measurement showed a bandwidth of 160 kHz under 2 to 1 and 1.3 to 1 at resonance. On 160, my figures agreed with the manufacturer with resonance at 1.2 to 1. However, in my case, I find the SWR measurements more or less academic. I made the above measurements without a Transmatch in the line. However, I then used the system with a Transmatch and I was always looking at a 1 to 1 50-ohm load. I might add that any Transmatch worthy of the name will match this system because the feed point is close to 50 ohms in all cases and any reactive component in the feed impedance is not that high.

I would be remiss if I didn't point out that this antenna does not use a "trap" on 80 and 160 meters. The unit that Alpha-Delta calls the "ISO-RES" is an extremely rugged loading coil (it easily handled 1500 watts p.e.p.— and would probably handle more!)

Tune-up is fairly easy. I used an SWR bridge and took a run across 40 meters looking for resonance. I had not pruned any wires at this point. I assumed (correctly) that resonance would be below 40 meters because the wire would be too long (always a good way to start—if you make the wire too short you have to solder or add wire some other way). The instructions say to prune the wire but I preferred to scrape away the insulation and fold the wire back on itself through the end insulator and connect it with a clip. I did this scraping of insulation in increments of a foot or so and kept taking frequency runs to determine the resonance point. Once I found the resonant length I made a permanent connection. Maybe I should explain "frequency runs" and finding resonance because some readers may be new amateurs and not know how.

Many amateurs who cut an antenna to formula length often wonder if the dog-gone thing is resonant or not. There is a rather easy way to find out. This is accomplished by using and ordinary SWR bridge and taking a frequency run across the desired band. One simply puts an SWR bridge in the 50 ohm feed line. Run enough power from the rig to get a full-scale reading in the forward position and take a reading at the bottom of the band. Write down the forward and reflected readings and then move up about 50 kHz and repeat measurements. Keep doing this across the entire band. If you are lucky, you'll find a dip in the readings and that indicates (more or less for you engineers reading this,resonance of the system, please note I said "system"). But let's assume you don't find a dip in the readings. Well, if the reflected readings beginning at the bottom of the band, say 3500 kHz, start low and get high at the top end, 4000 kHz, that means the antenna is too long. Resonance is probably outside the bottom end of the band. Of course, the reverse is true. If the readings (reflected) diminish as you get to the top end, then the antenna is too short. One last thing, many times resonance does not produce a 1 to 1 match, in other words, maximum forward for minimum reflected. This merely means, usually, that the impedance of the antenna has reactance present in the feed point or several other factors are getting into the act. Such things as height above ground, nearby objects and other things can make the antenna have an impedance other than 50 ohms. Of course when using a Transmatch, one tunes the entire system to a 1 to 1 match. Some day, I'll write a discussion of resonant antennas versus resonant systems—there is a difference.

However, this is a product review and I am not being fair to the manufacturer because I should keep to the subject, the DX-A Antenna. In any case, the foregoing discussion will help you in tuning and adjusting the twin sloper because that's the way I did the job. Don't misunderstand, the instructions are more than satisfactory and one should be able to get the system tuned without any problems. However, there are cut and tune adjustments to be made in this installation so the user should be aware of that fact.

The system proved to be a good performer. I had an 80 meter dipole on another support so I got to compare the two. On 40, I have a loaded quarter wavelength dipole that is rotatable so I could check against that. On 80, my dipole was higher, and horizontally polarized and most of the time, as it should have been, was the better performer— but by very little. In several instances, mostly on long DX, the sloper was a much better performer. On 40, the sloper in most instances was about the same as my loaded dipole. However, the sloper did provide better signal reports on long DX again.

For anyone with a tower and a triband beam on it, installing a DX-A is a good way to add the three lower bands. One more point here: I reduced power (about 200 watts) and because I was using a Transmatch, I tried tuning up on the 10.1 MHz band. The DX-A did not show any resonance on that band. However, as the SWR was not too high, I figured it wouldn't hurt anything to try it on 10.1. I worked a bunch of contacts, including DX!

The antenna is not expensive. The list price is only $49.95 which isn't too bad in this day and age. the antenna is made by Alpha Delta Communications, Inc., P.O. Box 571, Centerville, Ohio 45459, (513-435-4772). CQ

Here's a golden oldie brought up to date. It makes a great limited space antenna and a terrific first antenna project for a new Novice.

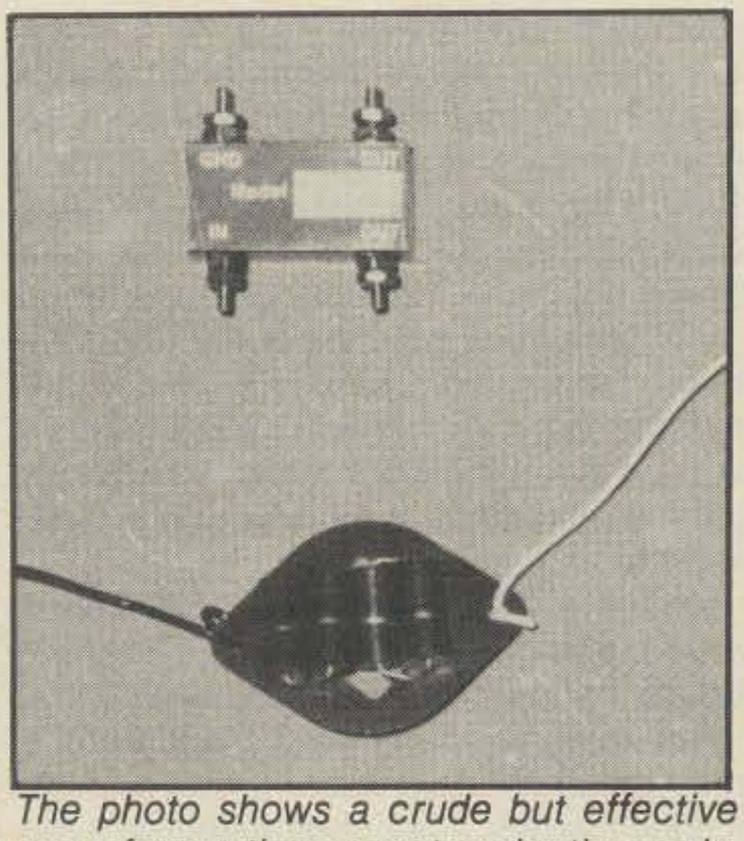
The T2FD Antenna Revisited

BY JOHN J. SCHULTZ*, W4FA

How would you like to have a simple wire antenna for the HF bands which is broadband (covers all the HF bands with a SWR of 1:2 or less), omnidirectional, of reasonable efficiency, requires no radials and is shorter on the lowest frequency of operation than a conventional half-wave dipole? Such an antenna does exist in the form of the "T2FD" or "TTFD" (Tilted Terminated Folded Dipole).

The T2FD is a sort of folded dipole antenna form which was publicized over 20 years ago (one of the first descriptions was by W3HH in a 1963 Antenna Roundup edition of *CQ*). It enjoyed a period of popularity for some time and then fell out of popularity. It was "rediscovered" a bit by German amateurs in the late 70's and again went through a period of popularity and then a decline of interest in it took place. Today, only a few antenna manuals, mainly those published in Europe, even make mention of the T2FD.

So, why take another look at this antenna form? The fact is that although the antenna does have some compromise features, it also has some outstanding advantages in today's world of solidstate transceivers. In the early 60's, the antenna's low SWR bandwidth was not of exceptional interest. Tube-type transceivers with tunable Pi-network outputs were the order of the day. They could compensate for fairly large SWR variations and they were designed for coupling into an unbalanced coaxial feedline. The T2FD has a balanced feedpoint of several hundred ohms. In the late 70's the use of ferrite core balun transformers easily took care of the problem of coupling a coaxial feedline into a T2FD without the use of an antenna tuner. However, many amateurs expected too much of the T2FD in terms of radiation efficiency, especially on the lower frequency amateur bands. Today probably many amateurs would accept an antenna form like the T2FD for its combination of features—practically instant QSY capability over most of the HF range using a solidstate transceiver, inexpensive and simple construction, compact size and reasonable radiation efficiency.



The photo shows a crude but effective way of mounting some terminating resistors if one just wants to test out a T2FD. The terminating resistors (a parallel combination to form 390 ohms) are mounted on an electrolytic capacitor chassis mounting insulator. At the bottom of the photo is one of Palomar Engineer's PB-1-6 baluns. It's a miniature size balun rated for 300 watts PEP which provides a 1:6 impedance stepup going from a 60 ohm coaxial line to the 300 ohm input impedance of a T2FD using a 390 ohm termination resistor.

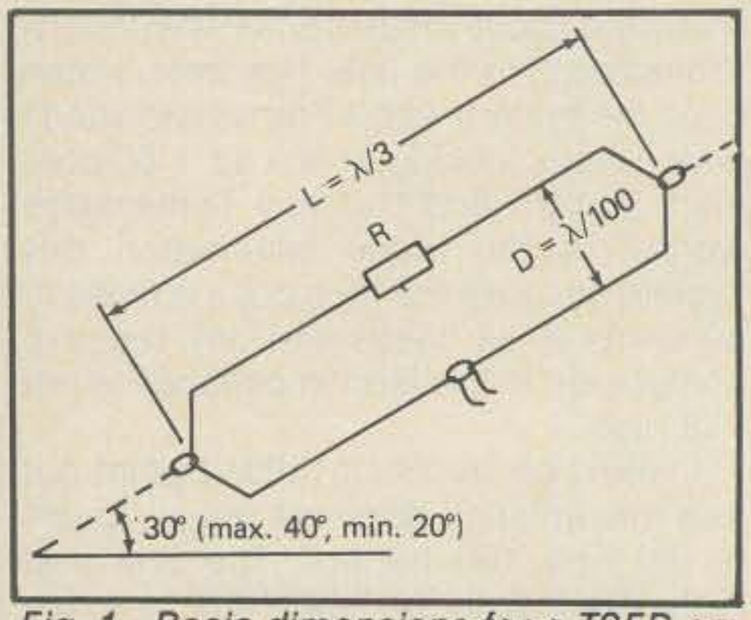


Fig. 1– Basic dimensions for a T2FD antenna. Normally, the lower end of the antenna should be 3 to 6 feet high, if possible. R represents the termination resistor (values are shown in fig. 3).

The basic T2FD dimensions are shown in fig. 1. It looks much like a folded dipole except that it is a terminated (aperiodic) form of antenna and the distance between the dipole wires is greater than would normally be used. The total length of the antenna is only λ/3 at the lowest operating frequency and the distance between the dipole wires at that frequency is λ/100. The antenna has a bandwidth (for a SWR of 1:2 or less) of 1:5. Thus a T2FD dimensioned for 40 meters will cover 40, 30, 20, 15 and 10 meters. The antenna will, in fact, cover *all* frequencies continuously between 40 and 10 meters since it is an aperiodic form of antenna and does not depend upon any form of harmonic resonances for its wide bandwidth. When it is erected as shown in its tilted form, the radiation pattern it exhibits is essentially omnidirectional over its bandwidth. The radiation pattern is not uniformly omnidirectional, according to various studies, but neither does it exhibit either any pronounced directional peaks or real nulls. The radiation efficiency is not as good as that of a full size dipole because some power will be dissipated and lost in the terminating resistor. The power lost in the termination can amount to 35% of the input power to the antenna. But, is a 35% power loss really that serious? Using a typical 100 watt output level transmitter, it means that instead of 100 watts being radiated only 65 watts are radiated (taking the simplistic but essentially true viewpoint that no other

*c/o CQ Magazine

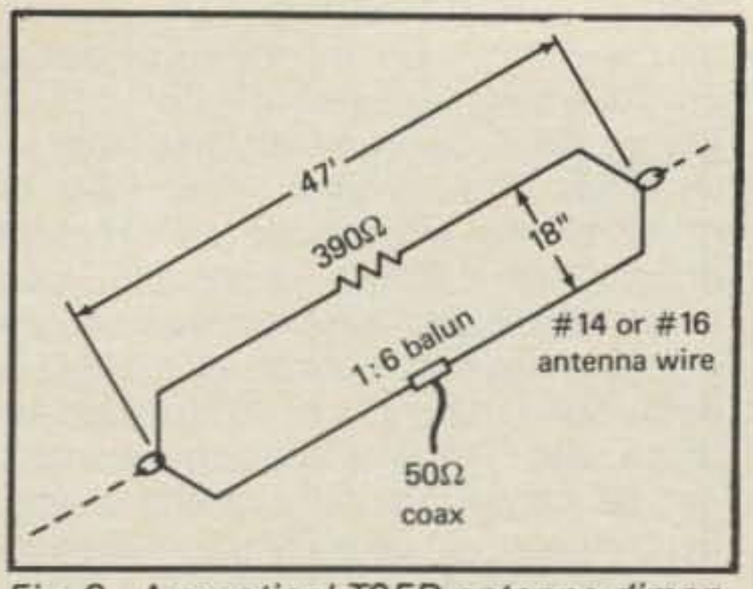


Fig. 2– A practical T2FD antenna dimensioned for the 7 to 30 MHz range.

Transmission Line or Feedpoint Impedance	Termination (ohms)
600	650
450	500
300	390

Fig. 3– Experimentally determined relationship between the termination resistor value and the feedpoint impedance for a T2FD.

significant power losses take place in the antenna system). It is doubtful that the slightly less than 2 dB power loss in the T2FD should prove all that significant in the real world of making QSO's.

Nonetheless, some users of T2FD's in the past lambasted the antenna as being terribly inefficient. Other users declared that the T2FD was 2 or more S units better than a regular halfwave dipole erected in the same location as the T2FD! It was indeed interesting to study past reports on the T2FD and to do some independent tests. It seems that a lot of early users of the T2FD were so convinced that the antenna was an amateur's dream come true that they comprised the use of the antenna in various ways. Some amateurs tried to use the antenna on frequencies below its λ/3 design length and were disappointed that it didn't perform like a full ½λ dipole (although they had none to compare it against). Other amateurs tried to narrow the distance between the wire elements or to erect the antenna wholly horizontal or wholly vertical (without radials). All experienced disappointing results. Still other amateurs who used T2FD's within its original design parameters reported the antenna to be a reasonably good radiator with signal levels 1-2 "S" below what they had thought was reasonable to expect from a full size ½λ horizontal antenna.

The "message" that seems to stand out from various amateurs' experiences with the T2FD is that one should not try to further compromise a compromise antenna. A T2FD, dimensioned as shown in fig. 2, was erected and tried over a flat roof surface on a one family house. The original T2FD antenna parameters were used as based on a lowest operating frequency of 7,000 kHz. The length of the antenna was 47 feet and the distance between wire elements was 18 inches. The high end of the antenna was just elevated enough so the tilt angle (as shown in fig. 1) was the mimimum allowed, 20 degrees. Some choice does exist as regards the termination resistance to be used and the relationship between the possible values of termination resistance and feedpoint impedance are shown in fig. 3. A 390 ohm termination resistance was chosen since this provided a feedpoint of 300 ohms which in turn meant that the antenna could be fed with a 50 ohm coaxial line via 1:6 impedance step-up balun. (Some construction points are covered later).

The first point of curiosity after the antenna was erected concerned SWR. The SWR did, in fact, check out at essentially far less than 1:2 over the entire frequency range of 7 to 30 MHz although there were a few odd excursions here and there where the SWR varied between 1:2 and 1:2.5. Probably by luck more than anything else, none of the high SWR excursions took place within the amateur bands and were probably due to the influence of nearby metallic objects on the roof location at specific frequencies. Running 100 watts keydown into the antenna, the termination resistance did become warm which, of course, didn't prove too much except that RF power was getting into the antenna.

The antenna was compared over a period of time with paralleled 10/15/20 meter dipoles which were supported at both ends at a height equal to that of the high end of the T2FD. The T2FD worked amazingly well under these comparison circumstances. On the three bands for which dipoles were available, the T2FD seemed to perform equally as well with, at best, a variation of ±1 to 2 "S" units under "real world" operating conditions which included both long and short skip contact conditions. At times the T2FD seemed to be greatly better than the dipoles but this was mainly when stations were worked which were in a direction off the ends of the dipoles.

So, the more or less omnidirectional radiation of the T2FD can have some bonus advantages. The T2FD design which was tried worked well on 40 meters although no comparison dipole was available for that band. Based on many years of operating experience, an "educated guess" is that the T2FD is not worse than two "S" units down on a full-size 40 meter dipole where both ends of the dipole would be at the same height as the high end of the T2FD.

All of the foregoing would seem to argue for the idea that the T2FD form of antenna does not deserve to be forgotten nor does it deserve to be viewed as a direct substitute for more efficient antenna forms (e.g. a grouping of single-band di-

poles). The amateur who is interested in the most efficient antenna performance possible and who has sufficient space available for multiple wire antennas should probably not consider a T2FD except if one has need of its exceptional bandwidth. On the other hand, the T2FD might well represent the ideal antenna for the casual operator who is interested in multiband operation using a single antenna which will provide both amateur band coverage and general HF coverage for reception purposes. An antenna tuner is generally not needed with a T2FD when using a solid state transceiver. Most modern transceivers will exhibit only a 20–30% power turndown at the worst SWR conditions presented by a T2FD. The possibilities for crossband QSK using a single T2FD antenna should also be obvious.

The construction of a T2FD does not present any real problems these days although those related to terminating and impedance matching the feedpoint of the antenna were present years ago. The terminating resistor has to be non-inductive. Ideally, it should be a transmitting type resistor designed for the termination of a low-power rhombic antenna. Occassionally such resistors do become available through surplus outlets (e.g. Fair Radio Sales). But, if only a 100 watt output level transceiver is being used, a perfectly satisfactory termination resistance can be formed using common two watt carbon composition resistors, as shown in fig. 4. One could wind a balun to match a 50 ohm coaxial line to the feedpoint impedance of a T2FD and the constructional details for such baluns can be found in many antenna manuals. However, if one uses a 100 watt output class transceiver, the use of the Palomar Engineers (see *CQ* advertisements) series of "PB" baluns are an ideal, commercially available alternative. The Palomar PB-6, PB-9 or PB-12 baluns will provide an excellent match into a T2FD, depending upon which termination resistance is chosen (fig. 3). Wire construction of a T2FD is easily done using #14 or 16 stranded antenna wire. The wire spacing insulators can be almost any form of stiff plastic. Even humble cut-up plastic clothes hangers will suffice very nicely. But, don't compromise more than an inch or two on the dipole wire spacing, in any case! Nor, on the minimum tilt angle of 20 degrees when erecting the antenna!

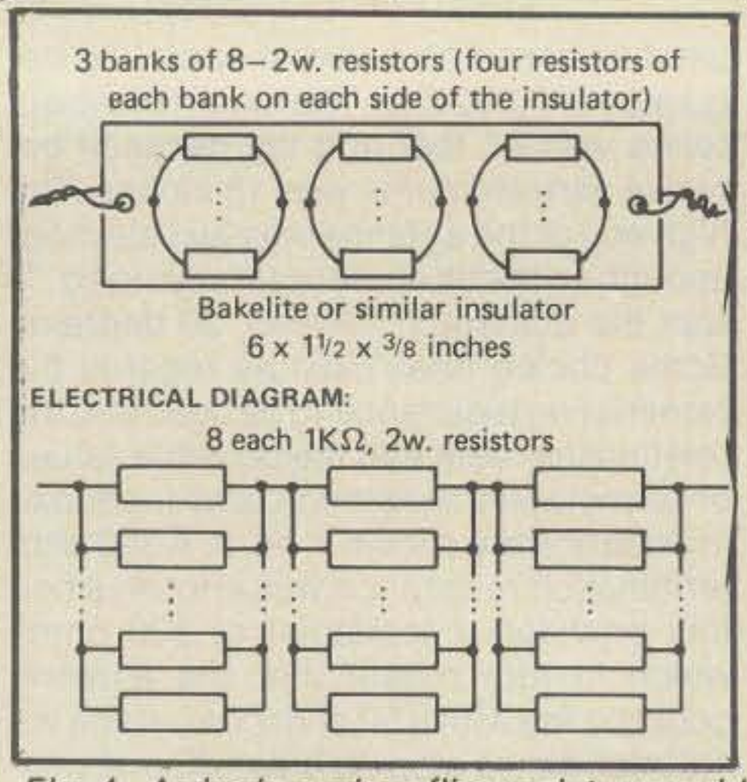


Fig. 4– A single carbon film resistor would be preferred for the termination for a T2FD. However, ordinary 2 watt carbon composition resistors can also be grouped together. In the diagram shown, 1K ohm resistors are used to form a 375 ohm termination which will dissipate about 40 watts and be suitable for a T2FD with a 100 watt output level transceiver.

Finally, one should mention that commercial versions of complete T2FD antennas are available. Barker and Williamson (see *CQ* advertisements) market several models including ones suitable for full KW power level operation and they include all parts—wire elements, spacers, balun, termination resistor, etc. They represent an excellent purchase for those who might not have the time to "roll their own" T2FD*.

*Models AC 5-30 for 5 to 30 MHz coverage with a length of 65 feet; AC 3.5–30 for 3.5 to 30 MHz coverage with a length of 90 feet and AC 2-22 for 2 to 22 MHz coverage with a length of 185 feet.

MFJ TUNERS

QUALITY TUNERS THAT DELIVER MORE PERFORMANCE, MORE FEATURES, MORE VALUE FOR YOUR MONEY.

MFJ-941D 300 WATT VERSA TUNER II

$99.95 (+$4) **MFJ's fastest selling tuner packs in plenty of new features.**
New styling! Brushed aluminum front. All metal cabinet.
New SWR/Wattmeter! More accurate. Switch selectable 300/30 watt ranges. Read forward/reflected power.

New antenna switch! Front panel mounted. Select 2 coax lines, direct or through tuner, random wire/ balanced line or tuner bypass for dummy load.

New airwound inductor! Larger more efficient 12 position airwound inductor gives lower losses and more watts out. Run up to 300 watts RF power output.

Matches everything from 1.8 to 30 MHz: dipoles, inverted vee, random wires, verticals, mobile whips, beams, balanced and coax lines.

Built-in 4:1 balun for balanced lines. 1000 V capacitor spacing. Black. 11 x 3 x 7 inches. Works with all solid state or tube rigs. Easy to use anywhere.

MFJ-940B, $79.95, 300 watts, SWR/Wattmeter, antenna switch on rear. No balun. 8 x 2 x 6 in. eggshell white with walnut grained sides.
MFJ-945, $79.95, like MFJ-940B with balun, less antenna switch.
MDJ-944, $79.95, like MFJ-940B with balun, antenna switch on front panel, less SWR/Wattmeter.
Optional mobile bracket for 940B, 945, 944, $5.00.

MFJ-900 200 WATT VERSA TUNER

Matches coax, random wires 1.8-30 MHz. Handles up to 200 watts output; efficient airwound inductor gives more watts out. **$49.95** (+$4)
5x2x6 in. **Use any transceiver,** solid state or tube. Operate all bands with one antenna.

OTHER 200 WATT MODELS:
MFJ-901, $59.95, like 900 but includes 4:1 balun for use with balanced lines.
MFJ-16010, $39.95, for random wires only. Great for apartment, motel, camping operation. Tunes 1.8-30 MHz.

MFJ-949B 300 WATT DELUXE VERSA TUNER II

$139.95 (+4) **MFJs best 300 watt Versa Tuner II. Matches everything** from 1.8 - 30 MHz, coax, randoms, balanced lines, up to 300W output, solid state or tubes.

Tunes out SWR on dipoles, vees, long wires, verticals, whips, beams, quads.

Built-in 4:1 balun. 300W, 50-ohm dummy load. SWR meter and 2 range wattmeter (300W and 30W).

6 position antenna switch on front panel, 12 position air-wound inductor; coax connectors, binding posts, black and beige case. 10 x 3 x 7 in.

MFJ-962 1.5 KW VERSA TUNER III

Run up to 1.5 KW PEP **$229.95** (+$10)
and match any feedline continuously from 1.8 to 30 MHz; coax, balanced line or random wire. Built-in SWR/Wattmeter has 2000 and 200 watt ranges, forward and reflected power. 2% meter movement. **6 position** antenna switch handles 2 coax lines (direct or through tuner), wire and balanced lines. 4:1 balun 250 pf 6 KV variable capacitors. 12 position inductors. Ceramic rotary switch. All metal black cabinet and panel gives RFI protection, rigid construction and sleek styling. Flip stand tilts tuner for easy viewing. 5 x 14 x 14 inches.

MFJ-989 3 KW ROLLER INDUCTOR VERSA TUNER V

$329.95 (+$10) **Meet "Versa Tuner V". It has all the features you asked for,** including the new smaller size to match new smaller rigs - only 10 3/4"W x 4 1/2"H x 14 7/8"D.

Matches coax, balanced lines, random wires — 1.8 to 30 MHz. 3 KW PEP- the power rating you won't outgrow (250 pf-6KV caps).

Roller Inductor with a 3-digit turns counter plus a spinner knob for precise inductance control to get that SWR down to minimum every time.

Built-in 300 watt, 50 ohm dummy load, built-in 4:1 ferrite balun.

Built-in 2% meter reads SWR plus forward and reflected power in 2 ranges (200 and 2000 watts). Meter light requires 12 VDC. Optional AC adapter MFJ-1312 is available for $9.95.

6-position antenna switch (2 coax lines, through tuner or direct, random/ balanced line or dummy load). SO-239 connectors, ceramic feed-throughs, binding post grounds.

Deluxe aluminum low-profile cabinet with sub-chassis for RFI protection, black finish, black front panel with raised letters, tilt bail.

MFJ-981, $239.95. 3 KW, 18 position switched dual inductor. SWR/Wattmeter. 4:1 balun.

ORDER ANY PRODUCT FROM MFJ AND TRY IT-NO OBLIGATION. IF NOT DELIGHTED, RETURN WITHIN 30 DAYS FOR PROMPT REFUND (LESS SHIPPING).
- One year unconditional guarantee • Made in USA.
- **Add shipping/handling shown in parenthesis**
- **Call or write for free catalog, over 100 products.**

MFJ ENTERPRISES, INC.
Box 494, Mississippi State, MS 39762

TO ORDER OR FOR YOUR NEAREST DEALER, CALL TOLL-FREE
800-647-1800. Call 601-323-5869 in Miss. and outside continental USA
Telex 53-4590 MFJ STKV

VISA* MasterCard

CIRCLE 81 ON READER SERVICE CARD

NEWS we'll treat you RIGHT

BULLETIN

For more than 40 years we have been serving the amateur community with QUALITY PRODUCTS and DEPENDABLE "S-E-R-V-I-C-E" and, we fully intend to carry on this proud tradition with even MORE new product lines plus the same "fair" treatment you've come to rely on. Our reconditioned equipment is of the finest quality with 30, 60 and even 90-day parts and labor warranties on selected pieces.
And, remember . . .

— WE SERVICE WHAT WE SELL —

AEA	DRAKE	MOSELEY
AMECO	ENCOMM	NYE
AMERITRON	HUSTLER	PALOMAR
ANTEK	ICOM	RADIO CALLBOOK
ARRL	JANEL	ROBOT
ASTRON	KANTRONICS	ROHN
ANTENNA SPECIALISTS	KDK	TELEX / HYGAIN
	KLM	TEN-TEC
B & W	LARSEN	TRIO-KENWOOD
BENCHER	MFJ	UNADILLA / REYCO
BUTTERNUT	MINI-PRODUCTS	YAESU
CUSHCRAFT	MIRAGE	
DIAWA		

Write today for our latest Bulletin/Used Equipment List.

SELECTION
S-E-R-V-I-C-E
and
SATISFACTION!

STORE HOURS:
9-5 P.M. (CST)
MONDAY thru FRIDAY
OPEN SATURDAYS
from 9-1 P.M. (CST)
CLOSED
SUNDAYS/HOLIDAYS

MasterCard VISA

P.O. Box 73
208 East Kemp
Watertown, SD 57201

Burghardt INC.
AMATEUR CENTER

"AMERICA'S MOST RELIABLE AMATEUR RADIO DEALER"

SELL-TRADE

New & Reconditioned

HAM EQUIPMENT

Call or Write Us Today For a Quote!
You'll Find Us to be Courteous, Knowledgeable and Honest

PHONE (605) 886-7314

AEA AMT-1. REGULARLY $479.95

NOW ONLY $299.95

THE **AMTOR TERMINAL UNIT!!!** Works with any ASCII terminal or personal computer with a terminal program. Also works RTTY, CW, ASCII.
ORDER YOURS TODAY! *Limited quantities.*

CIRCLE 32 ON READER SERVICE CARD

The Problem Solver. . .

The RF Wattmeter Model 81000-A from Coaxial Dynamics, Inc. does more than provide accurate rf measurements. Testing of transmission lines, antennas, connectors, filters and related components can reveal unknown problems and assure optimum equipment performance.

The 81000-AK Wattkit features this easy-to-read RF Wattmeter (pictured here), with its optional carrying case and an array of elements and accessories. Coaxial Dynamics elements can be purchased separately for use in other manufacturer's Wattmeters. For more information on the 81000-A Wattmeter or any of the complete line of Coaxial Dynamics RF products and OEM components please contact Coaxial Dynamics, Inc.

Special elements available for cellular radio.
Call factory for name of your local distributor.

COAXIAL DYNAMICS, INC.
15210 Industrial Parkway, Cleveland, OH 44135 • (216) 267-2233
Outside Ohio, WATS: (800) Coaxial, Telex: 980-630

CIRCLE 18 ON READER SERVICE CARD

AMATEUR

A WONDERFUL WORLD OF RF

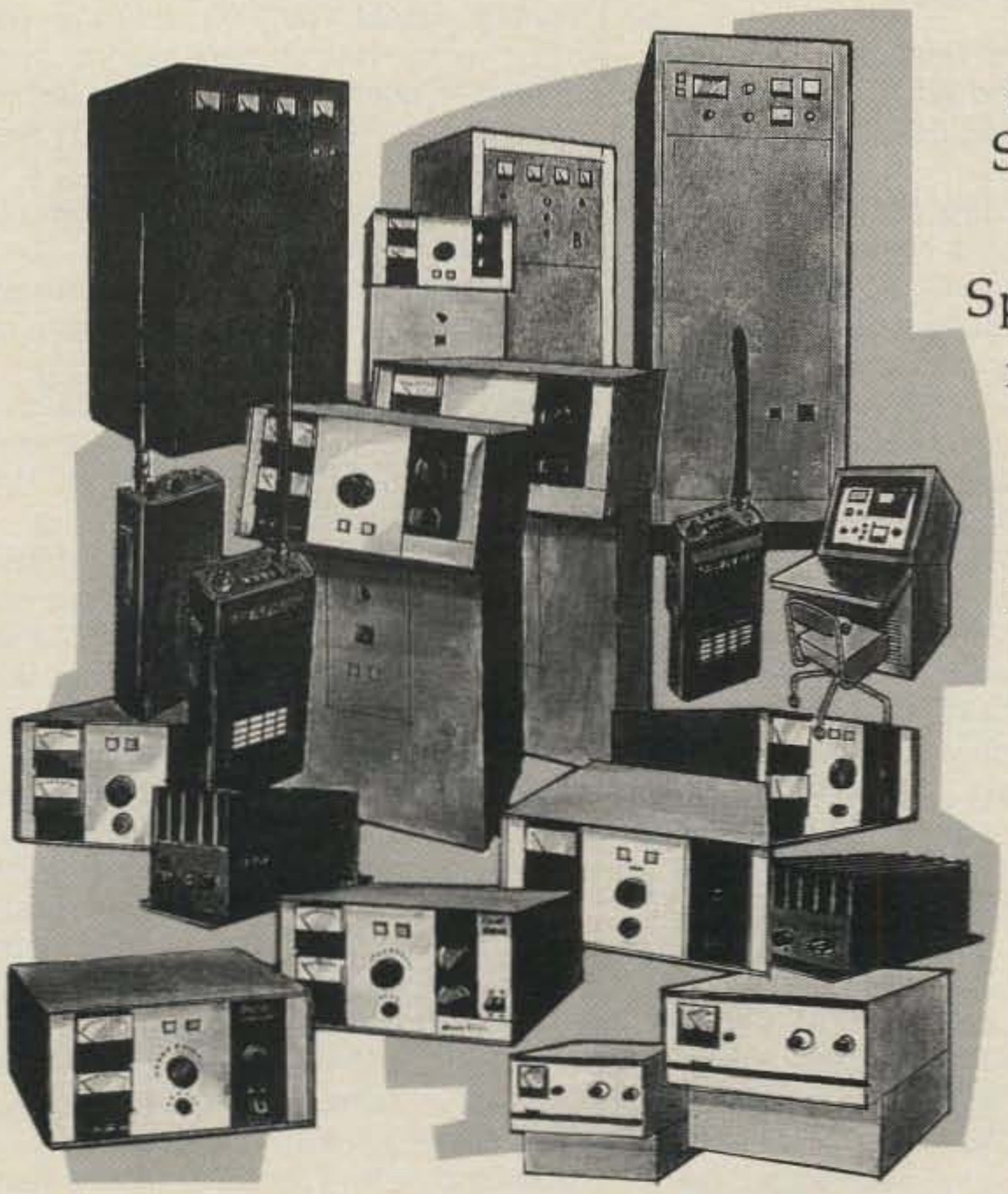
BY

HENRY RADIO

MILITARY COMMERCIAL INDUSTRY SCIENTIFIC

Since 1927 radio amateurs have known Henry Radio as their reliable source for every kind of radio equipment. It still is for tens of thousands of amateurs throughout the free world.

Quietly during the last twenty years, Henry Radio has also become the premiere source for high power RF amplifiers... not only for amateurs but for many different services.... Communications, HF-VHF-UHF, Industrial, RF Plasma generation for laser excitation, Sputtering, Etching, Nuclear Magnetic Resonance, Photo-Emissions Spectometry, Laboratory, VHF Micro-meteorite communications. If you need RF power in the two megahertz to 500 megahertz range with levels from 100 watts to 20,000 watts, Henry Radio may be your most reliable source.



Tell us how we can help you. Call or write Ted Henry, Ted Shannon or Mary Silva (Los Angeles office).

Henry Radio

2050 S. Bundy Dr., Los Angeles, CA 90025 (213) 820-1234
Butler, Missouri 64730 (816) 679-3127

CIRCLE 24 ON READER SERVICE CARD

Contest Calendar

a monthly feature by
FRANK ANZALONE, W1WY

NEWS/VIEWS OF ON-THE-AIR COMPETITION

We were indeed saddened to hear of the passing of W6AM, the "Grand Ole' Man of DXing." Don Wallace became a silent key from a heart attack on May 24th. Don was a *CQ* DX Hall of Famer and one of the original sponsors of a Trophy in our World Wide DX Contest, dating back to the late '50s. Recently he was in the process of having his record of the most countries contacted by an amateur radio station recognized by the Guiness Book of World Records. Hopefully the record will be accepted and another amateur radio call will appear in the Book.

John Attaway's K4IIF invitation for opinions to make changes in the scoring system in our World Wide DX Contest, that appeared in the June issue of his DX Column, is bound to start a controversy, but that is nothing new. We have been receiving gripes about the inequities in the scoring system for years. Invariably they are from individuals concerned only about their own disadvantages.

We concede that on a world wide basis certain areas will have the edge over other areas, but this does not hold true over the years. Changes in the propagation cycle, a change of activity in certain countries and areas are a deciding factor who has the advantage that particular year.

The change made some years ago that increased the QSO point value to 2 points between North American stations over the original 1 point, was done to stimulate activity in the Caribbean area. This eventually paid off with an increase in Contest Expedition stations that go to the many islands in that area. This created many new country multipliers that would otherwise not be available, not only for the U.S. but also for *all* other areas, especially the many European countries.

We do not agree or go along with the changes suggested by TF2CW. Siggi's suggested change would no doubt benefit Iceland and Zone 40, both areas of very low activity. The Europeans do not need an added advantage to be competitive. With the tremendous activity and many available countries in that area they have managed to snag many awards.

KG6DX's suggestion that we include a separate listing of top scores by continents in the final results is a good one and will be forwarded to the Contest Committee. This should emphasize the fact that competition is between stations in the same continental areas and not on a worldwide basis.

So quoting Joel's remarks, "we are leaving the *CQ* World WIDE DX Contest scoring system just as it is."

14 Sherwood Road, Stamford, CT 06905

Calendar of Events

*	Jul.	27-28	Venezuelan CW Contest
*	Jul.	27-29	County Hunters CW Contest
	July	27-29	"Armadillo" Run
	Aug.	3-4	Wild Bunch 160 SSB Contest
†	Aug.	3-4	Romanian DX Contest
	Aug.	3-4	ARRL UHF Contest
	Aug.	10-11	European CW Contest
	Aug.	17-18	SARTG RTTY Contest
*	Aug.	17-18	SEANET SSB Contest
	Aug.	17-18	Alaska QSO Party
	Aug.	17-18	New Jersey QSO Party
	Aug.	24-25	All Asian CW Contest
	Aug.	24-25	GARTG RTTY Contest
†	Sep.	1	Bulgarian CW Contest
	Sep.	4-5	YL-RL "Howdy Days"
	Sep.	9-15	QCWA Invitation Party
	Sep.	14-15	European Phone Contest
	Sep.	21-22	Scandinavian CW Contest
	Sep.	28-29	Scandinavian SSB Contest
	Sep.	28-29	G-QRP Club Activity
	Oct.	6-7	Illinois QSO Party
	Oct.	12-13	Pennsylvania QSO Party
	Oct.	16-17	YL-RL Anniv. CW Party
	Oct.	19-20	Boy Scouts Jamboree
	Oct.	**26-27**	**CQ WW DX Phone Contest**
	Oct.	30-31	YL-RL Anniv. SSB Party
	Nov.	**23-24**	**CQ WW DX CW Contest**

* *Covered last month.*
† *Not official.*

A phone call from KZ5M advised me that the "Armadillo Run" is again scheduled on the same weekend as the County Hunters CW Contest. Same format as last year, but the concentration this year will be counties in New Mexico and Oklahoma. No other details. I assume logs will again go to: The Texas DX Society, Att: Dennis Motschenbacker, KZ5M, P.O. Box 82, Thompsons, TX 77481.

The St. Maarten A.R.C. called attention to the fact that the maximum legal transmitter power for the French Antilles (FM, FG, FS and etc.) is only 100 watts, therefore linear amplifiers are normally not allowed on French territory. Also to keep this in mind when comparing contest scores with other stations in the same general area.

The Kansas City, MO. ARARAT Shrine Radio Club, WAØNQA will host it's second annual "Talk In" for the benefit of crippled children's hospitals. The theme being "We Talk So They Can Walk." Activity will be on August 3rd and 4th from 10 AM to 10 PM CST. Look for them in the lower 10 kHz of the 10, 15, 20 and 40 meter General portions of the bands, and also the Novice 40 meter band. Certificates will be awarded for all contacts. Include a large s.a.s.e. when you send your report to J.V. Foust, KAØGBK, 5240 N. Palmer, Kansas City, MO 64119.

Once again I remind you that announcements for November events must be received no later than August 15th, and September 15th for December activities.

Have you checked the expiration date of your license lately?

73 for this time, Frank, W1WY

Romanian DX Contest

2000Z Sat. to 1600Z Sun., Aug. 3–4

No word from the Romanian Amateur Radio Federation this year. Following are the rules used in last year's contest. Operation was on all bands 3.5 thru 28 MHz, both c.w. and s.s.b.

Classes: Single operator, single and all band, and multi-operator all band (club stations).

Exchange: RS(T) and ITU zone. YO stations will also include 2 letters identifying their county (41 counties).

Scoring: QSOs with YO stations are worth 8 points; with stations outside own continent 4 points; with stations within own continent 2 points. (Own country has no value.)

Multiplier: Sum of ITU zones and YO counties worked on each band.

Final Score: Total QSO points from all bands (or single band) times the sum of the multipliers worked on each band.

Awards: The top scorer in each class in each country will receive the title "International Short-Wave Champion of Romania" and will receive a crystal cup.

Stations contacting at least 50 different stations, a minimum of which are Romanian, will receive an award. The same YO station worked on different bands will count separately (maximum of 5).

The continental winner, regardless of class section, will become an honorary member of the YO DX Club.

Use a separate log sheet for each band, indicate the multiplier in a separate column only the first time it is worked, and be sure to cross out any duplicate contacts. A summary sheet showing the scoring, etc., and the usual signed declaration that all rules and regulations have been observed is also requested.

Mailing deadline for all entries is September 4th to: Romanian Amateur Radio

Federation, P.O. Box 05 - 50, R-76100 Bucharest, Romania.

"Wild Bunch" 160 SSB Contest

0000Z Sat. to 2359Z Sun., Aug. 3–4

Evidently last year's contest was a success as the "Wild Bunch" is at it again this summer.

Exchange: Signal report and QTH. State, VE province, or country. Members will also include their membership number in the exchange.

Points: 10 points per QSO, mobiles 20 points.

State, provinces and countries worked. In addition the following can be added to your multiplier. One for each member contacted, 2 if it's a honorary member, 3 if a charter member. A contact with club station VE7WCB is worth 10 multiplier points, work a mobile and earn 20 more multipliers, and an additional 20 if you can dig up 20 charter members contacts. Which could add up to a sizeable multiplier. (*Rather complicated and confusing.*)

Awards: Certificates to winners in each state, province, and country. Plaques to the overall winner and highest charter member score.

Write to KA1SR and an s.a.s.e. for a list of club members and information and requirements to join the "Wild Bunch" club.

Mailing deadline for mailing logs is September 7th to R. Koziomkowski, KA1SR, 5 Watson Drive, Portsmouth, RI 02871. Include an s.a.s.e. for a copy of the results.

European DX Contest

C.W.: Aug. 10–11 Phone: Sept. 14–15
Starts: 0000 GMT Saturday
Ends: 2400 GMT Sunday

This is the 30th annual contest sponsored by the DARC. The activity will be between European countries and the rest of the world on all bands 3.5–28 MHz.

Following are updated rules, including two new features. U.S. states will now count as a multiplier, and QSO dupe sheets will now be required for each band on which 200 or more contacts are made.

Only 36 hours out of the 48-hour contest period may be used by single-operator stations. The 12 hour off periods may be taken in one, but not more than three, periods anytime in the contest and must be indicated in the log.

Classes: Single operator and multi-operator single transmitter, both all bands. Multi-operator stations are allowed to change bands one time only within a 15 minute period. A quick band change and return is allowed to work a new multiplier.

Exchange: RS(T) plus a QSO number starting with 001. In addition, W/K stations will include their state (i.e., 599011 MA).

Scoring: One point per QSO and one point for each QTC reported.

Multiplier: The multiplier for non-European stations is determined by the number of European countries worked on each band (WAE list). Europeans will use the ARRL DXCC list. In addition, each call area of the following countries will be considered a multiplier: JA, PY, VE/VO, VK, ZL, ZS, and UA9Ø. *Each W/K state will also be considered a multiplier.*

The multiplier on 3.5 MHz may be multiplied by 4, on 7 MHz by 3, and on 14/21/28 MHz by 2.

Final Score: Total QSO points, plus QTC points, times the sum total multiplier from all bands.

QTC Traffic: Additional point credit can be realized by making use of the QTC traffic feature. A QTC is a report of a confirmed QSO that took place earlier in the contest and was later sent back to a European station. It can only be sent from a non-European station back to a European. The general idea is that after a number of Europeans have been worked, a list of these stations can be reported back during a QSO with another station. An additional, one point credit can be claimed for each station reported.

A QTC contains the time, call, and QSO number of the station being reported (i.e., 1300/DL2DN/134, which means that at 1300Z you worked DL2DN and received #134).

A QSO can be reported only once and not back to the originating station.

A maximum of 10 QTCs to a station is

allowed. The same station may be worked several times to complete this quota. Only the original contact, however, has QSO value.

Keep a uniform list of QTCs sent; (3/7 indicates that this is the 3rd series of QTCs sent and that 7 QSOs are being reported).

Awards: Certificates to the top scorers in each class in each country and areas listed in the multiplier. Continental leaders and stations having at least half the score of the continental leader will also be honored.

Disqualification: Violation of the rules of the contest, unsportsmanlike conduct, or taking credit for excessive duplicate contacts will be deemed sufficient cause for disqualification.

Logs: It is suggested that you use the official DARC or equivalent forms. Figure 40 contacts to the page, and use a separate sheet for each band. A large-size s.a.e. and IRCs will get you a supply.

All entrants are now required to submit cross-check dupe sheets for each band with 200 or more QSOs. A penalty of three contacts will be deducted for each duplicate QSO that is removed by the committee.

Mailing deadline is September 15th for C.W. and October 15th for Phone. All entries go to: The WAEDC Contest Committee, P.O. Box 1328, D-8950 Kaufbeuren, West Germany.

WAE Country List: C31, CT1, CT2, DL, EA, EA6, EI, F, FC, G, GD, GI, GJ, GM, GM Shetland, GU, GW, HA, HB9, HB∅, HV, I, IS, IT, JW Bear, JW, JX, LA, LX, LZ, M1, OE, OH, OH∅, OJ∅, OK, ON, OY, OZ, PA, SM, SP, SV, SV Crete, SV Rhodes, SV Athos, TA1, TF, UA13456, UA2, UA Franz Josef Land, UB5, UC2, UN1, UO5, UP2, UQ2, UR2, Y2, YO, YU, ZA, ZB2, 1A∅, 3A, 9H1, 4U1 Geneva, 4U1 Vienna.

New Jersey QSO Party

2000Z Sat. to 0700Z Sun. Aug. 17–18
1300Z Sun. to 0200Z Mon. Aug. 18–19

This is the 26th annual party sponsored by the Englewood ARA. Phone and c.w. are part of the same contest, the same station may be worked on each band and mode, and NJ stations may contact in-state stations for QSO and multiplier credit.

Exchange: QSO no., RS(T), and QTH. County for NJ, ARRL section or country for others.

Scoring: NJ stations score 1 point for W/K and VE/VO contacts, and 3 points for DX. Multiply total by ARRL sections worked (maximum of 74). KP4, KL7, KH6, etc., are 3-point contacts and section multipliers.

Out-of-state stations multiply total NJ QSOs by number of NJ counties worked (maximum of 21).

Frequencies: 1810, 3535, 3900, 7035, 7135, 7235, 14035, 14280, 21100, 21355, 28100, 28610, 50–50.5, and 144–146. Try phone on even hours, 15 on odd hours, and 160 at 0500 UTC.

Awards: Certificates to the top scorers in each NJ county, ARRL section, and DX country. Second-place awards if four or more logs are received from that section. Also Novice and Tech., and mobile awards.

Use UTC time, indicate the multiplier only the first time it is worked, include a QSO check sheet, and include a summary sheet showing the scoring, etc. Send a large s.a.s.e. if you wish a copy of the results.

Stations planning activity in NJ are requested to advise the EARA by August 1st so that coverage of all counties may be planned.

Logs must be received no later than Sept. 14th and go to: Englewood ARA, P.O. Box 528, Englewood, NJ 07631-0528.

SARTG RTTY Contest

Three Periods GMT
0000–0800 & 1600–2400 Sat., Aug. 17
0800–1600 Sun., Aug. 18

This is the 15th annual contest sponsored by the Scandinavian Amateur Radio Teletype Group. Use all bands 3.5 through 28 MHz. The same station may be worked on each band for QSO and multiplier credit.

Classes: Single operator, multi-operator single transmitter, and s.w.l.

Exchange: QSO no., signal report.

Points: QSOs with own country, 5 points. With other countries on same continent, 10 points. With other continents, 15 points. The U.S., Canada, and Australia call areas count as separate countries for scoring.

Multiplier: Each DXCC country and each W/K, VE/VO, and VK call area. A multiplier will not be considered unless the claimed station appears in at least five logs, or a log is received from that station.

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

S.w.l.'s use same scoring but based on sum of stations and messages copied.

Awards: Certificates to the top-scoring stations in each class in each country and each call area of the U.S., Canada, and Australia.

Use a separate sheet for each band, and include a summary sheet showing the scoring, comments, and other essential information, and your name and address in block letters.

Logs must be received by October 10th and go to: Contest Manager, Jorgen Dudahl-Lasjon, OZ1CRL, Egebjergvej 90, 4500 Nykohing Sj, DENMARK.

Alaska QSO Party

0200Z Sat. to 0200Z Mon., Aug. 17–18

This is the 4th time around for this QSO Party sponsored by the Alaska DX Association. All bands will be activated, offering a good opportunity to pick up some of those vacant spots for 5 Band WAS, WAZ, DXCC, etc. The same station may be contacted on each band, c.w. and s.s.b., for QSO credit, but counted only once as a multiplier.

Exchange: RS(T) and judicial district for KL7's. RS(T), QSO no., and state, province or DX country for others.

Scoring: *For Alaskans*—QSOs on 10, 15, and 20 count 2 points. On 40, 80, and 160 they are worth 5 points.

For non-Alaskans—On 10, 15, and 20 QSOs count 5 points. On 40, 80, and 160 they are worth 10 points.

Multiplier: *For Alaskans*—states, VE provinces, and DXCC countries worked on each band.

For non-Alaskans—KL7 judicial districts (1–4) worked on each band.

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

Frequencies: 10 kHz inside the low edge of each General Class segment, both on c.w. and s.s.b.

Awards: Certificates to the winner in each state, VE province, and DX country. The top Alaskan and non-Alaskan will receive an Alaskan Goldpanner Plaque.

Logs and summary sheets must be received no later than October 1st and go to: Alaska DX Association, Att: Tony

Smaker, KL7AF, P.O. Box 1614, Kodiak Island, Alaska 99615.

All Asian C.W. Contest

0000Z Sat. to 2400Z Sun., Aug. 24–25

The same rules as for the Phone Contest on June 15–16 apply here. See June Contest Calendar for complete rules. Logs for this one must be in the hands of the committee no later than November 30th. They go to: JARL, P.O. Box 377, Tokyo Central, Japan.

GARTG RTTY Contest

VHF: 1200Z to 1600Z Sat., Aug. 24
40 & 80 M: 0700Z to 1100Z Sun., Aug. 25

This is the fourth in a series of five short contest periods scheduled by the GARTG for 1985. They are local activities for GARTG members, but other areas are invited to participate.

Classes: A—200 watts or more input. B—200 watts or less input. C—SWL. D—VHF.

Exchange: RST, QSO no., name, and QTH.

Scoring: Contacts on 40 and 80 are worth 1 point. VHF contacts on 2 meters 1 point. On 70 cm 2 points. On 23 cm 3 points per kilometer worked. Final score total of QSO points.

Each contest is a separate activity and should be scored and reported separately. Results will be published in the GARTG news bulletin and the "RTTY" club magazine.

Logs must be mailed no later than 20 days from the end of each contest and go to: Wolfgang Puenjer, DL8VX, P.O. Box 90 11 30, D-2100 Hamburg 90, Federal Republic of Germany.

Bulgarian C.W. Contest

0000Z to 2400Z Sun., Sept. 1

This is a world-wide contest open to all, but with emphasis on working LZ's.

Classes: *A.* Single operator, single band. *B.* Single operator, all band. *C.* Multi-operator, all band. *D.* S.w.l.'s. Use all bands, 3.5 through 28 MHz.

Exchange: RST plus your ITU zone.

Scoring: One point for QSO with stations in the same continent (including same country), 3 points if in another continent, and 6 points for LZ contacts.

S.w.l.'s score 3 points if both calls and exchanges are reported, and 1 point if both calls but only one exchange.

Multiplier: Sum total of ITU zones worked on each band.

Final Score: Total QSO points from all bands times the total multiplier.

Awards: Medals to the top three world scorers in classes *A* and *B*. Cup and medals to classes *B* and *C*. Medals to continental leaders and s.w.l.'s.

Use a separate log sheet for each band, a summary sheet showing the scoring, and the usual signed declaration, plus your name and address in block letters.

Contest contacts may be used for the many LZ awards. Write to the BFRA for details.

Mailing deadline for logs is October 5th to: Bulgarian Federation of Radio Amateurs, P.O. Box 830, Sofia 1000, Bulgaria.

YLRL "Howdy Days"

1800Z Wed. to 1800Z Thurs., Sept. 4-5

This activity is for YL's, and scores will be based on contacts between YL's only. All licensed woman operators throughout the world are invited to join the party.

All bands and modes 10 through 80 meters may be used. Only one contact with the same station is permitted, regardless of the band. Crossband and Net contacts do not count.

Suggested Frequencies: C.W.—3555, 7055, 14055, 21095, 28095. S.S.B.—3955, 7255, 14265, 21365 28595. (Plus or minus 15 kHz.)

Score 2 points for each YLRL member worked; 1 point if it's with a non-member. Therefore, members should identify themselves in the exchange. There is no multiplier; just add the QSO points.

The top-scoring YLRL member will receive her choice of a YLRL pin, charm, or stationery. The highest scoring non-member will receive a one-year membership in the YLRL.

Submit your original log, no carbon copies. Indicate if you are a member, score your log, and sign the summary sheet.

You are expected to delete all duplicate contacts. For each duplicate contact that is removed by the Committee, a penalty of three additional and equal contacts will be removed from your score.

Logs must be received by October 4th and go to: Marty Silver, NY4H, 3118 Eton Road, Raleigh, NC 27608.

dateline... Washington, D.C.

a regular feature by
THEODORE J. COHEN, N4XX

THE INS AND OUTS OF THE WASHINGTON SCENE

Discussions Continue Of Call Sign Issuance By ARRL

In January 1985, the ARRL's Board of Directors asked the Executive Vice President ". . . to pursue the acquisition of all necessary statutory and regulatory authority to provide assistance to the Commission on the area of call sign issuance . . ." (Minute 52). In response to this directive, a number of meetings have been held in Washington, DC, and Gettysburg, PA, and elsewhere between League representatives and members of the Commission's Private Radio Bureau (PRB).

According to Ray Kowalski, Chief, Special Services Division, PRB, one subject under discussion involves the types of call signs that could potentially be issued (e.g., standard call signs issued under the current regulations; call signs for special events, repeaters, and clubs; preferred call signs; and dormant call signs that can be "recycled"). Also being discussed are the costs associated with call sign issuance. Kowalski pointed out that at this time, nothing regarding League assistance in this matter has been approved at the Commission level.

One way in which the Commission and the League could work together on issuing call signs—and this is only one of a number of options being considered—would work as follows. The FCC would still license individuals and would issue a standard call sign that would be used for reference purposes. The licensee may use this call sign on the air, or, alternatively, he or she may request a specific, unassigned call sign from the League. The League's service, by the way, would be available to members and non-members alike.

A determination as to whether the Commission and the League should proceed in this matter is not expected before the end of the year.

League To Pursue New Privileges For Novices

At it's meeting in May, the Executive Committee of the ARRL approved a plan to enhance provileges for Novice class operators. The move, which must still be approved by the Board of Directors (mail ballots are being solicited as this is written), was taken as but one of the many steps in the League's attempt to attract young people to amateur radio.

Basically, the following package of new privileges was endorsed:

1. Expand the current 28 MHz band to provide for CW and data transmission (1200 baud, maximum) in the sub-band 28.1–28.3 MHz, and to provide for CW and SSB in the sub-band 28.3–28.5 MHz.

2. Permit all voice and data modes in the band 220–225 MHz. Power would be limited to 25 watts output, and Novices, while able to use repeaters, would not be able to sponsor them.

3. Permit operations in the 1240 MHz band similar to those proposed for the 220 MHz band. However, power would be limited to 5 watts output.

Taken together, the proposals are meant to encourage those who are interested in computers, digital communications, and packet radio to join our ranks. Further access by Novices to VHF and UHF bands populated with repeaters was thought to be an ideal way to attract people who are interested in the public service aspects of amateur radio.

It should be noted that Technicians would be granted any new 10 meter privileges granted to Novices.

Report And Order Released On Spread Spectrum

According to Dr. Michael Marcus, Chief, Technology Analysis Division, Office of Science and Technology (OST), FCC, the Commission has adopted a Notice of Inquiry and Proposed Rule Making to permit the use of spread spectrum emissions in the amateur service (General Docket No. 81-414). In its Report and Order in the matter, the Commission noted its intent ". . . to provide licensees in the amateur service with the opportunity to experiment with and take advantage of (spread spectrum) technology which has been, until now, almost entirely limited to (use in) costly military systems." The wideband emissions used in spread spectrum transmission would be limited to our frequency bands at 420 MHz and above, and the new rules would not go into effect until 12 months after the Report and Order was released (i.e., one year from 24 May 1985). The year's wait was intended to give the amateur service time to develop voluntary standards for the use of spread spectrum emissions. Amateurs wishing to experiment with spread spectrum at this time, however, may still obtain a Special Temporary Authorization (STA).

In a spread-spectrum system, the transmitted bandwidth is significantly greater than the information bandwidth. That is, the radiated signal is "spread" over a broad band of frequencies. However, this "spreading" also reduces the power spectral density of the signal, and so, conventional (narrowband) communications receivers are not likely to experience harmful interference. At the receiving end, the spread spectrum signal is "de-spread" to yield the information transmitted.

Shuttle Flight 51 F To Carry Two Amateurs

About the time this issue hits the street, two astronauts—Tony England (WØORE) and John David Bartoe (W4NYZ)—should be active from Shuttle Flight 51 F on a frequency of 145.55 MHz (it's interesting to note that Shuttle Commander Gordon Fullerton was also once a licensed amateur). Amateur operations are expected to begin as early as the second half of Mission Day Two. Early transmissions will likely be made using slow-scan television, with the intent being to work youth groups that are paired with amateur radio clubs. Two-way voice contacts could occur as early as Day Three.

Amateurs seeking to work Flight 51 F should be patient. This flight, after all, is a SPACELAB mission, and Shuttle duties have first priority.

Check Your License Expiration Date . . . Now!

Before you even finish this column, take a moment and check the expiration date on your amateur license! Why? Because with its long validity period, it's all too easy to overlook the fact that at some point, the license will expire. If it does,

---

Media-Tech®, 8603 Conover Place, Alexandria, VA 22308

and if two years elapse, you will lose everything . . . your operating privileges, your station license, and your call. Even if you renew during the FCC-sanctioned "grace" period, you may not operate until your new license arrives.

Check now, before it's too late. And if the expiration date is near, send your FCC Form 610 to Gettysburg. You will not only have the peace of mind that comes with protecting your amateur privileges, but since your new license will be good for ten years, you can also stop worrying (at least for a while) about renewal.

RFI Complaints Remain At High Level

According to Jeffrey Young, Enforcement Division, Field Operations Bureau (FOB), FCC, RFI complaints to the Commision in the second quarter of FY-85 (January, February, and March 1985) totaled 19,000, up slightly from the 18,919 complaints reported in the same period a year earlier. This suggests that RFI cases are again running in excess of 75,000 per year!

Of the 19,000 complaints receive, 14,048 (74%) involved a television receiver as the victim device. Of these, CB operations were alleged to be involved in 8,307 cases of TVI (compared to 9,725 in the year-earlier period) while amateurs were cited in 1,053 cases (compared to 739 cases in the year-earlier period).

In all, CBers were alleged to be involved in 9,538 complaints, while amateurs accounted for 1,360. Complaints by amateurs against other amateurs totaled 230, down from the 384 complaints reported in the year-earlier period.

In reviewing the statistics on amateur-to-amateur complaints, Sue Earlewine, Chief, Public Contact Branch, Public Service Division, FOB, was encouraged by what appears to be a trend towards fewer cases of this type. She expressed the hope that this was an indication amateurs were moving to resolve co-channel interference problems on their own, without requiring the intervention of the Commission.

Soviet Union Also Has RFI Problems

Kommir Vasil'yevich Ivanov, Chief, State Telecommunication Inspectorate of the Ministry of Communication of the USSR, noted that ". . . the wide introduction of the most varied forms of radio equipment raises questions concerning electromagnetic compatibility." Writing in the journal *RADIO*, he noted that his Inspectorate receives as many as 10,000 requests each year for help in resolving RFI complaints involving consumer devices . . . devices, Ivanov notes, that are only weakly shielded from external radiation. "Experience shows that designers and producers (of consumer equipment) have not, and often do not, devote necessary attention to protecting consumer equipment from electromagnetic fields," he said. Further, Ivanov observed that "the wide introduction of transistors and microcircuits into consumer equipment creates additional problems unless special measures are taken."

People's Republic Of Benin Chancery Antenna Sparks Controversy

In December 1984, officials from the People's Republic of Benin applied for a permit to erect a radio tower at their chancery in Washington, DC. The 38-foot tower, on which would be mounted an antenna for the band 7–24 MHz, would be used for communications between the chancery and Benin, a small country in west Africa.

According to Sally Squires of *The Washington Post,* construction of the radio tower is opposed by the 6,000-member Woodley Park Community Association for two reasons:

1. Concern over possible health hazards from transmissions.
2. Fear that transmissions from the embassy would interfere with the operation of local radios, television receivers, and telephones.

According to Squires, who has recently written a series of articles on the hazards of non-ionizing radiation for the *Post,* at least one engineer confirms that both of the associations concerns are real possibilities, and that ". . . exposure to nonionizing radiation levels may exceed standards set by the American National Standards Institute." However, Benin and the U.S. State Department have argued that the radiation levels are safe and that interference will not be a problem.

The District's Board of Zoning Adjustment was expected to make a decision on this matter as this issue goes to press. Obviously, refusal of the Board to grant a permit on the basis of either argument set forth by the community association could have serious implications for amateurs in the District.

Telephone Interference Information Update

Audio rectification of radio signals in your telephone can be most annoying! And if you own your telephone, interference prevention is your responsibility . . . not the telephone company's.

The 1985 Radio Amateur's Handbook has information on how to resolve problems with your instrument. However, the following information, provided by W. E. Bip Bachman, W6BIP and Bob Marchand, K6HQL, may be of interest. Published in the *Bulletin* of the Southern California DX Club, it supplements the information in the *Handbook.*

"A new RF filter module SKU #52710 (consisting of inductances) which can be plugged into the telephone jack is now sold by AT&T at the National Service Center, St. Lous, MO (800-222-3111). The filter sells for $8.95 plus state sales tax and $4.75 shipping handling. One or more filters will be shipped for the $4.75 shipping and handling charge.

"Compensation networks #425J and 4010E are no longer manufactured.

"Compensation network (without varistors) #4228D is available for the series 500, 700, 1500, 1600, 1700, 2500, and 2700 phones. Bell system ordering information is COM CODE 102-390-150 listed in the *Product Ordering and Service Guide.*

"Compensation network (without varistors) #4228J is available for some series 900 phones. Bell system ordering information is COM CODE 103-390-200 listed in the *Product Ordering and Service Guide.*

Bell System Practice 500-150-100 has installation instructions for the compensation networks and RFI mitigation procedures."

A Reminder: 24 MHz Band Available

As predicted in an earlier column, the Commission has released a First Report and Order in the matter of new frequency

bands for the Amateur service (PR Docket 84-960), and has made the frequencies 24.890–24.990 MHz available to General, Advanced, and Amateur Extra class licensees. The band was officially opened on 22 June 1985, with the use of full power permitted (1500 Watts PEP). In the subband 24.890 to 24.930 MHz, only CW and RTTY may be used; however, CW, phone, FAX, and SSTV are authorized in the subband 24.930 to 24.990 MHz. Amateurs are reminded that the Fixed service has a Primary allocation in this band until 1989. As such, amateurs, who have only a Secondary allocation until that time, *may not* cause interference to stations in this service.

In the same action, the Commission made official the amateur 10 MHz allocation (10.1 to 10.15 MHz). However, the 200 watts PEP power limit remains in effect to protect Fixed service operations. Further, CW and RTTY are the only modes authorized in this band.

The 10 and 24 MHz issues were considered "non-controversial" by the Commission; hence, their early resolution. Other matters contained in PR Docket 84-960, such as the proposed allocation to amateurs at 902–928 MHz, involve contentious issues that will be resolved in a Second Report and Order.

Big Antennas . . . Big Birds . . . Big Problems

Regardless of whether you are a "big gun," or just a "little pistol," chances are pretty good that if you chase DX, you have some aluminum tubing in the air. Chances are also good that birds roost on the boom and elements. And that can spell trouble, especially if the antenna is mounted above your house, patio, or pool!

Is there anything you can do about the birds? You bet there is!! Just borrow an idea from Jim McCook, W6YA, who owns and operates a big contest station in Leucadia, CA. What McCook did was to mount two "scarecrow owls" on his arrays. Each owl, purchase from Sears (#9-9433) is a hollow plastic model of a Great Horned Owl, one of the most carnivorous predators in the American wilderness and an enemy to crows, pigeons, sparrows, woodpeckers, and other birds (not to mention rats, snakes, and rabbits). The plastic owl, which stands 18 inches high, can easily be mounted on a post or ledge using the pocket at the base of the owl. Alternatively, it may be suspended from an overhanging object. For mounting on an antenna boom, cut a circular wood block to fit the pocket at the base of the owl, and mount it on a plate which attaches to the boom using U-bolts.

According to Sears, experts recommend moving the owl occasionally so pests do not become accustomed to its static presence (the wind, of course, will move a suspended decoy). For owls mounted on your antenna, rotating the array from time to time should serve the same purpose.

Do the owls "work?" According to McCook, "For me, it has been a revolutionary experience! I haven't seen a pigeon in a year."

Owl scarecrows are also used by boaters to keep seagulls away from their craft. As such, marine supply outlets such as E&B Marine of Edison, NJ, a major East Coast discounter, also sells owls. (Note that the owls sold by marine supply outlets may differ in size and coloring from the owls sold by Sears.)

Give the idea a try. And let us know how it works!

Radio Marti Begins Broadcasting

Radio Marti, the U.S. government's broadcasting service to Cuba, began operation on Monday, 20 May 1985. The date marked the 83rd anniversary of Cuba's independence from U.S. military control following the Spanish-American War.

The new broadcasting service, which is named after the 19th-century Cuban patriot Jose Marti, and which broadcasts anticommunist political comment, news, and music, uses a 50,000 watt transmitter and operates on a frequency of 1180 kHz. Cuban President Fidel Castro immediately took steps to jam Radio Marti's transmissions, with a loud drone heard on the station's frequency only one day after the station went on the air. As we go to press, officials in Washington fear that Castro will retaliate for Radio Marti's broadcasts by disrupting the operation of commercial U.S. broadcasters. Readers may recall that during the Congressional debates on Radio Marti two years ago, programs beamed Stateside by Castro were heard as far west as Salt Lake City.

CATV Association Urges Scrambling Of Satellite Signals

According the *CATACABLE*, the journal of the Community Antenna Television Association, the Association is strongly urging its members to support ". . . only those cable programmers who scramble their satellite delivered signals." What incenses the Association is that 'someone else' (i.e., the owner of a home earth terminal) is getting a product for which the CATV operator must pay. This, obviously, translates into a loss of revenue for the cable industry since owners of these earth terminals are unlikely to purchase cable service. Equally annoying to the cable operators is the perception that the satellite services will move to scramble their signals only when they have assured themselves of being in a position of controlling the distribution of the signals (for example, by controlling an addressable computer in the home earth terminal that will unscramble the programs).

While there is very little in the way of concerted action that can be taken by the CATV operators at this time, the Association urged its members to support only those distributors who move quickly to scramble their programs. The others, said the Association, should be told to "market to the million or so home earth terminal folks."

The staff of CQ joins your Washington Editor in congratulating Ken Miller, K6IR, President and CEO of PENRIL Corporation, Rockville, MD, for being cited by the Society for Advanced Management at a key award ceremony.

The contributions to this month's column from Steve Thompson (N4TX) were most appreciated. CQ

TNT RADIO SALES INC.

AUG. EXPLOSION OF VALUES!

ICOM

KENWOOD

KANTRONICS

TELEX HY-GAIN

MIRAGE

HUSTLER

AEA

KLM

SANTEC

ROHN

KDK

MFJ

NYE VIKING

AMERITRON

WELZ

BENCHER

LARSEN

BUTTERNUT

CALL NOW!

1-800-328-0250

FOR ABSOLUTE

LOWEST PRICE BUSTERS!

... AND MORE!

INVENTORY REDUCTION PRICED to GO!

We must make more room for your trade-ins. Check now for lowest prices on previously owned bench-tested equipment!

VISA/MASTER CARD
FREE SHIPPING
ON MOST RIGS FOR CASH!

S.A.S.E. FOR OUR
"BENCH-TESTED"
USED EQUIPMENT LISTING

MON-FRI 9 AM - 6 PM CENTRAL TIME
SATURDAY 9 AM - 5 PM

4124 West Broadway,
Robbinsdale, MN 55422 (Mpls./St. Paul)

1-612-535-5050
(IN MINNESOTA CALL
TNT COLLECT)

1-800-328-0250
TOLL FREE QUOTES

CIRCLE 123 ON READER SERVICE CARD

1985 CQ 160 Meter Contest
High-Claimed Scores

The following are early-bird high-claimed scores as of May 16, 1985. These are raw scores subject to verification. An asterisk(*) denotes multi-op entries.

C.W.

EA2OP	362,610
GW3YDX	338,536
W1CF	323,444
*LZ1KDP	320,598
*GM0AAS	311,040
*EA3VY	295,360
HB9AMO	292,986
K1ZM	273,315
KV4FZ	264,771
K5NA	254,727
OH0BA	219,075
*N9MM	214,790
*W8JI	205,536
W1BIH/PJ2	202,150
*UP1BWR	194,346
K2EK	193,040
VE3MFA	190,240
*UR1RWX	189,610
N7DF	187,528
W3BGN	184,002
YU3EF	180,378
AA1K	167,220
W1RR	166,985
YV3AGT	165,319
YV1OB	155,000
*W0AIH	154,878
4X4NJ	154,639
*LZ2CJ	150,318
W4RX	150,093
K8MFO	141,375
UA1DZ	137,883
VE3ABG	135,309
*K5RR	134,827
PA3BFM	133,824
*YU1EXY	132,986
*K9RS	131,175
W3LPL	129,480
*K1RQ	129,437
*N4PN	128,650
K3TUP	127,604
*AD8C	125,520
*YU2CRT	124,320
*WA0TKJ	122,740
*N4EHJ	122,176
W0UA	121,280
*YT3T	121,275
K5GN	120,933
UB5ZAL	119,871
W7EJ	117,783
EA9EU	117,135
*W7FU	115,804
UC2AA	115,689
*DJ1BZ	114,266
*N4SF	113,575
*YU7JDE	113,080
*K6NA	112,393
AI7B	112,190
*W7TJ	111,975
VE5RA	111,264
G3XWZ	110,922
W1KM	110,290
VE5XU	110,105
*W0BXR	108,332
G4OBK	108,129
*DK6AS	108,088
*N4BP	107,680
*K4XU	106,416
W3GM	106,334
*W9AZ	106,288
*K3UA	105,042
CT1AOZ	102,776
*OK1KSO	102,196
*KI0G	100,110
LA2GV	100,080
*UP1BZR	100,000

S.S.B.

VE3CVX	368,549
K1ZM	293,250
*OK3KFO	287,400
*VP9IJ	285,515
VE3MFA	264,303
W1CF	251,133
KV4FZ	241,635
*UR1RWX	233,331
*KC8MK	231,748
AA1K	222,300
J87UEE	207,815
K2EK	201,115
*K4LYY	182,500
W9ZRX	178,230
*CG3NNR	166,920
*W9AZ	162,144
N7DF	159,068
W3TS	158,400
GW3YDX	157,666
*WU4G	154,800
W0EJ	149,328
*W8RA	138,776
*W8LT	138,158
LZ2CJ	138,088
VP2EAG	116,245
*WA4JXI	115,344
N4NX	115,206
AA4MM	114,912
YV2IF	107,640
W1ODY	101,982
VE3OME	101,657
*HB9CIP	96,530
K6HNZ	96,320
*I4YNO	95,050
KA1SR	94,146
*KB5DN	93,426
*NK7U	91,000
WI4R	89,040
*N4FNB	77,128
WZ4F	75,956
K2VV	74,337
W2FJ	73,000
KC8JH	72,298
EA3ALD	71,960
W4NL	69,479
N0BQV	68,640
*KG7Z	67,340
*K3UA	66,172
W3GG	63,744
K3ZO	62,811
KA7AUH	61,803

1985 CQ WW WPX S.S.B. Contest High-Claimed Scores

The following scores are early-bird high-claimed scores as of 1 June 1985. These are raw scores subject to verification.

U.S.A.
SINGLE OPERATOR ALL BAND

KI6P	4,485,496
K6HNZ	2,289,105
K3ZJ	2,093,056
K1YR	2,002,175
AK1A	1,996,052
N3BJ	1,562,912
K5RX	1,413,152
K1VUT	1,361,822
KJ9D	1,309,206
AI8S	1,239,882
AI2C/4	1,216,152
K4JPD	1,213,632
KM9L	1,142,745
KS3F	737,660
K6EID	731,023

28 MHz

N4EJV	8,835
WD8PAQ	528

21 MHz

N4MM	84,252
N4BP	70,905

14 MHz

KG1E	2,918,175
N2AA	2,375,955
N2AU	1,769,611
N8II	1,277,460
KØRWL	1,003,735
KQ9L	977,850
WI4K	894,795
K1KJT	667,945
KB8PK	542,440
KØSCM	533,336

7 MHz

NI6W	974,516
AG9S	146,286
N2BOW	68,364
KAØIQR	67,396
NJ8N	59,452
KBØC/9	57,380
KA7KDU	45,588

3.8 MHz

KQ2M	1,275,166
K9ZO	300,792
KN8R	244,728
KS9U	162,442
W6RJ	148,995
KU8E	137,000
K7GWK	135,790
KD8X	107,256
KC8JH	96,300
K7LXC	92,340

1.8 MHz

K5UR	124,576
KG4W	74,112
AA4MM	48,048
KA1SR	36,942
N4NX	23,100
N7DFØ	19,750
W3BGN	15,552
K7IDX	2,016

QRPp

WD4NBX	A	177,800
KB7M	21	1,105
W6CN	14	35,772

MULTI SINGLE

KN6M/5	4,427,304
N4WW	3,710,056
KW8N	3,646,552
NO4J	3,198,392
N7TT	2,945,792
NS6X	2,778,213
KI1G	2,423,160
NB6L	2,421,404
AA5B	1,766,709
NU6S	1,462,104
KMØL	1,132,404
WC6I	1,090,400
NI2T	1,025,960

MULTI-MULTI

NM5L	4,590,402
NO5Q	1,213,614
KJ6V	422,028
K5NA/2	301,570
K6XO	211,728

DX
SINGLE OPERATOR ALL BAND

EA9IE	8,780,965
AI6V/NH6	6,780,534
CG3IY	4,437,293
CG5RA	3,766,986
HB9CXZ	3,523,218
CT1BCM	3,276,680
AH8A	3,085,800
CG3CRG	3,019,218
D44BC	2,994,348
CG3XN	2,955,150
TR1G	2,874,485
VP2MBA	2,830,999
PP2ZDD	2,801,598
OK1RI	2,693,670
JG1ZUY	2,384,960
LU1BR	2,334,159
EA3CCN	1,599,000
HIØA	1,494,900
YU7AV	1,232,395
ED3CBE	1,157,679

28 MHz

LU1E	707,128
VK8XX	480,770
LU1VK	51,520
YV6BTF	47,895
JH1VTF	19,404

21 MHz

LU2FDR	5,429,424
CE6EZ	3,590,262
YCØDPO	2,018,351
ZY5BI	1,484,210
YCØEMJ	508,800
EA6VQ	223,608

14 MHz

VP2EC	5,030,424
OK3CSC	2,857,755
C44LP	2,476,031
JH3YJM	2,016,525
SMØAJU	1,515,366
JA3YKC	1,426,896
VE7IN	1,355,790
DL8PC	1,351,770
PY4OD	1,241,950
I5FCK	1,192,100
JH1AEP	1,033,290

7 MHz

CZ3BMV	3,423,816
VF1CV	3,386,736
FM5CD	3,169,310
DJ4PT	1,494,768
ZP5JCY	1,487,010
TE1W	1,303,272
4N3E	1,163,520
CT4KQ	1,089,564
JA2BAY	487,287

3.8 MHz

OH1RY/CT3	2,838,290
CX3CO	1,330,560
OH2JA	501,696
DF8XC	483,608
I4EWH	332,820
ZL1BMU	300,322
YV6CAX	231,166
DF1LX	183,084
KL7AF	166,108

1.8 MHz

CG3MFA	321,084
EA8AFS	284,798
VE3OME	162,798
SP5INQ	85,140
3V8PS	49,128
OK3CQD	28,120

QRPp

AH6EK	A	46,746
4M7QP	28	18,942
ZS6PT	21	89,082
SP4DM	14	7,020
JK1RJQ	7	4,030

MULTI-SINGLE

KD7P/NH4	10,553,222
IO5NPH	9,520,392
AH2U	7,576,045
OH8AA	6,470,880
ED8RCT	5,430,060
F6KAW	4,823,910
CG4ALO	3,108,742
GBØWPX	2,832,600
4U1ITU	2,759,022
EI7H	2,756,598
KB6DAW/KH2	2,550,175
YT3T	2,374,272
DLØWPX	2,095,038
OK3KII	1,404,840
5B4ES	1,332,034
JA6YAI	1,207,050
CG7UBC	1,097,628
DLØJU	1,097,010

MULTI-MULTI

WL7E	11,764,963
PI4DEC	2,017,400
VK75A	881,790
JAØZAV	207,888

Note: Queries pertaining to the WPX Contest should be sent to N8BJQ via *CQ* magazine, 76 N. Broadway, Hicksville, NY 11801.

KENWOOD

TS-940S LIST $1999
NEW Top-of-the-Line
HF Transceiver
- 100% Duty Cycle
- 40 Memory Channels

CALL FOR SPECIAL PRICES!!

TS-930S LIST PRICE $1649
CALL FOR SPECIAL SALE PRICE!

TS-430S LIST PRICE $899.95
CALL FOR SPECIAL SALE PRICE!

TS-711A LIST $799.95
TS-811A LIST $899.95
CALL FOR SPECIAL PRICE!

TW-4000A LIST $599.95
CALL FOR SPECIAL PRICE!

TR2600A - 2mtr
TR3600A - 70cm
High Tech
HT XCVRS

NEW
Ultra-
Compact
HT XCVRS
TH21AT 2mtr
TH31AT 220 MHz
TH41AT 440 MHz
CALL FOR SPECIAL PRICES—
SAVE $$$!!

MIRAGE AMPLIFIER SALE!

B3016
ONLY $199!

Model	Band	Pre-amp	Input	Output	Sale Price
A1015	6M	Yes	10W	150W	$249
B23	2M	No	2W	30W	$ 79
B215	2M	Yes	2W	150W	$259
B108	2M	Yes	10W	80W	$159
B1016	2M	Yes	10W	160W	$249
B3016	2M	Yes	30W	160W	$199
C22	220	No	2W	20W	$ 79
C106	220	Yes	10W	60W	$179
C1012	220	Yes	10W	120W	$259
D24	440	No	2W	40W	$179
D1010N	440	No	10W	100W	$289

ICOM

IC735 NEW General Coverage
HF Transceiver Full Featured
-Ultra Compact - Economical
List Price $849
CALL FOR SPECIAL PRICE!

IC745 General Coverage
HF Transceiver List $999
IC751 Full Featured
HF Transceiver List $1399
CALL TODAY FOR LOW
TEXAS TOWERS/ICOM PRICES!

IC271A List $699 IC271H List $899
IC471A List $799 IC471H List $1099

CALL TODAY FOR SPECIAL
LOW ICOM PRICES!!

IC27A List $369 IC27H List $409
IC37A List $449 IC47A List $469

CALL TODAY FOR SPECIAL
ICOM PRICES!

IC3200 NEW 2m/70cm
Dual Band Xcvr List $549
CALL FOR SPECIAL PRICE !

IC02AT - 2mtr
IC04AT - 70cm
High Tech
HT XCVRS

IC2AT - 2mtr
IC3AT 220 MHz
IC4AT 440 MHz
ALL IN STOCK—
CALL FOR SPECIAL PRICES!

ASTRON POWER SUPPLIES

Heavy Duty - High Quality - Rugged - Reliable

- Input Voltage: 105-125 VAC Output: 13.8 VDC ± .05V
- Fully Electronically Regulated—5mV Maximum Ripple
- Current Limiting & Crowbar Protection Circuits
- M-Series With Meter—
  A-Series Without Meter

Model	'Cont. Amps	ICS Amps	Price
RS4A	3	4	$ 39
RS7A	5	7	49
RS12A	9	12	69
RS20A	16	20	89
RS20M	16	20	109
RS35A	25	35	135
RS35M	25	35	149
RS50A	37	50	199
RS50M	37	50	229

YAESU

FT-757GX LIST PRICE $829
CALL FOR SPECIAL SALE PRICE!

FT-726R LIST PRICE $899
CALL FOR SPECIAL SALE PRICE!

FT2700RH NEW 2m/70cm
Dual Band Transceiver
Full Duplex — Cross Band
Operation! List $579
CALL FOR PRICE—SAVE $$!

FT-209RH
NEW High Tech
2mtr HT
5 Watt Output
NOW IN STOCK

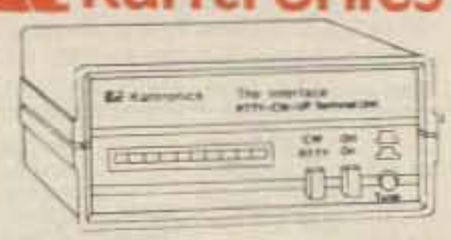
CALL FOR YOUR
SPECIAL PRICE!

CP-1 COMPUTER PATCH
List $239.95 SALE $189.95

CP1-1 Computer Patch	$189.95
CP-1/20 Computer Patch W/VIC20 MBATEXT	$219.95
CP-1/64 Computer Patch W/C64 MBATEXT	$219.95
CP-100 Deluxe Computer Patch	$299.95
MP-1 Micropatch	$129.95
ATU-1000 Advanced Terminal Unit	$949.95
MBATOR Software C64 or VIC20 (Specify)	$89.95
Doctor DX CW Band Simulator Software	$99.95
Doctor QSO Morse Code Trainer Software	$79.95
PKT-1 Packet Controller	$469.95

Isopole 144MHz, 220MHz & 440MHz Antennas
In Stock — CALL FOR SPECIAL PRICES!

Kantronics



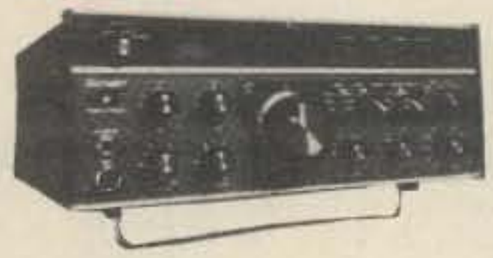
The Interface	List $169.95	SALE $129.95
Interface II	List $269.95	SALE $239.95
Challenger	List $99.95	SALE $89.95
Universal Term Unit	List $199.95	SALE $189.95
Packet Communicator	List $389.95	SALE $369.95
UTU Terminal Software (IBM/CPM/TRS80)		$19.95
Hamsoft/Amtorsoft (Atari/C64/VIC/TRS80C)		$79.95
Apple Hamsoft $29.95 Atari/VIC Hamsoft		$49.95
TRS80C Hamsoft $59.95 TI994A Hamsoft		$99.95
Hamtext (Apple/Atari/C64/VIC20)		$99.95
Amtorsoft (C64/VIC20)		$89.95
Amtorsoft (Apple)		$139.95

AMERITRON

AL80A NEW 1000W 3-500Z Amplifier $689

Al-84 600W PEP Output (4-6MJ6 Tubes)	$379
AL-1200 1500W Output (3CX-1200 Tube)	$1399
RCS-8 5 Pos Remote Antenna Switch	$119
ATR-15 1500W Antenna Tuner	$289

TEN-TEC SALE!



NEW CORSAIR II
CALL FOR PRICE AND DELIVERY INFORMATION

425 Titan New 3KW amplifier
in stock-only $2195!

J.I.L.

SX400 Deluxe Scanner

SX200 26-514 MHz Scanner	$199
SX400 26-520MHz Scanner/Radio	$499
RF1030 100kHz-30MHz Converter	$239
RF5080 500-800MHz Converter	$199
RF8014 800-1400MHz Converter	$199
ACB300 Antenna Control Box	$79
P-1A Regulated Power Supply Unit	$39

HAL SALE!

NEW RTTY/CW
COMPUTER
INTERFACES

CRI-100 List $249 SALE $229.95!
CRI-200 List $299 SALE $269.95!

KDK

KDK Scanning 10 Memory FM Transceivers
FM2033 2mtr $259
FM6033 6mtr $269
FM4033 220MHz $299
FM7033 440MHz $299

FREE SHIPPING-UPS SURFACE
(continental USA) (most items, except towers/antennas)

ORDER TOLL FREE 1-800-272-3467
Texas, Alaska & for information call 1-(214)-422-7306

VISA MasterCard

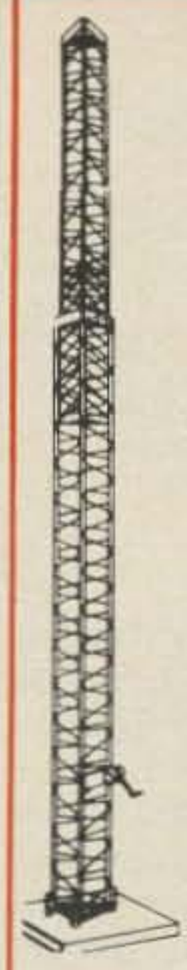
TEXAS TOWERS

Div. of Texas RF Distributors Inc.
1108 Summit Ave., Suite 4 • Plano, Texas 75074

Store Hours: Mon-Fri: 9am - 5 pm
Sat: 9am - 1 pm
(Prices & Availability Subject To Change Without Notice)

CIRCLE 135 ON READER SERVICE CARD

ANTENNA/TOWER SALE!



hy-gain

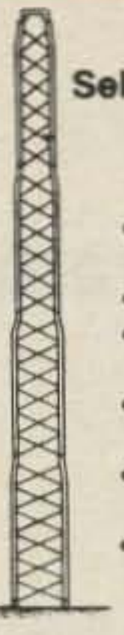
CRANKUP SALE!

All Models Shipped Factory Direct—Freight Paid*!

Check these features:
- All steel construction
- Hot dip galvanized after fabrication
- Complete with base and rotor plate
- Totally self-supporting—no guys needed

Model	Height	Load	Sale Price
HG37SS	37 ft	9 sq. ft.	$749
HG52SS	52 ft	9 sq. ft.	$1099
HG54HD	54 ft	16 sq. ft	$1699
HG70HD	70 ft	16 sq. ft.	$2699

Masts—Thrust Bearings—Other Accessories Available—Call! Prices Shown Are Your Total Delivered Price In Continental U.S.A.!



ROHN

Self Supporting Towers On SALE!

FREIGHT PREPAID

- All Steel Construction—Rugged
- Galvanized Finish—Long Life
- Totally Free Standing—No Guy Wires
- America's Best Tower Buy—Compare Save $
- Complete With Base and Rotor Plate
- In Stock Now—Fast Delivery

Model	Height	Ant. Load*	Weight	Delivered Price*
HBX40	40 ft	10 sq ft	164	$329
HBX48	48 ft	10 sq ft	303	$429
HBX56	56 ft	10 sq ft	385	$499
HDBX40	40 ft	18 sq ft	281	$399
HDBX48	48 ft	18 sq ft	363	$489

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

Tri-Ex®

These rugged crankup towers now available from Texas Towers! All models available On Sale for tremendous savings to you!

To save on freight costs, all towers are shipped directly from the Tri-Ex factory to you!

Check these features:
- **All steel construction**
- **Hot dip galvanized after fabrication**
- **Complete with base and rotor plate**
- **Totally self-supporting—no guys needed**

Model	Height Up	Down	Wind Load	List	Sale
W36	36.0 ft	20.5 ft	9.0 sq ft	$694	$579
WT51	51.0 ft	20.5 ft	9.0 sq ft	$1154	$899
LM354	54.0 ft	21.0 ft	16 sq ft	$2010	$1599
LM470D (Motorized)	70.0 ft	22.0 ft	16 sq ft	$4195	$3199
DX86 (Motorized)	86.0 ft	23.0 ft	25 sq ft	$7200	Call

US TOWER CORPORATION

Formerly Tristao Tower Co.

MA-40
40' tubular
Regular $745
SALE! $549

MA-550
55' tubular
Will handle 12 sq. ft. antennas at 50 MPH winds.
Regular $1245
SALE! $899

IN STOCK FOR IMMEDIATE DELIVERY

CALL FOR INFORMATION ON ALL OTHER MODELS

RG-213U

$.29/ft $279/1000 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.
- Guaranteed Highest Quality!

RG-8X

$.19/ft $179/1000 ft

- RG8X—95% Bare Copper Shield • Low Loss
- Non-contaminating Vinyl Jacket Foam Dielectric

Coaxial Cable Loss Characteristics (DB/100 ft)

Cable Type	Imped.	10MHz	30MHz	150MHz	450MHz
RG-213/U	50	.6	.9	2.3	5.2
RG8X	52	.8	1.2	3.5	6.8
RG-58/U	52	1.4	1.9	6.0	12.5
½" Alum	50	.3	.5	1.2	2.2
½" Heliax	50	.2	.4	.9	1.6
⅞" Heliax	50	.1	.2	.5	.9

HARDLINE/HELIAX™

Lowest Loss for VHF/UHF!

½" Alum. w/poly Jacket ..... $.79/ft
½" LDF4-50 Andrew Heliax ™ $1.69/ft
⅞" LDF5-50 Andrew Heliax ™ $3.99/ft
select connectors below.

HARDLINE & HELIAX ™ CONNECTORS

Cable Type	UHF FML	UHF MALE	N FML	N MALE
½" Alum	$19	$19	$19	$25
½" Heliax ™	$22	$22	$22	$22
⅞" Heliax ™	$49	$49	$49	$49

AMPHENOL CONNECTORS

Silver PL259 ..... $1.25
UG218 N Male ..... $2.95 UG23D N Female $2.95

Antenna Wire & Accessories

Copperweld Antenna Wire (steel core, copper coated
Solid 12 ga ..... $.12/ft 14 ga ..... $.10/ft
Stranded 14 ga ..... $.10/ft 16 ga ..... $.09/ft
¼ mile 18 ga copper-clad steel wire $30
6 inch heavy-duty end insulator ..... $2.00/ea.
Dog-bone insulator ..... $.79 Coax seal $2.50

Van Gorden

1:1 Balun ..... $11 Center Insulator $6
Dipole Kits D80 $31/D40 $28
Short Dipole Kits SD80 $35/SD40 $33
All-band Dipole w/ ladder line $29
Eavesdropper SWL Antenna $64

CUSHCRAFT

MULTI-BAND HF ANTENNAS

A3 3-el Tribander	$219	A4 4-el Tribander	$289
R3 20/15/10mtr Vert	$279	A743/A744 40mtr Kit	$75

HF MONO-BAND ANTENNAS

10-3CD	$ 95	10-4CD	$109
15-3CD	$119	15-4CD	$129
20-3CD	$199	20-4CD	$279
40-2CD	$289	D40	$149

VHF/UHF BEAMS

A50-5	$ 79	617B	$199
214B	$ 79	3219	$ 95
220B	$ 95	424B	$ 79

OSCAR/TWIST ANTENNAS

A144-10T	$ 52	A144-20T	$ 75
A147-20T	$ 63	416TB	$ 59
A14TMB	$ 29	PS4	$ 69

VHF/UHF FM ANTENNAS

A147-4	$ 29	A147-11	$ 49
214FB	$ 79	228FB	$219
A449-6	$ 29	ARX2B	$ 39

HY-GAIN

Discoverer 2-el 40-mtr Beam	**$339.00**
Discoverer 3-el Conversion Kit	**$219.00**
EXPLORER-14 SUPER SPECIAL	**$329.00**
QK710 30/40 mtr. Add-On-Kit	$85
V2S 2-mtr Base Vertical	$49
TH5MK2S Broad Band 5-el Triband Beam	$419
TH7DXS 7-el Triband Beam	$479
TH3JRS 3-el Triband Beam	$199
TH2MK3S 2-el Triband Beam	$179
205BAS 5-el 20-mtr Beam	$369
155BAS 5-el 15-mtr Beam	$219
105BAS 5-el 10-mtr Beam	$149
204BAS 4-el 20-mtr Beam	$269
64BS 4-el 6-mtr Beam	$69
66BS 6-el 6-mtr Beam	$139
18HTS 80-10 mtr Hy-Tower Vertical	$439
LC-160 160-mtr Coil Kit for 18HTS	$45
214BS 14-el 2-mtr Beam	$49
2BDQ 80/40 mtr Trap Dipole	$69
5BDQ 80-10 mtr Trap Dipole	$129
BN86 80-10 mtr KW Balun W/Coax Seal	$22

HUSTLER

6BTV 80-10 mtr Vert.	$129	5BTV 80-10 mtr Vert.	$109
4BTV 40-10 mtr Vert.	$89	G7-144 2-mtr Base	$119
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!

BUTTERNUT ELECTRONICS CO

NEW HF3B "Butterfly" Compact Beam $169. -delivered (cont. USA)

HF6V $129 Delivered (Cont. USA)
- Full Legal Power 80/10 Meters
- Optional Stub Tuned Radial Kit Model STR II $29
- Optional Roof Mounting Kit Model RMK II $49 (includes STR II)
- Optional 160 Meter Resonator Kit Model TBR 160 $49

HF2V 80/40 Meter Vertical Antenna $129 Delivered (Continental USA)
- Optional 160 Meter Resonator Kit Model TBR 160 $49

Free Shipping On Butternut Accessories Also When Purchased With Antenna

KLM

KT34A 4-el Broad Band Triband Beam	$339
KT34XA 6-el Broad Band Triband Beam	$489
40m-1 40-mtr Rotatable Dipole	$179
40m-2 2-el 40-mtr Beam	$309
40m-3 3-el 40-mtr Beam	$459
40m-4 4-el 40-mtr Beam	$649
2m-13LBA 13-el 2-mtr Beam	$79
2m-14C 14-el 2-mtr Satellite Antenna	$89
2m-16LBX NEW-16-el 2-mtr Beam	$99
2m-22C NEW-22-el 2-mtr Satellite Antenna	$119
432-30LBX NEW-30-el-432 MHz Antenna	$99
435-18C 435 MHz Satellite Antenna W/CS-2	$119
432-16LB 16-el 432 MHz Beam	$69
435-40CX 435 MHz Satellite Antenna w/CS-2	$159

MINI-PRODUCTS HQ-1 $159

ROTORS

Alliance HD73 (10.7 sq ft rating)	$109
Alliance U110 (3 sq ft rating)	$49
Telex HAM 4 (15 sq ft rating)	$219
Telex Tailtwister (20 sq ft rating)	$269
Telex HDR300 Heavy Duty (25 sq ft rating)	$519
KLM EL-3000 Moon Tracker Elevation Rotator	$369
Kenpro KR400 Azimuth Rotator	$129
Kenpro KR500 Heavy Duty Elevator Rotator	$159
Kenpro KR600 Azimuth Rotator	$199
Kenpro KR2000 Heavy Duty Azimuth Rotator	$379
Kenpro KR5400 AZ/EL Rotor Package	$259
Kenpro KR5600 Heavy Duty AZ/EL Rotor Pkg	$329

ROTOR CABLE

Standard 8 cond cable $.19/ft (vinyl jacket 2-#18 & 6-#22 ga)
Heavy Duty 8 Cond cable $.36/ft (vinyl jacket 2-#16 & 6-#18 ga)

UNR-ROHN GUYED TOWERS

10 ft Stack Sections

20G $39.50	45G $112.50
25G $49.50	55G $134.50

All 20G, 25G, 45G and 55G Accessories In Stock at Discount Prices - CALL!

Foldover Towers

Model	Height	Ant Load*	Price
FK2548	48 ft	15.4 sq ft	$899
FK2558	58 ft	13.3 sq ft	$949
FK2568	68 ft	11.7 sq ft	$999
FK4544	44 ft	34.8 sq ft	$1199
FK4554	54 ft	29.1 sq ft	$1299
FK4564	64 ft	28.4 sq ft	$1399
25G Foldover Double Guy Kit			$219
45G Foldover Double Guy Kit			$249

*Above antenna loads for 70 MPH winds and Guys at Hinge & Apex.

TOWER/GUY HARDWARE

3/16" EHS Guywire (3990 lb rating)	$.15/ft
1/4" EHS Guywire (6000 lb rating)	$.18/ft
5/32" 7 x 7 Aircraft Cable (2700 lb rating)	$.15/ft
3/16" CCM Cable Clamp (3/16" or 5/32" Cable)	$.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
3/8"EJ (3/8" Eye & Jaw Turnbuckle)	$7.95
1/2"EE (1/2" Eye & Eye Turnbuckle)	$9.95
1/2"EJ (1/2" Eye & Jaw Turnbuckle)	$10.95
3/16" Preformed Guy Grip	$2.49
1/4" Preformed Guy Grip	$2.99
6" Diam - 4 ft Long Earth Screw Anchor	$14.95
500D Guy Insulator (5/32" or 3/16" Cable)	$1.69
502 Guy Insulator (1/4" Cable)	$2.99
5/8" Diam - 8 ft Copper Clad Ground Rod	$12.95

PHILLYSTRAN GUY CABLE

HPTG2100 Guy Cable (2100 lb rating)	$.29/ft
HPTG4000 Guy Cable (4000 lb rating)	$.49/ft
HPTG6700 Guy Cable (6700 lb rating)	$.69/ft
9901LD Cable End (for 2100/4000 cable)	$7.95
9902LD Cable End (for 6700 cable)	$8.95
Socketfast Potting Compound (does 6-8 ends)	$14.95

GALVANIZED STEEL MASTS

Heavy Duty Steel Masts 2 in OD - Galvanized Finish

Length	5 FT	10 FT	15 FT	20 FT
.12 in Wall	$29	$49	$59	$79
.18 in Wall	$39	$69	$99	$129
.25 in Wall	$69	$129	$189	$249

VISA MasterCard

TEXAS TOWERS

Store Hours. Mon-Fri: 9am - 5 pm
Sat: 9am - 1 pm

Div. of Texas RF Distributors Inc.
1108 Summit Ave., Suite 4 • Plano, Texas 75074

ORDER TOLL FREE
1-800-272-3467
Texas, Alaska & for information
1 (214) 422-7306

(Prices & Availability Subject To Change Without Notice)

(Antenna/tower product prices do not include shipping unless noted otherwise)

CIRCLE 58 ON READER SERVICE CARD

Ticket Talk

a monthly feature by
FREDERICK O. MAIA, W5YI
National Volunteer Examiner Coordinator

INFO ON AMATEUR RADIO LICENSING

A Look at the VEC Program

My mail indicates that many amateurs are still confused about the new volunteer program. We constantly field questions like . . . Why do we have volunteer testing? How does it work? Where are the nearest amateur exams? Who do contact for testing? Which study material do I use? What about testing the handicapped? Where do the test questions come from? How often are they changed? Are the test questions and answers available? How is the Novice Class program affected? How is a VEC different from a VE? Why are there so many VEC's? And on and on.

Background of Amateur Testing

Actually Volunteer Examining in the amateur radio service got its start in the Novice program many years ago. In 1981, Congressman William E. Dannemeyer, (R-California) introduced legislation to make Novice testing by volunteer amateur operators legal. While Novice tests had been administered by volunteer examiners for decades, Dannemeyer pointed out that the federal law prevented the government from being assisted by volunteers. He proposed a Communications Act amendment to legally provide for volunteer amateur radio operator testing.

Barry Goldwater, K7UGA, noting that the FCC was faced with serious budgetary problems and personnel cutbacks, suggested that *all* amateur radio operator examinations be given by volunteers. He said it would save the taxpayers about $400,000 a year. After Congressional approval, President Reagan signed volunteer amateur testing into law on September 13, 1982, as part of Public Law 97-259.

Volunteer Testing is Implemented

The ARRL felt that a single non-profit U.S. amateur testing authority (namely themselves) should be appointed to oversee the volunteer testing program. The FCC elected, however, to authorize a system of regional liason testing administrators to act as the link between their Gettysburg licensing facility and the volunteer examiner. The Commission said that they would get more participation by authorizing as many *Volunteer Examiner Coordinators* (VECs) as could efficiently handle the job.

While the League was reluctant to become a VEC initially without provision for recouping expenses, several groups did accept the challenge. Among the first was the *Dayton Amateur Radio Association* who, under the able leadership of Judy Frye, KC8P, assisted the FCC in coming up with various question "banks." The DARA was also the first to administer volunteer tests at the 1983 Dayton HamVention. Other VECs followed . . . many using tests that were developed by the Dayton group. The League was also very instrumental in providing needed questions and answers for the written test question pools.

The FCC said 1984 would be the last year that they would administer amateur radio operator tests. We applied to become a VEC in all regions when 1984 was half over. Since the League said they could not be a VEC without provision for expense reimbursement, Goldwater authored a bill in November of 1983 providing for $4.00 testing fees with a provision for increases based on inflation. The ARRL became a VEC in all regions once expense recoupment was approved in July 1984.

Where Do The Tests Come From?

Public Law 97-259 not only permitted the use of volunteer examiners in the amateur radio service, but also test preparation. The FCC had a campaign three years ago to develop banks of questions that could be used for various written test elements. Amateurs were asked to submit questions for these pools and eventually ten times the number of questions needed for any one test were produced. There are 500 Technician/General (Element 3) and Advanced (Element 4A) questions . . . 400 Extra Class (Element 4B) questions.

But only the questions and not the answers made up the various question banks. The amateur community was left to determine the correct answers! At first, the FCC advised Volunteer Examiner Coordinators which questions to use when they approved test sessions. Every VEC had different answers to the test questions. Needless to say, it was sort of chaotic in the beginning! A test administered in Texas had different answers from those administered in New York! Eventually test design (that is, determining which questions to administer) was turned over to the VEC by the FCC.

The ARRL felt that not only the questions, but also the correct multiple choice answers and distractors (wrong answers) should be included in the question pool. So as not to obtain a publishing advantage, the FCC required the ARRL to place their answers and question distractors in the public domain. Once released, in the interest of standardization other VECs began adopting the League's answers and distractors.

Where Do I Get License Preparation Material From?

The ARRL's answers have now become the defacto standard among nearly all VECs. License preparation publishers such as AMECO, the ARRL, and West Radio School and others have published manuals that not only contain the various question pools, but the *exact answers and distractors* as well. As a convenience to applicants and VE's alike, the *W5YI Program* was granted permission by the FCC last March to distribute license preparation manuals to the amateur community.

A word of caution! Before you rush out and purchase the license manual you need for your next upgrade, be aware that the FCC revises the questions once a year on a staggered basis. A six month period is allowed before their use is required. Although new questions and answers can be used sooner, most VECs are waiting until the required implementation date.

When you purchase license preparation materials, be *certain* you get the right version! Our experience is that local bookstores and hamfest dealers are very

P.O. Box 10101, Dallas, TX 75207

frequently selling outdated manuals. Most do not know which is the correct question set. Until the required implementation date, questions from previous question banks are used. Sometimes the FCC makes massive question changes (such as in the case of the new Element 2 test) . . . other times there are very few revisions. The *most recent* test question versions are:

NEXT MONTH: How to become a Volunteer Examiner . . . Expense Recoupment Rules . . . and the Certificate of Successful Completion.

You are invited to submit your questions on the new Volunteer Examiner Program to: Fred Maia - W5YI-VEC; P.O. Box #10101, Dallas, Texas 75207. Questions of general interest will be answered in this column. CQ

Element:	License Class:	Question Date:	Implementation Date:
Element 2	Novice	August - 1984	February 1, 1985
Element 3	Tech/General	November - 1984	June 1, 1985
Element 4A	Advanced	March - 1985	October 1, 1985
Element 4B	Extra Class	April - 1985	November 1, 1985

VHF

a monthly feature by
STEVE KATZ, WB2WIK

PRINCIPLES, PRACTICES, AND PROJECTS FOR THE VHFER

Well, the Dayton Hamvention, April 26-28, was everything I said it would be. If you weren't there, you missed out on a great time. Dayton isn't just a big flea market, although the flea market is undoubtedly the largest one of its kind in all North America: Dayton is new equipment exhibits, forums, technical talks, meetings, hospitality suites, social gatherings of all sorts. While there are amateur radio conferences and symposia at many locations all through the year, Dayton is like all of those events wrapped into one. Even the debacle of the housing shortage brought about by the closing of one of downtown Dayton's major hotels did not unduly disrupt the good times.

The Dayton Hamvention gave me the opportunity to meet some people mentioned in the July column. I met Art Reis, K9XI, and we had a nice discussion about— what else?— the future of 220 MHz. Art has some good ideas on the subject of promoting the 125 cm band. While at Art's booth at Dayton, I had occasion to meet Rich Rosen, K2RR, Editor-in-Chief of *Ham Radio* magazine. I also bumped into Roger Cox, WBØDGF, editor of the *Midwest VHF Report* (mentioned briefly last month), and spent some time visiting with WA6IJZ at the *West Coast VHFer* (Oxnard, CA) booth, where the fellows had a nifty legal-limit amp for 144 MHz on display. This unit uses a pair of Eimac 3CX800's in push-pull and is said to deliver 1.5 kW output with reasonably low drive: They sell it as a complete RF deck only, without power supply, for $1500, about a dollar a watt. These folks publish an excellent monthly newsletter which should be of interst to VHF'ers everywhere. Write to P.O. Box 2041, Oxnard, CA 93034 for further information.

I also had the opportunity to spend some time with Tom Waldrin, proprietor of The VHF Shop (Mountaintop, PA). Tom is trying really hard to bring us VHF'ers in the U.S. out of the stone age and into the space age by importing all the great VHF/UHF products from Europe. He also talked me into buying a new SSB Electronics (German) model DX1296S low-noise GaAsFET preamplifier. This product is claimed to exhibit a 0.5 dB noise figure and 20 dB gain, using an MGF1412 active device. At this writing, I'm in the process of installing the new preamp in a weathertight box with a couple of coaxial relays for use at my 23 cm antenna; I'll print a complete review of this preamp and my results in a forthcoming column.

*24 Louis Dr., Budd Lake, NJ 07828

Rick's pointing to a vintage but "mint" condition Globe King transmitter which he uses on 160 meter AM! Quite a departure from the state-of-the-art gear he uses in his normal habitat above 50 MHz.

Here's Rick, WB2NPE, looking pretty relaxed between VHF contests in his home shack. The wraparound operating console contains gear for 160 meters thru 13 cm, set up in several different operating positions.

Dayton also afforded me a few moments to spend with Jay Rusgrove, W1VD, and Rosalie White, WA1STO of Advanced Receiver Research (Burlington, CT). These folks have all kinds of new products available, although most have not been advertised anywhere yet. They have mast-mount preamps using GaAsFET devices and offering built-in transfer relays capable of handling 1 kW of transmit power up to 432 MHz; they also have a new T/R "sequencer," which is basically an electronic timer with relay outputs designed to protect in-line preamplifiers from the hazards of high RF levels and transients. The sequencer, model TRSO4VD, was available at Dayton for only $49.95. Of course I bought one (need you ask?) and will let you know how it works.

I found Norm Alred, WA8EUU of Microwave Components of Michigan at the flea market and spent an enjoyable fifteen minutes or so discussing his new line of low-noise preamps for 144 thru 1296 MHz. Norm's preamps look very well made and user-seviceable (the transistor is easy to get at), and feature dual-tuned input matching and two bias adjustments which allow for field-optimization in the event the FET must be changed. Norm had one preamp tagged "0.38 dB NF" for 144 MHz, and this is such a good figure that I just couldn't resist: Yes, I now have it in my two meter station and will let you know how that works, too. If you're interested in M.C.M.'s products, drop them a line at 1126 Cape Cod, Taylor, MI 48180 or call (313) 941-8469.

Surplus Sales of Nebraska, 2412 Chandler Road, Bellevue, NE 68005, had a big display at the flea market. So did lots of other people, of course, but I mention these folks because they had so many items of interest to VHF'ers and homebrewers of VHF/UHF gear. For example, they had piles of brand-new JAN758OW/4CX25OR power tetrodes for very good prices; they also had HV doorknob capacitors, small vacuum variable capacitors (perfect for a 50 or 144 MHz amplifier), complete 10 GHz Gunnplexer transceivers, UHF chip capacitors and all kinds of goodies for builders. You might want to write for their catalog.

Way up near the inside ceiling of the HARA arena— about forty feet above ground— one of the new 4.3-wavelength super Boomer antennas for 144 MHz was lurking over the crowd at the Cushcraft booth. This thing is just plain enormous, even a bit longer than the KLM 2M-16LBX, and features an improved boom-support brace, plus their standard "trigon" (3-element) reflector and T-matched driven element. The new Cushcraft 28.8 foot monster is said to have more forward gain than any commercially-made two meter antenna. If you're a VHF'er and haven't used any Cushcraft antennas, you're in a field of one. Cushcraft has been serious about VHF antennas for several years, and I asked Bob Cushman about their producing antennas for 23 cm, the next logical step up the spectrum. We kicked the subject around for a while, but Bob made no promises, he knows how difficult it is to "educate" aluminum for frequencies above 1 GHz. Will Cushcraft overcome the technical difficulties associated with antennas for these frequencies? I hope so. Meanwhile, you might want to write for their new catalog: Send to Cushcraft Corporation, P.O. Box 4680, Manchester, NH 03108.

WE SHIP WORLDWIDE

Barry Electronics Corp.

WORLD WIDE AMATEUR RADIO SINCE 1950

Your one source for all Radio Equipment!

For the best buys in town call:
212-925-7000
Los Precios Mas Bajos en Nueva York...

Barry's is Busting Out All Over with *Summer Savings*. Izzy, Toni, Kitty WA2BAP, Mark K2CON, Jan KB2RV

CU At PEARL, Brewster, NY, Aug. 17th
CU At Gloucester, NJ, Aug. 25th

KITTY SAYS: WE ARE NOW OPEN 7 DAYS A WEEK.
Saturday & Sunday 10 to 5 P.M.
Monday-Friday 9 to 6:30 PM Thurs. to 8 PM
Come to Barry's for the best buys in town.

ONV Safety belts-in stock

ICOM

IC-R71A, IC-751, IC745, IC-27A/H, IC-37A, IC-47A, IC-1271A, IC-271A/H, IC-3200A, IC-471 A/H, IC-735

YAESU

FT-ONE, FT-980, FT-757GX, FRG-8800
FT-726R, FRG-9600, FT-270RH, FT-2700RH

SMART PATCH

CES-Simplex Autopatch 510-SA Will Patch FM Transceiver To Your Telephone Great For Telephone Calls From Mobile To Base. Simple To Use - $319.95.

KENWOOD

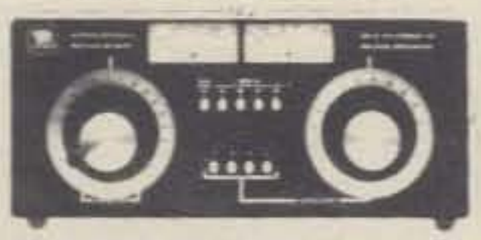
R-600, R-1000, R-2000, TS-940 S/AT
TS 430S, TR-3600A, TR 7950,
TW-4000A. Kenwood Service/Repair.
TH21/31/41AT, TM-211A/411A & TS-711A/811A

Antennas
A-S
Cushcraft
Hustler
KLM
METZ
Mini-Products
Mosley

YAESU	ICOM
FT-1/2/703R	IC2AT
FT-2/709R/H	ICO2AT
FTC-1903	IC-04AT

Land-Mobile H/T
Midland/Standard
Wilson Maxon
Yaesu FTC-2203, FT-4703
Icom IC-M12 (Marine) M700
Tempo M-1

CELLULAR 'PHONES
WELZ
FLUKE 77 Multimeter



Nye MBV-A 3 Kilowatt Tuner

NCG 7-21-50 Transceiver

COMPU-FIRE EXTINGUISHERS
EXL-5000E RTTY/AMTOR TERMINAL

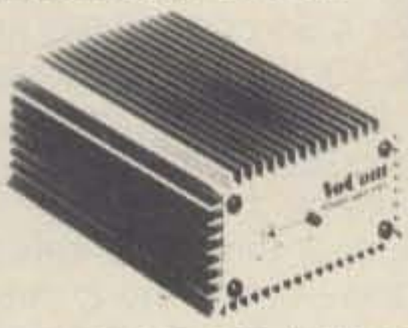
VoCom/Mirage/Daiwa
Tokyo Hy-Power Amplifiers &
5/8λ HT Gain Antennas IN STOCK

Large inventory of Saxton Wire & Cable

AMERITRON AMPLIFIER AUTHORIZED DEALER

Yaesu FTR-2410, Wilson
ICOM IC-RP 3010 (440 MHz)
ICOM IC-RP 1210 (1.2 GHz)

SANTEC
ST-222/UP
ST-142/UP
ST-442/UP
HT-7



Computer Interfaces stocked: MFJ-1224
AEA CP-1, PKT-1, DR.DX
CP-100, ATU, Dr. QSO, Morse University

ETO

ALPHA AMPLIFIERS

MFJ Models 422, 949C, 1224 & 941D

HAM MasterTapes— Beta or VHS Tapes

MURCH Model 2000 A, A-LS, B in stock

JBC soldering line in stock.

Complete Butternut Antenna Inventory In Stock!

MICROLOG-AIR I, Air Disk, SWL, Morse Coach

KANTRONICS
UTU, Interface II, Challenger

HEIL EQUIPMENT IN STOCK

DIGITAL FREQUENCY COUNTERS

Trionyx-	Pro-Com Engineering	
Model TR-1000	0-1 GHz	1200HH
0-600 MHz	0-1.3 GHz	1296HH

Long-range Wireless Telephone for export in stock

BENCHER PADDLES, BALUNS, AUDIO FILTERS, IN STOCK

MIRAGE AMPLIFIERS
ASTRON POWER SUPPLIES
Alinco/Falcon Amps

EIMAC
3-500Z
572B, 6JS6C
12BY7A &
4-400A

AEA 144 MHz
AEA 220 MHz
AEA 440 MHz
ANTENNAS

BIRD
Wattmeters & Elements In Stock

New TEN-TEC
2591HT, Corsair II, Argosy II, Century 22

Tri-Ex Towers
Hy-Gain Towers & Antennas, and Roters will be shipped direct to you FREE of shipping cost.

MAIL ALL ORDERS TO **BARRY ELECTRONICS CORP., 512 BROADWAY, NEW YORK CITY, NY 10012.**

New York City's LARGEST STOCKING HAM DEALER
COMPLETE REPAIR LAB ON PREMISES

"Aqui Se Habla Espanol"

BARRY INTERNATIONAL TELEX 12-7670
MERCHANDISE TAKEN ON CONSIGNMENT FOR TOP PRICES

Monday-Friday 9 A.M. to 6:30 P.M. Thursday to 8 P.M.
Saturday & Sunday 10 A.M. to 5 P.M. (Free Parking)

AUTHORIZED DISTS. MCKAY DYMEK FOR SHORTWAVE ANTENNAS & RECEIVERS.

Subways: IRT/LEX-"Spring St. Station"
BMT-"Prince St. Station"
IND-"F" Train-Bwy. Station"

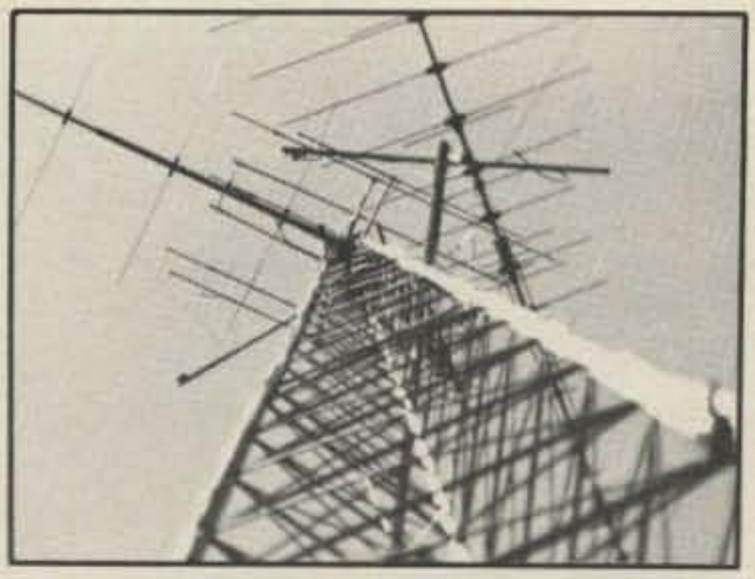
Bus: Broadway #6 to Spring St.
Path—9th St./6th Ave. Station.

Commercial Equipment Stocked: ICOM, MAXON, Midland, Standard, Wilson, Yaesu. We serve municipalities, businesses, Civil Defense, etc. Portables, mobiles, bases, repeaters...

Local Ham Club Speeches Given

We Stock: AEA, ARRL, Alpha, Ameco, Antenna Specialists, Astatic, Astron, B & K, B & W, Bash, Bencher, Bird, Butternut, CDE, CES, Collins, Communications Spec. Connectors, Covercraft, Cushcraft, Daiwa, Dentron, Digimax, Drake, ETO (Alpha), Eimac, Encomm, Heil-Sound, Henry, Hustler (Newtronics), Hy-Gain, Icom, KLM, Kantronics, Larsen, MCM (Daiwa), MFJ, J.W. Miller, Mini-Products, Mirage, Newtronics, Nye Viking, Palomar, RF Products, Radio Amateur Callbook, Robot, Rockwell Collins, Saxton, Shure, Telex, Tempo, Ten-Tec, Tokyo Hi Power, Trionyx TUBES, W2AU, Waber, Wilson, Yaesu Ham and Commercial Radios, Vocom, Vibroplex, Curtis, Tri-Ex, Wacom Duplexers, Repeaters, Phelps Dodge, Fanon Intercoms, Scanners, Crystals, Radio Publications.

WE NOW STOCK COMMERCIAL COMMUNICATIONS SYSTEMS
DEALER INQUIRIES INVITED. PHONE IN YOUR ORDER & BE REIMBURSED.
COMMERCIAL RADIOS stocked & serviced on premises.
Amateur Radio Courses Given On Our Premises, Call
Export Orders Shipped Immediately. TELEX 12-7670



It's pretty busy atop WB2NPE's 100-foot self-supporting tower: 11 elements for 50 MHz, 76 elements for 432 MHz, 90 elements for 1296 MHz; the TV antenna is side-mounted at about the 70' level, but looks closer thanks to telephotography.

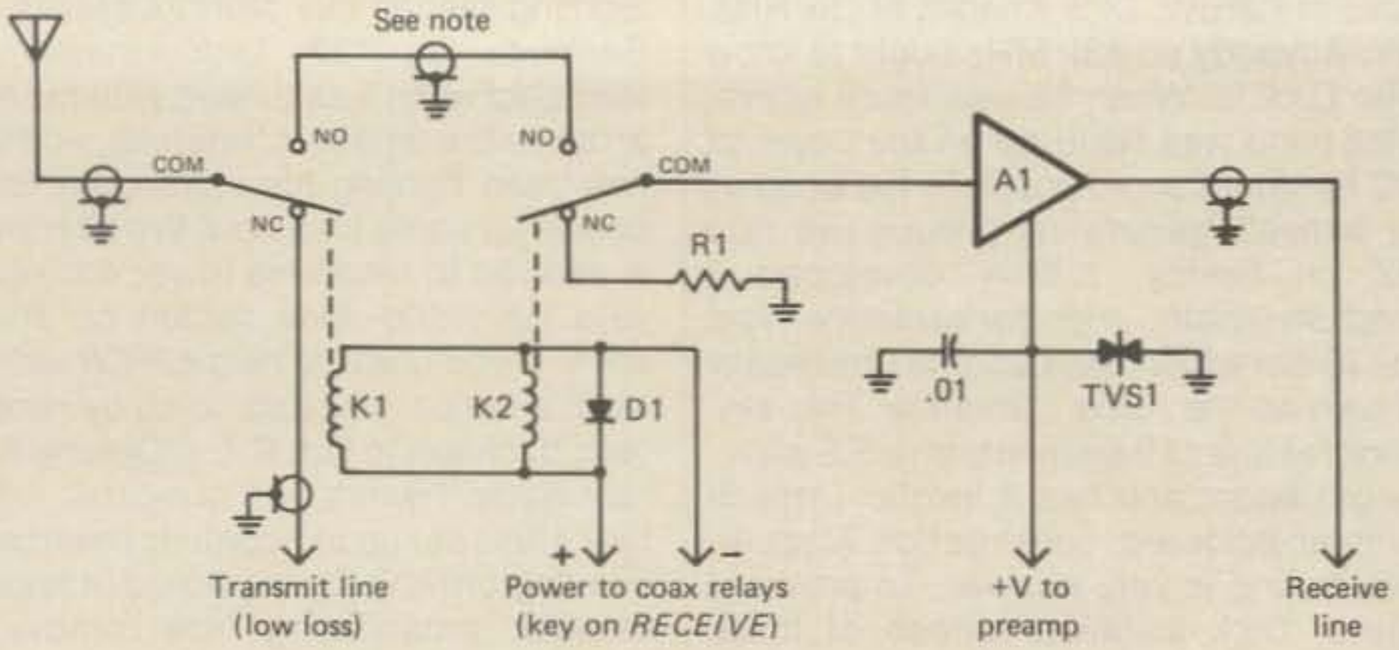
KLM Electronics' new catalog contains some good information on antenna stacking and spacing, and half their catalog is devoted to VHF/UHF products. I have received a couple of letters from readers who wanted to know how to find a KLM catalog. I picked up mine at Dayton, but for those who didn't make it, try writing them at P.O. Box 816, Morgan Hill, CA 95037.

I am really embarrassed to say that I didn't attend the Third Annual International VHF/UHF Conference on Saturday morning at Dayton. It's not that I didn't want to: I didn't want to: I had other speaking obligations (at the contest forum) scheduled for the same time slot and had committed myself several months ago, before knowing when the VHF Conference was to be. So, I missed out on what I'm cetain were some very interesting talks by VE3CIE, WA2AAU, W1JR, VE3BFM, WB5LUA and other notable VHF'ers. Sorry guys. I'm sure to make it next year.

On the brighter side, I did spend considerable time at the *CQ* booths, meeting with lots of folks wanting to know more about our new VHF WPX Contest. Our slide show on the new contest was given at the VHF forum and the Contest forum, plus we had it running continuously at the *CQ* booth. it drew *lots* of attention, and all the hundreds of copies of our Worlwide VHF WPX Contest log/entry sheets disappeared before Sunday. By the time this reaches print, the first VHF WPX entry will be history. We should be able to report a bit on station activities in the October column.

Activities

You never know who you're going to bump into on VHF. Just a week before Dayton, my CQ on two meter SSB was answered by Harry Dannals, W2HD, president emeritus of the ARRL. Harry is getting pretty active on 144 MHz and was looking to improve his station. He bought me up to date on the now-famous tower case of K2RIW, Dick Knadle, of Dix Hills, NY. Anybody on 432 MHz ought to know who Dick is: When he was more active, Dick (who was featured on the cover of *CQ* for June) could populate the band all by himself, generating pileups like rare DX on twenty. K2RIW developed a medium-length, high-performance yagi for 70 cm which has become universally known as the "RIW" antenna: This skyhook features 19 elements on a 5.6-wavelength boom and has a terrific T-match with all-soldered construction (copper/silver), and is very popular. To prove its worth, Dick installed *sixteen* of these things on his tower and began routinely working places like North Carolina and Bermuda on 432. Unfortunately, his township wasn't as thrilled with his huge array as the amateur fraternity, and Dick has been fighting his community in the courts for some time now. We all hope he is allowed to retain his tower and reactivate his world-class station on 70 cm soon. If you'd like to help K2RIW with his legal defense, you can do so by sending your donation to D.A.R.T. ("Defend Amateur Radio Towers"), a non-profit, volunteer effort set up to hopefully reverse the Huntington (NY) Zoning Board of Appeals decision amandating Dick remove his



PARTS LIST:

A1 = Preamplifier
D1 = 1N4004 or equivalent
K1, K2 = 50Ω coaxial SPDT relays
R1 = 50Ω termination, shielded
TVS1 = 1N6112 or equivalent bipolar transient voltage suppressor.
V_{BR} = 16v., V_{WKG} = 14v.

NOTE:

This coaxial interconnect cable should be selected so total length from "NO" port of K1 to input port of A1 ≈ ¼ wavelength in coax. *DO NOT ALLOW THIS LENGTH TO* = ½λ!

Fig. 1– GaAsFET preamp switching circuit.

tower. Send to D.A.R.T., P.O. Box 2851, Huntington Station, NY 11746 and write your callsign on your check so you can be added to their endorsement roster.

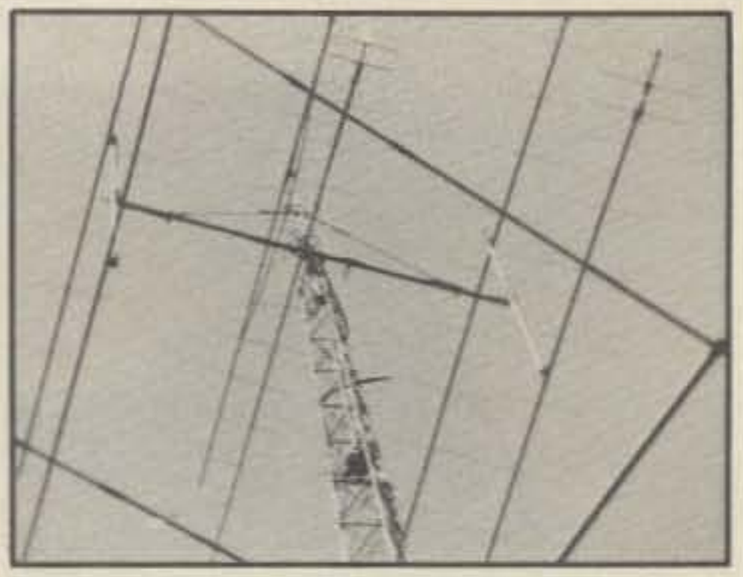
W5UWB writes in response to our May column re coaxial relays: "...it should be mentioned that while the (Kilovac/Dow-Key) 60-220142 with "G" connector on the NC (receive) post is quite good, most GaAsFET preamps do not tolerate an open or shorted input, but rather should be returned to a 50 Ohm load when transmitting. Thus we end up needing two relays. I like to use the 60-220142 with "G" connector in conjunction with a cheaper coaxial relay that places the preamp on a dummy load, the two relays being connected by a quarter-wave section of coax. That, plus the isolation of the 60-220142 will save most preamps on transmit..."

John did not send along a schematic diagram to illustrate his discussion, but I believe he is implying that he uses the "WD4MBK" (Charles Osborne) switching scheme, which terminates the preamp's input and output at all times and can also be used for antenna-mounted preamp applications. The schematic diagram for this is shown in fig. 1. I haven't used this setup yet, although I intend to for my new 23 cm GaAsFET preamp. I'm not cetain what, if any, liability exists with GaAsFET preamps having no input termination: Possibly they oscillate, but when your station is in the "transmit" mode, what difference will this make? All my preamps may oscillate while I'm transmitting; as long as they *stop* oscillating when I switch to receive, this is fine with me. Possibly a reader can write to let me know a bit more on this subject...I'll be happy to print anything relevant.

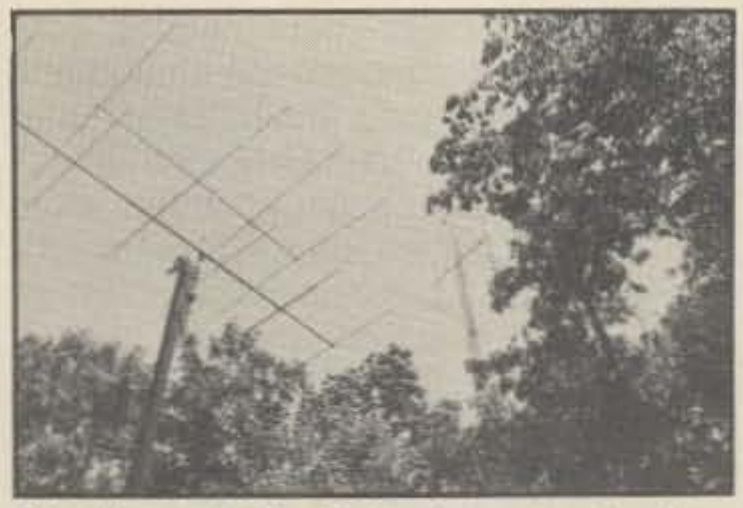
Sam Mannino, N7AIH, writes from Tijeras, NM (near Albuquerque) of his interst in VHF and his frustrating attempts to find enough technical information to help him choose what type equipment and antennas he should install. Sam, I recommend you contact Fred Fish, W5FF, who lives nearby enough that you can probably set up a personal meeting. Fred is an active and enthusiastic VHF/UHF'er with a long list of outstanding achievements to his credit, and I'm sure he'd be happy to help you get started. As for equipment and antennas, these are highly subjective areas. No amount of research will replace personal experience in these matters. But VHF specialty shops can probably guide you better than the broad-range amateur equipment dealers, since the speciality shop owners are bound to be active VHF'ers themselves. You may want to join a local radio club, if you haven't already, and ask the membership for suggestions. I can give you all kinds of advice from 2000 miles away, but only the "locals" can tell you about tower restrictions, TVI problems, the extent of VHF/UHF activity in your area and so forth. Meanwhile, Sam (and others with similar situations), keep reading this column! We have some equipment reviews coming up in the next few months, and maybe these will help guide your decisions.

If you read this column for June, you know we dealt with FM and repeaters as our main topic. Here is an addendum to that subject: Randy Dominicak, WA6RKK, has formed a group called "The Rebel Network" whose goal is to promote VHF/UHF repeater linking via telephone lines, using autopatch "call-in" (i.e., "reverse autopatch") circuits. When Randy first contacted me about this, I was unclear about his motives and the "rebel" name sounded a bit provocative. With continued correspondence, Randy convinced me his goal is simply to increase the enjoyment of amateur repeater work by allowing mobile/portable ops to work "DX" essentially via the telephone. Since I can't find anything illegal about this (no tariffs are being bypassed or discounted), the idea sounds fine to me. Of course, long-distance telephone calls can be costly, but if radio/repeater clubs help finance the calls—and if such calls are placed during the low-rate hours, such as evenings and weekends—this kind of setup might be a lot of fun for many users. The Rebel Network seeks vital statistics about all the repeaters in service which have autopatch "call-in" facilities. They'd like to receive this information by mail, to keep it reasonably proprietary, and will publish a sort of "network directory" when they have enough data. For more information on this intriguing system, contact WA6RKK c/o "The Rebel Network," P.O. Box 28, Santee, CA 92071.

How many of us are active on six meters? Hold your hands at bit higher, so I can see them. The Southern California Six Meter Group must be *very* active, for they've begun publishing their own newsletter. Gracie, N6FSL (Fullerton, CA) edits



A close-up of hardware atop WB2NPE's 90-foot self-supporting tower: 52 elements for 144 MHz in an "H"-frame, with 34 elements for 220 MHz stacked between the two meter beams. A bit of a Telrex tri-band HF beam can be seen as well.



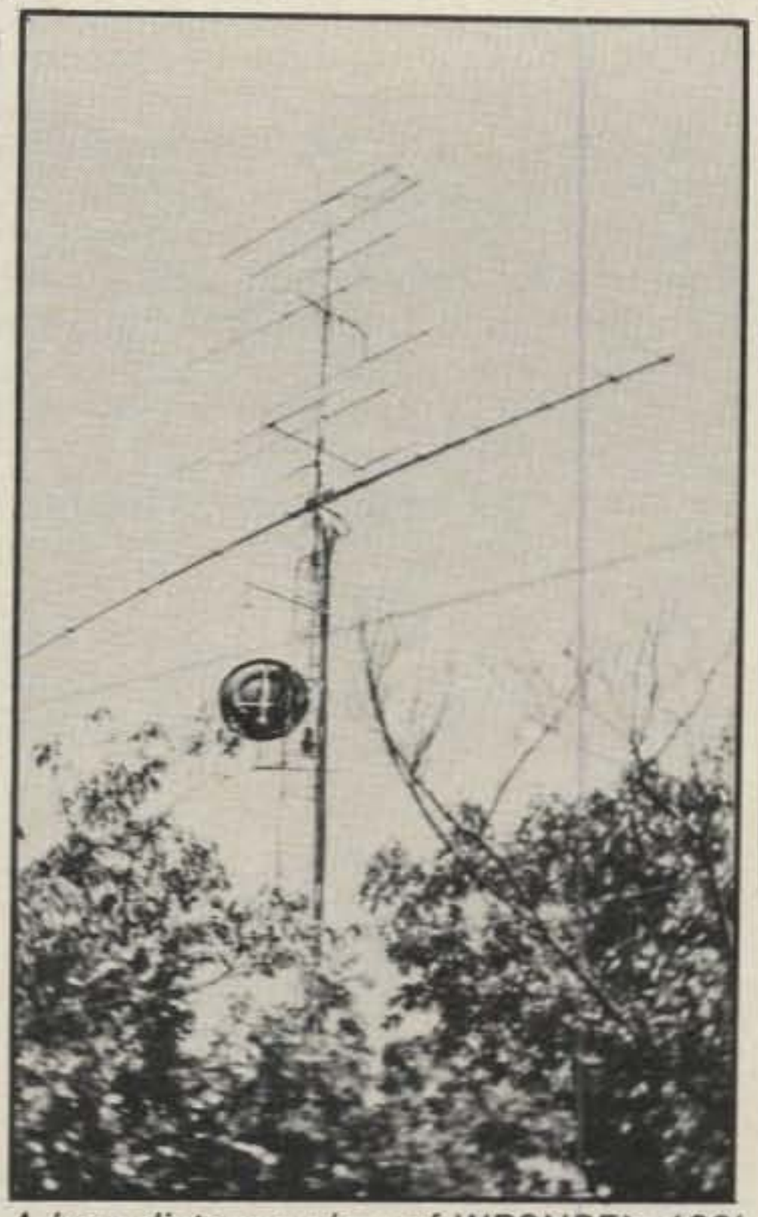
Six elements (by Telrex) on six, plus four elements on ten meters, installed atop a 30' utility pole; in the background, the 90' tower for 144/220 MHz can be seen.

this excellent new publication, and I was privileged to receive a copy of the first edition. While their newsletter deals primarily with W6-land activities, it does contain interesting tidbits of information on propagation, antenna design, contests, beacons and topics of general interest to six meter enthusiasts. The part I like best about Gracie's newsletter is the words "USE SIX METERS" printed here and there throughout the articles. She makes her point, loud and clear. Did you know that at least one organized group of non-hams has approached the FCC in an attempt to make the 50–54 MHz band a shared service? And that these folks are CB operators? Can you imagine what kind of TVI problems would be encountered if suddenly we had a few million unlicensed stations operating 50 MHz? I don't even want to think about it. Let's use six meters enough to discourage further attempts at reallocation. Six is a great band, not just during solar cycle peaks, but all the time. Six meters offers the most productive meteor scatter, aurora and E-skip; it's also a great band for local "rag chewing," nets and repeaters. If you'd like a copy of the Southern California Six Meter Group's newsletter, write to Gracie, N6FSL, at 854 Bernard Drive, Fullerton, CA 92635.

Another great newsletter I receive is *The VHF Journal,* published monthly by the Rochester (NY) VHF Group. This is an impressive publication from a large (105 member) and active group of enthusiastic VHF'ers, dealing with not just local trivia but significant matters of interest to all VHF'ers. So far, a yearly subscription to *The VHF Journal* has cost only $3, but I don't see how they can cover their mailing expenses for this small amount; I assume their subscription rate will increase soon. The May issue featured complete (electrical) plans for a 1296 MHz transmitting converter by Tom Hodge, WA2YTM. The Journal's been edited for some time by Tom Richmond, WB2IEY, who is moving to the midwest for a period and is turning this responsibility over to Ev Tupis, WB2ELB. If you're interested in receiving *The VHF Journal,* write to P.O. Box 106, Canandaigua, NY 14424.

Hams Across The Water

Henri Louis Schouten, PE1IML writes from the Netherlands to let us know he is very active on 144 and 432 MHz. Henri uses ICOM's new multimode transceivers, IC271E and IC471E, with a 900 watt amplifier for two meters and a 100 watt amplifier for 70 cm, in conjunction with a 44-element (4 × 11-el) "Flexa" yagi array for 144 and an 88-element "J-Beam" system for 432. PE1IML works e.m.e., aurora and OSCAR and has worked 37 countries on three continents via tropo and moonbounce, plus 100 countries via OSCAR 10. Henri says his best tropo DX has been 2199 km (1374 miles) on two meters. Operating from his home QTH about four miles from Amsterdam, Henri enjoys "free sight in all directions for many miles." Wow! How many of us can say *that*? PE1IML expects to be active on 23 cm with homebrew equipment and a four-foot dish in the near future.



A long-distance view of WB2NPE's 100' tower: As seen from across the street, about 200' away. The four-foot dish antenna, side-mounted at about 90' can be used as a reference for visual scaling of the other antennas.

It was nice to receive a note from Steve Kavanagh, VE2BTW/3, of Cambridge, Ontario. Steve is active on 144 and 432 MHz from his apartment, running 2.5 W to a 3 element yagi on two meters and 1 W to a 6 element yagi on 70 cm; despite these handicaps, VE2BTW/3 has managed to work 28 grid squares on two meters in just five months' time. When you consider that a grid at Steve's latitude is about 6,768 square miles, and there must be little for him to work to the north, that's quite an accomplishment. I worked Steve from my (NJ) home station back in January, and he had an RST 44 signal over the hilly 340 mile path between us. VE2BTW/3 has developed a listing of some 85 Ontario stations who are active on two meter SS/CW, showing their first names, locations and grid squares. If you'd like a copy of Steve's list, send an SASE to 141 Woodside Ave., Apt. 314, Cambridge, ONT N1S 4R8.

Personal Interview Dep't

This month's featured VHF'er is Rick Connor, WB2NPE, of Tabernacle, NJ. Connor is what I'd call a "big gun" VHF'er. He is fully equipped for operation

from 50 through 2304 MHz with competitive power and a total of 291 elements plus a 4′ dish spread over three towers! I visited Rick in mid-May to see firsthand what has made WB2NPE such a success in VHF DX'ing and contesting.

First, there's his location. Rick's QTH is just 27 miles southeast of Philadelphia in rural Burlington County, right in the middle of the famed "VHF Corridor" of the Northeast. There are no local obstructions and few, if any, sources of man-made noise in this area. The terrain is quite flat, so Rick's tower height is essentially his HAAT (Height Above Average Terrain). WB2NPE's two huge self-supporting towers, 90′and 100 ′ tall, achieve his goal of establishing considerable HAAT and a long horizon for his VHF/UHF antenna systems, which are impressive: 11 elements at 100′ and 6 elements at 32′ on six meters; 52 elements (4 × 13 el KLM) at 95′ on two meters; 34 elements (2 × 17 el Cushcraft "Boomers") at 95′ on 125 cm; 76 elements (4 × 19 el "RIW" design) at 110′ on 70 cm; 90 elements (2 × 45 el loop yagis, W3HQT design) at 117′ on 23 cm; 4′ parabolic dish with homebrew WA9HUV "can" feed on 13 cm, and the list goes on and on. All the antennas are fed with "hardline" (semi-rigid, solid conductor coaxial cable) and this, plus the height of the antennas, may help explain Rick's lack of TVI problems.

Rick says having two antennas, one "high," and one "low," on 50 MHz, allows him to work both high and low-angle E-skip more effectively than he could with a single antenna. This is why he has a six element yagi on a 30′ pole in addition to his 11 element KLM monster on the 100′ tower. He's also found that, contrary to some writings, height above ground for UHF antennas is *very* important, even after clearing all trees and local obstructions. As Rick is able to check into K4CAW's 70 cm net in North Carolina (375 miles) weekly, I guess he's proven his point.

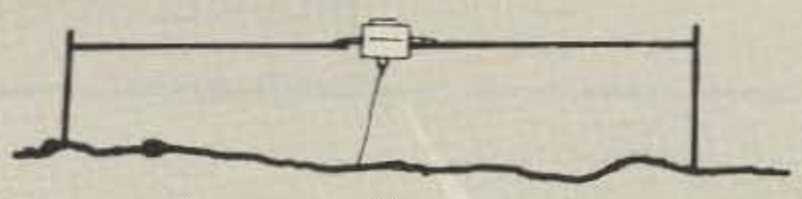
While all the impressive hardware "topside" might be enough to make most VHF'ers drool, WB2NPE's shack contains more of the same: state-of-the-art gear, optimized for performance under multi-operator contest conditions. On six meters, Rick runs a Drake TR-6 transceiver driving a Swan Mk VIB amplifier (2 × 3-500Z) to 1100 W output; on two meters, he uses an Icom IC251A driving an intermediate amplifier and then a Henry Radio "Tempo" 6n2 (2 × 8874) to 800 W output, plus a Collins 75S3B/Microwave Modules receiving converter/ARR GaAsFET preamp as an auxiliary receiver; on 1.25 meters, he has a Ten-Tec Delta 580 transceiver with a Microwave Modules transverter and a 4CX250B amplifier at 250 W output; the 70 cm station consists of a Kenwood TS520 transceiver with a Microwave Modules transverter, homebrew GaAsFET preamp and G.R. Stephen (K1FO) 8874 power amplifier at 250 W output; on 23 cm, Rick uses a Yaesu FT221R transceiver with a Microwave Modules transverter, homebrew GaAsFET preamp, and a soilid-state intermediate amplifier driving a pair of 7289's in a commercial (Parabolic UHF Units) power amplifier to 75 W output; and on 13 cm, the station consists of a homebrew (WA3AXV) 5-Watt solid-state transmitter and homebrew receiving converter, with a GaAsFET preamp and a Kenwood TR9000 IF system. WB2NPE is also fully equipped for FM operation on 146, 223 and 440 MHz.

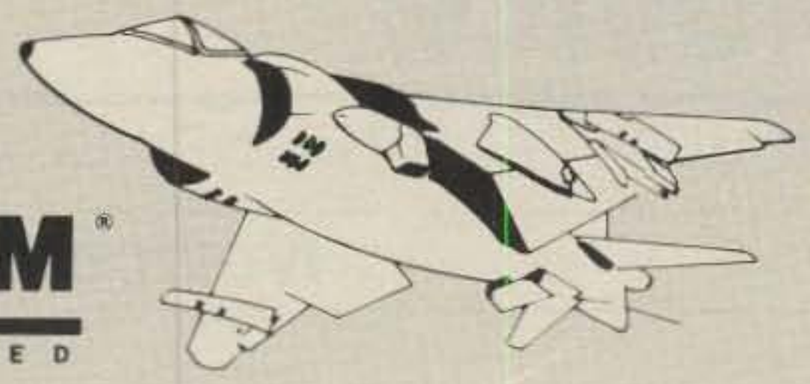
Rick has developed his station for contesting, and his contest crew, consisting of N2SB, WB2RVX, WA2VYA, WB8ZAR and himself, has done very well, setting new sectional or divisional records with nearly every try. Connor also one of the operators at the "Pack Rat" W3CCX/8 effort from Spruce Knob, WV during the 1984 ARRL UHF Contest and is looking forward to a similar outing in 1985. WB2NPE promised to activate his station for the new *CQ* World Wide VHF WPX Contest and was looking forward to the event.

Rick and I discussed at length the differences between HF and VHF DX'ing and contesting and mutually concluded there are many! Few experienced HF contesters are familiar with the continually changing nature of VHF propagation. Meteor scatter work requires considerable experience— not to mention a great measure of patience— and WB2NPE is a tried and true scatter operator, putting this unique talent to work during his favorite "wee hours" contest shifts. How many HF'ers can say they missed a multiplier because their beam heading was 6 degrees off? This is a common problem on the UHF bands, where antennas may have a front lobe less than 10 degrees wide and signals are only a dB above the noise when "peaked." VHF contesters like Rick Connor deal with these situations frequently, and tend to be annoyed by the "big gun" HF contesters' allegations that VHF work is kid stuff.

Readers who live in the eastern U.S. now know why WB2NPE is indeed a VHF "big gun," and will understand that Rick's big signal on the bands is the result of a *lot* of hard work. My sincere thanks to Rick and his lovely XYL for allowing me to visit to a few hours and capture some of the magic on film and paper.

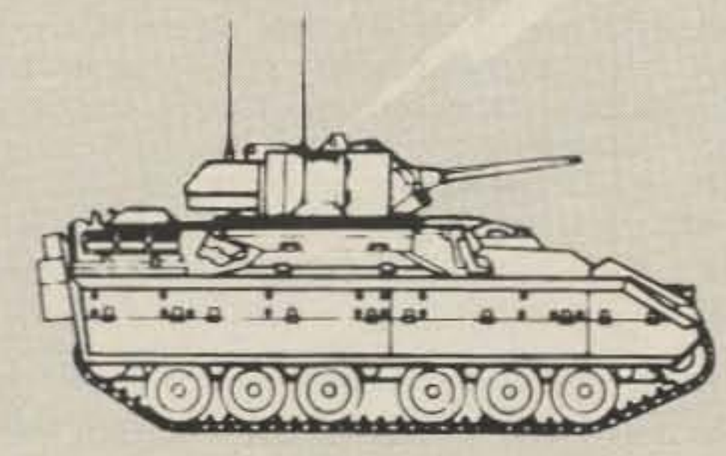
73, Steve, WB2WIK

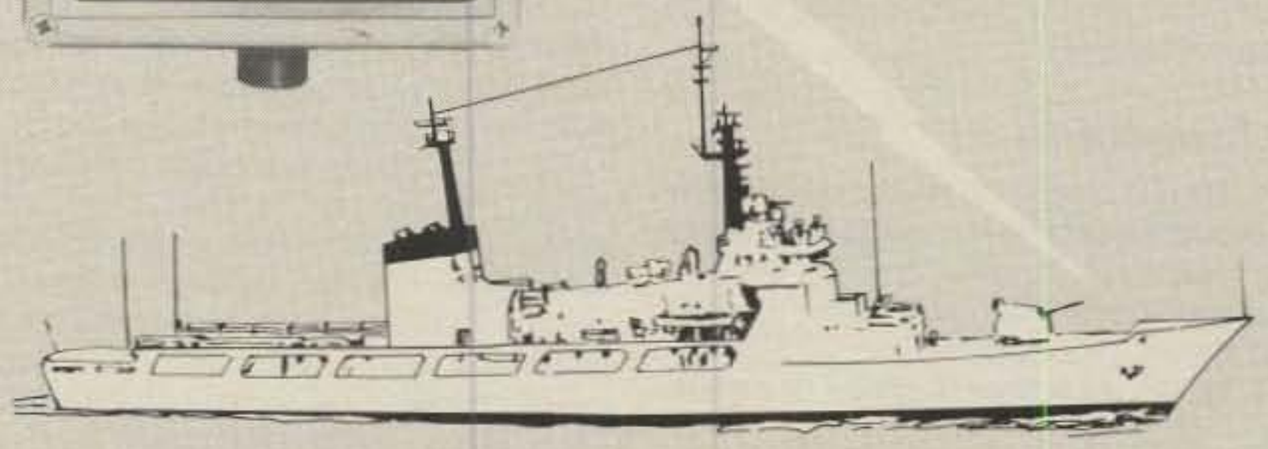




MAXCOM®
INCORPORATED

AUTOMATIC ANTENNA MATCHER





ONE ANTENNA .3 TO 70 MHZ.
VSWR 1.5:1 OR LESS

UNEXCELLED FOR **"FREQUENCY HOPPING"**

* NO MOVING PARTS !
* 5 YEAR WARRANTY !
* INSTANT MATCHING !
* 50 OHM INPUT !
* LOW NOISE !
* DIPOLE !
* MARINE !
* AMATEUR !
* 100% SOLID STATE !
* NO CONTROL LEADS !
* LIGHT WEIGHT !
* HIGH EFFICIENCY !
* 200 TO 2KW. P.E.P. !
* LONG WIRE !
* MILITARY !
* AVIONICS !

"NEW R.F. GROUNDLESS LONGWIRE MODELS NOW AVAILABLE"

CONTACT

MAGNUM DISTRIBUTORS INC.

1831 South Dixie Highway, Pompano Beach, Florida 33060
305-785-2002 • Telex 514365 (English FTL)

CIRCLE 22 ON READER SERVICE CARD

Novice

a monthly feature by
BILL WELSH, W6DDB

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

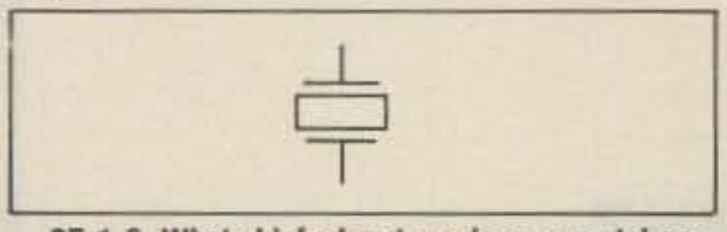
Novice Licensing Data—Part II

This article begins to cover the material one must know to pass an FCC Novice written examination (FCC element two). The balance of the material will appear next month. All parts should be studied prior to attempting to pass the test. The first part of this article provides the overall introduction to this instruction material, plus complete coverage of electrical principles. If you know someone who is interested in becoming an amateur radic operator, you should bring this article to his or her attention.

Circuit Components

2F-1.1. What is the general relationship between the thickness of a quartz crystal and its fundamental operating frequency? Thicker crystals provide lower frequencies, whereas thinner crystals produce higher frequencies.

2F-1.2. What is the schematic symbol for a quartz crystal?

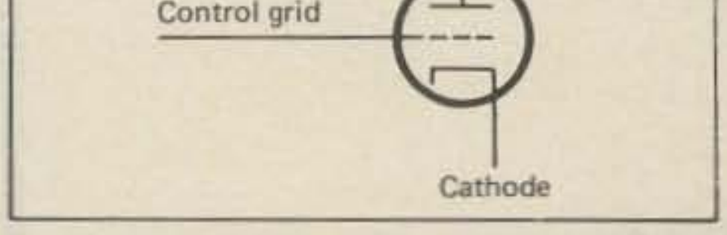


2F-1.3. What chief advantage does a crystal-controlled transmitter have over one controlled by a variable frequency oscillator? Better frequency stability.

2F-2.1. What two internal components of a D'Arsonval meter interact to cause the indicating needle to move when current flows through the meter? The permanent magnet and the current coil. The current coil is positioned between the North and South poles of the magnet. The indicator needle is attached to the current coil. The magnetic flux field, produced by current flowing through the coil, interacts with the permanent magnet's field, causing the coil/needle to deflect and produce the meter reading.

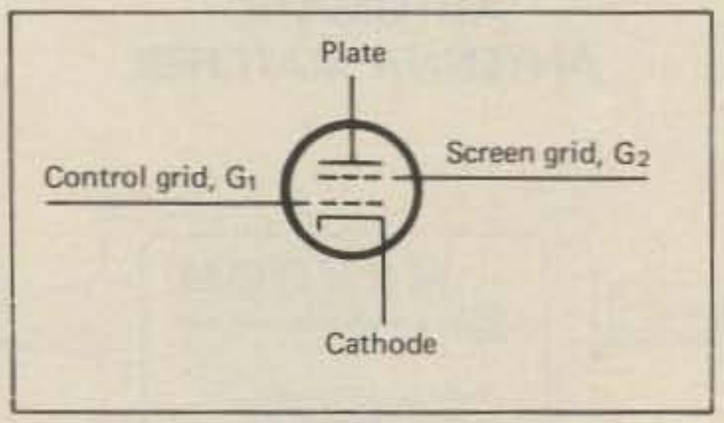
2F-2.2. What does a voltmeter measure? Voltage. There are microvoltmeters (measuring millionths of 1 volt) through kilovoltmeters (measuring thousands of volts) in amateur radio stations.

2F-3.1. Draw the schematic diagram of a triode vacuum tube and label the elements.



2F-3.2. Draw the schematic symbol for a tetrode vacuum tube and label the elements.

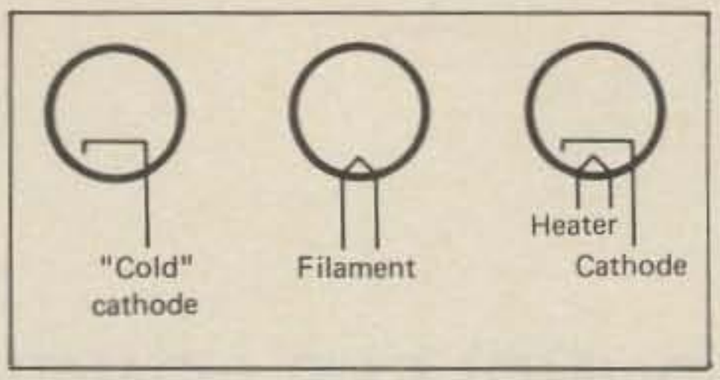
2814 Empire Ave., Burbank, CA 91504



Vacuum tubes are called electron valves in most parts of the world. It is easier to understand them in a progression from the two element (diode) thru the five element (pentode) tube. Some basic related facts need to be covered at this point, before tubes are covered.

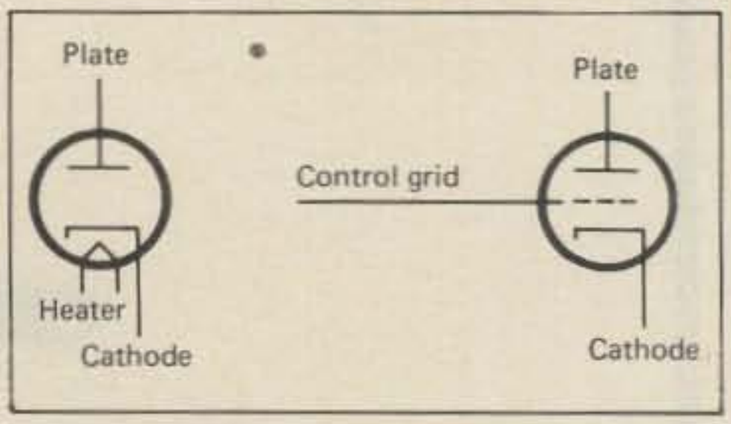
Power supplies are commonly referred to as "A", "B", or "C" supplies. These terms are in relationship to how they are commonly used with tubes. The "A" supply furnishes the low voltage that is used to power the filament or heater in a tube. The heater/filament voltage is usually a low value, and it can be either AC or DC. The "B" supply provides the voltage that is applied across the tube. The negative side of the "B" supply is connected to the emitter (usually a cathode), and it is called B-minus, because it is the negative (minus) side of the "B" supply. The positive side of the "B" supply is called B-plus, and it is connected to the plate (anode) of the tube to attract the negative electrons emitted from the cathode/filament. The "C" supply is the bias supply. It provides a voltage that is applied across the input of the tube. The negative (bias) voltage output is connected to the control grid, and the positive voltage output is connected to the emitting electrode (cathode or filament).

A tube's negative electron emitting electrode is usually in one of three configurations. It is considered to be a single electrode, even if it consists of a heater inside a cathode sleeve. Typical emitter electrode configurations are as follows:

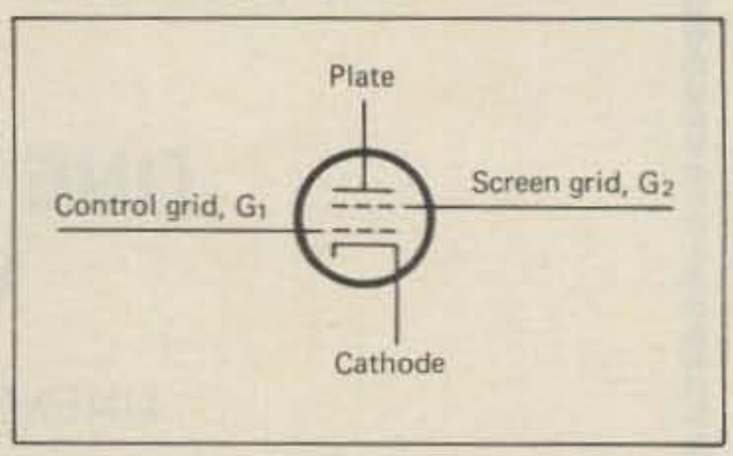


Tube Types and Element Functions

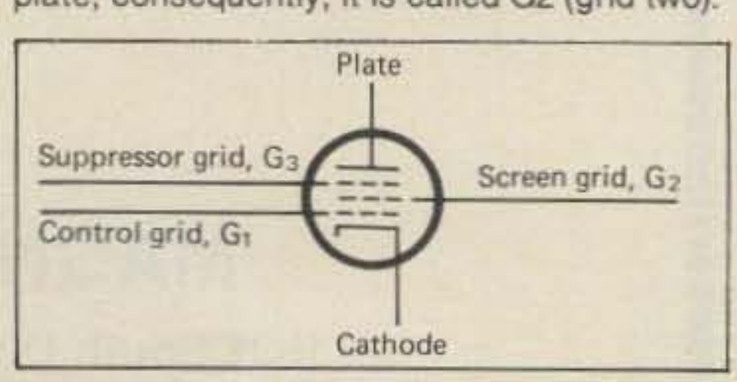
Diode—This two electrode (diode) tube is commonly used to convert AC to pulsating DC. Its function as a rectifier in power supplies is covered in general-class theory. The plate is connected to B-plus to attract negative electrons released by the cathode. The cathode is connected to B-minus (the negative output of the same supply that provides the positive potential to the plate) to furnish the stream of negative electrons that pass through the vacuum to the plate.



Triode—The addition of the control grid to a diode converts the diode to a three electrode (triode) tube. The control grid is called the control grid because it controls the flow of electrons (from cathode to plate) within a tube. Like electrical charges repel each other. The control grid has a negative voltage (called bias) applied to it, which enables it to control the flow of electrons from the cathode to the plate. The control grid is close to the cathode, which enables this grid to have a great effect on electron drift through the tube. The control grid is the first grid the electron stream passes through as it travels to the plate; and that is why it is called G1 (grid one).



Tetrode—The addition of the screen grid to a triode converts the triode to a four electrode (tetrode) tube. The major advantage of a tetrode over a triode is that the tetrode can be operated at higher frequencies without requiring neutralization to prevent self-oscillation. The screen grid acts as a buffer (screen) that isolates the output (plate) circuit from the input (control grid) circuit. The screen grid is commonly operated at a reduced B-plus voltage. In other words, the screen grid is connected to the B-plus feeding the plate of the tube, but the B-plus voltage is reduced through a series resistor to provide the lower voltage value that the screen grid requires. The screen grid is the second grid the electron stream passes through as it travels from the emitting surface (filament or cathode) to the plate; consequently, it is called G2 (grid two).



Pentrode—The addition of the suppressor grid to the tetrode configuration creates the

This is Bruce Chambers, KB4IFS, who helps make it easy to contact Manassas, Virginia. He credits the Ole Virginia Hams Club with giving him a start in amateur radio. Bruce obtained his Novice license in January 1984 and he upgraded to Technician in May. He has worked 44 states and 22 countries. His station includes a Kenwood TS-180S Transceiver with matching speaker, antenna tuner, and remote VFO. His antenna system includes a Butternut 10 thru 80 meter vertical and a 15 meter dipole. He enjoys DX (working distant stations) and ragchewing (chatting). He has interested his wife in amateur radio and she may be on the air by now.

five-electrode tube called the pentrode. The suppressor grid is connected to B-minus (cathode or filament), and its function is to minimize (suppress) space charge in the region between the screen grid and the plate. Electrons flowing from the emitting electrode (cathode or filament) to the plate are accelerated by the positive potential on the screen grid, which causes some of these electrons to bounce off the plate and to accumulate in the region between the screen grid and the plate. These space charge electrons slightly impede electron flow to the plate, and they cause an increase in the noise generated in the tube, due to collisions between electrons in the space charge area. Like electrical charges (negative, in this case) repel each other; therefore the negative polarity of the suppressor grid forces the negative space charge electrons back to the plate, minimizing the problem. The suppressor grid is the third grid the electron stream passes through on its way to the plate; consequently, it is also called G3 (grid three).

2F-3.3. What was one of the earliest uses of a two-element vacuum tube? The first use of a two-electride (diode) vacuum tube was as a rectifier, used to convert ac to dc pulsations. Diodes have many applications in electronics, and all of these applications relate to its rectification (one-way current flow) characteristic. One of its many applications in receivers is its use as a detector which extracts audio intelligence from the received and processed signal.

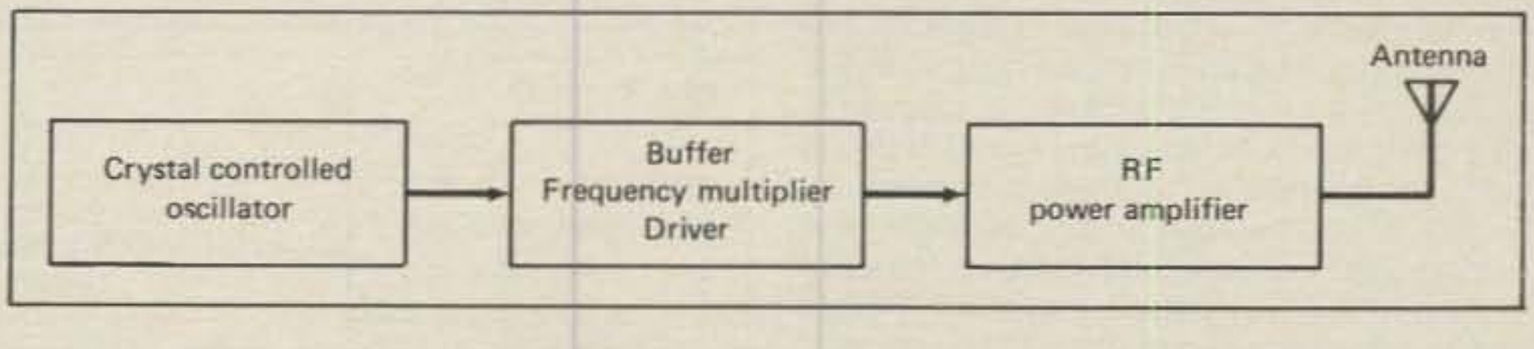
2F-4.1. What device should be included in electronic equipment to protect it from damage resulting from a short circuit? A fuse. Fuses are thin metal links that are designed to overheat and melt if an excessive current passes thru them. When a fuse melts (blows) it opens the circuit and prevents other circuit components from being damaged by high currents. Power is the product of voltage multiplied by current; consequently, it is essential to use a fuse with the correct voltage rating, as well as the right current rating.

2F-4.2. When a excessive amount of current flows through a fuse, what happens to the fuse? The circuit? The current? The **fuse** overheats and melts open. The **circuit** is de-energized, but its other component parts are saved from possible damage that could otherwise be caused by excessive currents. **Current** flow stops.

Practical Circuits

2G-1.1. Draw a block diagram representing the stages in a simple crystal-controlled telegraphy transmitter.

The crystal-controlled oscillator generates the fundamental frequency. If one is going to op-



Please send all reader inquiries directly.

erate on 7125 kHz, the *oscillator* generates a 7125 kHz signal which is then amplified by the *driver* to produce a strong enough signal to *drive* the *RH power (final) amplifier*. The final amplifier increases the input signal to supply no more than 200 watts peak envelope power (PEP) to the antenna system. The driver stage also serves as a *buffer* to isolate the oscillator from the load changes that occur when the power amplifier output is turned on and off as one closes and opens the telegraph key (sends code). This buffer action minimizes the possibility of chirp (instantaneous frequency change) in the radiated output signal. If one is going to operate on a frequency such as 21,102 kHz, the oscillator generates the fundamental frequency at 7034 kHz. The input of the buffer-driver stage is tuned to 7034 kHz and its output is tuned to 21,102 kHz, which is the third harmonic of the input frequency. In this example, the buffer-driver is also functioning as a *frequency multiplier;* specificaly, it is a frequency tripler. The input and output of the RF power amplifier are tuned to 21,102 kHz, producing the desired input to the antenna system.

2G-1.2. What type of transmitter does this block diagram represent?

A crystal-controlled radiotelegraph transmitter.

2G-1.3. Draw a block diagram representing the stages in a simple telegraphy transmitter having a variable frequency oscillator (VFO).

Operation of this transmitter is basically the same as the transmitter shows in the answer to **2G-1.1.** The only difference between these two transmitters is that this one has a **V**ariable **F**requency **O**scillator (**VFO**) which enables an operator to select any frequency within a Novice band.

2G-1.4. What type of transmitter does this block diagram represent?

It is a VFO controlled radiotelegraph transmitter.

2G-2.1. Draw a block diagram representing the stages in a simple superheterodyne receiver capable of receiving A1 telegraphy signals.

The antenna is bombarded with the thousands of radio signals that surround us. The antenna provides maximum signal output (to the receiver's input) at the frequency (or frequencies) to which it is resonant. The **RF AMP** is the radio frequency amplifier stage; its input and output circuits are tuned to the desired frequency, which is 7175 kHz in this example. Some receivers have more than one stage of RF amplification. It is essential that these "front end" stages generate very little noise, since the noise they produce is amplified many times in the following stages.

The RF amplifier's output is fed to the **Mixer** stage. The mixer stage also receives an input from the local oscillator. The dashed line indicates mechanical coupling between the RF amplifier and the local oscillator. A dual-section air variable capacitor varies the **Local Oscillator** output as the RF amplifier is adjusted; this maintains a constant difference between the received frequency and the local oscillator frequency. Assuming that this receiver is going to use an **Intermediate Frequency** (IF) of 455 kHz to process received signal, the local oscillator could be adjusted to track 455 kHz below the received frequency. In this case, the local oscillator output os 6670 kHz (7125 minus 455 kHz).

With 6670 and 7125 kHz applied to the mixer, four frequencies are available at the mixer output. In addition to 6670 and 7125 kHz, their sum (13,795 kHz) and difference (455 kHz) frequencies exist at the mixer output. The difference (455 kHz) frequency is used to process the received signal intelligence because it is easier to work with than the received frequency. In this example, the received frequency (7125 kHz) is almost 15 times higher than the IF processing frequency (455 kHz).

The input and output of each IF amplifier is tuned to 455 kHz. There is usually more than one stage of IF amplification. The number of IF stages depends on how much amplification is desired. The series of IF amplifiers narrows the processed spectrum (to eliminate or minimize signals and noise above and below the spectrum that contains the signal intelligence one wants to hear) and amplifies it.

The last IF amplifier is shown separated from the other IF amplifiers to make it easier to understand the function of the **Best Frequency Oscillator** (BFO). The BFO is a required stage in a communications receiver, whereas it is not part of a standard broadcast (AM or FM) receiver.

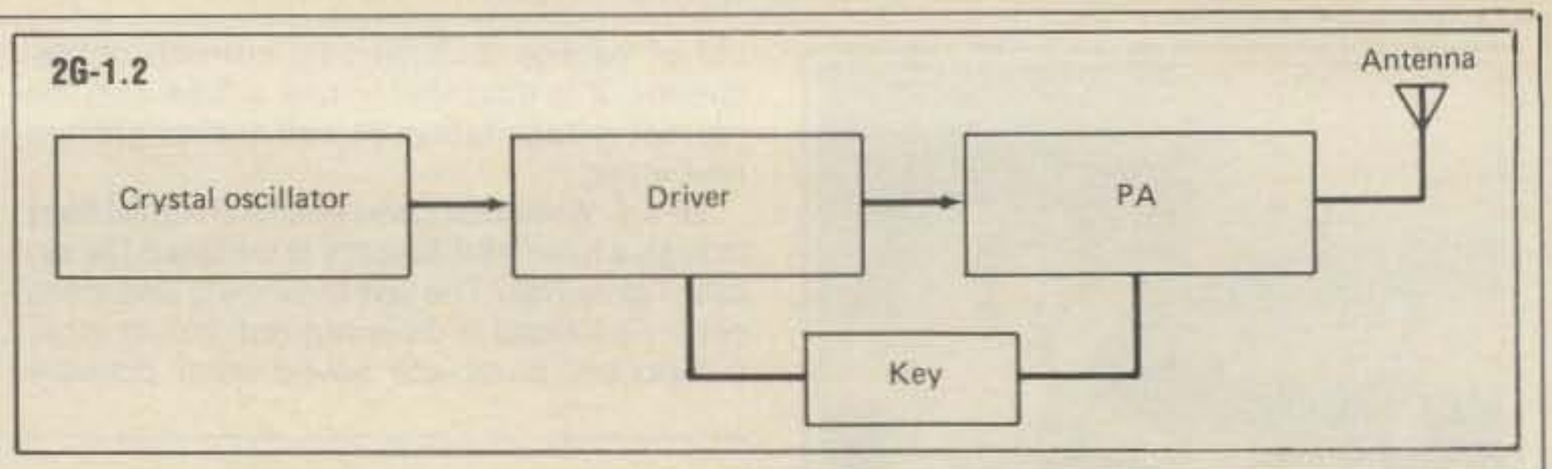
If we tuned to the exact center of a received signal, we would not hear a tone output when code is received. This is because there is a null (zero tone) at the center point. (The November 1984 Novice column covers null, zero beat, and other related factors.) The BFO produces a frequency that can be adjusted several kiloHertz above and below the 455 kHz intermediate frequency. A typical BFO output frequency range is 450 to 460 kHz, permitting an operator to tune from 5 kHz below the IF to 5 kHz above it. Most operators prefer to copy code using a tone of about 700 Hertz. In this case, the BFO can be adjusted 700 Hertz above (455.7) or below (454.3) the IF to produce the desired 700 Hertz tone each time a dit or dah is present in the signal being processed.

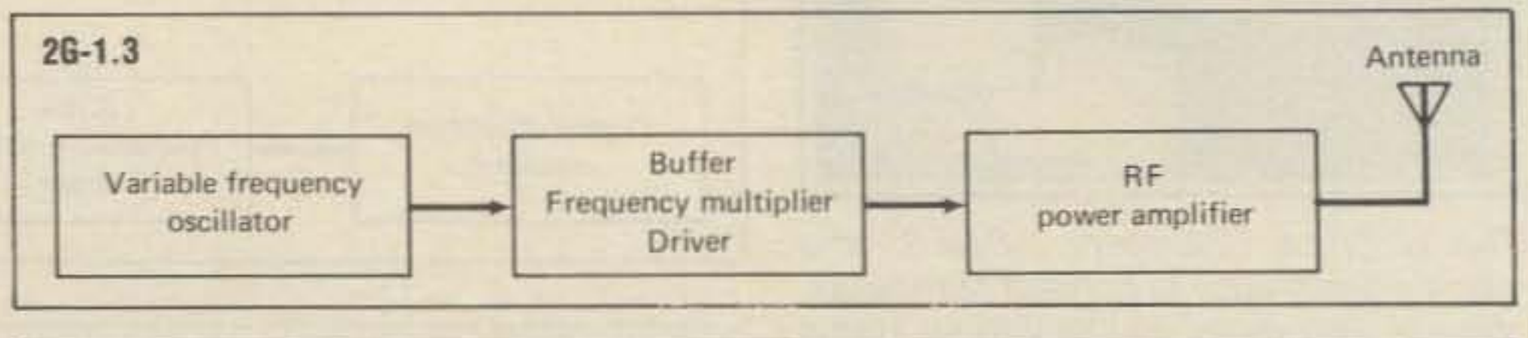
The **Detector** (DET) stage uses three things. First, it is a rectifier that passes just the upper (positive) half of the 455 kHz processing frequency, plus whatever audio intelligence (voice, tone, etc.) is riding on the intermediate frequency. Next, it bypasses the intermediate frequency component to ground. Last, it applies the audio frequency component (extracted from the top of the rectified IF) to the **Audio Frequency Amplifiers** (AF).

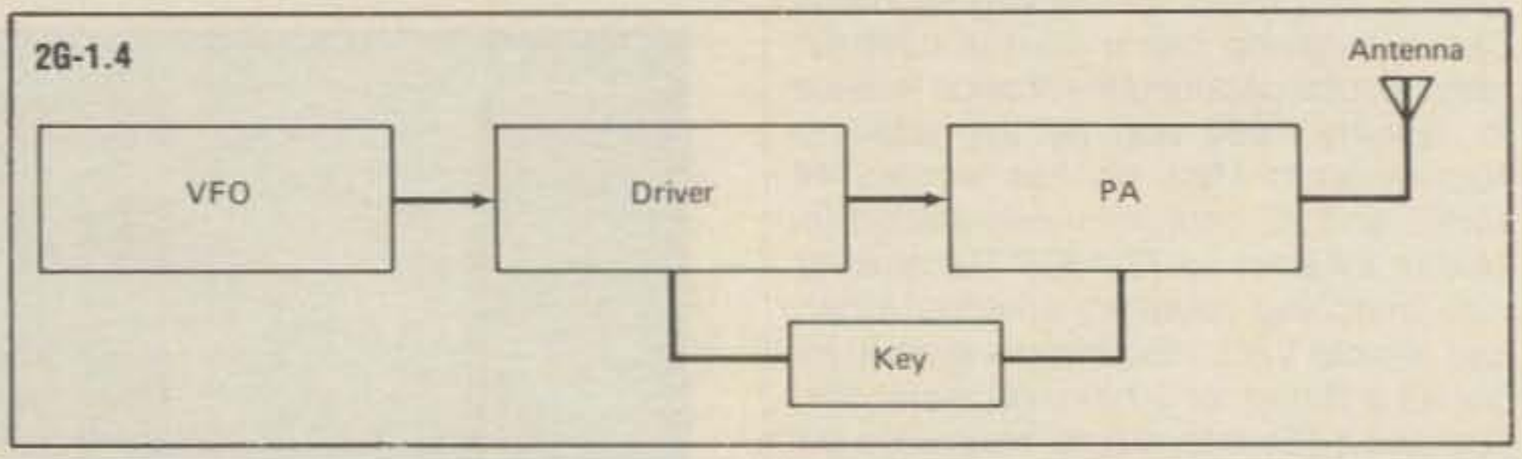
The audio frequency amplifier (AF AMP) may be more than a single stage. This amplifier increases the audio signal it receives from the detector. The amplified audio signal is applied to a loudspeaker (or headphones) to enable the operator to hear the intelligence on the received signal. In this case, the operator could hear radiotlegraph (A1) signals being transmitted on 7125 kHz.

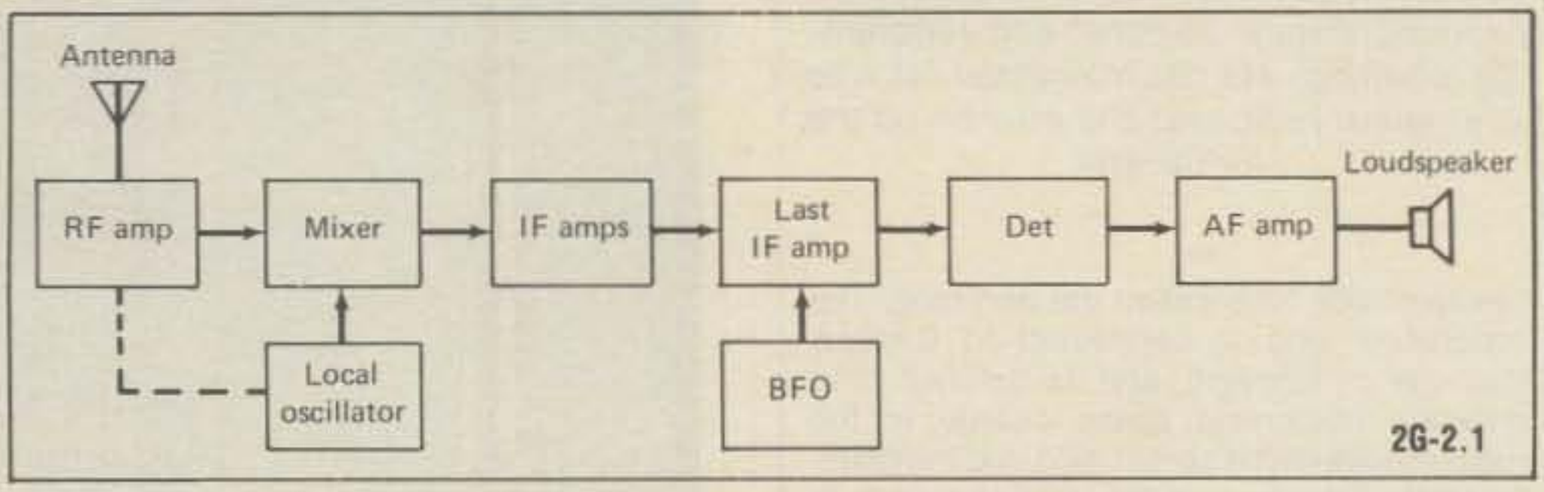
This block diagram represents a single conversion superheterodyne receiver, since the received signal is just converted to one intermediate frequency. Double and triple conversion are more common in the better superheterodyne receivers.

(to be continued)

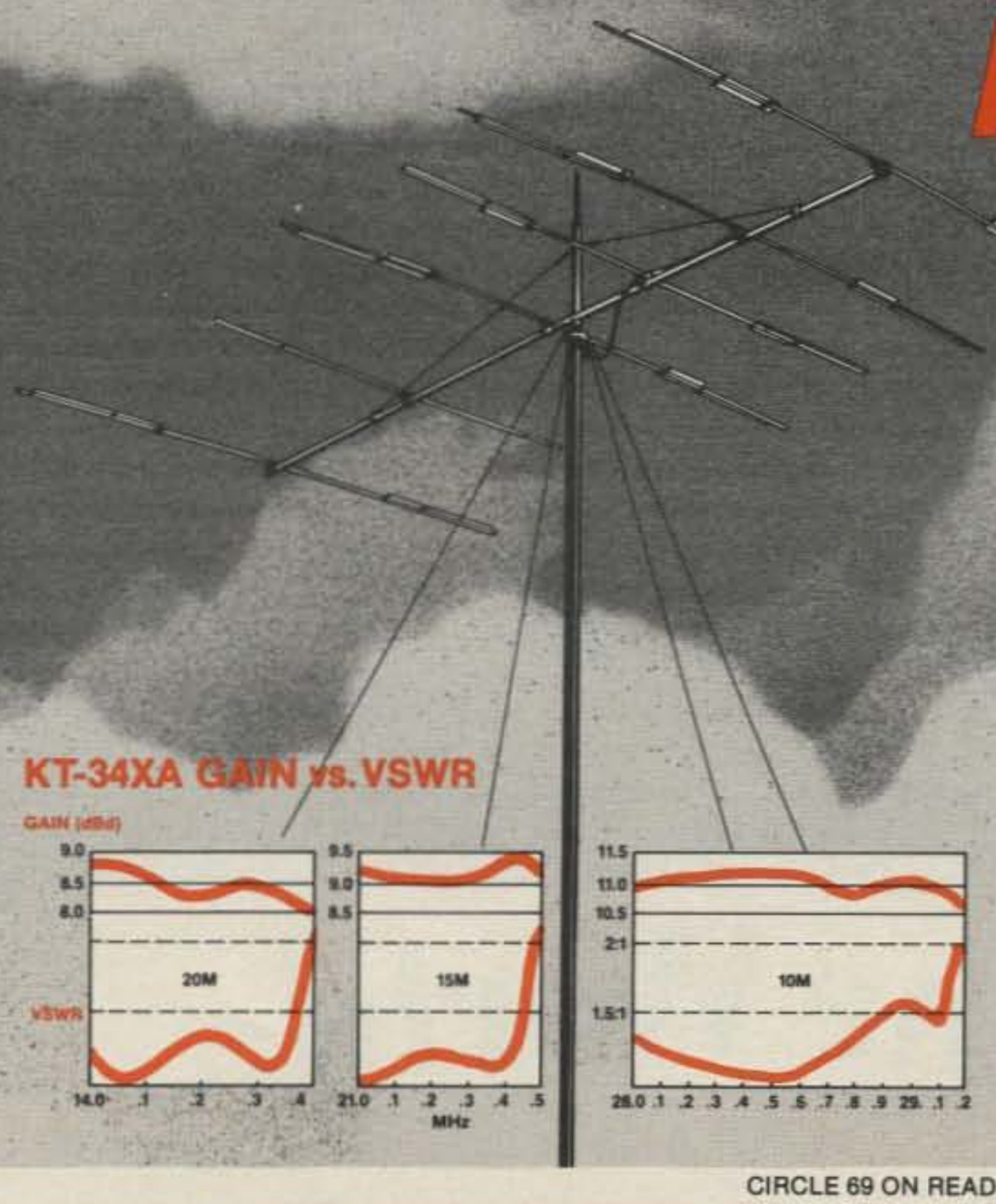








KT-34XA Triband Performance



Takes you through the sunspot lull with solid QSO's and exciting DX.

The unequalled performance of the KT-34A and KT-34XA Triband Antenna Systems are the result of *KLM's* uncompromising approach to antenna performance and reliability.

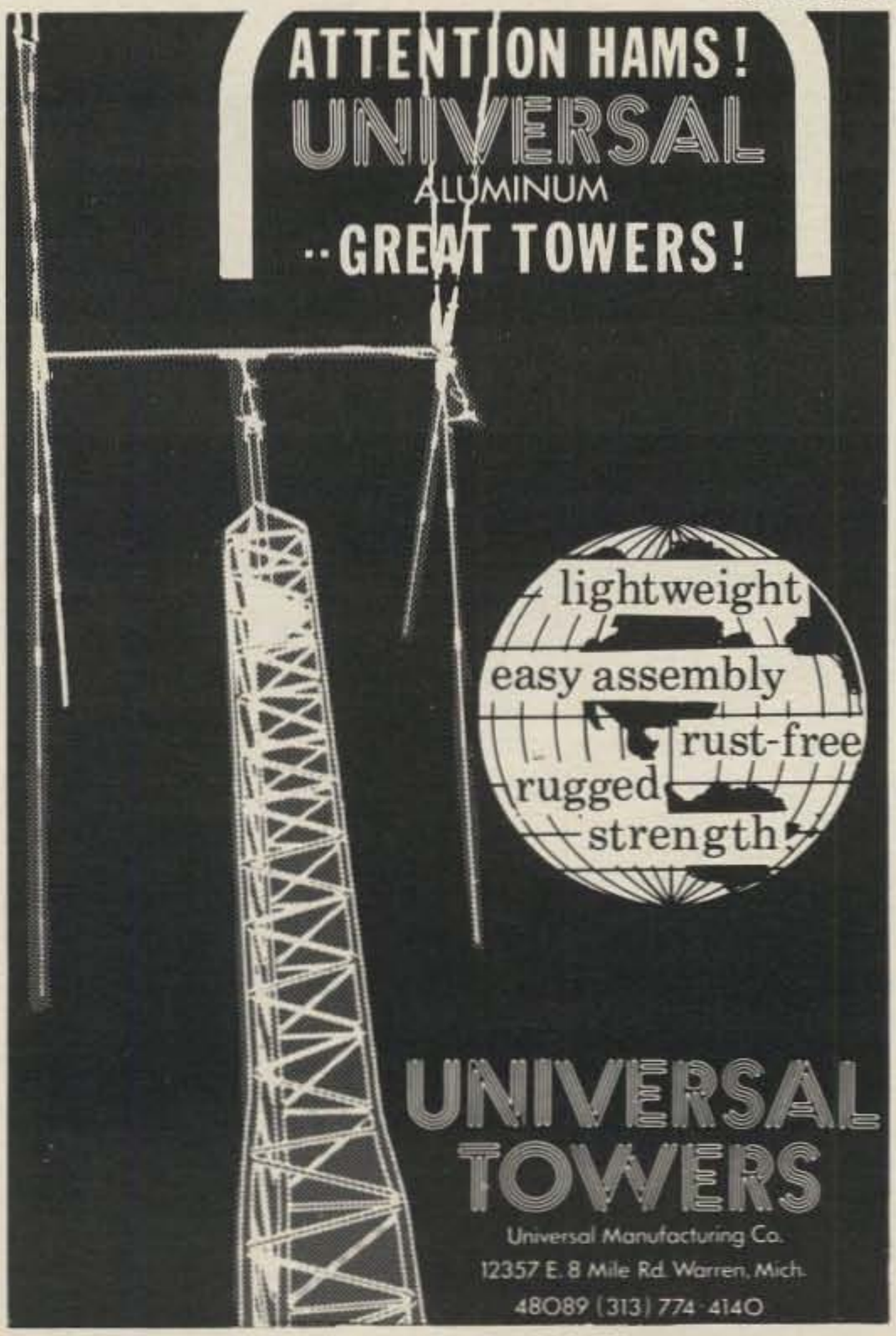
Our unique design utilizes lossless linear loading techniques with High Q Air Capacitors for peak efficiency. Dual driven elements deliver "Monobander" gain and low VSWR to make even barefoot solid state rigs work like kilowatts.

The four element KT-34A is expandable to the latest KT-34XA using the available KT-34XA upgrade kit.

See the complete line of ***KLM's*** *antennas and equipment at your local dealer, or write for our catalog.*

KLM ***electronics, Inc.***
P.O. Box 816
Morgan Hill, CA 95037

CIRCLE 69 ON READER SERVICE CARD



CIRCLE 77 ON READER SERVICE CARD

Free Antenna Accessories Catalog

◂ Coaxial Antenna Relays

Remotely select up to 9 antennas from your transmitter, using only *one* coaxial cable. Environmentalized, high power and low loss.

W2AU and W2DU Baluns▸

Our baluns, center insulators and insulators have been preferred for 20 years by Hams, industry, and the armed forces. Protect against TVI and lightning 1.8–200 MHz.

◂W2VS Antenna Traps

Add these traps to your dipole and get low SWR on 2 to 6 bands, depending on how many you add. Antenna wire and custom kits also available.

Send For Yours Today▸

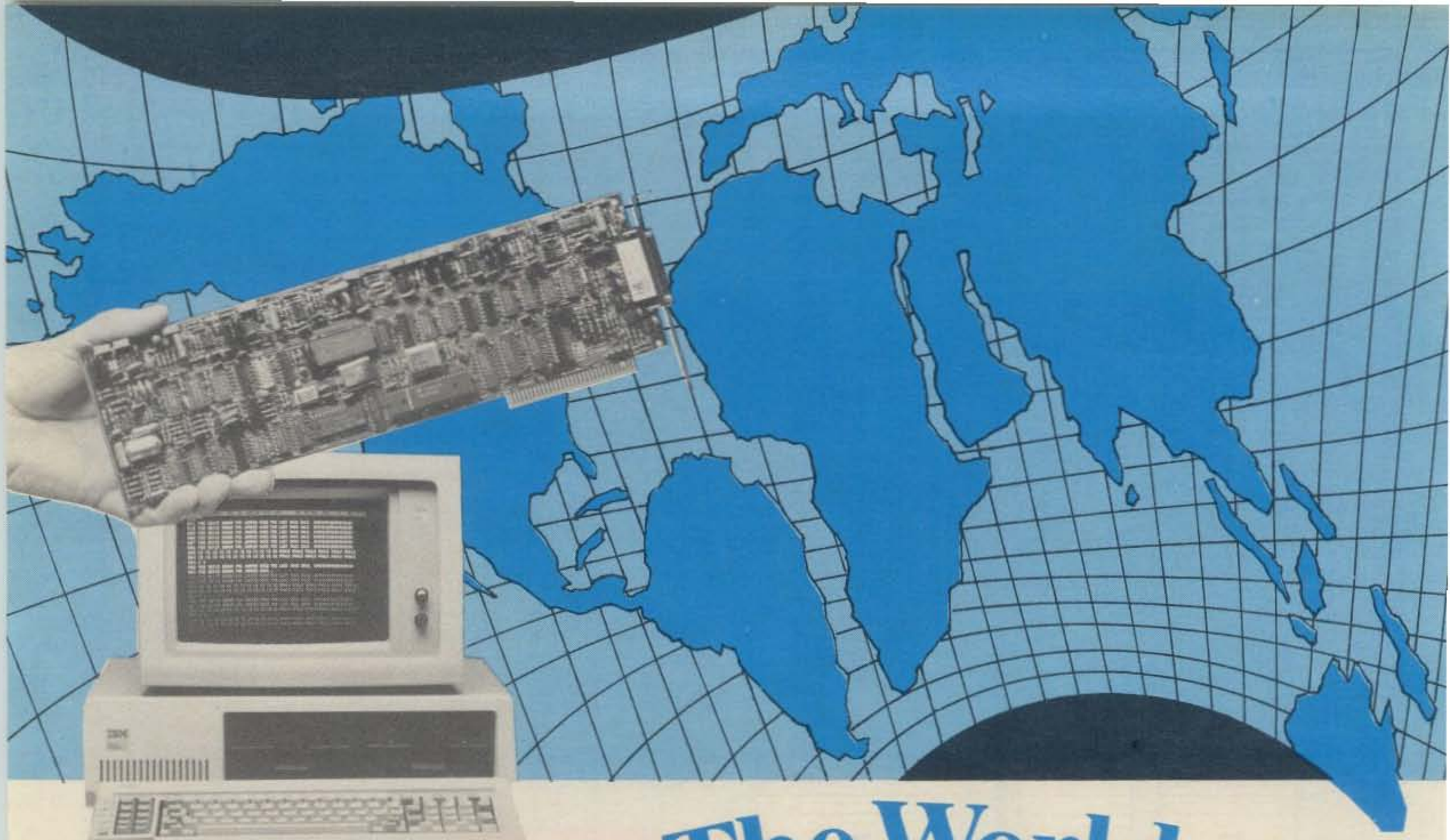
Don't delay. Call or write today, and we will send you free literature which fully describes our Ham antenna accessory product line.

Dealer inquiries also welcome.

UNADILLA/REYCO/INLINE
A Division of Microwave Filter Co., Inc.

6743 Kinne St., East Syracuse, NY 13057
Toll Free 1-800-448-1666 TWX 710-541-0493
NY/HI/AK/Canada (Collect) 315-437-3953

CIRCLE 76 ON READER SERVICE CARD



Speak To The World...

*With the Talkative Radio Modem from HAL And Your IBM-PC®**

Now, the world is your forum by plugging the HAL Personal Computer Interface 2000 radio modem into your IBM PC. You now make your PC even more valuable by being able to "speak to the world." The PCI circuit board includes the high-performance, no compromise RTTY and CW circuitry for which HAL is known around the world. From our proven sensitive and selective RTTY demodulator to the advanced CW receive circuit, the PCI-2000 offers system performance previously available only in our dedicated terminals. The PCI-2000 comes as a fully-integrated package with hardware, software, and many operator aids. Full-feature programs on computers can be very difficult to use and HAL has "gone the extra mile" to be sure that our system is friendly to you! From the custom keyboard overlay to the help menu, status line, and comprehensive manual, we think you will agree that the PCI-2000 is just the sort of fun-accessory you and your PC deserve. Some of the more outstanding PCI-2000 features are:

RTTY: 45-9600 baud
US or CCITT #2 Baudot
ASCII with selectable parity
170-425-850 shift
103/202 modem
Programmable end-of-line sequence
Transmit line length of 20 to 76 characters
Synthesized AFSK tones match receive mode
FSK output with 6 selectable levels
Audio input sensitivity — less than 1 mv R.M.S.

CW: 5-125 WPM Send and Receive
Autotrack receive with speed readout
Advanced CW receive algorithm

Display: Split screen for 12/12 or 20/4 RX/TX text
Receive text in bright video (TX in dim)
Full status line on top of screen
Full-feature editor in transmit buffer

Buffers: 250 line receive buffer with viewing scroll
2 - 250 line transmit buffers with scroll
10 - full-line HERE IS messages
Store all buffers and HERE IS messages on disk
Load and send any text file from disk
Set-up parameters stored on disk

COMPATIBILITY:*
IBM Personal Computers plus many others that are slot and BIOS compatible. Call for latest list.

Available NOW at your HAL dealer — Just $595, with software and documentation. Write or call for more information.

*IBM and IBM PC are registered trademarks of IBM Corporation.

HAL COMMUNICATIONS CORP.
Box 365, Urbana, IL 61801 Phone: (217) 367-7373 TWX: 910 245-0784

CIRCLE 40 ON READER SERVICE CARD

Awards

a monthly feature by
DOROTHY H. JOHNSON, WB9RCY

NEWS OF CERTIFICATE AND AWARD COLLECTING

The story of the month by Herb is:

Herbert J. Morgan, WD9GBH
All Counties #413, 1-17-85

"When I was growing up in Herkimer, New York, I remember listening to my shortwave radio many nights, but unfortunately never entered the world of amateur radio until 1977.

"After finishing my undergraduate degree at Hope College, Holland, Michigan, 3 years of science teaching and my master's degree at Penn State University, my wife, Joan, and I settled in Marion, Indiana (Grant County). Joan is a history teacher, and I am a counselor at the same high school.

"A good friend and fellow educator introduced me to amateur radio and helped me obtain my Novice license. Since that day I have worked hundreds of CW contacts (my favorite pastime) and finally upgraded to Extra Class in 1982. I am currently involved in the ARRL testing program as Volunteer Examiner liaison for our Grant County Amateur Radio Club.

"It was during my first year as a Novice that I discovered a hometown friend and eventual county hunter, Keith, WA2TJL, but I did not discover county hunting until December of 1979 when I happened by 14.336. After sorting out the happenings I made my first contact with Dick, K4DDB, in Mississippi. Four years later and with much help from many, I finally got my last county (La Paz, Arizona) courtesy of Chuck, N0BHO.

"During those four years I attended two national conventions and four mini-conventions, meeting many friends. I now know that CW has been replaced by listening for those new counties and that I will be attending many more of those great gatherings of 'great minds.'

"My understanding wife must be given a 'gold star' for putting up with me and my county hunting. Although she will never become a amateur she enjoys keeping my logs; but more important for her is that she has learned that she can also attend the conventions and meet those wonderful people who are the county hunters.

"The other two girls in my life, Beth and Carol, are currently attending Indiana and Purdue Universities and my son Evan, N9CQF, will start Purdue University next fall. He hopes to upgrade his amateur radio license to General class soon.

Herbert J. Morgan, WD9GBH, All Counties #413, at home in Marion, Indiana.

"I am currently working on the 'second time around,' 'the bingo game' and all YL contacts so it looks like I'll be around for a while collecting and putting out counties.

"Thanks to all the unsung heroes, mobile operators, net controls and assistants. With all the people helping people, this has to be the friendliest group in amateur radio.

73, Herb, WD9GBH"

333 South Lincoln Ave., Mundelein, IL 60060

Awards Issued

The gold seal for USA-CA 2500 #583 has gone to Antonin Blaha, 4-23-85, All CW, #1 to OK.

Ira L. Bell, KA4SAX, with his big signal from Tennessee, claimed USA-CA 2000 #639, 4-11-85, All SSB/Mobile.

Ellis Fenical, KA9GZM, qualified for USA-CA 1500 #712, 4-22-85, Mixed.

Lucien (Lou) Eloe, WA2SSH, won USA-CA 500 #2022, All CW, USA-CA 1000 #876, Mixed, and USA-CA 1500 #711, Mixed, all dated 4-1-85.

Norberto B. Lima Vidal, CT1AV, sent for USA-CA 500 #2024, All SSB, and USA-CA 1000 #877, All SSB, 4-26-85.

USA-CA 500 Certificates were issued to the following:

Lucien "Lou" Eloe, WA2SSH, #2022, All CW, 4-1-85.

Johannes Anholm, #2023, All CW, 4-18-85.

Norberto B. Lima, CT1AV, #2024, All SSB, 4-26-85.

Larry W. Dixon, KA9GWM, #2025, All CW, Novice Bands, 4-29-85.

Clifford R. Kurtz, N6ZU, #2026, Mixed, 4-29-85.

USA-CA Honor Roll

2500		1000	
OK1apv	583	WA2SSH	876
		CT1AV	877
2000		**500**	
KA4SAX	639	WA2SSH	2022
		OZ4ZU	2023
1500		CT1AV	2024
WA2SSH	711	KA9GWM	2025
KA9GZM	712	N6ZU	2026

Awards Available

The Field Award - Swedish Amateur Radio Society. Now that IARU has decided to adopt the new locator system (the Maidenhead locator) as from 1 January 1985, the Swedish Amateur Radio Society, SSA, has instituted a Field Award. The rules follow:

The Swedish Amateur Radio Society will issue the Field Award diploma to licensed radio amateurs and shortwave listeners for verified contacts with 'fields,' as defined by the locator system adopted as from 1 January 1985 (Maidenhead locator). Contacts on or later than this date are valid for the diploma.

The field award is issued in four classes:

PLATINUM—All 324 fields verified
GOLD—300 fields verified
SILVER—200 fields verified
BRONZE—100 fields verified

All amateur radio bands and modes are permitted. Endorsements will not be issued.

All contacts shall be made with stations on the earth's surface.

Contacts shall be verified by QSL cards or their equivalent, on which it is clearly stated the field or position, with such accuracy that the field can be determined. The term "position" refers to latitude and longitude or to a place name.

If there is any uncertainty about a field, SSA may demand further information before approving the contact. If the uncertainty remains, then the contact will not be approved.

A random sample of individual QSL cards will be made, which must be sent in for cnecking.

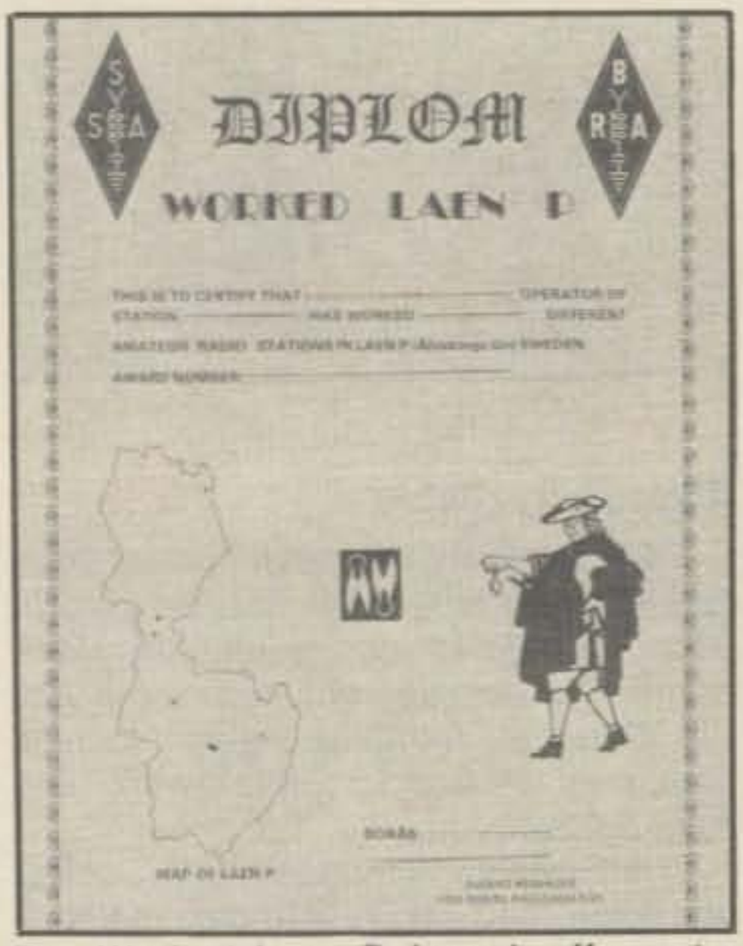
The application shall be made on a GCR list, containing the information from each QSL card which is required for approval. The GCR list shall be verified by the applicant's national amateur radio society.

The fee is 30 Swedish Crowns, 10 IRC's or $4.00 US. Send application and

fee to: Field Award Manager, SSA, Ostmarksgatan 43, S-123 42 Farsta, Sweden.

World Atlas. A world atlas, showing the new locator grid, has been produced by SM5AGM, and it can normally be purchased from every National Amateur Radio Society. The atlas can also be ordered by sending a SAE and 6 IRC's.

Worked LAEN P. Boras Radiomatorer, Sweden, is making an award available for working Laen (county) P.



The Worked Lean P Award, offered by Bora Radiomatorer.

The award is available to licensed amateurs and SWLs.

Contacts with Laen P after 1/1/1980.

All band and mode (no repeater traffic).

Scandinavian country: work 25 different stations in Laen P.

Other European country: work 15 different stations in Laen P.

All other countries: work 5 different stations in Laen P.

Application: List log information and have it checked by 2 licensed amateurs (no QSL), and send to: Boras Radioamatorer, c/o Lars Lind, SM6NT, Ekesund, S-520 11 Vegby, Sweden.

Fee: 10 Swedish Crown, $2.00 US or 10 IRC's (for SM only: Postgiro 87 78 17-7, Boras Radioamatorer).

The Breadfruit Award.

The Breadfruit Award. The Breadfruit Award is silk screened on cotton by Guadaloupean artisit 'Claudy,' and is offered in limited number by FG7AS, Sam Sharad Sahai (FK0AT).

Rules: U.S. Stations need 25 points, others need 20 points, as follows:
QSO with:

	Points
1. FG7AS, FG7AS/VP2D or F/S TK7GAS, HW7G, FK0AT	3
2. Ant FG, TU, VU, or FK station	2
3. FG7XA, VP2AW (V2AW), VU2IJ, ON5MF, XE1OX	3
4. K1MM, W2YC, WX4A, W6KG, N6IC W6QL, W6AQ, K6LPL, W7QS, K7SP	2
5. Handicapped operators add	3

Send log information to FG7AS Award, Box 444, Pointe-a-Pitre, Guadeloupe Island, F.W.I. along with fee of 10 IRC's or $4.00 U.S. for mailing costs.

Texas DX Society 1986 Armadillo Run. Plans for the 1986 TXDS Armadillo Run are well under way. This will be one of the major amateur radio operating events of 1986 when all counties in the fifty United States are activated!! The purposes of the run are:

1. A demonstration of amateur radio's ability to organize and mobilize in time of disaster.

2. A demonstration of the fraternal spirit among amateurs and amateur radio clubs.

3. An event to help celebrate the 150th Anniversary of the State of Texas.

Participation is open to amateur radio operators, worldwide. If your group or club would like to participate in the event, the Texas DX Society will be glad to help you with information about planning, logistics, etc. Write to: Tom Taormina, K5RC, 1986 Armadillo Run Coordinator, Route 1, Box 307, Manvel, Texas 77578. Watch this column for further details as plans progress.

Further Discussion Of "TEAM" Contacts

The following notice appeared in this column in March, 1985:

"The so-called 'team contacts,' wherein one person acknowledges a signal report and another returns a signal report while both amateur callsigns are logged will not be accepted for purposes of the USA-CA Award for contacts made after April 1, 1984." (Obviously, this date should have read April 1, 1985!!)

The February, 1985 issue of the County Line Road Runner (published by the Mobile Amateur Radio Awards Club), contained the following announcement:

"The so-called 'team contacts' wherein one person acknowledges a signal report and another returns a signal report while both amateur radio callsigns are logged will not be accepted for purposes of USA-CA Awards for contacts made after April 1, 1985.

"It is the consensus of the USA-CA Advisory Committee, and the conclusion of the USA-CA Custodian that such exchanges do not constitute a valid QSO with either member of the 'team.'

"Again, it is not our intention to make County Hunting difficult; rather, we aim to maintain the high degree of integrity and the prestige that the USA-CA program has always enjoyed."

The following condition was added to the USA-CA Rules and Program as of April 2, 1985:

"So-called "team" contacts, wherein one person acknowledges a signal report and another returns a signal report, while both amateur call signs are logged, are NOT valid for USA-CA. Acceptable contacts can be made with only *one* station at a time."

A brief explanation of "team contacts" and the problems associated with such "contacts" and the reasons for the decision not to recognize them as valid contacts follows.

FCC Rules, Parts 97.3, Definitions; 97.84, Station identification; 97.91, One-way communications; and Subpart E, Prohibited Practices and Administrative Sanctions are pertinent. It is worthwhile to note that amateur station identification, and amateur radio communication, is by and among amateur radio stations, not people (97.3(b), 97.84(a), 97.89); and that an amateur radio operator is licensed to operate an amateur radio station, not two or more stations simultaneously (97.3(c)).

Typically, team operating on the county hunting nets at 14.336 MHz and 3.886 MHz has followed this pattern (amateur calls and geographic location are fictitious, of course):

•Amateurs A and B are in a vehicle, equipped with a mobile station, in Kent County.

•Stations C, D, E, F, G, etc., want to make contact with Kent County.

•The transmissions, with sources identified as amateurs A and B, and stations C, D, E, etc.:

A–"this is XX9XYZ XX9ABC Kent County, Indiana Q R Z"
C–"CC2C"
A–"CC2C you are 59"
C–"QSL 59 you are 57"
B–"QSL 57"
A–"QRZ"
D–"DD2D"
A–"DD2D 59"
D–"QSL 59 also 59"
B–"QSL 59"
A–"XX9XYZ XX9ABC Kent County, Indiana QRZ"
E–"EE2E"
A–"EE2E 59"
E–"QSL 59 you are also 59"
B–"QSL 59"
A–"QRZ
Etc., etc.

It is highly questionable what station is operating mobile. Some people record both A and B in their USA-CA applica-

tions, some have recorded A only, and still others have recorded B only. One active county hunter told me of the practive of using the OM member of the team for USA-CA and the YL member for a YL award.

Some time ago the practice of double logging (logging more than one station call at either end of a QSO) got to the point of logging radio amateurs whose station license and operating privileges did not include the frequency in use. It also became known that some were requesting double (in some cases even multiple) logging when licensed amateurs other than the one actually operating the station were merely in the general vicinity. At that time my predecessor ruled that the practice of double logging would be alright for mobile contacts as long as both amateurs in the mobile station were heard on the contact. From there, the practice of "team" operating grew to include fixed, mobile and portable; with increasingly questionable identification practices. For example, it became commonplace to hear a transmission identified as "XX7ABYZ" from the QTH of two amateurs with identical prefixes and different two-letter suffixes.

Once again the concept of county hunting was brought into question. During the time (two years) that I have been USA-CA Custodian I have been questioned about this practice and found myself unable to defend it. I then submitted the question to my Advisory Committee for consideration. The committee consists of Bob Dyson, K0AYO, Scott Lehman, N9AG, Wayne Johnson, N9WA, Bob Fuss, W4OWY, Dennis Johnson, N0WA, Dick Lennon, N2BL, Bill Smith, W7GHT and Al Miller, W0EWH. These people are all well informed, knowledgeable amateurs who are active in many aspects of the hobby.

The question was put to the committee in this fashion in December, 1984:

"The validity of the so-called "team" contacts wherein one person acknowledges a signal report and another returns a signal report while both amateur calls are logged has been questioned. To the best of my knowledge such contacts are not accepted for other awards or for contests. This practice apparently started as an effort to make County Hunter Net operation more efficient and has led to some careless, if not illegal, radio operating, all in the name of county hunting. Please let me have your opinions on this matter.

Of the eight Advisory Committee members, 3 were ambivalent, and 4 expressed the unequivocal opinion that "team" contacts are not valid two way contacts. One suggested that we continue to honor them for USA-CA, but that they not be accepted for other purposes such as YL or CW contacts.

As you can see, this was not a unilateral decision made capriciously or in haste. It was made after due study, consultation with the USA-CA Advisory Committee and discussion with other knowledgable members of the amateur radio community.

Even in the face of all the discussion one fact remains self-evident. One station-call giving a signal report to a station and another station-call receiving a signal report back equals three station-calls with half finished signal exchanges.

Through the years it has been necessary to make specific rulings to disallow claims of contacts. Examples of these are the rulings disallowing, for credit for USA-CA, QSO's via repeaters and phone patches, multiple county points, and claiming contact with two counties at one time when the counties are separated by a body of water. It has been necessary to disallow some contacts because the mobile stations involved were not properly licensed for the frequency in use at the time of the contacts or were proven not to be where they claimed. So now it is necessary to rule that the "team contacts" are not valid for USA-CA.

It is not my intention to enter into an adversary relationship with any person or group of persons. Rather, I intend that the rules and criteria for the USA-CA Program be clear, that they be in accord with the rules governing the amateur radio service, and that they be above ridicule or question.

To allay the fears of those who may think that all comments have been negative, I'll quote from one letter received shortly after the announcement was published in the *Road Runner*:

"This county hunter . . . is in complete agreement with the decision of you and the committee regarding 'team contacts.' There are only a few who run counties in this manner, but there are many more county hunters that do not feel comfortable with this type of contact.

"Thank you, Dorothy, for making this much needed change in the rules."

To those who have objected to the ruling, I understand the desire to save time on the nets, and to make as many contacts as possible within a given time. However, this does not justify neglecting our obligation to uphold and safeguard the Amateur Radio Service in all of its aspects.

I hope this answers any remaining questions on the subject of "team contacts."

73, Dorothy, WB9RCY

CQ SHOWCASE

Hildreth Engineering Model 10 Super CW

The first filter, which may be selected for output in its linear mode is the filter position, is an 8th order Butterworth cascade of staggered pairs. This configuration is used to provide skirt rejection without excessive response to impulse noise. The 3 dB passband is from 700 to 800 Hz with a 3 to 30 dB shape factor of less than

3. The S/N boost function, which is driven by the pre-filter, provides a signal-to-noise ratio enhancement of over 10 dB as compared with the linear filter position, and it does it for signals that are well below the noise in a typical 3 kHz audio bandwidth. This boost circuitry uses compound-complex filter/limiter/filter elements with added active circuits that create S/N enhancement for CW, or any pulse-code-modulation signal. A 2 watt power amplifier with a controlled voltage gain of 25 is included. This allows a reduction in receiver RF gain, which reduces the tendency toward non-linear disturbances in a receiver's IF and/or product detector when listening to a weak signal under the condition of strong signal QRM outside of the 700 to 800 Hz passband.

The unit receives its input from the receiver's speaker output. Power supply requirements are 12 to 15 VDC at a normal 350 ma peak. The unit will drive a 4 to 8 ohm speaker. The Model 10 sells for $69.95. The wall transformer is $9.95. (Shipping and handling $5.00.) For more information, contact Hildreth Engineering Corp., P.O. Box 60003, Sunnyvale, CA 94088, or circle number 101 on the reader service card.

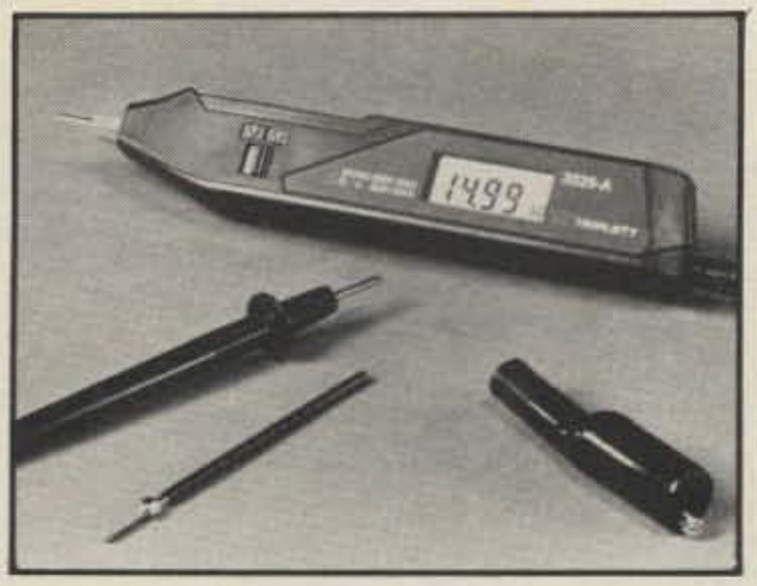
Talktronics VIC-TALKER

Talktronics, Inc. has announced the VIC-TALKER speech synthesis cartridge for the Commodore VIC-20 personal computer. VIC-TALKER provides unlimited vocabulary translation of text to synthesized speech using advanced English language pronunication rules and a user-expandable exception memory. The product is self-contained and permits operation at power-up with an unexpanded VIC-20. The cartridge incorporates an internal audio mixer to blend the synthesized voice output with sounds generated by the "VIC" sound chip for simultaneous sound effects with voice. In addition to the over 360 English rules, interpretation of numeric strings involving decimal fractions, simple fractions, dollars and cents is accomplished to permit voice synthesis of virtually any word-processor output.

Special modes are provided to define and select two different "voices," either one to be used on a word by word basis. VIC-TALKER will provide sentence-weighted intonation to provide a variable pitch voice to emphasize statements, questions, and exclamations. VIC-TALKER does not interfere with the VIC-20's user port, serial port, or RAM expansion. It occupies the memory space provided for ROM expansion. The unit is priced at $89.00. For more information, contact Talktronics, Inc., 27341 Eastridge Drive, El Toro, CA 92630, or circle number 102 on the reader service card.

Triplett Digi-Probe™ Volt-Ohm

The Model 3525-A Digi-Probe™ volt-ohmmeter now includes extended resistance ranges of 200 ohms and 20 megohms plus an additional 200 mV DC voltage range and improved accuracy. The shirt-pocket-size tester features a new 3½ digit, 12 mm LCD with visual indication of function, overranged, units, po-



larity, decimal, and low battery. A "data hold" feature facilitates readings in confined situations or in low ambient light, and auto-ranging provides one-hand "Touch & Test" readings. An instant-tone continuity test includes actual resistance measurements. Volts, ohms, and continuity are selected with a simple function switch.

The high-impact, black thermoplastic case has a textured surface and measures 6⅜"L × 1⅛"H × ¾"D. The Digi-Probe™ includes two 1½ volt button-type batteries, shirt-pocket carrying case, 28 inch test lead, manual, and one-year warranty. For more information, contact Triplett Corporation, One Triplett Drive, Bluffton, OH 45817, or circle number 105 on the reader service card.

Bird RF Interseries Adapter Kit

The Bird Electronics RF Interseries Adapter Kit allows you to assemble compact, precision 50 ohm adapters for 30 different matching requirements between 4 popular coaxial RF connector series. The four series included in this kit are N, UHF, BNC and TNC connectors, one male and one female each, except there are two male N and two female N. Also included are five couplers, so that five complete adapters can be assembled at any one time. This permits 28 combinations between series or with male/female of the same series. The two additional N connectors also permit assembling adapters with male N/male N and female N/female N functions.

The Model 4240-400 RF Interseries Adapter kit is priced at less than $85.00. For more information, contact Bird Electronic Corporation, 30303 Aurora Road, Cleveland (Solon), OH 44139, or circle number 106 on the reader service card.

DX

a monthly feature by
HUGH CASSIDY, WA6AUD

NEWS OF COMMUNICATIONS AROUND THE WORLD

Then, Old Age and Experience,
Hand in hand,
Lead him to DX
And make him understand,
That all his life he has been wrong
To call "CQ DX" so long...

Some may think that August is the month to hibernate, but we have been using the days to check to see if any of the longwires need work so that we will be ready for the low bands in the October *CQ* WW DX Test. But all the bliss was blown away when an irate Local came charging around the curve of the hill. This one was running on righteous indignation, the most explosive kind of indignation.

"Look at this," the Local demanded, thrusting some papers at us. "A couple of months back I worked this H44 station on 40 CW. I sent off my QSL with a stamped envelope for the return of his. Heck! I even went so far as to get that country's stamps for postage. Guess what I got back. Nothing!"

At times one has to sift through all the storm and fury to find the problem. Obviously this one had something or he would not have been showing such agitation. So we read the papers and there it was, all in a short note: "Sorry, but 50¢ stamp does not help run this end." And that was it.

What could one say? We could remember years back when we felt the same emotions, when we thought we had cornered a needed country for DXCC only to find that there was more going on than just working the station. There is—and never doubt it—a value to a QSL card, and especially one that will add a counter to your DXCC list. The first is a treasure to be enshrined forever in your DXCC records. By the time you have QSLed for that country about 25 or so times, you just send them through the out-going bureau in Newington. QSLs are always valued, sometimes more than others. But we had the Local obviously waiting for our denunciation. We were not going to disappoint him.

"You are right," we assured him. "You have run into one of those 'pay for QSLs' operators. Most DXErs realize that such things show at times, but generally there is disapproval of such tactics. Over the years DXers have often spontaneously shown willingness to help in situations in which they might feel it is needed. But it should always be voluntary." We paused

77 Coleman Dr., San Rafael, CA 94901

This is the lighthouse on OJ0-Market Reef, a place activated most summers. You probably will hear it this year. It is located at 60°18'N and 19°8'E. (K5KG photo)

to see the Local's condition. "You do understand this, don't you?" we asked, and he nodded his head. Perhaps he did, but as one often finds in DXing, there are a number of levels of understanding.

"Look," the Local espostulated, "I even spent a dollar for that stamp. I did what I thought was right and everything that might be expected of me. And what do I get? Nothing but a note that my price was not right! Are we supposed to subsidize DX stations so we can work them?"

Of course not. We explained all of this to the Local so that he would know it. We know it and you know it, but sometimes there are others who are not quite as sharp. Years ago we had tried to cautiously work around this question with a DX type from an exotic DX spot. Frankly, what we were trying to determine was the line between need and greed. We did not get very far.

"Take a look at it from my end," this one had protested strongly. "I spend a lot of my free time on the air so that the country is available. Shouldn't I get some consideration? After all, what joy is there for me in working the endless streams of W's, K's, JA's, VKs, Fs, and Gs and all the rest of the alphabet? They want to work me, but do you really think I need their QSL? Hardly!"

We had tried to steer the discussion around to that enduring tenet that "Amateur Radio" is amateur radio. That one gets in because often it becomes the enduring interest for one's freetime; that there are values of fraternalism, friendship, and world-wide camaraderie plus other abstract things such as these that have to be considered. We have always tended to think that DXers themselves are the ones who really appreciate these values. In this instance, we hardly made any impression at all.

We did not even mention that this one was at that exotic spot because his work took him there, that it was hardly a place where, under the great, lonely arch of the world, there was any local action except to watch the sun rise and the sun set, and that amateur radio was his ongoing contact with another world to which most other DXers were confined. Perish the thought, but without it things might be a bit drab for him.

"Look," he finally told us, "I've been reading the sports pages, and every time there is a report of someone getting a big salary to play a game he evidently enjoys playing, there is someone sure to rise and defend the salary, saying, "Get it while you can!" What's wrong with that thinking?"

Analyzing and attempting to correct his thinking was not what we were prepared to do. Every man has his own sense of beauty and every man will be stirred to protect his own thinking or his own interests. When we talked this one listened but heard nothing.

We talked on with the Local. This had been his first contact with the country in question. That was what hurt. We talked of various things such as printing costs for QSL cards, postage, equipment, and things like that. We also talked about other years when the problem had perhaps first gained proportions enough to be a problem. While many may dislike and decry the situation, no real overall solution exists except perhaps for the DXers themselves to control things. Acquiescence or even bidding for QSLs only makes the situation worse.

"Always keep in mind," we advised the Local, "that DXers are usually noted for their willingness to help. But there also will be efforts to take advantage of this willingness. Many of the matured, let's say elderly, DXers can cite instances of such happenings." We recounted to the Local the story about one DXer, anxious to help get a needed country in Central Africa on the air, who spent the better part of a year packing components in small packages to meet postal regulations and shipping them to that country. There the recipient working in that country had an amateur license and promised

The WPX Program

Mixed

1152	HB9BIN	1157	I1JQJ
1153	KX8N	1158	K9DCJ
1154	JH2ABL	1159	IS0LYN
1155	G3DCC	1160	YU2EZA
1156	JJ1CZR		

S.S.B.

1729	CT1AV	1734	I1ZFT
1730	KS3F	1735	DL8ZAW
1731	JO1BMV	1736	YB3CDL
1732	AG2K	1737	YC3CEV
1733	WA4PMF		

CW

2316	G3DCC	2318	WA5VGI
2317	JO1BMV	2319	EA4AYX

Endorsements

Mixed: 450 JH2ABL, I1JQJ, IS0LYN, YU2EZA. 500 JH2ABL, I1JQJ, JO1BMV, IS0LYN, YU2EZA, VE3KZE. 550 I1JQJ, JO1BMV, IS0LYN, YU2EZA. 600 I1JQJ, JO1BMV, IS0LYN, YU2EZA. 650 I1JQJ, IS0LYN, YU2EZA, EA1NZ. 700 KX7J, I1JQJ, IS0LYN, YU2EZA, EA1NZ. 750 KI3L, DF6EX, I1JQJ, IS0LYN, YU2EZA. 800 KI3L, DF6EX, IS0LYN, YU2EZA. 850 DF6EX, IS0LYN, YU2EZA. 900 IS0LYN, YU2EZA. 950 IS0LYN. 1000 IS0LYN. 1050 IS0LYN, WB8ZRL. 1100 IS0LYN. 1150 IS0LYN. 1200 IS0LYN. 1250 IS0LYN. 1300 KL7AF. 1450 N4UH. 1550 IN3ANE. 1600 VE7CNE.

S.S.B.: 350 CT1AV, K8KUH, JO1BMV, AG2K, I1ZFT, YB3CDL, YC3CEV. 400 CT1AV, AG2K, I1ZFT. 450 CT1AV, AG2K, I1ZFT. 500 CT1AV, AG2K I1ZFT. 550 CT1AV, AG2K, I1ZFT. 600 CT1AV, AG2K. 650 CT1AV, IK5ACO. 700 CT1AV, IK5ACO. 750 CT1AV, WB6SRK. 800 CT1AV. 1000 AC2J, WB8ZRL. 1250 WA4OIB. 2100 ZL3NS.

C.W.: 350 W9CBE, JO1BMV, EA4AYX. 400 PY2RRG, W9CBE, JO1BMV, EA4AYX. 450 PY2RRG, W9CBE, JO1BMV. 500 W9CBE, K7DBV. 600 WB8ZRL. 800 AK2H.

10 meters: I1JQJ.
15 meters: I1JQJ, JO1BMV.
20 meters: JJ1CZR, I1JQJ, KK5P, WA4PMF, EA1NZ.
80 meters: W3ARK.

Asia: JJ1CZR, I1JQJ.
Africa: I1JQJ.
So. America: AC2J.
No. America: JA2KVD, KS3F, WA5VGI.
Europe: G3DCC, I1JQJ, YU2EZA, WA4PMF.
Oceania: I1JQJ, JO1BMV.

Award of Excellence: WD9IIC; W3ARK with 160 meter endorsement.

Award of Excellence Holders: K6JG, N4MM, W4CRW, K5UR, K6XP, K2VV, VE3GCO, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, YU2DX, OK3EA, OK1MP, N4NO, ZL3GQ, W4BQY, I0JX, WA1JMP, K0JN, K4IEX, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, W8RSW, WA4QMQ, W8ILC, VE7DP, K9BG, W1BWS, G4BUE, N3ED, LU3YZ/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SM0DJZ, DK5AD, WD9IIC, W3ARK.

Award of Excellence Holders with 160 meter endorsement: K6JG, W4CRW, K5UR, OK1MP, W8CNL, W1JR, W5UR, W8RSW, W8ILC, W1BWS, G4BUE, LU3YL/W4, VE7WJ, W9NUF, N4NX, SM0DJZ, DK5AD, W3ARK.

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.

This is I2NYN atop the abandoned lighthouse on Caprara Island in the Adriatic. Marco was one of the DX Blue Team operators from Italy who was in Taiwan last year. Caprara is in the Tremiti group. The callsign used in the Caprara operation was I2NYN/IL7.

to get on the air if... When the final package was sent and the DXer started to wait in anticipation for the expected signal, he got word that the amateur had finished his contract, returning permanently to his homeland. Later he learned that the gear had been sold locally before the departure.

"Always there will be DXers in some countries who will be in need of something," we advised. "Possibly you will learn to avoid them. There are a number of organizations—the DX Foundations are good examples—to handle legitimate needs. These have also learned to be careful, to require something more than just a request, some justification or proven need often required. The small stuff, printing QSL cards for example, is one thing. The big financial involvements are something else. Of course you have heard about these DX Foundations," we asked, and the Local nodded his head.

"I can see now that I have a lot to learn about QSLing," he said, "but there must be something that I can learn to do right. How do the old-time type DXers QSL when they catch something they need? Do they have a better way to do it?"

"Better" is a relative term, though many DXers will concede that their method of QSLing is better than yours. "Many DXers realize that there can be a problem," we continued, "and they usually set an individual limit. Many will include a dollar bill with a QSL, or maybe some extra IRCs where there are currency problems, to help with expenses, but they flatly refuse to go beyond that. Many, such as yourself, will use an SASE and believe that any financial offering demeans the whole DX process. These will forego a QSL rather than go any step beyond what they think right." The Local was nodding his head at all of this, and we were thinking that we might be getting something across.

"However," we continued, "some with high totals feel that they have a vested interest in seeing that an operation, say a DXpedition to a remote spot or possible new country, is successful, and they may join early in supporting such efforts. Years back when we were tied into a DX bulletin we were not at all reluctant to support such efforts, but at the same time the point was made tht such support was voluntary. It has to be and it should be. No other way at all!"

The Local was starting to relax a bit. "I think I understand a bit," he said, "and I don't like the idea of being obliged to pay for a QSL. It might be that what really irritates me is when some DX spot thinks they have the local milking franchise and start squeezing a bit hard. But how about QSL Managers? What should I think about them?"

QSL Managers? Many DXers believe that a QSL Manager is the surest thing for a quick return on a QSL. Certainly, we told the Local, QSL Managers must be considered among the anointed in DXing.

"For QSL Managers, try the DX bulletins," we advised. They will usually run the current information. For long-term work it will be hard to beat the QSL Manager List published by the O'Briens, both DXers. They are at Box 700, Rio Linda, CA 95673. The bulletins are good. Those who list their information in alphabetical order are excellent—makes it

The WAZ Program

10 Meter Phone

298	K2LJA		

15 Meter Phone

218	AG9S	220	W0YDB
219	W8JXM		

20 Meter Phone

533	W0YDB	535	SP9PDF
534	WB4YZC		

80 Meter Phone

30	YB0WR		

15 Meter CW

114	DF3FJ	115	JE3NWN

All Band WAZ

S.S.B.

2948	JA6CSY	2952	W6IRD
2949	G4ULC	2953	EA4CDZ
2950	VK2NS	2954	N4CSF
2951	N4CRU		

C.W. and Phone

5870	JH7FWA	5876	HA7RB
5871	JH1DLJ	5877	JA8EJO
5872	AK8A	5878	KA6DXY
5873	KR9F	5879	W6TVP
5874	K2OD	5880	KN0V
5875	PA3BQX	5881	JA3MXE

Applications and reprints of the latest rules may be obtained by sending a self addressed stamped envelope (37 cents) size 4½ × 9½ to the W A Z Manager, Leo Haijsman, W4KA, 1044 S.E. 43 Street, Cape Coral, Florida 33904. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all C.Q. 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.

5 Band WAZ

Standings as of May 1, 1985

All 200 zones worked:

1. ON4UN	34. I0RIZ	67. ZS5LB
2. K4MQG	35. ON5NT	68. F6DZU
3. SM4CAN	36. OH6JW	69. DL4YAH
4. AA6AA	37. OK1AWZ	70. LA7ZO
5. W8AH	38. IV3PRK	71. W9ZR
6. W6KUT	39. DJ6RX	72. W1NG
7. EA8AK	40. OH3YI	73. VK9NS
8. LA7JO	41. I4RYC	74. N4KG
9. EA3SF	42. ZL1BIL	75. YU7DX
10. OH1XX	43. I4EAT	76. DL8MAG
11. EA8OZ	44. ZL1BQD	77. OK3DG
12. W0SD	45. TG9NX	78. ZL1BOQ
13. K0ZZ	46. XE1J	79. EA9IE
14. ON6OS	47. F5VU	80. DL7HZ
15. OK3TCA	48. W3AP	81. DJ9RQ
16. K6SSS	49. YO3AC	82. EA5SP
17. ZL3GQ	50. K3TW	83. EA2IA
18. OK3CGP	51. XE1OX	84. SP3BQD
19. SM0AJU	52. VE7IG	85. LZ1NG
20. OZ3PZ	53. OK1ADM	86. N4JF
21. I3MAU	54. CT1FL	87. CT2AK
22. I2ZGC	55. WA1AER	88. HB9CIP
23. 4Z4DX	56. N4RR	89. OK1MG
24. N4KE	57. UW0MF	90. CT4BD
25. K5UR	58. W4DR	91. VK6HD
26. K9AJ	59. OK1MP	92. EA6ET
27. SM3EVR	60. W1NW	93. VK3QI
28. LA5YJ	61. OE1ZJ	94. LZ2DF
29. DL3RK	62. HB9AHL	95. ON4QX
30. N4WJ	63. HB9AMO	96. SM0DJC
31. G3MCS	64. LA6OT	97. CT3BM
32. SM5AQD	65. UR2QD	98. K2TQC
33. W0MLY	66. UK2RDX	

The top 12 contenders for 5 Band WAZ are:

1. DK5AD, 199	7. LA9GV, 198
2. JA3EMU, 199	8. W6GO, 198
3. N4WW, 199	9. W4CEB, 198
4. EA8XS, 199	10. W2YY, 198
5. K6YRA, 199	11. SM5AKT, 198
6. W8UVZ, 199	12. G3GIQ, 198

316 Stations have attained the 150 zone level

easy to hunt up things. The *DX Report* is very good listing things alphabetically. It is published by VE3FRA and mailed in the states. Alan can be reached at 10 Fairington Crescent, St. Catherines, Ontario L2N 5W3. The *DX Bulletin* at Andover, CT 06232 is good, as is *QRZ DX* at Box 834072, Richardson, TX 75083. All of these are excellent bulletins, and any of them will be a help.

By this time we thought we had covered most of the needed points, but the Local was not yet finished. "What should I do about the H44 who apparently puts a cash price on a QSL? I need that country, so what should I do?

There are DXCC countries that may be hard to corner, only showing at intervals of years. Others show more or less regularly, and this instance was one of them. We told the Local what to tell the H44, and we suspect that he anticipated the advice. He even smiled. "There will be more H44s coming down your road," we advised, "and long before you reach the portals to the DXCC Honor Roll. There will be opportunities to catch others, and you probably will feel better for getting your QSL the old-fashioned way.

12 Meters

The FCC has moved to open the new IARU amateur bands, and since late June the 24 MHz (12 meter) band has been available to needy Dxers. At the same time the FCC made permanent the 30 meter band (10 MHz). Amateurs can use the full legal limit on 12 meters, but the 200 watt PEP limit continues on 30 meters.

These bands are exclusively for amateur use within the U.S., but care must be taken so as not to interfere with fixed or mobile services outside the U.S. who will continue to use these frequencies for a few more years.

On the 12 meter band you can use A1 and F1 from 24,890 kHz to 24,930 kHz. The rest of the band, from 24,930 kHz to 24,990 kHz, is open to A1, A3, A4, A5, F3, F4, and F5 emissions. Thus there is 40 kHz for CW DXing , and 60 kHz for phone Dxing. The band, if one has to be exact, has the entire span open for A1/F1.

On 30 meters the use by fixed and mobile serivces elsewhere in the world will be expected to end by 1989. As for the 18 MHz band, little is expected to be announced on this band for some time yet, as government and fixed services have priority over these frequencies. These also are expected to be gone in 1989 or thereabouts. On the 18 MHz band the amateur frequencies will be from 18,068 kHz to 18,168 kHz, or 100 kHz.

Guinea Bissau

Several of the club and DX bulletins have noted the continuing activity of J5WAD from Guinea-Bissau. As the station should be active for some months yet (possibly into November), information should be helpful for those who thirst for a valid J5 contact. W5KNE in the *QRZ DX* bulletin recently had considerable information on the operator Vladimir Vakatov, UB5WAD, a USSR technical specialist working in Guinea-Bissau.

Vlad was assigned to this African QTH last year, coming on the air using a VE-manufactured fixed-frequency transmitter. After making some modifications to the rig, SSB was possible as were SSB contacts—not many and hardly enough to satisfy the demand. While on a visit to the homeland, a home-brew low-power transceiver was given to Vlad, and since last fall Vlad has been cranking out a signal pushed by 30 or 40 watts of power. A linear amplifier is in the planning-construction stages, and better antennas to replace the initial slopers may be in the future if the right materials can be cornered.

Where do you look for Vlad? One good area is around 14240 kHz at 2130Z on Mondays, Tuesdays, and Wednesdays. Often this is M.C.ed by KC0YI or NF3U. He also works his manager, UA4PW, at 14125 kHz at 0700 on Sundays, sometimes the schedule is at 14300 kHz at 0800Z. QSLs to UA4PW for your J5WAD contact go only via Box 88, according to the QSL manager.

Uganda

At the Fresno International DX Convention KC7UU was the banquet speaker. Chuck was home from that far land, but he should have been back there some weeks ago, expecting to return for a long stay of several months.

The matter of a valid 5X5 license was mentioned as might be expected. Chuck noted that he was optimistic about operating permission. Some might even say he is chummy with the vice-president of Uganda, and this might be helpful. He noted that 5X5GK has authorization to operate, this being given in verbal form, which is about all the authorities will consider giving these days.

Chuck has a QTH on a hilltop near Entebee and will be in Africa for some time, having assignments that will take him to Zaire, Tanzania, and Mozambique at various times. All of this is for those who need 5X5 and who live in hope.

The High Cost of DXing

It is said that there are still some DXers who can remember when someone threw a rig in a car or a suitcase and headed out to those exotic climes from where DX had never been heard, delighting the Deserving with a needed QSL. Perhaps we should have said some old, really old, DXers remember. Some of the figures on the recent Clipperton effort are interesting, and maybe even more so if you are into cost accounting.

The FO0XX made some 29K QSOs from Clipperton on phone and CW plus another 81 contacts on RTTY. The estimated costs for the trip amount to, in rounded figures, some $60,000, plus an additional $25,000 representing donated equipment and supplies.

On the bands from 160 through 10 meters they ran just over 29K QSOs on CW and SSB—29,050 when all modes are added together. If you put a pencil to paper, it should

CQ DX Awards Program

S.S.B.

1410	W6KRO	1414	VE3NUP
1411	XE1JCL	1415	K2JLA
1412	N4CRU	1416	W8HFK
1413	G4UNH		

C.W.

633	G4GBG	637	DF3FJ
634	K9BWQ	638	VE5BAF
635	EA4AYX	639	F3TH
636	HB9AFI		

S.S.B. Endorsements

310	W6EUF/316	300	N4CRU/301
310	VE3MR/316	275	W4BQY/295
310	ZL1AGO/315	275	KB3OQ/293
310	W3AZD/315	275	K2JLA/291
310	K9MM/314	275	AG9S/284
310	YV5DFI/314	275	VE6PW/278
310	K9LKA/313	150	VE3NUP/165
310	K9BWQ/311	150	XE1JCL/161
300	VE3MRS/306	28 MHz	K2JLA

C.W. Endorsements

310	ON4QX/316	275	N8MC/284
310	W9DWQ/316	275	HB9AFI/279
310	K9MM/315	250	K9BWQ/257
310	DL3RK/310	200	F3TH/225
310	W4BQY/310		

Total number of active countries is 315. 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 s.a.s.e. 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.

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, with no fees required for up-dates.

MIXED

2715	F9RM	1699	SM7TV	1285	N6JM	1040	N4IB	837	VE2FOU
2690	YU2DX	1689	I2PHN	1268	IS0LYN	1018	G4FAM	829	VE5ADA
2466	K6JG	1677	I8YRK	1251	I2MQP	1012	N8BJQ	827	PY1DFF
2305	K2VV	1660	YU7AW	1249	KL7AF	1003	N3ED	801	YU1OHF
2277	K6XP	1648	W8CNL	1245	WA8YTM	999	KS7T	800	KO2O
2237	VE3GCO	1603	I6SF	1240	N6AW	999	G3ZRH	787	K9BQL
2109	N4MM	1589	I3ZKD	1226	W7CB	994	YU2CBK	754	I0AOF
2100	W4BQY	1577	K9BG	1212	PY4OD	980	K2POF	752	JH4UVU
2082	W9DWQ	1542	W0SFU	1207	NN4Q	955	N3RL	745	KX1A
2046	N4NO	1536	W1NG	1200	N5TV	933	N2AIF	739	NE6I
1951	YU7BCD	1501	KF2O	1194	JH1VRQ	922	W6YMH	722	K8HF
1905	N6CW	1491	WA1JMP	1190	DK5AD	914	AI8S	707	OE1KJW
1892	YU2TW	1482	IN3ANE	1172	WB8ZRL	913	AI6Z	662	K9LJN
1889	N6JV	1467	K6ZDL	1164	CT1LN	910	YU1SZ	657	ND6U
1875	N4UU	1464	EA2IA	1146	YU7AJD	905	W0JIE	630	WI4K
1840	N9AF	1444	IN3ANE	1126	YU4YA	876	VE2PD	622	KN1J
1837	K5UR	1401	K6DT	1125	LA7JO	860	WD4RAF	619	JA6GWU
1815	PA0SNG	1396	W9NUF	1095	KA3A	858	K7CU	611	JO1BMV
1801	YU7BPQ	1367	K8LJG	1070	YU2CQ	856	DF6EX	605	W9PWM
1727	N2AC	1330	SM6DHU	1048	WD9IIC	851	JH8NYK	600	N3KR
1726	YU1DZ								

S.S.B.

2632	F9RM	1600	WD8MGQ	1167	W1NG	993	HI8GB	792	Z21GJ
2316	I0ZV	1588	PA0SNG	1153	WA4OIB	956	NN4Q	787	W2XQ
2125	K6JG	1578	YU7BCD	1131	W2CC	954	KC8YM	761	WB6SRK
2089	ZL3NS	1561	K5UR	1108	ZP5RS	946	I1POR	755	WO4L
2074	I0AMU	1534	N4NO	1103	W3ARK	937	K8LJG	748	N3ED
2026	K6XP	1524	W9DWQ	1100	G4CHP	933	K5RPC	747	N3RL
1994	K2POA	1481	W4BQY	1099	N6FX	908	WB6GFJ	736	K3IXD
1968	K2VV	1396	YU7AW	1094	KC4OV	903	XE1XF	699	EA7AZJ
1895	N4MM	1383	N4UU	1062	W9NUF	901	PY4VX	693	ON6IT
1754	W0YDB	1380	N2SS	1048	I8KCI	895	WA2FKF	683	K9BQL
1743	CT1UA	1348	VE1YX	1029	EA2IA	858	VE2PD	667	JH5FQO
1730	I4ZSQ	1341	WA4QMQ	1028	JH1VRQ	850	N4IB	663	KB0C
1690	OZ5EV	1299	WF4V	1013	N4NX	846	W3GXK	661	K8ZZU
1678	HB9AAA	1271	I6NOA	1008	I1HAG	845	WA0DCQ	650	W6YMH
1667	I8KDB	1249	I2MQP	1003	N2AC	838	W0ULU	649	KK5P
1653	I2PHN	1248	KF2O	1000	N5TV	810	CT1BY	649	IK5ACO
1646	I8YRK	1241	CT1FL	1000	WB8ZRL	810	I0SGF	617	WI4K
1634	I0MBX	1234	PY3BXW	994	AC2J	801	CT4UW	610	VO1AW
1618	I6ZJC	1222	CT4NM	994	KL7AF	795	PY4OD	600	W7KWI

C.W.

1863	N6JV	1532	VE7CNE	1180	PY1APS	918	IT9VDQ	732	JA5SIX
1850	WA2HZR	1507	N2AC	1163	N6FX	900	N5TV	723	YU2CQ
1834	K2VV	1442	K5UR	1148	EA2IA	897	KL7AF	708	YK1AO
1809	W8KPL	1435	ON4QX	1123	I1YRL	841	DJ1YH	700	VE2FOU
1785	N4NO	1428	N4MM	1117	I2DMK	827	NN4Q	687	G4FAM
1762	K6JG	1401	YU7SF	1107	JA1KRU	813	JH1VRQ	655	SM5DAC
1680	K6XP	1383	VO1AW	1092	W4WJ	797	AK2H	652	OE1KJW
1657	W8DWQ	1355	I6SF	1011	W1NG	781	N3ED	633	W2XQ
1648	W4BQY	1305	LZ1XL	999	KF2O	767	WD9IIC	616	VE1ACK
1638	W3ARK	1294	K9QVB	990	W9NUF	755	N4NX	601	F6HKD
1635	DL1QT	1286	YU3NP	990	PY4OD	750	AI6Z	600	W6YMH
1608	G2GM	1278	YU7AW	969	KA7T	748	N2AIF	600	N3RL
1555	YU7BCD	1244	N4YB	963	K8LJG	741	EA1JO	600	VE4AEX
1553	N4UU	1182	K6ZDL						

figure out to around $2.90 per QSO. Even if you add in some 400/mm QSOs made while circling the island and waiting for conditions to improve, your costs will still run over $2.50 per QSO.

Why do we run all these figures up and down the pages? Perhaps just to give some idea how expensive a little 'ol DXpedition can run. And after all the time and effort and expense, many comments were heard hailing the effort for what some thought was lack of knowledge of propagation. This was particularly heard from Europe. There were opinions saying that when bands were open to Europe, the group concentrated on working other areas, these often closer to Clipperton.

Acknowledging that DXers live in anticipation of catching a needed country and suffer grievously when one is on and missed, some feel that the expectations might have been too high for the recent Clipperton effort, especially with band conditions declining. There is always quick praise for a DX station worked and a sour taste for the one missed. But the FO0XX crew did work a lot of stations, and here is the breakdown:

	SSB	CW	Total
1.8 MHz	23	287	310
3.5 MHz	2094	1225	3319
7.0 MHz	2581	2800	5381
14 MHz	8558	3085	11643
21 MHz	4173	2584	6757
29 MHz	1208	351	1559
Total	10332	18637	28969

Considering that possibly only about 50% of the QSOs will be having QSLs sent to YASME, the QSL route, it is almost obvious that there will be a considerable deficit. If you were one of the Clipperton operators, a top-notch DXer, a high DXCC total, or a position on the Honor Roll, think of how one might feel when someone comes voicing a complaint that they did not work you at Clipperton? And why! The group tried and tried hard. But it was not the best of times, of seasons, of DX, or of band conditions.

One of These Dog Days- You'll Bite

Hard to get through on our 800 number? *Call before 10 a.m. or after 5 p.m., or call our regular number. If you pay for the call and order, we'll credit your order with $1.*

KENWOOD **YAESU** **ICOM** **SANTEC**™

HF TRANSCEIVERS

NEW TS-940S HF Transceiver . . . . CALL
With General Coverage Receiver

TS-930S HF Transceiver . . . . . CALL
With General Coverage Receiver

TS-430S HF Transceiver SUPER SPECIAL
With General Coverage Reciever

TS-830S Transceiver . . . . . CALL
160-10 Meter With Power Supply

TS-530SP 160-10 Meter XCVR . . . CALL
With Power Supply & Notch Filter

RECEIVERS

R-2000, R-600, R-1000, R-11 . . . . CALL
General Coverage Receivers

VHF/UHF

TR-7950/7930 . . . . . CALL
2-meter Mobile Units, 45 or 25 Watts

TR-9130 2m All-mode, 25 Watts . . CALL

TS-711A/TS-811A . . . . . CALL
All-mode Transceivers
2m *or* 70cm mobile or base station

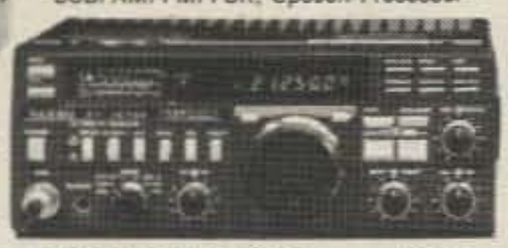
HANDHELDS

TR-2600A 2m FM Transceiver . . . . CALL
With memories, LCD, scan

TH-21A, 21AT/TH-41A, 41AT . . . . CALL
2m/70cm Ultra-compact FM Transceiver

HF TRANSCEIVERS

FT 980 CAT System 1439.00
AC Power Supply, Full Break-in CW,
SSB/AM/FM/FSK, Speech Processor



FT 757 HF XCVR with mic 699.95
with General Coverage RCVR
includes CW keyer, AM/FM, CW filter

NEW SCANNER

FRG 9600 . . . . . Intro Price 549.95
Continuous Coverage
60 MHz-905 MHz, All mode

SWL RECEIVER

NEW FRG 8800 SWL Receiver . . . 519.95
VHF Converters, Active Antennas available

HANDHELDS

FT 209RH 2m HT Intro Special . . 299.95
All accessories in stock

VHF/UHF

NEW FT 270RH 2m, 45-watt 369.95
Very small mobile rig

NEW FT 2700RH 25-watt 499.95
Dual-band 2m and 440

FT 726R For 2m 759.95
(Optional modules for 6m, 430,440 MHz)
Great for Satellite Work

HANDHELDS

IC 02AT 2m HT, 10 Memories . . . . CALL
IC 04AT 440 HT/Touchtone 299.95
IC 2AT 2m HT/Touchtone 199.95
IC 3AT 220 MHz HT/Touchtone . 229.95
IC 4AT 440 MHz HT/Touchtone . 229.95

SWL RECEIVERS

R71 . . . . . Limited Quantities 599.95
General Coverage Receiver

VHF/UHF

NEW IC 3200 2m/440 bands . . . 489.95
IC 271H 100-watt 2m XCVR 732.95
IC 27A 2m compact mobile 309.95
IC 290H 25-wt all-mode 2m XCVR 479.95

IC 271A . . . . . Special 559.95
All-mode 2m Transceiver

HF TRANSCEIVERS

IC 745 . . . . . 759.95
HF XCVR/Gen Cov RCVR

IC 751 HF XCVR/Gen Cov RCVR . 1179.00
With PS35 installed 1299.00

MARINE

M12 12-ch Programmable HT . . . 219.95
M2 76-channel Synthesized HT . 261.95
M80 25-watt all-channel Scanner 387.26
M80C Commercial M80 . . . . . 429.95
New M5 all-channel HT 325.95

SANTEC™

ST 142 Handheld 249.95
STLC Leather Case with Strap . . . 34.95
SM3 Speaker Mic 34.50

KDK

FM 2033 2m 25-watt 259.95

TEN-TEC

2591 2m Synth Handheld 259.95
Century 22 CW XCVR 350.00
2510 Model B 410.95
Satellite Station for Oscar 10
CORSAIR Model 560 . . . . . 999.95
ARGOSY II 525D Digital 519.95
TRITON 425 HF Amp 1.5kW . . . . . CALL

SCANNERS

REGENCY

New R1060 10-ch, 6-band 99.95
MX4000 mobile 30-900 MHz . . . . . Call
HX1000 20-ch Handheld 209.95
HX2000 Handheld 120-900 MHz . . . Call
MX3000 30-ch, 6-band mobile . . 210.95
MX5000 20-ch 25-512 MHz cont. 354.95

BEARCAT

New 100XL Handheld . . . . . Call
260 16-ch mobile 248.95
201 16-channel/aircraft 169.95
2020 40-ch/aircraft 274.95
210XL 195.00
300 50-ch scanner/aircraft 341.00

SONY RECEIVERS

2002 SWL Receiver 209.95
2010 SWL Receiver 279.95
4910 SWL Receiver 89.95

HAL

CWR 6850 Telereader 746.95
CRI 100 RTTY/CW Interface 214.95
CRI 200 RTTY/CW Interface 259.95
Other items available . . . . . CALL

HARDWARE

MFJ 1224 with MFJ C-64/V-20 Soft 79.95
MFJ 1229 . . . . . CALL
Kantronics Interface II 210.95
AEA CP-100 Interface 284.95
AEA MPI Micropatch 119.95
AEA CP-1 Interface 179.95

PACKAGES

Microlog AIR-1 Vic-20/C-64 . . . . 179.95
AEA CP1 for Vic-20/C-64 . . . . . 209.95
AEA Microamtor Patch MAP-64 . . 119.95

SOFTWARE

Kantronics Hamtext
Vic-20, C-64, Apple . . . . . CALL

Kantronics Hamsoft/Amtor
Vic-20, C-64, TRS-80 color, Atari . 69.95

Kantronics Hamsoft
Vic-20, Apple, Atari, TRS-80C, TI-99 CALL

Microlog Air Disk
Vic-20 and C-64 Disk 39.95
Cartridge 56.95

AEA
MBA Text Vic-20 or C-64 . . . . . 79.95
MBA-tor 64 . . . . . 89.95
Marstext Vic-20 or C-64 . . . . . 79.95

Dr. DX by AEA 95.95
Dr. QSO by AEA 71.95

HAM DATA

Amateur Software for the VIC-20 and Commodore 64
Specify tape or disk.

	C-64	VIC-20
Contest Log	24.95	24.95
Antenna Design	9.95	--
Computer Morse	9.95	9.95
Propagation Chart	16.95	16.95
Super Log	19.95	19.95
Net Controller	16.95	16.95
DX Tool Kit	24.95	--
Master Log (Disk)	28.95	--

ANTENNAS

CUSHCRAFT

A3 3-element 10-15-20m	205.00
A4 4-element 10-15-20m	264.95
R3 10-15-20m Vertical	256.95
214B SSB/215WB FM 2m Boomers	73.00
ARX-2B 2m Ringo Ranger	34.95
A3219 2m Boomer	88.00

KLM

KT34A 4-element 10-15-20m	334.95
KT34XA 6-element 10-15-20m	479.95
2m-11X 11-element 2m	59.95
2m-16LBX 16-element 2m	91.95

MOSLEY

CL-33 3-element Triband Beam	265.95
TA-33 3-element 10-15-20m	239.95
Pro 37 7-element 10-15-20m	465.95

HUSTLER

6-BTV 10-80m Vertical with 30m		128.95
5-BTV 10-80m Vertical		108.95
MOBILE RESONATORS	Standard	Super
10 and 15 meter	11.95	17.95
20 meters	15.50	21.95
30 and 40 meters	17.95	25.95
75 meters	19.95	36.95

HY-GAIN

391S TH7DX 7-ele 10-15-20m	445.00
393S TH5DX 5-ele 10-15-20m	406.95
395S Explorer 14 10-15-20m	305.00

Order Hy-Gain tower, Hy-Gain antenna, & Hy-Gain rotor—get free shipping on all.

MORE ANTENNAS

AEA Isopoles	CALL
AVANTI HM 151.3G 2m on-glass	31.95
LARSEN LM-150 5/8 Mag Mount	39.95
MINIQUAD HQ-1	141.95
BUTTERNUT HF6V 10-80m Vert	109.95
FOR OSCAR by Cushcraft & KLM	CALL

TOWERS

Unarco-Rohn

Self-supporting towers:

HBX40 40-feet with Base	198.00
HBX48 48-feet with Base	264.00
HBX56 56-feet with Base	335.00
HDBX40 Higher load with Base	248.00
HDBX48 Higher load with Base	325.00

Other BX, HBX, HDBX in stock

Guyed foldover towers:

FK2558 58-feet, 25G	940.00
FK4554 54-feet, 45G	1296.00

Other sizes at similar savings.
Foldovers shipped freight paid.
10% higher west of the Rockies.

Straight Sections:

20G Straight Section	37.95
25G Straight Section	48.95
45G Straight Section	109.00

Complete Tower Packages . . CALL

Tri-Ex — Call for our low prices

CABLE BY SAXTON

RB213 Mil Spec	29¢/ft
RG8/U Foam 95% Shield	25¢/ft
8-wire Rotator 2 #18, 6 #22	17¢/ft
Mini-8 95% Shield	13¢/ft

CABLEWAVE HARDLINE Call

ACCESSORIES

FOR PACKET

AEA PKT1 Packet Controller	459.95
Kantronics Packet Controller	339.95

BENCHER PADDLES

Black/Chrome 38.95/48.95

ASTRON POWER SUPPLY

RS7A	49.95	RS20M	104.95
RS12A	69.95	RS35M	149.95
RS20A	88.95	VS20M	124.95
RS35A	132.95	VS35M	169.95
RS50A	189.95	RS50M	209.95

AEA KEYERS

CK-2 Contest Keyer	146.95
MM-2 Morsematic Keyer	172.95

TELEX HEADPHONES

Procom 250 Headset/Mic	99.95
Procom 450 Headset/Mic	49.95

MFJ PRODUCTS . . . . . Call

B & W

375 6-position Coax Switch	23.50
425 1 kW Low Pass Filter	26.50

DAIWA/MCM/J.W. MILLER

CN-520/CN-540 Meters	59.95/69.95
CN-620B/CN-630 Meters	106.00/126.00
CNW-419 Antenna Tuner 500 W	174.95

AMPHENOL

Connectors of all kinds in stock . . . CALL

ROTATORS

Alliance HD73	98.95
Kenpro KR500 Elevation Rotator	159.95
Hy-Gain Ham IV	229.95
Hy-Gain Tailtwister T²X	269.95
Hy-Gain CD4511	145.95
Hy-Gain Heavy-duty 300	530.00

Buy an HF Beam & get an HD73 for $91.95

AMPLIFIERS

TOKYO HY-POWER

VHF & UHF amps . . . . . CALL for Quotes

DAIWA

LA-2035 2m Amp, 2 in, 30 out	68.95
LA-2035R 2m Amp with preAmp	74.95

MIRAGE

B23A 2m Amplifier 2-30	84.95
B1016 2m Amplifier 10-160	242.95
B3016 2m Amplifier 30-160	199.95
D1010N UHF Amp/N connectors	279.95
B215 2m Amp: 2 in, 150 out	245.95
A1015 6m Amp: 10 in, 150 out	242.95

AMERITRON HF AMPS

AL80 1200 watt	589.95
AL84 HF Amp 160-15	389.95
AL1200 1.5 kW Amp	1399.95

KENWOOD TL922 2kW . . . . CALL

AMP SUPPLY

LA 1000A 160-15m Amp	389.95
LK 500NT HF Amp no tune	1185.00
AT 1200A 1200 PEP Tuner	169.95
LK 500ZA 2.5 kW hipersil	999.00

VOCOM AMPLIFIERS

2 watts in, 30 watts out 2m Amp	69.95
2 watts in, 60 watts out 2m Amp	107.95
2 watts in, 120 watts out 2m Amp	169.95
200mW in, 30 watts out 2m Amp	84.95

New VHF/UHF Amps
from TE Systems
with Low Noise GaAs FET Preamp
Call for Quotes

ege, inc.

13646 Jefferson Davis Highway
Woodbridge, Virginia 22191
Information & Service: (703) 643-1063

Store Hours: MTT: 10 a.m.—6 p.m.
WF: 10 a.m.—8 p.m.
Sat: 10 a.m.—4 p.m.

Order Hours: M-F 9 a.m.-7 p.m.
Saturday 10 a.m.-4 p.m.

Send 3 22¢ *stamps for a flyer.*
Dealer Inquiries Invited

LACOMBE DISTRIBUTORS

Our associate store
Davis & Jackson Road, P.O. Box 293
Lacombe, Louisiana 70445
Information & Service: (504) 882-5355

AT&T PHONE CENTER

Terms: *No personal checks accepted. Prices do not include shipping. UPS COD fee: $2.35 per package. Prices are subject to change without notice or obligation. Products are not sold for evaluation. Authorized returns are subject to a 15% restocking and handling fee and credit will be issued to use on your next purchase. EGE supports the manufacturers' warranties. To get a copy of a warranty prior to purchase, call customer service at 703-643-1063 and it will be furnished at no cost.*

For Orders and Quotes Call Toll Free: 800-336-4799
Virginia Orders and Quotes Call Toll Free: 800-572-4201

ege, inc.

On a trip through the South Pacific early this year, Joe Hypnarowski, WA6VNR, tried to catch all the local DX types. Here in Tonga Joe visits with John Lee, A35JL, in John's shack. While in Tonga Joe signed A35CQ, possibly to note his favorite magazine.

IARC

Ted, F8RU, retires from the ITU this year and also ends his long presidency of the International Amateur Radio Club based in Geneva. F8RU is Edouard Robinson, long remembered for his connection with 4U1ITU. F8RU worked CE0AA recently, completing his list of DX stations, and some have speculated that Ted is leaving because there is nothing left to look forward to, nothing left to work.

There are a number of changes at the Fifth Floor QTH in downtown Geneva, with G3NAQ relinquishing his post as the VHF/UHF specialist at 4U1ITU, while station engineer CX9AAK, David, also leaves, but with the possibility of returning for another stint in Geneva before long.

For those lost looking for the station there in Switzerland, 4U1ITU is at the ITU outpost (ITU Varembe Street, 5th floor). You enter at the ITU Tower entrance on Guizeppe Motta Avenue. To fill out your day, don't forget the La Siesta Pizza Restaurant operated by Pierre, HB9AMO, and his family. And there is a neat summary is the DXers Guide to downtown Geneva—4U1ITU and Pierre's Pizza Parlour! Where else but in *CQ* can a DXer get such vital and needed information?

Pribilof Islands

Years back we were tied with a club that required a 75% member approval vote for a new member to be accepted. There was no problem, none being anticipated, until a couple got together to organize a vote against someone who possibly had beaten them out for some new countries. The first ballot was a puzzler—no 75% approval. So they ran another, and another, each still without the necessary margin. Finally on the fourth ballot there was success, procedure and justice triumphed, and the new member was welcomed into the inner sanctum. That is just the way it went. Positively!

Now we are coming up on, or already have had, the third vote on DXCC status for the Pribilofs. The first vote was a tie, 8–8. The second vote moved slightly in the wrong direction, the vote being 7 for and 9 against DXCC status. Some feel that there will have to be enough votes taken until they get things right, or possibly until a new committee comes along, or something like that.

At the great International DX Meeting in Fresno there were fervent arguments in favor of recognition given by NL7G and NL7P, the latter being David Vogel, the secretary-treasurer of the Alaska DX Association.

The Alaska DX Association has continued to press for recognition, working to clarify its contention that the Pribilof's qualify under Point 2(a) of the criteria. To support their contention that the Pribilofs are truly one of the cherished DXCC countries, the association prepared a 22-page brief in favor of such recognition, and to this was attached a 10-page appendix. All this was in response to the staff report out of Newington on the petition of the Alaska DX group for country status for the Pribilofs.

One thing for certain, the Alaska DX Association does research. They quote from *QST* listings of new countries, some quotes going back close to 40 years. They quote Webster's Dictionary and grammatical reference books. They quote and are in disagreement with many points in the staff report on the matter and how Rule 2(a) is determined or administered.

The Pribilofs, as the Alaska DX Association states, are 260 miles from the nearest point of the Alaska mainland. Criteria 2(a) says that islands 225 miles from the mainland qualify. Simple? Just what is the "mainland"? If there is another island which does not qualify for DXCC country status under 2(a) do you measure from that island? Unalaska is 205 miles from the Pribilofs. Unalaska is an island in the Aleutian chain.

Specifically in arguing the staff report, the Alaska DX Association points to (1) Ogasaward-JD1; (2) Auckland Island-ZL; (3) Willis Island-VK; (4) Mellish Reef (VK); and (5) Fernando de Noronha-PY0. The argument is that these would not be on the DXCC list if the distance were measured from the offshore islands.

Why 225 miles? The argument cites Bob White as saying that the 225 mile stipulation was adopted back in 1960 because there was knowledge that up to that point no country had been accepted for DXCC status with mileage less than 225 miles, the criteria possibly being molded to conform to the countries already on the DXCC list.

Many of the differences have come about because of various interpretations given the DXCC rules by various sources, these ranging back some 40 years since DXCC was started again after WW II. The failure to exactly define certain terms, "mainland" being the one in this instance, brings diverging opinions further down the line.

There is also the matter of precedence and the reluctance shown to reconsider a "country" opinion delivered previously on the qualifications of an area for country status. Keep in mind that every decision establishes a precedent, and these precedents can be cited to support an application any number of years downstream.

How will it all go? First of all, keep in mind that the Alaska DX Association has done an excellent job of preparing their case, refuting any points raised in opposition, as well as quickly grasping any section of the ARRL staff report that supports their contentions. They are also dogged in their persistance; they just won't go away. In short, they think they are right.

The paper prepared by the Alaska DX Association contains a wealth of DX information on a number of DXCC decisions. If you

want to be a well-informed DXer, send an 8″ × 11″ SASE with $1.05 in postage to NL7P and ask for a copy. Certainly it will clear your thinking, at least on the Pribilof matter.

Montserrat

Russ Mason, KG6IP, and Wayne Sakamoto, WD6M, will be at VP2M from July 29th through August 5th working all bands from 160 through 10, CW and SSB, usual DX window openings and band openings. Russ and Wayne are hoping that the new moon about that time will bring all the DX signs into the best zodical alignment and, noting that the sign of Leo for that month looks a bit like earphones, are expecting only the best. KG6IP's QTH is in the 85 Callbook. If you don't have that, try Box 481, Culver City, CA 90232.

Some Short DX Notes

At the Fresno International DX Convention CE3ESS said that if you did not receive your CE0AA QSL, as of the latter part of May, write again to the Radio Club de Chile, Box 700, Santiago, Chile, and they will see what they can do. Just send your QSL. Also at Fresno, Josephine Clarke, WB6ZUC, was named the Northern California DX Club's DXer of the Year. W0PU on Crete has shown intentions of getting back on the air, Hal signing SV0DV while XYL Lynn signs SV0EW. They should be there until the end of the year. The DXAC was still taking a look at 4U1VIC a month or so back, and possibly something will be heard before long. The Pribilof question was due to be put out to balloting in May. If you have not heard anything recently, listen at the time of the next board meeting. The West Kent Radio Society will be on the west coast of Ireland for two weeks starting August 17th, attempting to work North America on 2 meters. This would be the first ever if successful. David Green, G4OTV, 12 Culverden Down, Turnbridge Wells, Kent, England TN49SB, is handling the scheduling on this effort.

DX Incorporated is an organization to help new DXers or SWLs, according to their information sheet. WA9BXB is the president, and you can catch the whole story by writing to Box 1082, LaGrange, IL 60525. DK7PE was scheduled to be at BY1PK in June. Stanley Kohn, KH6SK, is presently in Port Sudan and hopes to get a license before the fall DX season is upon us. Stan is there on a one-year contract and this may be extended. His current address is either c/o American Embassy-Khartoum, APO New York 09668-5374, or direct to Stan at Box 1007, Port Sudan, Sudan. He still has logs for P29KK, where he worked some on 40/80 meters. W7PHO has the logs for his KC6BK (ECI) or KC6SK (WCI) operations.

Sam Sharad Sahai, FG7AS, is currently in New Caledonia on a teaching assignment. He should be heard signing FK0AT and plans to be in the CW tests. Down that way the Amateur Radio Association of New Caledonia will be celebrating its 25th anniversary in 1986.

At Dayton W8ACE/4 was named the Ham of the Year, John being recognized for his work in making the Hamvention the big event it is, some 30,000 or so showing this year. MacQuarrie island is being reported, 3795 kHz at 0800Z or 7083 kHz at 0630Z. VK0GC is usually the operator. Later this year, when it is spring in the southern hemisphere, there may be some continued action from South Sandwich and South Georgia islands. The RSGB is planning some operations starting along about November and extending into January. If the Russian callsigns cause the brow to furrow, go back to the May issue of *CQ* and check UV3GM's article.

The season for the *CQ* WW DX Tests will be with you before many more weeks pass. Prepare! The lower frequencies may be the source of a lot of the action. The SSB Test is the last weekend in October, and the CW Test is the last weekend in November. That's the way it has always been!

73, WA6AUD

DX Ten Years Back

In August 1975 3B9DA was being heard from Rodriguez. XT2AA was showing on a schedule for a list operation handled by W1AM. Malpelo was rumored, and the W/K's were starting to show from Diego Garcia with VQ9Z one of the first. ZL3NR/C was heard from Chatham, while Bougainville served notice on the Papua-New Guinea government that it intended to secede and form a new country. The CW DXCC Award was being handed out; the commotion over how some stations were worked had yet to surface. PA0IWH, who had been operating from S2-Bangladesh, shut down his operation and returned to the Netherlands. Cabinda was being scanned for possible new country status; they are still looking. From the Maldives 8Q6AI was anticipated. Martin Laine, OH2BH, just finished up his operation from SV1GA/A on Mt. Athos.

QSL Information

WB4UBD says he is not the QSL Manager for the TI9J-operation this spring. Jim says he is only the manager for the February 1985 TI9TTY operation, the first RTTY/AMTOR Cocos activity. If you are still looking, try TI2J for TI9J. You can use the same route for TI9CF.

A35CQ to WA6VNR
A35EA to ZL1AMO
C6ABA to G3AMR
C02HS to XE1XM
DL7AH/3X to DL7AH
DL8YR/ST2 to DL8YR
EL1G to WD9IDS
E01AWL to UZ1WWE
E01AWP to UZ1WWA
EU1R to UR1RWN
EM3AXK to UA3XEF
EM7BRN to UB4RWW
EM5T to UT4UWV
EU2C to UC1AWR
EV4AP to UZ4PWR
EW2C to UC1AWC
E03AIR to UZ3IWA
E03ATO to UZ3TWT
E07L to UL7GWB
EV9AW to UW9WR
FG5DL/FS to F6ARI
HG40U to HA8UB
HP1XXO to W0ANZ
NA6T/AH4 to KD7P
JW8EQ to LA5NM
PY0FNI to PY7ZZ
SU1ER to W4ZWE
SV1RP to SV1NA
TI9J to TI2J
T32AF to KH6UR
TK5EP to F6EYS
V2AZL to W2HWS
V3C to N5DDV
VP2MGD to W2RQ
W4HHB/5N3 to K8LJG
ZF2AF to W0GI
ZK1XJ to WA6VNR
ZC4MR to G4SAJ
3D2CQ to WA6VNR
5N9DM to I8XIU
5V8WX to DJ6QG
5W1FC to WA6VNR
5X5BD to DJ6SI
EA9KQ to Box 21, Melilla, Spanish North Africa
FY4CD to Box 747, Cayenne, French Guiana
GJ2LU to POB 338, Jersey, Channel Islands, United Kingdom
HG4OB to Box 102, Manor, Hungary
KL7XD to P.O. Box 88, Esther, Alaska 99725
YI8AY to POB 5864, Baghdad, Iraq
ZS3GB to POB 1165, Tsumeb, Southwest Africa

All of the following was gathered with help from W9LNQ, KA6A, and other watchers of the lonely night.

Propagation

a monthly feature by
GEORGE JACOBS, W3ASK

THE SCIENCE OF PREDICTING RADIO CONDITIONS

The decline of the present sunspot cycle appears to be picking up speed. Based upon the daily observations compiled by the Royal Observatory of Belgium, the monthly mean sunspot number for April was 16. This results in a provisional smoothed sunspot number of 28, centered on October, 1984. This is a drop of almost five points in the cycle in a one month period. A smoothed sunspot number of approximately 20 is forecast for August, 1985, although there is a possibility that solar activity may be considerably less than this.

August Propagation

During August, a few *10 meter* DX openings should be possible to southern and tropical areas. Best bet is during the afternoon when conditions are expected to be HIGH NORMAL, or better. Frequent shortskip openings between distances of about 500 and 1400 miles can also be expected.

Look for no more than an occasional *15 meter* DX opening towards Europe and the east before noon, but chances should be much better during the afternoon hours, particularly towards Africa, South America, the South Pacific and Oceania. Expect frequent short-skip openings between distances of about 400 and 1400 miles.

During August, *20 meters* should continue to be the best band for DX propagation. Openings are forecast to most areas of the world between sunrise and Midnight, when conditions are at least LOW NORMAL. Peak conditions should occur, with strongest signals, during a two-to-three hour window just after local sunrise, and again during the late afternoon and evening. When conditions are HIGH NORMAL or better, *20 meters* may remain open through much of the period of darkness, particularly towards southern and tropical areas. Excellent short-skip openings are also expected to continue on *20 meters* from shortly after sunrise to almost Midnight. These should range from a few hundred miles out to the one-hop limit of about 2300 miles.

Some fairly good *40 meter* DX openings are forecast for the early evening hours, towards the east and south. Conditions should improve towards the west and south after midnight, with the band remaining open for DX until sunrise. Look for excellent short-skip openings between about 250 and 750 miles during the daylight hours, and between 750 and 2300 miles at night.

Despite seasonally high static levels, some fairly good DX openings should also be possible on *80 meters* during the hours of darkness. Conditions should peak just as the sun begins to rise on the "light" side of the path. Try *80 meters* for short-skip openings up to about 250 miles during the daylight hours, and between 250 and 2300 miles at night.

It's still too early for *160 meter* DX openings, but an occasional one may be possible during the hours of darkness and the sunrise period. Short-skip on *160* looks good during the hours of darkness for distances up to at least 1300 miles.

Since the summer propagation season usually ends by mid-September, this month's *DX Propagation Charts* cover only a *one month* period rather than the usual two months. *Short-Skip Charts* for August appeared in last month's column.

11307 Clara Street, Silver Spring, MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for August 1985

	Expected Signal Quality			
Propagation Index	**(4)**	**(3)**	**(2)**	**(1)**
Above Normal: 2, 9, 11, 29	**A**	**A**	**B**	**C**
High Normal: 1, 3, 6, 10, 20, 25-26, 28, 30	**A**	**B**	**C**	**C-D**
Low Normal: 4, 7-8, 12, 15-17, 19, 21, 23-24, 27, 31	**A-B**	**B-C**	**C-D**	**D-E**
Below Normal: 5, 13-14, 18, 22	**B-C**	**C-D**	**D-E**	**E**
Disturbed: None	**C-E**	**D-E**	**E**	**E**

Where expected signal quality is: **A—Excellent opening, exceptionally strong, steady signals greater than S9.**

B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find *propagation index* associated with particular band opening from Propagation Charts appearing on the following pages.

2. With the *propagation index*, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be good (B) on the 1st, excellent (A) on the 2nd, good (B) on the 3rd, good-to-fair (B-C) on the fourth, fair-to-poor on the 5th, etc.

V.H.F. Ionospheric Openings

Although sporadic-E ionization is expected to decrease during August, some *6 meter* short-skip openings still should be possible. These openings should normally extend between approximately 750 to 1300 miles, but during periods of widespread sporadic-E ionization, *6 meter* "two-hop" openings may be possible up to as great as 2500 miles. During periods of intense sporadic-E ionization also check for possible short-skip openings on *2 meters*, over a range of about 1100 to 1300 miles.

What is likely to be the year's most prolonged and intensive meteor shower should take place between August 10 and 14. Called the *Perseids*, it's expected to peak on August 12th, with an average count of 50 meteors an hour. Ionization produced by these meteors as they enter the earth's atmosphere should make possible numerous meteorscatter type openings on the *6* and *2 meter* bands. The range of such openings could be up to several hundred miles, and at times somewhat greater.

August is not usually a good month for auroral-type propagation on the VHF bands, but some could occur during times when the ionosphere is disturbed. Check the *Last Minute Forecast* appearing at the beginning of this column for those days that are expected to be BELOW NORMAL or DISTURBED. These are the days when chances are best for auroral-type openings on the VHF bands.

Auroral-scatter openings can range from a few hundred up to about a thousand miles, and are usually characterized by very rapid flutter fading, and Doppler shift on SSB signal.

73, George, W3ASK

August 15-September 15, 1985
Time Zone: EDT (24-Hour Time)
EASTERN USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	Nil	09-11 (1) 14-16 (1)	06-07 (1) 07-08 (2) 08-09 (3) 09-10 (2) 10-13 (1) 13-14 (2) 14-16 (3) 16-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	19-21 (1) 21-22 (2) 22-01 (3) 01-03 (2) 03-04 (1) 21-23 (1)* 23-01 (2)* 01-03 (1)*

Northern Europe & European USSR	Nil	09-11 (1)	06-07 (1) 07-10 (2) 10-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	20-22 (1) 22-00 (2) 00-03 (1) 22-02 (1)*
Eastern Mediter-ranean & Middle East	Nil	11-13 (1) 13-15 (2) 15-16 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1) 22-00 (1)	19-21 (1) 21-23 (2) 23-00 (1) 22-00 (1)*
West Africa	14-16 (1)	09-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	13-15 (1) 15-16 (2) 16-17 (3) 17-18 (4) 18-20 (3) 20-21 (2) 21-23 (1)	20-23 (1) 23-02 (2) 02-04 (1) 22-02 (1)*
Central & East Africa	Nil	11-14 (1) 14-16 (2) 16-17 (1)	13-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	21-01 (1)
South Africa	12-14 (1)	08-11 (1) 11-12 (2) 12-14 (3) 14-15 (2) 15-16 (1)	07-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-20 (1) 23-01 (1)	21-23 (1) 23-01 (2) 01-03 (1) 23-02 (1)*
Central & South Asia	Nil	17-19 (1)	07-08 (1) 08-10 (2) 10-11 (1) 20-23 (1)	05-07 (1) 18-21 (1)
Southeast Asia	Nil	18-20 (1)	07-08 (1) 08-10 (2) 10-11 (1) 18-22 (1)	Nil
Far East	Nil	17-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-21 (2) 21-23 (1)	06-08 (1)
South Pacific & New Zealand	16-19 (1)	13-16 (1) 16-18 (2) 18-20 (1)	07-08 (1) 08-11 (2) 11-13 (1) 18-21 (1) 21-00 (2) 00-02 (1)	01-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 04-08 (1)*
Australasia	17-19 (1)	16-17 (1) 17-19 (2) 19-20 (1)	06-08 (1) 08-10 (2) 10-12 (1) 15-16 (1) 16-18 (2) 18-21 (1) 21-00 (2) 00-02 (1)	03-04 (1) 04-07 (2) 07-08 (1) 05-07 (1)*
Northern South America	13-15 (1) 15-17 (2) 17-18 (1)	08-12 (1) 12-14 (2) 14-16 (4) 16-17 (3) 17-19 (2) 19-20 (1)	06-07 (1) 07-08 (2) 08-10 (4) 10-12 (3) 12-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-22 (2) 22-02 (1)	19-20 (1) 20-21 (2) 21-04 (3) 04-06 (2) 06-08 (1) 22-02 (1)* 02-04 (2)* 04-07 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	14-16 (1) 16-17 (2) 17-18 (1)	08-10 (1) 10-12 (2) 12-15 (1) 15-16 (2) 16-18 (4) 18-19 (2) 19-20 (1)	06-08 (1) 14-16 (1) 16-17 (2) 17-18 (3) 18-20 (4) 20-21 (3) 21-00 (2) 00-02 (1)	21-23 (1) 23-01 (2) 01-03 (1) 03-06 (2) 06-07 (1) 04-06 (1)*
McMurdo Sound, Antarctica	Nil	15-18 (1)	07-09 (1) 16-18 (1) 18-19 (2) 19-21 (3) 21-23 (2) 23-01 (1)	01-06 (1)

*Predicted times for 80 meter openings. Openings on 160 meters are also possible during those times when 80 meter openings are shown with a forecast rating of (2), or better.

Time Zones: CDT & MDT (24-Hour Time) CENTRAL USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	Nil	09-11 (1) 13-15 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-16 (3) 16-17 (2) 17-19 (1)	20-22 (1) 22-01 (2) 01-04 (1) 22-02 (1)*
Northern Europe & European USSR	Nil	10-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-13 (2) 13-14 (3) 14-16 (2) 16-17 (1) 21-23 (1)	20-02 (1) 22-01 (1)*
Eastern Mediter-ranean & Middle East	Nil	10-15 (1)	07-14 (1) 14-16 (2) 16-18 (1) 21-23 (1)	20-21 (1) 21-23 (2) 23-00 (1) 21-23 (1)*
West Africa	12-14 (1)	09-11 (1) 11-14 (2) 14-16 (1)	07-09 (1) 13-15 (1) 15-16 (2) 16-19 (3) 19-20 (2) 20-22 (1)	20-22 (1) 22-01 (2) 01-02 (1) 23-01 (1)*
Central & East Africa	Nil	12-15 (1)	13-17 (1) 17-19 (2) 19-21 (1) 07-09 (1)	21-00 (1)
South Africa	11-14 (1)	08-10 (1) 10-14 (2) 14-15 (1)	07-09 (1) 12-15 (1) 15-18 (2) 18-20 (1) 22-01 (1)	20-21 (1) 21-23 (2) 23-01 (1) 22-00 (1)*
Central & South Asia	Nil	18-21 (1)	07-08 (1) 08-10 (2) 10-11 (1) 18-21 (1)	06-08 (1) 19-21 (1)
Southeast Asia	Nil	17-21 (1)	07-08 (1) 08-10 (2) 10-12 (1) 20-23 (1)	06-08 (1)
Far East	Nil	15-17 (1) 17-19 (2) 19-20 (1)	07-08 (1) 08-10 (2) 10-13 (1) 17-19 (1) 19-22 (1) 22-01 (1)	03-06 (1) 06-07 (2) 07-08 (1) 06-07 (1)*
South Pacific & New Zealand	16-19 (1)	12-15 (1) 15-19 (2) 19-21 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-18 (1) 18-21 (2) 21-23 (3) 23-02 (2) 02-07 (1)	00-01 (1) 01-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 02-04 (1)* 04-06 (2)* 06-07 (1)*

HOW TO USE THE DX PROPAGATION CHARTS

1. Use Chart approprate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8 KP4, KG4 and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9 and 0 areas; the Western USA Chart in the 6 and 7 areas, and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 Meters) for a particular DX region, as shown in the left-hand column of the Charts. An * indicates the best time to listen for 160 meter openings.

3. The *propagation index* is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of *days* during the month on which the opening is expected to take place as follows:
(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days
Refer to the "Last Minute Forecast" at the beginning of this column for the actual *dates* on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

4. Times shown in the Charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *daylight* time is used, *not* GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts 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 10 dB loss, it will lower by one level.

6. Propagation data contained in the Charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce. Boulder, Colorado, 80302.

Australasia	16-19 (1)	14-16 (1) 16-19 (2) 19-21 (1)	00-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-16 (1) 16-18 (2) 18-20 (1) 20-00 (2)	02-04 (1) 04-07 (2) 07-09 (1) 04-05 (1)* 05-07 (2)* 07-08 (1)*
Northern & Central South America	12-15 (1) 15-17 (2) 17-18 (1)	08-09 (1) 09-12 (2) 12-14 (3) 14-17 (4) 17-18 (2) 18-19 (1)	06-07 (1) 07-08 (3) 08-10 (4) 10-12 (3) 12-16 (2) 16-17 (3) 17-19 (4) 19-21 (3) 21-22 (2) 22-02 (1)	19-21 (1) 21-23 (2) 23-03 (3) 03-06 (2) 06-07 (1) 21-00 (1)* 00-03 (2)* 03-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, Uruguay	13-14 (1) 14-16 (2) 16-17 (1)	08-10 (1) 10-12 (2) 12-15 (1) 15-16 (2) 16-18 (4) 18-19 (2) 19-20 (1)	07-09 (1) 13-15 (1) 15-16 (2) 16-17 (3) 17-20 (4) 20-22 (3) 22-01 (2) 01-03 (1)	21-23 (1) 23-01 (2) 01-03 (1) 03-05 (2) 05-07 (1) 02-06 (1)*
McMurdo Sound, Antarctica	Nil	15-18 (1)	15-17 (1) 17-19 (2) 19-21 (3) 21-23 (2) 23-00 (1) 08-10 (1)	01-06 (1)

Time Zone: PDT (24-Hour Time)
WESTERN USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western Europe & North Africa	Nil	11-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-15 (2) 15-17 (1) 22-00 (1)	20-21 (1) 21-23 (2) 23-00 (1) 22-23 (1)*
Central & Northern Europe & European USSR	Nil	10-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-14 (2) 14-16 (1) 21-23 (1)	19-00 (1)
Eastern Mediter-ranean & Middle East	Nil	09-12 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-15 (1) 20-22 (1)	20-23 (1)
Western & Central Africa	Nil	12-15 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	21-01 (1)
East Africa	Nil	Nil	12-15 (1) 15-17 (2) 17-19 (1)	20-22 (1)
South Africa	Nil	10-12 (1)	07-09 (1) 12-14 (1) 14-16 (2) 16-18 (1) 22-00 (1)	20-21 (1) 21-22 (2) 22-23 (1) 20-22 (1)*
Central & South Asia	Nil	17-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-20 (2) 20-21 (1)	06-08 (1)
Southeast Asia	Nil	16-20 (1)	08-09 (1) 09-11 (2) 11-13 (1) 18-21 (1) 21-00 (2) 00-01 (1)	02-05 (1) 05-07 (2) 07-08 (1) 06-07 (1)*
Far East	Nil	15-17 (1) 17-19 (2) 19-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-18 (1) 18-20 (2) 20-22 (3) 22-23 (3) 23-01 (1)	01-02 (1) 02-06 (2) 06-07 (3) 07-08 (1) 03-07 (1)*
South Pacific & New Zealand	16-18 (1)	12-15 (1) 15-16 (2) 16-19 (3) 19-20 (2) 20-21 (1)	01-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-14 (1) 14-18 (2) 18-20 (3) 20-22 (4) 22-23 (3) 23-01 (2)	22-23 (1) 23-00 (2) 00-06 (3) 06-07 (2) 07-08 (1) 23-02 (1)* 02-05 (2)* 05-07 (1)*

Australasia	15-18 (1)	13-16 (1) 16-17 (2) 17-19 (3) 19-21 (2) 21-22 (1)	12-19 (1) 19-20 (2) 20-01 (3) 01-04 (2) 04-07 (1) 07-08 (2) 08-10 (3) 10-12 (2)	00-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 02-04 (1)* 04-06 (2)* 06-07 (1)*
Northern & Central South America	12-14 (1) 14-17 (2) 17-18 (1)	08-09 (1) 09-12 (2) 12-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-16 (2) 16-17 (3) 17-19 (4) 19-20 (3)	18-21 (1) 21-22 (2) 22-01 (3) 01-03 (2) 03-07 (1) 20-22 (1)* 22-02 (2)*

			20-22 (2) 22-02 (1)	02-05 (1)
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	13-14 (1) 14-16 (2) 16-17 (1)	08-10 (1) 10-12 (2) 12-15 (1) 15-16 (2) 16-17 (4) 17-19 (2) 19-20 (1)	04-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-19 (3) 19-22 (2) 22-00 (1)	20-22 (1) 22-00 (2) 00-02 (1) 02-04 (2) 04-06 (1) 01-05 (1)*
McMurdo Sound, Antarctica	Nil	13-16 (1) 16-18 (2) 18-20 (1)	08-10 (1) 16-19 (1) 19-21 (2) 21-23 (3) 23-00 (2) 00-01 (1)	01-06 (1)

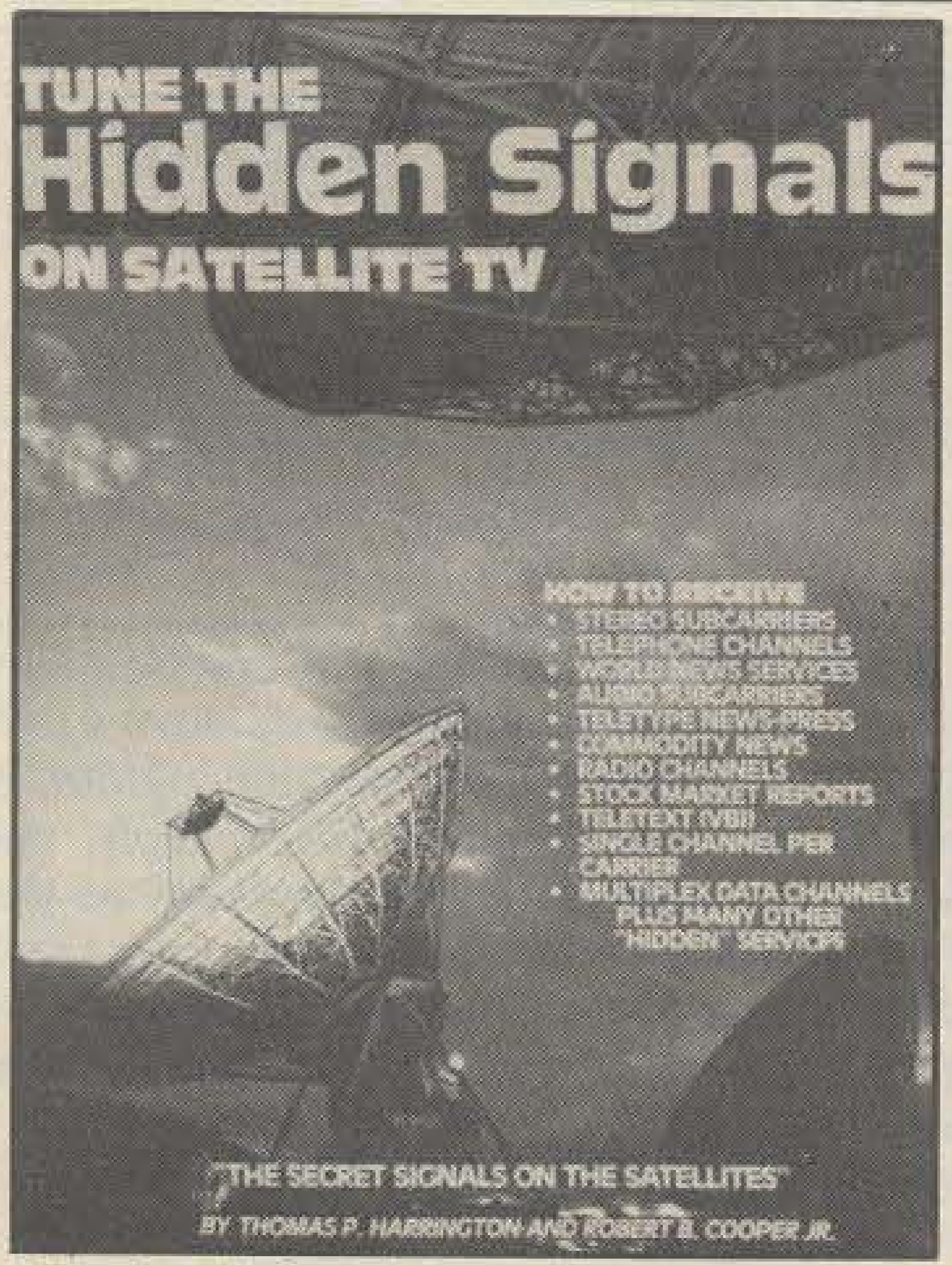
bridge or own meter (using very low power, of course!) can facilitate match- | covered up by North American stations. | Pattern Plotter, Antenna Matching Evalu-

Antennas & Accessories

a monthly feature by
KARL T. THURBER, JR., W8FX

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

From the Notebook—Part V



New book for the satellite gang covers the full gamut of non-video satellite services on the domestic "birds." These include telephone and stereo channels, news and press services, and other data systems. Point your antenna and be surprised! (Photo courtesy Universal Electronics, Inc.)

lites. It's billed as the first complete book dealing entirely with the non-video services carried by (or hidden in, if you will) the many domestic satellites. Tom's book covers these services completely, including the radio networks, press and business services, stereo subcarriers, telephone channels, TeleText, and many other data systems. The book deals with all phases of this expanding side of the satellite business: the systems, how they work, who uses them, how they are received, and how they can best be utilized.

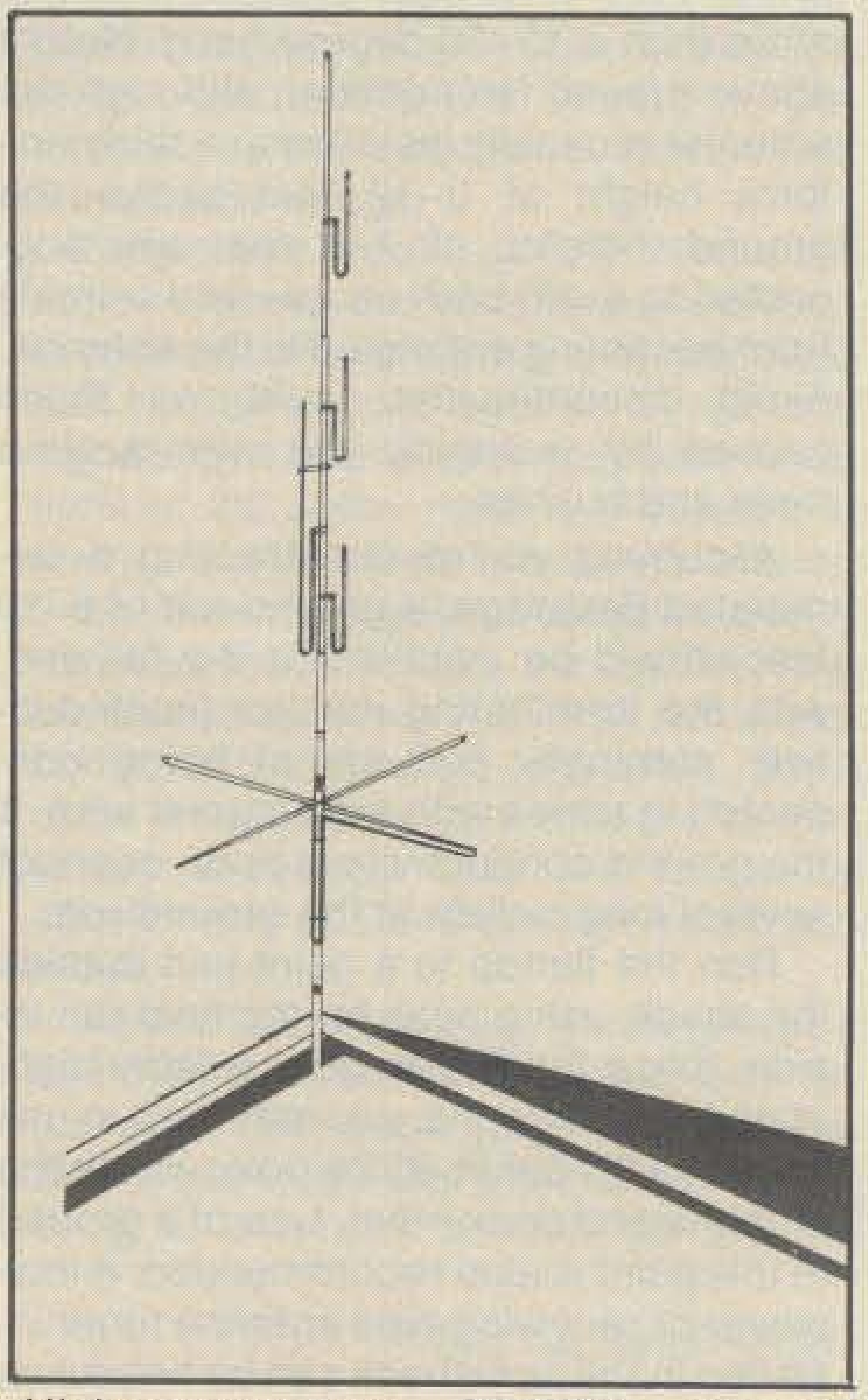
Though of primary interest to people in the commercial satellite or cable TV business, I found the book interesting from an inquisitive amateur's "what's really up there standpoint," and I was amazed at the complexity of the signals carried by the satellites. Had I a "dish" in my backyard, rather than being a garden-variety cable subscriber, I immediately would have rushed to DX the satellites for all the neat stuff Tom highlights in his 180-page, $14.95 book. For more information, contact Universal Electronics, Inc., 4555 Groves Rd., Suite 3A, Columbus, OH 43232.

New Product Scan

Two from Butternut. Scanner buffs should be interested in a new scanner antenna from Butternut Electronic, 405 E. Market St., Lockhart, TX 78644. Dubbed the SC-3000, the antenna is a collinear array (with proven Trombone® phasing sections used in Butternut's famous multiband antennas) to reportedly achieve up to 7 dB gain over a ¼-wave vertical. The 11 foot antenna has a large capture area, and is rated to survive in 100 m.p.h. winds. According to Don Newcomb, W0DN, of Butternut, a two-page "tech note" for the antenna, which discusses its construction, theory of operation, and mounting possibilities, is available. The antenna sells for $65 postpaid.

For 80 and 40 meters, the same firm has introduced a 32 foot, self-supporting vertical, the HF2V, that features automatic bandswitching. The antenna does not use any traps and boasts a VSWR at resonance of 1.5:1 or less. On 40 meters the full band is covered with an SWR of 2:1 or less, while 90 kHz are covered on 80 for the same SWR window. Resonator kits are available for 20, 30, and 160-meter operation. Also, a novel top-loading kit for increased efficiency and bandwidth on 80 and 160 meters is available; this kit consists of four 25-foot stranded umbrella wires. The HF2V, priced at $147, has an unguyed wind survival rating of 60 m.p.h.

W9INN Update. Late last year we highlighted some of the slopers and dipoles offered by William E. Fanckboner, W9INN (W9INN Antennas), P.O. Box 393, Mt. Prospect, IL 60056. In our writeup we mentioned the compact 46 foot "Space-Saver" dipoles for 160–10 meters, which had been furnished primarily for use with



High-capture-area SC-3000 scanner antenna makes use of the patented Trombone® phasing sections to achieve up to

★ *NEW* ★ *COUNTY' 64* ★ *NEW* ★ *COUNTY' 64* ★
COUNTY' 64 COME WITH THE POWERFUL LOGGING FEATURES OF CONTENDER PLUS II(without WAZ & DXCC) / PLUS A SPECIAL COUNTY LOGGING SYSTEM. THIS SYSTEM TAKES THE WORK OUT OF COUNTY RECORD KEEPING.

OTHER LOGGING SYSTEMS AVAILABLE FROM CRUMTRONICS ARE:

CONTENDER PLUS II (one disk)..... $34.95
CONTENDER PLUS II / with USA-CA. (three disk)..... $49.95
COUNTY' 64 (two disk)..... $34.95
USA-CA ADD ON FOR CONTENDER PLUS II (2 disk)..... $12.00

FOR FREE FACT SHEET OR TO ORDER WRITE:

CRUMTRONICS
SOFTWARE DIVISION
P. O. BOX 6187
FORT WAYNE, IN 46896

COD ORDERS CALL: 219/745-0350 or 219/485-2718
CRUMTRONICS is our name logging is our game

CIRCLE 96 ON READER SERVICE CARD

CABLE TV EQUIPMENT

Jerrold, Hamlin, Zenith—Many Others! Factory Units/ Lowest Dealer Prices. Complete illustrated catalog, $2.00.
Pacific Cable Co., Inc., 7325½ Reseda Blvd., #902
Reseda, CA 91335 (818) 346-5071

CIRCLE 95 ON READER SERVICE CARD

NEW PRODUCTS

PIN DIODE T/R SWITCH
SOLID STATE FRONT END PROTECTOR
QSL FOR FREE FACT SHEET
DESIGN ELECTRONICS OHIO
4925 S. HAMILTON RD.
GROVEPORT, OHIO 43125
614-836-3929

CIRCLE 97 ON READER SERVICE CARD

Amateur Radio
LICENSE PREPARATION
Study Guides
Get the RIGHT study material!
Manuals have *all* FCC Amateur Radio Operator multiple-choice questions, *answers*, distractors (wrong answers) and discussion as to why answer is right!

FCC - NOVICE STUDY GUIDE..... $2.95 (Element 2)
FCC - TECH./GENERAL STUDY GUIDE. $5.00 (Element 3)
FCC - ADVANCED STUDY GUIDE..... $5.00 (Element 4A)
FCC - EXTRA CLASS STUDY GUIDE.... $5.00 (Element 4B)
THE FCC RULE BOOK..... $3.00 (Use in conjunction with Study Guide)

Add $1.50 each manual for first class postage. Same day shipment!

W5YI - VEC
P.O. Box #10101-C, Dallas, TX 75207

CIRCLE 92 ON READER SERVICE CARD

NOT SO HOT.

At high power a hot antenna rod is a sure sign that power is going to waste. At lower power you're losing the same percentage of energy, but the dissipation is so rapid you can't feel the heat. That's why it's important to know the cold facts about Larsen antennas.

Our exclusive Kūlrod® whip minimizes RF loss regardless of the watts applied, so you can talk farther. It stays cool to the touch even at high power.

The stainless steel rod is first plated with nickel, then with copper for high conductivity. Thin layers of nickel and chrome protect the copper from corrosion and provide a sleek finish, without hindering performance.

So whether you're calling for fun, or calling for help, you can depend on Larsen antennas and our no-nonsense warranty to deliver a strong, clear signal... instead of a lot of hot air.

Shown in cutaway: Top plating of chrome. Inner platings of nickel, copper and nickel over stainless steel rod. (Layers not drawn to scale.)

Larsen Antennas
The Amateur's Professional™
See your favorite amateur dealer or write for a free amateur catalog.

IN USA: Larsen Electronics, Inc.
11611 N.E. 50th Ave. P.O. Box 1799
Vancouver, WA 98668
206-573-2722

IN CANADA: Canadian Larsen Electronics, Ltd.
149 West 6th Avenue
Vancouver, B.C. V5Y 1K3
604-872-8517

LARSEN,® KÜLROD® AND KÜLDUCKIE® ARE REGISTERED TRADEMARKS OF LARSEN ELECTRONICS, INC.

CIRCLE 148 ON READER SERVICE CARD

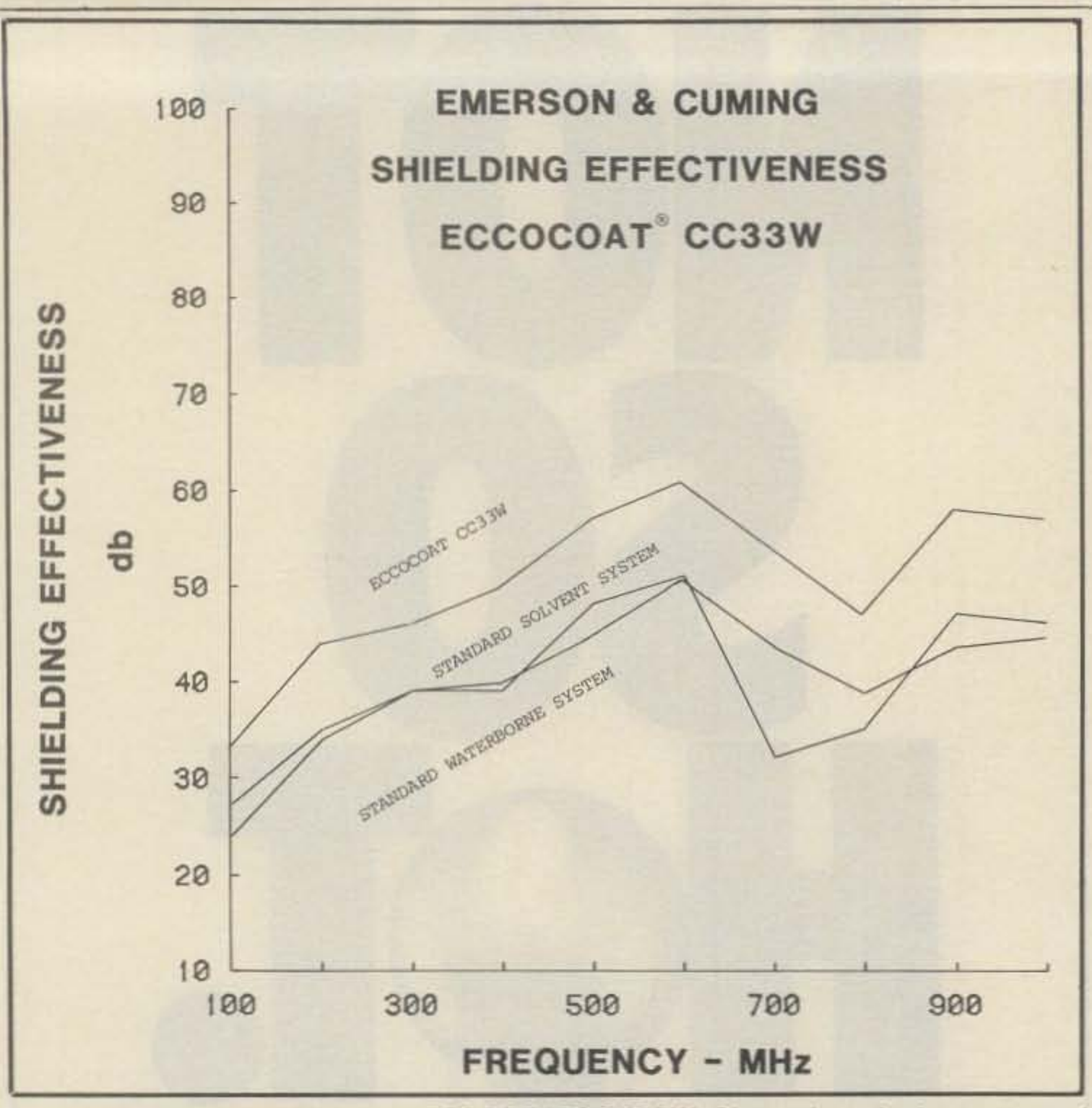
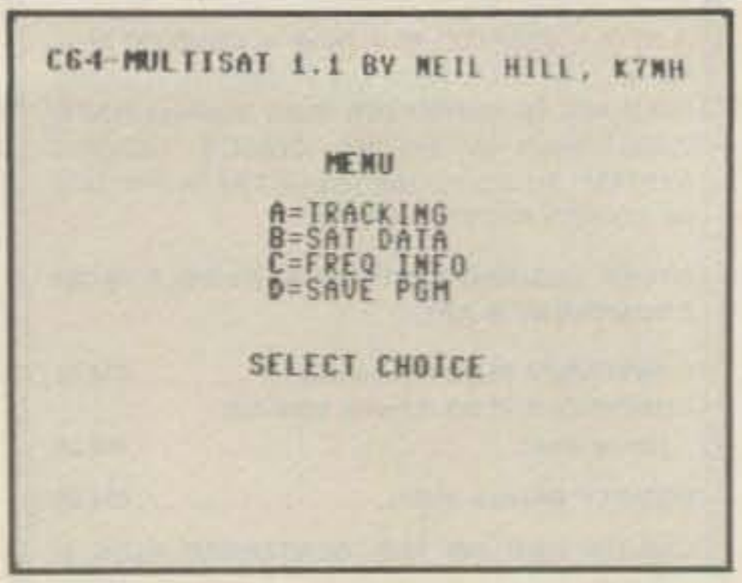
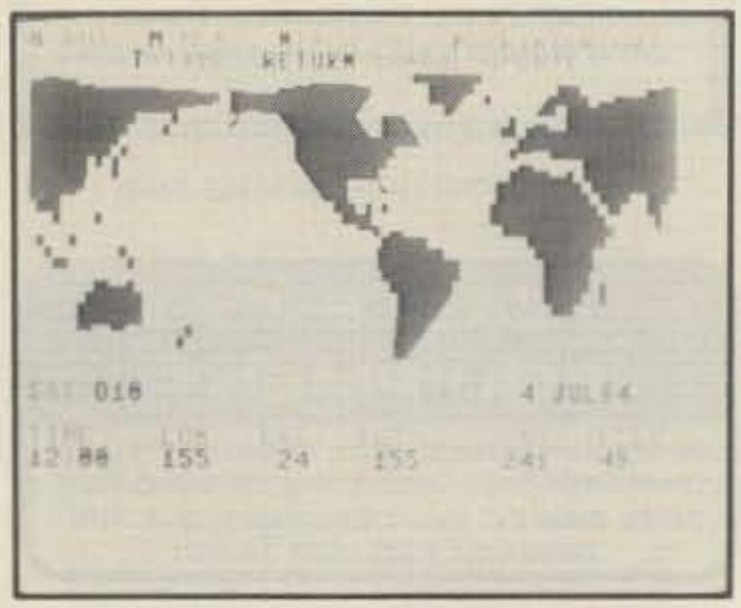


Fig. 3– Shielding effectiveness, ECCOCOAT® CC33W. Shown here is the measured shielding effectiveness in dB of the Emerson & Cuming CC33W EMI/RFI conductive coating over the range of 100 to 900 MHz.



Main menu for Spectrum West's C-64 Multistat program. Program is designed for use with any single elliptical or circular satellite, but is set up for OSCAR 10. (Photo courtesy Spectrum West)



A world map with blinking cursor provides a clear indication of satellite location on the C64-Multistat program by Spectrum West.

openwire feedline. Bill advises us that the assembled dipoles are now available for feed with 50 ohm coax, and when so directly fed, may be used on 80, 40, 20, and 15 meters without the need for an antenna tuner. W9INN's antenna catalog is an interesting one, with many good mounting ideas for various dipoles and slopers contained within.

Spray-On Shielding? To be sure, in the hamshack the variety of electronic devices that can produce radio frequency interference (RFI) is large and growing. Unfortunately, the computers that we know and love so well are among the worst RFI offenders, having the capability to entirely mask the weak signals the reception of which they are intended to facilitate. In some cases the computer itself is susceptible to RFI from the associated amateur equipment.

What can be done? While stringent FCC incidental emission regulations do exist, these regulations do not fully allow peaceful coexistence between the PC and amateur gear used in close proximity. Fairly conventional TVI-style filtering of leads to and from the computer and amateur gear will do much to alleviate the interference problem. However, much interference is of the nature of direct radiation from the computer equipment, or swamping of the computer by the close-by transmitter.

Some amateurs have alleviated the interference problem by using aluminum foil on the interior of their plastic-encased computers. Another approach, one with very good potential and not an inexpensive one, lies in spraying the inside of the computer's cabinet with a special conductive coating. We know of two sources for such coatings: Miller-Stephenson Chemical Co., George Washington Highway, Danbury, CT 06810; and Emerson & Cuming, 869 Washington St., Canton, MA 02021.

Miller-Stephenson produces an RF conformal coating, the MS-485. The MS-485 is a black coating which comes in a spray can and may be applied in a 2-mil layer to absorb RFI/EMI over a broad frequency range. The spray dries in approximately 15 minutes and may be used on most plastics. The coating is removable using a coating stripper, also sold by the company. The MS-485 is normally sold in minimum quantities of 4 cans at $7 each, although the firm has a trial sample offer of a single 16 oz. can for $6. Orders placed directly with the manufacturer are shipped postpaid.

Emerson & Cuming also manufactures a line of conductive coatings. The ECCOCOAT® CC-33W is a waterborne nickel acrylic coating specifically designed for commercial application to business machines and computers. Rated attenuation is up tp 60 dB from 30–1000 MHz, as shown in fig. 3. A more convenient, spray-can conductive coating suitable for hamshack use is known as the ECCOCOAT® CC-2 Aerosol Spray, which has the primary purpose of "fixing" plastic housings to meet FCC shielding standards. The CC-2 spray lacquer is said to provide excellent adhesion to plastic, glass, ceramics, and metals. For more information and availability, contact the manufacturer directly.

Note that while most amateurs would use these products for RFI/EMI reduction purposes, the sprays can be used to seal metal-to-metal surfaces, form ground plans underneath antennas, coat waveguides and reflectors, and even repair antenna dishes.

Software Notes

Scientific Software. In past columns we have taken note of the expanding line of Commodore 64 and Vic-20 science software offered by David Eagle. Dave has many interactive BASIC computer programs which can be used for various scientific activities and hobby applica-

ICOM HF Transceiver IC-751

The Standard of Excellence in HF Base Stations

The IC-751 is the most advanced transceiver available today. It's a competition grade ham receiver, a 100KHz to 30MHz continuous tuning general coverage receiver AND a full-featured all mode solid-state ham band transmitter. The IC-751 also covers the new WARC bands, MARS frequencies, and is AMTOR compatible.

Important Standard Features. Compare these important standard features in this "top of the line" base station:

- 100KHz – 30MHz Receiver
- 105dB dynamic range
- QSK — full break-in CW
- FM Mode Standard
- High-grade FL-44A 455KHz SSB filter
- 32 tunable Memories with lithium battery backup
- 100% Duty Cycle Transmitter
- Passband Tuning
- 12V DC operation
- Adjustable AGC
- Adjustable Noise Blanker
- RIT/XIT with separate readout
- IC-HM12 Microphone with Up/Down Scan
- Continuously adjustable transmit power

Options. IC-EX310 speech synthesizer, internal IC-PS35 power supply, external IC-PS15 or IC-PS30 system supply, IC-SM8 two-cable desk mic, IC-SM6 desk mic, RC-10 external controller, and a variety of filters.

FILTER SPECIFICATIONS

Filter	Model	Center Freq. (KHz)	-6dB (KHz) Width
STANDARD FILTERS			
AM Ceramic	CFW 455 IT	455	6.0
SSB (PBT) XTAL	FL-30	9011.5	2.3
FM Filter	9M15A	9011.5	15 (-3dB)
SSB Narrow (Hygrade Crystal)	FL-44A	455	2.4
OPTIONAL FILTERS			
CW Narrow	FL-52A	455	0.500
CW Narrow	FL-53A	455	0.250
SSB Wide	FL-70	9011.5	2.8
CW Narrow	FL-32	9010.6	0.500
CW Narrow	FL-63	9010.6	0.250
AM	FL-33	9010.0	6.0

Operating From 12V, the IC-751 is also available with an optional internal AC power supply, the IC-PS35...for the winning edge in field day competition.

The IC-751 provides superior performance for all amateur radio operators...from novice to extra class. See the IC-751 at your local ICOM dealer.

Now with a ONE YEAR Warranty!

CIRCLE 136 ON READER SERVICE CARD

ICOM

First in Communications

ICOM America, Inc., 2380-116th Ave NE, Bellevue, WA 98004 / 3331 Towerwood Drive, Suite 307, Dallas, TX 75234

tions. Over 20 different programs are available for amateur astronomy, satellite tracking, model rocketry, and hot-air balloon performance applications. The software is inexpensive, and the larger programs are available in a compiled version for faster running qualities.

Dave has moved from Pennsylvania to Colorado since we first mentioned his offerings. Request a catalog by writing to David Eagle, Eagle Software, 7952 W. Quarto Drive, Littleton, CO 80123.

Spectrum West. Interest in the "specialized" communications modes, such as OSCAR, is at a high, especially as we slide down the trough of the 11-year sunspot cycle. *CQ*, of course, gives special attention to amateur satellite communication through regular articles, as well as in Dave Ingram, K4TWJ's "World of Ideas" monthly column. Occasionally, we delve into this realm when the subject relates to antenna positioning.

A series of amateur satellite tracking programs for the Vic-20, Commodore 64, and Timex-Sinclair computers is offered by Spectrum West, 5717 N. E. 56th St., Seattle, WA 98105. Spectrum West offers a number of utility programs for tracking OSCAR and other satellites, including hardware/software packages to physically control an antenna rotator in terms of azimuth and elevation.

Among the tracking programs offered are Vik-multistat, Viktrak-map, Worldtrak, and C-64 Multistat. Rotator control routines, to operate an automatic antenna aiming system package, are written into all of the programs offered. I had the opportunity to check out C-64 Multistat, written by Niel Hill, K7NH, which I found to be an easy-to-use tracking program that handles both elliptical and circular satellites, and which provides satellite location with a blinking cursor superimposed on a world map. The program provides bearing and elevation to the satellite if it is within range, and output to a printer for hardcopy is also available.

The "second generation" of satellite tracking programs offered by the firm is based on the Autotrak computer rotator control system. The system, which has both a software (on disk or tape) and a hardware (interface board) component, is designed for computer-controlled operation of rotators, in both azimuth and elevation, directly from the computer's keyboard. They system works with any potentiometer-type rotator (Kenpro KR-400/500, HD-73, Hy-Gain, etc.), and the menu-driven software provides complete control of all turning functions. Satellite antenna control is the primary function of the system, although for terrestrial HF/VHF work, two arrays may be controlled independently of one another.

In most cases the interface board is plugged into the accessory port of the computer, though with some machines

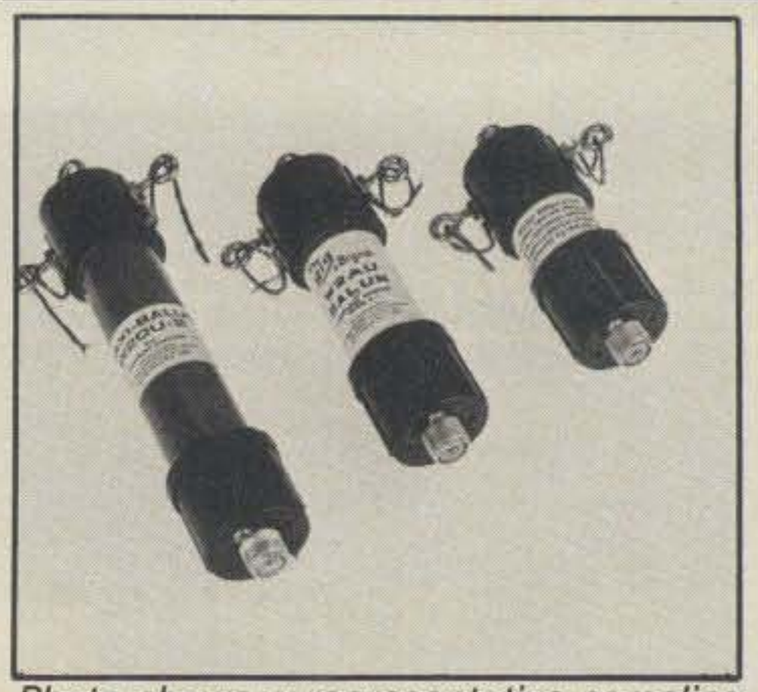


Photo shows a representative sampling of baluns offered by Unadilla/Reyco/Inline. The W2DU "Maxi-Balun" at left is unique, in that having no transformer, there is no coupling loss, no core to saturate to limit power and SWR or generate harmonics, and no leakage reactance to ruin precise measurements. This type of balun features lower loss at high power with high SWR, and greater accuracy of SWR and impedance measurements than with transformer-type baluns. Both HF and VHF versions are available. (Photo courtesy Unadilla/Reyco/Inline)

hard-wiring is required. As we go to press, system packages are available for the C-64, Vic-20, T/S 1000 (with 16K memory), and T/S 2068. Versions for the IBM, Apple, and TRS-80 are expected to be released shortly. Hardware interface and software are also available separately.

Of This 'n' That

Back to Baluns. In the January issue we examined some of the products offered by Unadilla/Reyco/Inline (6743 Kinne St., E. Syracuse, NY 13057), with special emphasis on the W2AU/W2DU baluns. In that column we may have given the impression that the W2DU baluns were available for VHF use only. This is not the case, with the rather novel W2DU-HF balun covering 1.8–30 MHz.

A particularly interesting feature of this balun is that it contains no ferrite core to saturate at high power levels when running high SWR. Consequently, the balun permits an antenna tuner to be used for making wide frequency excursions from antenna resonance—much greater than with transformer baluns having ferrite cores. This is an important consideration for those with solid state rigs with finicky final output stages. This type of balun is also less likely to "blow up" under mismatch conditions.

More Murphy. Murphy, it seems, has more "laws" than Carter had pills. Here are more of Murphy's truths for your contemplation:

If anything can go wrong, it most certainly will, and at the worst possible time.

Everything takes longer than you think it

Transmitter site for the National Bureau of Standards Radio Station WWVH, located on the island of Kauai, Hawaii. Around-the-clock, continuous broadcast services from Hawaii supplement those from WWV in Fort Collins, Colorado to provide high-quality signal coverage to the Pacific Basin. The UTC time and standard frequency signals are similar to those of WWV. (Photo courtesy NBS).

will, and costs a lot more than originally planned.

Whenever you set out to do something, something else must be done first.

If you do something which you are sure wili meet with everyone's approval, somebody surely won't like it.

The probability of something happening is in inverse ratio to its desirability.

When working on a project, if you put away a tool that you're sure you've finished with, you'll need it immediately.

Never try to duplicate a successful experiment.

All the "good ones" are taken.

101 and Going Strong. Somehow we missed the fact that last year, 1984, was the "Meridian Year," commemorating the 100th anniversary of the establishment of the Greenwich Meridian as the Prime Meridian, which serves as a baseline for the world's time zones, and from which the term *Greenwich Mean Time (GMT)* is derived. The background on GMT is interesting.

In 1884, at a meeting in Washington, delegates from 25 countries met and agreed to recognize the zero hour of a 24-hour day at Greenwich, England as the point from which time-reckoning should begin. The establishment of the Greenwich reference point, coupled with the defining of 24, 15-degree interval standard meridians around the world to form standard time zones, was a giant step, fostering orderly communications and commerce. Today at Greenwich in the Old Royal Observatory courtyard there is a brass strip that marks the precise path of the meridian.

Actually, "time" has become a good deal more complex in the past 100 years. GMT, or Zulu Time, is now actually Coordinated Universal Time, or UTC (the letters of the acronym seem out of order, as they are derived from the French). In fact, there are actually three major systems of time measurement in use. These are atomic time (AT), derived from the operation of atomic clocks; ephemeris time (ET), derived from the revolution of the earth about the sun; and the familiar universal time (UT), derived from the rotation of the earth about its axis. However, to meet the needs of precision timekeeping for various technical and scientific purposes, other "mathematical flavors" of time are calculated, including true and mean sidereal, and three variations of UT (UT0, UT1, and UT2).

The time broadcast over the familiar National Bureau of Standards time-and-frequency stations WWV and WWVH is UT2, referred to in the station announcements as Coordinated Universal Time, or UTC. This time is coordinated through international agreements by the International Time Bureau in Paris, so that time signals broadcast from the many standard stations such as WWV and WWVh throughout the world will be in close agreement. Happy 101st Year, GMT!

Wrapping It Up

This time we have delved into the classic Beverage antenna; noted some interesting reading matter, new products, and software; and examined a couple of tail-end topics. Next month: still more from the Notebook. See you then.

73, Karl, W8FX

World of Ideas

a monthly feature by
DAVE INGRAM, K4TWJ

A LOOK AT THE WORLD AROUND US

Surviving and Enjoying Sunspot Minimums

Tuning across our HF bands today while reflecting back on the exciting times around 1980 reveals some quite noticeable differences. Another sunspot minimum has descended upon us, making rare DX once again rare and playfully juggling band conditions like a ride on a roller coaster. Being creatures of habit, however, many of us continue pursuing our old established styles of operating rather than using this opportunity to broaden our horizons. If you've inadvertently fallen into that situation, new involvements and experiences can truly prove to be a refreshing change of pace. Such open-ended possibilities may be as simple as favorably shifting operating times and concepts (mobiling during day/lunch hours rather than tuning a "dead band" from home at night) to instigating some of those plans or ideas you've been postponing until a more opportune time. Unusual reasoning, you say? Not really.

Our amateur radio world offers unlimited areas of pursuit, many of which can be enjoyed through what I call the "operating time versus yearly investment concept" (actually a modification of the old Collins expense justification viewpoint). Visualize, as hypothetical examples, the merits of exchanging your extra HF transceiver and 2 meter FM rig for OSCAR 10 compatible multimode gear or trading your occasionally used 6 meter setup for a packet radio system. Logical? Sure! A number of amateurs enjoy trading HF transceivers whenever new models are introduced, an idea I compare to trading cars for retaining the pleasures of motoring. Comparatively, I suggest shifting to a totally different concept of touring, experiencing new areas and making new friends, heartily expanding one's horizons during an otherwise *passe* period. Should you later prefer returning to old-time interests rather than continuing with new waves of technology, removed equipment can be used for securing a new model HF transceiver. Your overall cost was reasonable, and you gained first-hand experience in an exciting new era.

Possibly you've been considering building some miniature QRP gear, rigging your own station remote control, fitting an HF transceiver into an auto's dash, starting a classic equipment collection, or volunteering to revitalize your radio club's public image. There's no better time than the present(!), and you can enjoy some long overdue "personalized QSOs" during new-found diversions. Once you're involved with a few of today's exciting innovations, we'll lay odds you'll reap more sheer enjoyment than you did during sunspot peaks! Need more coaxing to try new ideas and areas of interest? That's the main purpose of this month's column, so read on!

*Eastwood Village No 1201 So., Rt. 11, Box 499, Birmingham, AL 35210

OSCAR Satellites

This unique frontier is amateur radio's hottest area of development, and right now is the ideal time to join the ground-floor excitement. Today's satellite activities bear a striking resemblance to the Golden Age of Radio, when communications held an aire of newness, frequencies had "elbow room," and each contact was especially significant to its operators. The 1983 launch of our first Phase III satellite, OSCAR 10, sparked this new era by providing both "local" and intercontinental communications abilities on a predictable basis for several hours each day, broadband relaying 150 kHz segments in the 23 cm, 70 cm, and 2 meter bands. The deluxe spacecraft operates independent of sunspot fades while eliminating QRM through full duplex operation (simultaneous transmit and receive, with numerous SSB and CW QSOs across its bandpass).

OSCAR 10's lifespan is predicted to be more than double that of previous OSCARs, with 10 to 12 years being a logical estimate. Prior to satellites experienced battery "wearouts." OSCAR 10 is still operating on its main battery, however, with an extra on-board battery awaiting its call-up from "cold storage"! Another Phase III satellite is presently being prepped for launch during 1986. This OSCAR will host 23 cm, 70 cm, and 2 meter operations just like OSCAR 10, but with even more efficient signal-relaying transponders (if that's possible). During 1987, JAMSAT (AMSAT of Japan) plans to launch into orbit an amateur data-relaying satellite. This (2 meter/70 cm) "flying mailbox" will accept RTTY and packet-type messages from amateurs, deliver them for retrieval by amateurs in other lands, and return with the replies. Beyond that point, a "triple launch" of Phase IV OSCARS is under preparation (again using 23 cm, 70 cm, and 2 meters). Those three equally-spaced satellites will provide direct globe-spanning capabilities, with interlinking and directions of coverage selected by one's uplinked frequencies. This area of amateur radio enjoyment has an unlimited future in store, and it's rapidly approaching reality! Need more information on OSCAR satellites? Read my article "OSCAR 10 Simplified" in last month's issue of *CQ*, and watch for my new book "OSCAR 10 and Phase III Satellites" available from Universal Electronics or the *CQ* Bookshop ($5.95 plus shipping).

Packet Radio

You've probably heard of this mode, but unless you live in an amateur-radio-favoring area such as California or Florida, its concepts may be rather vague. Unlike RTTY or AMTOR, packet radio is a form of ever-expanding network communications which are usually conducted on VHF bands such as 2 meters. It's a keyboard-type teleprinting mode, and due to its high speed (fast baud rate), numerous QSOs can simultaneously be conducted on the same amateur frequency without interference. How? Transmissions or messages between communicating amateurs are broken into 128 character packets, "addressed," error-coded for checking their contents, then rapidly moved through the network in a sort of "bulk form" to the intended distant party—all at the speed of light. The overall concept resembles a computer-controlled telephone system wirelessly interconnected via 2 meter FM rigs, each inputting to the network and each capable of relaying messages "down the line" in a time-sharing fashion. A network can begin almost anywhere there are amateurs—Miami, Palm Beach, Orlando, etc.—and expand in any direction as others join the action. There's a good possibility that our full continent will be linked via packet radio with the next decade, and that coverage will be expanded almost worldwide via amateur satellite links. Since packet radio handles multiple QSOs on a single frequency, typically centers around small 2 meter rigs and antennas, and is 100 percent reliable, its future looks quite encouraging.

Assuming you presently own a 2 meter rig and are within range of a packet network, additional gear needed to join that

Enjoy assembling miniature amateur radio gear? The ballpoint pen case in this picture houses a 300 milliwatt, crystal-controlled, 30 meter transmitter complete with 12 volt mercury battery and top-mounted pushbutton key. Unit on adjacent circuit board is an under-construction 30 meter transceiver. Each circuit is first assembled and checked on "experimeter's block." All are spare-time projects of K4TWJ.

though the transmitter is quite "airworthy," I mainly enjoy demonstrating it near those working-gear setups displayed as hamfests. No problems with sunspot minimum have been notice there.

Another "homebrewing area" worthy of investigation during this sunspot minimum is microwaves. Ten GHz transmitting and receiving gear has now become available at a quite acceptable cost, and their possibilities of individual or group application are unlimited. A simple amateur weather RADAR can be assembled using a Gunnplexer, audio oscillator, and a triggered sweep oscilloscope. Transmitted signal reflected off thunderclouds would be time-displaced on the scope's display according to their distance (5.36 microseconds per mile one way), while Gunnplexer "aiming" would indicate direction. If you're not overwhelmed with weatherwatching, a pair of Gunnplexers could be rigged for broadband relaying full portions of your favorite HF bands between some prime remote site and your home or apartment (an attractive alternate for the antenna-restricted cliff dwellers).

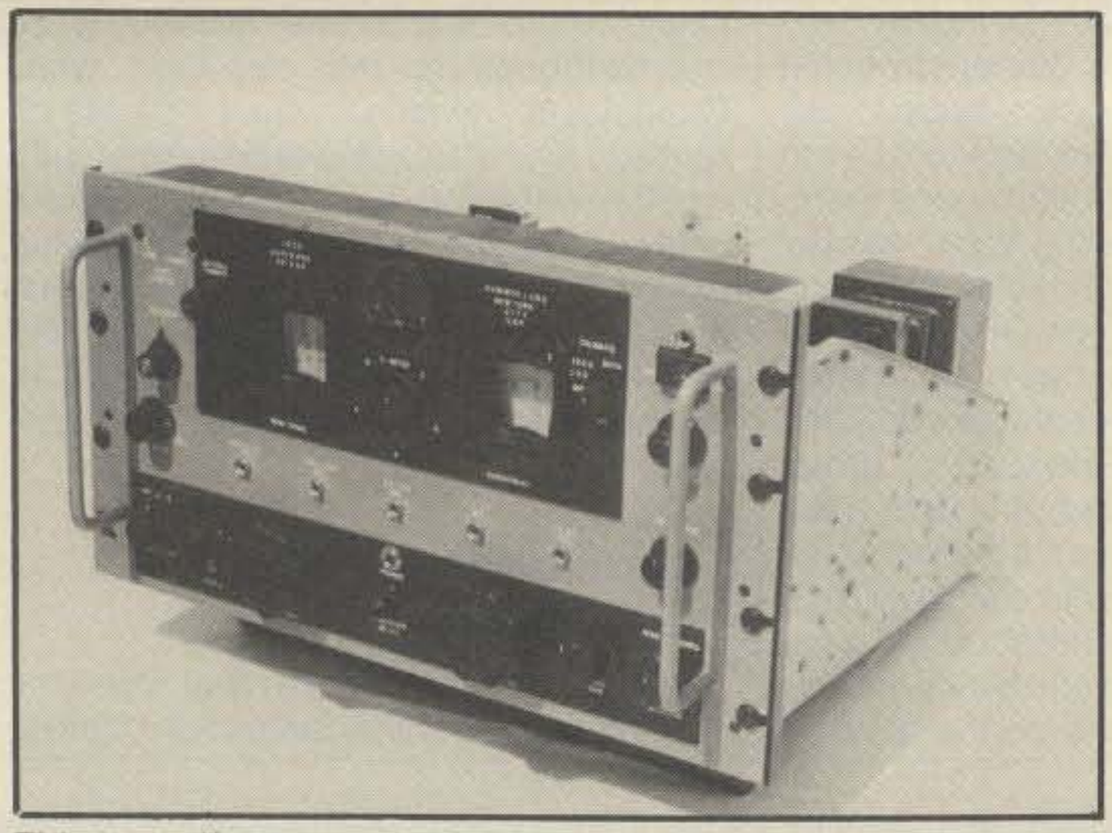
Collecting and Restoring Classic Gear

Sunspot minimums are ideal times for developing a personal collection of amateur activity consists of a home computer and a packet terminal node controller unit. A basic normal terminal program such as used with telephone/modem links (Compuserve, etc.) is loaded into the computer. Its RS232 output then connects to the terminal node controller (the most common units are AEA's PKT-1 or the Tucson Amateur Group's equivalent kit unit). That controller's output then connects to the VHF transceiver's audio input/output lines, and the setup is ready for operating. The usual format is an FSK-ASCII at 1200 baud. A small number of packet operations are conducted on HF bands, but their success has been confined by propagation fades and 300 baud limits.

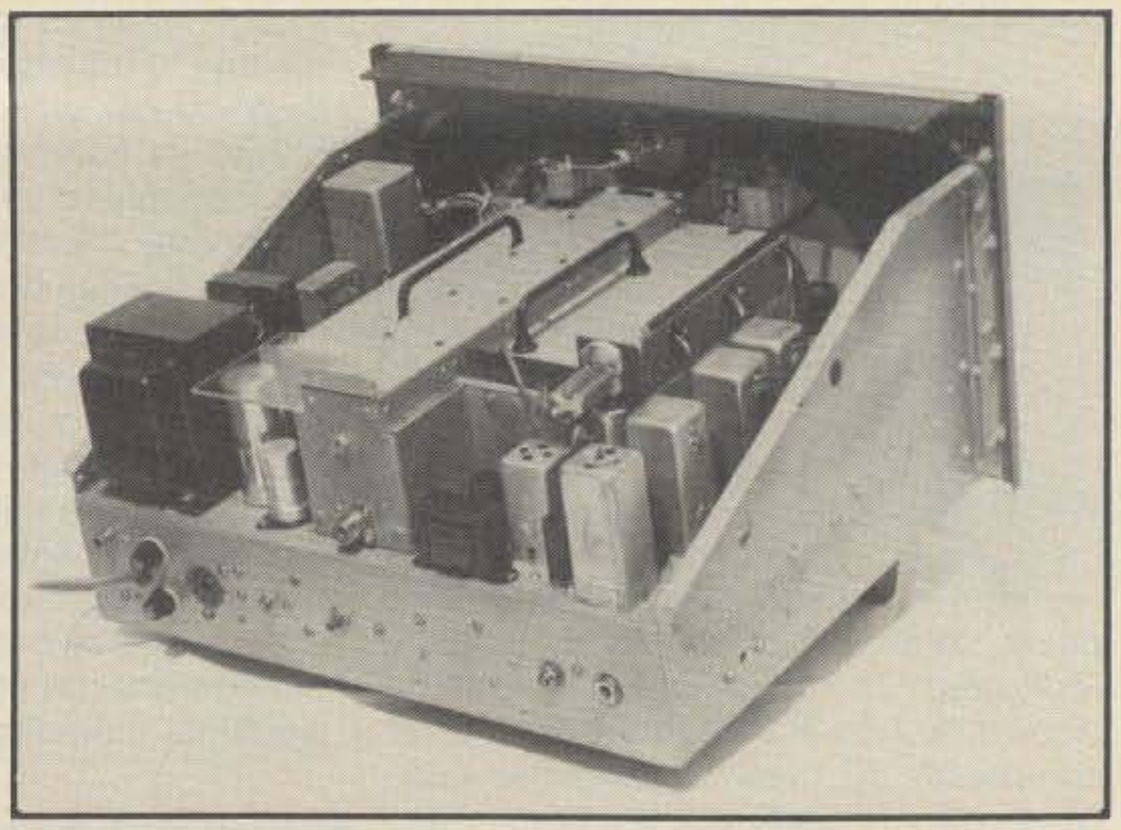
Designing and Building Gear

Although home-constructing primary station units such as receivers or transceivers may be a declining art, this approach continues to prove beneficial for acquiring those special items that are not available commercially. Have you considered, for example, replacing that noisy AM/FM radio in your car's dashboard with a nice low power 30 meter transceiver? Circuit Board Specialists, P.O. Box 969, Pueblo, Colorado 81002, produces a full kit version of W1FB's "8P6 Hamcation Special" modified for 30 meters, and its front-panel layout can be varied to fit your dash area without modification. Most cars provide a weather-insulated shelf around their radio area, and 7 or 8 watts "gets out" great on 30 meters.

Another intriguing idea involves constructing a basic CW transmiter or receiver in some unique yet useful manner. I recently assembled a complete 30 meter transmitter in a ballpoint pen case, for example, and am now fitting its mating receiver into a cigarette lighter case. Al-



This beautiful example of restoration and modernization is the work of John Leary, W9WHM. Classic receiver is 1939 model Hammarlund SP200. Wouldn't you enjoy getting in front of the controls of this gem?



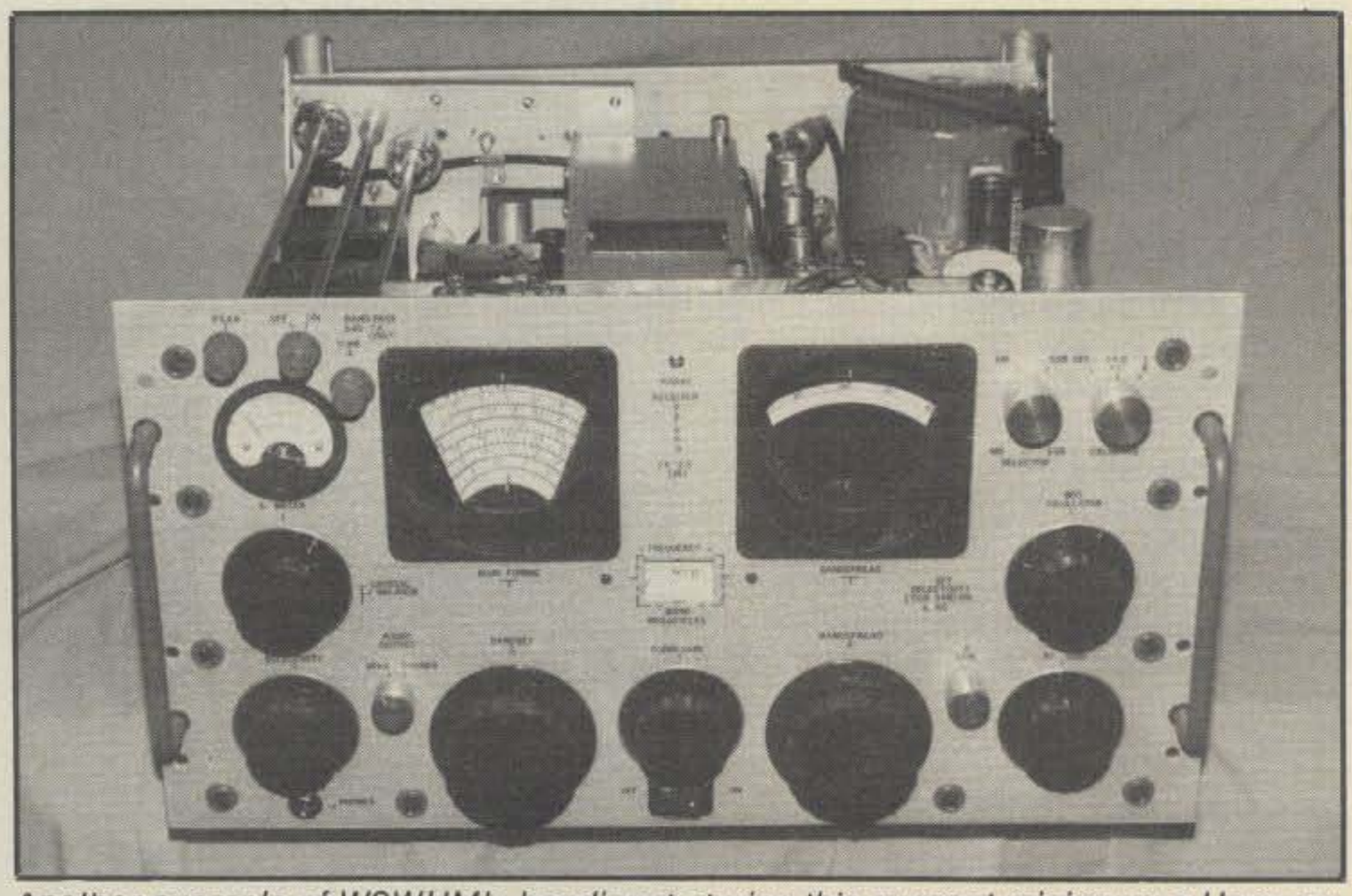
Rear view of the 1939 Hammarlund SP200 showing immaculate restoration and "open air" warmth of this well-known receiver. John says approximately six months of work is necessary to convert "junkers" into the shown results.

teur-radio-related items, and restored units can truly become lifetime treasures. Such collections can pursue any direction or size one desires—a number of 1930s-style "homebrew" transmitters, one or two classic model receivers, large or small tube key collections, or maybe a full vintage station setup modified for use on our new 30 meter band. Each of those areas reflects a special romance and glamour that seems to be disappearing in our modern age of "enclosed" and highly regulated living. Rapidly fading tube gear, for example, was well known for its beautiful audio, which can't be equalled by today's solid-state gear. Older receivers had a special warmth (more ways than one), and a smoothly operated bug can still sing beautiful Morse.

Some of the appealing aspects of older amateur gear are its relatively low cost, feasibility or restoration while replacement parts are still available, and its sheer in-use enjoyment. Then, too, the excitement of using such gear could only be compared to flying an open-air biplane rather than passenger-riding in a modern jetliner. Remember when you could read a magazine from the glow of your transmitter tubes filaments . . . when you could reach over and light a neon on its copper tubing tank coil . . . when receiver dials glowed like a harvest moon and speakers were full size? Now's the perfect time to enjoy first-time experiencing or reliving that classic era, and it's an ideal means of describing our proud past to future generations, and their future generations, which brings us to the next subject of consideration . . .

Inspiring Newcomers

Surely the most rewarding and ultimately beneficial activity each of us can pursue during this sunspot minimum is assisting amateur radio newcomers and/



Another example of W9WHM's handiwork during this sunspot minimum: a Hammarlund SP600 that performs as good as it looks. A beautiful receiver, and those big knobs really fit your band!

or inspiring curious onlookers to join our ranks. This vacancy is the most serious and critical problem facing U.S. amateurs today; it's an era that desperately needs our help, and its generally being ignored with an apparent attitude of "Let someone else do it . . . I've contributed my fair share." There isn't a hypothetical "someone else," gang; we're the consensus. We are aging ourselves out of existence, just like the American Indian, the buffalo, or the bald eagle. We must take steps to replenlish our ranks before we become only a proud memory. Being a college-level educator for over 10 years, I've experienced the problem of our situation first-hand. My apologies if I seem offensive when speaking openly. The majority of today's young adults noticeably prefer passive entertainment to various forms of mental/technical involvement (our hat's off to exceptions of that rule: *they are truly the backbone of our society).* The home computer craze isn't an argument here; it's the by-product of massive "bright lights and glamour" advertising, a concept we also must adopt for survival. Each of us must come out of the woodwork, locate that typical one person in two hundred capable of becoming a radio amateur, and patiently guide him or her through initial exposure, licensing, and on-the-air enjoyment. Television and newspaper interviews with space-shuttle followers, OSCAR operators, or packet enthusiasts are good mass exposure starters here, especially when followed with details on local club courses and means of acquiring more information. Shopping-mall demonstrations complemented with large speakers and "guest microphones" for serious investigators,

Gleaming back from sunspot cycles of yesteryear, this conversation-inspiring Harvey Wells Bandmaster transmitter is part of Steve Wilson, KØJW's special collection. Unit is fitted with lamp socket and shade, transmitter on/off switch, controlling light. Rig can be restored to original within minutes. Adjacent bug is genuine McElroy.

plus weekly newspaper columns on amateur radio activities, are additional possibilities. Who'll write that column? You! Are you not a knowledgeable amateur? Share your knowledge! We must keep our world in front of the public on a daily basis, make amateur radio a household word, and hope we can inspire enough intelligent people for survival. The marines are not the only group looking for a few good men. Let's all pull together to ensure the future existence of this world we cherish.

Conclusion

Sunspot minimums are an ideal time for reviewing our plans and accomplishments, experiencing new area, rekindling our original enthusiasm, and favorably encouraging "outsiders" to join our ranks. Given half a chance, these times can be filled with a kaleidoscope of memorable occasions. While only a limited number of interesting possibilities were "nutshell overviewed" in this column, we hope it inspires further thinking towards the many new directions awaiting your pursuit and enjoyment. You know, the unlimited opportunities of involvement in our amateur radio world can keep one fascinated for two or three lifetimes. If one area or aspect becomes less than personally overwhelming, you can shift to another area and renew that original infatuation of proudly being a radio amateur. Some folks may call amateur radio a hobby; I call it a lifestyle beyond comparison.

73, Dave, K4TWJ

Zero Bias

(Continued from page 4)

share gets smaller and smaller, and you'd rather keep what's left less crowded, then there really isn't a problem for you at all. If you're below the median age and would like to keep enjoying amateur radio, then the situation is more important to you. If you're at the median age or above, you can concentrate on the condos, golf, and shuffle-board to keep you busy later on.

Amateur radio needs the vitality and enthusiasm that only young people can bring to it. We need them to ensure the continuation of amateur radio itself. We need them as customers for an amateur radio industry. Without customers, there is no demand for product and with no product-demand there is no industry. The word profit is not a dirty word, you know, and companies evolve and stay alive by profit (including the one you work for), even non-profit ones. Without an industry, there is no amateur radio. Everything gets down to economics. There are plenty to commercial, industrial, and military electronics firms who are enjoying a very healthy market, and they are now actively seeking our frequencies for their constituancies.

Everything isn't fine and everything certainly isn't terrible. Things have changed around us, and perhaps we have been too close to see the changes. The technology changed and we took it as a present and not a challenge. A high performance rig is just an extension of a high performance car. Gone are the week-end tune-ups and oil changes in the driveway. Now it's make an appointment for service. It's not a question of right or wrong, it's just the way things are. Rather than fixate on an ideal situation that hasn't existed for 20 or 30 years, we have to look beyond ourselves and to the needs of the amateur radio service itself. To paraphrase the military, we have to look at the "mission" of amateur radio today, and in today's terms. Can we accomplish the "mission" and can we continue to accomplish the "mission" in the years to come? If you look at it realistically, we can use a lot more Privates.

It's up to each of us to proselytize and recruit more amateurs, even if it means the eventual rethinking of our "rites of passage." We went beyond spark kicking and screaming, beyond AM kicking and still screaming, and beyond straight keys and bugs to a machine that sends and receives perfect CW punctuation. It all means growth and continuation, and it's up to us to make sure it's still here for the future. Amateur radio is a *Natural* resource, not a sacrosanct private club for members only. The amateur radio frequency spectrum is like land—there's only so much of it. And like land, it appreciates in value each year. Land, like the amateur radio spectrum, can get to a point in value whereby it has more value for the common good than by those presently using it. At that point, it's simply taken away for the common good. It's called *eminent domain*—look it up.

The first thing to do is to recognize the need. The second thing to do is to decide as individuals just what we can do to help satisfy that need. It's up to us to convince young people that we have something to offer. You know better than anyone else what that something is, you've been fighting to keep it unchanged for years. Take the time to bring someone to a club meeting and a hamfest. Take the time to help them enroll in a amateur radio class and be there for them when they have questions or need advice. Share your enthusiasm, it's catching. We can all do something. The reader I quoted before was "willing to risk it all," however, to quote an old adage "Winning isn't everything, but losing is nothing!"

CQ's New Junior Op

Talk about your dedication! *CQ*'s Associate Editor, Gail Schieber, worked well into the evening one day last May to help put the finishing touches on our July issue. The next day she went into the hospital and delivered a healthy, handsome, new baby son, Brian Edward. Mom and dad and baby Brian are doing fine and are at home resting and getting acquainted. So, if in the next issue or two my spelling and punctuation seems a bit odd, you'll know why. Gail's timing was, as always, impeccably perfect—she waited until the issue was completed. That's dedication!

Don Wallace, W6AM; 1899–1985

The following is quoted from the May 21st issue of *The Westlink Report* and was written by its editor, Bill Pasternak, WA6ITF:

" 'Mr. Ham Radio has died at age 86. The legendary Don Wallace, W6AM, succumbed to a stroke at a Long Beach, California hospital at about 1:30 PM on Saturday, May 25. Wallace began his career in electronics in 1909, but did not build his first transmitter until 1911. Soon he had obtained his ship radio operator's license and began working on a vessel traveling between Los Angeles and San Francisco. He obtained his First Class commercial license in 1912 and was issued the callsign 6OC. His career at Hamline College in Minnesota was interrupted by WWI when he entered the navy. After several assignments he wound up as the radio operator on board President Woodrow Wilson's yacht, the *George Washington*, which carried Wilson to the 1919 Versailles Peace Conference. After the war, he returned to college and then went to work for National Radio Products and was assigned to territory in the southwest. In the early 1930's, Don was instrumental in obtaining a 120 acre site in Palos Verdes, California for the Press-Wireless Corporation. In 1944, Press-Wireless moved to San Francisco and W6AM bought the decommissioned site and converted it into his now famous rhombic farm. Don was dubbed "Mr. DX" by his close friends and has been at the top of the DXCC Honor Roll for the past three decades, with 366 confirmed countries. Several years ago, at the opening of the commemorative amateur station aboard the *Queen Mary* in Long Beach harbor, it was W6AM who was invited to make the first contact; this writer was present to record the moment. Don Wallace is survived by two sons, a daughter and thousands of friends in the amateur fraternity worldwide who loved him, respected him and are sad at his passing."

Truly, a legend is gone from our midst, we will all miss him.

73, Alan, K2EEK

Ham Shop

FREE TO CQ SUBSCRIBERS

Advertising Rates : Non-commercial ads are 20 cents per word including abbreviations and addresses. Commercial and organization ads are 60 cents per word. Minimum charge $2.00. No ad (non-subscriber) will be printed unless accompanied by full remittance. Non-commercial ads free to CQ subscribers, as space permits, maximum 3 lines each. All ads must be typewritten double spaced. Recent CQ mailing label must accompany ad.

Closing Date: The 10th day in the third month preceding date of publication. Because the advertisers and equipment contained in Ham Shop have not been investigated, the Publisher of CQ cannot vouch for the merchandise listed therein. Direct all correspondence and ad copy to: CQ Ham Shop, 76 N. Broadway, Hicksville, NY 11801.

C-64 HAM SOFTWARE: Headings, MUF, Morse Trainer/Practice. Send SASE for information. ULTRA HAM SOFTWARE, Box 119, Macedonia, OH 44056.

QSL's 100/$12.95. WA4PRE, Jim's Printing Service, 2155 Young, Memphis, TN 38104 SASE.

TRANSCEIVERS: TICC-I Solid-state Transceiver, 10 to 80 meters, SSB, 100 Watts Output. All-American Telephone Supply Company, 18968 NE 5th Ave, Miami, FL 33179. Tel: 305-653-7505.

ANTENNAS: 3-Element Beams, Cubical Quads, Multi-band Verticals. All-American Telephone Supply Company, 18968 NE 5th Ave, Miami, FL 33179. Tel: 305-653-7505.

WANTED: Kenwood 6 meter and 2 meter converters, and aux. coil sets, for R-599 or R-499 receivers. State price, condition, and shipping. W8QXB via Callbook.

CASA MARCONI, INC. Pre-owned communication equipment. We buy and sell. 7189 S.W. 8 St., Miami, FL 33144, phone 305-264-8443.

HAMFESTERS 51st Annual Hamfest. One of the Midwest's largest. Sunday, August 11, 1985. Santa Fe Park, 91st and Wolf Road, Willow Springs, IL., Southwest of Chicago. Exhibitor Pavilion and the famous SWAPPERS ROW. Tickets: Gate $4.00, advance $3.00. Tickets available, check or MO, to HAMFESTERS, P.O. Box 42792, Chicago, IL. 60642. Talkin 146.52.

HEATH SSB STATION: HX-10, RX-1, Excellent, $295, offers. WA9HKA (219) 356-3459.

RECLAIM SILVER from electronics scrap! Write RALTEC, 25884C Highland, Cleveland, OH 44143.

HOUSE READY FOR HAM. Beautiful mountaintop all brick 4 bedroom, 3 full bath home and radio site on one acre landscaped, private, with huge inground pool. Located 55 miles from Washington, DC and 60 miles from Balitmore, easy commute by Amtrak or van pools. Extremely energy efficient brick home, full basement and other extra rooms, radio rooms. All cable, poles, antennas, fire alarm system, and intercom system stay. Must see to fully appreciate. Call or write to receive free written details of all features, $250,000. Phone (301) 371-7521. John Murray, Box 290, Jefferson, Maryland 21755.

HAM TRADER YELLOW SHEETS, in our 24th year. BUY, SWAP, SELL Ham Radio gear. Published twice a month. Ads quickly circulate—no long wait for results. SASE for sample copy. $10.00 for one year (24 issues). P.O. Box 356, Wheaton, IL 60189.

DESPERATE: Need manual or copy for COSMOPHONE 35 or 50 XCVR. Will pay. N2DDK, Charlie (718) 375-2066.

TWO 5¼" SS/DD Drives in cream cabinet with ps/fan/manual. $225 + shipping or B/O. Charlie (718) 375-2066.

HALLICRAFTER SX-62 FOR SALE, working well. Tel. (203) 966-7372.

COMMODORE 64 CW INSTRUCTOR PROGRAM. Generates C.W. on TV speaker. Random code, keyboard input, or prerecorded "CW Tests." Character speed and spacing set independently. Designed for classes and increasing code speed. $15.00—diskette or cassette (specify). N7BCU, Dennis Oliver, 22000 S. Tonya Ct., Beavercreek, OR 97004.

FOR SALE: GEM QUAD, NEVER USED. Two elements, complete with spider, fiberglass spreaders, wire & balun. Ten, 15, 20 meters & wire for 2 meter band. Handbook and instructions. US $165 or nearest offer. You pay shipping. VE7EHD, 604-265-3175.

HAVE AM CAPABILITY? Join SPAM (Society for Promotion AM). Membership is free. For free into send SASE to: SPAM, c/o F. Dunlap, WA5TWF, 14113 Stoneshire, Houston, TX 77060.

RUGGED CANADIAN TOWER—COMMERCIAL: Tower manufacturer is offering a heavy-duty self-support tower direct to Hams. Save big on direct order—save even more with exchange rate. Tower is capable of supporting up to 60 square feet of antenna. Don't miss the opportunity to buy a well-constructed tower at a super low price. Dealer inquiries invited. Trylon Towers, P.O. Box 186, 21 Howard Avenue, Elmira, Ontario, Canada, N3B 2Z6. Phone Number (519) 669-5421.

COMPUTER PROGRAMS for C-64. Menu driven logs for BCL/SWL. Update formats, QSL records, other. Disk or tape. Screen/printer. Send SASE for info & sample. W3GMG, P.O. Box 5624, Baltimore, MD 21210.

FOR SALE: HAM IV ANTENNA ROTOR, CDE, NEVER USED! In original carton with control unit and handbook. You pay shipping. US $199 or nearest offer. VE7EHD, 604-265-3175.

QSLs & RUBBER STAMPS—Top Quality! Card Samples and Stamp Information 50¢. Ebbert Graphics D-2, Box 70, Westerville, OH 43081.

IMRA-International Mission Radio Assn. helps missioners—equipment loaned; weekday net, 14.280 MHz, 2:00–3:00 PM Eastern. 1 Pryer Manor Rd., Larchmont, NY 10538.

KNOW FIRST! Ham radio fanatics—you need THE W5YI REPORT, a twice-monthly award-winning Hot Insider Newsletter. Acclaimed best! Confidential facts, ideas, insights, nationwide news, technology, predictions, alerts. Quoted coast-to-coast! We print what you don't get elsewhere! $18.00 annually w/money-back guarantee! FREE SAMPLE for S.A.S.E. (two stamps). W5YI, Box 10101-C, Dallas, Texas 75207.

FOR SALE. CQ/Ham Radio/QST/73 magazines @ 35¢ (thru 1975) and 50¢ (1976-up) each, including shipping. W6LS, 2814 Empire, Burbank, CA 91504.

CERTIFICATE for proven contacts with all ten American districts. SASE to W6LS, 2814 Empire, Burbank, CA 91504 brings data sheet.

CHESS PLAYERS! Enjoy radiochess. For information write K2VJ, Box 682, Cologne, NJ 08213.

CLANDESTINE CONFIDENTIAL NEWSLETTER: Latest info on secret broadcasters. Six issues $10 US, $13 foreign, US funds. RR4 Box 110, Lake Geneva, WI 53147.

CHASSIS AND CABINETS KITS: SASE K3IWK.

QSL the Best! Full Color, send $20 for 100. As low as $9. Free samples. Toll-Free credit card order line 1-800-531-7373. Since 1956. Rusprint, Box 7575, K.C., MO 64116. KA@CSR.

HALLICRAFTERS Service Manuals. Amateur and SWL. Write for prices. Specify Model Numbers desired. Ardco Electronics, P.O. Box 95, Dept. C, Berwyn, IL 60402.

ATLAS 350XL OWNERS GROUP. Free newsletter. Send QSL with rig s/n and SASE. Know people who repair them? Information to share? Questions? Rod Sharp, N5NM, Box 2169A, Santa Fe, NM 87504.

MILITARY RADIOS: R-390A, premier communications receiver, .5–30 MHz, 4 mechanical filters, meters sealed (Government removed) operation unaffected: complete/checked $175, complete/unchecked $115, spare parts unit (80% complete, missing PTO/power supply) $65. R-390A Manual reprint $5. CPRC-26 Manpack Radio, compact, transceives 46–54 MHz FM, 6 channels, with battery box, antenna, crystal, handset: $22.50 apiece, $42.50/pair. PRC-510 Backpack Radio (Canadian version of American PRC-10), transceives 38–55 MHz FM continuous tuning, with battery box, headset, antenna: $39.50 apiece, $77.50/pair. ARC-27 Guard Receiver, single channel 220-250 MHz AM: $12.50. R-108 Vehicular/Field Receiver, 20–28 MHz FM: $27.50. 45-Day Replacement Guarantee. Add $9.50 shipping-handling (except R-390A, shipped actual charges collect). Baytronics, Dept. CQ, Box 591, Sandusky, OH 44870.

AMATEUR radio exhibit of National, Hallicrafter, and other early receivers, including broadcast. Early parts and tubes. Spark and tube-type transmitters, telegraph station, and keys. Write: Bruce Kelley, W2ICE, RD #3, Holcomb, NY 14469.

WANTED: Older model bugs, unusual bugs, and miniature hand keys. State price, condition. Dave Ingram, K4TWJ, Rt. 11, Box 499 #1201 South, Birmingham, AL 35210.

FREE SUBSCRIPTION—THAT'S RIGHT. We will send you a FREE one-year subscription to "THE SWAP LIST" . . . the national publication where you can sell your used equipment FAST. To get your FREE SUBSCRIPTION just send us an ad of 30 words or more selling used Radio, Computer, or Electronic Equipment. Personal ads are 25¢ a word; Business ads are 50¢ a word. Mail to: THE SWAP LIST, BOX 988-C, EVERGREEN, CO 80439.

AAA Wanted: Radio Tubes (2A3, 45's, 50's, 202, 211, 845, VT-52, VT-62). Western Electric Tubes, Amps, Mixers, Consoles, Tweeters, Drivers, Horns, Speakers, Parts, etc. Tannoy Speakers & McIntosh or Marantz Tube-Type Amps. Tel: 818-576-2642. David Yo, P.O. Box 832, Monterey Park, CA 91754.

QUADS * QUADS * 2, 3 & 4 Element Kits. Also components, Fiberglass Spreaders, Spiders, Wire, etc. (3) $.20 stamps for complete brochure. db + ENTERPRISES, Box 24, Pine Valley, NY 14872, phone 607-739-8480.

WANTED: Old tubes, speakers, amplifiers, by Western Electric, RCA, Cunningham, Telefunken, Genalex, DeForrest, Mcintosh, Marrantz, Tannoy, JBL, Quad. Telephone 713-728-4343, Maury, 11122 Atwell, Houston, TX 77096.

CIRCLE 72 ON READER SERVICE CARD

ROSS $$$$ USED August SPECIALS: (OVER 200 USED ITEMS IN STOCK) KENWOOD TS-130S $469.00, TR-2400 $169.90, TS-180S $429.00, TR-9500 $459.00, TS-820 $399.90, TS-820/DIG $499.90, ROBOT 800 $239.90, 800C $339.00, 400H-RGB $389.00, YAESU FT-101F & FR-101 $569.00, FT-301D $369.00, FT-620B $279.00, ICOM IC-280 $189.00, IC-551D/WFM $579.90, IC-send SASE, Call letters, name & phone # for used list. Over 6,500 NEW ham related items in stock. MENTION AD. PRICES CASH, FOB PRESTON. WE CLOSE AT 2:00 ON SATURDAYS & MONDAYS. ROSS DISTRIBUTING COMPANY, 78 SOUTH STATE, PRESTON, ID 83263 (208) 852-0830.

ROSS $$$$ NEW SPECIALS (August only): If you don't see what you want, send Call letters, name & phone # for personal quote. Over 6500 ham-related items in stock. ICOM # IC-735, $729.90, IC-45A $299.90, IC-745 $768.90, IC-O4AT $285.90, IC-271A $529.90, KENWOOD # TS-940S/WAT $1699.90, TH-21AT $194.90 TR-8400 $379.90, TR-7950 $356.90, TS-430S $667.90, TM-211A $299.90, DFC-230 $169.90, TW-4000A $504.90, TS-660 $759.90, YAESU # FC-102 $239.90, FT-757GX $698.50, FT-708R $229.90, FRG-7700 $369.90, FRG-8800 $589.00, FRG-9600 $486.90, FT-230R $239.90. All major lines stocked, L.T.O. MENTION AD. PRICES CASH, FOB PRESTON. WE CLOSE AT 2:00 ON SATURDAYS & MONDAYS. ROSS DISTRIBUTING COMPANY, 78 SOUTH STATE, PRESTON, IDAHO 83263 (208) 852-0830.

THE CANADIAN AMATEUR magazine carries up-to-date Canadian regulations for DXpeditioners to VE/VO/VY, columns on DX, AMSAT, VHF/UHF, Microwaves, packets, contests. Technical projects, serialized books, tutorials. Eleven issues $20, Box 855, K6A 3C9 Canada.

DESPERATELY NEED GE Portamobil Power Supply 4EP47A11 12 volt; also GE-PM mikes. Ad Franjul, 8 Kittredge St. #16, Roslindale, MA 02131.

TOO MANY MICROPHONES ON YOUR OPERATING DESK? With the SISCO Model 612 Mic control you can now use one microphone with several rigs. Prices start at $15.95. Southern Instrumentation, P.O. Box 5097, Ormond Beach, FL 32074, phone 904-673-1059.

RADIO AMATEUR AWARDS DIRECTORY OF THE WORLD 1985 REVISED EDITION: $8 US to Stateside, $10 to DX, from VE3XN, Garry Hammond, 5 McLaren Ave., Listowel, Ont., Canada N4W 3K1.

REPLACE RUSTED ANTENNA BOLTS WITH STAINLESS STEEL. Small quantities, free catalog. Elwick, Dept. 550, 230 Woods Lane, Somerdale, NJ 08083.

"FREE PRE-TESTING" ICOM ICR-71/A $639.50. Kenwood R-2000 $479.50. Sony 2010 $279.50. Regency MX-7000 $449.50, MX-5000 $369.50, HX-2000 $369.50, HX-1000 $239.50, BC-300 $359.50. Radio Tap $129.50!! Panasonic, MFJ, CBs, Coax, Antennas, MUCH MORE!! WE PRE-TEST BEFORE SHIPPING!! FREE UPS SHIPPING & INSURANCE TO 48 STATES. 25-page picture catalog $1.00 (REFUNDABLE). GALAXY ELECTRONICS, Box 1202, 67 Eber Ave., Akron, Ohio 44309, (216-376-2402) 9–5 pm EST.

FREE SHIPPING. Continental USA, MINI-QUADS $139.95, BUTTERNUT HF6V's and HF2V's and accessories, MOSLEY TA33's $239.95, NYE MB-V-A tuners $468.00, DIPOLE KITS, etc. Stamp for flyer. Don, HART EASTERN COMMUNICATIONS, 1444 Darlington, Derby, NY 14047 (near Buffalo), 716-947-4840.

APPLE USERS Contest log. CQWW and CQWPX. Menu-driven routines. Automatic points, multipliers, and dupes. Prints log complete with final score. Delivered ready for your country. Single or dual drive. Disk with both programs $25.00. Outside Europe add $2.00 s/h. LA8DY, Leif Nielsen, Geiterasen 16, 4630 Soegne, Norway.

HEATH HW-101/P.S. $250.00. Filter schematic for HBO descrambler $2.00 and SASE J.C., P.O. Box 6349, Evansville, IN 47712.

NATIONAL NCL-2000 linear amp, 10 to 80 meters, mint, plus two new RCA spare 6122 tubes, $600. Sencore VA-48 in original carton, manuals, etc., like new, $750. W1HFL 878-7333 (Milford, CT).

On April 25, 1985, Kenwood model TR-7950 Transceiver S/N 5050504, was stolen from the automobile of WA2VYA while it was parked in the parking garage at his apartment complex. Please contact Frank L. Widmann, 114 Haddonfield Commons, Haddonfield, NJ 08033 or Patrolman Gasparovic, Police Headquarters, Borough of Haddonfield, 242 Kings Highway East, Haddonfield, NJ 08033, if you can provide information leading to the recovery of the equipment.

FACTORY FRESH GE 6146B's in matched sets. $25 per pair, $36 per trio. 12BY7A or 6CL6 driver included $4.50 additional ppd USA. Spencer Tube Co., RD2 Box 24, Corning, NY 14830.

WANTED by church: Amateur radio club parts for high-power all-band AM/CW transmitter. Call Bill at 714-986-3515.

DENTRON G.L.A.-1000 w/10 meters, excellent, $200 ppd. KD5ZE 501-856-3784.

YAESU FRG-7000 with all Radio West mods-mint; make offer. 609-358-6951.

FOR SALE: Drake R7 receiver w/noise blanker $700. Infotech M200E RTTY/Morse decoder $150. JIL SX-200 scanner $100. John Washburn, 2008 Dimond Dr., Anchorage, AK 99507-1312; phone 907-563-7356.

FOR SALE: HP Dual Trace Scope Mod. H 12-175A, Heathkit SW101 SSB transceiver/power supply/speaker, Realistic PRO 2001 scanner, sine-square wave generator, Heathkit RC bridge, dip meter, tubes, transformers, components, more. Best offer takes all. Bob Friedman, KB4DKW, 5218 Kerley Rd., Apt. B-9, Durhan, NC 27705, phone 919-493-1057.

ANTIQUE RADIOS, SCHEMATICS, TUBES & LITERATURE send $1 to VRS(CQ), 376 Cilley Rd., Manchester, NH 03103 for large catalog.

HAMSWAP Newletter: Send us your FREE AD. Include phone BUY/SELL/TRADE. Subscriber equipment DISCOUNTS. 12 issues $9.00. HamSwap, P.O. Box 420171, Sacramento, CA 95842.

QTH FOR RENT near Washington, D.C. in Northern Virginia, 4-bedroom brick home and garage, 5-minute walk to Ballston subway. 60' tower, 3-element beam, ½ acre, fenced yard. Karl, K4YT, Arlington, VA. Phone 703-525-0485 evenings.

HEATHKITS professionally assembled. Send for quote. K4TL, 306 W. Amherst, Melbourne, FL 32901.

Wanted: Front panel for Heathkit SB-630 Station Console. DE WB9RJY, Earl M. Schultz, 904 21st St. #33, Lincoln, IL 62656.

HELP: Junior High School needs donations of Ham/SWL equipment, FM 2 mtr xcvr, cassettes, books. G. Skloot, c/o JHS 180, 320 B 104 Street, Rockaway Park, NY 11694.

HELP: Need 4-section electrolytic can capacitor 20-20-20-30 mf @ 650 volts. Schramm/KA2JLC, 28-28 35 St., LIC, NY 11103.

VERTICAL VIBROPLEX and other telegraph instruments wanted. Dick Randall, K6ARE, 1263 Lakehurst Rd., Livermore, CA 94550.

WANTED: ICOM 25-A transceiver. FOR SALE: Heath HW-32A/HP13A, Johnson Invader, Hallicrafters SX-100. Mike Ludkiewicz, 143 Richmond Rd., Ludlow, MA 01056.

SELL: Tektronix scopes Model 516, only $100 plus shipping. 45 year collection vacuum tubes. M. Levy, 4141 Krupp Drive, E.P., TX 79902, tel. 915-532-2509.

WANTED: Drake MN2700 Antenna Tuner. WF4V, 403 Juniper Rd., Port Richey, FL 33568.

DRAKE LINE SALE: Mint TR-4 w/NB, RV-4, AC-4, MS-4 Super clean w/manuals $450. SSR-1 solid state gen. cov. rcvr. w/ manual, low mileage, $130. KA1BFV, 31 Duane Ln., Burlington, CT 06013.

HEATH SB-102 Transceiver w/400 Hz CW filter, new finals, factory aligned, PS, spkr, SB-630 Station Console, manuals. $350 I ship. Call John, KD7WS, 206-782-1147 eves.

SALE OR TRADE: Info Tech keyboard and converter, models 75 and 150 with manuals, $200.00 or trade for a general-coverage receiver. Joseph Schwartz, 11 Windham Loop, 1JJ, Staten Island, NY 10314. Phone (718) 698-8069.

G3SUQ: Does anyone know the whereabouts of Bill's logs when he was VS9AWR? G. Skloot, KE2N, 2923 Mandalay Beach Road, Wantagh, NY 11793.

HEATHKIT IM-2410 frequency counter, $58.00. HM-2140 Wattmeter/SWR, $42.00. Both like new. WB7VOO, 602-298-4820.

WANTED: Yaesu FTV-707 or FTV-700 transverter with 435 MHz module. Please contact me: LU8MAD, G. Garcia, Cabildo 584, (5521) Mendoza, Argentine.

WANTED: Tower sections or tower, reasonable price, 2.1–3.0 MHz. Command Transmitter, plastic QSL card holders of type that have twenty insert pockets each. D. L. Barrett, WA7MEL, 10321 Violet Dr., Sandy, Utah 84070. Tel. (801) 572-2707 or radiogram via National Traffic System.

WANTED: Back issues of Sinclair/Timex computer magazines. Fred Gunther, K7FG, 1402 W. Craig, Moses Lake, WA 98837.

DRAKE TR 7, DR 7, PS7, SP7, MIC., ALL CW FILT. AUX 7, SP. PROC; MARS-FREQU. $795. Phone 213-377-5566.

WANTED: Antique radios, tubes, horn speakers, pre-1939. State price and condition. Howard Stone, HCR-3 Box 418, Deer River, MN 56636.

WANTED: Coaxial Antenna Changeover Relay, such as B&W 377 or CR 115. Q. R. Galbraith, K5TVC, 4303 Kingsway Dr., Farmington, NM 87401.

SELL/TRADE: Ranger $50, Viking T/R Switch $10, Valliant M/O, Knight T-60 $30, Knight T-150A $50, HW 100 $150, HP 23 $25, HP 13 $20, HG 10 W/PS $50. WB4PFY, Joe, 9834 Elm Way, Tampa, FL 33615, phone (813) 885-2956.

REGENCY HX-1000 Scanner, nice, $190. Sony ICF-6500W 5 band receiver, 6 months old, $85. I will pay shipping. Fred Allen, Box 1771, Grand Forks, ND 58206-1771 (tel: 701-746-0073).

HELP! I need programs of high resolution graphics and past loading for TS1000. (Shop, swap, or free.) LU8MAD, G. Garcia, Cabildo 584, (5521) Mendoza, Argentine.

FOR SALE: Drake Twins, R4B, T4X, AC4/MS4, manuals, cables & extra xtals. Excellent condition, $325. Mel Toren, W2GMA, 1762 Larkspur Rd., Cherry Hill, NJ 08003, phone (609) 795-3295.

USED/UNUSED electronic parts, must liquidate large selection of unused electronic hardware; screws, washers, nuts, etc. Free list. Mote, Rt. 3, Box 631, Ontario, OR 97914.

DIGITAL DISPLAY for Collins "S" Line by Grand Systems $75. Joe Adinolf, WB6ZWS, 1028 Fairview Road, Ojai, CA 93023.

CX7 with many improvements. $3400. Mark Mandelkern, 2315 Derby St., Berkeley, CA 94705, phone 415-549-9210.

SELL: Yaesu YP-150 dummyload wattmeters $50. Heathkit HW-12, HW-22, PS, $45 each. New Kenwood VFO-240 $125. 10-420 MHz signal generator $35. Brad Hyde, 1106 Duvall, Killeen, TX 76541. Phone (817) 699-7817.

CLANDESTINE CONFIDENTIAL NEWSLETTER: Latest info on secret broadcasters. Six issues $10 US, $13 foreign, US funds. RR4 Box 110, Lake Geneva, WI 53147.

FOR SALE: Hammarlund Receiver Model HQ-129-X, good operating condition. $50, you pay shipping. Phone 716-825-3287.

TRADE my mint TEN-TEC ARGONAUT 505/PS for your TRITON. SASE for list of other equipment. Joe Bedlovies, 241 Dover Street, Bridgeport, CT 06610.

FOR SALE: Yaesu FL-110 200 watt amplifier, 160–10 meters, AM/CW/SSB, 1 to 15 watts drive, works great with HW8/Argonaut, $185. C. Bright, 4115 Buckley Ridge, St. Louis, MO 63125.

HEIL EQUALIZER, new $32. Two transmatches, 160–10 meters, 2 KW, $100 each. Hal 914-963-0689.

Advertiser's Index

The Yaesu FT-209RH. 5 watts that your batteries can live with.

Have the power you need when you need it with Yaesu's new 5-watt, 2-meter handheld. Power to get out in situations where ordinary HTs just won't make it.

We designed our HT with a unique user-programmable Power Saver that puts the rig to "sleep" while you're monitoring and "wakes it up" when the squelch breaks. So you can listen for hours and still have plenty of power to hit those hard-to-reach repeaters when you need to.

With the FT-209RH there's no need to fiddle with knobs when you change from one memory channel to another. That's because you can independently store everything you need in each of the ten memories: receive frequency, standard or non-standard offset, even tone encode/decode with an optional module. And then recall any channel at the touch of a button.

It's easy to hear what's happening on your favorite repeaters or simplex frequencies. Just touch a button and scan all memory channels, or selected ones. Or all frequencies between any two adjacent memories. Use the priority feature to return automatically to your special frequency when it becomes active.

Bring up controlled-access machines with the optional plug-in subaudible tone encoder/decoder, independently programmed from the keyboard for each channel. Listen for tone-encoded signals on selected channels—without having to hear a bunch of chatter—by enabling the decode function.

The FT-209RH, which covers 10 MHz for CAP and MARS use, comes complete with a 500-mAh battery, charger and soft case.

For those who want a basic radio without the bells and whistles, consider the compact, lightweight FT-203R. This economical HT features 2.5 watts of power and an optional DTMF keypad. Most all the accessories for the 209 work with the 203, including an optional VOX headset that gives you hands-free operation that's perfect for public service events.

So when you visit your dealer, let him know you won't settle for anything but the best. A radio built by Yaesu.

YAESU

Yaesu Electronics Corporation
6851 Walthall Way, Paramount, CA 90723
(213) 633-4007.

Yaesu Cincinnati Service Center
9070 Gold Park Drive, Hamilton, OH 45011
(513) 874-3100.

CIRCLE 141 ON READER SERVICE CARD

Prices and specifications subject to change without notice.

FT-209RH shown actual size.

FT-203R transceiver.

ICOM 2-Meter Mobile

IC-27H

Compact Size No Compromise

Now ICOM offers the best choices in compact 2-meter FM mobiles...the IC-27H 45-watt compact and the IC-27A 25-watt ultra compact mobile.

Size. The ICOM IC-27A and IC-27H measure only 5½"W x 1½"H x 7"D (IC-27H is 9" deep).

Easy to Operate. Even though the IC-27A and IC-27H are the smallest mobiles they have large operating knobs which are easy to use in the mobile environment.

32 PL Frequencies. The compacts come ready to go with 32 PL frequencies.

Internal Speaker. The compacts feature an internal speaker which allows the mobiles to be mounted in a variety of compact locations.

9 Memories. The compact mobiles have 9 memories which will store the receive frequency, transmit offset, offset direction and PL tone. All memories are backed up with a lithium battery.

Speech Synthesizer. To verbally announce the receive frequency, an optional UT-16 voice synthesizer is available.

Scanning. The ICOM compacts have four scanning systems...memory scan, band scan, program scan and priority scan. Priority may be a memory or a VFO channel...and the scanning speed is adjustable.

More Features. Other standard features include a mobile mount, IC-HM23 DTMF mic with up/down scan and memory scan and internally adjustable transmit power.

An optional IC-PS45 slimline external power supply and IC-SP10 external speaker are also available.

See the IC-27A/H compact mobile transceivers at your local ICOM dealer. For superb performance and reliability your only choice is an ICOM.

Also Available are the IC-37A 220MHz and IC-47A 440MHz 25 watt compact mobiles.

CIRCLE 121 ON READER SERVICE CARD

ICOM

First in Communications

ICOM America, Inc., 2380-116th Ave NE, Bellevue, WA 98004 / 3331 Towerwood Drive, Suite 307, Dallas, TX 75234